

NEWSLETTER



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Wadden Sea Newsletter 2005 - No.1

SCHIERMONNIKOOG 2005

10th Trilateral Governmental Conference on the island of Schiermonnikoog _____ 2
By Jens Enemark

Keep on going! Position statement of the nature NGOs _____ 4
By Hans-Ulrich Rösner

Wadden Sea fishing industry please with integrated management strategy _____ 6
Joint statement by the Dutch, German and Danish fishing industry

Wadden Sea Forum - Stakeholder participation, sustainable development and Integrated Coastal Zone Management _____ 7
By Folkert de Jong

International Wadden Sea School - Trilateral education supports long-term protection of the Wadden Sea _____ 9
By Anja Szczesinski

MONITORING AND RESEARCH

Wadden Sea Quality Status Report 2004 ____ 11
By Karel Essink and Harald Marencic

Alien species in the Wadden Sea - A challenge to act _____ 13
By Stefan Nehring and Frank Klingenstein

Perishing blue mussels and invading aliens - What are the reasons for ecological turnover in the Wadden Sea ? _____ 17
By Georg Nehls, Susanne Diederich, David W. Thielges and Matthias Strasser

Highlights of breeding birds in the Wadden Sea in 2003 and 2004 _____ 21
By the Joint Monitoring Group of Breeding Birds (JMBB)

Counting Harbour Seals in the Wadden Sea in 2004 and 2005 - Expected and unexpected results _____ 26
By the Trilateral Seal Expert Group (TSEG)

LANCEWADPLAN - Passing the treasure ____ 28
By Manfred Vollmer

The HARBASINS project _____ 30
By Herman Mulder

CONFERENCES AND MEETINGS

Coastal salt marshes throughout the world - Significances and mechanisms in life histories of waders _____ 31
By Stefan Thyen, Klaus-Michael Exo, Harald Marencic, Nadine Oberdiek, Jennifer Smart and Martin Stock

Monitoring and Assessment in the Wadden Sea - Foundations and perspectives _____ 34
By Karsten Laursen, Karel Essink and Harald Marencic

NEW PUBLICATIONS _____ 36

Cultural-historic portrait of the Wadden Sea region

Solutions for sustainable coastal protection

Migratory birds in the Wadden Sea

Quality Status Report

Contaminants in bird eggs in the Wadden Sea

Vegetation of the East-Frisian islands

Salt marshes in Schleswig-Holstein

CALENDAR OF EVENTS _____ 40

NOTES FOR CONTRIBUTORS _____ 41

Schiermonnikoog Conference 2005

Jens Enemark, Common
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Schiermonnikoog 2005: The 10th Wadden Sea Conference



The 10th Trilateral Governmental Conference on the Protection of the Wadden Sea was held on the Dutch Wadden Sea island of Schiermonnikoog on 2-3 November 2005 under the chairmanship of the Dutch Minister for Agriculture, Nature and Food Quality, Cees Veerman. The German and the Danish governments were represented by Parliamentary State Secretary Simone Probst and Deputy Director General Anne-Marie Rasmussen.

The 10th Ministerial Conference already. The first was held in 1978 in The Hague. 2 years ago 25 years of trilateral Wadden Sea Cooperation was celebrated at "Schloss Gödens". The Wadden Sea cooperation is one of the 'older ladies' in the

international community of nature protection cooperation. Much has been achieved in the past generation, much to be proud of. World-wide the Wadden Sea protection and management and the trilateral cooperation ranks as a model for transboundary cooperation over the comprehensive protection of shared nature areas. Ministers' conferences are the key occasions. They set out the agenda for the cooperation for the next 4-5 years.

The Schiermonnikoog Conference was novel in one regard. It was the first time that a ministerial conference had been held on an island. The conference literally occupied the island for a couple of days under excellent meeting circumstances. It was an extraordinary experience for the participants to meet at a location so to speak surrounded by the Wadden Sea, easy to relate to the issues discussed at the conference.

World Heritage Site nomination

The Schiermonnikoog Conference will publicly be remembered as the conference where a start was made with the actual nomination of a major part of the Wadden Sea. After the preceding consultations, Germany and The Netherlands will now make a start with the nomination procedure. The procedure will be open for an extension during the

Signing of the Schiermonnikoog Declaration. From left to right: State Secretary Simone Probst (Germany), Jens Enemark (Secretary), Minister Cees Veerman (The Netherlands, chairperson), Deputy Director General Anne-Marie Rasmussen (Denmark). (Photo: M. Vollmer)





Observers during the Schiermonnikoog Conference (Photo: M. Vollmer).

procedure and also after a successful nomination. This is called a serial nomination in the UNESCO World Heritage Site terminology. It is anticipated that the procedure leading up to an inscription in the World Heritage List will take 2.5 to 3.5 years. The nomination procedure is strictly codified. Nominations can be made each year until 1 February and the cycle leading up to the inscription takes almost 18 months, i.e. the World Heritage Committee which decides on the inscriptions will take a decision in June/July the year after the submission of the nomination dossier.

Wadden Sea Forum continues

A further issue discussed at the meeting was the report of the Wadden Sea Forum installed at the previous conference in Esbjerg in 2001 under the chair of the Queen's Commissioner of Fryslan Ed Nijpels. The report of the Wadden Sea Forum "Breaking the Ice" (see article in this issue) was welcomed by the conference and it was decided to continue the work of the Forum in the next period under the chairmanship of the chairman of county council of Ditmarschen, Jürgen Klimant. A primary task of the Forum will be to implement the action plan which it has drawn up on the basis of the strategy encompassed in "Breaking the Ice".

A key element in the work of the cooperation in the next period is the further development of the Wadden Sea Plan. The designation of the Natura 2000 areas in the Wadden Sea area has now been largely concluded, as has the designation of the coastal areas of the Water Framework Directive and the time has therefore come to develop the Wadden Sea Plan into a management plan in the

sense of the Habitats Directive and other directives. This is wholly in line with the intentions of the Joint Declaration 1982 which remains the basis for the cooperation. European Union legislation constitutes the overall main framework for the cooperation and the further development of the Wadden Sea Plan will ensure that this will be carried out in a coordinated way.

Shipping Safety

Another issue discussed was shipping safety. A package of measures was adopted and agreement was reached to focus on a number of areas in the forthcoming period, such as emergency towing and pollution response.

Wadden Sea School

The International Wadden Sea School will be continued until the next conference. The IWSS was launched on the occasion of the 25 year cooperation two years ago and has been a successful project to link schools and students from the area for a future sustainable conservation of the Wadden Sea as a shared area.

Next conference

The 11th Wadden Sea Conference will be held in Germany in spring 2010.

The Schiermonnikoog Declaration can be found on www.waddensea-secretariat.org

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Keep on going! Position statement of the nature NGOs

It is not easy to cooperate for 27 years and still keep the same speed of progress as in earlier years. Indeed, the Wadden Sea world has not greatly changed since the 10th Trilateral Governmental Conference (TGC) finished its work. Some have even said that nothing important has been decided upon. I do not agree and would like to focus attention on a number of important issues where progress in the sense of coming closer towards the Trilateral Cooperation's targets has been made.

1. Improving shipping safety

After the formal designation of the Wadden Sea as a PSSA ("Particularly Sensitive Sea Area") after the last TGC in 2001 and no less than 35 recommendations to improve shipping safety by the Wadden Sea Forum (WSF) in 2004 the issue became central at the TGC. Though the recommendations of the WSF are only partly reflected in the Ministerial Declaration (MD), six action points were highlighted. These are spatial planning in the North Sea adjacent to the Wadden Sea, day-to-day joint cooperation between the shipping safety administrations of the three countries, appropriate emergency towing and pollution response capacities, the practical implementation of Places of Refuge, the harmonization of the no-special-fee-system and aerial surveillance. Indeed, these are among the most important fields of action which can be undertaken on the Wadden Sea level, besides others at the EU and the IMO level. Also, by declaring "The safety of shipping in the North Sea Area should be kept at least at the present level, irrespective of what kind of offshore development might occur, and where feasible be enhanced" the governments were setting a standard which in the light of coming developments may become very important.

2. Decision to implement the International Wadden Sea School (IWSS)

After a successful 2-year pilot phase the IWSS will be implemented. This reflects the important role young people will play in the future of the Wadden Sea. It can now be expected that education will constitute a new and important element in the Trilateral Cooperation (see page 9).

3. Developing the Wadden Sea Plan (WSP)

The WSP will be updated and then incorporate the requirements of various EU directives (e.g. Birds, Habitat, Water). This is quite ambitious and can also be seen as a chance to reduce bureaucracy to the necessary level: As the Wadden Sea is a transboundary nature area, it makes little sense to implement the EU directives concerning the environment in different ways in the different countries, possibly ending up with dozens of management plans for small parts of the area or even completely different management plans according to different directives, each setting its own goals. Beside a clear and focussed legal framework in line with the trilateral principles and targets, it is also in the interest of nature conservation that the rules are understood and accepted by everybody with a stake in the area and not hidden in mountains of paper.

4. Continuing the Wadden Sea Forum (WSF)

Today there are signs of an increasing involvement of many stakeholders. The Wadden Sea is being perceived more and more as a common region, also with regard to other issues than nature conservation and in a larger geographical context than the formal trilateral cooperation area. For this extended area, the term "Wadden Sea Region" has been defined by the WSF and proposals for the sustainable development of that region have been developed. Even if these might not fully reflect what should by definition be "sustainability", it was an important step forward. The WSF was also a platform to talk to each other. Altogether, this is a promising development, which needs to be continued towards an Integrated Coastal Zone Management. The conservation goals and principles for the actual Wadden Sea Area, which were also accepted by the WSF in its vision, must remain unchanged and should be strengthened by this process. The way to continued and cooperative stakeholder work is now open, after the TGC in general appreciated the WSF results, linked many of the MD's paragraphs to the WSF report and suggested a continuation of the WSF.

5. Starting a process for World Heritage nomination

Certainly the Wadden Sea is worthy of becoming a UNESCO World Natural Heritage Site. However, after having discussed this option for 14 years it was time to bring the issue forward. The TGC has done this, though the nomination process will now be for the area from the River Eider (S-H) to Den Helder (NL) only, because a nomination has not been supported yet in the northern Wadden Sea. However, it would certainly be much more appropriate to list the entire Wadden Sea as a World Heritage Site and it was therefore a wise decision of the TGC to leave the door open for Nordfriesland and Denmark to enter the nomination process later if they wish.

6. Monitoring to be continued

The "Trilateral Monitoring and Assessment Programme" (TMAP) was one of the milestones the Trilateral Cooperation decided upon in previous years. It is important that the TGC has now confirmed the programme, improved the data handling and will also incorporate the monitoring needs of various EU directives (including the Water Framework) into TMAP.

7. "Best Environmental Practices" in coastal defence

A study by the CPSL ("Working Group on Coastal Protection and Sea-Level Rise") describes "Best Environmental Practices" in coastal defence in the Wadden Sea. These practices were not always well known and/or chosen in the past. By welcoming the CPSL recommendations the TGC underlined what is already European law, i.e. the most environmentally friendly way in coastal defence must be chosen (e.g. sand nourishment instead of stone walls at certain sites).

8. Cooperation with West Africa

The TGC also looked beyond the Wadden Sea. Many of our Wadden Sea birds need coastal areas at the West African coast during winter just as they need the Wadden Sea for certain periods in the year. Therefore, it can also be considered protection of the Wadden Sea that the TGC decided to support, jointly with WWF, concrete activities of mutual conservation interest in the West African countries.

Not only progress

Unfortunately, there was not only progress at the TGC. This concerns in particular the handling of offshore wind farms and the protection of Harbour Porpoises:

Offshore wind farms

The MD seems to exclude wind turbines from the 12 seamile zone, which was – among others – suggested by the WSF. However, looking at the exceptions in Denmark and Niedersachsen, there will not really be an exclusion. Also concerning the construction of cables the MD describes roughly the status quo but does not – as would have been necessary – make clear, that 1. the conservation area should be avoided to the largest possible extent, 2. cables should preferably be laid in already disturbed areas such as waterways and sea channels, and 3. high standards are required in terms of cable bundling.

Harbour Porpoises

The protection of the only Wadden Sea whale species was listed during the preparation of the TGC as one out of seven "politically important issues" up to one year ago. Therefore, the TGC should have agreed about protection of the harbour porpoise against incidental bycatch at least in the Wadden Sea, e.g. in the whale sanctuary west of Sylt. However, having not agreed on a common opinion, the MD unfortunately does not even mention this fascinating species. This is the less understandable as all three countries are members of an international agreement to protect such species.

Altogether, the Trilateral Cooperation on Schiermonnikoog proved its value in its 27th year. Much has been achieved in this time, such as an increase of naturalness in saltmarshes, a stop of further embankments, and a ban on hunting waterbirds. Also the economy has been stabilized, as North Sea tourists love nature and most inhabitants of the Wadden Sea area make their living from tourism. In other words: the Wadden Sea with all its beauty and uniqueness would look different today without this cooperation. Keep on going!

Position statement of the nature NGOs:
www.wwf.de/imperia/md/content/pdf/37.pdf

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Joint press release of the Dutch, German and Danish fishing industry*

Wadden Sea fishing industry pleased with integrated management strategy

The Dutch, German and Danish fishing industry welcome the progress made at the 10th Trilateral Government Conference on the protection of the Wadden Sea at the Dutch island of Schiermonnikoog. For the first time, the trilateral co-operation makes a true attempt at balancing the protection of the Wadden Sea with the interests of people living, working and recreating in the area. The trilateral fishing industry is therefore pleased that the Wadden Sea Forum will continue until the next conference to translate its work on sustainable socio-economic development of the Wadden Sea region into concrete actions. Concerns remain as regards to the World Heritage nomination and negative effects of large scale infrastructural projects on the Wadden Sea ecosystem.

Fishermen support the protection of the Wadden Sea. Many fishermen and coastal communities depend on these waters. The Wadden Sea supports important fisheries for shrimp, cockles and mussels. It is also an important nursery for North Sea fish. The trilateral fishing industry firmly believes in the concept of sustainable fisheries. Europêche representative Johan Nooitgedagt stresses on behalf of the trilateral fishing industry: "Realizing sustainable fisheries not only depends on the fishing industry, but also on the willingness of the respective governments and non-governmental organizations to change existing management regimes to achieve continuous improvement. I am extremely pleased that the Wadden Sea Forum has taken up this challenge and has developed a comprehensive action plan for sustainable socio-economic development. The ministers have secured the forum's follow-up in the coming years, thereby acknowledging that only an integrated coastal zone management strategy will balance the need for nature protection with the needs of society. We wholeheartedly support this".

The trilateral fishing industry regrets that the UNESCO World Heritage Site nomination will only apply to parts of the trilateral co-operation area. "The trilateral Wadden Sea Plan sets conservation goals for the entire Wadden Sea area and management has been brought in line with these goals. We believe it is a negative signal to user groups in the area, particularly in the case of trans-boundary activities such as fisheries, if some parts of the Wadden Sea get what is essentially an

award while other areas under the same management agreements don't. A level playing field is not only needed in fisheries regulations, but also in the larger management framework", says Johan Nooitgedagt. The fishing industry is also concerned that the World Heritage Nomination will eventually lead to further restrictions.

A future challenge to integrated management is the Dutch plans to expand the Port of Rotterdam through a land reclamation project. Earlier this year, the highest Dutch court granted an appeal by the fishing industry ruling that the potential impacts on the Wadden Sea from this project had not been properly assessed according to the Habitat Directive. The fishing industry argued that the land reclamation will have negative effects on the flow of fish larvae into the Wadden Sea and the development of fish and shellfish stocks in the area.

Not only would such effects have direct negative consequences for fishing opportunities, but also for the development of several bird populations in the Wadden Sea. The project is now halted until the results of a so-called Appropriate Assessment are available. The trilateral fishing industry is surprised that this project has hardly been on the agenda of the trilateral co-operation so far and has urged the ministers to keep the further developments under close scrutiny. In this context, it also draws attention to potential adverse effects of other infrastructural developments such as the construction of Jade-Weserport Harbour and the development of large scale offshore wind parks just outside the Wadden Sea.

* Joint press release by:

Europêche, Trilateral Association of Shrimp Producers' Organisations, Productschap Vis, Nederlandse Vissersbond, Federatie van Visserijverenigingen, Producentenorganisatie van de Nederlandse Mosselcultuur U.A., Producentenorganisatie van de Nederlandse Kokkelvisserij U.A., Producentenorganisatie van de Schelpdiervisserij Noordzee U.A., the Dutch association for non-mechanical cockle fishermen, Stichting Ontwikkeling Duurzame Schelpdiervisserij, Nederlandse Bond van Garnalenkustvissers, Deutscher Fischereiverband e.V., Niedersächsische Muschelfischer GbR, Erzeugergemeinschaft der schleswig-holsteinischen Muschelzüchter e.V., Danmarks Fiskeriforening and Danske Fiskeres Producent Organisation.

