

New Publications

Stability Properties and Mechanisms

Dittmann, S. (Ed.) 1999. *The Wadden Sea Ecosystem – Stability Properties and Mechanisms*. Springer Verlag Berlin Heidelberg, pp. 307, 169.00 DM

In the wake of the designation of the German Wadden Sea as national parks, two applied and two basic research projects on this ecosystem were funded by federal institutions and the states of Schleswig-Holstein and Lower Saxony. The strategic idea was to back up regulations in the national parks by sound scientific knowledge on the natural processes and human impacts. As a result, the German Wadden Sea advanced to one of the best studied coastal ecosystems but science was also blamed for having fostered apparent overregulation. Such an incrimination would be outright misleading concerning the ELAWAT scientists. Their basic research was devoted to the question: How is the persistence of the Wadden Sea ecosystem possible in the face of the frequent and strong disturbances? The general conclusion they offer is that stability is achieved by a high functional diversity and flexibility, high reproductive output and high mobility in the biotic assemblage of the Wadden Sea. High variability is mainly restricted to short terms and a local scale, while at longer terms and a regional scale this gives way to constancy. The synthesis of ELAWAT has now been published.

Traditionally ecosystem research is dominated by quantifying the flow of energy and matter through the web of biotic components. However, the ELAWAT project has chosen a new approach. The investigators focussed on stability properties and attempted to find the processes relevant to the development of spatio-temporal patterns observed in a back-barrier tidal flat area. Although the research was performed by several groups of investigators, altogether 69 according to an appendix of the book, a team of nine writers, headed by Sabine Dittmann, undertook the task to bring the various results and insights into a coherent synthesis. At first sight, this arrangement seemed strange to me. For example, in a chapter on the shore crab, the principal investigator is not among the authors but merely cited. However, in a large project like ELAWAT, it may have been impossible to arrive at the same degree of coherence in the synthesis as this is actually achieved in the present volume.

The book begins with a clear conceptual framework and definitions of essential terms, a general description of the area and methods, and then proceeds with chapters on observed patterns in the benthic and pelagic realm of the tidal basins near

the East Frisian island of Spiekeroog. Emphasis is given to recolonization after experimental disturbance, effects of an ice winter, mud derived from mussel beds and population dynamics of the tube worm *Janice conchilega* in particular. A very promising approach are the grid-based models described in detail. A dynamic view on the Wadden Sea ecosystem is regarded as more appropriate than a static one. With respect to the National Park regulations, it is recommended to prevent all exploitations from selected tidal basins as the best way to secure natural dynamics such as the recolonizations by benthic organisms after disturbances as studied in the ELAWAT project. The same recommendation was voiced earlier by an ecosystem project SWAP, which concentrated on transport processes in the northern Wadden Sea.

The book is very well written and admirably edited, it is highly informative, and I strongly recommend all scientists and graduate students involved in Wadden Sea research reading it. There should be no library without this volume.

Karsten Reise

Salt marshes in Schleswig-Holstein

Stock, M. & Kiehl, K., 2000. *Die Salzwiesen der Hamburger Hallig*. Schriftenreihe des Nationalparks Schleswig-Holsteinisches Wattenmeer. Heft 11, Boyens Verlag, Heide, pp. 88, 19.80 DM

The brochure entails the results of the long-term monitoring of the salt marshes on the Hamburger Hallig from 1991 – 1999 and covers the evolution and recent site conditions, the developments of the vegetation and their influence on the use of this site by geese, breeding bird populations, prediction of future changes in vegetations and suggestions for salt marsh management.

ECSA Seagrass Workshop

Amus, H & Asmus, R., (Eds), 2000. *ECSA-Workshop on Intertidal Seagrass Beds and Algal Mats: Organisms and Fluxes at the Ecosystem Level*. Helgoland Marine Research 54.

Proceedings of an international workshop at the Wadden Sea Station Sylt on 7th – 13th August 1998. Besides a presentation of novel field methods, the workshop discussed the possible causes of seagrass decline all over the world. A brief summary of the workshop is given in the Wadden Sea Newsletter 1999, No. 1.

