Individual transferable quotas, does one size fit all?: Sustainability analysis of an alternative model for quota allocation in a small-scale coastal fishery

The introduction of vessel-based Individual Transferable Quotas (ITQs) in Danish demersal fisheries in 2007 caused significant structural changes in the fleet, towards fewer and larger vessels deploying otter trawls. Mainly smaller coastal vessels deploying Danish seines and gillnets reduced in numbers. The ecosystem effects of this structural change were investigated by comparing the sustainability of a local, small-scale, coastal fishery (Thorupstrand) using Danish seines and gillnets with that of demersal trawling by larger vessels using the same fishing grounds. The fisheries were compared using six ecological and socio-economic indicators: 1), discards (food web), 2), by-catch incidences (food web/biodiversity), 3), seabed impacts, 4), fuel use efficiency, 5), quality of fish landed (food provision), and 6), social and cultural gains and drawbacks (social and cultural features). Except for by-catch of vulnerable species, the fisheries using Danish seines and gillnets scored better in all indicators when compared to otter trawls. Additional commercial and cultural benefits of establishing a local fishery guild with share-owned quotas and land-based facilities were investigated. The results and lessons learned are discussed in the context of an ecosystem approach to fisheries management and the current reform of the common fisheries policy of the European Union.
Differences in biological traits composition of benthic assemblages between unimpacted habitats

There is an implicit requirement under contemporary policy drivers to understand the characteristics of benthic communities under anthropogenically-unimpacted scenarios. We used a trait-based approach on a large dataset from across the European shelf to determine how functional characteristics of unimpacted benthic assemblages vary between different sedimentary habitats.

Assemblages in deep, muddy environments unaffected by anthropogenic disturbance show increased proportions of downward conveyors and surface deposit-feeders, while burrowing, diffusive mixing, scavenging and predation traits assume greater numerical proportions in shallower habitats. Deep, coarser sediments are numerically more dominated by sessile, upward conveyors and suspension feeders. In contrast, unimpacted assemblages of coarse sediments in shallower regions are proportionally dominated by the diffusive mixers, burrowers, scavengers and predators. Finally, assemblages of gravelly sediments exhibit a relatively greater numerical dominance of non-bioturbators and asexual reproducers. These findings may be used to form the basis of ranking habitats along a functional sensitivity gradient.

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Cefas, Bangor University, Hellenic Centre for Marine Research, Institute of Agricultural and Fisheries research (ILVO), Wageningen IMARES, Institute of Marine Research, Ondokuz Mayis University
Fouragerings-strategi hos ådselædende slimål i Kattegat

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Arctic Section
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Publication: Research › Poster – Annual report year: 2017

 Hvordan påvirker bundtrawlfiskeriet Kattegats bundfauna? En analyse af ændringer i densitet og artsrigdom og en diskussion af potentielle indikatorer

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data
Authors: Gislason, H. (Intern), Dinesen, G. E. (Intern), Bastardie, F. (Intern), Egekvist, J. (Intern), Eigaard, O. R. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
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Identification of ICM elements in Danish cormorant management

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, University of Copenhagen, Københavns Universitet
Authors: Andersen, S. F. (Intern), Dinesen, G. E. (Intern), Worsaae, K. (Forskerdatabase), Støttrup, J. G. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
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Publication: Research › Conference abstract for conference – Annual report year: 2017

Lost in translation? Multi-metric macrobenthos indicators and bottom trawling
The member states of the European Union use multi-metric macrobenthos indicators to monitor the ecological status of their marine waters in relation to the Water Framework and Marine Strategy Framework Directives. The indicators translate the general descriptors of ecological quality in the directives into a single value of ecological status by combining indices of species diversity, species sensitivity and density. Studies and inter-calibration exercises have shown that the indicators respond to chemical pollution and organic enrichment, but little is known about their response to bottom trawling. We use linear mixed effects models to analyze how bottom trawling intensity affects the indicators used in the Danish (Danish Quality Index, DKI) and Swedish (Benthic Quality Index, BQI) environmental monitoring programs in the Kattegat, the sea area between Sweden and Denmark. Using year and station as random variables and trawling intensity, habitat type, salinity and depth as fixed variables we find a significant negative relationship between the BQI indicator and bottom trawling, while the DKI is related significantly to salinity, but not to trawling intensity. Among the indicator components, the species diversity and sensitivity indices used in the DKI are not significantly linked to trawling, and trawling only affects the BQI when species sensitivities are derived from rarefied samples. Because the number of species recorded per sample (species density) is limited by the number of individuals per sample (density), we expect species density and density to be positively correlated. This correlation was confirmed by a simulation model and by statistical analysis of the bottom samples in which log species density was highly significantly related to log density (r = 0.75, df = 144, p

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data
Authors: Gislason, H. (Intern), Bastardie, F. (Intern), Dinesen, G. E. (Intern), Egekvist, J. (Intern), Eigaard, O. R. (Intern)
Pages: 260-270
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Main Research Area: Technical/natural sciences

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- BFI (2017): BFI-level 2  
- Web of Science (2017): Indexed yes  
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- Scopus rating (2016): CiteScore 4.07 SJR 1.308 SNIP 1.756  
- Web of Science (2016): Indexed yes  
- BFI (2015): BFI-level 2  
- Scopus rating (2015): SJR 1.481 SNIP 1.726 CiteScore 3.99  
- BFI (2014): BFI-level 2  
- Scopus rating (2014): SJR 1.463 SNIP 1.996 CiteScore 3.76  
- BFI (2013): BFI-level 1  
- Scopus rating (2013): SJR 1.353 SNIP 1.837 CiteScore 3.63  
- ISI indexed (2013): ISI indexed yes  
- Web of Science (2013): Indexed yes  
- BFI (2012): BFI-level 1  
- Scopus rating (2012): SJR 1.257 SNIP 1.858 CiteScore 3.42  
- ISI indexed (2012): ISI indexed yes  
- Web of Science (2012): Indexed yes  
- BFI (2011): BFI-level 1  
- Scopus rating (2011): SJR 1.21 SNIP 1.732 CiteScore 3.05  
- ISI indexed (2011): ISI indexed yes  
- BFI (2010): BFI-level 1  
- Scopus rating (2010): SJR 1.239 SNIP 1.603  
- BFI (2009): BFI-level 1  
- Scopus rating (2009): SJR 1.047 SNIP 1.769  
- BFI (2008): BFI-level 1  
- Scopus rating (2008): SJR 0.907 SNIP 1.474  
- Scopus rating (2007): SJR 0.774 SNIP 1.395  
- Scopus rating (2006): SJR 0.677 SNIP 0.958  
- Scopus rating (2005): SJR 0.465 SNIP 1.035  
- Scopus rating (2004): SJR 0.731 SNIP 1.182  
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**Re-visiting ICM theory and practice: Lessons learned from the Baltic Sea Region**

Sustainable management of coastal systems requires an iterative process using a multidisciplinary approach that integrates the three pillars of sustainable development: environmental protection, social progress and economic growth. The Systems Approach Framework (SAF) provides a structure for an Integrated Coastal Management (ICM) process with an effective science-policy interface that embraces the challenge of
simulating complex systems and encapsulates citizen involvement from the onset. We analysed the findings of 16 re-
analyses studies undertaken in eight Baltic Sea countries to test how well
SAF elements had been applied in practice within ICM processes. The results revealed the main ICM driver was ecology
or economy. Several ICM elements as defined by the SAF are already standard within the Baltic Sea region. However, in
many cases, the omission of stakeholder and institutional mapping as
instructed by the SAF led to an unbalanced participation of stakeholders, or in some cases, lack of involvement of
stakeholders at the start of the process. Most of the ICM processes failed to include an integrated, cross-sectorial,
ecological-socio-economic assessment. This extends from the lack of system
thinking when defining the Policy issue for the problem and when developing the conceptual model, which often leads to
one-sectorial solutions, which may not be sustainable. Furthermore, the duration of some of the ICM processes was
prolonged due to disagreement and opposition early in the process and/
or lack of manager experiences in conducting a stakeholder participatory process. Finally, due to its stringent structure the
SAF was found to be a suitable quality assurance for sustainable ICM processes

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Gillgren and
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(Ekstern)
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.23 SJR 0.887 SNIP 1.123
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.783 SNIP 1.002 CiteScore 1.92
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.883 SNIP 1.306 CiteScore 2.05
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.719 SNIP 1.394 CiteScore 1.84
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.724 SNIP 1.061 CiteScore 1.72
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.85 SNIP 0.986 CiteScore 1.65
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.852 SNIP 0.958
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.539 SNIP 0.875
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.541 SNIP 0.926
Scopus rating (2007): SJR 0.835 SNIP 1.073
Scavenging strategies of hagfish in the Kattegat

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Main Research Area: Technical/natural sciences

The footprint of bottom trawling in European waters: distribution, intensity, and seabed integrity

Mapping trawling pressure on the benthic habitats is needed as background to support an ecosystem approach to fisheries management. The extent and intensity of bottom trawling on the European continental shelf (0-1000 m) was analysed from logbook statistics and vessel monitoring system data for 2010-2012 at a grid cell resolution of 1 x 1 min longitude and latitude. Trawling intensity profiles with seabed impact at the surface and subsurface level are presented for 14 management areas in the North-east Atlantic, Baltic Sea and Mediterranean Sea. The footprint of the management areas ranged between 53-99% and 6-94% for the depth zone from 0 to 200 m (Shallow) and from 201 to 1000 m (Deep), respectively. The footprint was estimated as the total area of all grid cells that were trawled fully or partially. Excluding the untrawled proportions reduced the footprint estimates to 28-85% and 2-77%. Largest footprints per unit landings were observed off Portugal and in the Mediterranean Sea. Mean trawling intensity ranged between 0.5 and 8.5 times per year, but was less in the Deep zone with a maximum intensity of 6.4. Highest intensities were recorded in the Skagerrak-Kattegat, Iberian Portuguese area, Tyrrenian Sea and Adriatic Sea. Bottom trawling was highly aggregated. For the Shallow zone the seabed area where 90% of the effort occurred comprised between 17% and 63% (median 36%) of the management area. Footprints were high over a broad range of soft sediment habitats. Using the longevity distribution of the untrawled infaunal community, the seabed integrity was estimated as the proportion of the biomass of benthic taxa where the trawling interval at the subsurface level exceeds their life span. Seabed integrity was low (< 0.1) in large parts of the European continental shelves, although smaller pockets of seabed with higher integrity values occur. The methods developed here integrate official fishing effort statistics and industry-based gear information to provide high-resolution pressure maps and indicators, which greatly improve the basis for assessing and managing benthic pressure from bottom trawling. Further they provide quantitative estimates of trawling impact on a continuous scale by which managers can steer
Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions

This study assesses the seabed pressure of towed fishing gears and models the physical impact (area and depth of seabed penetration) from trip-based information of vessel size, gear type, and catch. Traditionally fishing pressures are calculated top-down by making use of large-scale statistics such as logbook data. Here, we take a different approach starting from the gear itself (design and dimensions) to estimate the physical interactions with the seabed at the level of...
the individual fishing operation. We defined 14 distinct towed gear groups in European waters (eight otter trawl groups, three beam trawl groups, two demersal seine groups, and one dredge group), for which we established gear “footprints”. The footprint of a gear is defined as the relative contribution from individual larger gear components, such as trawl doors, sweeps, and groundgear, to the total area and severity of the gear's impact. An industry-based survey covering 13 countries provided the basis for estimating the relative impact-area contributions from individual gear components, whereas sediment penetration was estimated based on a literature review. For each gear group, a vessel size–gear size relationship was estimated to enable the prediction of gear footprint area and sediment penetration from vessel size. Application of these relationships with average vessel sizes and towing speeds provided hourly swept-area estimates by métier. Scottish seining has the largest overall gear footprint of ∼1.6 km² h⁻¹ of which 0.08 km² has an impact at the subsurface level (sediment penetration ≥ 2 cm). Beam trawling for flatfish ranks low when comparing overall footprint size/hour but ranks substantially higher when comparing only impact at the subsurface level (0.19 km²h⁻¹). These results have substantial implications for the definition, estimation, and monitoring of fishing pressure indicators, which are discussed in the context of an ecosystem approach to fisheries management.
Functional morphology, biology and sexual strategy of the circumboreal, adventitious crypt-building, Crenella decussata (Bivalvia: Mytiloidea: Crenellidae)

The anatomy of Crenella decussata (Mytiloidea) is described. Individuals of this circumboreal species occupy granular crypts composed of sand grains held in place by mucus. The swollen basal region of the tube is occupied by an individual, which connects to the sediment surface by two posterior tubes accommodating the inhalant and exhalant streams. There is reduction in musculature and, most importantly, anterior foreshortening of the outer ctenidial demibranchs and loss of the labial palps. This creates an anterior space in the mantle for the initial brooding of fertilized ova by females to the prodissoconch stage. Subsequently, these larvae are transferred to the exhalant tube of the crypt wherein they attach by a single fine byssal thread and are further brooded until the crawl-away juvenile stage is attained. Experimental studies of larval behaviour suggest that parental pheromones sustain the female/offspring bond. Newly hatched individuals responded to parental exhalant water by actively attaching themselves using a byssal thread. This response persisted for 28 days, but not after 55 days when, we suggest, the pheromonal response ceases and offspring are developed sufficiently to take up life in their own nests. Offspring retrieved from parental crypts and fed continuously reached an average shell length of 500 mm after 7.5 months. Brooded offspring thus appear to rely on embryonal energy resources until post-metamorphosis, after which suspension feeding becomes essential for further growth and development before the parental crypt is vacated.
Grains of sand, a sunken treasure?

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Sørensen, T. K. (Intern), Støttrup, J. G. (Intern), Dinesen, G. E. (Intern)
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Kortlægning af fiskenes levesteder i den danske del af Øresund: Rapport til Miljø- og Fødevareministeriet

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, University of Copenhagen
Authors: Sørensen, T. K. (Intern), Egekvist, J. (Intern), Brown, E. J. (Intern), Hansen, F. I. (Intern), Carl, H. (Ekstern), Møller, P. R. (Ekstern), Dinesen, G. E. (Intern), Vinther, M. (Intern), Støtrup, J. (Intern)
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Detecting ecological-economic effects of marine spatial plans from displacing the bottom fishing pressure

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University
Authors: Thoya, P. (Intern), Bastardie, F. (Intern), Dinesen, G. E. (Intern), Hansen, J. L. (Ekstern), Nielsen, J. R. (Intern)
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Effekter af blåmuslingesild på bundfauna

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Danish Shellfish Centre, Section for Monitoring and Data
Authors: Dinesen, G. E. (Intern), Canal-Vergès, P. (Intern), Nielsen, P. (Intern), Filrup, K. (Ekstern), Geitner, K. (Intern), Petersen, J. K. (Intern)
Number of pages: 31
Publication date: 2015

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Long-term effects of an offshore wind farm in the North Sea on fish communities

Long-term effects of the Horns Rev 1 offshore wind farm (OWF) on fish abundance, diversity and spatial distribution were studied. This OWF is situated on the Horns Reef sand bank in the North Sea. Surveys were conducted in September 2001, before the OWF was established in 2002, and again in September 2009, 7 yr post-establishment. The sampling surveys used a multi-mesh-size gillnet. The 3 most abundant species in the surveys were whiting Merlangius merlangus, dab Limanda limanda and sandeels Ammodytidae spp. Overall fish abundance increased slightly in the area where the OWF was established but declined in the control area 6 km away. None of the key fish species or functional fish groups showed signs of negative long-term effects due to the OWF. Whiting and the fish group associated with rocky habitats showed different distributions relative to the distance to the artificial reef structures introduced by the turbines. Rocky habitat fishes were most abundant close to the turbines while whiting was most abundant away from them. Species diversity was significantly higher close to the turbines. Overall, these results indicate that the artificial reef structures were large enough to attract fish species with a preference for rocky habitats, but not large enough to have adverse negative effects on species inhabiting the original sand bottom between the turbines.

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources, FishStats, Orbicon
Authors: Stenberg, C. (Intern), Støttrup, J. (Intern), Deurs, M. V. (Intern), Berg, C. W. (Intern), Dinesen, G. E. (Intern), Mosegaard, H. (Intern), Grome, T. (Intern), Leonhard, S. (Ekstern)
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Main Research Area: Technical/natural sciences

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Scopus rating (2016): CiteScore 2.4
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Scopus rating (2015): CiteScore 2.56
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BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.75
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.79
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.9
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Multidisciplinary mapping of fish habitats in the Sound, Denmark for maritime spatial planning

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Natural History Museum of Denmark
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Presfaktorer på miljøet i Limfjorden – betydning af fiskeriet på udvalgte nøgleparametre

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Organisations: National Institute of Aquatic Resources, Danish Shellfish Centre, Section for Ecosystem based Marine Management
Authors: Petersen, J. K. (Intern), Canal-Vergés, P. (Intern), Dinesen, G. E. (Intern)
Publication date: 2015
Event: Abstract from 18. Danske Havforskermøde, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2015
Sustainability, fuel use, and profitability: interlinked consequences of stock dynamics and choices of individual vessel spatial effort allocation within the Western Baltic

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Publication date: 2015
Event: Abstract from SOCIIOEC EU-FP7-SYMPOSIUM: the socio-economic impacts of management measures of the new Common Fisheries Policy, Brussels, Belgium.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2015

Temporal development of coastal ecosystems in the Baltic Sea over the past two decades
Coastal areas are among the most biologically productive aquatic systems worldwide, but face strong and variable anthropogenic pressures. Few studies have, however, addressed the temporal development of coastal ecosystems in an integrated context. This study represents an assessment of the development over time in 13 coastal ecosystems in the Baltic Sea region during the past two decades. The study covers between two to six trophic levels per system and time-series dating back to the early 1990s. We applied multivariate analyses to assess the temporal development of biological ecosystem components and relate these to potential driving variables associated with changes in climate, hydrology, nutrient status, and fishing pressure. Our results show that structural change often occurred with similar timing in the assessed coastal systems. Moreover, in 10 of the 13 systems, a directional development of the ecosystem components was observed. The variables representing key ecosystem components generally differed across systems, due to natural differences and limitation to available data. As a result of this, the correlation between the temporal development of the biological components in each area and the driving variables assessed was to some extent area-specific. However, change in nutrient status was a common denominator of the variables most often associated with changes in the assessed systems. Our results, additionally, indicate existing strengths as well as future challenges in the capacity of currently available monitoring data to support integrated assessments and the implementation of an integrated ecosystem-based approach to the management of the Baltic Sea coastal ecosystems

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Swedish University of Agricultural Sciences, University of Tartu, Stockholm University, Fish Resources Research Department, Sea Fisheries Institute, AtlantNIRO, Swedish Agency for Water Management, Finnish Environment Institute, Finnish Game and Fisheries Research Institute
Pages: 2539-2548
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Main Research Area: Technical/natural sciences
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Volume: 72
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Determining the impacts of trawling on benthic function in European waters: a biological traits approach

One of the most widespread yet manageable pressures we impose on the seabed is disturbance of the substrate by towed demersal fishing gear (bottom trawling and dredging). Over the past forty to fifty years, many studies have been conducted specifically aiming to understand the impacts of such fishing gear on the seabed communities. Their outcomes have demonstrated dramatic effects of bottom trawling on the structure of marine ecosystems although impacts tend to be wide-ranging, depending upon the gear, intensity, spatial area and the nature of the seabed habitats. However, understanding the functional impacts of this activity (as opposed to impacts on the structure of benthic assemblages) has only recently been attempted. Advances in the application of biological traits analysis (BTA) wherein the assemblages are described in terms of their life history, behavioural and morphological characteristics, have allowed us to better understand the interactions between the benthic fauna and their environment at a functional level. We present the initial findings of work conducted under the auspices of the EU-funded project 'BENTHIS' which aims to improve our understanding of the impacts of trawling on benthic ecosystem functioning over much larger spatial scales than previously undertaken. Biological traits information from 887 stations across European waters (Norwegian, UK,
Belgian, Dutch, Danish waters, the Mediterranean and Black Sea) were analysed to: i) quantify the relationships between infaunal trait composition and environmental variables (depth, sediment granulometry); ii) determine the relationship between traits and habitat type (EUNIS level 4); and iii) assess the relationships between trawling pressure (using data derived under BENTHIS; see Eigaard et al., this volume) and traits composition

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Cefas, Hellenic Centre for Marine Research, Ondokuz Mayis University, Bangor University, Institute for Agricultural and Fisheries Research, Wageningen IMARES, Institute of Marine Research, Aarhus University
Authors: Bolam, S. (Ekstern), Kenny, A. (Ekstern), Garcia, C. (Ekstern), Eggleton, J. (Ekstern), Dinesen, G. E. (Intern), Buhl-Mortensen, L. (Ekstern), Smith, C. (Ekstern), Kalogeropoulou, V. (Ekstern), Gumus, A. (Ekstern), Hiddink, J. G. (Ekstern), Hoey, G. V. (Ekstern), Kooten, T. V. (Ekstern), Hansen, J. (Ekstern)
Publication date: 2014
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2014

Development and use of a bioeconomic model for management of mussel fisheries under different nutrient regimes in the temperate estuary of the Limfjord, Denmark
Coastal ecosystems worldwide are under pressure from human-induced nutrient inputs, fishing activities, mariculture, construction work, and climate change. Integrated management instruments handling one or more of these problems in combination with socioeconomic issues are therefore necessary to secure a sustainable use of resources. In the Limfjord, a temperate eutrophic estuary in Denmark, nutrient load reductions are necessary to fulfill EU regulations such as the Water Framework Directive (WFD). The expected outcome of these load reductions is an improved water quality, but also reduced production of the abundant stock of filter-feeding blue mussels, Mytilus edulis. This is expected to have significant economic consequences for the million-euro mussel fishing industry taking place in the Limfjord today. We developed a bioeconomic model that can be used to explore the consequences of load reductions for mussel fishery as practiced today, as well as potential management options, to obtain an economically and ecologically sustainable mussel fishery. Model simulations clearly demonstrate a substantial decrease in mussel production after the nutrient load reductions necessary to obtain the targets in the WFD. With today's practice, the mussel fishery in the Limfjord will not be profitable in a future, less eutrophic estuary. However, model simulations also revealed that mussel fishery can be profitable after implementation of the WFD with a reduction in the total fishing quota, fewer fishing vessels, and a higher fishing quota per vessel.

