Effectiveness of fully documented fisheries to estimate discards in a participatory research scheme

A key challenge for fisheries science and management is the access to reliable and verifiable catch data. In science, the challenge is to collect reliable, precise and traceable data to provide sound advice. In management, the challenge is that catch documentation is necessary to enforce regulations. Currently, catch inspection at sea, self-reporting through e-log and on-board observers are the primary methods to document catches at sea. However, at-sea control and on-board observers are costly and have limited coverage, while self-reporting is susceptible to fraud and provides limited coverage. New cost-effective methods are currently emerging involving Remote Electronic Monitoring (REM) and on-board cameras. Previous studies have tested REM with promising results. However, evaluation of the potential biases of REM is needed before full benefits can be obtained. We deployed REM with on-board cameras on 14 fishing vessels and were able to inspect 56% of 1523 hauls made in the 6 month trial period, using an estimated 582 man-hours of video audit. The results showed an overall good agreement between the fishers self-reported discards and the video inspectors discard estimates. However, there was large variation in precision between individual vessels and species. Additionally, trial setup and process errors were shown to have a large effect on the precision of the video inspectors discard estimates. Nevertheless, despite challenges, REM was evaluated to have the potential to streamline monitoring and scientific documentation in a medium-size fishing fleet.
Recreational sea fishing in Europe in a global context—Participation rates, fishing effort, expenditure, and implications for monitoring and assessment

Marine recreational fishing (MRF) is a high-participation activity with large economic value and social benefits globally, and it impacts on some fish stocks. Although reporting MRF catches is a European Union legislative requirement, estimates are only available for some countries. Here, data on numbers of fishers, participation rates, days fished, expenditures, and catches of two widely targeted species were synthesized to provide European estimates of MRF and placed in the global context. Uncertainty assessment was not possible due to incomplete knowledge of error distributions; instead, a semi-quantitative bias assessment was made. There were an estimated 8.7 million European recreational sea fishers corresponding to a participation rate of 1.6%. An estimated 77.6 million days were fished, and expenditure was €5.9 billion annually. There were higher participation, numbers of fishers, days fished and expenditure in the Atlantic than the Mediterranean, but the Mediterranean estimates were generally less robust. Comparisons with other regions showed that European MRF participation rates and expenditure were in the mid-range, with higher participation in Oceania and the United States, higher expenditure in the United States, and lower participation and expenditure in South America and Africa. For both northern European sea bass (Dicentrarchus labrax, Moronidae) and western Baltic cod (Gadus morhua, Gadidae) stocks, MRF represented 27% of the total removals. This study highlights the importance of MRF and the need for bespoke, regular and statistically sound data collection to underpin European fisheries management. Solutions are proposed for future MRF data collection in Europe and other regions to support sustainable fisheries management.
Reducing discards without reducing profit: Free gear choice in a Danish result-based management trial

The 2013 Common Fisheries Policy introduced a landing obligation on a range of species. This is changing the fundamental principles on which EU fisheries management is based, with more focus on the full accountability of all catches (a move towards catch quota management) and less accountability on the means used to obtain these catches (a move towards results-based management). To investigate the potentials and challenges that these paradigm shifts give rise to, a 6-months ‘unrestricted gear’ trial was performed in Denmark in 2015. Twelve trawlers of different size, rigging, fishing area and target species were challenged to test their own solutions to reduce unwanted bycatch and/or choke species, while maintaining their profitability. Fully documented fishery (FDF) was required, including electronic monitoring, self-estimation of discards and haul-by-haul catch documentation. Fishers’ participation in the trial was partly incentivized through the allocation of additional quota. Fishers used twinned standard and test gears whenever possible, or switched gear sequentially otherwise. The participating fishers tested different options depending on their fishery and the type of issues they faced individually, and adjusted their test fishery over time through incremental small steps. A total of 1497 hauls were analysed for landings, discards and discard-ratio (discard to catch ratio), along with species composition and temporal trends. Nine vessels reduced discard ratio in the test fishery, one showed no difference between test and control fishery, while two vessels displayed an increase in discard ratio. The catch compositions were also significantly different, with fewer predicted “choke species” occurring in the test fisheries and a more valuable size composition. Ultimately, despite smaller landings in multiple vessels, no vessel showed reduction in value-per-unit-effort (VPUE) and one Baltic vessel significantly increased the VPUE. No temporal trends in discard ratio were noted. This trial showed that relaxing technical regulations has a potential to provide some flexibility to cope with the landing obligation, where unwanted catches could be reduced to some extent without negative effects on economic viability. Some practical implementation challenges were nevertheless encountered, which are discussed in the perspective of implementing results-based management at full scale.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Aalborg University
Authors: Mortensen, L. O. (Intern), Ulrich, C. (Intern), Qvist Eliasen, S. (Ekstern), Olesen, H. J. (Intern)
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Scopus rating (2015): CiteScore 2.18
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Scopus rating (2013): CiteScore 2.46
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Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.35
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Remote electronic monitoring and the landing obligation – some insights into fishers’ and fishery inspectors’ opinions