Stakeholder participation, sustainable development and Integrated Coastal Zone Management

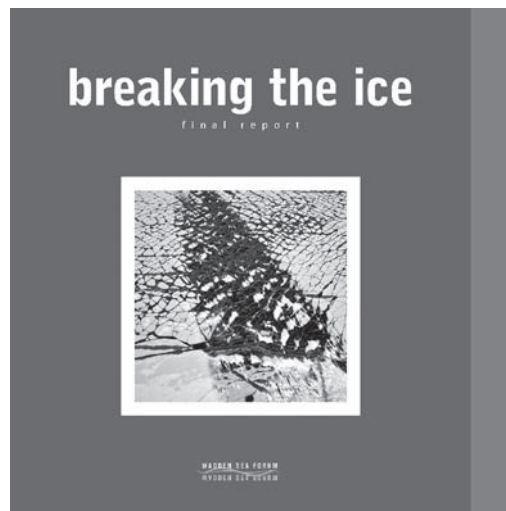
Folkert de Jong, Wadden Sea Forum Secretariat, Wilhelmshaven, FRG

The results of three years of Wadden Sea Forum work were presented to the 10th Wadden Sea Conference by WSF chairman Ed Nijpels. The achievements of the Forum were received very positively, both by the ministers and the invited speakers.

WSF started its work in 2002 with 41 members, representing the sectors of fisheries, agriculture, industry and harbours, tourism, energy and nature protection, as well as local and regional governments. By the end of 2004 the number of organisations involved had increased to more than 300. The task of the forum, formulated by the 9th Wadden Sea Conference (Esbjerg, 2001), was to develop proposals for sustainable development scenarios and strategies for their implementation.

WSF, which was co-funded by the Interreg IIIB North Sea programme, has been very successful in two respects. First, the WSF has opened up channels of communication and thus of mutual understanding and will turn out to be a valuable exercise for future co-operation and co-existence in the area. Second, WSF has identified various points of synergy between different sectors, such as energy and agriculture with regard to wind and biomass energy generation, tourism and nature protection, which agreed on a better promotion of the natural values, as well as industry, agriculture and fisheries regarding a common Wadden Sea brand.

WSF's final report "Breaking the Ice" contains an overall vision, objectives for the three dimensions of sustainability, proposals for themes of common interests, e.g. infrastructure, coastal protection and safety of shipping, as well as sustainability strategies for the sectors of agriculture, fisheries, tourism, energy and industry and harbours. The groundwork for WSF's overall vision and the sector strategies was done in five thematic working groups in which various scenarios for future development in Europe were elaborated and discussed. The time horizon was the year 2020. On the basis of these discussions strategy elements best suited to meet future demands for each of the sectors were selected. These strategy elements



were then tested for the three dimensions of sustainability, i.e., ecological, social and economic aspects relevant for the Wadden Sea Region. Finally, the resulting sustainability strategies for the sectors were compared with the existing legal and administrative regime and main obstacles for the implementation of the strategies identified. This identification process resulted in the formulation of a catalogue of recommendations to the 10th Wadden Sea Conference.

In developing the scenarios, the strategies and the recommendations, the Forum has made use of several detailed studies carried out by external experts. These include inventories of the socio-economic situation in the Region (employment, education, demography, etc.), an analysis of socio-economic perspectives, inventories and analyses of the legal regimes (for example with regard to shipping safety) and an analysis of developments of the concept of sustainability.

The work of WSF fits very well into topical developments with regard to integrated coastal zone management (ICZM) and stakeholder participation, in particular the EU Council and Parliament Recommendation on ICZM, in which member states are requested to deliver national ICZM strategies by 2006. The experience with WSF makes clear why it is so important that

stakeholders are involved in ICZM. By formulating common long-term objectives for the region, WSF members have developed a framework for spatial planning, investments and the adaptation of legal instruments necessary for achieving sustainable development.

The participants in the Forum are convinced that what has been achieved so far is not the end of the process but rather the first step in a new development. WSF will therefore continue its work under the new chairman, Mr. Jörn Klimant, head of the council of Kreis Dithmarschen.

One of the first activities to be undertaken is the implementation of the WSF action plan. This plan contains sector specific projects and a number of generic issues, among which the development of Wadden Sea Region specific indicators for the ecological, social and economic dimensions of sustainability. Such indicators are indispensable in the process of weighing future human activities for sustainability. More generally WSF sees its future role as to:

1. Oversee, stimulate, support, facilitate and evaluate the implementation of the strategies,
2. Encourage the further dialogue between stakeholders in the region,
3. Inform each other and exchange views about relevant developments,
4. Initiate new initiatives and actions.

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"Breaking the Ice" and WSF background reports are available in English, Dutch, German and Danish and can be obtained from the WSF secretariat or download from www.wadden-sea-forum.org

WSF-Publications

Breaking the Ice. Final Report of the Wadden Sea Forum, February 2005, 72 pp., in English, Dutch, German and Danish.

The First Steps. Summary of the final report of the Wadden Sea Forum. February 2005, 27 pp, English, Dutch, German and Danish.

Background reports

Review of International Legal Instruments, Policies and Management in respect of the Wadden Sea Region Oxford Brookes University, 2003, 110 pp, Wadden Sea Forum Report No. 1, (English).

Report and assessment of socio-economic data in the Danish sector of the Wadden Sea region. COWI A/S Denmark, 2003, 142pp, Wadden Sea Forum Report No. 2, (English and Danish).

Inventory and Evaluation of Socio-Economic and Socio-Cultural Data in the German Wadden Sea region Planco Consulting, Essen, 2003, 144 pp, Wadden Sea Forum Report No. 3, (German, English summary).

Sustainable Development Strategy for the Wadden Sea Region. COWI A/S Denmark, March 2004, 102pp, Wadden Sea Forum Report No. 4, (English).

The Wadden Sea: Maritime Safety and Pollution Prevention of Shipping, GAUSS mbH, Bremen, June 2004, 42 pp. and Annexes, Wadden Sea Forum Report No. 5, (English).

Inventory and Evaluation of Socio-Economic Data in the Wadden Sea Region. Regional Analysis, PROGNOSE AG, June 2004, Wadden Sea Forum Report No. 6, (English, German, Dutch, Danish).

The Operation of the EIA Directive in the Wadden Sea Region. Oxford Brookes University, September 2004, Wadden Sea Forum Report No. 7 (English).



Trilateral education supports long-term protection of the Wadden Sea

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Launched on the occasion of the 25th anniversary of the Trilateral Wadden Sea Cooperation in October 2003, the International Wadden Sea School (IWSS; also see Wadden Sea Newsletter 2003/No .2) has in a two-year pilot phase developed and tested a concept for trilateral Wadden Sea education. The successful project's results were presented on the 10th Trilateral Governmental Conference on Schiermonnikoog in November 2005 and the governments have decided to continue the IWSS in a four-year "implementation phase". A professionalization and further development will prepare the IWSS' continuation as long-term program of the Trilateral Cooperation after 2009.

With the aim to "enhance the awareness of the Wadden Sea as a shared natural and cultural heritage and to support the understanding for a long-term protection and sustainable management of the Wadden Sea as a whole", the International Wadden Sea School has been initiated by the Trilateral Wadden Sea Cooperation and Nature NGOs in late 2003. A two-year pilot phase has been jointly financed by the cooperating countries and the German "Umweltlotterie Bingo". The experiences made during this time were supposed to serve as a basis for an organizational and financial concept for a possible implementation of trilateral Wadden Sea education as long-term program of the Trilateral Wadden Sea Cooperation. At the end of the pilot phase, the IWSS can draw a very positive balance:

Over the last two years, a network of 3 Danish, 5 German and 2 Dutch Wadden Sea education centers has developed and run international study courses for pupils from the Wadden Sea countries. For actual international experience, classes from any of the Wadden Sea countries were encouraged to travel abroad to foreign Wadden Sea destinations. Here, the participating pupils got to know ecological, cultural, historical and political aspects of the various regions and learned about national and international approaches to protect the Wadden Sea. To facilitate communication in the international Wadden Sea area, the courses were conducted in English. International teaching resources such as multi-lingual identification guides, games and worksheets have been devel-



oped and helped teachers and partners prepare and run the courses.

In 2004 and 2005, 36 classes from Germany, Denmark and The Netherlands took part in the pilot IWSS courses. For 10 classes, the courses were not only international class trips, but also international meetings with pupils from another Wadden Sea country. Altogether, the IWSS has provided international Wadden experience for 860 pupils.

These numbers speak for themselves: The concept of international class trips with a comprehensive, interdisciplinary educational program,



Network of education
centers participating in the
International Wadden Sea
School

Wadden Sea Dictionary

The IWSS courses are conducted in English – a sometimes quite challenging task for both the guides and the audience. For children, hands and feet often provide appropriate means of communication and offer good alternatives to words. For everybody else involved in Wadden Sea matters, the IWSS has compiled an English-German-Danish-Dutch "Wadden Sea Dictionary" with general terms and species names often missing in usual dictionaries.

The dictionary is available as PDF at www.waddensea-secretariat.org.



international experience and intercultural learning proved to be successful. Both the teachers' and pupils' evaluations of the pilot courses were very positive, and besides the content and quality of the course program also the assistance with travel arrangements was highly appreciated by teachers.

Also the partner centers participating in the IWSS pilot phase were enthusiastic about the international courses and appreciated the international exchange of experience and ideas among colleagues in the IWSS network. The IWSS activities and international teaching resources like the "Wadden Sea Dictionary" that has been developed within the project supported the internationality of the centers' work and also visitors beyond the IWSS courses benefited from it.

A thorough analysis of the pilot phase showed that the IWSS has the potential to establish as high-quality and highly customized educational program for a broad target group. However, to compete on the class trip market and thus succeed as educational measure, adaptations to scholar demands and an overall professionalization of the offer are essential. Therefore, the main recommendation of the pilot phase was that the identified need for adaptations and improvements should be implemented in a follow-up project phase from 2006-2009, to allow for a thorough preparation of a long-term IWSS after 2009.

This "implementation phase" will be realized: In the Ministerial Declaration of the 10th Trilateral Governmental Conference on the Protection of the Wadden Sea, Denmark, Germany and The Netherlands stated on 3rd November 2005 that „We recognize that in particular our youth play a vital role for the continuation of our joint Wad-

den Sea protection. We appreciate therefore the work of the International Wadden Sea School (IWSS) project and will contribute to future IWSS activity."

In only two years of work, the IWSS has succeeded in introducing Wadden Sea education to the Trilateral Cooperation's political agenda. As a result of the successful pilot phase, the IWSS is supported not only by the relevant governmental authorities, but also by the Wadden Sea Forum, representing almost all stakeholder groups in the Wadden Sea region.

In the next four years, the IWSS will be strengthened, expanded and professionalized to further implement trilateral, interdisciplinary Wadden Sea education on the basis of sustainable international class trips. Depending on the overall budget that is currently being raised, a variety of targets will be headed for, such as the development of standards for sustainable class trips and the improvement of the educational program and quality of training towards a broader scope of education for sustainable development and intercultural learning. The main focus, however, will be on the establishment of a strong organizational and financial basis for a long-term IWSS providing international Wadden experience for as many pupils as possible.

And although certainly not every participant will become a nature lover because of a class trip with the IWSS, the majority will keep their "Wadden experience" in a good memory and develop positive associations with the Wadden Sea. Some will return for a holiday with their parents, some might value a living in the Wadden Sea region more than before, others might volunteer for conservation in a couple of years, and for a few of them, the IWSS course might be a spark for a serious engagement in the Wadden Sea. In any case, the trilateral approach to education will contribute to a broader Wadden awareness and thus to the long-term protection of the Wadden Sea and a sustainable development in the entire region.

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Wadden Sea Quality Status Report 2004

Introduction

In June 2005, the newest Wadden Sea Quality Status Report (QSR) (Essink *et al.* 2005) was published by the Trilateral Monitoring and Assessment Group (TMAG). The QSR was prepared by over 90 scientists from 50 institutes from the three countries. In this preparation, for the first time, an operational common TMAP data handling system was used which has recently been evaluated positively (Orbis, 2004).

The QSR contains basic information on human activities and on recent developments in physico-chemical and ecological conditions in the entire Wadden Sea. It also gives an evaluation of the Targets of the Trilateral Wadden Sea Plan together with recommendations for monitoring, research and management which were used for the 10th Trilateral Governmental Conference on Schiermonnikoog, 3 November 2005.

The "Trilateral Monitoring and Assessment Program" (TMAP) has proven its value in enabling a comprehensive evaluation of the Wadden Sea ecosystem as a basis for joint management. The QSR has also illustrated the indispensable value of long-term data series for the assessment of trends.

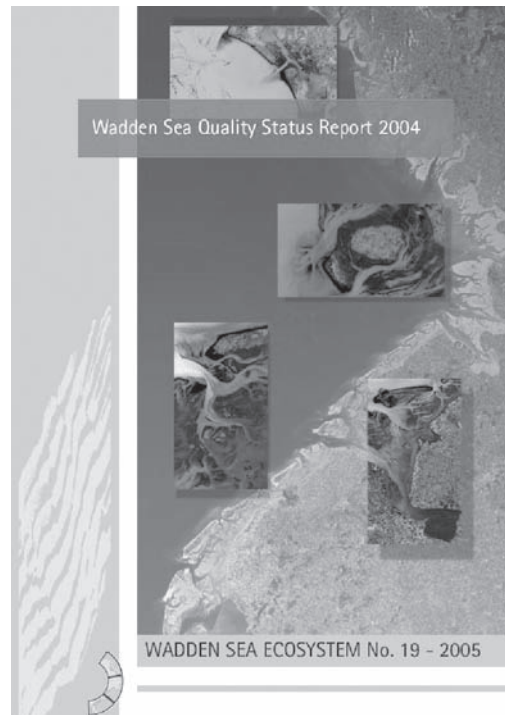
The Cooperation has achieved a great deal

The 2004 QSR revealed that in the past decades the quality of the Wadden Sea ecosystem has much improved by working towards the Targets of the Wadden Sea Plan.

For instance, the input of nutrients decreased, resulting in decreasing phosphate concentrations, chlorophyll levels and organic matter input in the Wadden Sea. Also, contaminant concentrations in the sediments and biota decreased in most parts of the Wadden Sea (Becker and Muñoz Cifuentes, 2004)

An increase in the area of natural and semi-natural salt marshes was observed, caused by reduction or phasing out of cattle grazing and artificial drainage and by outbanking of summer polders.

The Tidal Area is still characterized by a high degree of natural dynamics; the area of natural mussel beds increased in the Dutch Wadden Sea and seagrass beds are beginning to recover. Mechanical cockle fishing is not allowed any more



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in almost all parts of the Wadden Sea.

The quality of habitats has increased in the last decades resulting in, for example, an increase of breeding bird populations such as common red shank in salt marshes. The harbour seal population is healthy and viable, even after the 2002 phocine distemper epidemic, and a growth of the grey seal population was observed (see page 26).

Challenges ahead

Thus, the QSR gives reasons to be optimistic, but there is also cause for concern which should be addressed in the management and policy focus in the forthcoming years. Examples are the reduction in mud flat area specifically suited as settlement habitat for young bivalve molluscs and the increased use of beaches by tourists. The latter has led to a further reduction in the breeding numbers of great ringed plovers and kentish plovers.

The target of a Wadden Sea as a "eutrophication non-problem area" has not yet been reached and therefore the current policies to reduce the nutrient inputs on national, international and EU level have to be continued.

Policies aiming at the reduction of hazardous substances, especially from riverine inputs as the quantitatively most important source, should be also be continued and special attention should be given to newly developed xenobiotics, such as brominated flame retardants, antifouling ingredients and nonylphenole which can disturb hormonal processes.

Introduced species such as the Pacific oyster as well as the accelerated sea-level rise could have negative consequences that cannot be calculated today. Further research is necessary to fill the remaining gaps in knowledge, and the precautionary principle needs to be rigorously applied.

About two-thirds of the Wadden Sea dunes consist of mid-successional dune types illustrating that the Targets of increased natural dynamics and of an increased presence of a complete natural vegetation succession have not been reached yet. Important other types, e.g. embryonic dunes and species-rich dune slacks, are not present or show a further decline.

Some populations of breeding birds are stable or increasing, while significant decreases have been observed in others. Food supplies have been inadequate for eider ducks and oystercatchers, which is largely due to shellfish fishing, especially in the Dutch Wadden Sea. With regard to beach breeding birds, protective measures for the colony breeding little tern have been successful, whereas the numbers of great ringed plovers and Kentish plovers have continued to decrease. These two species need more undisturbed beaches and primary dune areas.

For migratory bird species, 21 out of the observed 34 migratory bird species experienced a decrease in population size in the period 1992 – 2000. Five of these species also show a long-term decrease (1980 – 2000) whereas the other species were stable over that period (Blew and Südbeck, 2005). About 18 out of the 21 decreasing bird species feed on benthic species, especially bivalves. For this reason measures to preserve the bivalve population are necessary, in order to ensure an adequate food supply is available. Further effort is also required to protect high-tide roosting sites which are partly located in areas that are used for farming or are disturbed by human recreational activities, as is also the case with moulting sites.