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Aarhus University, University of Southern Denmark, Novo Nordisk A/S
Authors: Timmermann, K. (Ekstern), Dinesen, G. E. (Intern), Markager, S. (Ekstern), Ravn-Jonsen, L. (Ekstern), Bassompierre, M. (Ekstern), Roth, E. (Ekstern), Støttrup, J. G. (Intern)
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Scopus rating (2015): SJR 1.933 SNIP 1.571 CiteScore 3.92
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.64 SNIP 1.478 CiteScore 3.37
Web of Science (2014): Indexed yes
Estimation of seafloor impact from demersal trawls, seines and dredges based on gear design and dimensions

This study estimates the seafloor impact of towed fishing gears from a bottom-up perspective. Traditionally fishing pressure, often in terms of indicators, is calculated top-down using the fishing effort information available in large-scale statistics such as logbook and VMS data. Here we take a different approach using the gear itself (design and dimensions) for understanding and estimation of the physical interactions with the seafloor at the individual fishing operation level. With reference to the métier groupings of EU logbooks, we defined 17 distinct towed gear groups in European waters (11 otter trawl groups, 3 beam trawl groups, 2 demersal seine groups, and 1 dredge group), for which we established seafloor “footprints”. The footprint of a gear was defined as the relative contribution from individual larger gear components, such as the trawl doors, sweeps and ground gear, to the total area and severity of the gear impact. An industry-based vessel and gear survey covering 13 different countries provided the basis for estimating the relative impact-area contributions from individual gear components, whereas seafloor penetration and resuspension was estimated for different sediment types based on a review of the scientific literature. For each defined gear group a vessel-size (kW or total length) – gear size (total gear width or circumference) relationship was estimated to enable the prediction of gear footprint area and sediment penetration from vessel size. The implications for the definition and monitoring of fishing pressure indicators are far-reaching, and are discussed in context of an ecosystem approach to fisheries management (EAFM)

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Institute of Marine Research, IFREMER, Lund University, Marine Scotland Science, Institute for Agricultural and Fisheries Research, Marine Institute, Consiglio Nazionale delle Ricerche, Central Fisheries Research Institute, Wageningen IMARES
Authors: Eigaard, O. R. (Intern), Bastardie, F. (Intern), Breen, M. (Ekstern), Dinesen, G. E. (Intern), Lafargue, P. (Ekstern), Nilson, H. (Ekstern), O'Neil, F. (Ekstern), Polet, H. (Ekstern), Reid, D. (Ekstern), Sala, A. (Ekstern), Sørensen, T. K.
High-resolution mapping of European fishing pressure on the benthic habitats

Mapping and monitoring of pressure from fishery on the marine benthic environment is necessary to support an ecosystem approach to fisheries management (EAFM). In many cases this need is not reflected in official fisheries statistics and logbooks, where focus typically is on catch rather than effort. Consequently, most logbook information is not well suited for quantitative estimation of seafloor impact (swept area and impact severity) of the different gears and trips. We present a method to overcome this information deficiency of official statistics and develop high-resolution large-scale maps of benthic fishing pressure covering the EU, Norwegian and Turkish waters. First individual logbook observations from 13 countries were assigned to 17 different functional gear groups (métiers) based on target species and gear type information. Secondly, relationships between gear width and vessel size (e.g. trawl door spread and vessel kW) for each métier were used to assign quantitative information of bottom contact to each logbook trip by translating vessel size information into measures of gear size. Thirdly the extended logbook data was merged with highresolution activity data (VMS) and gear width estimates were assigned to individual interpolated vessel tracks based on VMS data. The outcome was European wide highresolution fishing intensity maps (total yearly swept area within grid cells of 1°1 minute longitude and latitude) for 2010, 2011 and 2012. Finally the high-resolution fishing pressure maps were overlaid with existing marine habitat maps to identify areas of potential ecosystem service conflicts.

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Nyt trawldesign kan gøre jomfruhummer fiskeriet meget mere effektivt

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Danish Fishermen's Producers' Organization
Authors: Krag, L. A. (Intern), Frandsen, R. (Intern), Dinesen, G. E. (Intern), Karlsen, J. D. (Intern), Lund, H. S. (Ekstern)
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Main Research Area: Technical/natural sciences
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Review of the functional morphology, biology and perturbation impacts on the boreal, habitat-forming horse mussel Modiolus modiolus (Bivalvia: Mytilidae: Modiolinae)
The boreal bivalve Modiolus modiolus is common subtidally where it aggregates to form extensive, long-lived, biogenic habitats with a diverse associated flora and, especially, fauna. Despite this ecological importance, M. modiolus has not been described in terms of its functional morphology and overall biology. Modiolus modiolus is a typical epibenthic, suspension-feeding mytilid, albeit with anatomical modifications adapting it to a partially buried, gregarious lifestyle in a stable environment experiencing medium–high energy levels. The juvenile shell is covered partly in byssal setae secreted by the byssal gland and foot complex and becomes covered in sand grains held in place by a mucoid cement secreted by the dorsal mantle. The camouflaged shell at this vulnerable time probably serves as an anti-predator device. Individuals grow to maximum shell lengths of ~60–213 mm, depending on depth and locality. With age (≥ 20–45 years), shells often become deformed, particularly posteriorly and around the byssal gape, thereby increasing reproductive capacity (gonadal volume) without increasing somatic growth. Information on the biology, reproductive strategy and life history traits of M. modiolus are reviewed. These field- and laboratory-derived data provide us with essential information to aid future research into the protection and conservation of this ecologically important biogenic habitat. This is because, today, dredging and fishery activities using bottom-towed gear have seriously damaged several M. modiolus habitats with deleterious impacts on ecosystem functioning. Post-impact recovery times are slow and dependent on both local and mega-population distributions

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, University of Hong Kong
Fiskeriets påvirkning af naturtypen 'Rev' (1170) i Natura 2000 området i Lillebælt

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Havvindmæleparker og deres indflydelse på fisk - et casestudy fra Horns Rev havvindmælepark

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Department of Applied Mathematics and Computer Science, Dynamical Systems
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Konsekvensvurdering af fiskeri på blåmuslinger i Lillebælt 2013

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Organisations: National Institute of Aquatic Resources, Danish Shellfish Centre, Section for Ecosystem based Marine Management, Section for Monitoring and Data
Authors: Dolmer, P. (Intern), Christoffersen, M. O. (Intern), Geitner, K. (Intern), Larsen, F. (Intern), Dinesen, G. E. (Intern), Holm, N. (Intern)
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Konsekvensvurdering af muslingefiskeri i Natura 2000 områder

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Organisations: National Institute of Aquatic Resources, Danish Shellfish Centre, Section for Ecosystem based Marine Management, Section for Monitoring and Data
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Publication date: 2013
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Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2013
Temporal development of coastal ecosystems in the Baltic Sea - an assessment of patterns and trends

Coastal areas are amongst the most biologically productive aquatic systems worldwide, but face strong and variable anthropogenic pressures. Many marine ecosystems worldwide have gone through substantial structural changes during recent decades, but few studies have addressed the temporal development of coastal ecosystems in an integrated context. The current study represents a first example of a coordinated assessment of ecosystem development in 13 coastal systems of the Baltic Sea. The data covers different geographical areas, ranging from the Kattegat and Skagerak in the southwest to the Bothnian Bay in the north, covers between two to five trophic levels per area, and include time series dating back to the early 1990s. Using multivariate analyses, we assess the temporal development of species abundance or biomass at different trophic levels in relation to the development of variables related to local and regional climate, hydrology, nutrient loading and fishing pressure. Our results highlight the relative timing of change in ecosystem structure and the development of key biological elements across areas. Besides describing the temporal development of coastal ecosystems in the Baltic Sea during the past two decades, our results also highlight limitations and gaps in available monitoring data to support integrated environmental status assessments of Baltic ecosystems as required in current international directives as the Baltic Sea Action Plan and Marine Strategy Framework Directive, as well as the potential for further developing multisectorial management advice in coastal ecosystems

General information

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Udvikling af effektivt og skånsomt redskab til tobisfiskeri på Dogger Banke

General information

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Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Ecosystem based Marine Management, Section for Marine Living Resources
Authors: Behrens, J. (Intern), Dinesen, G. E. (Intern), Tørring, P. (Ekstern), Eigaard, O. R. (Intern), Pedersen, E. M. (Intern), Stage, B. (Intern), Sørensen, T. K. (Intern), Mosegaard, H. (Intern)
Publication date: 2013
Event: Abstract from 17. Danske havforskermøde, Roskilde, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2013

Integrated trend assessment of ecosystem changes in the Limfjord (Denmark): evidence of a recent regime shift?

