Discard survival assessment of plaice (Pleuronectes platessa) and lemon sole (Microstomus kitt) caught by demersal otter trawling in Skagerrak

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Nowack, T. (Intern), Karlsen, J. D. (Intern), Savina, E. (Intern)
Publication date: 2017
Event: Abstract from ICES Annual Science Conference 2017, Fort Lauderdale, United States.
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2017/J:206
Publication: Research › Conference abstract for conference – Annual report year: 2017

FLEXSELECT: counter-herding device to reduce bycatch in crustacean trawl fisheries
FLEXSELECT is a simple counter-herding device which aims at reducing the bycatch of fish by scaring them away from the trawl path without affecting the catches of the target species. FLEXSELECT was tested in the Norway lobster (Nephrops norvegicus) directed trawl fishery, as this includes bycatch of both roundfish and flatfish. Length-based data were collected for Nephrops, four roundfish species (cod, haddock, whiting and hake) and two flatfish species (plaice and lemon sole) and length-based catch comparisons performed. No significant effect on the target species, Nephrops, was detected, whereas a reduction of 39% (CI: 29-46 %) was obtained for the overall number of fish. Catches of all the six fish species examined were significantly reduced by FLEXSELECT, with the efficiency varying considerably among species and over length classes. No significant diel differences were found for either roundfish or flatfish species. FLEXSELECT prevents bycatch species from interacting with the trawl, thus most likely enhancing their survival and fitness. Moreover, its fast attachment system makes FLEXSELECT a flexible tool, adaptable to different fisheries and catch goals.

General information
State: Accepted/In press
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF Fisheries and Aquaculture
Authors: Melli, V. (Intern), Karlsen, J. D. (Intern), Seekings, J. P. (Intern), Herrmann, B. (Ekstern), Krag, L. A. (Intern)
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Canadian Journal of Fisheries and Aquatic Sciences
ISSN (Print): 0706-652X
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
Identifying candidate reflexes for lemon sole (Microstomus kitt)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Wageningen IMARES
Authors: Karlsen, J. D. (Intern), Noack, T. (Intern), Uhlmann, S. (Ekstern), Krag, L. A. (Intern)
Publication date: 2017
Event: Abstract from ICES Annual Science Conference 2017, Fort Lauderdale, United States.
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2017/ J:579
Publication: Research › Conference abstract for conference – Annual report year: 2017

Improving escape panel selectivity in Nephrops directed fisheries by actively stimulating fish behaviour

The efficiency of escape panels inserted in trawls relies on fish actively attempting to escape through them. However, several studies indicate that most fish drift towards the aft end of the trawl, passing the escape panel through which they easily could have escaped, without making contact with it. To increase the efficiency of such panels, the contact probability needs to be improved. In this study, we investigate to what extent the efficiency of escape panels can be improved by actively stimulating the escape behaviour of fish. The performance of two identical panel sections was compared in a twin-trawl system, one with and one without a stimulation device. A new coupled analysis method was used to explicitly quantify the improvements in contact probability and release efficiency for the escape panel. The results demonstrate that by actively stimulating escape behaviour, the contact probability and release efficiency for cod (Gadus morhua) can be significantly improved without effecting the catch of Nephrops (Nephrops norvegicus)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF, Danish Fishermen's Producers' Organization
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Feekings, J. P. (Intern), Lund, H. S. (Ekstern), Karlsen, J. D. (Intern)
Pages: 486-493
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Canadian Journal of Fisheries and Aquatic Sciences
Volume: 74
Issue number: 4
ISSN (Print): 0706-652X
Ratings:
BFI (2018): BFI-level 2
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BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.56 SJR 1.322 SNIP 1.163
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.256 SNIP 1.051 CiteScore 2.22
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.443 SNIP 1.379 CiteScore 2.6
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.421 SNIP 1.081 CiteScore 2.25
ISI indexed (2013): ISI indexed yes
Stress and recovery from trawl capture of Norway lobster (Nephrops norvegicus) and potential for live storage

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquaculture, Section for Ecosystem based Marine Management, Section for Marine Living Resources, STMI
Authors: Skov, P. V. (Intern), Methling, C. (Intern), Larsen, B. K. (Intern), Unmack, C. P. (Ekstern), Karlsen, J. D. (Intern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

**Abstract**
Reducing discards of unwanted sizes and species which have a low survival rate is one of the major challenges in fisheries worldwide today. Numerous devices and fishing gears aiming at improving both species and size selectivity have been developed and implemented by various fisheries. Selective gears are often developed in collaboration between scientists and fishers. Part of the development is a controlled scientific test documenting the selectivity effect. In this study, we compared two versions of a mandatory escape panel that were introduced into the mixed species fishery in the Skagerrak in 2013: the version implemented in the legislation (pre-implementation version) and the version the industry was using one year after its implementation, the post-implementation version (post-version). The post-version went through some simple adjustments that resulted in a panel section with a larger vertical distance between the upper panel (escape panel) and the bottom panel compared to the pre-version. Both designs are legal and considered identical. The results of this study showed significantly higher catches (lower selectivity) for the post-version for all five species examined; cod (Gadus morhua), saithe (Pollachius virens), haddock (Melanogrammus aeglefinus), plaice (Pleuronectes platessa) and Norway lobster (Nephrops norvegicus). Thus the modification by fishers of certain gear properties not specified in the legislation can significantly influence the efficiency of an escape panel. We discuss to what extent catch quotas instead of the former landings quotas could provide the economic incentives for fishers to actively use selective gear designs more optimally and thereby play an active role in the management of fisheries.