The harbour seal population has recovered well from the last distemper epidemic in 2002. The recent data revealed that harbour seals from the Wadden Sea are using the North Sea to a much greater degree than was previously known. This has to be kept in mind, for example, when planning offshore wind parks. The number of grey seals increased over recent years probably as a result of the immigration of grey seals from the British Isles. Further research is needed to provide a basis for effective conservation measures. With regard to harbour porpoises it is difficult to judge whether the population is large enough and is producing enough young to maintain the North Sea population in the long term.

Future Management

The QSR illustrates the major recent developments in the Wadden Sea ecosystem based on a common monitoring system, the TMAP. Several recommendations have been prepared which can now be taken up by the Trilateral Cooperation for future policy and management decisions.

Building on the successful joint management established by the three Wadden Sea states, the task now is to master the challenges of the future:

- to pursue and put into practice the common Targets for the Wadden Sea,
- to respond in a coordinated manner to new threats to the Wadden Sea ecosystem,
- to expand the joint conservation and management concept and consolidate it into an integrated coastal zone management that is appropriate to the Wadden Sea as an open ecosystem linked to the surrounding rivers, the mainland and the North Sea.

Literature

- Becker, P.H. and J. Muñoz Cifuentes, 2004. Contaminants in Bird Eggs in the Wadden Sea. Recent Spatial and Temporal Trends. Wadden Sea Ecosystem No. 18: 5–25. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Wilhelmshaven, Germany.
- Blew, J. and Südbeck, P. (Eds.), 2005. Migratory Waterbirds in the Wadden Sea 1980 – 2000. Wadden Sea Ecosystem No. 20. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Joint Monitoring Group of Migratory Birds in the Wadden Sea, Wilhelmshaven, Germany, 200 p.
- Essink, K., C. Dettmann, H. Farke, K. Laursen, G. Luerßen, H. Marencic, W. Wiersinga (Eds.). 2005. Wadden Sea Quality Status Report 2004. Wadden Sea Ecosystem No. 19. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Wilhelmshaven, Germany, 360 p.
- Orbis, 2004. Evaluation of the TMAP Data Handling for the Trilateral Wadden Sea Cooperation. Orbis Institute, Ottawa, Canada, September 2004, 76 p. and 52 p. Annexes.

www.waddensea-secretariat.org/QSR

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Alien species in the Wadden Sea – A challenge to act

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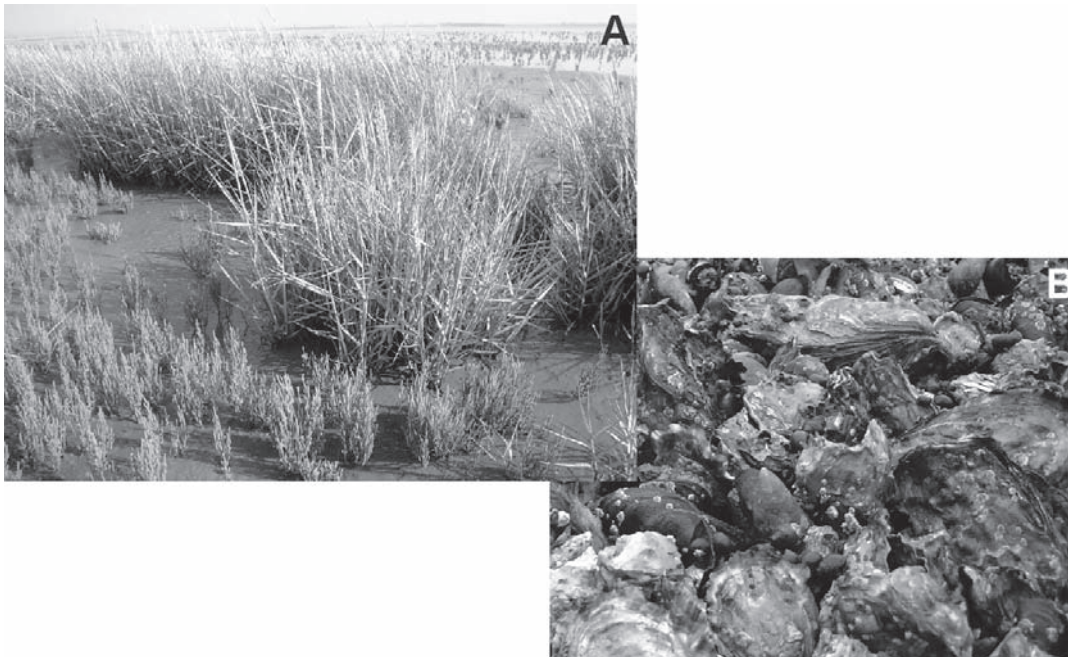


Figure 1:
Invasive alien species in the
Wadden Sea.

A: The cord-grass *Spartina anglica* (at the back), introduced in the 1920s to promote sediment accretion, displaces a.o. the native glass-ward *Salicornia stricta* (in the foreground).

B: The Pacific oyster *Crassostrea gigas*, imported for commercial production first in 1964, reproduced successfully during the last two decades and uses the native blue mussel *Mytilus edulis* as habitat and eventually kills individuals by overgrowth.

For centuries, alien species have been introduced to new areas in which they were previously absent and which they have reached through human agency. Because of the increase in global trade, the introduction of alien species, both intentional and unintentional, has increased significantly and has become more complex. The impacts of alien species are often immense, insidious, and usually irreversible, and can have enormous economic and human health consequences. Viewed on a global basis, alien species are one of the key threats to native species and ecosystems and other aspects of biodiversity.

Ship hull fouling, ballast water and aquaculture are the main pathways that have been identified as significant for transporting aquatic alien species into new marine and estuarine systems all over the world. Even in the Wadden Sea area, in fact an ecosystem highly protected by law and actually nominated as World Heritage Site, a diverse range of alien species have established permanent populations.

The worldwide implications of alien species have been identified by non-governmental and governmental organizations alike as well as being emphasized in numerous international conventions and other instruments. Up to now, all of these measures lack extensive efficiency and the rate of alien introductions has clearly increased,

especially in coastal waters during the last two decades, with no end in sight. Thus, alien species are still a challenge to act. Therefore, an unlimited observance of existing management initiatives and instruments as well as the implementation of new and purposeful ones are absolutely necessary.

Status of alien species

The number of alien taxa assumed to have been established in the North Sea amounts to about 80 species of which about 52 also occur within the Wadden Sea. A variety of taxonomic groups such as protozoans, macroalgae, crustaceans, molluscs, polychaetes and parasites have contributed to major invasions in recent years. Most invertebrate invaders originate from the Atlantic coast of America and were predominantly introduced by shipping (hull fouling, ballast water), while most algae species are native to the Pacific and were introduced with imports of seed oysters. In contrast to European freshwater systems, in which a multitude of vertebrate alien species live, particularly fish, no such species occur in the North Sea in self-sustaining populations up to now.

The share of aliens in the North Sea biota increases from the offshore part towards the coast. So the percentage of alien species compared to the respective total species numbers amounts to <<1% in the central North Sea, roughly 1% in the

coastal offshore area, about 6% in the Wadden Sea and up to 20% in the brackish water zones of the estuaries. It seems that low species richness in aquatic communities is a considerable factor for bioinvasions. The frequency and intensity (or size) of inoculation are critical components in colonization success, however. Intense intercontinental shipping and the existence of aquaculture plots, particularly oyster farms, create the highest infection rate for coastal areas in northern Europe. In the Wadden Sea, the biotic communities of mixed native and alien organisms behave in many respects like co-evolved assemblages. Empty niches, however, seem to be an essential basis for this.

While many of the alien species seem to remain insignificant additions to the native flora and fauna, the international focus is on the few invasive species which threaten ecosystems, habitats or species. For the Wadden Sea six benthic species are recognized which have already altered the habitat or have sustain lasting effects on native biota (Reise *et al.* 2005). These targeted species are the cord-grass *Spartina anglica*, the brown algae *Sargassum muticum*, the polychaete *Marenzelleria cf. wireni* as well as the three molluscs *Crepidula fornicata*, *Ensis americanus* and *Crassostrea gigas* (Figure 1). Their occurrence has irreversibly modified the Wadden Sea ecosystem (for review see Reise *et al.* 2005) and there is no indication that these alien species will ever leave the Wadden Sea again.

It is highly probable that in the near future new alien species will arrive in our coastal waters. The current 'tens rule' of thumb of biological invasions in terrestrial habitats will be applicable to European aquatic systems, too: out of 100 established alien species, 10 percent will become invasive. However, this statistical approach says nothing about the next species and its impacts on biodiversity, ecosystem functioning, human health and economy. Every alien species has the potential of unwanted and uncontrollable consequences and their introduction as well as their spreading should be minimized wherever possible.

Regulations

Many conventions, codes of conduct and other instruments reference the subset of alien species, including genetically modified organisms. These range from legally binding treaties to non-binding technical guidance focused on particular pathways to prevent the introduction of alien species. Most instruments are specific to a sector, taxonomic group, type of environment or type of harm (for a review see SCBD 2001).

At global level the only instrument that covers all aspects of invasive alien species as they relate to biodiversity is the Convention on Biological Diversity (CBD), which was adopted in 1992 and entered into force in 1993. Its aims are the conservation of biological diversity, the sustainable usage of biological resources, and the fair and equitable sharing of benefits arising from the use of genetic resources. Article 8h of the CBD requires all Contracting Parties "as far as possible and as appropriate, to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". This statement was specified by the decision VI/23 "Guiding Principles on Invasive Alien Species" by the 6th Conference of the parties to the CBD in 2002. Its adoption suggests comprehensive national strategies on the basis of a hierarchical approach (prevention, early detection, measures). The CBD became law in Germany in 2002 through the revised Federal Nature Conservation Act (BNatSchG), which includes a permission requirement for the release of alien species (§ 41.2). The permission is to be denied if a risk to the existing flora and fauna cannot be excluded.

In marine environments and inland water systems, alien species can be hard to detect and organisms disperse rapidly. Therefore several international instruments are being prepared for preventive measures against unwanted introductions to aquatic ecosystems. One important example is the guideline of the International Maritime Organization on minimizing current risks and side effects to the environment and human health arising from the transfer of species in ships' ballast water and sediments, which was actually adopted as a convention by IMO member States in 2004. This convention will enter into force 12 months after ratification by 30 States, representing 35 percent of world merchant shipping tonnage.

The EU Water Framework Directive (WFD), aiming to restore good ecological quality in all inland, transitional and coastal water bodies (e.g., estuaries, Wadden Sea), could be a potentially powerful legislative measure for all kinds of environmental pressures and impacts. However, in the course of meeting discussions about environmental quality standards, it was decided by administrative experts that alien species will not be taken into account as a specific quality criterion, because aliens are not directly involved in the degradation of water quality. During recent months first comments on this decision were announced by scientists to reassess the status of alien species within the WFD. The final summary - to which everyone can still contribute - is expectantly awaited.

Nature conservation and measures

The Guiding Principle of the trilateral Wadden Sea policy is to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way. Invasive alien species in particular pose a serious threat to such nature conservation interests. Up to now the introduction, establishment and spreading of alien species in the Wadden Sea has been perceived only on a descriptive level in some ways, a purposeful strategy in dealing with the phenomenon in regard to the protection and conservation of the Wadden Sea is lacking.

The immense scope of the field of prevention and management of alien species makes it impossible to include all aspects in depth here. Hence, the objective of the paper is to awake interest and to designate potential handling options for nature conservation management in relation to aquatic alien species.

Depending on the species, efforts should target one of the four categories: (a) acceptance of established non-invasive species; (b) prevention of introductions through education and regulations; (c) monitoring of occurrence, impacts and spread by monitoring programs; and (d) minimization of impacts by eradication or control (Figure 2).

a. Acceptance

Many alien species which have already been introduced and established are innocuous and have no relevant ecological or economic effects. These species should be accepted as new components of our native flora and fauna.

b. Prevention

Since it is well known that eradication of an introduced species, once it has become established in the marine environment, will be very expensive, or even impossible, the prevention of introductions is the first and most cost-effective option. During the last decade, first binding and non-binding instruments were adopted for preventive measures against un-intentional as well as for controlled intentional introductions to aquatic ecosystems (see above). However, there are gaps, overlaps and inconsistencies in these instruments and all of them have lacked efficiency up to now. Thus, once invasive species become established within one country, they pose a threat to an entire region through natural dispersal. Further on, climate warming favours the establishment of more cosmopolitan species across wider geographic areas. For these reasons, from the perspective of

abating the risks of alien species, more effective actions and instruments with an international focus are warranted.

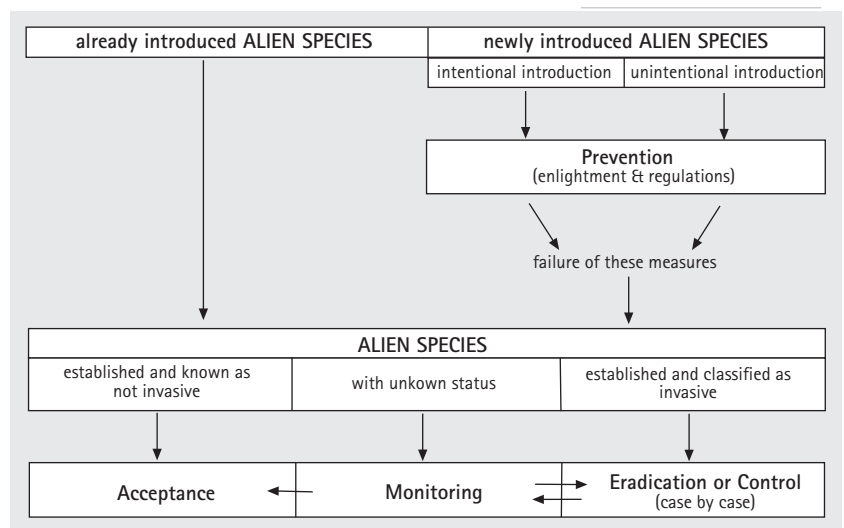
An important additional field in prevention, which should not be underestimated, is the education of politicians, authorities and business people, scientists as well as citizens about alien species, their risks and the possibilities to prevent further introductions. In addition to specific presentations and discussions in the press and scientific literature, on the radio and TV, web-based information platforms offer a great chance to enhance persistently the awareness of the alien problem on a national (e.g. Handbook of Invasive Alien Plant Species in Germany, www.neophyten.de) and international level (e.g. Nordic-Baltic Network on Invasive Species NOBANIS www.sns.dk/nobanis/).

c. Monitoring

The development of effective monitoring programs is necessary to aid the early detection and determination of the status of newly introduced alien species. This is essential for taking rapid measures of eradication and control especially in the case of newly observed invasive species, because these species can spread quickly and cause unwanted negative effects. However, aquatic environments are much more difficult to monitor than terrestrial habitats and measures should be well thought-out and developed.

Additionally monitoring is an important basis for the assessment of impacts and the invasiveness of alien species as well as for the efficiency of eradication and control measures.

Figure 2: Handling options for nature conservation management in relation to former and future introductions of alien species (modified after Klingenstein 2004; further explanation see text).



d. Eradication or Control

Where an alien species has become invasive, eradication is an effective action to prevent its spread and to minimize impacts. The best chance for a successful eradication of most unwanted species is during the early phase of invasion, while the target populations are small and/or limited to a small area.

However, in aquatic environments we are often faced with the impact at a very late stage when the species might have been there for several generations and has already spread their offspring to other areas. Thus, in most cases it is impossible to find an efficient method to eradicate aquatic alien species once they have become established.

Once the establishment of an alien species is accepted as irreversible, unwanted species can be controlled by reducing density and abundance to keep their impact to an acceptable level. It is worthy of note that probably such measures make sense only for specific species, for which definite criteria exist (e.g. occurrence restricted only to terrestrial or intertidal areas). Control methods should be selected taking into consideration efficiency, selectivity and the undesired effects they may cause. This should proceed in accordance with Community regulations and codes.

In principle, every measure should be based on an individual case decision. In order to evaluate the success or failure of a management program, it will be necessary to monitor changes and impacts and evaluate to what extent the targets set at the beginning of the efforts have been met. This will provide an opportunity to change and adapt the program to new perceptions and situations.

Conclusions

Even against the background that continuous climate change will probably influence the biocoenosis of North European coastal waters much more strongly (Nehring 1999), alien invasions in aquatic systems are irreversible and should be avoided wherever possible. These species pose a serious impact to native biodiversity because they have the potential to alter the natural state of an ecosystem into which they were introduced and may enhance the trend of global unification of flora and fauna. Such changes may consequently affect nature conservation interests.

In the highly protected Wadden Sea a multitude of alien species have established permanent populations, at least six of them are of invasive nature. Up to now no management plan exists in which way the preservation or restoration of the Wadden Sea ecosystem in relation to alien species could

be guaranteed. Even in the common package of TMAP parameters alien species have not yet been integrated as a specific investigation criterion. At present, most analyses that evaluate patterns of aquatic invasion or test specific hypotheses derive data from existing literature, which is extremely uneven in space and time. Thus, the development of an alien species plan on the level of the Trilateral Cooperation on the Protection of the Wadden Sea is absolutely essential. In this context, for the most recently established invasive species, the Pacific oyster *Crassostrea gigas*, a coordinated environmental program to document the spreading and impacts should be designed and implemented in the trilateral conservation area of the Wadden Sea. Additionally, the new German "zero-use area" Hörnumtief should be accorded the status of a priority area for alien species research. As a matter of fact a mini Ecosystem Research Program for this area is in preparation and it should be examined as to how far R&D studies on the occurrence and effects of alien species on the native biocoenoses in detail can be integrated here.