An integrated ecosystem assessment was carried out for the Limfjord over the period from 1984 to 2008 to describe changes in ecosystem structure and potentially important drivers. The Limfjord is an eutrophic transitional Danish fjord system with the main inflow from the North Sea in the west and main outflow to the Kattegat in the east. We showed that from 1990 to 1995, the ecosystem structure shifted from dominance by demersal fish species (eel, pouit, whiting, flounder, plaice) to that of pelagic fish species (sprat, herring, sticklebacks), small-bodied fish species (black goby, pipefish), jellyfish, common shore crab, starfish and blue mussels. We interpret this change as a regime shift that showed a similar temporal pattern to regime shifts identified in adjacent seas. The observed changes in trophic interactions and food web reorganisation suggested a non-linear regime shift. The analyses further showed the regime shift to be driven by a combination of anthropogenic pressures and possible interplay with climatic disturbance

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Coastal Ecology, Section for Management Systems
Authors: Tomczak, M. T. (Ekstern), Dinesen, G. E. (Intern), Hoffmann, E. (Intern), Maar, M. (Ekstern), Stettrup, J. (Intern)
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BFI (2015): BFI-level 1
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Web of Science (2015): Indexed yes
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Scopus rating (2012): SJR 1.256 SNIP 1.419 CiteScore 2.52
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.383 SNIP 1.325 CiteScore 2.52
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BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.231 SNIP 1.202
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.169 SNIP 1.262
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.244 SNIP 1.302
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Scopus rating (2007): SJR 1.114 SNIP 1.355
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.203 SNIP 1.365
Scopus rating (2005): SJR 0.92 SNIP 1.237
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.815 SNIP 1.044
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.934 SNIP 1.238
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.694 SNIP 1.25
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Scopus rating (2000): SJR 1.033 SNIP 1.39
**Konsekvensvurdering af fiskeri på blåmuslinger i Lillebælt 2012**

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State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Poulsen, L. K. (Intern), Geitner, K. (Intern), Christoffersen, M. O. (Intern), Christensen, H. T. (Intern), Dolmer, P. (Intern), Larsen, F. (Intern), Dinesen, G. E. (Intern), Holm, N. (Intern)
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**Offshore windfarms and their impact on fish abundance and community structure**

Deployment of offshore windfarms (OWF) is rapidly expanding. A before–after control impact (BACI) approach was used to study the impact of one of the world’s largest offshore windfarms (Horns Rev Offshore Windfarm) on fish assemblages and species diversity. Fish were generally more abundant in the control than the impact area before the establishment of the OWF. Eight years later fish abundance was similar in both the impact and control area but the abundance of one of the most frequently occurring species, whiting, was much lower compared to 2001. However, the changes in whiting reflected the general trend of the whiting population in the North Sea. The introduction of hard bottom resulted in higher species diversity close to each turbine with a clear spatial (horizontal) distribution. New reef fish such as goldsinny wrasse (Ctenolabrus rupestris), viviparous eelpout (Zoarces viviparous), and lumpsucker (Cyclopterus lumpus), established themselves on the introduced reef area. In contrast very few gobies were caught near or at the OWF, presumably owing to the highly turbulent hydrographical conditions in the OWF. We suggest that the lack of this common prey fish is the main reason for the absence of larger predatory fish species.

**General information**
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Organisations: National Institute of Aquatic Resources, Section for Coastal Ecology, Section for Population Ecology and Genetics, Department of Informatics and Mathematical Modeling, Mathematical Statistics
Authors: Stenberg, C. (Intern), Dinesen, G. E. (Intern), Deurs, M. V. (Intern), Deurs, M. V. (Intern), Berg, C. W. (Intern), Mosegaard, H. (Intern), Leonhard, S. (Ekstern), Groome, T. (Ekstern), Støttrup, J. (Intern)
Number of pages: 18
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Precautionary sandeel fishery in Natura 2000 areas on the Dogger Bank (North Sea): a way to comply with MSFD implementation?

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Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Management Systems, Section for Coastal Ecology
Authors: Behrens, J. (Intern), Tørring, P. (Ekstern), Eigaard, O. R. (Intern), Dinesen, G. E. (Intern), Pedersen, E. M. (Intern), Sørensen, T. K. (Intern), Mosgaard, H. (Intern)
Publication date: 2012
Main Research Area: Technical/natural sciences
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Effect of the Horns Rev 1 Offshore Wind Farm on Fish Communities. Follow-up Seven Years after Construction: Follow-up Seven Years after Construction

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Life on wood - the carnivorous deep-sea mussel Idas argenteus (Bathymodiolinae, Mytilidae, Bivalvia)
Deep-sea mussels associated with sunken wood are less well known in terms of anatomy, biology and evolution than their bathymodioline allies from cold seeps and hydrothermal vents. During the Danish 'Ingolf Expedition' (1895-96) to the Northeast Atlantic, two pieces of pinewood were collected from a depth of 1836 m. The wood was inhabited by several hundred individuals of the deep-sea mussel Idas argenteus and the wood-boring pholadid Xyloredo ingolfia. Idas argenteus is the type species of its genus and differs from some of the species until now referred to Idas by having gill filaments like those of suspension-feeding mytilids, with no abfrontal tissue adaptation for symbiotic chemo-autotrophic bacteria. The adaptations in I. argenteus to capture prey as well as the reproductive pattern of the prey, Xyloredo, and its functional dwarf males are described. The population dynamics and adaptation to an ephemeral habitat in the deep sea of both species are described herein. Although larviphagi is known to occur in some filter-feeding bivalves, Idas argenteus is the first mytilid known to be specifically adapted to a carnivorous life. Further, it is argued that the modifications of I. argenteus with regard to its shell development, alimentary system, gill anatomy and life habits provide important clues to the evolution of the Bathymodiolinae.

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Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Ockelmann, K. W. (Ekstern), Dinesen, G. E. (Intern)
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Main Research Area: Technical/natural sciences
Mussel production and Water Framework Directive targets in the Limfjord, Denmark: an integrated assessment for use in system-based management

Growth of human activities often conflict with nature conservation requirements and integrated assessments are necessary to build reliable scenarios for management. In the Limfjord, Denmark's largest estuary, nutrient loading reductions are necessary to fulfill EU regulations criteria, such as the Water Framework Directive (WFD). Cuts in nutrient
loadings do not necessarily result in corresponding reductions in eutrophication impacts or in improving primary and higher trophic-level production. Similarly, the socioeconomic consequences of a mussel fishery and aquaculture production are complex and hard to predict. This study focuses on the usefulness of a System Approach Framework (SAF) implementation for stakeholder understanding of complex systems and development of sustainable management.

Ecological-social-economic (ESE) model simulations clearly demonstrated the potential problems of WFD implementation for mussel fishers and mussel farmers. Simulation of mussel fishery closures resulted in a tenfold increase in the hitherto fishable mussel biomass and a similar decrease in the biomass of shallow-water mussels and medium-sized ones in deep water. A total closure of the mussel fishery could result in an annual profit loss of ~€6.2 million. Scenario simulation of the introduction of one, two, three, and four mussel culture farms of ~19 ha showed that the introduction of line-mussels would decrease the biomass of wild mussels both in shallow and deep waters, affecting the catch and profit of fishers. The SAF, which included consultation with stakeholders at all stages, differs from the traditional public consultation process in that (1) communication was verbal and multilateral, (2) discussion among stakeholders was facilitated, and (3) stakeholder opinions and priorities formed the focus of the ESE assessment.

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Authors: Dinesen, G. E. (Intern), Timmermann, K. (Ekstern), Roth, E. (Ekstern), Markager, S. (Ekstern), Ravn-Jonsen, L. (Ekstern), Hjorth, M. (Ekstern), Holmer, M. (Ekstern), Støttrup, J. (Intern)
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Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.48 SNIP 1.51 CiteScore 2.84
ISI indexed (2011): ISI indexed yes
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BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.499 SNIP 1.367
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.427 SNIP 1.556
Scopus rating (2007): SJR 1.29 SNIP 1.534
Scopus rating (2006): SJR 1.418 SNIP 1.271
Colonization of Asian freshwaters by the Mytilidae (Bivalvia): a comparison of Sinomytilus harmandi from the Tonle-Sap River, Phnom Penh, Cambodia, with Limnoperna fortunei

Sinomytilus harmandi occurs in the lakes and rivers of Indochina, notably in Cambodia, Laos, Thailand and Vietnam and, again notably, the Mekong River and its myriad tributaries. Hitherto, this species and its four junior synonyms have been examined only superficially. Because of an interior shell septum, S. harmandi was originally assigned to the Dreissenidae (Bivalvia: Heterodonta), an anatomically distinct family naturally restricted to Europe and the Americas. In addition to S. harmandi, a second species of mytilid mussel, Limnoperna fortunei, also occurs in Asian freshwater systems and both belong to the Mytilidae (Pteriomorphia), as demonstrated in this study for S. harmandi and elsewhere for L. fortunei.

Sinomytilus harmandi is likely endemic to the Mekong River where it is sympatric with L. fortunei, the latter species being widely distributed in Indochina, south of and including the Yangtze River in China. Limnoperna fortunei is a highly opportunistic species that has been introduced into many locations outside its mainland Chinese borders, for example, Japan, Taiwan and South America. We suggest the possibility that L. fortunei has also been introduced into tropical Indochina from China. Because L. fortunei has a Devonian (~345-395 mya) modioline ancestry and S. harmandi is derived from a Permo-Trias (~265–225 mya) ancient mytiline ancestor it appears that Asian freshwater systems have been colonized by representatives of the Mytilidae on two separate temporal occasions.
Integrated assessment for use in system-based management: ecosystem health and reestoration through sustainable use of resources

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Main Research Area: Technical/natural sciences
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Publication: Research › Conference abstract in proceedings – Annual report year: 2010

Integrated assessment for use in system based management: WFD nutrient targets and mussel production in the Limfjord, Denmark

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Authors: Poulsen, L. K. (Intern), Christoffersen, M. O. (Intern), Kristensen, P. S. (Intern), Dolmer, P. (Intern), Aabrink, M. (Intern), Kindt-Larsen, L. (Intern), Dinesen, G. E. (Intern), Holm, N. (Intern)
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Limfjord, Denmark

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State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Støttrup, J. (Intern), Dinesen, G. E. (Intern)
Pages: 7
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SPICOSA Appraisal Step Scientific Report: SSA 5 - Limfjorden, Denmark

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The biology and functional morphology of Modiolarca subpicta (Bivalvia: Mytilidae: Musculinae), epizoically symbiotic with Ascidiella aspersa (Urochordata: Ascidiacea), from the Kattegat, northern Jutland, Denmark

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State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Morton, B. (Ekstern), Dinesen, G. E. (Intern)
Pages: 1637-1649
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of the Marine Biological Association of the United Kingdom
Volume: 91
Issue number: 8
ISSN (Print): 0025-3154
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.382 SNIP 0.546 CiteScore 0.8
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.532 SNIP 0.683 CiteScore 0.99
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.484 SNIP 0.742 CiteScore 0.91
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.607 SNIP 0.859 CiteScore 1.1
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.554 SNIP 0.761 CiteScore 1.08
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.531 SNIP 0.747 CiteScore 0.95
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.595 SNIP 0.708
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.629 SNIP 0.799
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.742 SNIP 0.839
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.605 SNIP 0.727
Scopus rating (2006): SJR 0.604 SNIP 0.748
The Limfjord, Denmark. SPICOSA study site 5