The European fisheries management is currently undergoing a fundamental change in the handling of catches of commercial fisheries with the implementation of the 2013 Common Fisheries Policy. One of the main objectives of the policy is to end the practice of discarding in the EU by 2019. However, for such changes to be successful, it is vital to ensure stakeholders acceptance, and it is prudent to consider possible means to verify compliance with the new regulation. Remote Electronic Monitoring (REM) with Closed-Circuit Television (CCTV) has been tested in a variety of fisheries worldwide for different purposes and is currently considered as one possible tool to ensure compliance with a European ban on discards. This study focuses on Danish fishery inspectors and on fishers with REM experience, whose opinions are less well known. Their views on the landing obligation and on the use of REM were investigated using interviews and questionnaires, and contrasted to some fishers without REM experience. 80% of fishery inspectors and 58% of REM-experienced fishers expressed positive views on REM. 9 out of 10 interviewed fishers without REM experience were against REM. Participation in a REM trial has not led to antipathy towards REM. Fishery inspectors saw on-board observers, at-sea control and REM as the three best solutions to control the landing obligation but shared the general belief that the landing obligation cannot be enforced properly and will be difficult for fishers to comply with. The strengths and weaknesses of REM in this context are discussed.

General information
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Organisations: Section for Marine Living Resources, National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Aalborg University, Ministry of Food, Agriculture and Fisheries
Authors: Schreiber Plet-Hansen, K. (Intern), Qvist Eliasen, S. (Ekstern), Mortensen, L. O. (Intern), Bergsson, H. (Ekstern), Olesen, H. J. (Intern), Ulrich, C. (Intern)
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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
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Scopus rating (2012): SJR 1.339 SNIP 1.495 CiteScore 2.54
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.406 SNIP 1.263 CiteScore 2.07
ISI indexed (2011): ISI indexed yes
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Scopus rating (2010): SJR 1.289 SNIP 1.483
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1.500 mærkede torsk skal give bedre bestandsvurdering

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Monitoring and Data, Danish Fishermen's Producers' Organization
Authors: Hüssy, K. (Intern), Olesen, H. J. (Intern), Hansen, K. K. (Ekstern), Lund, H. S. (Ekstern)
Pages: 11
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MINIDISC-projektet fik afprøvet det frie redskabsvalg

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Danish Fishermen's Producers' Organization, Aalborg University
Authors: Mortensen, L. O. (Intern), Ulrich, C. (Intern), Olesen, H. J. (Intern), Eliasen, S. Q. (Forskerdatabase), Lund, H. S. (Ekstern)
Pages: 16
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Discarding of cod in the Danish Fully Documented Fisheries trials

Denmark was the first nation in Europe to promote the use of Fully Documented Fisheries (FDF) through Remote Electronic Monitoring (REM) and CCTV camera systems, with pilot schemes in place since 2008. In theory, such a scheme could supplement and even potentially replace expensive control and monitoring programmes; and when associated with a catch quota management (CQM) system, incentivize positive changes in fishing patterns in a results-based management approach. New data flows are, however, required to ensure the practical implementation of such a scheme. This paper reviews the quality of the FDF data collected during 2008–2014 and their potential in strengthening information on cod discards. The analyses demonstrate the improved reporting of discards in logbooks and overall discard reductions, but they also show that some uncertainties around the absolute estimates of discard quantities have remained. Regular validation of weight estimation methods and close collaboration between scientific monitoring and control are important to support the use of reported discards as a reliable source of information. We discuss the potential of electronic monitoring in the context of the EU landing obligation.

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Eel, cod and seatrout harvest in Danish recreational fishing during 2012

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State: Published
Organisations: National Institute of Aquatic Resources, Section for Monitoring and Data
Authors: Olesen, H. J. (Intern), Storr-Paulsen, M. (Intern)
Number of pages: 21
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Publication information
Publisher: Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet
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Empowering fishermen towards the landing obligations, with their own technical solutions

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data
Authors: Mortensen, L. O. (Intern), Olesen, H. J. (Intern), Egekvist, J. (Intern), Rindorf, A. (Intern), Ulrich, C. (Intern)
Publication date: 2015
Event: Abstract from Conference of the European Association of Fisheries Economists, Salerno, Italy.
Main Research Area: Technical/natural sciences
Publication: Research › Report – Annual report year: 2015

Fully documented fisheries - is remote electronic monitoring the future tool in fisheries control?

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State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Ministry of Food, Agriculture and Fisheries
Authors: Schreiber Plet-Hansen, K. (Intern), Ulrich, C. (Intern), Olesen, H. J. (Intern), Mortensen, L. O. (Intern), Bergsson, H. (Ekstern)
Publication date: 2015
Event: Poster session presented at ICES Annual Science Conference 2015, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
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Kan frit redskabsvalg hjælpe når discardforbudet kommer?