References

- CBD, 1992. The Convention on Biological Diversity. UN Conference on Environment and Development, Rio de Janeiro, www.biodiv.org
- SCBD, 2001. Review of the efficiency and efficacy of existing legal instruments applicable to invasive alien species. Secretariat of the Convention on Biological Diversity Montreal, CBD Technical Series No. 2, 31 pp.
- Klingenstein, F., 2004. Invasive gebietsfremde Arten aus Sicht des Naturschutzes auf Bundesebene. In: Bundesamt für Naturschutz (Ed.), Neophyten - Ergebnisse eines Erfahrungsaustausches zur Vernetzung von Bund, Ländern und Kreisen. BfN-Skripten 108, pp 21-30.
- Nehring, S., 1999. Biocoenotic signals in the pelagial of the Wadden Sea: The possible biological effects of climate change. *Senckenbergiana marit.* 29, Suppl., 101-106.
- Reise, K., Dankers, N. and Essink, K., 2005. Introduced species. In: Essink, K., C. Dettmann, H. Farke, K. Laursen, G. Luerßen, H. Marencic, W. Wiersinga (Eds.). 2005. Wadden Sea Quality Status Report 2004. Wadden Sea Ecosystem No. 19, pp 155-161.

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Perishing blue mussels and invading aliens – What are the reasons for ecological turnover in the Wadden Sea ?

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Introduction

Failing spatfall and decreasing blue mussel *Mytilus edulis* beds are a source of continuous concern to Wadden Sea ecologists. Following periods of very low blue mussel stocks in the Netherlands and Niedersachsen, blue mussel beds have been strongly decreasing for more than a decade in the northern parts of the Wadden Sea. At the same time, two introduced species, the American slipper limpet *Crepidula fornicata* and the Pacific oyster *Crassostrea gigas* are prospering. The spread of the Pacific oyster especially has attracted the attention of both scientists and the public and – as with the slipper limpet at the time of its introduction – the newcomer is considered as a plague to the Wadden Sea ecosystem and often taken as a reason for decreasing blue mussel beds. Both introduced species preferably settle on blue mussel beds and an increasing portion has turned into dense limpet layers or oyster reefs. Experimental investigations demonstrated negative impacts of oysters and slipper limpets settling on blue mussels and as both introduced species are filter feeders, competition not only for space but also for food can be assumed. However, whether invading oysters and slipper limpets can be considered as a reason for declining blue mussel beds is questionable and it should be considered that the observed reciprocal trends may be coincidental and not a result of competitive displacement.

Decreasing blue mussel beds

The development of blue mussels and invading bivalves in the Wadden Sea of Schleswig-Holstein in fact shows a marked reciprocal trend. At the end of the eighties, blue mussel beds covered the so far highest recorded area of about 1500 ha, which is about 1.15 % of the intertidal mudflats between the Eiderstedt peninsula and the Danish border. Blue mussel stocks decreased after this and were not fully restored after the severe winter 1995/96. In 1999, blue mussel bed area reached 1000 ha and has more than halved since then (Figure 1). Total biomass of blue mussels was estimated at 12,000 t which is only a fifth of the 60,000 t estimated in 1989 (Nehls & Ruth, 2004). Mussel beds vanished in all parts of the Wadden Sea of Schleswig-Holstein and it is especially notable that even in the sheltered areas behind the islands of Sylt and Amrum blue mussel stocks are today very low. These areas traditionally hold extensive and stable blue mussel beds as the islands offer protection against storms with westerly winds which are – apart from very cold winters – generally the main cause of blue mussel beds being lost. Most blue mussel beds in these areas are visited regularly in the course of the blue mussel monitoring program within the Wadden Sea National Park of Schleswig-Holstein and it became obvious that the decrease of blue mussel beds is not caused by single storm events but a continuous process. It appears that even small losses in

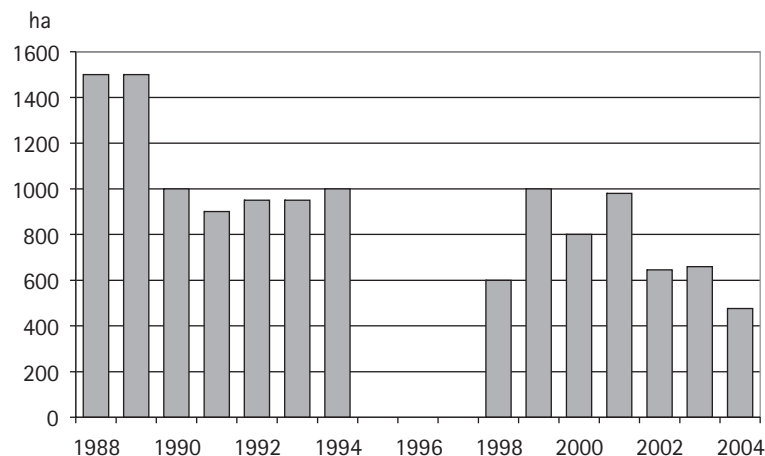


Figure 1:
Development of blue mussel bed area in the Wadden Sea of Schleswig-Holstein.

Figure 2:
Dense assemblages of slipper limpets cover a blue mussel bed in the Lister Deep



blue mussel bed area are not compensated by spatfall, so annual losses accumulate and lead to a permanent decrease.

In this respect, it is particularly interesting that the establishment of new blue mussel beds was a rare event for almost a decade. After the cold winter 1995/96 many blue mussel beds were replenished by a strong spatfall in summer 1996 and from the data of the monitoring program it can be estimated that about 60 blue mussel beds were re-established. In the following years, very limited spatfall occurred and few blue mussel beds were re-established or increased in size. Since 2000 no newly established blue mussel bed have been recorded in the area between Eiderstedt and the Danish border. Spatfall into existing beds was noticed but it was, however, insufficient to allow a stable population.

Prospering invaders

In contrast to blue mussels, Pacific oysters and slipper limpets successfully spread out in the Wadden Sea of Schleswig-Holstein and strongly increased. The Pacific oyster, introduced to North Sea waters in the sixties, is found settling on blue mussel beds since 1991 and since then spread out. Four strong spatfall events since 2001 – facilitated by warm summer water temperatures – have strongly increased the size of the oyster population and this species is now taking over the dominance on many blue mussel beds (Diederich et al., 2005). The species is found on almost all blue mussel beds and all other hard substrates in the Wadden Sea of Schleswig-Holstein but the two main centers of its distribution still have the highest numbers: the Lister Deep behind the

island of Sylt, where oysters started to spread in the vicinity of the local oyster farm, and the tidal flats behind Amrum. These two areas are so far the only places where high densities of oysters on the blue mussel beds occur, whereas in the other parts their density is still below 1 oyster/m². On the blue mussel beds near Amrum oyster density on the blue mussel beds reached 50 oyster/m² in 2005, whereas in the Lister Deep, a mean density of about 500 oysters/m² was recorded with highest values reaching 1000 oysters/m². Some parts of the blue mussel beds have now turned into dense layers of oysters attached to each other forming a very solid structure. The development of the oysters in Schleswig-Holstein indicates at least two different origins: the initial development in the Lister Deep is associated with the local oyster culture, whereas the spread in the southern parts since 2000 reflects the general spread of oysters in the Wadden Sea moving from west to east along the Dutch and Niedersachsen Wadden Sea.

The American slipper limpet, which was unintentionally brought to Europe in the 1870s was introduced to the Wadden Sea of Schleswig-Holstein seventy years ago probably with Dutch oysters to the Lister Deep. Today it is found in all parts of the Wadden Sea wherever a suitable substrate in the lower intertidal and subtidal is available. As blue mussels form a very suitable substrate for settlement, highest densities are found on blue mussel beds which are partly covered and formed into limpet layers (Figure 2). Although the slipper limpet has been regarded as a threat to native species since its introduction to Europe, its spread in the Wadden Sea has led only locally to dominance in the benthic communities



Figure 3:
The race is still open: blue mussels settling on top of Pacific oysters.

which is mainly a cause of cold winters leading to severe mortality and thereby forcing major drawbacks in population development (Thieltges et al., 2004). In the last decade slipper limpets were not much constrained by cold winters and thus strongly increased and maximum values of 300 to 400 specimen/m² were recorded on blue mussel beds in the Lister Deep and locally it forms dense single-species layers.

Competitive displacement ?

At present it looks as if blue mussel beds in the northern part of the Wadden Sea are being replaced by introduced species and forming into oyster reefs and limpet layers. The classical view on this development is to blame the invader. However, no evidence has yet been presented that this is the case (Nehls *et al.*, submitted). There are two facts which strongly oppose the hypothesis of competitive displacement through the invaders. First, the decline of the blue mussel beds occurred in all areas of the Wadden Sea of Schleswig-Holstein, irrespective of the presence of oysters and slipper limpets. Even in sheltered areas such as east of the island of Amrum, blue mussel beds declined and vanished before oysters spread on the remaining fragments of the blue mussel beds. Second, the invaders until now cover only a rather small fraction of the former blue mussel beds. For the Lister Deep we estimate that dense oyster reefs only cover 10 to 20 % of the blue mussel bed area of 1999 and the portion covered by slipper limpets is even smaller. Despite a high density of oysters and slipper limpets, even in the Lister Deep blue mussel biomass still exceeds the biomass of the invaders.

Climate change as driving force

So what are the reasons for declining blue mussel beds? As outlined above, the results from mussel monitoring indicate repeated failures of blue mussel recruitment and over the last six years, no new blue mussel beds were established in the area between Eiderstedt and the Danish border. Decreasing or failing recruitment success has been reported for blue mussels from other parts of the Wadden Sea as well as for other bivalve species. As a rule of thumb, the recruitment success of blue mussels and other bivalves of the Wadden Sea is good after cold winters. This is because the main predators of bivalve postlarvae and spat, shrimps and crabs, move later into the Wadden Sea if water is cold, giving settling bivalves a relief from predation (Strasser, 2002; Beukema & Dekker, 2005). In a warming Wadden Sea, cold winters occur less frequently and so will good recruitment of blue mussels and other native species. In contrast to this, recruitment success of Pacific oysters and slipper limpets appear to be much less affected by predation, allowing these species to successfully reproduce in the presence of potential predators and take full advantage of the warming climate. A warming Wadden Sea will allow the oyster, originating from warmer climates, to reproduce successfully more frequently and winter mortality of slipper limpets will be reduced. Taking this into account, invading oysters and limpets may well take over the remaining blue mussel beds but whether they have the potential to fully replace them is still an open question. However, every single cold winter may change the observed developments and eventually oysters may find

themselves to be a suitable habitat for settling blue mussels (Figure 3).

We conclude that there is yet no evidence that the invaders are the cause of perishing blue mussel beds. The driving factor behind this marked turnover in a highly important benthic community of the Wadden Sea appears to be the changing climate, which facilitates the spread of the invaders but restrains blue mussel reproduction. In this respect, the expected climate change may provoke more than just a change in the dominance within native communities, but allow further invaders to prosper in the Wadden Sea.

The work of Georg Nehls is supported by the Regional Office of the Wadden Sea National Park of Schleswig-Holstein.

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Literature

- Beukema, J.J. and Dekker, R., 2005. Decline of recruitment success in cockles and other bivalves in the Wadden Sea: possible role of climate change, predation on postlarvae and fisheries. *Mar. Ecol. Prog. Ser.* 287: 149–167.
- Diederich S., Nehls, G., Beusekom, J.E.E. van, and Reise, K., 2005. Introduced Pacific oysters (*Crassostrea gigas*) in the northern Wadden Sea: invasion accelerated by warm summers? *Helgol. Mar. Res.* 59: 97–106.
- Nehls, G., Diederich, S., Strasser, M. and Thieltges, D. W. Submitted. Wadden Sea mussel beds invaded by oysters and slipper limpets – competition or climate control? *Helgol. Mar. Res.*
- Nehls, G. and Ruth, M., 2004. Miesmuschelmonitoring und Miesmuschelmanagement im Nationalpark „Schleswig-Holsteinisches Wattenmeer“ Berichtszeitraum 1997 – 2002. Bericht an das Landesamt für den Nationalpark Schleswig-Holsteinisches Wattenmeer und das Amt für Ländliche Räume, Kiel.
- Strasser, M., 2002. Reduced epibenthic predation on intertidal bivalves after a severe winter in the European Wadden Sea. *Mar. Ecol. Prog. Ser.* 241: 113–123.
- Thieltges, D.W., Strasser, M., Beusekom, J.E.E. van, and Reise, K., 2004. Too cold to prosper – Winter mortality prevents population increase of the introduced American slipper limpet *Crepidula fornicata* in northern Europe. *J. Exp. Mar. Biol. Ecol.* 311:375–391.

Highlights of Breeding Birds in the Wadden Sea in 2003 and 2004



Joint Monitoring Group of Breeding Birds in the Wadden Sea (JMBB): Kees Koffijberg, Lieuwe Dijkens, Bernd Hälterlein, Karsten Laursen, Bernd Oltmanns, Petra Potel, Peter Südbeck & Ole Thorup

Breeding Herring Gull (*Larus argentatus*) (Photo: L. Dijkens).

Introduction

A comprehensive review of trends in breeding birds in the Wadden Sea in 1991–2001, along with the results from the latest total survey in 2001, will be given in the next trilateral breeding bird report of the JMBB, which will be published in the near future. Regarding overall trends, many species have experienced significant increases in the past decade, notably Great Cormorant (*Phalacrocorax carbo*), Lesser Black-backed Gull (*Larus fuscus*), Eurasian Spoonbill (*Platalea leucorodia*) and Mediterranean Gull (*Larus melanocephalus*). These species are currently expanding their breeding range and have colonized several new breeding sites within the Wadden Sea. Furthermore, the population of Little Tern (*Sterna albifrons*) is showing signs of recovery from its low level in the 1970s and 1980s and has increased annually with 5% since 1991; a trend which can be largely attributed to prevention of human disturbance to its breeding sites.

However, worrying declines have continued in species like Kentish Plover (*Charadrius alexandrinus*) and Great Ringed Plover (*Charadrius hiaticula*), and recently have also become apparent in Common Eider (*Somateria mollissima*) (though not significant), Hen Harrier (*Circus cyaneus*) and Arctic Tern (*Sterna paradisaea*). Especially in the Dutch Wadden Sea, several species have shown downward trends in the past decade, including species which have remained stable or even increased in the German and Danish Wadden Sea, like Oystercatcher (*Haematopus ostralegus*) and Black-headed Gull (*Larus ridibundus*). As shown

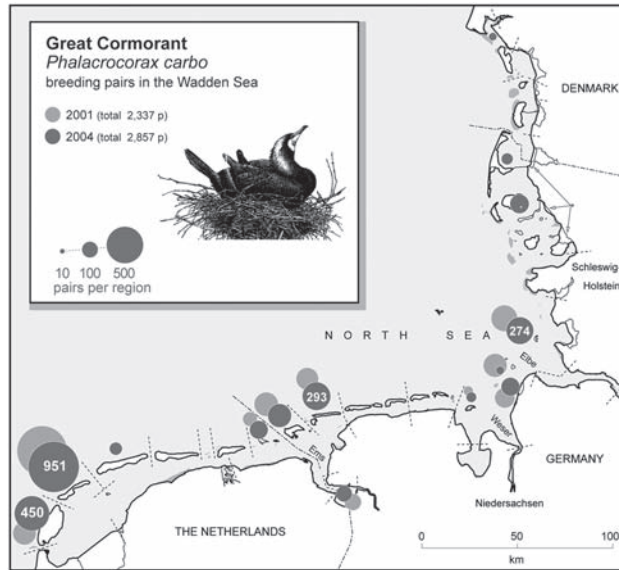
by the recent EVAII studies, part of these downward trends have been influenced by mechanical cockle- and blue mussel fisheries (Rappoldt *et al.*, 2003).

Since the next report of JMBB deals with trends until 2001, this contribution highlights the development of some breeding bird species after 2001, with special emphasis on the recent 2003 and 2004 seasons. Data presented here often represent preliminary figures and were partly retrieved from national reports already available (Thorup, 2004; van Dijk *et al.*, 2005). A more detailed analysis of the data presented here will be included in the trilateral report of the next total count 2006.