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Feekings, J. P. (Intern), Karlsen, J. D. (Intern)
Number of pages: 10
Publication date: 2016
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Aquatic Living Resources
Volume: 29
Issue number: 3
Article number: 306
ISSN (Print): 0990-7440
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 1.41 SJR 0.59 SNIP 0.743
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.747 SNIP 0.848 CiteScore 1.39
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.641 SNIP 0.905 CiteScore 1.25
This study aims at testing how to improve catch quality aboard a coastal gillnetter by looking at an easily controllable parameter known to have an effect on the degree of fish damage, soak time, and investigating if the registered damages on whole fish have an effect on processed products such as fillets. Plaice (Pleuronectes platessa) was captured with commercial gillnets soaked for 12 and 24 hours. Damages were assessed using semi-quantitative indices of individual fish condition gathered in a Catch-damage-index for onboard fish and a Processed fish-damage-index for whole, skinned and filleted plaice processed at a land-based factory. Cumulative link mixed modelling allowed the estimation of the size of effects. Damage in fish was significantly more likely for longer soak times but effects were comparable to those of fish length and between-sets, making a change in soak time not so substantial for improving plaice quality in coastal gillnetting. Damage in fish was significantly more likely for whole than filleted fish, but there was substantial heterogeneity among fish. Severe damage in whole fish may not matter in filleted fish whereas some damage may only be visible at the fillet level.
Using fish behaviour to separate fish from Nephrops in a horizontally divided codend in the mixed trawl fishery

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF Fisheries and Aquaculture, Danish Fishermen's Producers' Organization
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Herrmann, B. (Ekstern), Lund, H. S. (Ekstern)
Publication date: 2016
Event: Abstract from ICES-FAO Working Group on Fishing Technology and Fish Behaviour, Mérida, Mexico.
Main Research Area: Technical/natural sciences
Electronic versions:
Publishers version

Escape panels in trawls – a consistent management tool?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Feekings, J. P. (Intern), Karlsen, J. D. (Intern)
Publication date: 2015
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2015/SSGIEOM:22, p. 10

Fishing for food: simple changes in codend design improves the quality of fish products

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Albertsen, C. M. (Intern), Frandsen, R. (Intern)
Publication date: 2015
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2015/SSGIEOM:22, p.19

From fishing to fish processing: Separation of fish from crustaceans in the Norway lobster-directed multispecies trawl fishery improves seafood quality

Fishing gears have negative impacts on seafood quality, especially on fish in the mixed trawl fishery targeting Norway lobster (Nephrops norvegicus). In this fishery, which is worth about €80 millions in Denmark alone, the quality of fish can be significantly improved by simple gear changes. A trawl codend divided into an upper and lower codend was designed to separate fish from Norway lobster during the fishing process by encourage fish to swim into the upper codend by using a frame at the entrance of the lower codend. Separate codends for fish and Norway lobster in the same gear provide the opportunity to selectively reduce small low-value fish, which will reduce catch weight and sorting time onboard the vessel. For this horizontally divided test codend and a standard codend, in which the catch was mixed, quality assessments were performed on the same batches of fish during three steps of the value chain: i) aboard the fishing vessel; ii) at the Fishermen's Collection Central, and iii) in the production plant. Four species of fish and fillets from fish caught in the upper codend of the test codend were of significantly better quality for several of the assessed parameters compared with those caught in the standard codend: i) newly caught fish showed significantly less scale loss and discolourations and had significantly better texture; ii) landed fish had significantly better skin appearance and texture and significantly fewer discolourations; and iii) fillets showed significantly fewer blood spots and had significantly better texture. There were no differences in injuries for newly caught fish or gaping and bruises for fillets between the test and standard codends. The
decrease in catch-related damages in the test codend is explained by little contact between fish and animals with hard or spiny surfaces due to successful separation of fish and Norway lobster into the upper and lower codends, respectively, and by lower catch weight in the upper codend of the test codend compared with the standard codend. The decrease in damages may also improve quality indirectly by inflicting less stress to the fish and subsequently give better texture, which offers advantages such as pre-rigor filleting and fresher products for the market.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Albertsen, C. M. (Intern), Frandsen, R. (Intern)
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Journal: PLoS ONE
Volume: 10
Issue number: 11
Article number: e0140864
ISSN (Print): 1932-6203
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 3.11 SJR 1.201 SNIP 1.092
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.414 SNIP 1.131 CiteScore 3.32
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.545 SNIP 1.141 CiteScore 3.54
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.74 SNIP 1.147 CiteScore 3.94
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.945 SNIP 1.142 CiteScore 4.15
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.369 SNIP 1.23 CiteScore 4.58
ISI indexed (2011): ISI indexed no
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.631 SNIP 1.161
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 2.473 SNIP 0.985
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 2.323 SNIP 0.96
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.289 SNIP 0.525
Web of Science (2006): Indexed yes
Improving escape panel selectivity by active stimulation of fish behaviour

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Feekings, J. P. (Intern), Karlsen, J. D. (Intern)
Publication date: 2015
Main Research Area: Technical/natural sciences

Bibliographical note
ICES CM 2015/SSGIEOM:22, p. 45
Publication: Research › Conference abstract for conference – Annual report year: 2015