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Public Sector Consultancy, Aalborg University
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MINIDISC - Minimering af discards i danske fiskerier

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Pilot project for the preparation of MSC certification of the gillnet fishery in the Baltic Sea

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Organisations: National Institute of Aquatic Resources, Section for Monitoring and Data, Section for Ecosystem based Marine Management, Danish Fishermen's Producers' Organization
Authors: Olesen, H. J. (Intern), Larsen, F. (Intern), Kindt-Larsen, L. (Intern), Jacobsen, J. B. (Ekstern)
Number of pages: 26
Publication date: 2015

Relaxing technical regulations under the Landings Obligation – effects on the discard ratio

The landings obligation (LO), currently being implemented in the new CFP, puts major constraints on fishers, by making the landing of unwanted catch mandatory. Less restrictive technical rules (TR) in a results-based management frame have been suggested as a mechanism to release some of these constraints. To investigate the effects of the existing TR, some fishers were relaxed from TR during the trial and could freely choose and develop alternative gears, aiming to optimize annual catch value, while reducing discards. The study included 14 demersal fishing vessels, operating in the North Sea, Skagerrak and the Baltic Sea. Fishers used test and control gears interchangeably or in pairs and were required to sort and weight all discard of seven common target species on a haul by haul basis. All vessels were equipped for Fully Documented Fisheries, including cameras. Collected data were analyzed to investigate differences in landings, discards, discard ratio, CPUE, VPUE and DPUE, between conventional (control) and new gears (test). The results showed a varying degree of success, depending both on area and on choices made by the individual fisher. The best results were observed in the Baltic Sea, where relaxing technical rules led to major improvements in fishing patterns. But gear changes did not contribute much in fisheries where initial discards rates were already low

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DTU Aqua søger fiskere til discardprojekt

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Public Sector Consultancy
Authors: Ulrich, C. (Intern), Olesen, H. J. (Intern), Dalskov, J. (Intern)
DTU og fiskere samarbejder om optimering af fangstmuligheder

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Projektet MINIDISC sættes i gang

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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Danish Fishermen's Producers' Organization
Authors: Ulrich, C. (Intern), Olesen, H. J. (Intern), Fischer, K. S. (Ekstern)
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Behind the shine: An appraisal of five years of Danish CCTV trials
Denmark has been the first nation in Europe to promote the use of Fully Documented Fisheries (FDF) through Remote Electronic Monitoring (REM) and CCTV camera systems, and some pilot schemes for monitoring cod catches have been in place since 2008. In theory, such a scheme could supplement and even potentially replace expensive control and
monitoring programs; and, when associated to a Catch Quota management system, incentivize positive changes in fishing patterns in a results-based management approach. However, in practice, the technical and institutional challenges remain important hurdles to overcome for the system to be beneficial and reliable. In this paper we investigate the added value on catch information gained over the last five years, and discuss the future of REM as a monitoring program in the context of the future discards ban.

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Public Sector Consultancy, Section for Monitoring and Data
Authors: Ulrich, C. (Intern), Dalskov, J. (Intern), Egekvist, J. (Intern), Håkansson, K. B. (Intern), Olesen, H. J. (Intern), Storr-Paulsen, M. (Intern)
Number of pages: 2
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**Danish Catch Quota Management trials – application and results**

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Public Sector Consultancy, Section for Monitoring, Danish AgriFish Agency
Authors: Dalskov, J. (Intern), Olesen, H. J. (Intern), Møller, E. (Ekstern), Jensen, S. P. (Ekstern), Jensen, M. (Ekstern), Schultz, F. (Ekstern), Schou, M. (Ekstern)
Number of pages: 28
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http://www.aqua.dtu.dk/Publikationer/Forskningsrapporter/Forskningsrapporter_siden_2008
Publication: Commissioned › Report – Annual report year: 2012

**Tobis skrabetog viser lave forekomster af tobis**

**General information**

State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Monitoring
Authors: Rindorf, A. (Intern), Olesen, H. J. (Intern)
Pages: 7
Publication date: 2012

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Newspaper: Fiskeritidende
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Brislingeprøver fra fiskerne til DTU Aqua

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources
Authors: Olesen, H. J. (Intern)
Pages: 13
Publication date: 2011

Publication information
Pages (from-to): 13
Newspaper: Fiskeritidende
Volume: 18
No.: 40
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 284925
Publication: Communication › Newspaper article – Annual report year: 2011

Elektronisk monitering giver fiskerne incitament til et miljømæssigt bæredygtigt fiskeri

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Public Sector Consultancy
Authors: Olesen, H. J. (Intern), Dalskov, J. (Intern)
Publication date: 2011
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Main Research Area: Technical/natural sciences
Electronic versions:
danfish_cqm-JD-kst_hjo.pdf
Source: orbit
Source-ID: 314662
Publication: Research › Poster – Annual report year: 2011

Final Report on the Danish Catch Quota Management Project 2010

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Organisations: Section for Public Sector Consultancy, National Institute of Aquatic Resources, Section for Monitoring
Authors: Dalskov, J. (Intern), Håkansson, K. B. (Intern), Olesen, H. J. (Intern)
Number of pages: 27
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Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
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Original language: English
Potential bias in estimates of abundance and distribution of North Sea cod (Gadus morhua) due to strong winds prevailing prior or during a survey

The impact of strong winds on catches of cod (Gadus morhua) was studied using different fishing methods during small-scale surveys with commercial fishing vessels in the north-eastern central North Sea. Catch per unit effort of a flyshooter and a trawler were considerably lower in the shallower coastal water than in the deeper parts of the study area after a three week period with strong winds and rough weather conditions during the survey. At the same time, catches taken with a gillnetter showed an opposite pattern with the highest catch rates occurring at depths shallower than 50 m relative close to the coast. In another situation in which the weather conditions prior and during the survey were more moderate, the flyshooter and the trawler recorded high catch rates in the shallow coastal waters as well. Generalized Linear Model analyses revealed that wind speed prior to and during the survey had significant effects on the catch rates in particular for the trawler. These results supports fishermen's opinion that strong winds may cause an underestimation of biomass of cod in shallow waters and a bias in the resulting spatial distribution derived from bottom trawl surveys.
Vigtigt med tobisprøver fra fiskerne til DTU Aqua

Changes of cod abundance in the north-eastern central North Sea based on surveys with commercial fishing vessels in 2006 to 2009

Estimating a catchability coefficient for a commercial fishing vessel
RESOURCE-projektet er i gang

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Monitoring
Authors: Pedersen, E. M. (Intern), Olesen, H. J. (Intern), Wieland, K. (Intern), Beyer, J. (Intern)
Pages: 8
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Main Research Area: Technical/natural sciences
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Source-ID: 267917
Publication: Communication › Newspaper article – Annual report year: 2010

Spatially-explicit management methods for North Sea cod – a Danish fishermen science collaboration (REX): Fisker/forsker samarbejdet REX om Nordøst torsk - REX III report FERV, June 2010

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population Ecology and Genetics
Authors: Wieland, K. (Intern), Pedersen, E. M. (Intern), Olesen, H. J. (Intern), Karlsen, J. (Intern), Andersen, N. G. (Intern), Beyer, J. (Intern)
Number of pages: 137
Publication date: 2010

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 268693
Publication: Research › Report – Annual report year: 2010

The OSkar project: a collaborative fishermen-scientist project on "Optimizing sustainable use of fish resources in the Skagerrak"

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population Ecology and Genetics
Authors: Wieland, K. (Intern), Pedersen, E. M. (Intern), Olesen, H. J. (Intern), Lund, H. S. (Ekstern), Andersen, N. G. (Intern), Poulsen, J. (Ekstern), Nielsen, J. (Ekstern), Jakobsen, J. (Ekstern), Pedersen, C. H. (Ekstern), Hansen, J. (Ekstern), Beyer, J. (Intern)
Publication date: 2010
Event: Poster session presented at 70th International Fishing Fair, Ancona, Italy.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 268682
Publication: Research › Poster – Annual report year: 2010
The REX project: a collaborative fishers-scientists project on the geographical distribution of Atlantic cod in the northeastern part of the central North Sea

General information
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Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Monitoring
Publication date: 2010
Event: Poster session presented at 70th International Fishing Fair, Ancona, Italy.
Main Research Area: Technical/natural sciences
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Publication: Research › Poster – Annual report year: 2010

At vrage eller ikke at vrage - torskens valg på skibsvrag

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Karlsen, J. (Intern), Olesen, H. J. (Intern), Andersen, N. G. (Intern)
Pages: 6
Publication date: 2009

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Newspaper: Fiskeritidende
Volume: 16
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Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 250208
Publication: Communication › Newspaper article – Annual report year: 2009

Behaviour of large Atlantic cod at ship wrecks and similar rough bottom structures in the north-eastern part of the central North Sea

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Karlsen, J. (Intern), Olesen, H. J. (Intern), Andersen, N. G. (Intern)
Pages: 1-14
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Place of publication: Copenhagen
Publisher: International Council for the Exploration of the Sea
Main Research Area: Technical/natural sciences
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Cod at shipwrecks in the North Sea—residence and effect of environmental factors

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Karlsen, J. (Intern), Olesen, H. J. (Intern), Andersen, N. G. (Intern), Thygesen, U. H. (Intern)
Publication date: 2009
Event: Poster session presented at The 8th conference on fish telemetry, Umeå, Sweden, September 14-18.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252558
Publication: Research › Poster – Annual report year: 2009

Effect of bottom type on catch rates of North Sea cod (Gadus morhua) in surveys with commercial fishing vessels
Seven surveys with commercial fishing vessels were conducted during a collaborative fishermen-scientist project on the distribution of cod in the north-eastern North Sea between June 2006 and June 2008. A flyshooter, a trawler and a gillnetter participated in this study. In general, catch rates were substantially higher on gravel or stone bottom and at ship wrecks than on sand bottom. The difference in the catch rates between the two bottom categories at paired stations within a short distance was highly significant for all the three fishing methods. Similarly, average CPUE for most surveys was several times higher on rough than on smooth bottom. These differences were highly significant for early autumn surveys conducted with the flyshooter and trawler and all gillnet surveys, the summer surveys for the flyshooter and the gillnetter, but not for the winter surveys with the trawler and the flyshooter. The latter suggest that bottom type preference may change with season, e.g. with respect to spawning migrations in winter and in relation with changes in the availability of food during spring and summer.