Expansion in Cormorant and Spoonbill continues

Eurasian spoonbill, often regarded a flagship-species of nature conservation, continued its colonization of the German Wadden Sea. The population in Niedersachsen in 2003 even increased to 103 pairs, but dropped to 54 pairs in 2004. Schleswig-Holstein supported 14 and 16 pairs in 2003–04, with a new colony established at Trischen in 2002. Ringing recoveries have shown that German breeding birds at least partly originate from thriving colonies on the Dutch Wadden Sea islands (Overdijk, 2004; Penkert *et al.*, in prep.), where the population only slightly increased, to 1,030 pairs in 2004. It is not clear yet to what extent the populations on the Dutch islands has become saturated yet, but if so, further increases in the eastern and northern part of the Wadden Sea might be expected. The high number

Figure 1:
Distribution of Great
Cormorant in the Wadden
Sea in 2004 (2001 given as
comparison).



in Niedersachsen in 2003 (with 51 pairs at Memmert) coincided with a temporarily decline in the Dutch Wadden Sea, which suggests that possibly exchange between nearby colonies occurs. The Wadden Sea population in 2004 is estimated at 1,100 pairs (2001: 831).

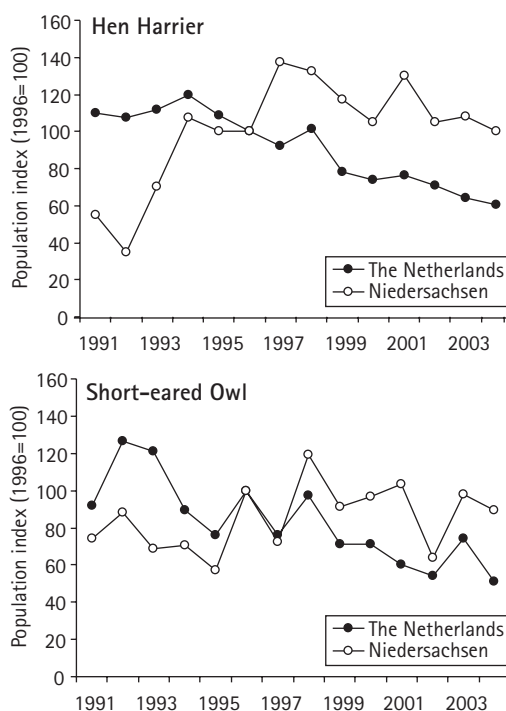
Great cormorants recently expanded their population especially in Schleswig-Holstein and Denmark, and had only a slight increase in the Dutch Wadden Sea (from 1,447 to 1,683 pairs in 2002-2004, one new colony at island of Terschelling) (Figure 1). In Schleswig-Holstein, two new colonies settled on Sylt (from 14 pairs in 2003

to 40 in 2004) and rapidly growing numbers were observed on Föhr (135 pairs in 2004). The total population in this section of the Wadden Sea increased to 463 pairs in 2004 (2001: 254). In the Danish Wadden Sea, a small colony of five pairs tried to breed on Langli in 2003, for the first time after the failed colonization of Jordsand in 1994-95. However, in July the nests were deserted and a renewed settlement in 2004 (24 nests) was controlled by the Forest- and Nature Agency, thus all birds remaining unsuccessful. In Niedersachsen, most colonies remained stable or declined. Only on Memmert, the population rose from 182 to 293 pairs between 2001 and 2004.

Contrasting trends in Raptors and Owls

Hen Harrier and Short-eared Owl (*Asio flammeus*) are typical Wadden Sea species. Denmark and Schleswig-Holstein only support a few pairs. Nearly the entire Wadden Sea population of both species is confined to Niedersachsen and the Netherlands. Here, the Wadden Sea islands represent the core breeding areas in the country. In 1991-2001, a remarkable contrast in trends was observed between both regions. Whilst in the Netherlands both species experienced a serious breakdown, numbers on the East-Frisian Islands in Niedersachsen were thriving (Figure 2). Recently, populations of both species tend to decline here too, but in 2004 still supported 40 pairs of Hen Harrier and 52 pairs of Short-eared Owl (in 2001: 52 and 60 pairs respectively). In the Dutch Wadden Sea, Hen Harrier dropped from 70 pairs in 2001 to 58 in 2004. Short-eared Owl experienced a similar decline and had only 18 pairs left in 2004 (2001: 23). Overall breeding success seems to be poor, especially for Hen Harrier. In 2004, a project was initiated to investigate the backgrounds for the decline in this species, including research on diet and dispersion as well as studying movements and recruitment by color-ringing (Dijksen, de Boer & Klaassen, in prep.). So far, possible causes which have been put forward are changes in vegetation (higher vegetation disables prey-detection) and declines in rabbit-population by the Viral Haemorrhagic Syndrome (VHS-disease) (deteriorating food availability). Since populations on the East-Frisian islands in Niedersachsen have not declined, similar research there would be very valuable to retrieve comparative data and would especially help to understand the contrasting trends observed.

Figure 2:
Trend in Hen Harrier and
Short-eared Owl in the
Wadden Sea in the Neth-
erlands and Niedersachsen
1991-2004 (based on
indices retrieved from total
counts).



New declines in Oystercatcher

Oystercatcher, along with Common Eider, Herring Gull (*Larus argentatus*) and (migratory) Red Knot (*Calidris canutus*), is one of the species which has suffered from the removal of blue mussel beds and mechanical cockle fisheries, as was shown by the EVA II study in the Dutch Wadden Sea (Rappoldt *et al.*, 2003; Verhulst *et al.*, 2004). In 1991–2001, this resulted in a significant downward trend in breeding oystercatcher in the Dutch Wadden Sea. In the German and Danish Wadden Sea, growing or stable numbers were recorded during the same period. However, after 2001 at least in Schleswig-Holstein and Denmark, Oystercatcher-populations have suffered losses as well. As shown in Figure 3, trends in the Netherlands and Schleswig-Holstein are now rather similar; in both countries numbers have declined with 3–4% annually after 1996. Whilst in the Netherlands, this decline already started in 1996, the downward trend in Schleswig-Holstein has started after 1998. Danish breeding numbers dropped in 2002 and 2003, but recovered slightly in 2004. Breeding numbers in the Dutch Wadden Sea seem to have stabilized after 2002 (Figure 3).

Avocet suffering predation?

Avocet (*Recurvirostra avosetta*) is one of the species for which the Wadden Sea represents a core breeding area within NW-Europe (about 60% of the population breeds in the area). In the 1990s, the population in the entire Wadden Sea remained stable. However, in Niedersachsen and in the Netherlands numbers tended to decline after 1996. Recently this decline has accelerated, notably along the mainland coast of the Dutch Wadden Sea. In 2004, the population size along the mainland coast of Groningen for instance, represented only 22% of the population in 1991. Here, avocet numbers dropped sharply after 1999 (Figure 4). A similar trend has been reported for the mainland coast of Friesland. Both areas, along with the coast of Dithmarschen in Schleswig-Holstein (where the population is at least stable, see Figure 4) supported the highest numbers in the Wadden Sea in 1991–2001 (Dijksen *et al.*, in prep.).

Several causes have been put forward to explain the recent declines. Koopman (2003) has attributed the downward trend along the mainland coast of Friesland mainly to predation by red fox and the cessation of the maintenance of drainage works on the salt marshes (which usually provided sparsely vegetated areas along the channels). Predation is likely to be a major cause for the observed decline

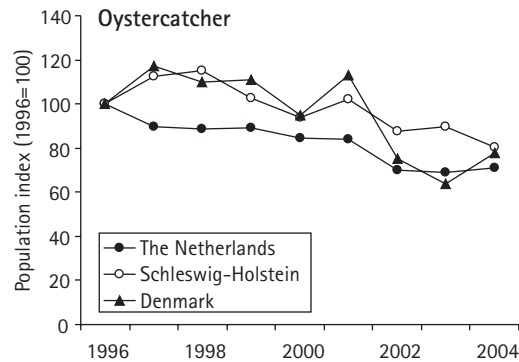


Figure 3: Trend in Oystercatcher in the Wadden Sea 1996–2004 (based on indices retrieved from census areas).

along the Groningen coast, although precise data on nest success and chick survival have not been collected and thus the impact can not be quantified. Accidental data on brood sizes, gathered during the surveys, indicate that since 2000 there has been a complete failure of clutches in this area (K. Koffijberg, pers. comm.). Similar trends seem to occur in other coastal breeding birds like Black-headed Gull and Common Tern (*Larus canus*). Contrary to these species, however, Avocet did not switch to breeding sites on the islands (Dijksen *et al.*, in prep.). Locally, also vegetation succession (caused by cessation of livestock-grazing) has made breeding sites unsuitable, but since many sites are still available this development is probably only responsible for declines at a very local scale. Although Avocet are known to switch breeding sites easily from one year to another, the declines along the Dutch mainland coast and also along the coast of Niedersachsen have not been compensated for elsewhere in the Wadden Sea. Numbers in Schleswig-Holstein have hardly changed after 2001 (2001/2004: 4,439/4,300 pairs, trend in Figure 4). In Denmark, numbers have declined too after 1999, but this involves a rather small number (2004: 476 pairs).

In 2005, research to investigate breeding success and the impact of predation have started in the Leybucht Area (Niedersachsen) and the Dollard (Netherlands). Comparative studies are recommended at other sites (both with declining

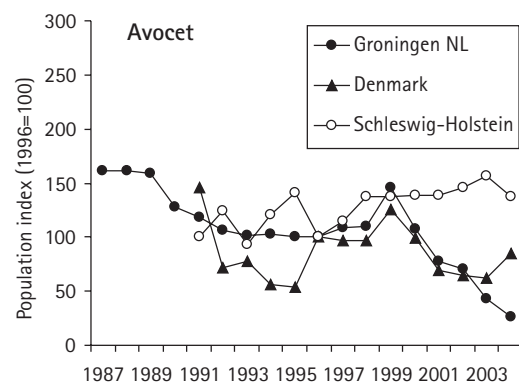


Figure 4: Trend in Avocet along the mainland coast of Groningen (Netherlands) 1987–2004 compared with population trends in Denmark and Schleswig-Holstein (based on indices retrieved from total counts).

and increasing or stable trends), including surveys or data analyses to quantify the impact of habitat changes and possible changes in food availability. Although predation seems to be the most likely cause for the declines, it cannot be excluded that other factors contribute as well.

Kentish Plover on the brink of extinction

Kentish plover is one of the few species which has experienced a continuous decline in breeding population in the Wadden Sea throughout the 1990s, a trend which is especially worrying since the Wadden Sea is the species' main stronghold in NW-Europe. Compared to the population in 1991, only 60% (340 pairs) remained in 2001. This decline was recorded in all countries but Denmark, where the population even increased. From 2001 to 2004, a further reduction in numbers of about 35% (at least 218 pairs) occurred. Niedersachsen lost a large part of its population recently, with a decline from 54 to 19 pairs (- 65%) between 2001-2004. On most of the East-Frisian islands the species has become nearly extinct, and remaining populations along the mainland coast are assumed to vanish as they only temporarily benefited from reconstruction works in the Leybucht area. Also in the Netherlands, the species is becoming increasingly rare, with only 32 pairs left in 2004. Schleswig-Holstein and Denmark, which represent the core breeding regions within the Wadden Sea, have reported recent declines too. Major breeding sites in 2004 were Rømø (60 pairs), several coastal wetlands in Nordfriesland (at least 32), and the area around St. Peter Ording at the Eidersted peninsula (41 pairs).

Thus, 60% of the current population in the Wadden Sea is confined to only three breeding regions! Protection, i.e. preventing breeding sites disturbed by recreation, will be extremely important here to avoid further declines. Moreover,

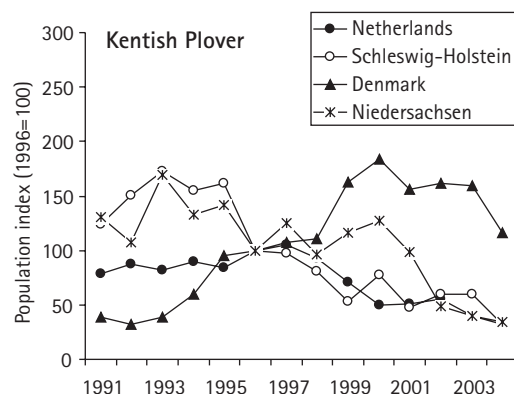
the population in coastal wetlands in Schleswig-Holstein might not be able to keep its current population as predation is assumed to increase and vegetation succession will deteriorate breeding habitat unless livestock-grazed or intensively grazed by geese. Furthermore, conservation action is urgent at sites where only scattered populations still exist or where the species occurred recently. In the Dutch Wadden Sea, a special project, in which nature conservationists and local authorities collaborate, has been proposed for breeding sites at beaches, but this should be implemented before the population reaches a level where it will not be sustainable. Furthermore, restoration of coastal dynamics, of which both Kentish Plover and Great Ringed Plover would benefit, should be stimulated. It is not known to what extent Kentish Plover is also influenced by other factors, e.g. outside the breeding areas. BirdLife International (2004) has reported declines throughout most of the breeding range, indicating that not only local conditions in the breeding areas contribute to the observed downward trend in the Wadden Sea.

Rare breeding birds

In line with the increase in the SW-Netherlands, the number of Little Egrets (*Egretta garzetta*) has recently increased in the Wadden Sea. So far, settlements have only been observed at some Dutch Wadden Sea islands (2004: seven pairs at Schiermonnikoog), but considering numerous spring-observations at other sites in the Dutch Wadden Sea it is expected that the species will further expand in due course, at least to Niedersachsen. Another thriving species is Mediterranean Gull. Similar to little egret, this species has established strongholds in the SW-Netherlands and along the Belgian coast. Despite this upward trend and increasing numbers of breeding birds in the Elbe estuary (Boschert, 2002), the population in the Wadden Sea has only gradually increased (2001: nine pairs, 2004: 16 pairs). In addition, the species is frequently observed without confirmation of breeding, often in colonies of Black-headed Gull. Sightings of ringed birds point at different origins (e.g. one Hungarian-ringed bird and SW-Netherlands-ringed bird in Polder Breebaart/Dollard, Netherlands; R. Oosterhuis & A. Boven, pers. comm.).

Gull-billed Tern (*Gelochelidon nilotica*) has its only NW-European colony in the Wadden Sea and is now mainly confined to the salt marsh of Neufelderkoog, in the Elbe estuary in Schleswig-Holstein. Between 2001 and 2004, the population declined from 56 to 25 pairs. According to

Figure 5:
Trend in Kentish Plover in the Wadden Sea 2001-2004 (based on indices retrieved from total counts).



data collected during autumn migration in the Netherlands, these birds have a regular breeding success. Between 1988 and 2001, the amount of first-year birds on migration ranged from 25–51% (Vlek, 2002). However, in 2002 breeding nearly failed since only 6% first-year birds were observed. Among passerines, there was a remarkable report of Red-backed Shrike (*Lanius collurio*) (two pairs) at Spiekeroog (Niedersachsen). This dune-breeding species has become extremely rare on the Wadden Sea islands. The population on the island of Ameland, one of the former strongholds in the Netherlands, disappeared already in the 1990s (SOVON, 2002). By this time, the breeding population in dunes in the Netherlands became extinct

Future prospects

Trends in breeding birds in the Wadden Sea for many species point at increases. Considering newcomers like Little Egret and Mediterranean Gull, we can also report an increased species-diversity. However, some characteristic Wadden Sea breeders show serious declines, like Hen Harrier, Oystercatcher, Avocet, Great Ringed Plover, Kentish Plover and Short-eared Owl. In some species (e.g. Oystercatcher) backgrounds of these downward trends have been studied and are known to a large extent. For most other species, however, there is hardly evidence which factors contribute to the observed declines, and e.g. for Hen Harrier and Short-eared Owl there are even contrary trends within the Wadden Sea. The largest gap in knowledge is lack of data on reproduction (*i.e.* monitoring of breeding success) and survival (*i.e.* bird ringing).

With the current TMAP breeding bird monitoring program, trend assessments have become well possible. However, factors causing the observed population trends are largely unknown in most species, but urgently needed when e.g. conservation action has to be undertaken. In most declining species it is not clear if they fail to breed at all or e.g. if they cannot raise enough offspring due to food-shortage or other factors. Monitoring of breeding success, as earlier proposed by Thyen *et al.* (1998), would therefore be a valuable extension of the monitoring program for breeding birds and could also underpin discussions on e.g. predation pressure and vegetation succession. Both aspects have been extensively discussed, but often without the backup of sound data. Within this context we also recommend to improve analysis on existing data on e.g. breeding bird trends and vegetation developments, as done earlier by Schrader (2003) for some census areas in salt marshes in

Schleswig-Holstein. Several other TMAP-monitoring schemes retrieve data on their own, but when comparing and analyzing data from several programs it would become possible to assess some of the observed trends in breeding birds.