Kan frit redskabsvalg hjælpe når discardforbudet kommer?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Monitoring and Data, Public Sector Consultancy, Aalborg University
Publication date: 2015
Event: Poster session presented at Internationale fiskerimesse, Aalborg, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2015

Katalog over selektive redskaber afprøvet i dansk fiskeri: En guide til bedre at undgå uønsket fangst

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Frandsen, R. (Intern), Krag, L. A. (Intern), Karlsen, J. D. (Intern), Feekeings, J. P. (Intern)
Number of pages: 55
Publication date: 2015

Publication information
Place of publication: Charlottenlund
Publisher: Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet
ISBN (Electronic): 978-87-7481-211-1
Original language: Danish
Series: DTU Aqua-rapport
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Main Research Area: Technical/natural sciences
Electronic versions:
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Links:
http://www.aqua.dtu.dk/Publikationer/Forskningsrapporter/Forskningsrapporter_siden_2008
Publication: Research › Report – Annual report year: 2015

MINIDISC - Minimering af discards i danske fiskerier

General information
State: Published
Species selectivity in different sized topless trawl designs: Does size matter?

Most demersal trawl fisheries are conducted in a multispecies setting, and the catch consists of several different species. An inherent challenge in such fisheries is to provide both biologically and economically sustainable exploitation of individually fluctuating stocks and vessel- or fleet-specific quotas. The topless trawl design was developed to improve species-specific selectivity in such fisheries. In a topless trawl, the foot rope is located more forward than the headline to allow fish to escape upwards, whereas the headline is located in front in traditional trawl designs. In this study we conducted twin trawls with a topless trawl towed parallel to a similar standard trawl; we tested a topless trawl design on a small trawl with a low headline height and on a larger trawl with a high headline height. We conducted the tows in the Nephrops (Nephrops norvegicus) directed mixed fisheries. For both the small and large trawls, we found a significant topless effect for haddock (Melanogrammus aeglefinus) and no effect for Nephrops. For Atlantic cod (Gadus morhua) we found a significant topless effect for the low headline trawl but no effect for the high headline trawl. In both the eastern and western Atlantic, topless trawls have been introduced as legal cod-selective trawl designs. However, this study demonstrates that identical gear modifications made to similar trawls of different sizes and used in the same fishery can lead to different results.

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF Fisheries and Aquaculture, Johann Heinrich von Thünen-Institute
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Karlsen, J. D. (Intern), Mieske, B. (Ekstern)
Pages: 243-249
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information

Journal: Fisheries Research
Volume: 172
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
Scopus rating (2012): SJR 0.93 SNIP 1.177 CiteScore 1.78
Sustainable development of the Nephrops fishery in the Kattegat-Skagerrak region

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Management Systems, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, Institute Management, Swedish University of Agricultural Sciences, Institute of Marine Research, Danish Fishermen's Producers' Organization, Aalborg University
Number of pages: 23
Publication date: 2015

Publication information
Understanding the release efficiency of Atlantic cod (Gadus morhua) from trawls with a square mesh panel: effects of panel area, panel position, and stimulation of escape response

Based on size selectivity data for more than 25,000 cod (Gadus morhua) collected during experimental trawl fishing with six different codends, all of which included a square mesh panel, we investigated the effect on cod-release efficiency based on the size of the square mesh panel area, position of the square mesh panel, and stimulation of the escape response. Based on the results, we were able to explain why the BACOMACodend, applied in the Baltic Sea cod directed trawl fishery, releases juvenile cod efficiently, whereas other designs, including a square mesh panel with similar mesh size, are less efficient. Our main findings reveal that the release efficiency of the square mesh panel in the BACOMA codend depends largely on the overlap of the square mesh panel and the catch-accumulation zone in the codend, where cod do not have the option of just drifting further back in the trawl when proximate to the panel. On the contrary, the reduction in panel size by 50% did not significantly affect the release efficiency when the panel overlapped with the catch-accumulation zone. It was possible to stimulate an escape response for cod to achieve a release through a square mesh panel positioned away from the catch-accumulation zone. Our findings demonstrated that this release was as efficient as for a panel mounted in the catch-accumulation zone of the codend. Devices that stimulate behaviour may improve the release efficiency of cod through square mesh panels in other fisheries where this is a problem.
Inferring fish escape behaviour in trawls based on catch comparison data: Model development and evaluation based on data from Skagerrak, Denmark

During the fishing process, fish react to a trawl with a series of behaviours that often are species and size specific. Thus, a thorough understanding of fish behaviour in relation to fishing gear and a scientific understanding of the ability of different gear designs to utilize or stimulate various behavioural patterns during the catching process are essential for developing more efficient, selective, and environmentally friendly trawls. Although many behavioural studies using optical and acoustic observation systems have been conducted, harsh observation conditions on the fishing grounds often hamper the ability to directly observe fish behaviour in relation to fishing gear. As an alternative to optical and acoustic methods, we developed and applied a new mathematical model to catch data to extract detailed and quantitative information about species- and size-dependent escape behaviour in towed fishing gear such as trawls. We used catch comparison data collected with a twin trawl setup; the only difference between the two trawls was that a 12 m long upper section was replaced with 800 mm diamond meshes in one of them. We investigated the length-based escape behaviour of cod (Gadus morhua), haddock (Melanogrammus aeglefinus), saithe (Pollachius virens), witch flounder (Glyptocephalus cynoglossus), and lemon sole (Microstomus kitt) and quantified the extent to which behavioural responses set limits for the large mesh panel’s selective efficiency. Around 85% of saithe, 80% of haddock, 44% of witch flounder, 55% of lemon sole, and 55% of cod (below 68 cm) contacted the large mesh panel and escaped. We also demonstrated the need to account for potential selectivity in the trawl body, as it can bias the assessment of length-based escape behaviour. Our indirect assessment of fish behaviour was in agreement with the direct observations made for the same species in a similar section of the trawl body reported in the literature.

Publication: Research - peer-review › Journal article – Annual report year: 2014

Inferring fish escape behaviour in trawls based on catch comparison data: Model development and evaluation based on data from Skagerrak, Denmark

During the fishing process, fish react to a trawl with a series of behaviours that often are species and size specific. Thus, a thorough understanding of fish behaviour in relation to fishing gear and a scientific understanding of the ability of different gear designs to utilize or stimulate various behavioural patterns during the catching process are essential for developing more efficient, selective, and environmentally friendly trawls. Although many behavioural studies using optical and acoustic observation systems have been conducted, harsh observation conditions on the fishing grounds often hamper the ability to directly observe fish behaviour in relation to fishing gear. As an alternative to optical and acoustic methods, we developed and applied a new mathematical model to catch data to extract detailed and quantitative information about species- and size-dependent escape behaviour in towed fishing gear such as trawls. We used catch comparison data collected with a twin trawl setup; the only difference between the two trawls was that a 12 m long upper section was replaced with 800 mm diamond meshes in one of them. We investigated the length-based escape behaviour of cod (Gadus morhua), haddock (Melanogrammus aeglefinus), saithe (Pollachius virens), witch flounder (Glyptocephalus cynoglossus), and lemon sole (Microstomus kitt) and quantified the extent to which behavioural responses set limits for the large mesh panel’s selective efficiency. Around 85% of saithe, 80% of haddock, 44% of witch flounder, 55% of lemon sole, and 55% of cod (below 68 cm) contacted the large mesh panel and escaped. We also demonstrated the need to account for potential selectivity in the trawl body, as it can bias the assessment of length-based escape behaviour. Our indirect assessment of fish behaviour was in agreement with the direct observations made for the same species in a similar section of the trawl body reported in the literature.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF Fisheries and Aquaculture
Nyt trawldesign kan gøre jomfruhummer fiskeriet meget mere effektivt
Værdioptimering af fiskefangsten i dansk blandet fiskeri (VærdiFisk) - forbedret kvalitet og selektion som følge af redskabsudvikling

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Lund, H. S. (Ekstern), Lewy, P. (Intern), Albertsen, C. M. (Intern), Kajgaard, L. (Ekstern), Clausen, B. (Ekstern), Thomsen, F. (Ekstern), Jensen, L. P. (Ekstern), Kajgaard, J. (Ekstern), Kusk, M. (Ekstern), Pedersen, C. (Ekstern), Madsen, N. (Intern), Frandsen, R. (Intern)
Number of pages: 60
Publication date: 2014

Publication information
Publisher: Ministeriet for Fødevarer, Landbrug og Fiskeri
Original language: Danish
Main Research Area: Technical/natural sciences
Publication: Commissioned › Report – Annual report year: 2014

Dokumentation af selektiv effekt af SELTRA 180: Slutrapport til Ministeriet for Fødevarer, Landbrug og Fiskeri

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Krag, L. A. (Intern), Poulsen, M. (Ekstern), Vinther, M. (Intern), Herrmann, B. (Ekstern), Madsen, N. (Intern), Frandsen, R. (Intern), Karlsen, J. D. (Intern)
Number of pages: 48
Publication date: 2013

Publication information
Original language: Danish
Main Research Area: Technical/natural sciences
Publication: Commissioned › Report – Annual report year: 2013

Forbedring af selektiviteten i trawl med henblik på beskyttelse af bestandene af torsk bedst muligt: Slutrapport til Ministeriet for Fødevarer, Landbrug og Fiskeri

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Krag, L. A. (Intern), Herrmann, B. (Ekstern), Karlsen, J. D. (Intern), Seekings, J. P. (Intern), Lund, H. (Ekstern)
Number of pages: 113
Højere kvalitet på trawlfangst hummerfisk

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Kajgaard, L. (Ekstern), Clausen, B. (Ekstern), Thomsen, F. (Ekstern), Jensen, L. (Ekstern), Kajgaard, J. (Ekstern), Kusk, M. (Ekstern), Pedersen, C. (Ekstern), Lund, H. (Ekstern), Madsen, N. (Intern), Frandsen, R. (Intern)
Publication date: 2013
Event: Poster session presented at DanFish International Fisheries Exhibition, Aalborg, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2013

SELTRA selektionspaneler i Kattegat og Skagerrak

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management
Authors: Krag, L. A. (Intern), Karlsen, J. D. (Intern), Madsen, N. (Intern)
Publication date: 2013
Event: Poster session presented at DanFish International Fisheries Exhibition, Aalborg, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2013

Understanding the size selectivity in diamond mesh codends based on flume tank experiments and fish morphology: effect of catch size and fish escape behaviour

This study quantifies potential size selection of a fish and a crustacean species in diamond mesh codends during a fishing process. Changes in mesh geometry along the codends and at different catch weights were recorded in a flume tank and subsequently used together with the morphology of cod (Gadus morhua) and Nephrops (N. norvegicus) to simulate potential size selection. By assuming certain patterns of fish escape behaviour in the codend, it was demonstrated that it was possible to replicate results for size selection based on sea trials with similar codends. Results show that L50 can increase significantly with increasing catch weight at the aft end of the codend where most of the selection is known to occur. The results document the variation in potential size selection along a codend during a catch-build-up. It is emphasized that experimental studies aiming at describing the selectivity in different types of codends in a commercial situation, need to be based on catch levels representative for the commercial levels to prevent underestimation of the selectivity in the system, especially for designs to be included in the legislation. It was additionally noted that escapement happens mostly in the area of catch accumulation. In response to questions, it was also noted that FISHSELECT methodology has been used. Mesh penetrations were simulated for each individual. Considering the relationship between catch weight and codend selectivity, studies with lower catches can underestimate size selection in commercial conditions

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF
Authors: Karlsen, J. D. (Intern), Krag, L. A. (Intern), Herrmann, B. (Ekstern), Hansen, K. (Ekstern)
Publication date: 2013
Event: Main Research Area: Technical/natural sciences
Electronic versions:
Conference report
Publication: Research › Conference abstract for conference – Annual report year: 2013

Designoptimering af SELTRA 180 mm

General information
State: Published
Does the cylinder model of gastric evacuation predict observed evacuation of mixed meals of prey of contrasting geometries in a piscivorous fish?

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Karlsen, J. (Intern), Andersen, N. G. (Intern)
Pages: 166-180
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Fish Biology
Volume: 80
Issue number: 1
ISSN (Print): 0022-1112
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 1.57 SJR 0.741 SNIP 0.882
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.951 SNIP 0.935 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.944 SNIP 0.934 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.118 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.93 SNIP 1.035 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.895 SNIP 0.946 CiteScore 1.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.774 SNIP 0.834
Web of Science (2010): Indexed yes
**Escapement efficiency through a square mesh panel**


**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Management Systems
Authors: Herrmann, B. (Intern), Wienbeck, H. (Ekstern), Karlsen, J. (Intern), Dahm, E. (Ekstern), Moderhak, W. (Ekstern), Stepputtis, D. (Ekstern)
Publication date: 2012
Event: Abstract from ICES-FAO Working Group on Fishing Gear Technology and Fish Behaviour (WGFTFB), Lorient, France.
Main Research Area: Technical/natural sciences

**Electronic versions:**
WGFTFB12.pdf

**Bibliographical note**

Published on p. 89-90
Publication: Research – Conference abstract for conference – Annual report year: 2012

**Quantifying fish escape behaviour through large mesh panels in trawls based on catch comparison data – model development and a case study from Skagerrak**


Based on catch comparison data, it is demonstrated how detailed and quantitative information about species-specific and size dependent escape behaviour in relation to a large mesh panel can be extracted. A new analytical model is developed, applied, and compared to the traditional modelling approach for such data. As a case study, we used data collected with a twin trawl setup. The only difference between the two 120 mm trawls was that a 12 meter long section in the upper panel was replaced with 800 mm diamond meshes (LMTP) in one of them. Based on this very large mesh size, we assumed that all individuals that contacted the panel also escaped through it. The new analytical method was applied to quantify escape behaviour for cod, haddock, saithe and Nephrops of different sizes. There was a need to include the full gear selectivity in the trawl, and we show how this selectivity can bias the interpretation of the length based escapement behaviour over the
large mesh panel. Our length based behavioural description is in good agreement with direct observations of the same species in the trawl cavity reported in literature.

Fish behaviour understanding is essential. Observations are often difficult using optical devices such as cameras. The alternative is to use catch data to reconstruct behaviour. Every fish in every haul counts. Bootstrapping can be used. An experimental catch comparison index was calculated. Length frequency distributions and catch comparison rates are not suitable to infer behavioural patterns. A full gear selectivity model was developed in which data of low lengths was deleted and double bootstrapping is used. Catching is a sequential process. Panel contact was assumed leading to escape.

Flounder shows strong length dependent escape behaviour. Curves were presented for COD, HAD, LEM, POL, and WTH. Comments made on knife-edge curves found for cod using stochastic simulation, apparently caused by data weakness. LMTP affects fish but not Nephrops

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Management Systems
Authors: Krag, L. A. (Intern), Herrmann, B. (Intern), Karlsen, J. (Intern)
Publication date: 2012
Event: Abstract from ICES-FAO Working Group on Fishing Gear Technology and Fish Behaviour (WGFTFB), Lorient, France, France.
Main Research Area: Technical/natural sciences
Electronic versions: WGFTFB12.pdf

Bibliographical note
Published on p. 88-89
Publication: Research › Conference abstract for conference – Annual report year: 2012

Hot on the tail of hefty Atlantic cod: an interdisciplinary study on the behaviour at ship wrecks in the North Sea

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Karlsen, J. (Intern)
Number of pages: 203
Publication date: 2011

Publication information
Place of publication: Aarhus
Publisher: Aarhus University
Original language: English
Main Research Area: Technical/natural sciences

Bibliographical note
Supervisors: Associate Professor Peter Grønkjaer, Department of Bioscience, Aarhus University; Senior Research Scientist Niels G. Andersen, National Institute of Aquatic Resources, Technical University of Denmark
Source: orbit
Source-ID: 282052
Publication: Research › Ph.D. thesis – Annual report year: 2011

Observing fish by means of acoustic tagging: benefits and constraints of acoustic shadow zones

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Karlsen, J. (Intern), Hedger, R. (Ekstern)
Publication date: 2011
Event: Poster session presented at 1st International Conference on Fish Telemetry, Sapporo, Japan.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 279194
Publication: Research › Poster – Annual report year: 2011

The REX-project: Cod at ship wrecks in the North Sea – residence and effect of environmental factors

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

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Monitoring
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 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
State: Published
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
Source: orbit
Source-ID: 270936
Publication: Research › Poster – Annual report year: 2010

A study of fish behaviour in the extension of a demersal trawl using a multi-compartment separator frame and SIT camera system

A rigid separator frame with three vertically stacked codends was used to study fish behaviour in the extension piece of a demersal trawl. A video camera recorded fish as they encountered the separator frame. Ten hauls were conducted in a mixed species fishery in the northern North Sea. Fish behaviour was analysed using the camera observations from several of these hauls by assigning seven descriptive attributes and also using catch data. Gadoids, in particular haddock (Melanogrammus aeglefinus), whiting (Merlangius merlangus), and saithe (Pollachius virens), were caught in the upper codend, whereas Nephrops (Nephrops norvegicus) were caught in the lower codends. Catches of flatfish were more uniformly distributed among the three codends. Unlike the flatfish, gadoids reacted to the presence of the separator frame. The camera method and the separator frame yielded different information about fish behaviour within the trawl, and together the two methods provided a more complete picture of the catching process. Behavioural observations, vertical distribution, and the methodology are discussed, as is the potential for improving species separation in demersal trawls.

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Krag, L. A. (Intern), Madsen, N. (Intern), Karlsen, J. (Intern)
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

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

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
Transmission loss patterns from acoustic harassment and deterrent devices do not always follow geometrical spreading predictions

Acoustic harassment and deterrent devices have become increasingly popular mitigation tools for negotiating the impacts of marine mammals on fisheries. The rationale for their variable effectiveness remains unexplained, but high variability in the surrounding acoustic field may be relevant. In the present study, the sound fields of one acoustic harassment device and three acoustic deterrent devices were measured at three study sites along the Scandinavian coast. Superimposed onto an overall trend of decreasing sound exposure levels with increasing range were large local variations in the sound level for all sources in each of the environments. This variability was likely caused by source directionality, inter-ping source level variation and multipath interference. Rapid and unpredictable variations in the sound level as a function of range deviated from expectations derived from spherical and cylindrical spreading models and conflicted with the classic concept of concentric zones of increasing disturbance with decreasing range. Under such conditions, animals may encounter difficulties when trying to determine the direction to and location of a sound source, which may complicate or jeopardize avoidance responses.
Indirect observation of fish movements: a general methodology applied at different scales

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Fisheries- and Monitoring Technology, Section for Fisheries Advice, Mathematical Statistics, Department of Informatics and Mathematical Modeling
Authors: Thygesen, U. H. (Intern), Karlsen, J. (Intern), Nielsen, A. (Intern), Pedersen, M. W. (Intern)
Publication date: 2008
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 229069
Publication: Research - peer-review › Journal article – Annual report year: 2009

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
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: 249849
Publication: Communication › Newspaper article – Annual report year: 2008

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)
Pages: 6
Publication date: 2008

Publication information
Pages (from-to): 6
Newspaper: Fiskeri Tidende
Volume: 15
No.: 34
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: 249850
Publication: Communication › Newspaper article – Annual report year: 2008

Kommer torsken tilbage til vraget?

General information
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
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
Summer vocalisations of adult male white whales (Delphinapterus leucas) in Svalbard, Norway

The principal aim of this study was to describe the vocalisations produced by the largely unstudied white-whale population in Svalbard, Norway. It was found that Svalbard’s white whales produced most of the vocalisations that have been documented in other populations, but they also displayed minor vocal novelties and differences. A subjective classification suggested 21 call types, which were dominated by a variety of whistles. A statistical classification (cluster analyses) produced 11 groupings (after exclusion of general pulsed call types), which contained fairly logical grouping of the subjectively determined call types. However, neither method of classification employed was considered ideal for classifying white-whale vocalisations because of the highly graded nature of the calls. The white whales in this study were most vocal during milling and joining behaviours. A surprising result in this study was how little time white whales in this area spent vocalising. Their relative silence could possibly be: (1) an anti-predator strategy in response to killer whales (Orcinus orca); (2) a result of the type of schools encountered during this study (all-male grouping); (3) a by-product of the presence of the research boat in an area where whales are not accustomed to boat traffic; or (4) a result of the limited behavioural repertoire covered in this study. More extensive studies of acoustic behaviour of this population, which include various age and sex classes, with broader seasonal coverage that includes more potential behavioural contexts, are required before firm conclusions can be made regarding geographic trends in white-whale acoustic behaviour.
Projects:

From science to innovation in the Nephrops fishery to comply with the Common Fisheries Policy: development of an optimal and flexible selection system for trawl by use of new technology and underutilized fish behaviour (39375)
The aim of the VISION-project is to develop a new generation of trawl designs towards a targeted and controllable species and size selection in the mixed fisheries targeting Nephrops by improving vertical separation of the catch and gear selectivity. This will contribute to an economic viable fishery and sustainable use of resources under a landing obligation.

The mixed fisheries targeting Nephrops is one of the most economically important Danish fisheries. It is characterized by high proportions of discards and will have a low capitalization of the vessels’ quotas under a landing obligation.

In the VISION-project, a horizontally divided codend developed in the FishValue-project (vaerdifisk.dk) will be refined to increase the vertical separation of cod, flatfish and small fish in general from Nephrops. The project will combine new technology and knowledge of fish behavior in an innovative way to develop new selection principles and thus gear designs with an increased species and size selectivity. Also, the project seeks to provide solutions for a highly flexible fishery so fishermen can change their gear to match the selective properties with the current fishing situation.

This project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Euronete Scandinavia A/S
Strandby Net A/S
Danish Fishermen's Association
Period: 01/08/2016 → 08/08/2018
Number of participants: 4
Project participant:
Andersen, Niels Gerner (Intern)
Krag, Ludvig Ahm (Intern)
Melli, Valentina (Intern)
Project Coordinator:
Karlsen, Junita Diana (Intern)
Project

Identifying simple and cost effective gear solutions which can lead to an effective implementation of the new EU common Fisheries Policy (CFP)

National Institute of Aquatic Resources
Period: 15/12/2015 → 14/12/2018
Number of participants: 4
Phd Student:
Melli, Valentina (Intern)
Supervisor:
Gislason, Henrik (Intern)
Karlsen, Junita Diana (Intern)
Main Supervisor:
Krag, Ludvig Ahm (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Selective and low impact gear for fishing live nephrops (39042)

The Danish nephrops fishery is important with an annual value of the landings of approximately 300m DDK. The quota is high as many nephrops inhabit the inner Danish waters. However, cod is a frequent by-catch which is problematic due to low cod quotas, and resulltantly, nephrops quota are rarely fully exploited. Furthermore, nephrops are traditionally fished with bottom trawl which exert high impact on the seabed. The first aim of the project is to solve the cod by-catch issues by using trawling speed as a selective mechanism, which will take advantage of the superior swimming capabilities of cod as compared to nephrops. Lowering the trawling speed will enable cod to escape the trawl while still ensuring nephrops catch. The second aim is to design and implement a new type of trawl doors that do not touch the seabed and highly reduce impact of the sweeps. Besides, materials used for the new trawl will be produced in much lighter and stronger materials than the traditional trawls. Altogether this reduces the drag in the water and fuel consumption considerably. Trawling at a lower speed lessens the mechanical damage to the nephrops and this enhances their chances of survival. The project will take this one step further by establishing gentle handling routines on board the ships, in addition to appropriate conditions for keeping live animals. Physiological tests will define threshold levels in relation to temperature, light and moist, and characterise the most favourable conditions for further survival. Besides optimising conditions on board the ships this knowledge will be used in relation to temporary storage and to ensure optimal conditions during transport of live nephrops to southern Europe. The final aim of the project is thus to establish an export chain of live nephrops to markets in southern Europe. This can provide the fishermen up to three times the price as compared to when landing nephrops on ice, and the price that the Danish export companies’ gain will likewise increase.

Within the project we successfully developed and tested pelagic doors for use in the nephrops fishery, showing that it is indeed possible to implement these in this fishery. Using reduced speed as a way to allow escape of round fish from the trawl (i.e reduce catch of these) did however not work as anticipated, and cannot be recommended for future practice. We tested the effects on survival of nephrops of sprinkling with fresh seawater on-board after trawling, light- and air exposure and various temperatures. Of these, air exposure and air temperature (the higher the worse) had the greatest effect on survival and in determining the period it took for nephrops to recover from post trawling and handling stress. Furthermore, a ‘one-tough’ packing system, including optimal conditions for the animals when transported, was successfully developed, tested and implemented, resulting in up to 95% survival of nephrops transported by truck to southern Europe. Finally, a manual with guidelines for optimal practice for fishery and export of live nephrops was made.

The project was coordinated by AquaMind and CATch-Fish.

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

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
AquaMind
CATch-Fish
Strandby Net A/S
Danish Fishermen's Association
Infuser
STMI
Seafood-Supply.dk ApS
ChrisFish
Frank Majken s281
Kim Sørensen s42
Period: 01/01/2013 → 31/03/2015
Number of participants: 4
Research areas: Fish Biology & Aquaculture & Fisheries Technology & Fisheries Management
Project participant:
Karlsen, Junita Diana (Intern)
Skov, Peter Vilhelm (Intern)
Eigaard, Ole Ritzau (Intern)
Project Manager, academic:
Behrens, Jane (Intern)
Optimizing the value of fish caught in the Danish mixed fishery – Improved quality and selectivity as a consequence of gear development (FishValue) (39033)

In the FishValue project (VærdiFisk) the main goal was to increase the biological and economical sustainability of the Danish Mixed fishery by increasing the gear selectivity and improve the quality of whole and processed fish. A horizontally divided codend was developed in the project to separate four fish species from Nephrops (Nephrops norvegicus) in an upper and lower compartment, respectively, to avoid physical contact between fish and animals with hard or spiny body surfaces. Focus was given to design and placement of a grid in the lower compartment to obtain an effective separation. Square meshes of different mesh sizes in the upper and lower compartment were used to investigate if it is possible to customise the selection of fish and Nephrops separately while retaining the most valuable catch. Quality assessments of the catch were performed to measure whether catch from the two compartments increased quality of whole fish and fish fillets, compared with the standard codend in which the catch components were mixed. Design and placement of a grid in the lower codend gave an effective separation of all the species investigated when compared to the first version of the experimental codend. Catch from the upper compartment showed a significant quality improvement for whole fish, fillets and Nephrops compared to the standard codend. It was possible to customize the selection of fish and Nephrops separately and at the same time retain the most valuable catch using different mesh sizes of square meshes in the upper and lower codend. In fact, the horizontally divided codend had 10% higher catch rate of Nephrops compared to the standard codend. This more efficient fishery gives less fuel consumption per kilogram Nephrops caught, and may, if evaluated over longer time periods, imply less impact on the sea bottom than when fishing with the standard codend.

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
Danish Fishermen's Association
FN-430 Tove Kajgaard
Strandby Net A/S
Clausen & Sonner
Strandby Fiskeeksport
Strandby Fiskeauktion
Fishermen’s Collecting Central
Fishermen’s Association of Strandby
Period: 01/01/2013 → 27/05/2014
Number of participants: 3
Research area: Fisheries Technology
Project participant:
Krag, Ludvig Ahm (Intern)
Frandsen, Rikke (Intern)
Project Coordinator:
Karlsen, Junita Diana (Intern)

Economically sustainable fishery for Nephrops in Skagerrak and Kattegat (ØBJ-FISK) (38865)

Optimizing the exploitation of the resources of the sea areas Skagerrak and Kattegat is central to promote an economically sustainable development in the region. Norway lobster or Nephrops is one of the economically most important resources for the majority of the commercial fishery in the Kattegat-Skagerrak (KASK)-region where the annual first value was app. 350 million DKR in 2011. Nephrops are mainly caught in bottom trawls (95 % of the total landings), where other species such as cod and sole constitute part of the by-catch. A minor fishery with creels – partly commercial and partly recreational – takes place along the Swedish and Norwegian coast in areas that are generally inaccessible to the trawlers. Taking into account the majority of the Nephrops landings in the KASK region are sold directly to the local fish processing industry or are sold directly in the local areas, the total socio-economic value is much higher than the first value.

In later years, there has been a shift towards an ecosystem-based management e.g. through the NATURA2000
regulations or the Community Action in the field of Marine Environmental Policy. The consequence of this shift is that the
focus is no longer on the state of single species but on the entire marine ecosystem. This has led to regulations aiming at
reducing discard of unwanted catch as well as reducing the impact of fishing on vulnerable habitats. Regulations that
among other things include a discard ban (implemented for Skagerrak by Norway, Denmark and Sweden in 2013), area
 closures, reductions in number of days at sea, and minimization of unwanted by-catch, have caused uncertainty in the
fishing industry and limits the possibilities of exploiting the resource maximally. To ensure an economically sustainable
growth of the Nephrops fishery in the KASK region, an increased collaboration between science and industry is needed as
is innovation in the design of low impact fishing gears and a reliable stock assessment.

The project aimed at:
- Establishing a platform where the industry, the science, and the managers could work together to identify the challenges
  that restrain an optimal exploitation of the Nephrops resource
- Establishing a knowledge based collaboration to identify low impact fishing methods that may lead to future economically
  sustainable growth in the KASK region
- Improving the biological knowledge on which the stock assessment is based - Increasing the reliability of the stock
  assessment.

The project was coordinated by DTU Aqua.

The project was funded by EU, InterReg (regional collaboration).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Institute of Marine Research
Lund University
Aalborg University
Danish Fishermen's Association
Period: 01/06/2012 → 31/12/2014
Number of participants: 7
Research area: Fisheries Technology
Project participant:
Madsen, Niels (Intern)
Lundgren, Bo (Intern)
Feekings, Jordan P. (Intern)
Karlsen, Junita Diana (Intern)
Nielsen, Anders (Intern)
Krag, Ludvig Ahm (Intern)
Project Coordinator:
Frandsen, Rikke (Intern)

Improving the selectivity for cod in Danish trawl fisheries (38887)
The aim of the project was to develop and test more selective fishing gear for three major Danish fisheries:
- The demersal trawl fishery in the North Sea (120 mm)
- The demersal trawl fishery in Kattegat and Skagerrak (90 mm)
- Improve the selection range (SR) in the BACOMA codend used in the Baltic Sea

The new and more selective fishing gears were developed under consideration of the economy in the fishery. The project
delivered three new selective gear solutions of which two were tested during experimental fishery. Technical descriptions
of the new designs were delivered. Furthermore, an economical model to quantify the economic consequences of using
the new selective fishing gears compared to existing standards was developed.

Experiments were conducted in the Baltic Sea cod fishery demonstrating that the selection range (SR) could be reduced
by using a larger diamond mesh in the lower sheet of the BACOMA design. Further the project demonstrated the
efficiency of legal selective escape panels in Skagerrak/Kattegat and the effect of varying design parameters in both the
panel section and the trawl body. Finally the project demonstrated that active stimulating fish behavior around selective
escape panels significantly can improved the escape panels’ selectivity.

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).
Test and demonstration of a selective topless trawl in the North Sea (38699-2)
The aim of the project was to develop and test a selective topless trawl to improve selectivity of cod in the demersal mixed species fishery in the northern North Sea.

The design idea was based on utilizing behavioral differences between the species, specifically that most fish stay low in the trawl, and that gadoids, like cod, raise further aft in the tapered section of the gear and can escape above the cut-back headline. An improved species selectivity of cod in the North Sea can allow and economically feasible mixed fishery without further exhausting the cod stocks.

In addition to the topless design, a SELTRA sorting box was installed in codend to compare the selective effect between a relatively large design modification in the forward part of the trawl with a relative small change in codend where the behavioral differences between species is less expressed.

The project is coordinated by DTU Aqua.

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