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Wieland, K. (Intern), Pedersen, E. M. (Intern), Olesen, H. J. (Intern), Beyer, J. (Intern)
Pages: 244-251
Publication date: 2009
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
Volume: 96
Issue number: 2-3
ISSN (Print): 0165-7836
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): CiteScore 2.21 SJR 1.12 SNIP 1.136
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.067 SNIP 1.133 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.105 SNIP 1.312 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.037 SNIP 1.173 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Estimating abundance and biomass of North Sea cod based on surveys with commercial fishing vessels

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Wieland, K. (Intern), Pedersen, E. M. (Intern), Olesen, H. J. (Intern), Berg, C. (Ekstern), Beyer, J. (Intern)
Pages: 1-28
Publication date: 2009

Host publication information
Title of host publication: ICES C.M.
Volume: L:03
Place of publication: Copenhagen
Publisher: International Council for the Exploration of the Sea
Main Research Area: Technical/natural sciences
**Estimating a catchability coefficient for a commercial fishing vessel**

**General information**
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Monitoring
Authors: Olesen, H. J. (Intern), Wieland, K. (Intern), Thygesen, U. H. (Intern), Beyer, J. (Intern)
Publication date: 2009
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252455
Publication: Research › Poster – Annual report year: 2009

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**Hvor er torskene og hvad har de gang i?**

**General information**
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Fisheries- and Monitoring Technology
Authors: Olesen, H. J. (Intern), Karlsen, J. (Intern), Andersen, N. G. (Intern)
Pages: 11
Publication date: 2009

**Publication information**
Pages (from-to): 11
Newspaper: Fiskeritidende
Volume: 16
No.: 19
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 249671
Publication: Communication › Newspaper article – Annual report year: 2009

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**Miljøfaktorer styrer store torsks ophold på vrag**

**General information**
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Fisheries- and Monitoring Technology
Authors: Olesen, H. J. (Intern), Karlsen, J. (Intern), Andersen, N. G. (Intern)
Pages: 25
Publication date: 2009

**Publication information**
Pages (from-to): 25
Newspaper: Fiskeritidende
Volume: 15
No.: 51
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 256365
Publication: Communication › Newspaper article – Annual report year: 2009

REX - sommertogtet fangede flere små torsk end sidste år

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Wieland, K. (Intern), Olesen, H. J. (Intern)
Pages: 8
Publication date: 2009

Publication information
Pages (from-to): 8
Newspaper: Fiskeritidende
Volume: 16
No.: 44
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251731
Publication: Communication › Newspaper article – Annual report year: 2009

The REX project: a collaborative fishermen-scientist project on the geographical distribution of Atlantic cod in the northeastern part of the central North Sea

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Monitoring, Section for Fisheries- and Monitoring Technology
Publication date: 2009
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252557
Publication: Research › Poster – Annual report year: 2009

Vintertog i REX-projektet

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Monitoring
Authors: Olesen, H. J. (Intern), Wieland, K. (Intern)
Pages: 10
Publication date: 2009

Publication information
Pages (from-to): 10
Newspaper: Fiskeritidende
Volume: 16
No.: 11
Ratings:
ISI indexed (2013): ISI indexed no
REX II - Fase 2: Fisker-forsker samarbejde om forsøgsfiskeri efter torsk i Nordsøen

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Fisheries- and Monitoring Technology, Section for Monitoring
Publication date: 2008

Publication information
Publisher: Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet
Original language: Danish
Main Research Area: Technical/natural sciences
Electronic versions:
REX II fase 2 - Bilag beskåret printvenlig.pdf
REX II fase 2 - Slutrapport1.pdf

Bibliographical note
Projektet er støttet af Fødevareministeriet og EU gennem fiskerisektorprogrammet FIUF
Source: orbit
Source-ID: 231410
Publication: Research › Report – Annual report year: 2008

REX-projektet: Mærkning af gydetorsk i Nordsøen/Skagerrak

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Karlsen, J. (Intern), Olesen, H. J. (Intern), Andersen, N. G. (Intern)
Pages: 7
Publication date: 2008

Publication information
Pages (from-to): 7
Newspaper: Fiskeri Tidende
Volume: 15
No.: 11-12

Torskeadfærd og bøjer i bevægelse

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Karlsen, J. (Intern), Olesen, H. J. (Intern), Andersen, N. G. (Intern)
Forskellige redskabstyper er vigtige i REX II-forsøgsfiskeriet

Kommer torsken tilbage til vraget?
REX II på februartogtet 2007

General information
State: Published
Organisations: Unknown
Authors: Olesen, H. J. (Intern), Pedersen, E. M. (Intern)
Pages: 12
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Fiskeritidende
Issue number: 15
ISSN (Print): 0909-7325
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: 226967
Publication: Research › Journal article – Annual report year: 2007