References

- Boschert, M., 2002. Bestandssituation der Schwarzkopfmöwe *Larus melanocephalus* in Deutschland unter Einbeziehung der ersten bundesweiten Zählung 1999. Vogelwelt 123: 241 - 252.
- BirdLife International, 2004. Birds in Europe II. BirdLife International, Cambridge.
- van Dijk, A.J., Dijksen L., Hustings F., Koffijberg K., Schoppers J., Teunissen W., van Turnhout C., van der Weide, M.J.T., Zoetebier D. & Plate C., 2005. Broedvogels in Nederland in 2003. Sovon Vogelonderzoek Nederland, Beek-Ubbergen.
- Koopman, K., 2003. De balans van 20 jaar ringonderzoek aan broedvogels bij Holwerd. Twirre 14 (3), 73-80.
- Overdijk, O., 2004. De Lepelaar als ambassadeur voor bescherming van internationale trekroutes. Limosa 77: 93-100.
- Rappoldt, C., Ens, B.J., Dijkman, E. and Bult, T. 2003. Voedselreservering voor Scholeksters in de Nederlandse Waddenzee. EVAII deelrapport B1. Alterra, Wageningen, Alterra rapport 882, 1-152.
- Schrader, S. (2003). Zehn Jahre später – Brutvogelbestände in unterschiedlich beweideten Salzwiesen der schleswig-holsteinischen Festlandküste. Vogelkdl. Ber. Niedersachs. 35: 167 - 172.
- SOVON, 2000. Atlas van de Nederlandse broedvogels 1998-2000. Nederlandse Fauna 5. NNM Naturalis, KNNV Uitgeverij and EIS, Leiden.
- Thorup, O., 2004. Ynglefugle i Vadehavet 2004. NERI, Kalø. http://www2.dmu.dk/1_om_dmu/2_afdelinger/3_vibi/nyhedsbreve/Vadehavet2004.pdf
- Thyen, S., Becker, P.H., Exo, K-M., Hälterlein, B., Hötker, H. and Südbek, P., 1998. Monitoring breeding success of coastal birds. Final report of the pilot studies 1996-1997. Wadden Sea Ecosystem Ecosystem No. 8. Common Wadden Sea Secretariat, Wilhelmshaven.
- Verhulst S., Oosterbeek, K., Rutten, A.L. and Ens, B.J., 2004. Shellfish fishery severely reduces condition and survival of oystercatchers despite creation of large marine protected areas. Ecology and Society 9 (1): 17. www.ecologyandsociety.org/vol9/iss1/art17.
- Vlek, R. 2002. Lachsterns Gelochelidon nilotica op slaappleaatsen rond het noordelijk IJsselmeergebied. Limosa 75: 147-158.
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Harbour Seal Counts

Trilateral Seal Expert Group
(TSEG)

Counting Harbour Seals in the Wadden Sea in 2004 and 2005 - Expected and unexpected results



Harbour seals on
a sandbank
(Photo: S. Tougaard).

Results of the aerial surveys in 2004

Following the Trilateral Seal Management Plan, harbour seals in the Wadden Sea are monitored annually by a series of five aerial surveys. The 2003 census has shown the extent of the 2002 distemper mass mortality. The 2004 counting data documents the first step of the recovery of the seal stock. In the peak moulting season in early August, maximum numbers of seals counted in the Wadden Sea were 3,194 in The Netherlands (NL), 3,098 in Niedersachsen (Nds)/Hamburg, 5,032 in Schleswig-Holstein (SH), and 1,479 in Denmark (DK), a grand total of 12,803 seals. Maximum figures for newborn seals counted during the late pupping season in late June / early July make up a grand total of 3,704, with 694 in NL, 946 in Nds, 1,781 in SH, and 283 in DK (the latter may be biased downwards due to an early count date).

The total number of seals counted is 18% higher than the 2003 result, which compares to the pre-epizootic average growth rate of 12-13% per year. Of course, year-to-year records can differ from the actual growth rate due to random or methodological effects. The figure of 18% in fact remains within the previous range of annual changes in counts from the moulting season. However, we actually did expect an elevated stock

increase after 2003 (see WSNL 2003-2, page 11). This was based on evidence of a temporary surplus of adult female seals, at least in part of the population, caused by the mass mortality in 2002. An elevated proportion of females in turn means elevated productivity, as was in fact observed in 2003. It is emphasized that we do not relate high productivity to lower seal density. Although population size increased by a factor of five between 1989 and 2002, fertility of seals is considered stable throughout that period.

Surprisingly, productivity appears even higher in 2004 than in 2003: The number of newborn seals counted is as much as 25% higher than in 2003, and the ratio between the count of newborns and the total count in August (which contains only very few pups of the year) is 29%, compared to 27% in 2003. Due to the presumably high recruitment of young seals born in 2003, which do not contribute to the 2004 pup production, we had rather expected a lower per capita birth rate this year. Of course, count results do not precisely reflect birth rate or changes thereof. For instance, the fraction of seal pups born in a year that is actually counted may be influenced by the temporal spread of births, the average length of lactation, and survey dates. Nevertheless, certain demographic effects related to the 2002 seal epidemic (i.e. skewed sex ratio amongst

survivors, certain rate of reproductive failure in 2002) are considered in order to explain recent count results.

In any case, harbour seals are likely to recover quickly from the blow in 2002. Assuming a current growth rate around 18% per year, which may level off to the normal 12–13% within three years or so, rebuilding of the 2002 stock size may be expected at least until 2008.

Results of the aerial surveys in 2005

In 2005, the total number of seals counted during the moult period in August was 14,275. This number consisted of 1,720 in Denmark, 5,505 in Schleswig-Holstein, 3,607 in Niedersachsen/Hamburg and 3,443 in The Netherlands. The maximum number of pups counted during the whelping season in June was 4,507, in detail: Denmark 388, Schleswig-Holstein 2,046, Niedersachsen/Hamburg 1,176 and The Netherlands 897.

This is an apparent increase of 11.5% compared to 2004, and close to the average annual growth rate of 12–13% observed in the pre-epizootic period 1990–2001. As the increase from 2003 to 2004 was 18%, the average growth rate observed so far after the epizootic in 2002 is higher than

before the epizootic. This corresponds to the remarkably high ratio of pups versus total number of seals found over the last three years. This ratio was 27–31% for the period 2003–2005, compared to 20–25% for the period 1990–2001.

Elevated productivity may partly be explained by a female-biased demography as a consequence of the 2002 mass die-off. Population recovery to the pre-epizootic level may be expected by 2007/2008.

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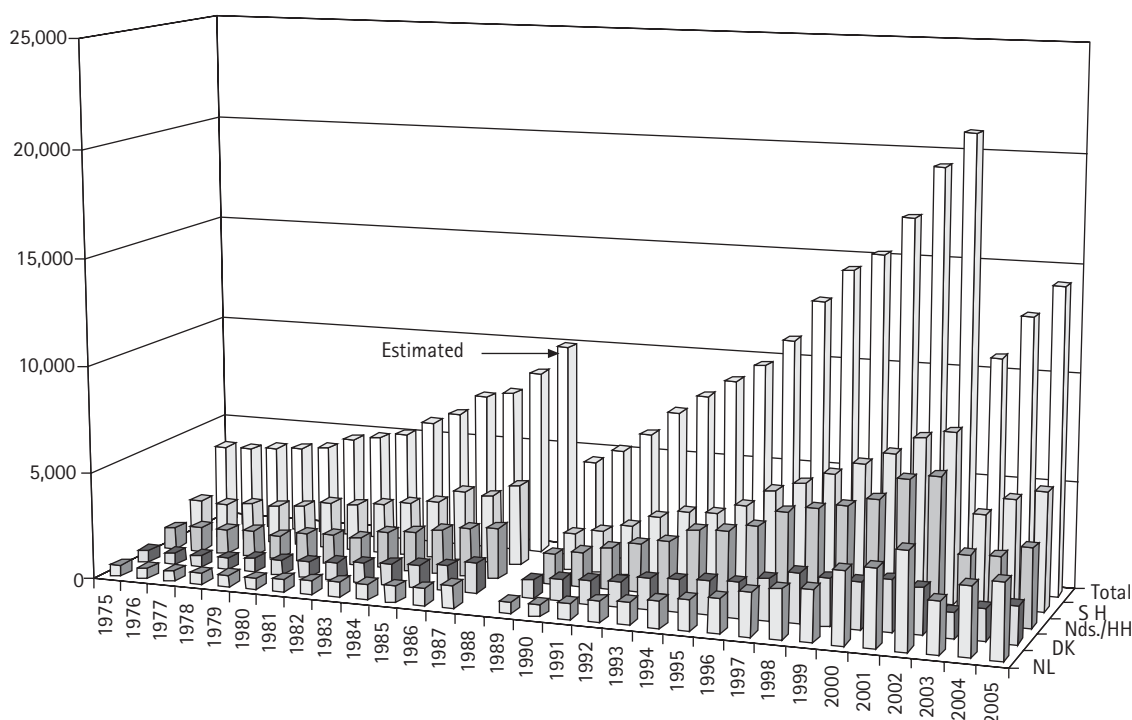


Figure 1:
Number of counted seals
in the Wadden Sea since
1975.

LANCEWADPLAN



Bauernhaus Wiedingharde
(Photo: ALSH)



Manfred Vollmer, Common
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LANCEWADPLAN Passing on the Treasure

Background

With its wide open skies and flat horizons, the Wadden Sea region extends over the borders of Germany, Denmark and the Netherlands, and is one of the best preserved landscapes in Europe. Popular with tourists, it boasts a natural, tidal landscape, full of life, and islands with beaches, marshes and small villages. Along its coast you will find expanses of green pastureland, ancient seawalls and waterways, farmhouses, churches, and an impressive number of ancient "mounds", or man-made hills used as dwelling places, sometimes for over two thousand years. But the region is undergoing rapid development and transformation, as it has to provide housing and services for growing numbers of inhabitants. Industry and farming also need space for development. An integrated strategy is needed to balance economic growth with preservation of the landscape and cultural heritage of the region. However, such a strategy is only possible with a transnational approach.

Aim

The LANCEWADPLAN project has been set up to present a plan for the sustainable development and preservation of the Wadden Sea region. One of the project's chief goals is to reinforce sectoral planning, for example agriculture or housing, and spatial planning with a clear input of the values of heritage. It also looks at how they can be treated not as a barrier but as an opportunity in a region that extends over the borders of three separate countries. Rather than managing the heritage with a focus on single interests and responsibilities, the

project aims at integrated policies and strategies, involving horizontal and vertical responsible levels, and to deal with the common Wadden Sea cultural heritage and landscapes as an entity.

Of equal importance to the project is enhancing the awareness of the values of heritage to inhabitants and governments, as well as local and regional groups working on landscape and cultural history in the region. This is a precondition for sustainable management and development.

Activities and Outcomes

Central to LANCEWADPLAN is the development of an "Integrated Landscape and Cultural Heritage Management and Development Plan" for the Wadden Sea Region. This document lays out an integrated policy for the overall management of the region, as well as guidelines for regional and local spatial planning. It takes into account the views of diverse groups of stakeholders, from heritage experts, spatial planners and farmers to environmentalists and politicians. Furthermore, the cultural landscape plans are in accordance with the relevant ICZM principles to reach sustainable solutions and a broad acceptance among the stakeholders and the public.

The partnership will develop a common policy to resolve such issues as large-scale developments planned on sites of cultural or historical importance, or the restoration and preservation of ancient landmarks. The plan highlights the idea that sustainable use of heritage is the key to preserving the assets of the region in a way that is economically viable.

A central task of the project is to design ways to use the opportunities for economic and social development, which the heritage offers and to contribute to the economic and social cohesion of the region.

LANCEWADPLAN is carried out in the framework of the official trilateral Wadden Sea Co-operation, made up of the governments of Germany, Denmark and The Netherlands. All three governments are committed to the implementation of the Integrated Landscape and Cultural Heritage Management and Development Plan for the Wadden Sea Region. They will be able to use the project's results in the making of policies at a local and regional level.

Cooperation with The Wash

The Wash area is on the east coast of middle England and could be described quite simply as a large, shallow embayment with five estuaries surrounded by a hinterland of fenland, but defined in slightly more detail, there are various characteristic landscape types.

The area shares many similarities with the Wadden Sea region, particularly with regard to landscape patterns and maritime heritage. The

Wash Estuary Strategy Group recently completed a wide-ranging review process consulting extensively with the stakeholders to develop an integrated management plan for the area which has a whole series of policies to help protect and enhance the cultural landscape and historic environment assets of the area. Working in partnership with the Wash Estuary Strategy Group will lead to a sound knowledge exchange and to a desirable support in achieving the project aims.

Further information: www.lancewadplan.org

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Waldusener Tief, Pellworm
(Photo: ALSH)



HARBASINS

Herman Mulder, RIKZ
Haren, NL

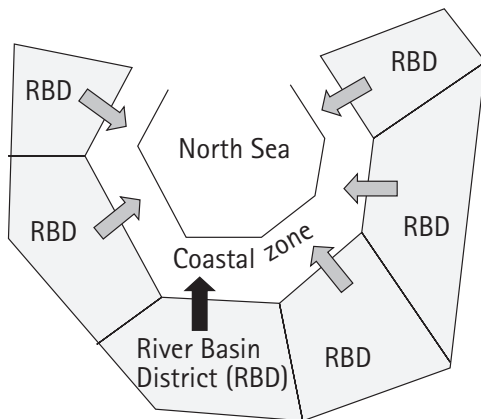


Figure 1:
Various River Basin Districts
(RBDs) meet in the coastal
zone of the North Sea.

on Spatial Development.

The management of the European waters is governed by the EU Water Framework Directive for river basins as well as various international agreements for the coastal zones. However, river basins usually cross borders, regional as well as national. Even within countries, management strategies are not always coordinated. On the other hand coastal zones are regarded as ecological entities and encompass several river basin areas, as illustrated in the figure below. The coastal zones are guided by various international agreements, such as those of the Oslo-Paris Convention (OSPAR) and the Trilateral Wadden Sea Cooperation. This may sometimes result in different approaches which are not well tuned with the implementation of the relevant European Directives. An overall coordination of the different practices and initiatives is needed in order to integrate the North Sea as one region.

Therefore the aim of the project is to enhance the compatibility of the management strategies for the North Sea's coastal waters, estuaries and river basins. The focus is on harmonisation of the EU Water Framework Directive and international cooperation on integrated management of coastal zones.

The project is divided into 5 work packages. Work package 1 on Harmonisation River Basin Management Strategies deals with the overall objective of harmonising management strategies and will integrate the results of 3 other work packages. These work packages are (2) Estuarine Ecosystem Functioning and Health, which deals with the biological quality of the system, (3) Trans River Basin Pollution, concerning the chemical qual-

ity, and (4) Hydro-morphological Pressures and Impacts, which is related to the physical quality. A fifth work package contains the Overall Project Management and Knowledge Dissemination.

In 2005 a new project was started, called 'Harmonised River Basin Strategies North Sea' (HARBASINS), which links to the Trilateral Wadden Sea Cooperation. The project runs until mid 2008 and has a total budget of EUR 3.1 million. It is co-funded by the European Regional Development Fund (ERDF) Interreg IIIB North Sea Programme, a Community Initiative concerning Transnational Cooperation

ity, and (4) Hydro-morphological Pressures and Impacts, which is related to the physical quality. A fifth work package contains the Overall Project Management and Knowledge Dissemination.

In the first phase of HARBASINS a network of public authorities and scientific institutions will be created, encouraging the communication required for establishing optimum management, monitoring and assessment techniques. HARBASINS will hold forums and seminars to further these discussions and will publish a website for the dissemination of data and expertise. One aim of the project is to standardise scientific parameters, for example, the partners would like to agree a fish-based index for assessing ecosystems. Another aim is to set standard levels of contaminants in sediment and suspended matter as indicators for measuring water pollution. Sediment is a defining ecological factor as it strongly influences the variety and abundance of fish and bottom-dwelling, or benthic, fauna. An important item is the harmonisation of monitoring, which links, for example, to the Trilateral Monitoring Programme (TMAP).

The 6 partners in the project come from 4 countries:

- National Institute for Coastal & Marine Management (NL, Haren) Lead Partner
- Institute of Estuarine & Coastal Studies (UK, Hull)
- Institute for Forestry and Game Management (B, Groenendaal)
- Lower Saxon State Agency for Water Management, Coastal Protection and Nature Preservation -Coastal Research Station- (G, Nordene)
- Northern Netherlands Department of Rijkswaterstaat (NL, Leeuwarden)
- Common Wadden Sea Secretariat (G, Wilhelmshaven)

Recently the project was presented on a poster during the Tenth Trilateral Governmental Conference on the Protection of the Wadden Sea at Schiermonnikoog, November 3, 2005.

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Coastal salt marshes throughout the world - Significances and mechanisms in life histories of waders

Workshop at the International Wader Study Group Annual
Conference, Papenburg, 5 November 2004

Stefan Thyen, Klaus-
Michael Exo, Harald
Marencic, Nadine Oberdiek,
Jennifer Smart & Martin
Stock



Salt marsh on Spiekeroog
(Photo: H. Marencic)

Salt marshes are globally distributed and are often important breeding, staging or wintering habitats for virtually all flyway populations of wader species. More than 280 Ramsar sites around the world include intertidal marshes. Eight of the world's 13 most important intertidal areas for migratory waterbirds include salt marshes. Similar to other examples such as Delaware Bay (West Atlantic Flyway) and Saemangeum (East Asia-Australasia Flyway), the European Wadden Sea annually supports more than 2.6 million waders within the East-Atlantic Flyway. As demonstrated by these examples, salt marshes are obviously of essential and global importance on nearly all flyways. However, these and many other examples raise several questions about the function and importance of these habitats for waders and other waterbirds. Although salt marshes are fundamental components of many stopover sites, our knowledge of the functioning of salt marshes for staging waders appears to be very limited (in contrast to species groups such as geese). Moreover, knowledge about the role of salt marshes for breeding waders appears to be even more limited, except for a few species breeding in Europe and North America.