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Division of Seafood Research, National Food Institute, Section for Management Systems, Danish Shellfish Centre
Authors: Dinesen, G. E. (Intern), Timmermann, K. (Ekstern), Markager, S. (Ekstern), Roth, E. (Ekstern), Ravn-Jonsen, L. (Ekstern), Hjort, M. (Ekstern), Petersen, J. K. (Intern), Støttrup, J. (Intern)
Publication date: 2010
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 271277
Publication: Research › Poster – Annual report year: 2010

SPICOSA og integreret udvikling af forvaltningsscenarioer i kystzonen: Eutrofiering og muslingeproduktion i Limfjorden

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Dinesen, G. E. (Intern), Ahsan, D. (Ekstern), Hjorth, M. (Ekstern), Køppen, A. (Ekstern), Markager, S. (Ekstern), Ravn-Jonsen, L. (Ekstern), Roth, E. (Ekstern), Sverdrup-Jensen, S. (Ekstern), Timmermann, K. (Ekstern), Støttrup, J. (Intern)
Number of pages: 42
Publication date: 2009

Host publication information
Title of host publication: 15th Danish Marine Sciences Meeting
Main Research Area: Technical/natural sciences
Conference: The 15th Danish Marine Sciences Meeting : Program og abstracts, Helsingør, 01/01/2009
Source: orbit
Source-ID: 251131
Systematic relationship of the genus Adula and its descent from a Mytilus-like ancestor (Bivalvia, Mytilidae, Mytilinae)

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Ockelmann, K. W. (Ekstern), Dinesen, G. E. (Intern)
Pages: 141-152
Publication date: 2009
Main Research Area: Technical/natural sciences

Baltic Sea marine landscapes and habitats - mapping and modeling

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Section for Public Sector Consultancy
Number of pages: 46
Publication date: 2008

From the deep-sea to the surface - and back again
SPICOSA Design Step, SSA 5 Limfjorden, Denmark – progress and results

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Section for Shellfish, Section for Management Systems, Danish Shellfish Centre
Publication date: 2008
Event: Poster session presented at SPICOSA SAF Meeting, Faro, Portugal.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251183
Publication: Research › Poster – Annual report year: 2008

SPICOSA Formulation Step Documentation Report

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Number of pages: 39
Publication date: 2008
Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259911
Publication: Research › Report – Annual report year: 2008

SPICOSA Formulation Step Scientific Report: SSA 5 - Limfjorden, Denmark

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Number of pages: 36
Publication date: 2008
Publication information
Original language: English
Series: SPICOSA
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259909
Publication: Research › Report – Annual report year: 2008

SPICOSA Formulation Step, SSA 5 Limfjorden, Denmark – progress and results

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Danish Shellfish Centre
SPICOSA System Design report: SSA 5 - Limfjorden, Denmark

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Section for Management Systems, Division of Seafood Research, National Food Institute, Danish Shellfish Centre
Number of pages: 26
Publication date: 2008

Publication information
Original language: English
Series: SPICOSA
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259941
Publication: Research › Report – Annual report year: 2008

Background knowledge and tools for prediction of ecological impacts

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Pages: 335-344
Publication date: 2007

Host publication information
Title of host publication: Environmental Design Guidelines for Low Crested Coastal Structures
Publisher: Elsevier Science
Editors: Burchart, H., Hawkins, S., Zanuttigh, B., Lambert, A.
ISBN (Print): 978-0-08-044951-7
Chapter: 14
Main Research Area: Technical/natural sciences
Publication: Research - peer-review › Book chapter – Annual report year: 2007

Biogene biotopers udbredelse og betydning: stor artsdiversitet og høj abundance

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Tendal, O. (Ekstern), Dinesen, G. E. (Intern)
Publication date: 2007
Event: Poster session presented at The 14th Danish Marine Sciences Meeting, Odense, .
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251184
Publication: Research › Poster – Annual report year: 2007
Detailed design of preferred scheme

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Pages: 47-61
Publication date: 2007

Host publication information
Title of host publication: Environmental Design Guidelines for Low Crested Coastal Structures
Publisher: Elsevier Science
Editors: Burchart, H., Hawkins, S., Zanuttigh, B., Lambert, A.
ISBN (Print): 978-0-08-044951-7
Chapter: 8
Main Research Area: Technical/natural sciences
Publication: Research - peer-review › Book chapter – Annual report year: 2007

Development of marine landscape maps for the Baltic Sea and the Kattegat using geophysical and hydrographical parameters

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Number of pages: 76
Pages: 61-65
Publication date: 2007

Host publication information
Volume: 13
Publisher: Danmarks og Grønlands Geologiske Undersøgelse
Editors: Sønderholm, M., Higgins, A.
ISBN (Print): 978-87-7871-202-8
Main Research Area: Technical/natural sciences
Links:
http://www.geus.dk/publications/bull/nr13/index-dk.htm
Source: orbit
Source-ID: 250478
Publication: Research - peer-review › Book chapter – Annual report year: 2007

Function of LCSs

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Pages: 5-10
Publication date: 2007

Host publication information
Title of host publication: Environmental Design Guidelines for Low Crested Coastal Structures
Publisher: Elsevier Science
Towards benthic marine landscapes in the Baltic Sea

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Section for Shellfish, Section for Management Systems
Number of pages: 118
Publication date: 2007

Publication information
Publisher: BALANCE
ISBN (Print): 978-87-7871-203-5
Original language: English
Series: BALANCE Interim Report
Number: 10
Main Research Area: Technical/natural sciences
Links:
Source: orbit
Source-ID: 250820
Publication: Research › Report – Annual report year: 2007

Literature review of the "Blue Corridors" concept and it's applicability to the Baltic Sea

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Number of pages: 72
Publication date: 2006

Publication information
Publisher: BALANCE
Original language: English
Series: BALANCE Interim Report
Number: 4
Main Research Area: Technical/natural sciences
Links:
Source: orbit
Source-ID: 250822
Publication: Research › Report – Annual report year: 2006

Biogenic sediments, substrates and habitats of the Faroese shelf and slope

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Horse mussel aggregations in Faroese waters: population structure and diversity of associated fauna

General information
State: Published
Organisations: Danish Forest and Nature Agency
Authors: Dinesen, G. E. (Intern), Tendal, O. (Ekstern)
Publication date: 2005
Event: Poster session presented at The 13th Danish Marine Sciences Meeting, .
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251186
Publication: Research › Poster – Annual report year: 2005

Low crested coastal defence structures as artificial habitats for marine life: Using ecological criteria in design

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Moschella, P. S. (Ekstern), Abbiati, M. (Ekstern), Åberg, P. (Ekstern), Airoldi, L. (Ekstern), Anderson, J. M. (Ekstern), Bacchiocchi, F. (Ekstern), Bulleri, F. (Ekstern), Dinesen, G. E. (Intern), Frost, M. (Ekstern), Gacia, E. (Ekstern), Granhag, L. (Ekstern), Jonsson, P. R. (Ekstern), Satta, M. P. (Ekstern), Sundelöf, A. (Ekstern), Thompson, R. C. (Ekstern), Hawkins, S. J. (Ekstern)
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Coastal Engineering
Volume: 52
Issue number: 10-11
ISSN (Print): 0378-3839
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.44 SJR 1.98 SNIP 2.252
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.925 SNIP 2.097 CiteScore 2.9
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.785 SNIP 2.123 CiteScore 2.55
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.727 SNIP 2.264 CiteScore 2.58
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.912 SNIP 2.226 CiteScore 2.21
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.616 SNIP 2.502 CiteScore 2.43
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.898 SNIP 2.332
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.067 SNIP 2.454
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.189 SNIP 2.166
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.642 SNIP 2.164
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.249 SNIP 2.2
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.22 SNIP 1.966
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.143 SNIP 2.273
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.997 SNIP 1.873
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.729 SNIP 1.104
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.864 SNIP 1.127
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.832 SNIP 1.273
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.534 SNIP 1.096
Original language: English
DOIs:
10.1016/j.coastaleng.2005.09.014
NorGIS 2005-2006: Geographical analysis for identification and mapping of Nordic marine and coastal habitats

General information
State: Published
Organisations: Unknown
Authors: Dinesen, G. E. (Intern), Isæus, M. (Ekstern), Jónsson, O. (Ekstern), Lindblad, C. (Ekstern), Norderhaug, K. (Ekstern), Nyman, M. (Ekstern)
Publication date: 2005
Event: Poster session presented at The 1st IMPAC meeting in Australia, and at the LIFE workshop on habitat mapping in the Baltic Countries, Estonia.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251185
Publication: Research › Poster – Annual report year: 2005

Spatial distribution and species distinction of Modiolus modiolus and syntopic Mytilidae (Bivalvia) in Faroese waters (NE Atlantic)

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Dinesen, G. E. (Intern), Ockelmann, K. (Ekstern)
Pages: 124-135
Publication date: 2005
Main Research Area: Technical/natural sciences
Publication information
Journal: Frodskaparrit
ISSN (Print): 0367-1704
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
BFI (2016): BFI-level 1
BFI (2015): BFI-level 1
BFI (2014): BFI-level 1
BFI (2013): BFI-level 1
ISI indexed (2013): ISI indexed no
BFI (2012): BFI-level 1
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1
BFI (2009): BFI-level 1
BFI (2008): BFI-level 1
Original language: English
Source: orbit
Source-ID: 250753
Publication: Research - peer-review › Journal article – Annual report year: 2005

Assessment of direct and indirect effects of breakwaters on the recruitment, growth and survival of epibiota

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Moschella, P. (ed.) (Ekstern), EFSA Publication
Prototype observations in Denmark: Study site report

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Kramer, M. (Ekstern), Dinesen, G. E. (Intern)
Number of pages: 23
Publication date: 2004

Publication information
Original language: English
Series: DELOS
Main Research Area: Technical/natural sciences

Bibliographical note
Source: orbit
Source-ID: 251134
Publication: Research › Report – Annual report year: 2004

Rock and coral boring Bivalvia (Mollusca) of the Middle Florida Keys, U.S.A

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Valentich-Scott, P. (Ekstern), Dinesen, G. E. (Intern)
Pages: 339-254
Publication date: 2004
Main Research Area: Technical/natural sciences