REX på hot spots

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Population Ecology and Genetics, Section for Monitoring, Section for Management Systems
Authors: Neuenfeldt, S. (Intern), Olesen, H. J. (Intern), Karlsen, J. (Intern)
Pages: 7
Publication date: 2007

Publication information
Pages (from-to): 7
Newspaper: Fiskeri Tidende
No.: 40
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226765
Publication: Communication › Newspaper article – Annual report year: 2007

Torskeadfærd på vrag i Nordsøen

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Management Systems
Authors: Olesen, H. J. (Intern), Karlsen, J. (Intern)
Pages: 11
Publication date: 2007

Publication information
Pages (from-to): 11
Newspaper: Fiskeri Tidende
No.: 24
Ratings:
ISI indexed (2013): ISI indexed no
Torskmærkninger i Øresund

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Population Ecology and Genetics, Section for Management Systems, Section for Monitoring
Authors: Neuenfeldt, S. (Intern), Karlsen, J. (Intern), Olesen, H. J. (Intern)
Pages: 13
Publication date: 2007

Publication information
Pages (from-to): 13
Newspaper: Fiskeri Tidende
No.: 43
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226969
Publication: Communication › Newspaper article – Annual report year: 2007

Torsk på hotspots

General information
State: Published
Organisations: Section for Monitoring, National Institute of Aquatic Resources, Section for Management Systems
Authors: Olesen, H. J. (Intern), Karlsen, J. (Intern)
Pages: 8
Publication date: 2007

Publication information
Pages (from-to): 8
Newspaper: Fiskeri Tidende
No.: 21
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Publication: Communication › Newspaper article – Annual report year: 2007

Marin habitatrestaurering: Havets vidundermedicin

General information
State: Published
Organisations: Section for Shellfish, National Institute of Aquatic Resources, Section for Coastal Ecology, Section for Population- and Ecosystem Dynamics
Authors: Dolmer, P. (Intern), Støttrup, J. (Intern), Olesen, H. J. (Intern)
Pages: 8-13
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Projects:

Forbedring af forvaltningsgrundlaget for bestande i det rekreative fiskeri (39370)
National Institute of Aquatic Resources
Section for Monitoring and Data
Section for Ecosystem based Marine Management
Section for Freshwater Fisheries Ecology

Institute Management
Period: 14/07/2016 → 14/07/2018
Number of participants: 16
Acronym: REKREA
Project participant:
Olesen, Hans Jakob (Intern)
Storr-Paulsen, Marie (Intern)
Støttrup, Josianne Gatt (Intern)
Skov, Christian (Intern)
Christoffersen, Mads (Intern)
Reeh, Line (Intern)
Stubgaard, Karin (Intern)
Svendsen, Jon Christian (Intern)
Pedersen, Stig (Intern)
Pedersen, Michael Ingemann (Intern)
Jepsen, Niels (Intern)
Aarestrup, Kim (Intern)
Hansen, Frank Ivan (Intern)
Pinna, Line Giovanna Buhl (Intern)
Azour, Farivar (Intern)
Larsen, Peter Vingaard (Intern)

Tagging Baltic cod (TABACOD) (39333)
The aim of this project is to improve the management of eastern Baltic cod by 1) providing new information on growth and mortality patterns, and 2) develop a validated method for deriving this information from historic and future samples.

In recent years, the traditional age-based stock assessment had to be abandoned owing to extensive uncertainties in stock trends. These uncertainties were to a large extent attributable to inconsistencies in age estimation. As a consequence thereof, the current stock status is unknown.

Estimates of growth and mortality rely on unbiased age information. TABACOD will provide this information through a large scale tagging experiment, where 20,000 cod are tagged with and externally visible tag as well as with an internal tag on their otoliths. This experiment will also provide the samples for the development and validation of a new age estimation method based on the chemical composition of the cod's otoliths.

The knowledge gained will be incorporated in length-based assessment models and their performance compared to the traditional methods evaluated in order to provide the ICES stock assessment group with the relevant tools to provide a reliable advice and to improve stock exploitation.

This project is coordinated by DTU Aqua.

The project is funded by BalticSea2020.
Minimising discards in Danish fisheries (MINIDISC) (39020)

The landings obligation, currently being implemented in the new CFP, puts major constraints on fishers, by making the landing of unwanted catch mandatory. Less restrictive technical rules (TR) in a results-based management frame under Catch Quota Management (CQM) have been suggested as a mechanism to release some of these constraints. To investigate the effects of the existing TR, some fishers were relaxed from TR during the trial and could freely choose and develop alternative gears, aiming to optimize annual catch value, while reducing discards. The study included 14 demersal fishing vessels, operating in the North Sea, Skagerrak and the Baltic Sea.