Dune Slack Vegetation

Petersen, J., 1999. Die Dünenvegetation der Wattenmeer-Inseln in der südlichen Nordsee. Eine pflanzensoziologische und ökologische Vergleichsuntersuchung unter Berücksichtigung von Nutzung und Naturschutz. Husum Druck- und Verlagsgesellschaft, Husum, pp. 205, 78.00 DM

The dunes on the Wadden Sea islands from Texel to Fanø have been investigated during 1994–1999 with respect to the ecology and phytosociology of the dune-slack vegetation, which is the most endangered one of coastal vegetations. On the basis of the results of these investigations, the prob-

lems of nature conservation and management of the dune-slack ecosystems are addressed at both local levels and within the overall Wadden Sea region. For example, recent data is compared with historical time series as recorded from Terschelling in the period 1937 – 1947 and historical forms of land use and their influence on the dune slack vegetations is discussed. In order to preserve the plant communities of moist dune slacks and their biodiversity, a combination of active and passive conservation measures is recommended.

Conferences and Meetings

ECSA-Workshop on Community Ecology of Soft Bottom Mussel Beds

Harald Asmus, Alfred-Wegener-Institute of Polar and Marine Research, Sylt, FRG

An international workshop on the ecology of mussel beds with 42 participants from 6 nations was held at the Wadden Sea Station Sylt of the Alfred Wegener Institute for Polar and Marine Research from August 2 to 6. This workshop focussed on the ecology of soft bottom mussel bed communities, which are typical elements of the Wadden Sea ecosystem and the intertidal sandy and muddy shores of the North Sea coasts and their estuaries. The objectives were to update the state of current research by exchanging experience between different "mussel bed ecologists" and to point out the demand of research issues for the future. We aimed at focussing mainly on basic research and discussed advanced aspects or conflicts between mussel bed ecology and fishery only marginally.

To introduce the workshop guests to the local situation, K. Reise and H. Asmus gave an overview on the ecology of mussel beds near the island of Sylt. They showed that mussel beds provide a unique habitat at sedimentary coasts, and they surpass by far their surroundings in terms of species richness, biomass, productivity, trophic transfer and material cycling. Even at the comparatively small spatial scale like that of the Wadden Sea around Sylt, mussels are highly variable and complex in biogenic structure, species composition and species interactions. This was also confirmed by M. Tsuchiya (University of the Ryukyus, Nishihara, Okinawa, Ja-

pan) who presented the ecological characteristics of mussel beds of Japan and East Asia showing that mussel beds are also able to accumulate biodeposits on exposed rocky shores and create a special environment. He further led the attention to the associated fauna causing a higher biodiversity in mussel beds compared to the ambient areas.

The habitat requirements of blue mussels in the Dutch Wadden Sea were described by B. Brinkman (Alterra, Texel, NL). Mussel beds in the 90s showed high preferences for regions with low wave action and moderate flow velocities as well as immersion times less than 50%. Mussel beds are very susceptible to wave disturbance, and thus an increasing storminess will limit mussel bed distribution in sedimentary environments.

On the other hand, mussels affect their ambient physical environment. This was demonstrated by studies with a laboratory flume by L. van Duren et al (NIOO-CEMO, Yerseke, NL). The filtration activity of mussels has modifying effects on the benthic boundary layer structure. Mussel beds create a microturbulent layer beneficial for food retention. This could also be shown by flume studies by J. Widows (Plymouth Marine Laboratory, UK) who demonstrated additionally that mussel beds accumulate and stabilize sediments at high densities, while low densities and disrupted mussel layers may enhance erosion.

Although larval supply is variable, it is rarely a limiting factor in mussel recruitment. However, larval supply seems to be dependent on parental stocks, as a study by C.P. Günther (AWI, Bremerhaven) on larval abundance of mytilid larvae at different places of the boreal east Atlantic (Wadden Sea to the White Sea) showed.