Publication information
Journal: Malacologia
Volume: 46
Issue number: 2
ISSN (Print): 0076-2997
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.442 SNIP 0.844 CiteScore 0.97
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.47 SNIP 0.925 CiteScore 1.17
BFI (2014): BFI-level 1
Brooding of embryos and juveniles in New Caledonian Rhomboidella (Bivalvia, Pteriomorphia, Mytilidae)

General information
State: Published
Organisations: Unknown
Authors: Dinesen, G. E. (Intern), Ockelmann, K. (Ekstern)
Publication date: 2003
Event: Poster session presented at Open Meeting on Bivalves in Honour of Professor Brian Morton, Cambridge, United Kingdom.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 250754
Publication: Research - peer-review › Journal article – Annual report year: 2004

Anamixidae (Amphipoda: Crustacea) from the Andaman Sea, north-eastern Indian ocean

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Coastal Ecology
Authors: Jansen, T. (Intern), Dinesen, G. E. (Intern)
Pages: 265-272
Publication date: 2002
Main Research Area: Technical/natural sciences
Publication information
Journal: Phuket Marine Biological Center. Special Publications
Kunstigt substrat som habitat - Marinbiologiske aktiviteter i danske farvande under EU projektet DELOS

General information
State: Published
Organisations: Unknown
Authors: Dinesen, G. E. (Intern), Tørring, D. (Ekstern), Bruhn, A. (Ekstern)
Publication date: 2002
Event: Poster session presented at The 12th Danish Marine Sciences Meeting.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 231439
Publication: Research - peer-review › Journal article – Annual report year: 2002

Modiolus modiolus beds

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Dinesen, G. E. (Intern), Bruntse, G. (Ekstern)
Number of pages: 80
Pages: 33-36
Publication date: 2001

Host publication information
Title of host publication: Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands
Publisher: Kaldbak Marine Biological Laboratory
Editors: Bruntse, G., Tendal, O. S.
ISBN (Print): 9991830669
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251189
Publication: Research › Poster – Annual report year: 2002

A history of the controversy about Glochidium parasiticum Rathke, 1797 (Palaeoheterodonta: Unionoida: Unionoidea)

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Heard, W. H. (Ekstern), Dinesen, G. E. (Intern)
Pages: 89-106
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Malacological Review
Volume: Suppl. 8
Issue number: 1
ISSN (Print): 0076-3004
Ratings:
Web of Science (2018): Indexed yes
Modiolus modiolus and the associated fauna

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Dinesen, G. E. (Intern)
Pages: 66-71
Publication date: 1999

Host publication information
Title of host publication: Marine benthic algae and invertebrate communities from the shallow waters of the Faroe Islands: a base line study
Publisher: Kaldbak Marine Biological Laboratory
Editors: Bruntse, G., Lein, T., Nielsen, R.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 250765
Publication: Research - peer-review › Book chapter – Annual report year: 1999

Monitoring of Danish Boulder Reef - a case story

General information
State: Published
Organisations: Unknown
Authors: Frederiksen, R. (Ekstern), Dinesen, G. E. (Intern), Knudsen, L. (Ekstern)
Publication date: 1999
Event: Poster session presented at The 2nd Nordic Marine Science Meeting, Hirtshals, .
Main Research Area: Technical/natural sciences

Bibliographical note
Poster presentation and video
Source: orbit
Source-ID: 251190
Publication: Research › Poster – Annual report year: 1999

Effekter af springlagsopblomstring på benthos

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Jensen, J. (Ekstern), Josefson, A. (Ekstern), Dinesen, G. E. (Intern)
Number of pages: 34
Publication date: 1994

Publication information
Place of publication: København
Publisher: Miljøstyrelsen
Original language: Danish
Series: Havforskning fra Miljøstyrelsen
Number: 34
ISSN: 0906-3773
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251137
Færøske hestemuslinger og deres logerende

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources
Authors: Dinesen, G. E. (Intern)
Pages: 6-9
Publication date: 1994
Main Research Area: Technical/natural sciences

Publication information
Journal: Dyr i Natur og Museum
Volume: 2
ISSN (Print): 0109-1190
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Source: orbit
Source-ID: 250767
Publication: Communication › Journal article – Annual report year: 1994

Projects:

Fishery and Fisheries Ecosystem Impac Modelling
National Institute of Aquatic Resources
Period: 01/06/2017 → 31/05/2020
Number of participants: 5
Phd Student:
Rufener, Marie-Christine (Intern)
Supervisor:
Dinesen, Grete E. (Intern)
Kristensen, Kasper (Intern)
Nielsen, J. Rasmus (Intern)
Main Supervisor:
Bastardie, Francois (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Project: PhD

Baltic Sea Check Point (BSCP) (39294)
The overall aim of this project is to examine the current data collection, observation, surveying, sampling and data assembly programs in the Baltic Sea basin, assess and demonstrate how they can fit into purpose in the 11 challenge areas in terms of data uncertainty, availability, accessibility and adequacy, and deliver the findings to stakeholders through an internet portal with dynamic mapping features and a stakeholder workshop. The Baltic Sea region is as defined by the Marine Strategy Framework Directive, i.e., the semi-enclose sea bounded by the parallel of the Skaw in the Skagerrak at 57°44.43' This project is coordinated by the Danish Meteorological Institute. The project is funded by the EU Executive Agency for Small and Medium-sized Enterprises (EASME) & the Ministry of Environment and Food of Denmark and the European Maritime and Fisheries Fund (EMFF).

National Institute of Aquatic Resources
Section for Marine Living Resources
Danish Meteorological Institute
A systems approach framework for coastal research and management in the Baltic (BaltCoast) (39201)
The ultimate objective of this project is a coherent and systematic management approach that encompasses multiple impacts in a spatially heterogeneous context.

In BaltCoast we tackle this complex task using the Systems Approach Framework (SAF). The SAF is an issue oriented investigation and methodology that applies a holistic perspective. It investigates and quantifies the functions of systems in order to simulate specific questions concerning their functions or policies. It comprises the process from issue identification through system analyses to policy implementation.

This Systems Approach can, hence, competently address implementation of international directives (e.g. Water Framework Directive (WFD), Marine Strategy Framework Directive (MSFD)). In BaltCoast we address multiple issues through case studies that reflect current regional management challenges and develop a generic tool for integrated system assessment.

This project is coordinated by Leibniz-Institute for Baltic Sea Research (IOW).

The project is funded by EU, BONUS (Science for a Better Future of the Baltic Sea Region), ERA-NET.
Mapping of fish habitats with Øresund as a case study (FISKEHAB) (39208)
Mapping of fish habitats in the Danish part of Øresund, based on existing data on fish and habitats, interviews with gillnet fishermen, anglers and workshop participants. The project was commissioned as a response to widespread protest over sand extraction activity in several designated sites in the area. Øresund is a relatively data poor sea area that is fished primarily by fishermen with vessels below 12 meters, i.e. vessels without satellite location data. The project succeeded in creating maps indicating the distributions of 7 key commercial fish species within Øresund with direct association to benthic habitats.

This project was coordinated by DTU Aqua.

The project was commissioned directly by the Danish Ministry of Food, Agriculture and Fisheries.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
University of Copenhagen
Period: 03/12/2014 → 31/08/2015
Number of participants: 6
Research area: Ecosystem based Marine Management & Coastal Ecology
Project participant:
Egekvist, Josefine (Intern)
Støttrup, Josianne Gatt (Intern)
Vinther, Morten (Intern)
Dinesen, Grete E. (Intern)
Phd Student:
Brown, Elliot John (Intern)
Project Coordinator:
Sørensen, Thomas Kirk (Intern)

The effect of bottom trawling on marine bottom fauna and eelgrass (ØB Bundfauna) (39192)
The project provided input to the analysis of the impact of fishing on the ecological quality of the Danish marine environment to the Danish Nature Agency in relation to the water plans needed in connection with the implementation of the Water Framework Directive.

It contained three subprojects:
- Quantifying the area of seabed swept by Danish bottom trawl fisheries.
- Quantifying the impact of bottom trawling on marine benthos.
- Quantifying the possible interaction between bottom trawling and the depth distribution of eelgrass (Zostera marina).

This project was coordinated by DTU Aqua.
The Project was funded by the Danish Nature Agency.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Aarhus University
Period: 01/05/2014 → 31/12/2015
Number of participants: 6
Research areas: Ecosystem based Marine Management & Coastal Ecology & Fisheries Management
Project participant:
Eigaard, Ole Ritzau (Intern)
Bastardie, Francois (Intern)
Boulder reefs as spawning and nursery areas for fish (RevFisk) (39144)
The project aimed to build knowledge about marine boulder reefs and their biological function for fish as spawning and nursery areas.

The field work was conducted on a stone reef, Hatter Barn at two depths 6-12 m and 13-17 m. These two depths were chosen to provide information on fauna and flora in the upper photic zone and a deeper zone. The dominant fish were labrids, which also spawned in the area and juvenile cod. Acoustic tagged cod provided information on their presence around the reef. Many exhibited a diurnal rhythm, concentrating on the reef during nighttime, although some cod were stationary on the reef the whole time. The deeper reef was more frequently visited (fourfold) by cod than the shallower reef.

Experimental work conducted at the Blue Planet aquarium revealed that corkwing wrasse are highly territorial and able to prevent juvenile cod from occupying their crevices. Goldsinnny wrasse showed little interaction with cod and generally utilized very small crevices. Both labrids and cod utilized shelter from current flows provided by the structures and cod were often seen in high concentrations near the bottom where the current flows were laminar.

The results are useful for further developing models that quantify boulder reefs impact on fish (larvae, juvenile, adult) as a function of the reefs condition, size and depth location. The results are useful in helping plan and design the restoration of destroyed boulder reefs but also to manage existing boulder reefs.

The project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management

Ecosystem based method for impact assessment (39142)
The project aimed to develop a methodology for impact assessment and measures to support the implementation of the Marine Strategy Framework and Natura 2000.

The project included
- Development of an approach to impact assessment and step by step guide for management actions to ensure biodiversity, marine food webs and seabed integrity.
- A Case Study on the Dogger Bank to support the implementation of the Natura 2000 processes was evaluated and best practice identified.
- A Case study in the Kattegat with monitoring and ecosystem analysis of muddy habitats to optimize nature conservation
and fisheries management under the Marine Strategy was evaluated and best practice identified.

- Development of cost-effective methods for management, monitoring and control in a report that describes the best practices in the subareas and the related costs.

The project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

National Institute of Aquatic Resources

Arctic Section

Danish Anglers Association

Dalsgaard Data A/S

Silkeborg Fiskeriforening

Period: 23/07/2013 → 01/05/2015
Number of participants: 4

Research areas: Observation Technology & Marine Living Resources & Coastal Ecology

Project participant:
Pedersen, Eva Maria (Intern)
Mosegaard, Henrik (Intern)
Dinesen, Grete E. (Intern)

Project Coordinator:
Stage, Bjarne (Intern)

Project

Stone reefs: Review of the biological and ecological knowledge on stone reefs and their function in temperate areas (Stenrev) (39038)

Boulder reefs have been the subject of extensive mining where a number of reefs have been wholly or partially removed from the marine areas, especially the shallow coastal waters less than 10 m depth. A review on the importance of cold temperate reefs was requested. The review summary highlighted the following. Reefs are known for their high species richness and are biologically very productive. They are home to many fish using reefs for refuge. In particular cavernous reefs with high complexity and many small niches (between and around stones) are characterized by high species diversity, high productivity and have an important function as a feeding area for many species of fish and marine mammals. There are no quantitative estimates of the impact and effects of reefs for fish stocks in Danish waters. However, the relationship between refuge options and survival was shown for goby, as well as for juvenile cod. Larger cod are attracted to reefs during autumn before they start their spawning migration. Results of the first reef restoration project in Danish waters showed a clear development of both macro-algae and benthic fauna and in fish abundance for fish normally associated with reefs. The many fish had probably attracted porpoises, which are now observed more frequently and for longer periods in the area. The European lobster occurs in salty water (> 25 parts per thousand) at 2-40 m depth around vegetated reefs or rocky ground, and therefore, this habitat is an important habitat for lobster. Of the sessile invertebrates highlighted, mussels were found in several different types of habitats, including reefs and is one of the species that are first to colonize new habitats - such as newly established reefs.

This project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

National Institute of Aquatic Resources

Section for Ecosystem based Marine Management

Period: 01/01/2013 → 15/02/2013
Number of participants: 5

Research area: Costal Ecology

Project participant:
Stenberg, Claus (Intern)
Christensen, Helle Torp (Intern)
Wieland, Kai (Intern)

Project Manager, academic:
Dinesen, Grete E. (Intern)

Project Coordinator:
Støttrup, Josianne Gatt (Intern)

Project
**Benthic ecosystem fisheries impact study (BENTHIS) (39021)**

There is general concern about the adverse impact of fisheries on benthic ecosystem which may negatively affect the fisheries yield and integrity of the sea bed. In an integrated approach to marine management, there is a need to develop quantitative tools to assess the impact of fisheries on the benthic ecosystem and at the same time collaborate with the fishing industry to develop innovative technologies and new management approaches to reduce the impact on benthic ecosystems. BENTHIS will provide the knowledge to further develop the ecosystem approach to fisheries management as required in the Common Fisheries Policy and the Marine Strategy Framework Directive. It will study the diversity of benthic ecosystem in European waters and the role of benthic species in the ecosystem functioning. Fisheries impacts will be studied on benthic organisms and on the geo-chemistry. The newly acquired knowledge will be synthesized in a number of generic tools that will be combined into a fishing/seabed habitat risk assessment method that will be applied to fisheries in the Baltic, North Sea, Western waters, Mediterranean and Black Sea. Fisheries will be selected with the fishing industry based on the impact on the benthic ecosystem. BENTHIS will integrate fishing industry partners to collaborate in testing the performance of innovative technologies to reduce fishing impact. Finally, in collaboration with the fishing industry and other stakeholders, new management approaches will be developed and tested on their effects on the ecosystem and their socio-economic consequences. As such BENTHIS will substantially improve the scientific basis to integrate the role of marine benthic ecosystems in fisheries management.

The project has 33 partners from 12 countries.
The project is coordinated by Institute for Marine Resources & Ecosystem Studies (IMARES), Wageningen University, The Netherlands.
The project is funded by EU, Framework Programme 7.

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**Efficient and low impact gear in the Danish fishery for industrial species (GUDP Tobis) (38849)**

The aim of the project was to ensure the future of the Danish industrial fisheries in the increasing demands for reduced environmental impact. The Danish industrial fisheries amount to around 800 million DKK a year in first value. The industrial fishing for sandeel, was seen threatened by a potential ban against bottom trawling in the main fishing areas at Dogger Bank in the North Sea, due to appointment of a large Natura 2000 area by UK, the Netherlands and Germany were bottom trawl could be considered to affect the conservation status of the sand habitat negatively. In addition profitability was threatened by the high vessel operating cost, considering fuel prices at the time.

The objective was to develop and document a fishing method for industrial fisheries (sandeel, Norway pout and sprat) where the trawl doors don’t have bottom contact and where modern materials are used in the gear and for the wire. Thus, compared to traditional gear, an overall energy saving of minimum 30% on each kg fish caught was expected, and also the damages on the benthic fauna was expected to be reduced or eliminated.

The new pelagic gear was constructed according to specifications. It behaved as intended and could easily be operated on Dogger Bank. The new gear consisting of pelagic doors and Dynema equipped trawl has attracted considerable attention among fishers and can be considered a business success. Catch volumes (tons/hour) did not differ between the experimental and standard trawl under parallel fishing. Sandeel behavioral differences could not be identified from sonar and UV-camera recordings, and size and oil content of sandeels was not systematically different between the two gears. Calibration experiments demonstrated 24 % lower fuel consumption in the new trawl.
Bottom surveys were carried out annually from 2012 to 2014 in the North-eastern part of Dogger Bank (in the Dutch/NL EEZ) at approximately 35 meters depth. Sediment analyses showed a grain size composition dominated by fine sand mixed with small amounts of gravel, whereas fine particles comprises 1% maximum ideal as a sandeel habitat. Grain size composition was not altered by trawling or time.

Bottom impact with new gear is estimated to be 30% reduced compared to a similar trawl using conventional doors. Based on the side-scan sonar recordings it was not possible to distinguish differences between the two trawl types in sediment depth penetration. The footprints left by both sandeel trawls in one year were not discernible in subsequent years. Results from the video record analyses showed especially conch and hermit crabs were more abundant soon after trawling compared to before impact. The sediment analyses revealed nearly 100 different invertebrate species many of which lives burrowed or tube building in the sand. Overall diversity did not differ significantly between transects trawled by the two gears and the non-trawled transect. Detailed analyses showed, however, that some species (fragile sea anemones, polychaetes and echinoderms) were less abundant after impact from the conventional trawl compared with the newly-designed trawl and the control transect. A few species were more abundant in the transect trowled by the conventional trawl, including some smaller crustaceans. These results suggest the newly-designed sand eel trawl has a lower impact on benthic fauna than the conventional trawl and we expect the final analyses will support these results.

The project is coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries through the Green Development and Demonstration Program (GUDP).

National Institute of Aquatic Resources
Section for Marine Living Resources
Thyborøn Harbours Fishermen’s Association
Northsea Trawl
Thyborøn Trawldoor.dk
Period: 01/01/2012 → 05/01/2015
Number of participants: 6
Research areas: Marine Living Resources & Fisheries Management & Observation Technology
Project participant:
Eigaard, Ole Ritzau (Intern)
Dinesen, Grete E. (Intern)
Stage, Bjarne (Intern)
Madsen, Niels (Intern)
Project Manager, organisational:
Pedersen, Eva Maria (Intern)
Project Coordinator:
Mosegaard, Henrik (Intern)

EU preparatory action on maritime spatial planning in the North Sea (MASPNOSE) (38895)
Several EU member states had been working on spatial plans for their part of the North Sea. However, most marine spatial planning was carried out on a national level and largely ignored the possible benefits of cross-border cooperation. Joining forces with neighboring countries could have been an efficient way forward. A first step in this direction was the EU MASPNOSE project that brought together spatial planning practitioners, stakeholders and researchers in order to deal with these bottlenecks. MASPNOSE was an EU project on ecosystem based Maritime Spatial Planning (MSP) in the North Sea, focusing on cross-border areas. The project focused on the southern North Sea with Belgium, Denmark, Germany and the Netherlands as target countries.

To achieve this aim, MASPNOSE explored possibilities for cooperation among North Sea countries; established elements for a common agenda for cooperation of countries around the North Sea; tested the 10 key principles on Maritime Spatial Planning set up by the European Commission; and identified potential barriers and opportunities for cross border Maritime Spatial Planning.

The MASPNOSE project acknowledged the overarching importance of national authorities and other stakeholders (e.g. industries, NGO’s) in Maritime Spatial Planning. National governments had an advisory role in the project. Stakeholder participation was one of the focus points of the project and took place in the different case studies on a local scale. MASPNOSE could be seen as an experiment on how cross-border Maritime Spatial Planning could be carried out. This was based on two cross-border case studies in the North Sea: the Dutch-Belgian border and the Dogger Bank.

The project was coordinated by Wageningen University, The Netherlands.
The project was funded by EU, Call for tender (Preparatory Action for Maritime Spatial Planning).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Wageningen IMARES
Stichting DLO
Deltares
Johann Heinrich von Thünen-Institute

Ghent University
Period: 01/01/2010 → 31/05/2012
Number of participants: 3
Research areas: Ecosystem based Marine Management & Marine Living Resources & Coastal Ecology
Project participant:
Dinesen, Grete E. (Intern)
Egekvist, Josefine (Intern)

Project Manager, academic:
Sørensen, Thomas Kirk (Intern)

Project

Fisheries management in NATURE 2000 areas (38797)
Approximately 17% of the Danish sea territory is appointed as Nature 2000 areas. Many of these areas are also very important for fishery. To allow fishery to continue in Nature 2000 sites, it must be demonstrated that the fishery does not negatively impact the basis for appointment for the site. The project aims to establish the science base for development of a concept for Environmental Impact Assessments (EIA) for fishery and aquaculture in Nature 2000 areas, as well as establish interactions between the mussel fishery and the basis for appointment of Nature 2000 areas. The results generated will provide input to the EIA conducted by DTU Aqua and to other advisory issues related to mussel fishery, and to improve the environment in Nature 2000 areas. The approach is a combination of field experiments, model development and theoretical work. Through the project, knowledge will be generated on eelgrass, macrophyte and blue mussel ecology and abundance and interactions with mussel fishery. Development of the oyster fishery in the Wadden Sea will be developed with focus on the Nature 2000 site N89. Seabed mapping of the stone reefs in the Little Belt Sea will include an analysis of the impact of blue mussel fishery on these habitats. Finally the project will establish knowledge base for interactions between aquaculture and Nature 2000 areas.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Danish Shellfish Centre
Period: 01/01/2010 → 30/09/2012
Number of participants: 7
Research areas: Ecosystem Based Marine Management & Observation Technology
Project participant:
Dinesen, Grete E. (Intern)
Stage, Bjarne (Intern)
Lisbjerg, Dennis (Intern)
Rasmussen, Richard Skøtt (Intern)

Project Manager, academic:
Dolmer, Per (Intern)
Christoffersen, Mads (Intern)
Poulensen, Louise K. (Intern)

Project

Interaction in coastal waters: A roadmap to sustainable integration of aquaculture and fisheries (COEXIST) (38789)
The project aims to provide a roadmap towards improved integration, sustainability and synergies among different activities in the coastal zone.

The project will study interactions between capture fisheries and aquaculture, and evaluate mutual benefits and possible bottlenecks for concomitant development of these activities in the coastal zone within the context of the ecosystem
approach to management.

The project will also develop and evaluate different forms of coastal aquaculture and fisheries at different scales and exploit mutual opportunities within a concept of competition for space by multiple users.

Furthermore, the project will address differences in acceptance of activities by society and develop a strategy for communication and involvement of stakeholder as well as for dissemination of results to general and targeted audiences. Six case studies are involved. Individual processes and their interaction will be investigated in each case study using spatial management tools and an array of models.

The project is coordinated by Institute of Marine Research, Norway.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Johann Heinrich von Thünen-Institute
University College Cork
IFREMER
National Institute of Biological Resources
Finnish Game and Fisheries Research Institute
Consiglio Nazionale delle Ricerche
Cefas
Wageningen IMARES
Aqua TT UETP Ltd
Finnish Environment Institute
Institute of Marine Research, Denmark

Wageningen University & Research
Period: 01/01/2010 → 31/12/2012
Number of participants: 7
Research area: Coastal Ecology

Project participant:
Støtrup, Josianne Gatt (Intern)
Stenberg, Claus (Intern)
Sørensen, Thomas Kirk (Intern)
Dinesen, Grete E. (Intern)
Nielsen, J. Rasmus (Intern)
Bastardie, Francois (Intern)

Project Manager, academic:
Dolmer, Per (Intern)

Effect of the Horns Rev 1 offshore wind farm on fish communities (38734 and 38735)
The present project focuses on the fish community at the Horns Rev 1 Offshore Wind Farm. The objective of the present study was to document possible refuge effects or changes in local fish communities, seven years after the establishment of the wind farm at a time where wind farm effects on the physical and biological environment could be assumed to have stabilized. Fish communities and sandeel assemblages were compared inside and outside the wind farm area, with the null-hypothesis that the introduction of an offshore wind farm does not affect species composition, temporal or spatial distribution of species or relative abundance.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Orbicon
Monitoring and evaluation of spatially managed areas (MESMA) (38871)

The MESMA project focused on marine spatial planning and aimed to produce integrated management tools (concepts, models and guidelines) for monitoring, evaluating and implementing Spatially Managed Areas (SMAs). The main tasks in the project were information analysis, the development of a generic framework, the testing and evaluation of this framework through case-studies and the development of a toolbox. A significant proportion of the effort was centered on the case studies within five geographical regions: the North Sea, Baltic, Mediterranean, Atlantic, and Black Sea. This approach made it possible to compare pressures on an inter-regional level (e.g. offshore wind farms in the North Sea, Black Sea and Baltic), or a multi-pressure level for a specific region (e.g. SMA in fishing, wind-energy, geo-hazards and tourism in the Black Sea).

The project was coordinated by IMARES, Wageningen UR, The Netherlands.

The project was funded by EU, Framework Programme 7.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Wageningen IMARES
University College London
Senckenberg Gesellschaft für Naturforschung
Ghent University
Hellenic Centre for Marine Research
Bulgarian Academy of Sciences
Institute of Marine Research
University College Cork
National Research Council of Italy
Marine and Food Technological Centre
Polish Academy of Sciences
Ministry for Resources and Rural Affairs
Cefas
Heriot-Watt University
Deltares
Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek
Institute for Agricultural and Fisheries Research
Johann Heinrich von Thünen-Institute
Management Unit of the North Sea Mathematical Models and the Scheldt Estuary
Project participant:
Christensen, Asbjørn (Intern)
Dinesen, Grete E. (Intern)
Egekvist, Josefine (Intern)
Project Manager, academic:
Sørensen, Thomas Kirk (Intern)

Relations
Publications:
Ecosystem-based marine spatial management: Review of concepts, policies, tools, and critical issues

Science and policy integration for coastal systems assessment (SPICOSA) (38180)
The objective of SPICOSA was to develop a self-evolving, holistic research approach, for integrated assessment of Coastal Systems so that the best available scientific knowledge could be mobilized to support deliberative and decision-making processes towards improving the sustainability of Coastal Systems by implementing Integrated Coastal Zone Management policies. Based on a System Approach, a multidisciplinary assessment framework was developed with a balanced consideration of the Ecological, Social and Economic (ESE) sectors of Coastal Systems.

The System Approach Framework (SAF) developed in the project was then used to explore dynamics of Coastal-Zone Systems and potential consequences of alternative policy scenarios in 18 different Study Sites. We demonstrated that achieving this objective required a restructuring of the science needed to understand the interactions between complex natural and social systems at different spatial and temporal scales including the overall economic evaluation of alternative policies. The software used for the modeling was furthermore developed with the aim to support transfer of scientific products to policy decision-makers, stakeholders and end-users. The SAF Portfolio consisted of generic assessment methodologies, specific tools, models and model blocks and new knowledge useful for ICZM provided in a user-friendly manner and updateable for future CZ researchers and professionals. In addition SPICOSA generated new training curricula, training modules and training opportunities for academics and professionals involved in Sustainability Science and ICZM implementation.

The project was organized into 5 Nodes with DTU Aqua leading one of these 5 Nodes.

In total the project had 54 partners from 22 EU countries.

The project was coordinated by University of Western Brittany, France, Institute of Coastal Marine Environment of CNR, Italy and French National Institute of Marine Research (IFREMER), France.

The project was funded by EU, Framework Programme 6.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Period: 01/01/2007 → 31/12/2011
Number of participants: 3
Research areas: Coastal Ecology & Ecosystem based Marine Management
Project participant:
Dinesen, Grete E. (Intern)
Geitner, Kerstin (Intern)
Project Manager, academic:
Støttrup, Josianne Gatt (Intern)

Limfjord regime shift (38181)
The aim of the project was to reveal causes and mechanisms related to a regime shift in the Limfjord, including the relationship with nutrient loading and fish production in the Limfjord. Furthermore management scenarios for ensuring good environmental conditions and sustainable use of the living resources would be examined and discussed. DTU Aqua’s share of the project was through models to demonstrate a regime shift and to explore potential causes of this. The project made it possible to combine different types of data across sub-basins with different physical-chemical conditions and trophic groups and to explore various methods. We chose to use an Integrated Trend Assessment approach and a series of statistical tests were applied (sequential t-test analyses of regime shifts (STARS), principle component analyses (PCA), STARS on PCA scores and Chronological Clustering). A Traffic Light Plot was used to visualize changes in the ecosystem. A regime shift was identified starting in 1990 and fully developed by 1996. It impacted the whole food-chain structure in the fjord. Possible causes were identified as climatic causes (temperature, salinity and wind) and eutrophication (nutrient N, P loadings and bottom oxygen conditions). To a lesser extent fishery of demersal fish species
could also have been a contributory factor. The regime shift caused a decrease in the fishery of large demersal fish, whereas there was a general increase in the stock size of pelagic and small demersal fish species, crustaceans (crabs, lobster), echinoderms, starfish and jelly fish. After the regime shift primary production in the water column decreased. In the present project it was not possible to determine if the decrease in large demersal fish stocks was caused by failure in recruitment or by over-fishing. At the management level it was pointed out that it was important to study sub-basins of the fjord due to the high variation of parameters between sub-basins. The fundamental changes that had occurred in the system further suggested that it may not be possible for the system to revert back to its original condition even if the nutrient loadings were brought back to their original levels. However, this needs to be further investigated.

The project was coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Aarhus University
Period: 01/01/2005 → 31/12/2010
Number of participants: 4
Research area: Coastal Ecology
Project participant:
Dinesen, Grete E. (Intern)
Hoffmann, Erik (Intern)
Tomczak, Maciej T. (Ekstern)
Project Manager, academic:
Støttrup, Josianne Gatt (Intern)

Activities:

**ICES - Benthos Ecology Working Group - BEWG (External organisation)**
Period: 2015
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Degree of recognition: International

**Related external organisation**

**ICES - Benthos Ecology Working Group - BEWG**
Activity: Membership › Membership of commitees, commissions, boards, councils, associations, organisations, or similar

**ICES - Working Group on Marine Habitat Mapping - WGMHM (External organisation)**
Period: 2015
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Degree of recognition: International

**Related external organisation**

**ICES - Working Group on Marine Habitat Mapping - WGMHM**
Activity: Membership › Membership of commitees, commissions, boards, councils, associations, organisations, or similar

**ICES - Working Group on marine planning and coastal zone management - WGMPCZM (External organisation)**
Period: 2015
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Degree of recognition: International

Related external organisation

ICES - Working Group on marine planning and coastal zone management - WGMPCZM
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

ICES - Working Group on the Ecosystem Effects of Fishing Activities - WGECO (External organisation)
Period: 2015
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Degree of recognition: International

Related external organisation

ICES - Working Group on the Ecosystem Effects of Fishing Activities - WGECO
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

ICES - Working Group on the Ecosystem Effects of Fishing Activities - WGECO (External organisation)
Period: 2014
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Degree of recognition: International

Related external organisation

ICES - Working Group on the Ecosystem Effects of Fishing Activities - WGECO
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

ICES - Benthos Ecology Working Group - BEWG (External organisation)
Period: 2012 → …
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Coastal Ecology
Degree of recognition: International

Related external organisation

ICES - Benthos Ecology Working Group - BEWG
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

ICES - Working Group for Marine Planning and Coastal Zone Management - WGMPCZM (External organisation)
Period: 2012 → …
Grete E. Dinesen (Participant)
National Institute of Aquatic Resources
Section for Coastal Ecology
Degree of recognition: International

Related external organisation

ICES - Working Group for Marine Planning and Coastal Zone Management - WGMPCZM
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar
ICES - Working Group on Biodiversity Science - WGBIODIV (External organisation)
Period: 2012 → …
Grete E. Dinesen (Participant)

National Institute of Aquatic Resources
Section for Coastal Ecology
Degree of recognition: International

Related external organisation

ICES - Working Group on Biodiversity Science - WGBIODIV
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar