Eastern Baltic cod in distress: biological changes and challenges for stock assessment

The eastern Baltic (EB) cod (Gadus morhua) stock was depleted and overexploited for decades until the mid-2000s, when fishing mortality rapidly declined and biomass started to increase, as shown by stock assessments. These positive developments were partly assigned to effective management measures, and the EB cod was considered one of the most successful stock recoveries in recent times. In contrast to this optimistic view, the analytical stock assessment failed in 2014, leaving the present stock status unclear. Deteriorated quality of some basic input data for stock assessment in combination with changes in environmental and ecological conditions has led to an unusual situation for cod in the Baltic Sea, which poses new challenges for stock assessment and management advice. A number of adverse developments such as low nutritional condition and disappearance of larger individuals indicate that the stock is in distress. In this study, we (i) summarize the knowledge of recent changes in cod biology and ecosystem conditions, (ii) describe the subsequent challenges for stock assessment, and (iii) highlight the key questions where answers are urgently needed to understand the present stock status and provide scientifically solid support for cod management in the Baltic Sea.
Lessons for fisheries management from the EU cod recovery plan

The performance of the EU long-term management plan for cod stocks, in force since 2009, is analysed focusing on the human and institutional factors. The plan operates through landings quotas (TACs) and effort restrictions following a Harvest Control Rule, and deploys a novel instrument allowing Member States to ‘buy back’ or increase fishing effort for fleet segments engaged in cod-avoidance measures. The stipulated fishing mortality reductions have not been achieved. On the positive side, the ‘buy-back’ instrument has led to increased uptake of selective gear and implementation of permanent and real-time temporary closures. On the negative side, ignoring the dimension of fishers as reactive agents in the design, the impact assessment, and the annual implementation of the measures has contributed to the failure to adequately implement the plan and achieve its objectives. The main problem is that the landings quotas taken in a mixed fishery did not limit catches because fishers were incentivised to continue fishing and discard overquota catch while quota for other species was available. The effort limitations intended to reduce this effect were insufficient to adequately limit fishing mortality in targeted fisheries, although fishers experienced them as prohibiting the full uptake of other quotas. Recommendations for future plans include (i) management through catch rather than landings quotas, (ii) the internalisation of the costs of exceeding quotas, (iii) use of more selective gear types, (iv) the development of appropriate metrics as a basis for regulatory measures and for evaluations, (v) participatory governance, (vi) fishery-based management, (vii) flexibility in fishing strategy at vessel level.

General information

State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources, Institute Management, Section for Public Sector Consultancy
Pages: 200-213
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information

Journal: Marine Policy
Volume: 37
ISSN (Print): 0308-597X
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 2.7 SJR 1.335 SNIP 1.182
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.591 SNIP 1.397 CiteScore 3.07
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.438 SNIP 1.56 CiteScore 3.09
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.472 SNIP 1.635 CiteScore 2.71
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.339 SNIP 1.495 CiteScore 2.54
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Rebuilding EU fish stocks and fisheries, a process underway?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Institute Management, Lund University, European Commission - Joint Research Center, Regional Agency for the Protection of the Environment in Tuscany, Cefas, Johann Heinrich von Thünen-Institute, Vilnius University, University of Copenhagen
Authors: Cardinale, M. (Ekstern), Doerner, H. (Ekstern), Abella, A. (Ekstern), Andersen, J. (Ekstern), Casey, J. (Ekstern), Döring, R. (Ekstern), Kirkegaard, E. (Intern), Motova, A. (Ekstern), Andersson, J. (Ekstern), Simmonds, I. (Ekstern)
Pages: 43-52
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Policy
Volume: 39
ISSN (Print): 0308-597X
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 2.7 SJR 1.335 SNIP 1.182
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Catch-Quota Management - an example of result based fisheries management

The European Commission tabled in July 2011 a proposal for a revision of the Common Fisheries Policy (CFP). A central element of the revision is the introduction of a quota management system where all fish caught count against the quotas. The principle of full accountability of the catch is a complete change from present management where only the fish landed count against the quotas. The principle of full accountability opens for the introduction of a result based fisheries management strategy, where a fishery is regulated by clearly stated results and the fisher enjoys a maximum of freedom to plan and conduct the fishing operation to meet these results. Experiences from Danish trials with Catch Quota Management (CQM) conducted in 2008 to 2012 is presented and the possibilities of simplifying the current EU fisheries management and control regulations under a CQM system are evaluated.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Institute Management, Section for Public Sector Consultancy, Ministry of Food, Agriculture and Fisheries
Authors: Kirkegaard, E. (Intern), Schou, M. (Ekstern), Dalskov, J. (Intern)
Publication date: 2012
Event: Abstract from World Fisheries Congress, Edinburgh, United Kingdom.
Main Research Area: Technical/natural sciences
En til tider udsøldt race

General information
State: Published
Organisations: National Institute of Aquatic Resources, Institute Management
Authors: Kirkegaard, E. (Intern)
Pages: 203-207
Publication date: 2012

Host publication information
Title of host publication: Fortællinger om fisk og fiskere: Danmarks Fiskeriforening 125 år, 1887-2012
Place of publication: Fredericia
Publisher: Danmarks Fiskeriforening
Editor: Lyngs Mortensen, M.
ISBN (Print): 978-87-90749-04-0
Main Research Area: Technical/natural sciences
Publication: Communication › Book chapter – Annual report year: 2012

Fiskebestandenenes struktur. Fagligt baggrundsnotat til den danske implementering af EU's havstrategidirektiv

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population Ecology and Genetics, Section for Public Sector Consultancy, Section for Coastal Ecology, Institute Management, Section for Ocean Ecology and Climate
Authors: Warnar, T. (Intern), Huwer, B. (Intern), Vinther, M. (Intern), Egekvist, J. (Intern), Sparrevohn, C. R. (Intern), Kirkegaard, E. (Intern), Dolmer, P. (Intern), Munk, P. (Intern), Sørensen, T. K. (Intern)
Number of pages: 121
Publication date: 2012

Publication information
Publisher: Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet
ISBN (Electronic): 978-87-7481-158-9
Original language: Danish
Series: DTU Aqua-rapport
Number: 254-2012
Main Research Area: Technical/natural sciences
Electronic versions:
254_2012_fiskeestandenes_struktur_baggrundsnotat_til_havstrategi.pdf
Links:
http://www.aqua.dtu.dk/Publikationer/Forskningsrapporter/Forskningsrapporter_siden_2008
Publication: Commissioned › Report – Annual report year: 2012


The scientific advice on the stocks and fisheries in the Baltic Sea in 2013 evaluated and endorsed by the Scientific, Technical and Economic Committee for Fisheries (STECF) by written procedure in June 2012 on a request by the European Commission

General information
State: Published
Organisations: National Institute of Aquatic Resources, Institute Management
Authors: STEFC Members
Number of pages: 29
Publication date: 2012

Publication information
Place of publication: Luxembourg
Coastal states arrangements. Blue whiting, herring, mackerel, capelin

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Kirkegaard, E. (Intern)
Number of pages: 103
Publication date: 2011

Host publication information
Title of host publication: The Pelagic Complex in the North East Atlantic Ocean. Challenges and possibilities in the pelagic sector – looking towards the future
Place of publication: Copenhagen
Publisher: Nordic Council of Ministers
ISBN (Print): 978-92-893-2228-7

Series: TemaNord
Number: 2011:531
ISSN: 0908-6692
Main Research Area: Technical/natural sciences
Conference: The Pelagic Complex in the North East Atlantic Ocean. Challenges and possibilities in the pelagic sector – looking towards the future. International Conference 7-9 Sept, 01/01/2010
Links:
Source: orbit
Source-ID: 281217
Publication: Research › Article in proceedings – Annual report year: 2011

Fishery reform: many stocks secure

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Cardinale, M. (Ekstern), Dörner, H. (Ekstern), Casey, J. (Ekstern), Abella, A. (Ekstern), Andersen, J. L. (Ekstern), Döring, R. (Ekstern), Kirkegaard, E. (Intern), Simmonds, E. J. (Ekstern), Stransky, C. (Ekstern)
Pages: 282
Publication date: 2011

Main Research Area: Technical/natural sciences
Publication information
Journal: Nature
Volume: 476
ISSN (Print): 0028-0836
Ratings: 
BFI (2018): BFI-level 3
Fully documented fishery: a tool to support a catch quota management system

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources, Institute Management, Section for Public Sector Consultancy
Authors: Kindt-Larsen, L. (Intern), Kirkegaard, E. (Intern), Dalskov, J. (Intern)
Pages: 1606-1610
European eel and aquaculture

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology, Section for Public Sector Consultancy, Section for Aquaculture, Section for Population Ecology and Genetics
Number of pages: 19
Publication date: 2010

Publication information
Place of publication: Charlottenlund
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
ISBN (Print): 978-87-7481-127-5
Original language: English

Series: DTU Aqua-rapport
Number: 229-2010
ISSN: 1395-8216
Main Research Area: Technical/natural sciences
Electronic versions: 229-2010_European-Eel-and-Aquaculture.pdf
Links:
Source: orbit
Source-ID: 270913
Publication: Research › Report – Annual report year: 2010

Fully documented fishery - using electronic monitoring to improve industry self reported data

General information
State: Published
Organisations: Section for Public Sector Consultancy, National Institute of Aquatic Resources, Section for Management Systems, Institute Management
Authors: Dalskov, J. (Intern), Kindt-Larsen, L. (Intern), Kirkegaard, E. (Intern)
Pages: 1-10
Publication date: 2009

Host publication information
Title of host publication: ICES C.M. ASC
Volume: N:18
Place of publication: Copenhagen
Publisher: International Council for the Exploration of the Sea
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252483
Publication: Research › Article in proceedings – Annual report year: 2009

Et flerårigt grundlag for dansk industrifiskeri: Biologisk vurdering af ressourcegrundlaget og analyse af forvaltningsmodeller

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics, Section for Fisheries Advice, Section for Management Systems, Section for Monitoring
Authors: Kirkegaard, E. (Intern), Jensen, H. (Intern), Mosegaard, H. (Intern), Vinther, M. (Intern), Payne, M. (Intern), Nielsen, J. R. (Intern), Dalskov, J. (Intern)
Number of pages: 63
Publication date: 2007

Publication information
Place of publication: Charlottenlund
Publisher: Danmarks Tekniske Universitet. Danmarks Fiskeriundersøgelser
Presentation of fisheries advice taking account of mixed fisheries, environmental integration requirements, harvest rule-based fishery evaluations, and yield considerations and economic analysis

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Patterson, K. (Ekstern), Kirkegaard, E. (Intern)
Pages: 21
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: ICES C.M.
Volume: X:18
Original language: English
Links:
http://www.ices.dk/products/CMdocs/2003/X/X1803.PDF
Source: orbit
Source-ID: 281214
Publication: Research › Conference article – Annual report year: 2003


General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources, Section for Fisheries Advice, Section for Fisheries- and Monitoring Technology
Number of pages: 45
Publication date: 2001

Publication information
Publisher: [s.n.]
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 225391
Publication: Research › Report – Annual report year: 2001

Report of the scientific meeting on technical measures for the fisheries on Baltic cod, Brussels 20-24 august 2001

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources, Section for Fisheries- and Monitoring Technology
Authors: Dahm, E. (Ekstern), Kirkegaard, E. (Intern), Lassen, H. (Ekstern), Netz, J. (Ekstern), Larsen, L. (Ekstern), Pilkhos, M. (Ekstern), Madsen, N. (Intern), Hagström, O. (Ekstern), Gasyukov, P. (Ekstern), Larsson, P. (Ekstern), Ernst, P. (Ekstern), Suuronen, P. (Ekstern), Aps, R. (Ekstern), Toliusis, S. (Ekstern), Reeves, S. (Ekstern)
Number of pages: 60
Publication date: 2001

Publication information
Publisher: [s.n.]
Fiskeribiologisk rådgivning

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Degnbol, P. (Ekstern), Kirkegaard, E. (Intern)
Pages: 7-17
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisk og Hav
Issue number: 51
ISSN (Print): 0105-9211
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Links:
Source: orbit
Source-ID: 225264
Publication: Research › Journal article – Annual report year: 2000

Fiskebestande og fiskeri i 1999

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Degnbol, P. (Ekstern), Kirkegaard, E. (Intern)
Number of pages: 75
Publication date: 1999

Publication information
Place of publication: Hirtshals
Publisher: Danmarks Fiskeriundersøgelser
ISBN (Print): 87-88047-96-2
Original language: Danish

Series: DFU-rapport
Number: 62-99
Main Research Area: Technical/natural sciences
Electronic versions:
62-99_fiskebestande_og_fiskeri.pdf
Source: orbit
Source-ID: 225261
Publication: Research › Report – Annual report year: 1999

Operation and distribution of the industrial fisheries in the North Sea

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Kirkegaard, E. (Intern), Wright, P. (ed.) (Ekstern), Kennedy, F. (ed.) (Ekstern)
Pages: 3-8
Publication date: 1999
Living marine resources-module: the provision of scientific advice on fisheries

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Bailey, R. (Ekstern), Kirkegaard, E. (Intern)
Publication date: 1997

Host publication information

Series: Elsevier Oceanography Series
Number: 62
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 228759
Publication: Research › Article in proceedings – Annual report year: 1997

The industrial fishery and the North Sea sandeel stock

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Institute Management
Authors: Gislason, H. (Intern), Kirkegaard, E. (Intern)
Publication date: 1997

Publication information
Publisher: [s.n.]
Original language: English

Series: Fisken og Havet
Number: 1-1997
Main Research Area: Technical/natural sciences

Bibliographical note
Seminar report: The Precautionary Approach to North Sea Fisheries Management
Source: orbit
Source-ID: 225516
Publication: Research › Report – Annual report year: 1997

Biologisk rådgivning 1997

General information
Fiskeriets modeller: Forvaltning på et objektivt grundlag?

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Institute Management
Authors: Gislason, H. (Intern), Kirkegaard, E. (Intern)
Pages: 9-12
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Samfundsoekonomen
Volume: 2
ISSN (Print): 0108-3937
Ratings:
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
BFI (2016): BFI-level 1
Changes in the status of the major roundfish, flatfish, and pelagic stocks in the North Sea over the past 30 years are reviewed. Synopses are presented on trends in catches, fishing mortality, spawning-stock biomass, and recruitment for eight stocks (cod, haddock, whiting, saithe, plaice, sole, herring, and mackerel), together with an evaluation of the current state of these resources and the most resent management advice provided by the ICES Advisory Committee on Fishery Management. (C) 1996 International Council for the Exploration of the Sea

**Status and trends of the major roundfish, flatfish, and pelagic fish stocks in the North Sea: Thirty-year overview**

Changes in the status of the major roundfish, flatfish, and pelagic stocks in the North Sea over the past 30 years are reviewed. Synopses are presented on trends in catches, fishing mortality, spawning-stock biomass, and recruitment for eight stocks (cod, haddock, whiting, saithe, plaice, sole, herring, and mackerel), together with an evaluation of the current state of these resources and the most recent management advice provided by the ICES Advisory Committee on Fishery Management. (C) 1996 International Council for the Exploration of the Sea.
Status og udviklingsmøder i den biologiske fiskerirådgivning

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources
Authors: Kirkegaard, E. (Intern)
Publication date: 1996

Publication information
Publisher: Teknologirådet
Original language: Danish
Series: Teknologirådets rapporter
Number: 1996/8
Main Research Area: Technical/natural sciences

Bibliographical note
Sludokumenter og ekspertindlæg fra konsensuskonferencen 22.-25. november 1996
Source: orbit
Source-ID: 226195
Publication: Research › Report – Annual report year: 1996


General information
State: Published
Organisations: Unknown
Authors: Kirkegaard, E. (Intern), Gislason, H. (Intern)
Publication date: 1996

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 282298
Publication: Research › Report – Annual report year: 1996
The cultivation of Acartia tonsa Dana for use as a live food source for marine fish larvae

The marine calanoid copepod Acartia tonsa has been continuously cultivated in the laboratory at the Danish Institute for Fisheries and Marine Research for over 70 generations. A description of the cultivation procedures is presented in this paper. Adult copepods are maintained in 200–450-l tanks and are fed the cryptophyte Rhodomonas baltica. The concentration of adult copepods is held between 50 and 100/l. Eggs are harvested daily and, on average, ca. 25 eggs are collected per female per day.

General information
State: Published
Organisations: Section for Coastal Ecology, National Institute of Aquatic Resources, Institute Management
Authors: Støttrup, J. (Intern), Richardson, K. (Ekstern), Kirkegaard, E. (Intern), Pihl, N. J. (Intern)
Pages: 87-96
Publication date: 1986
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquaculture
Volume: 52
Issue number: 2
ISSN (Print): 0044-8486
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 2.75 SJR 1.101 SNIP 1.524
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.103 SNIP 1.254 CiteScore 2.12
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.002 SNIP 1.34 CiteScore 2.16
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.136 SNIP 1.3 CiteScore 2.18
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.212 SNIP 1.487 CiteScore 2.32
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.294 SNIP 1.542 CiteScore 2.39
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.151 SNIP 1.394
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.941 SNIP 1.263
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.909 SNIP 1.173
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.019 SNIP 1.318
Eastern-western Baltic cod: Improved management based on stock discrimination of eastern and western Baltic cod (Øst-Vesttorsk) (38989)

The aim of this project was to improve the management of western Baltic cod by incorporating stock identification routines in order to discriminate between eastern and western Baltic cod stocks. In recent years evidence from fishery patterns and otolith structures have indicated an increasing degree of mixing between the two cod stocks which until 2013 were managed as two separate stocks. Changes in fishing pressure and patterns would therefore result in a risk for local depletion of the smaller western stock.

Stock identification methods were based on established approaches using genetic discrimination and otolith shape analysis, and improved by linking these methods. This method provides a tool to estimate the degree of stock mixing using the existing otolith archives. This approach documented an increase of eastern Baltic cod from 30% to > 80% in the eastern part of the western Baltic Sea management area. As a consequence of this stock mixing, a new procedure incorporating stock mixing on an annual basis was set in place, with the aim to improve stock exploitation and reduce the risk of local depletion. The knowledge gained also influenced recent management regulations, particularly a prolongation of spawning closer of the fishery in 2016.

The project was coordinated by Centre for Environment, Fisheries & Aquaculture Science, UK. 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 Marine Ecology and Oceanography

Cefas
Period: 27/06/2011 → 29/03/2013
Number of participants: 18
Research areas: Marine Populations and Ecosystem Dynamics & Marine Living Resources & Population Genetics & Fisheries Management
Project participant:
Hansen, Jakob Hemmer (Intern)
Huwer, Bastian (Intern)
Bastardie, Francois (Intern)
Eero, Margit (Intern)
Nielsen, J. Rasmus (Intern)
Worsøe Clausen, Lotte (Intern)
Catch quota project 2011 (38823)
The aim of the project is further development and test of Catch Quota Management (CQM) systems in Danish fisheries by the use of electronic monitoring systems. Furthermore, to test whether electronic monitoring – video and sensor recordings – can provide the necessary documentation to support a CQM system. In addition the project will illustrate whether full documentation of catches can support implementation and certification and traceability solutions which requires linkage to project dealing with these issues.

As the Danish Government has worked intensively for the implementation of CQM in the new Common Fisheries Policy (to be implemented from 2013 and onwards) the project should also facilitate international cooperation on European level to set up common standards for CQM data collection, data processing, data exchange and base development.

The project is coordinated by DTU Aqua.

Optimal sustainable exploitation of Nephrops norvegicus in Kattegat and Skagerrak (38909)
The scientific advice on management of fisheries is primarily aiming at avoiding overfishing of the fish and shellfish stocks and only to a very limited extend addresses how the utilisation of the resources can be optimised within a sustainable ecosystem framework. An example is the regulation of the demersal trawl fisheries in the Skagerrak and the Kattegat which to protect the cod stock is sub-optimal in relation to the utilisation of the Norway lobster (Nephrops) stocks. The project takes a new approach to the management and aims at optimising the utilisation of Nephrops stocks without compromising the protection of cod.

The Nephrops fishery is one of the economically most important fisheries in Denmark. In the Kattegat and Skagerrak, Nephrops catches accounted in 2010 for 53 % and 25 %of the total value of fish and shellfish, respectively, landed by Danish fishermen. Cod is taken as by-catch in the Nephrops fishery and it has been necessary to introduce measures to limit the by-catches of cod, which is currently below agreed reference points for stock size. These measures have had a negative impact on Nephrops catches.
The project addressed four objectives: (i) development of advice on the fishing mortality for the Nephrops stocks, which is consistent with maximum sustainable yield; (ii) mapping of the distribution of Nephrops in Skagerrak and Kattegat; (iii) development of a new trawl concept optimising the catchability on Nephrops while limiting the by-catches of cod and impact on the sea bed; and (iv) evaluating alternative fishing methods for Nephrops including fishing with pots.

The project was 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 Ecosystem based Marine Management

Danish Fishermen's Association
Period: 01/01/2011 → 31/12/2014
Number of participants: 10
Research areas: Fisheries Management & Fisheries Technology & Marine Living Resources

Project participant:
Nielsen, Anders (Intern)
Madsen, Niels (Intern)
Krag, Ludvig Ahm (Intern)
Eigaard, Ole Ritzau (Intern)
Stage, Bjarne (Intern)
Project Manager, academic:
Kirkegaard, Eskild (Intern)
Christensen, Asbjørn (Intern)
Wieland, Kai (Intern)
Frandsen, Rikke (Intern)
Project Coordinator:
Rindorf, Anna (Intern)

Catch quota project 2010 (38787)
The aim of the project is further development and test of Catch Quota Management (CQM) systems in Danish fisheries by the use of electronic monitoring systems. Furthermore, to test whether electronic monitoring – video and sensor recordings – can provide the necessary documentation to support a CQM system.

In addition the project will illustrate whether full documentation of catches can support implementation and certification and traceability solutions which requires linkage to project dealing with these issues.

From January 2010 the European Council has adopted possibilities for EU Members States to conduct trials on catch quota management on cod in the North Sea, the Skagerrak and the Kattegat.

As the Danish Government has worked intensively for the implementation of CQM in the new Common Fisheries Policy (to be implemented from 2013 and onwards) the project should also facilitate international cooperation on European level to set up common standards for CQM data collection, data processing, data exchange and data base development.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Public Sector Consultancy
Archipelago Marine Research Ltd
Period: 01/01/2010 → 31/12/2011
Number of participants: 5
Research area: Fisheries Management

Project participant:
Olesen, Hans Jakob (Intern)
Jensen, Reinhardt (Intern)
Kirkegaard, Eskild (Intern)
Management plans and Danish fishery (2245)
The objectives of the project were with reference to the EU Commissions proposals on multi-annual management plans, to deliver high quality advice on management of the fishing effort in Danish fisheries in the Baltic Sea, the North Sea, the Skagerrak and the Kattegat.

To be able to deliver the advice the project addressed the need for detailed and accurate data on catches, effort and economical performance in the main demersal Danish fisheries in the concerned areas and the need for accurate stock assessment of the economically most important fish and shellfish stocks. The project also developed a systematic method to give a qualified prediction of the selectivity of a trawl based on information on the trawl design.

The project included seven work packages: (i) Description of development in catches, fishing effort and economical performance of the main demersal Danish fisheries including creation of a single database; (ii) Develop a reference fleet system to collect detailed information on catches and fishing effort; (iii) Development of a software to be used to simulate trawl selectivity; (iv) Establish a fisheries independent monitoring survey on Norway lobster in the Skagerrak and the Kattegat; (v) Provide advice on a fishing effort management system for the demersal fisheries in Kattegat including proposal for enhancement of the cod selectivity in trawl fisheries; (vi) Provide advice on fishing effort in form of days at sea by métier; and (vii) Evaluate the impact of the effort management system in the Baltic Sea on the Danish fishery and the stocks.

The project was coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
University of Copenhagen
Period: 01/01/2006 → 31/12/2008
Number of participants: 13
Research areas: Fisheries Management & Fisheries Technology
Project participant:
Munch-Petersen, Sten (Intern)
Madsen, Niels (Intern)
Bastardie, Francois (Intern)
Pedersen, Eva Maria (Intern)
Christensen, Steen (Ekstern)
Project Manager, academic:
Kirkegaard, Eskild (Intern)
Andersen, Bo Selgaard (Intern)
Jørgensen, Ole A. (Intern)
Herrmann, Bent (Intern)
Storr-Paulsen, Marie (Intern)
Dalskov, Jørgen (Intern)
Nielsen, J. Rasmus (Intern)
Krag, Ludvig Ahm (Intern)