Recent phases of mussel bed declines in the North Sea may have been caused by a combination of overexploitation and natural disturbances. In the Dutch Wadden Sea, A.C. Smaal (RIVO, Shellfish Research Centre, Yerseke, NL) explained that the large dynamics are owed to variability in recruitment success, climate-induced mortality, predation and fishery. Subtidal stocks of wild mussels show great annual variability, and have decreased since 1990 as well. Subtidal stocks of culture plots are more stable. Especially at the Lower Saxony coast, the development of mussel stocks declined to critical values, presented by H. Michaelis (Landesamt für Ökologie, Forschungsstelle, Norderney, DE). G. Nehls (National Park Office, Wadden Sea Schleswig-Holstein, DE) reported that in the Wadden Sea of Schleswig-Holstein, mussel beds covered an area of 1000ha in 1999, which is about one third of the value found ten years ago. He discussed the development of the mussel stock in relation to recent history, the impact of storms, ice and fishery.

Different types of mussel beds exist at sedimentary shores. In some regions, natural mussel beds are able to persist continuously over several decades, while in others bare flats and mussel beds may alternate in the course of time. Mussel beds reveal cycles of disappearance and recurrence preferring distinct locations on intertidal flats. Mussel bed layers could be found buried in the sediment. G. Hertweck (Senckenberg Institute, Wilhelmshaven, DE) and G. Liebezeit (Terramare Research Center, Wilhelmshaven, DE) suggested a period of 30 to 35 years for forming those mussel bed layers. The absence of old mussel beds, indicated by bare sediment structures is due to deep sediment reworking or by ice rafting. The occurrence of mussel bed layers buried in sediments may also be an indication of a longer period of mild winters.

Mussel bed communities provide suitable substrates for sessile epibionts and a rich associated fauna. The costs and benefits of such communities were investigated by C. Buschbaum (AWI, Wadden Sea Station Sylt), who measured a 2-fold higher reproductive output of barnacles growing on living mussels to those which are attached to empty shells. Additionally his field experiments showed that barnacles may enhance the recruitment success of

Mytilus edulis. A comparison between hard bottom mussel beds and soft bottom mussel beds was presented by M. Thiel and N. Ulrich (Univ. Católica del Norte, Coquimbo, Chile and IFM Kiel, DE). Based on their investigations they formulated the hypothesis that mussels on hard bottoms primarily provide substrate for the accompanying fauna, while mussels on soft bottoms provide both substrate and food resources.

B. Saier (AWI, Wadden Sea Station Sylt) showed that the low tide line separates mussel beds into two distinct zones, which differ in structure and function. Especially predation by juvenile starfish is high in subtidal areas and therefore escape from predation is rare during the first months in a mussel's life.

Some presentations focussed on fishery aspects of mussel ecology. Mussel fishery changes the physical structure and complexity of the seabed and has a strong impact on coastal ecosystems, where mussels are the dominant component. This was exhibited by P. Dolmer and R. Frandsen (Danish Institute for Fisheries Research, Charlottenlund Castle, DK) for the Limfjorden.

U. Walter (Terramare Research Center, Wilhelmshaven, DE) showed that the seeding density of mussels on culture plots is one important factor determining somatic growth of *M. edulis* and controlling the yield of subtidal mussel cultures. Intertidal mussel beds have decimated since 1988 with incidental large scale spatfall in 1994 and 1999. During the poster session, the technique of long-line mussel culturing was demonstrated by D. Bryant (King's Lynn Fishing Industry Co-operative, Norfolk, UK). This could be an important step towards a sustainable mussel fishery, in that exploiting seed mussels from wild beds and use of large areas of sea bottoms for culture plots could be reduced, especially if this technique is approached off shore. Also other poster presentations showed the environmental impacts and sustainability of mussel cultivation (H. Beadman, University of Wales, Bangor, UK).

Other poster presentations revealed topics from community ecology of mussel beds and species diversity (B. Aspden, University of Plymouth, UK), and sediment deposition (M. Browne, University of Plymouth, UK) to methods of stock assessment (D. den Os, RIVO, Shellfish Research Centre, Yerseke, NL), from settlement of bivalve larvae in relation to flow (I. Hendricks, NIOO-CEMO, Yerseke, NL) to investigations of the valve movement behavior of mussels in a special laboratory device (J. Wolf & H.

Leuchs, Bundesanstalt für Gewässerkunde, Koblenz DE).

A. Wehrmann (Senckenberg Institute, Wilhelmshaven, DE) emphasized in the last oral presentation of the workshop that no common definition exists as what constitutes a mussel bed. He showed that soft bottom mussel beds often consist of an aggregation of two species, *Mytilus edulis* and *Cerastoderma edule*, and that this should be considered in the future.

Additional aspects of mussel bed ecology were touched in discussions. One point was substrate availability: Suitable substrates for attachment are rare outside established mussel beds at sedimentary coasts. Sustainable use of mussel resources should attempt to maintain, restore or provide suitable substrates for juvenile attachment. Another point was the present mussel fishery, which should be open to some modifications due to the ecological characteristics of the mussels and the expected climatic changes. The provision of an off-bottom refuge for juvenile mussels from benthic predators will increase the efficient use of mussel resources and will help avoiding destructive fishery on natural beds of seed mussels. Expected climate changes

with more mild winters and increasing storminess may require the mussel fishery to turn more to off-bottom spat collection. At coasts with mussel beds on intertidal flats, the role of the subtidal populations and drifting mussel aggregates needs further research. The importance of introduced species for the development of the mussel beds should also be a future research issue. At North Sea shores, the introduced Japanese oyster is advancing and capable of displacing mussel beds.

Mussel beds are biotic structures with a high potential to modify and control ecological relevant processes in the ambient ecosystem. Changing these structures by man will have consequences on the total ecosystem, especially on the material cycling, energy flow, species diversity, species interactions, trophic interactions as well as sediment stability and hydrodynamics.

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International Oil Spill 2000

Oil and Hydrocarbon Spills, Modelling, Analysis and Control

2nd International Conference, September 18 - 22, 2000, Gran Canaria, Spain

The occurrence of large oil spills and the subsequent impact on the environment, such as despoiled coasts, oiled birds as well as economic loss from ruined fisheries, has created a growing concern about necessary prevention measures. The Wessex Institute of Technology, Southampton, UK in cooperation with the University of Las Palmas de Gran Canaria, Spain, organized the second conference on Oil and Hydrocarbon Spills to help closing the gap between theoretical developments and practical applications in different topics.

The development of adequate oil spill contingency plans, to ensure that when oil spills do occur they can be dealt with effectively, requires information about a large number of physical, chemical and biologically complex phenomena. Consequently, research results on oil spill modeling, prevention and mitigation methods are an essential tool for engineers and managers involved in contingency planning. At the Oil spill 2000 conference, recent

research aspects in different topics such as oil spill modeling, prevention, behavior, biological impact, control, oil spill detection, oil analysis and cleanup techniques were presented in 28 papers. The conference gathered about 40 researchers, engineers and managers from about 20 countries from all over the world to discuss the state-of-the-art techniques to model, prevent and control oils spills on land and in water bodies.

The proceedings of the conference are published in book form by WIT Press and are available throughout the international book trade:

Rodriguez, G.R. & C.A. Brebbia (eds), 2000. Oil and Hydrocarbon Spills II, Modelling Analysis and Control. Second International Conference Oil Spill 2000, WITPress Southampton, Boston, ISBN: 1-85312-828-7, 246 pp.

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Mortality of Eider Ducks in the Wadden Sea in 1999 - 2000

Available and planned Information and Publications

In the winter 1999/2000, an extraordinary mass mortality of Eider Ducks occurred mainly in the southwestern parts of the Wadden Sea. In the Dutch Wadden Sea, in total about 7,271 dead Eiders were found between November 1999 and June 2000. The mortality in Germany was three (in Schleswig-Holstein) to four and a half times (in Lower Saxony) higher than normal, however, the total numbers are with close to 3,000 Eiders between June 1999 and May 2000 far below the numbers of the Netherlands. In the Danish part of the Wadden Sea, the mortality rate of Eider Ducks was not increased in the winter 1999/2000.

Two expert meetings on Eider mortality took place in the Netherlands to collect all information and results of studies and to discuss the causes of the mass mortality. The first workshop was held at the Netherlands Institute for Sea Research (NIOZ) on Texel on 20 April 2000, and the second one was organized by the Ministry of Agriculture, Nature Management and Fishery in Den Haag on 27th July 2000. In August 2000, a governmental report on all findings compiled by the Expertisecentrum LNV was published as Werkdocument IKC Natuurbeheer No. 186.

On the basis of that, the Dutch state secretary of Nature Management formulated the management implications. Some papers on the Eider mortality for publication in scientific journals are being prepared.

On the occasion of the 10th International Scientific Wadden Sea Symposium in Groningen a workshop on the Eider mortality is planned to be organized by the Dutch Wadden Sea Society on 30.10.2000 (contact: Anky Woudstra, e-mail: woudstra@waddenvereniging.nl).

To give an overview on the Eider mortality to all interested persons in the three Wadden Sea states on what are the relevant scientific findings, possible and proved causes as well as the consequences in view of management the publication of a WSNL special issue on the Common Eider epizootic is planned. According to the current planning, the WSNL special issue will be presented at the end of 2000.

Reference

van den Berk, V.M., S. Dirksen & M.J.M. Poot, 2000. Sterfte onder eidereenden in de Waddenzee 1999 - 2000, een zoektocht naar de oorzaak van massale sterfte van eidereenden in de Waddenzee. Werkdocument EC-LNV nr. 186, Wageningen 2000, Expertisecentrum LNV, Ministerie van Landbouw, Natuurbeheer en Visserij, 71pp.

The governmental report (only in Dutch) can be ordered at the:

Expertisecentrum LNV
Postbus 30
NL 6700 AA Wageningen
Tel: +31 (0) 317 - 474 801
Fax: +31 (0) 317 - 427 561

Wadden Sea Conference, October 31, 2001 in Esbjerg – Esbjerg revisited

Jens Enemark, Common
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The next Trilateral Governmental Conference on the Protection of the Wadden Sea will be held in Esbjerg, Denmark, on the invitation of the Danish government on October 31, 2001. The conference will be the 9th ministerial conference, held between the three Wadden Sea countries of The Netherlands, Germany and Denmark to discuss the overall protection and management of the Wadden Sea. The 1st conference was held in The Hague in 1978. At the 3rd conference in Copenhagen, the three governments signed the Joint Declaration on the Protection of the Wadden Sea which remains the foundation for the collaboration.

It is the second time that a Wadden Sea Conference will be held in Esbjerg. The first one in 1991 signified a major leap forward in the cooperation. It was at this conference that the common principles and policies for the overall protection and management of the Wadden Sea were adopted. It was also at this conference that it was decided to elaborate a common management plan, which was developed on the basis of the principles and policies and became the Wadden Sea Plan adopted at the last Conference in Stade in 1997.

The preparation of the 2001 Esbjerg Conference has started. It is anticipated that the conference will primarily focus on the implementation of the Wadden Sea Plan and the Trilateral Monitoring and Assessment Program and the follow-up actions agreed at the Stade Conference. An important contribution to this discussion is the Quality Status Report published in 1999, which will be politically assessed for the conference.

An important follow-up element is the potential nomination of the Wadden Sea national parks and nature reserves or parts of them as a natural

World Heritage Site. This is a follow-up of decisions of previous conferences and a recent feasibility study has concluded that an inscription in the World Heritage List under the current conservation and management arrangements is feasible. The inscription in the List would constitute a major award for efforts of the people of the Wadden Sea including those who live and work in the area for the protection and sustainable management of the area. The World Heritage List entails natural and cultural heritage monuments unique on a worldwide scale, like the pyramids, Taj Mahal and the Great Barrier Reef. In the three countries, the list encompasses, e.g. the old Hanse city of Lübeck, the Beemster Polder, and the Jelling Mounds. It is expected that the consultations in the countries will start soon. As a next step, it is intended that the inscription as a cultural site will be undertaken as soon as the preconditions have been fulfilled, e.g. the conclusion of the LANCEWAD project.

Other issues, which will be addressed at the conference, include discussing the results of the projects launched at the Stade Conference, e.g. the inventory of the landscape and cultural heritage of the Wadden Sea region and the sea level rise project.

The Inter-regional Wadden Sea Cooperation launched the NetForum project in the past period. The collaboration will table a proposal for a common policy on sustainable tourism to be discussed by the ministers.

The 2001 Conference will be an Esbjerg-revisited event. 10 years after the 1991 conference – same city – same conference center – looking back and setting the future agenda for Wadden Sea protection.

Calendar of Events

2000

Challenges to the Wadden Sea Area

31 October - 2 November 2000, Groningen, The Netherlands.

Perspective for the integration of ecology and economy. 10th International Scientific Wadden Sea Symposium. Contact: C.J.M.van.Berkel@lnvn.agro.nl

Marine SACs: Partnership in Action

15 - 16 November 2000, Edinburgh, UK
A conference on establishing management on UK marine Special Areas of Conservation (SACs). Monitoring Workshop on 17th November. Contact: John Torlesse, English Nature, Northminster House, Peterborough, PE1 1UA, phone: +44 1733 455 308, fax: +44 1733 568 834, john.torlesse@english-nature.org.uk, <http://www.english-nature.org.uk/uk-marine>

3. Deutsches See- und Küstenvogelkolloquium

18 - 19 November 2000, Kiel, Germany.
AG Seevogelschutz, LANU, FTZ Westküste, University Kiel. Main items: Birds in offshore areas; distribution and development of coastal birds. Contact: Staatliche Vogelschutzwarte, LANU, Olshausenstr. 40, D-24118 Kiel.

4th International Rhine Conference: The River, the Port and the Sea

22 - 24 November 2000, Rotterdam, The Netherlands.

50th anniversary of the International Commission for the Protection of the Rhine (ICPR). Info: Maritime Events Promotion, Mr. René M. Struijs, Wilhelminekade 701, P.O. Box 51290, NL 3007 GG Rotterdam, phone: +31 10 486 66 54, fax: +31 10 484 60 71, mep@marinesafety.nl

Fish Stock Assessments and Predictions: Integrating Relevant Knowledge

4 - 6 December 2000, Bergen, Norway.
SAP Symposium, co-sponsored by ICES.

2001

Oceans III Millennium

24 - 27 April 2001, Pontevedra, Spain.
1st International Congress on Marine Science and Technology. Info: formar@formar.org, <http://www.fomar.org>

6th Annual Goose Specialist Group Meeting

27 April - 1 May 2001, Estonia.
Contact: Dr. Barwolt Ebbing, Wetland International, phone: +31 317 478729, fax: +31 317 424988, e-mail: b.s.ebbing@ibn.dlo.nl

FSBI conference, Fish Biodiversity and Conservation

9 - 13 July 2001, Leicester, UK.
Info: Dr. P. Hart, pbh@leicester.ac.uk

Coastal Zone 01

17 - 19 July 2001, Cleveland, Ohio, USA.
Hands across the water - Linking land, lake and sea. Info: <http://www.csc.noaa.gov/cz2001>

Hydrobiological Variability in the ICES Area, 1990 - 1999

8 - 10 August 2001, Edinburgh, Scotland, UK.
ICES Symposium, Co-Conveners: Dr R. R. Dickson (UK) and Professor J. Meincke (Germany). Info: <http://www.ices.dk/symposia/symposia.htm>

People and the Sea

30 August - 1 September 2001, Amsterdam, The Netherlands.

Maritime research in the social sciences - an agenda for the 21st century. University of Amsterdam and Netherlands Institute for the Social Sciences. Info: Center for Maritime Research, Planete Muidergracht 4, NL 1018 TV Amsterdam, phone: +31 20 527 06 61, fax: +31 20 622 94 30, e-mail: mare@siswo.uva.nl, <http://www.siswo.uva.nl/mare>

An Estuarine Odyssey

4 - 8 November 2001, St. Pete Beach, Florida, USA.
16Biennial Conference of the Estuarine Research Federation (ERF). Info: <http://www.erf.org>

2002

Acoustics in Fisheries and Aquatic Ecology

10 - 14 June 2002, Montpellier, France.
ICES Symposium. Co-sponsors: Acoustical Society of America, UK Institute of Acoustics, Société française d'acoustique. Preliminary Announcement.

Regular updated list on the website of the Common Wadden Sea Secretariat, section News/Service:<http://cwss.www.de>