The workshop was therefore organised with the aim of 1) reviewing existing knowledge, 2) identifying requirements for further research and conservation, 3) emphasizing the global impor-

tance for waders, 4) publicising conclusions to international/national research groups, administrations and NGOs and 5) inspiring the implementation of existing knowledge in management and monitoring schemes. Fifty experts attended the workshop and 13 talks and two posters were presented originating from nine study areas in Europe, Canada and South America, ranging from single species studies to ecosystem approaches.

Studies in the Wadden Sea and the UK showed that salt marshes are the most important breeding sites for several coastal wader species breeding in Europe. The abundance of species such as Eurasian Oystercatcher *Haematopus ostralegus* and Pied Avocet *Recurvirostra avosetta* are higher in salt marshes than in other wetlands. Furthermore, this was also shown to be the case for Common Redshank *Tringa totanus*, which is in decline over a wide range of European breeding sites except for Wadden Sea salt marshes. However, detailed studies on fitness consequences of breeding on salt marshes are largely confined to Oystercatchers and Avocets breeding in the Wadden Sea. Relatively little is known about species with different life-history traits (e.g. nesting ecology) such as, e.g., Redshank. Particularly in these species, the structure and topography of salt marshes may itself play a decisive role in fitness. However, this assumption has never been investigated in

long-term studies including breeding success. In addition, virtually nothing is known (or at least published) on numbers, density and breeding ecology of waders breeding in salt marshes outside Europe.

In contrast to breeding birds, numbers of waders stopping over at wetlands and intertidal areas are relatively well known, at least at the most important hot spots throughout the world. In addition, the functioning of stopover sites including intertidal areas as foraging grounds, adjacent high tide roosts and its ecological inter-relationships have been relatively well studied with examples originating from Europe, Australia and the Americas. However, the role of salt marshes within stopover ecology and fitness consequences of roosting and foraging in salt marshes have been studied far less and possibly even underestimated as factors influencing the annual life cycle of waders. Besides functioning as high tide roosts, salt marshes affect the stopover ecology of waders through many further mechanisms. They can affect sediment-prey-wader inter-relationships through energy and nutrient fluxes. They can serve as alternative or supplementary feeding sites used during periods of high tide or severe weather. Salt marshes are thus suited to expand temporal or energetic bottlenecks during migration. Though, apart from some secondary habitats (e.g. Mediterranean saltworks), the quantitative significance of using salt marshes as feeding sites and its density-dependence as well as individual (body condition, age) and environmental covariates (weather, predator density) has hardly been estimated.

Thus, as highlighted by the talks, there is some evidence that salt marshes are of potential importance for coastal breeding and migratory waders including their potential as relatively undisturbed hideaways of inland (breeding) waders suffering habitat losses elsewhere. Nevertheless, little is known of the mechanisms behind this importance and the consequences of breeding, roosting and feeding on salt marshes either at an individual or population level. This lack of knowledge is not only crucial from a scientific point of view, but also in the successful implementation of conservation and monitoring schemes. Threats to salt marshes leading to considerable habitat changes or even habitat loss are manifold including, e.g., reclamation of large intertidal areas as recently at Nordstrander Bucht, (Germany), Cardiff Bay, (Wales), or as presently (but meanwhile interrupted) at Saemangeum, (South Korea). Furthermore, climate change and sea-level rise (e.g. low lying areas in

SE England) during forthcoming decades and clay removal from salt marshes for dike construction (e.g., Germany) are important threats to salt marsh habitats. Agricultural usage through mowing, cattle grazing and artificial drainage lead to habitat changes by altering topography and vegetation structure. To qualify salt marshes as protected areas and to predict the effects of habitat change and habitat loss, the number of breeding, roosting and wintering waders using these habitats has to be estimated. In addition, at least in selected model species representing different life-history and migratory strategies, there is a need to acquire knowledge of how waders use salt marshes during different stages of their annual cycle and which factors are important determinants of fitness. To examine the effects of habitat change and the efficiency of management measures, schemes for monitoring demographic parameters such as population size and breeding success should essentially be implemented. Even though not yet fully implemented, the Trilateral Monitoring and Assessment Program (TMAP) of the three nations neighbouring the European Wadden Sea (Trilateral Wadden Sea Co-operation) should be mentioned as an example of a successful monitoring scheme combining a wide set of, amongst others, habitat and biological parameters.

Considering this background information, the workshop participants discussed and agreed the following conclusions and recommendations:

- It is widely acknowledged that salt marshes throughout the world are of importance for waders using these habitats as breeding, roosting and feeding sites.
- There are many studies showing to what extent and in what manner salt marshes are used by waders during their annual cycle. However, compiling existing knowledge reveals very distinct geographic as well as topical gaps in our knowledge and in conservation.
- Main studies of the numbers and ecology of waders in salt marshes originate, with very few exceptions, from European and North American breeding and stopover sites, with the exception of single studies in Argentina. We have insufficient knowledge from Korean wetlands and virtually nothing is known from salt marshes in the rest of the world, in particular South America, Asia and Australia.
- Existing studies mainly follow single species approaches concentrating on a few selected species and on a few topics on breeding and stopover ecology of waders. Examples of hot

topics insufficiently considered at present may include long-term studies of breeding density and breeding success of salt marsh breeding waders including influencing factors such as sea-level rise, on effects of predators on breeding and stopover populations, and on effects of salt marsh dynamics on breeding as well as stopover populations. As suggested by some European studies, it has to be questioned if predation in salt marshes is on the increase and if salt marshes may therefore be acting as sink habitats for some wader populations. Thus, a wide range of questions have to be addressed following individual, population and ecosystem level approaches.

- Largely resultant from the lack of knowledge, there is a strong disparity in the distribution of Ramsar sites and protected areas including salt marshes. About 180 out of 285 salt marsh Ramsar sites worldwide are located in Europe and one third of the European Ramsar sites are located in the UK. In contrast, in Asia only 10 Ramsar sites including salt marshes exist and North America and the Neotropics each have less than thirty.

- It therefore is recommended that there is an urgent need
 - to create a survey of the global distribution of salt marshes and to assess their intrinsic values as well as its global value within wader flyways.
 - to install global, flyway and ecosystem wide co-operations including research and conservation organisations agreeing upon hot spots and hot topics at different spatial scales.
 - to consequently derive and implement conservation and management needs including agricultural management or natural development of Wadden Sea salt marshes and the creation of new salt marsh areas to replace future losses in relation to sea-level rise.
 - to design integrated population monitoring schemes which inevitably should include, at least, monitoring population sizes (breeding as well as migratory birds) and necessarily monitoring breeding success. Considering the example of the TMAP in the Wadden Sea, the need for monitoring breeding success not only should be acknowledged, but also be implemented.

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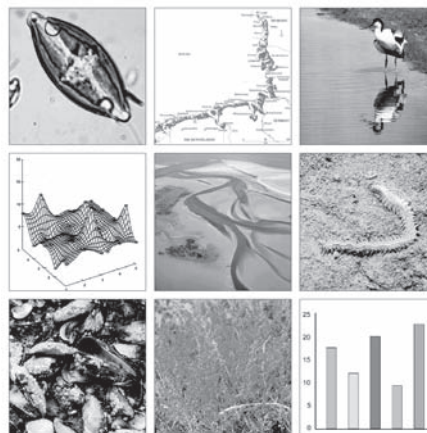
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Monitoring and assessment in the Wadden Sea – Foundations and Perspectives

11th International Scientific
Wadden Sea Symposium

Esbjerg, Denmark, on 4 – 8
April 2005



The 11th International Scientific Wadden Sea Symposium organized by the National Environmental Research Institute (NERI), was held 30 years after the 1st Scientific Conference which convened on the island of Schiermonnikoog, on 26 – 28 November 1975. The focus of this 11th symposium was on "Monitoring - Foundations and Perspectives" in order to scientifically support the evaluation and revision of the Trilateral Monitoring and Assessment (TMAP). It was attended by 159 scientists, government officials and representatives of non-governmental organizations. During the symposium 66 scientific papers and 26 posters were presented and discussed, from which a large number of recommendations for improvement of monitoring and assessment in the Wadden Sea area resulted. The recommendations were edited by Prof. Wim Wolff together with the Preparatory Committee. The complete list of the 42 recommendations adopted can be downloaded at www.waddensea-secretariat.org

The symposium underlined that research deserves more attention because of the value it adds to monitoring and assessment. Results of concomitant research – inside as well as outside the Wadden Sea Cooperation Area – can be used in the design and optimization of monitoring programs, and are of importance for a proper assessment. For example, current monitoring programs insufficiently covered lower trophic levels (phytoplankton, zooplankton) and the processes that regulate primary and secondary production. Information on these parameters was vital for the understanding of the functioning of the whole ecosystem and monitoring of relevant parameters should be promoted. Furthermore, habitat changes such as the loss of muddy intertidal flats and the increased area of hard substrate (stones) habitats, as well as the occurrence of alien species should be assessed with regard to possible functional shifts in the Wadden Sea.

Wim Wolff chaired the plenary discussion of the symposium recommendations (Photo: H.Marencic).





Plenary meeting at the Esbjerg Symposium (Photo: H. Marencic).

The symposium stressed that the present TMAP Common Package was limited. In addition, the issues of concern for the Wadden Sea were partly the same as 10 years ago when the TMAP had been established. New issues came up the last decade such as sea-level rise, the food supply of migratory birds, introductions of exotics, the lack of dynamics of dune and salt marsh vegetation, the changing of the functioning of the mudflats by processes such as coarsening of the sediment and shift of bivalve recruitment to the upper tidal zones. This led to the recommendation to reconsider the contents of the TMAP program, taking into account identified gaps such as fish, exotics, beach parameters and composition of tidal-flat sediments.

In the TMAP Revision process the parameter package and habitat coverage must be elaborated with a view to adequately serve both the assessment objectives of the Wadden Sea Plan and the monitoring requirements of the relevant EU Directives. During this revision process adequate attention should be given to further improvement and harmonization of parameter measurement, including quality control of the data produced. In this context, the TMAP data handling system needs to be further optimized to enable efficient dissemination of data and information. Structural funding of this system needed to be secured. The symposium recommended that during the TMAP revision process various experts and expert groups should be involved to support the Trilateral Monitoring and Assessment Group (TMAG) in charge of the TMAP. The EU Directives set specific pre-conditions for monitoring and assessment of the Wadden Sea ecosystem. This should be taken into account in the TMAP Revision process.

The symposium was once again an excellent

opportunity and platform to exchange results from research and monitoring and to intensify the communication between researchers and managers. A special acknowledgement was made to Prof. Wim Wolff who has attended the scientific symposia for over 30 years – from the start as the editor of the proceedings of the first symposium in 1975 on Schiermonnikoog up to the recent 11th symposium as member of the scientific committee. On the occasion of his retirement in November 2005 the symposium thanked him for this great commitment during such a long period and wished him all the best for the coming years.

A prize was offered to the speaker at the symposium who could present the longest time series in monitoring. Some biological monitoring could present results during a 40–50 year period, which is impressive. However, Prof. Dr. Karl-Ernst Behre from Niedersächsisches Institut für Küstenerforschung presented a time series of 8,000 years, analyzing sea-level changes in the southern North Sea. This study made him an obvious candidate for the prize.

Papers presented at the symposium are in the editing process, and are expected to be published during 2006.

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Publications

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Cultural-historic portrait of the Wadden Sea region

Abrahamse, J., Bemelman, M and Hillenga, M. (Eds.), 2005:
Wadden. Verhalend Landschap. Cultuurhistorische reis langs
de Waddenkust van Denemarken, Duitsland en Nederland,
Tirion/CWSS, 2005.

Das Wattenmeer. Kulturlandschaft vor und hinter den Deichen.
Theiss/CWSS, 2005.

Vadehavet. Portrætter af et kulturlandskab. Amternes Vade-
havssamarbejde/CWSS, 2005.

The book is available in all bookshops.

Many people appreciate the cultural landscape of the Dutch-German-Danish Wadden Sea Region as unique and exceptional, but few recognize its world class. Three years ago an inventory was made of the landscape and cultural heritage of the entire region. This scientific inventory - the Lancewad project - documented its outstanding international importance, in line with other recognized cultural landscapes such as Tuscany in Italy and Provence in France. The exceptional quality of the cultural landscape heritage of the Wadden Sea Region is that it is shared by three countries.

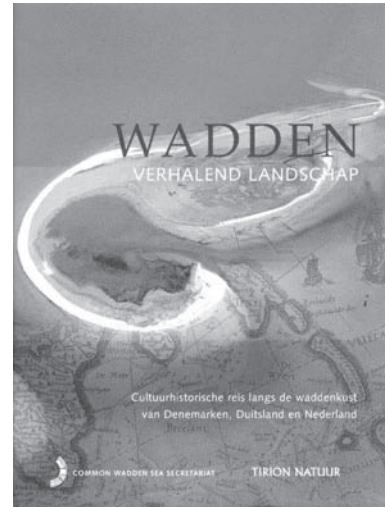
In order to make this heritage accessible to a wide audience renowned authors, literary journalists and landscape historians from the three countries with an affinity of the cultural landscape were asked to write the regional 'stories' inspired by the Lancewad inventory. The regional stories include oral history and interviews with local people.

WADDEN/DAS WATTENMEER/VADEHAVET - uncovers this outstanding landscape and its cultural heritage for a wide audience of interested people who live, work and recreate in the area, for decision makers and for all those readers who are interested in landscape heritage for current and future generations. The book aspires to be an authoritative, comprehensive and impressive standard work based on an unconventional approach.

The book is illustrated with new, mainly full-page high-quality photos by prominent photographers from the three countries.

At the presentation of the book at the Schiermonnikoog Conference, Willem van Toorn, who has written one of the regional contributions, gave the following speech:

*"Your excellencies, ladies and gentlemen, beste vrienden,
it is not without pride and certainly a little bit*



surprised that I am standing here, with these three beautiful books (that is: one book in our three languages). When later you open the book, you will see that the pride speaks for itself. The surprise has to do with the fact that I did not make or initiate the book. I only wrote a contribution - about the most western and most southern part of the Wadden region: the northern part of our province of North-Holland. That modest role means that I don't have to be modest here, I can freely say that the makers made an impressively beautiful book.

When I say beautiful, I mean not only the outer form, but as much the idea of the book. Whole libraries have been published about the natural treasures of the Wadden Sea region - scientific, popular, touristic books, photo books - and please don't misunderstand me, there are never enough of these books. But this book has an unique approach; inspired by the Lance Wad Report it aims at letting the general reader experience the cultural significance of the Wadden Landscapes in our three countries. Experience, because the book is, apart from the amazing photographs, composed of the stories of these landscapes; stories of inhabitants, told in interviews with the writers, memories, daily experiences, ideas about the future. (I, for instance, let myself be guided by one of the finest Dutch landscape painters.) In this way the book shows, in all its richness, the inner life of this collection of man-made landscapes, of farmland and fishing towns and villages, of the medieval churches and ultra-modern ports, the locks, the country roads and dykes, the polders and the eternal presence of the sea. It shows us who we are, who we have been and will be, because there is no better mirror of the human experience than the landscape.

There is also no better mirror of the human arrogance. We don't have to travel far from here

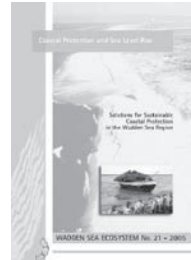
to see shocking examples of what the recreation industry and the property market can do to landscapes. I don't have to be too specific; we all live in the new Europe of the free market, where the new European dreams of building his new house on a waterfront. And the new European is not always a man (or woman) of modesty and good taste.

There is an ongoing discussion in the Netherlands about what nature, and what kind of nature, we wish to protect or create. But it is only since a couple of years that we realize that in our countries we can only see nature as a part of the cultural landscape, the landscape in which people live and work. Human beings have always changed their landscapes to survive, to live in safety and prosperity. But we realize now perhaps more than ever that to a certain extent you can make, or recreate, nature; but that a cultural landscape, with all its layers and stories and signs of human life, is irretrievably lost if you neglect or destroy it. This book is full of the stories and images of our Wadden landscapes, it is like a camera that zooms in on the intimacy of the treasures we have received - to use them, but also to safeguard them. I am happy to give it to you, in the name of the real makers."



Slachtedijk near Oosterbierum, Fryslân, NL
(Photo: H. Scharzbach)

Solutions for Sustainable Coastal Protection



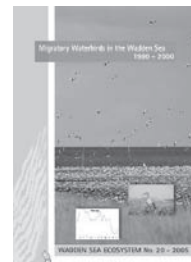
CPSL 2005. Solutions for Sustainable Coastal Protection in the Wadden Sea Region. Wadden Sea Ecosystem No. 21. Final report by the Working Group on Coastal Protection and Sea Level Rise. Common Wadden Sea Secretariat. Wilhelmshaven, Germany. Price 6 Euro, download: www.waddensea-secretariat.org

This is the second report of the Trilateral Working Group on Coastal Protection and Sea-Level Rise (CPSL) which consists of members from nature conservation agencies as well as coastal protection agencies. The first report was published in 2001 and contained three scenarios (sea-level rise of 10 cm, of 25 cm and of 50 cm until 2050) for which impacts on selected physical, biological, and socio-economic parameters were investigated.

The results of the second work phase (2003 - 2005) are presented in the recent report which focus on elaborating integrated coastal defence solutions, which undergo a feasibility check on safety standards, natural assets (best environmental practices), cost-benefit, public acceptance, legal aspects, and "harmony" with other interests in the Wadden Sea (e.g. tourism).

The report served as an input for the 10th Trilateral Governmental Conference for Protection of the Wadden Sea on the island of Schiermonnikoog on 3 November 2005.

Migratory Birds in the Wadden Sea



Blew, J. and Südbeck, P. (Eds.), 2005. Migratory Waterbirds in the Wadden Sea 1980 - 2000. Wadden Sea Ecosystem No. 20. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Joint Monitoring Group of Migratory Birds in the Wadden Sea, Wilhelmshaven, Germany, Price 10 Euro, download: www.waddensea-secretariat.org

This report consists of four contributions and was prepared by the Joint Monitoring Group of Migratory Birds in the framework of the Trilateral Monitoring and Assessment Program (TMAP). In the first and main one, an overview of numbers and trends 1980 - 2000 for all 34 species of the monitoring program is given. In the following three contributions, different authors discuss specific aspects of selected species groups in relation to habitat use, hunting and shellfish fishery.

Harald Marencic, Common Wadden Sea Secretariat, Wilhelmshaven

The report concluded that some 6.1 million migratory birds are present in the Wadden Sea; considering turnover, this number may be as high as 10–12 million birds per year. The majority, about 3.36 million, are waders, followed by 1.66 million ducks and geese and 0.96 million gulls. The world-wide importance of the Wadden Sea is also documented in the fact that almost the entire population of dark-bellied Brent goose and dunlin use the Wadden Sea during several periods of the annual cycle. An additional seven species are present with 50% and further 14 species with more than 10% of their flyway population.

The recent trend analysis shows that 21 out of the observed 34 species experienced a decrease in the population size in the 1990s, 18 of the decreasing bird species feed on benthic species, especially bivalves. The causes of the observed declines are not known in detail for all species. However, the report could provide valuable hints on the probable causes on the regional and the flyway level and thus support management measures in the field.

This detailed analysis reports a comprehensive status and trend description of the migratory birds in the Wadden Sea. It also gives insight into the sometimes difficult but challenging task of compiling data from so many counters and assessing and evaluating them consistently for a broad range of different species taking into account regional developments.

Quality Status Report

K. Essink, C. Dettmann, H. Farke, K. Laursen, G. Lierßen, H. Marencic, W. Wiersinga (Eds.), 2005. Wadden Sea Quality Status Report 2004. Wadden Sea Ecosystem No. 19, Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Wilhelmshaven, Germany, Price 10 Euro, download: www.waddensea-secretariat.org



In June 2005, the newest Wadden Sea Quality Status Report (QSR) was published by the Trilateral Monitoring and Assessment Group (TMAG). The QSR was prepared by over 90 scientists from 50 institutes from the three countries. For the first time, an operational common TMAP data handling system was available.

The QSR contains basic information on human activities and on recent developments in physico-chemical and ecological conditions in the entire Wadden Sea. It also gives an evaluation of the Targets of the Trilateral Wadden Sea Plan together with recommendations for monitoring, research and management which was presented

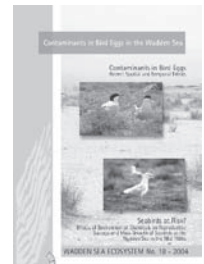
at the 10th Trilateral Governmental Conference on Schiermonnikoog, 3 November 2005.

The joint "Trilateral Monitoring and Assessment Program" (TMAP) has proven its value in enabling a comprehensive evaluation of the Wadden Sea ecosystem as a basis for joint management. The QSR has also illustrated the indispensable value of long-term series for the assessment of trends.

The main results of the QSR (see also page 11) are summarized in a leaflet which is available in German and English.

Contaminants in Bird Eggs in the Wadden Sea

Becker, P.H., J. Muñoz Cifuentes, 2004. Contaminants in Bird Eggs in the Wadden Sea. Recent Spatial and Temporal Trends. Muñoz Cifuentes, 2004. Seabirds at Risk? Effects of Environmental Chemicals on Reproductive Success and Mass



Growth of Seabirds Breeding at the Wadden Sea in the Mid 1990s. Wadden Sea Ecosystem No. 18. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Wilhelmshaven, Germany.

Price 6 Euro, download: www.waddensea-secretariat.org

Birds play a prominent role as bioindicator and are one of the best studied groups of organisms. As top predators seabirds accumulate persistent chemicals which affect their physiology, reproduction and even survival. Bird eggs are a favorable matrix as they indicate the local pollution and also long term trends in pollution load.

In this report, the authors give an overall assessment of the contamination of seabirds for the entire Wadden Sea – for some areas a time series of now 22 years could be analyzed. For the first time, temporal trends of Chlordane levels are presented. The results give reason to be optimistic, as the burden by pollutants is slowly decreasing. However, there are also some areas which show stagnation or even increase – probably due to local problems or remobilization.

In the second part of the report, the effects of chemicals on reproductive success and mass growth on four common larid species were investigated. Except for the Elbe estuary, where hatching success of common gull was probably impaired by HCB, DDE and HCH, the report concluded that during the 1990s bird reproduction in general was not at risk from toxic substances on the Wadden Sea coast.

The report again shows the value of long term monitoring and the use of birds as both accumulative and sensitive indicators of chemical contamination.

Vegetation of the East-Frisian Islands

Jörg Petersen & Richard Pott, 2005. Ostfriesische Inseln - Landschaft und Vegetation im Wandel. Niedersächsischer Heimatbund (Hrsg.), 160 p, 174 figures, and separate folders with maps. ISBN 3-89993-654-X, Schlütersche Verlagsgesellschaft, EUR 39,90.



The vegetation of the East-Frisian islands was mapped by Prof. Reinhold Tüxen in the 1940s. Later, in the 1990s, the vegetation of the islands was again investigated by several scientists. On basis of these historic records and recent vegetation maps, the authors have carried out very detailed GIS analyses on the long-term development of salt marsh and dune vegetation. The changes of the vegetations are illustrated with an impressive set of maps on a scale of 1:15,000 for each of the examined islands compiled in a separate folder.

The book gives also a comprehensive overview about the geomorphological developments of the Wadden Sea and the barrier islands together with a detailed description of the vegetation of the different biotopes, including neophytes. A historical description of the islands completes the overview, which is illustrated with a set of illustrations and impressive photographs.

The GIS analyses show that embryonic dune areas decreased to one-third, probably as a result of an increased recreational pressure on the beaches. Another alarming result was the decrease of dune slack vegetation to one-third mainly because of ground water extraction and changes in the use of the dune areas. For salt marshes such big changes have not been recorded - however the vegetation within the major salt marsh types has changed, sometimes considerably.

This detailed and long-term vegetation analysis based on GIS data over almost 60 years for such a large area is quite unique, scientifically sound and valuable for monitoring and management. Although this chapter is rather short compared to the previous detailed description of island vegetation and developments, it gives an excellent overview of how the island vegetation has altered during the last decades and how one can react to these developments through proper monitoring and management.

Salt marshes in Schleswig-Holstein

M. Stock, S. Gettner, H. Hagge, K. Heinzel, J. Kohlus & H. Stumpe, 2005. Salzwiesen an der Westküste von Schleswig-Holstein 1988-2001. Schriftenreihe des Nationalparks Schleswig-Holsteinisches Wattenmeer, Heft 15, 239 p., 190 maps. Boyens Buchverlag, ISBN 3804207030, EUR 20.



This book presents an overview of repeated mapping of the salt-marsh vegetation in 1988, 1996 and 2001 of mainland marshes and two Halligen, and in 1996 and 2001 of island marshes. The remaining Halligen has been mapped once, namely, in 2001. The vegetation mapping has been carried out according to the TMAP (Trilateral Monitoring and Assessment Program) typology. Hence, these activities match the proposals made in the recently published chapter 'Salt marshes' in the Quality Status Report 2004 (Bakker *et al.* 2005).

The authors also published an extra map of each site in which it can immediately be seen which areas became covered by vegetation between 1988 and 2001, which parts lost their vegetation, and which parts maintained their vegetation. From this comparison it can be calculated that the total area of mainland salt marshes has increased from 6650 to 7760 ha. For individual sites it turned out that 28 out of 32 sites revealed an increase of the area covered by vegetation. The comparison of vegetation types featured aging of both the mainland and island salt marshes. In other words pioneer communities decreased and later successional stages increased. The pioneer communities increased in sites with enhanced areas covered by vegetation. The two reasons for these changes are assumed to be natural succession and changes in management regime.

It would have been convenient for the reader if a little map of the coastline had been inserted with each vegetation map to indicate the position of the site along the coast. Perfect photographs by Martin Stock illustrate the book.

Conclusion: Schleswig-Holstein provides a good example of the monitoring of salt marshes in the Wadden Sea. The same procedure has been adopted in The Netherlands. Hopefully, Niedersachsen and Denmark will follow in the near future.

Bakker, J.P., Bunje, J., Dijkema, K.S., Frikke, J., Hecker, N., Kers, A.S., Körber, P., Kohlus, J. & Stock, M., 2005. Salt Marshes. In: Essink, K., Dettmann, C., Farke, H., Luerßen, G., Marencic, H. & Wiesersing, W. (Eds). Wadden Sea Quality Status Report 2004. Wadden Sea Ecosystem No 19, pp. 163-179.

J.P. Bakker, Community and Conservation Ecology Group, University of Groningen, Haren, NL

Calendar of Events

2005

Ecosystems in Changing Estuaries

28 - 29 November 2005, Haren, NL
 ECSA Local Meeting, Biological Centre, University of Groningen
www.ecsa-coast.org/local-meeting-groningen-details.htm

2006

Participatory planning and working with natural processes on the coast

19 January 2006, The Hague, NL
 COIREPOINT Conference
<http://corepoint.ucc.ie>

Moving the Global Oceans Forward

23 - 27 January 2006, Paris, France
 Third Global Conference on Oceans, Coasts and Islands, www.globaloceans.org

Coastal Futures 2006 - Review and Future Trends

25 - 26 January 2006, London, UK
www.coastms.co.uk

Estuaries and Enclosed Seas under Changing Environmental Conditions

7 - 11 May 2006, Warnemünde, Germany
 9th International Estuarine Biogeochemistry Symposium
www.io-warnemuende.de/che/9th_iebs

The Coastal Society's 20th Biennial Conference

14 - 17 May 2006, St. Pete Beach, Florida, USA
www.thecoastalsociety.org/conference/tcs20/

New water policies - The Water Framework Directive

17 - 18 May 2006 in Barcelona, Spain
 International Symposium
www.ewaonline.de/pages/workshops.htm#SPA

Case Studies of Innovation

June 2006, Galway, Ireland
 ICES Symposium on Management Strategies,
 Conveners: Poul Connolly (Ireland), Mike Armstrong (UK) and Doug Wilson (DK)

24th International Ornithological Congress

13 - 19 August 2006, Hamburg, Germany
 Hosted by the German Ornithologist's Society and the Institute of Avian Research 'Vogelwarte Helgoland' Wilhelmshaven
www.i-o-c.org/

Coastal Innovation and Initiatives

18 - 20 September 2006, Gdansk, Poland
 Littoral 2006 Conference
www.littoral2006.gda.pl

Fishing Technology in the 21st Century

30 October-3 November 2006, Boston USA
 Fishing Technology in the 21st Century
 ICES Symposium, Co-Conveners: Chris Glass (USA), Bob van Marlen (Netherlands), and Stephen Walsh (Canada), www.ices2006boston.com/

2007

Marine Bioinvasions

May 2007, Washington DC, USA
 ICES-PICES Symposium, Co-Conveners: James Carlton (USA), Erkki Leppäkoski (Finland) and Dr. Yasuwo Fukuyo, PICES (Japan)
www.ices.dk/iceswork/symposia.asp?topic=2007

International Symposium on Integrated Coastal Zone Management

11 - 14 June 2007, Arendal, Norway
 Hosted by the Institute of Marine Research, Norway, www.imr.no/iczm

Contents

The Wadden Sea Newsletter is a trilateral periodical to inform scientific, nature management and policy-making institutions in Denmark, Germany and The Netherlands about research projects, their results, management measures and topical news in the Wadden Sea area.

Length and Structure

"Main theme" articles should be about 3 printed pages (about 1500 words with one figure on each page), short contributions of about one page (about 500 word with one figure) and brief notes are also welcome.

The "main theme" articles should include an abstract of 4 - 7 lines in easy English. The body of the article should be organized in sections with headings.

Only a few (2 - 4) recent references should be added to the contributions.

Example: Becker, P.H., S. Thyen & K.R. Schneider, 1998. Monitoring Pollutants in Coastal Bird Eggs. Wadden Sea Ecosystem No. 8, Common Wadden Sea Secretariat, Wilhelmshaven, pp 59 - 101.

Reference in text: (Becker et al. 1998) or (Beukema & Vlas 1979).

Authors are advised to consult this issue of the Newsletter and follow the conventions for section headings, tables, captions, references, addresses, quotation marks and abbreviations. (see also: <http://www.waddensea-secretariat.org>)

Language

The Wadden Sea Newsletter is published in English.

Format

A hard copy of the text, tables and figures and an electronic copy of the manuscript in WORD or RTF format should be submitted, either as a file attached to an e-mail (preferred) or on a diskette.

With the exception of species names (*italics*) the text should not contain any further formats (e.g. bold, underlined, hyphenation, justified setting).

Photos, Figures, Illustrations, Tables

Photos, figures and illustrations with useful captions and legends are welcome and should be included wherever possible.

Photos should be submitted as slide or photo print. Electronic versions of figures, illustrations and tables should be delivered in black and white (resolution 300 dpi at 9 x 13 cm) and as separate files in the program they have been created with, e.g. Excel, Freehand, CorelDraw or as an Adobe Illustrator format (or another format which can be edited).

Please, send your article to the

Common Wadden Sea Secretariat

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D - 26382 Wilhelmshaven

e-mail: marencic@waddensea-secretariat.org

**Deadline for contributions to the next
Wadden Sea Newsletter
15 March 2006**

Wadden Sea Newsletter 2005 – No. 1

SCHIERMONNIKOOG 2005

10th Trilateral Governmental Conference on the island of Schiermonnikoog _____ 2
By Jens Enemark

Keep on going! Position statement of the nature NGOs _____ 4
By Hans-Ulrich Rösner

Wadden Sea fishing industry please with integrated management strategy _____ 6
Joint statement by the Dutch, German and Danish fishing industry

Wadden Sea Forum – Stakeholder participation, sustainable development and Integrated Coastal Zone Management _____ 7
By Folkert de Jong

International Wadden Sea School – Trilateral education supports long-term protection of the Wadden Sea _____ 9
By Anja Szczesinski

MONITORING AND RESEARCH

Wadden Sea Quality Status Report 2004 ____ 11
By Harald Marencic and Karel Essink

Alien species in the Wadden Sea – A challenge to act _____ 13
By Stefan Nehring and Frank Klingenstein

Perishing blue mussels and invading aliens – What are the reasons for ecological turnover in the Wadden Sea? _____ 17
By Georg Nehls, Susanne Diederich, David W. Thieltges and Matthias Strasser

Highlights of breeding birds in the Wadden Sea in 2003 and 2004 _____ 21
By the Joint Monitoring Group of Breeding Birds (JMBB)

Counting Harbour Seals in the Wadden Sea in 2004 and 2005 – Expected and unexpected results _____ 26
By the Trilateral Seal Experg Group (TSEG)

LANCEWADPLAN – Passing the treasure ____ 28
By Manfred Vollmer

The HARBASINS project _____ 30
By Herman Mulder

CONFERENCES AND MEETINGS

Coastal salt marshes throughout the world – Significances and mechanisms in life histories of waders _____ 31
By Stefan Thyen, Klaus-Michael Exo, Harald Marencic, Nadine Oberdiek, Jennifer Smart and Martin Stock

Monitoring and Assessment in the Wadden Sea – Foundations and perspectives _____ 34
By Karsten Laursen, Karel Essink and Harald Marencic

NEW PUBLICATIONS _____ 36

Cultural-historic portrait of the Wadden Sea region

Solutions fo sustainable coastal protection

Migratory birds in the Wadden Sea

Quality Status Report

Contaminants in bird eggs in the Wadden Sea

Vegetation of the East-Frisian islands

Salt marshes in Schleswig-Holstein

CALENDAR OF EVENTS _____ 40

NOTES FOR CONTRIBUTORS _____ 41