Fishers used test and control gears interchangeably or in pairs during up to 6 months and were required to sort and weigh all discard of seven common target species on a haul by haul basis. All vessels were equipped for Fully Documented Fisheries (FDF), including cameras. Collected data were analyzed to investigate differences in landings, discards, discard ratio, CPUE, VPUE and DPUE, between conventional (control) and new gears (test). The results showed a varying degree of success, depending both on area and on choices made by the individual fisher. The best results were observed in the Baltic Sea, where relaxing technical rules led to major improvements in fishing patterns. But gear changes did not contribute much in fisheries where initial discards rates were already low. Interviews realized with the skippers around the end of the trial were performed and analyzed to investigate (i) their experiences with “free” choice of gear, (ii) the processes that they followed for developing their gears and (iii) their tools for evaluating the efficiency and selectivity of their trial.

In addition to the trial, a number of other activities were performed under the MINIDISC project, including (i) the publishing of a catalogue (in Danish) of the selectivity devices experimented in Danish fisheries, (ii) a scientific selectivity trial on Danish seines fisheries in Skagerrak and (iii) a review of international experiences in the uptake of selective devices.

The project has been disseminated through several meetings and conferences. A number of scientific publications are in review or close to submission.

This project was coordinated by DTU Aqua.

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

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management

Danish Fishermen's Producers' Organization
Period: 01/01/2014 → 15/07/2015
Number of participants: 8
Research areas: Fisheries Management & Fisheries Technology & Marine Living Resources
Project participant:
Mortensen, Lars O. (Intern)
Catch Quota Management and choke species 2014 (39079)
The aim of the project is further development and test of Catch Quota Management (CQM) systems in Danish demersal 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.

This project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Monitoring and Data
Ministry of Food, Agriculture and Fisheries
Period: 22/07/2013 → 15/07/2015
Number of participants: 4
Research area: Fisheries Management
Project participant:
Dalskov, Jørgen (Intern)
Håkansson, Kirsten Birch (Intern)
Degel, Henrik (Intern)
Project Manager, academic:
Olesen, Hans Jakob (Intern)
Project

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 up 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 in, 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
Development of monitoring plans for incidental bycatch of harbour porpoises in inner Danish waters (38869)

Incidental bycatch of harbour porpoises in Danish fisheries has till now primarily been documented by on-board observers or voluntary reporting by fishermen. An observer program in 1992-98 showed bycatch in Danish North Sea fisheries to occur primarily in bottom-set gillnets for turbot, cod, hake and plaice, but a similar program has not been conducted in inner Danish waters and the Baltic Sea.

The objective of the present project is thus to further develop and carry out plans for monitoring of incidental bycatch of harbour porpoises in inner Danish waters by use of CCTV camera systems. Further, to ensure full documentation of smaller gillnet vessels’ fishing operations by:
- monitoring all seasons of the major gillnet fisheries;
- providing information on bycatch of harbour porpoises and seabirds by fishery/season/area with a view to develop management plans for Natura2000 areas;
- providing information on discard of cod by gillnet vessels in inner Danish waters.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Period: 16/06/2011 → 28/02/2014
Number of participants: 4
Research area: Ecosystem Based Marine Management

Pilot project for the preparation of certification (MSC) of gillnet fishing in the Baltic Sea (38974)

Fishing for some important stocks has been assessed in accordance with Marine Stewardship Council (MSC) principles for sustainable fisheries. All these fisheries have now passed the assessment and are certified, with a single exception: Gillnet fishing in the Baltic. This is due to the lack of evidence for gillnet fishing East of Bornholm not having by-catches of the very small population of harbor porpoises which are found in the Baltic Sea in Ices Subdivision (SD) 24 and East.

There has not been registered by-catch of porpoises in the Danish gillnet fishing East of Bornholm, neither in biological
studies nor by fishermen themselves. But as the Swedish and Polish studies have shown individual by-catches in some gillnet fisheries and the current estimates of stock size means that the by-catch of even a few individuals can prevent it from being restored, the MSC considered that it was not sufficiently proven that the Danish gillnet fisheries did not constitute a threat to the population.

There is therefore a need for documentation of the level of by-catch of harbor porpoises in the Danish gillnet fisheries.

This project is coordinated by Danish Fishermen's Association.

National Institute of Aquatic Resources
Section for Monitoring and Data
Danish Fishermen's Association
Period: 09/06/2011 → 01/05/2015
Number of participants: 6
Research area: Fisheries Management
Project participant:
Larsen, Finn (Intern)
Kindt-Larsen, Lotte (Intern)
Degel, Henrik (Intern)
Rasmussen, Mie Lundsfryd (Intern)
Lundgaard, Louise Scherffenberg (Intern)

Project Manager, academic:
Olesen, Hans Jakob (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.

National Institute of Aquatic Resources
Public Sector Consultancy
Ministry of Food, Agriculture and Fisheries
Archipelago Marine Research Ltd
Gemba Seafood Consulting
Period: 01/01/2011 → 30/09/2012
Number of participants: 5
Research area: Fisheries Management
Project participant:
Olesen, Hans Jakob (Intern)
Jensen, Reinhardt (Intern)
Kirkegaard, Eskild (Intern)
Håkansson, Kirsten Birch (Intern)

Project Manager, academic:
Dalskov, Jørgen (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
Danish Directorate for Fisheries
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)
Håkansson, Kirsten Birch (Intern)
Project Manager, academic:
Dalskov, Jørgen (Intern)

Electronic monitoring on smaller fishing vessels fishing with gillnets (38773)
The aim of the project is to examine whether electronic monitoring by the use of CCTV and sensor recordings can ensure full documentation of the fisheries carried out by smaller gillnetters, and whether the use of “pingers” (acoustic deterrent devises) can be more operational.

Furthermore, the project has the aim to proof that:
- A total recording of all catches of quota managed species and a reduction of “high-grading”
- Involvement of the fishing industry in collection of detailed data and thereby ensure industry involvement for joint responsibility for the collection of data to be used as the basis for the scientific advice
- An adequately documentation that can ensure that the fishery could be carried out sustainably in sensitive marine areas such as NATURA 2000 sites
- An improved economy for vessels that participate in fully documented fishery
- A documentation that can provide the basis for the marked to be able to evaluate sustainability of the fisheries.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Archipelago Marine Research Ltd
Period: 01/01/2010 → 31/12/2011
Number of participants: 5
Research areas: Fisheries Management & Observation Technology
Project participant:
Kindt-Larsen, Lotte (Intern)
Larsen, Finn (Intern)
Olesen, Hans Jakob (Intern)
Jensen, Reinhardt (Intern)
Project Manager, academic:
Dalskov, Jørgen (Intern)
Sandeel Dredge Survey (39064)
The scientific sandeel dredge survey is carried out each year in November/December and it covers the most important sandeel fishing banks in the North Sea.

The aim is to collect the sandeels when they are buried in the seabed and compare the catches (number and age composition) with the previous year's collections. The specific year class strength of sand eels is assessed for the different areas adopted by ICES in 2009.

Data from the dredge survey is the basis for calculating an index, which is used in the stock assessment.

This project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Monitoring and Data
Period: 01/11/2006 → 31/12/9999
Number of participants: 8
Project participant:
Tijssen, Dirk Cornelis (Intern)
Håkansson, Kirsten Birch (Intern)
Hansen, Stina Bjørk Stenersen (Intern)
Hansen, Susanne (Intern)
Fuglsang, Nina (Intern)
Hansen, Anne Grete D. (Intern)
Rasmussen, Helle (Intern)
Project Manager, academic: Olesen, Hans Jakob (Intern)

Spatially-explicit management methods for North Sea cod – a Danish fishermen-science collaboration (REX, REX II, REX III) (38430, 38431, 38541)
The REX project started in 2006 as a protest from the Danish Fishermen Association because fishers had a less pessimistic perception of the status of the cod stock in the North Sea than ICES, and they considered the agreed TAC levels far too low. In particular the fishers considered the scientific surveys as inappropriate due to extremely low catches of large cod because of wrong gear and fishing on smooth bottom only. This seemed to call for more spatially-explicit oriented approaches and REX was born with an aim of getting closer to a common understanding of the true number of adult cod in the North Sea by focusing on communication and collaboration in developing and implementing a scientifically sound and robust survey strategy with commercial ships in a north-eastern area selected by the Danish Fishermen Association using three vessels presenting different fishing methods (flyshooter, trawler and gillnetter).

The development of the fishermen-scientists collaboration with mutual respect has increased the understanding on both sides. In particular the emphasis on defining common goals, facing and solving conflicts immediately and extending thorough collaboration from survey planning, conducting of field work to interpretation of results during workshops have contributed to bridging the communication gab.

A better understanding of cod biology has also been a focal point in these projects through the new field studies incorporating fishers’ knowledge. This includes distribution and migration, feeding behavior and importance of Hot-Spots (e.g. ship wrecks). Electronic tags were applied to learn about migration also in the Baltic. Together with the aim of continuing to obtain better assessments of the stocks such more mechanistically oriented studies are needed to answer two apparently simple questions “Where are the cod and why?”

The REX projects have strengthened the scientific collaboration with fishermen and produced several results and types of knowledge that will influence future work on developing spatial explicit management tools. REX also represents capacity building for DTU Aqua’s interdisciplinary field research and monitoring towards the spatial dynamics of cod.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Marine Living Resources
Danish Fishermen's Association
Period: 01/01/2006 → 31/01/2010
Number of participants: 17
Research area: Marine Living Resources
Activities:

**ICES - Working Group on Recreational Fisheries Surveys - WGRFS (External organisation)**
Period: 2015
Hans Jakob Olesen (Participant)
National Institute of Aquatic Resources
Section for Monitoring and Data
Degree of recognition: International

**Related external organisation**

**ICES - The Working Group on Recreational Fisheries Surveys - WGRFS**
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

**Related external organisation**

**ICES - Working Group on Recreational Fisheries Surveys - WGRFS (External organisation)**
Period: 2013 → …
Hans Jakob Olesen (Participant)
National Institute of Aquatic Resources
Section for Monitoring and Data
Degree of recognition: International

Related external organisation

ICES - Working Group on Recreational Fisheries Surveys - WGRFS
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar