Clerk of the Authority
Caroline Lacey
County Hall, Beverley
East Riding of Yorkshire, HU17 9BA

Chief IFC Officer
David McCandless, BSc. MSc.
Town Hall, Quay Road, Bridlington
East Riding of Yorkshire, YO16 4LP

North Eastern IFCA
Inshore Fisheries and Conservation Authority

All enquiries should be directed to:
Sarah Murray
NEIFCA Operational Support Manager

Tel: 01482 393515
Fax: 01482 393699
E.Mail: sarah.x.murray@eastridingogov.uk
Our ref: NEIFCA
Date: 29 August 2019

Dear Member

Science Advisory Group Meeting of North Eastern Inshore Fisheries & Conservation Authority – Friday 06 September 2019

I hereby give you notice that the next Science Advisory Group Meeting of North Eastern Inshore Fisheries and Conservation Authority will be held on **Friday 06 September 2019**, **at the Bridlington Business Centre, Enterprise Way, Bessingby Industrial Estate, Bridlington, YO16 4SF starting at 10:30am.** The agenda and reports for the meeting are enclosed.

On arrival please ask for David McCandless. Can members please send apologies by Wednesday 04 September 2019, please telephone 01482 393515 or email ne-ifca@eastriding.gov.uk. Thank you to members who have already given their apologies.

Please contact me if you have any queries.

Yours Faithfully

David McCandless
Chief IFC Officer

SCIENCE ADVISORY GROUP MEETING
Friday 6 September 2019
Commencing 10:30 am
Bridlington Business Centre, Enterprise Way, Bessingby Industrial Estate, Bridlington YO16 4SF

AGENDA

1. Apologies for absence

2. To take the minutes of the last meeting held on 14 March 2019 as a correct record *(page 1-4)*

Items for Decision

3. Annual Research plan 2020-21 *(page 5-20)*

Items for Discussion

4. Lobster and Edible crab stock status *(page 21-34)*

5. State of the Fisheries report *(page35-70)*

6. Scallop dredge fishery video assessment *(page 71-80)*

7. Humber eelgrass survey and management *(page 81-94)*

8. Byelaws update *(page 95-116)*

9. Licensing and consents update *(page 117-152)*

10. Project updates – verbal update

Any other items which the Chairman decides are urgent by reason of special circumstances which must be specified

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

SCIENCE ADVISORY GROUP

14 March 2019

Present	**Representing**
Dr Stephen Axford (Chair)	MMO Appointee
Mrs Kirsten Carter	MMO Appointee
Mr Bob Houghton	MMO Appointee
Mr John Whitton	MMO Appointee

Chief Officer David McCandless and Senior Environmental and Scientific Officer Tim Smith also attended the meeting.

The group met at the Bridlington Business Centre, Enterprise Way, Bessingby Industrial Estate, Bridlington. The meeting started at 12:30.

10. APOLOGIES

Apologies for absence were received from Marine Management Organisation appointees Prof Mike Elliot, Mr Phillip Macmullen, and Mr Michael Montgomerie and MMO representative Mr Christian Proud.

11. MINUTES OF THE MEETING HELD ON THE 06 SEPTEMBER 2018

Members requested that minute item number 5, Scallop Survey Plan was altered to reflect that it was the 'amended proposed sampling regime' that was approved by members at the last meeting. Members also requested that the draft minutes be circulated at the earliest convenience.

Resolved - That the minutes of the Science and Governance Working Group Meeting held on the 06 September 2018 be confirmed and signed as a correct record by the Chair.

12. NEIFCA 5 YEAR STRATEGIC RESEARCH AND EVIDENCE PLAN

Senior Environmental Officer Tim Smith presented a report which provided members with a draft NEIFCA 5 year Strategic Research and Evidence Plan for review and comment. The aim of the Strategic Research and Evidence Plan was to identify long-term approaches, research themes and core, on-going priorities for the organisation as well as setting out organisational research resources and capabilities. The strategy would communicate organisational priorities to stakeholders and partner agencies and form the basis for the Annual Research and Evidence Plans developed over the lifespan of the plan. Members were asked to provide feedback and comments including any further recommendations electronically. Members discussed each priority area detailed in the plan and made recommendations and suggestions, which included a tracking/progress mechanism tool to be incorporated into the plan. Members also recommended the inclusion of some basic statements relating to each priority area, indicating the rationale behind them.

Resolved – Members noted the report.

13. NEIFCA ANNUAL RESEARCH PROGRAMME 2019/2020

The Senior Environmental Officer Tim Smith presented a report providing members with a draft copy of the scientific and environmental work programme for the 2019/20 season. The Authority's environmental and scientific work is supported by a detailed offshore and land-based programme of survey work linking to the delivery of the overarching strategic plan. The Research and Evidence Annual Plan is the core planning and operational document where actions and priorities can be agreed in context. The aim of the document is to identify new and continuing priorities for the organisation during the 2019-2020 period. Members discussed the scallop survey plan and highlighted that it may be necessary to manage the expectations of members and to arrange a specific meeting in advance of the main Authority meeting in June to look at the data gathered.

Resolved – Members noted the report.

14. NEIFCA ANNUAL RESEARCH REPORT 2018/2019

The Senior Environmental Officer Tim Smith presented a report providing members with a draft copy of the research and evidence outputs for 2018/19. The Authority's Environmental and Scientific team complements the Enforcement and Administrative teams to deliver evidence based fisheries management that is sensitive to social, environmental and economic needs. In addition to continuing to support the Authority's management of the shellfish potting and scallop dredge fisheries, the Environmental and Scientific team undertake research, monitoring and assessment to ensure that the Authority delivers its statutory duties in regards to Marine Protected Areas. Significant time during 2018/19 was directed towards on-going programmes that would be reported on later, such as the development of testing procedures to effectively enforce legislation prohibiting the landing of egg bearing female lobsters and management of recreational shore collection in Marine Protected Areas.

Resolved – Members noted the report

15. NEIFCA AIS & CRUSTACEA CONSERVATION BYELAW UPDATE

The Chief Officer presented a report to update the group on all current fisheries byelaw work streams.

Byelaw XXVIII Crustacea Conservation Byelaw 2018

This new byelaw regulation was made by the Authority at its meeting on 14 June 2018. It retains, updates and rationalises existing management regulations covering the exploitation of lobster, edible crab, velvet crab and nephrops within the Authority's district and included some other key revisions including protection for egg bearing lobsters, 'V' notched lobsters and a new protection for 'soft' lobsters. Following a period of informal consultation with the MMO IFCA byelaws team, formal public consultation commenced on 15 October 2018 and concluded on 7 December 2018. In total the Authority received ten objections to the proposal, primarily in relation to the new maximum vessel length size for shell fishing of 10 m within the 3 nautical mile limit and the prohibitions on taking soft and mutilated lobsters. Prior to responding to the objections, all members were contacted via email on 24 January 2019, the Chief Officer outlined his intentions to strengthen some of the definitions contained within the byelaw, particularly relating to 'soft' lobsters and submit the byelaw proposal for formal confirmation. The definition of 'soft lobster' was strengthened within the draft byelaw and it was submitted for formal confirmation on 8 February 2019. Following a preliminary review of the submission some minor changes were recommended to the wording of the draft regulation. A revised draft of both the regulation and supporting Regulatory Impact assessment were re-submitted for confirmation on 18 February 2019 and copies were included within the report for member's information.

XXXI Automatic Identification System (AIS) Byelaw 2016

The proposed AIS byelaw was one of five regulations which were formally made by the Authority on 27 April 2016 which also included the following:

- XVIII Method and Area of Fishing (Netting) Byelaw 2016
- XXIX Humber Estuary Fishing Byelaw 2016
- XXXI Catch Returns Byelaw 2016
- XXII Shellfish Permit Byelaw 2016

Following informal review by the Marine Management Organisation the byelaws progressed to formal consultation which commenced on 21 December 2016 and terminated on 17 February 2017.

During the formal consultation process 44 responses were received including two multi-signature petitions. Members considered the output from the formal consultation on 20 July 2017 and agreed to continue with the progression of the byelaws with the exception of the Shellfish Permit regulation which needed further consideration. Since July 2017 the byelaws have passed through two further reviews by the Marine Management Organisation (MMO) and at one point had been signed and formally submitted to Defra but were sent back into the quality assessment process overseen by the MMO. Further delays have resulted from issues surrounding the supporting Regulatory Impact Assessments (RIAs). Since the 25 May 2018 officers had made further submissions and representations, regarding the byelaws, to the MMO IFCA byelaw team via the Authority's legal advisors. On 8 October 2018 the MMO advised officers that the quality assurance process had been completed on three of the four byelaws with the exception of the AIS Byelaw which carried a recommendation that it should be subject to a further period of formal consultation. The MMO considered that given the significant development of the national IVMS project since the original byelaw was made in 2016, necessitating subsequent changes to the supporting RIA, a further period of consultation was felt appropriate. To that end officers commenced a second period of formal consultation on the AIS byelaw alongside the Crustacea Conservation Regulation on 15 October 2018. This consultation period closed on 7 December 2018. During the second period of formal consultation on the AIS byelaw proposal the Authority received eighteen objections and two letters of support for the measure. Sixteen of the eighteen objections came from representatives of the recreational rod fishing sector and two from the commercial fishing industry.
The objections from the recreational rod fishing sector raised a number of complex issues relating to the commercial classification of recreational charter fishing businesses many of which carried no clear or immediate answer. Copies of all the objections received and responses were attached for additional information. Prior to responding to the objections the Chief Officer contacted all members via email on 21 December 2018 indicating his intention to remove the recreational fishing sector from the scope of the byelaw provisions and re-submit the regulation for formal confirmation. All members were supportive and the AIS byelaw was re-submitted for formal confirmation on 24 January 2019 and alongside the three other outstanding byelaws, is now, finally, being considered by senior Defra officials.

Resolved – That members noted the report and endorsed the decision to progress both byelaw regulations for final confirmation.

16. LICENSING AND CONSENTS UPDATE

The Senior Environmental Officer Tim Smith updated members on marine licensing and consent applications reviewed by officers since the last meeting on the 06 September 2018.

Resolved – Members noted the report.

17. NEIFCA PROJECTS UPDATES

The Senior Environmental Officer Tim Smith updated members on the progress of all active externally funded project initiatives.

Resolved – Members noted the report.

18. ANY OTHER BUSINESS

The Chief Officer informed members that phase one of the EMFF Flag project, Holderness Coast Lobster Fishery was complete, a report was expected by the end of March 2019, which would be circulated to members for information.

The meeting closed at 14.25

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

Annual Research and Evidence Plan 2020/21

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To agree the annual research and evidence priorities for the 2020/21 period.

B. **Recommendation**

That members endorse the plan.

1. **Background**

1.1 The Authority's environmental and scientific work is supported by a detailed offshore and land-based programme of survey work linking to the delivery of the overarching strategic plan. The Research and Evidence Annual Plan is the core planning and operational document where actions and priorities can be agreed in context. The aim of the document is to identify new and continuing priorities for the organisation during the 2020-2021 period.

1.2 The main focus for evidence collection remains to be data related to the regionally important lobster and crab pot fishery and the ongoing development of the scallop dredge fishery. Annual monitoring of the eelgrass bed in the Humber Estuary EMS will continue to ensure that management measures continue to be appropriate.

1.3 Following the apparent loss of the blue mussel (*Mytilus edulis*) bed in the Flamborough No Take Zone (NTZ) observed during the 2019 survey, it is proposed that the survey be removed from the annual plan. Discussions have also been held with the Flamborough Head EMS Project Officer (PO) regarding the continuation of potting surveys in the NTZ which have been supported by NEIFCA in the past. It has been proposed that NEIFCA and the Flamborough PO will discuss wider partner and academic institution involvement in developing projects to better monitor the Flamborugh Head EMS outside of statutory responsibilities at the next meeting of the Yorkshire Marine and Coastal Biodiversity Group meeting.

1.4 Monitoring of the cockle beds in the Tees and Humber Estuaries is included in the 2020/21 plan following the decision to move to biennial sampling frequency in 2018.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

North Eastern IFCA

Inshore Fisheries and Conservation Authority




Research and Evidence Annual Plan

2020-2021

Date submitted:	23/08/2019
Report compiled by:	TS
Quality control by:	
Approved by & date:	
Version:	Draft

This plan has been prepared by North Eastern Inshore Fisheries and Conservation Authority with all reasonable care and attention to detail. All information provided is the best available at the time of production.

North Eastern IFCA
Town Hall
Bridlington
East Riding of Yorkshire
YO16 4LP

1 Contents

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Acronyms

DHC	Durham Heritage Coast partnership
EA	Environment Agency
EMS	European Marine Site
HFIG	Holderness Fishing Industry Group
IFCA	Inshore Fisheries and Conservation Authority
MCZ	Marine Conservation Zone
MIF	Multiple Indicator Framework
MPA	Marine Protected Area
NE	Natural England
NEG III	North Eastern Guardian III
NEIFCA	North Eastern Inshore Fisheries and Conservation Authority
NTZ	No Take Zone
SAC	Special Area of Conservation
SI	Statutory Instrument
SPA	Special Protection Area
YWT	Yorkshire Wildlife Trust

1. Introduction

North Eastern Inshore Fisheries and Conservation Authority (NEIFCA) is one of ten such Authority's established in October 2010 under provisions contained within the Marine and Coastal Access Act 2009. NEIFCA have a statutory duty under the Marine and Coastal Access Act 2009 to manage the exploitation of sea fisheries resources.

The Authority also has duties as a relevant authority in relation to marine protected areas and European Marine Sites (EMS) under the Conservation of Habitats and Species Regulations 2017 (SI:1012/2017), as such are responsible for monitoring and managing fishing activity within a network of marine protected areas in the district including:

- Teesmouth and Cleveland Coast SPA
- Flamborough Head EMS (SAC & SPA)
- Humber EMS (SAC & SPA)
- Northumbria Coast SPA
- Greater Wash SPA

In addition to two Marine Conservation Zones:

- Holderness Inshore MCZ
- Runswick Bay MCZ

IFCAs are small, multi-functional organisations that carry out a range of work to fulfil these responsibilities including evidence collection and research as well as the implementation and enforcement of legislation. The Research and Evidence Annual Plan is the key planning and operational document where actions and priorities can be agreed in context. The aim of this document is to outline survey, research and evidence gathering priorities for the 2020-2021 period.

2. Working groups

The NEIFCA sits on a variety of working groups as a statutory relevant authority or participating stakeholder. Core, on-going working groups are outlined in the Strategic Research and Evidence Plan. The table below outlines additional shorter term working and project groups that Officers will be engaged with during 2019/20.

Table 1. NEIFCA working groups

Group	Area	Other Members	Frequency
Holderness Fisheries Local Action Group	Holderness	HFIG, MMO, YWT	Quarterly
Durham Heritage Coast - Seascape Partnership	Tyne to Tees		Quarterly
Whelk Working Group	National		

3. Research and evidence work streams for 2020/21

Offshore

Shellfish potting – NEG III	
In order to capture data on lobster and crab population components that are subject to landings restrictions, potting surveys are undertaken from the patrol vessel over the summer months. Data is used to carry out annual stock assessments and is shared with Cefas to inform stock unit level assessments against MSY targets. Additional fleets are worked within and in the vicinity of the permitted dredge areas in order to monitor any impacts arising from the scallop fishery.	
Outputs	
Stock status reports to include: • Length/width frequency data for assessment against MSY targets • Sex ratios • Seasonal trends in catch composition and population structures • CPUE • Proportion V-notched lobsters • Proportion of egg bearing female lobsters • Condition (1 or no claws, prevalence of black spot disease) • Pre-recruit abundance	Data Acquisition May-Oct Reporting Stock status reports - Sep Priority High

Scallop dredging – NEG III	
Following the introduction of a scallop dredge permitting system in 2015, annual assessment of stocks within the permitted dredge areas are required to inform management decisions including the number of permits to be issued. The number of permits to be issued each year is to be published by the 1st of November. Offshore sampling is carried out using industry standard Newhaven dredges from NEG III.	
Outputs	
Stock status reports to include: • Size frequency data • Pre recruit data • Age (ring) frequency data • Catch Per Unit Effort (CPUE) • Bycatch species	Data Acquisition Apr, Mar Reporting Scallop fishery report - Jun Priority High

Scallop dredging – Video assessment – NEG III	
Concerns have been raised regarding the impacts of the dredge fishery on habitats. To increase confidence surrounding the knowledge base of impacts arising from the fishery, video assessment work will be undertaken to gather data on indicator species and habitat condition. The utility of the Authorities remote baited camera system will also be assessed.	
Outputs	
• Comparison of areas exposed to varying levels of scallop dredging effort to those with no effort • Establish survey stations for annual monitoring	Data Acquisition Apr, Mar Reporting Scallop fishery report - Jun Priority High

Scallop dredging – Permitted vessels	
Concerns have been raised regarding the impacts of the scallop dredge fishery on habitats and, in particular, on lobster and crab stocks. Supplementary to dredge surveys carried out from NEG III, surveys aboard permitted vessels are undertaken throughout the season to accurately record bycatch levels and to capture further scallop stock data.	
Outputs	
Stock status reports to include: • Size frequency data • Pre recruit data • Age (ring) frequency data • Catch Per Unit Effort (CPUE) • Bycatch species	Data Acquisition Nov-Apr Reporting Scallop fishery report - Jun Priority High

Broad Scale Habitat Classification	
NEIFCA has implemented a long term programme of data collection to improve knowledge of sea bed habitats within the district utilising the Authorities multibeam echosounder. Surveys are carried out on an ad hoc basis during routine patrol, focussing on a series of 1km^2 sampling sites and as such are not included in the survey Gantt chart.	
Outputs	
• Complete coverage the 48, 1 km² survey areas • Bathymetry profile from 0.1-0.25m² • Hardness profile	Data Acquisition Apr-Mar Reporting Annual research report - Mar Priority Low

Sea temperatures	
The patrol vessel continues to maintain a long term data set of sea surface and bottom temperatures taken at stations throughout the district while on routine patrol and as such are not included in the survey Gantt chart.	
Outputs	
• Monthly sea bed and surface temperature	Data Acquisition Apr-Mar Reporting Annual research report - Mar Priority Low

Shore and desk based work streams

Catch returns	
It is a condition of the shellfish permit for all vessels to submit accurate returns for the preceding month. These are collected using the Marine Shellfish Activity Returns (MSAR) form. Officers quality assure the returns and input the data to produce summary statistics. This process will be reviewed after the implementation of the revised catch return byelaw encompassing all fishing methods occurring within the District.	
Outputs	
Summary data for inclusion in stock status reports including: • Total landings • Landings • Number of pots set/hauled • Quarterly catch distribution • Landings per unit effort	Data Acquisition Apr-Mar Reporting Stock status reports - Sep Priority High

Quayside sampling	
Quayside sampling of commercial catches provides biometric data on the main species landed within the NEIFCA district. Effort is focussed on lobster and brown crab to inform annual stock assessments with additional sampling of *Nephrops*, velvet crab and whelk undertaken when observed. Data is shared with Cefas to inform stock unit level assessments against MSY targets. Monthly sampling is carried out in the major ports of Bridlington, Scarborough and Whitby with supplementary sampling at other ports.	
Outputs	
Stock status reports to include: • Length/width frequency data for assessment against MSY targets • Sex ratios • Seasonal trends in catch composition and population structures • CPUE	Data Acquisition Apr-Mar Reporting Stock status reports - Sep Priority High

Berried lobster testing	
During 2017 national legislation and a local byelaw were introduced which prohibited the landing of egg bearing female lobsters. In order to enforce this management measure NEIFCA is having to develop its own in-house knowledge and capability in order to positively identify lobsters that have had their eggs forcibly removed; an act known as 'scrubbing'. Current work is building on tests developed for the US Maine lobster fishery and previous work carried out by Eastern IFCA and Devon and Severn IFCA. Once the test process and procedures are in place, ongoing testing will likely become a major work stream for the Environmental and Scientific team. In order to address questions surrounding the differentiation of scrubbed and naturally shed lobsters, holding tanks are being developed so that supporting evidence may be collected.	
Outputs	
• Test validation and development of internal policies and procedures for the detection of scrubbed lobsters. • Successful prosecution based on testing results.	Data Acquisition Apr onwards Reporting As available Priority High

Humber Estuary EMS eelgrass monitoring	
Monitoring of the eelgrass bed is carried out annually to assess byelaw effectiveness. Officers work closely with other statutory partners to maximise the utility of resources and data collected to address NEIFCA and partner priorities. Partners involved: Natural England, Environment Agency, Yorkshire Wildlife Trust.	
Outputs	
Stock status reports to include: • Identification of bed spatial extent • Population length and age structure • Estimated density and biomass within bed	Data Acquisition Jul Reporting Sep Priority Moderate

Cockle monitoring	
Since the introduction of byelaw XXIV to manage effort in the district, which stipulates a catch return system, a closed season from 1st May – 21st August, daily catch limits, minimum landing size and technical gear restrictions, the beds had to be closed due to overexploitation. Monitoring in the district to assess whether the closure is benefitting the stock is carried out bi-annually across three sites; Bran Sands, Middleton Basin and Wonderland (Cleethorpes).	
Outputs	
Stock status reports to include: • Identification of bed spatial extent • Population length and age structure • Estimated density and biomass within bed	Data Acquisition Apr-May Reporting Jun Priority High

MPA effort reporting	
The MPA effort report draws together effort, landings and socio-economic data in order to assess the need for revision to existing MPA fisheries impact assessments. This work is part of a rolling programme of assessments to ensure that activities occurring will not adversely affect the achievement of designated sites conservation objectives.	
Outputs	
Effort Report synthesising: • Review of spatial distribution of effort • Review of catch return and landings data • Review of socio-economic data including numbers of active vessels and employment • Assessment of impacts on MPAs	Data Acquisition Apr-Mar Reporting Mar Priority Moderate

Table 2 Survey Gantt Chart 2020/21

Workstream	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Shellfish potting – NEG III												
Scallop dredging – NEG III												
Scallop dredging – Video assessment – NEG III												
Scallop dredging – Permitted vessels												
Cockle monitoring												
Humber Estuary EMS eelgrass monitoring												

Table 3 Reporting Gantt Chart 2020/21

Workstream	Jun Auth	Sep SAG	Mar SAG
Annual research report			
MPA effort report			
Lobster and Edible crab stock status reports			
Scallop fishery report*			
Cockle monitoring report			
Humber Estuary EMS eelgrass report			

*Special SAG meeting in May if needed

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

Lobster and edible crab stock status 2018

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To update members on preliminary results of the 2018 lobster and crab monitoring programme and provide copies of the lobster and edible crab stock status reports.

B. **Recommendation**

That members note the reports.

1. **Background**

1.1 Stock monitoring of the lobster and edible crab stocks includes both quayside sampling and offshore surveys. Monthly sampling is undertaken at three key ports (Bridlington, Scarborough and Whitby) with supplemental sampling from other ports when possible. Dedicated fishery independent surveys are carried out from North Eastern Guardian III between May and October each year.

1.2 The stock summary reports present initial results for the previous years monitoring. The full stock status report will be included in the annual research report.

1.3 The status of lobster stocks in the NEIFCA district is considered to be low, with both male and female fishing mortality rates above the maximum reference point. A significant increase in spawning stock biomass and/or reduction in fishing mortality would be required to achieve MSY.

1.4 The status of the crab stock within the NEIFCA district is considered fairly low. Mortality rates are above the level needed to achieve MSY but are below the maximum reference point.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

North Eastern IFCA

European Lobster - Stock Summary 2018

Overview: The Yorkshire coast European lobster (*Homarus gammarus*) is one of the largest in the UK. An estimated 492 tonnes were captured within NEIFCA jurisdiction in 2018, with a first sale value of approximately £7.1 million. The fishery supported an estimated 178 vessels and 420 fishermen (Table 3).

Sampling Programmes: NEIFCA target the fishery through dedicated surveys, including quayside sampling and offshore surveys. Monthly sampling is undertaken at three key home ports across our jurisdiction, with sampling providing information on size, sex and condition composition. Offshore surveys provide information on capture rates, recruit and pre-recruit composition, individual weights, seasonal and spatial distribution.

Table 1 Quayside sampling totals for 2012-2018

Year	Number of animals	Number of samples	Sampled weight (kg)
2012	781	17	513
2013	4399	47	2492
2014	3028	65	1906
2015	4738	84	2420
2016	5344	101	3213
2017	4713	107	2768
2018	6297	120	3960

Size Composition: Annual size distributions for recruits determined that overall size is significantly associated between years in both males ($p < 2.20^{E-16}$) and females ($p < 2.20^{E-16}$). Post-hoc pairwise comparisons for females suggested 2013-2018 data sets were very similar. Overall median sizes of female lobsters since 2012 have remained between 92-94mm, with 2017-18 being consistent at 93mm. Male median sizes in the same period are stable between 93-94mm with 2018 showing a 1mm decrease on 2017 to 93mm (Figure 1). Average monthly carapace lengths ranged from 92-98mm and 92-97mm for male and females respectively. The lack of representation by older animals in particular animals above carapace length 120mm in samples was again noted and consideration should be given to a targeted assessment of this demographic to determine if they are aggregating offshore or dynamically vulnerable.

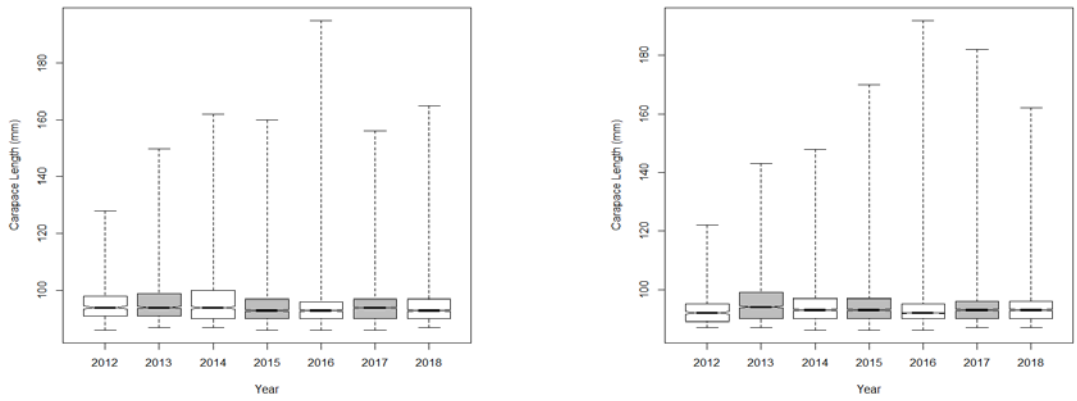

Figure 1. Box and whisker plots of lobster carapace length from quayside sampling for the period 2012-2018.

Mortality: Since 2013 annual exploitation rates in the main have been steadily increasing, within a range of 40-55% and 45-65% for males and females respectively (Figure 2). Female mortality continues to show a greater degree of annual variability, which as previously noted appears attributed to the representation of older females in samples. Both male and female exploitation rates were subject to a reduction of ~9%, between 2016 and 2017. This increase in part, was thought to be attributed to the introduction of mandatory escape gaps in latter part of 2016 via NEIFCA bylaw XXVIII. However in 2018, female mortality markedly increased back to near 2016 levels, conversely male mortality remained stable for a second year in a row. Although shown, the 2012 annual harvest rate estimate is thought to be artificially inflated as the assessment was performed on a reduced data set from only one port (Table 1).

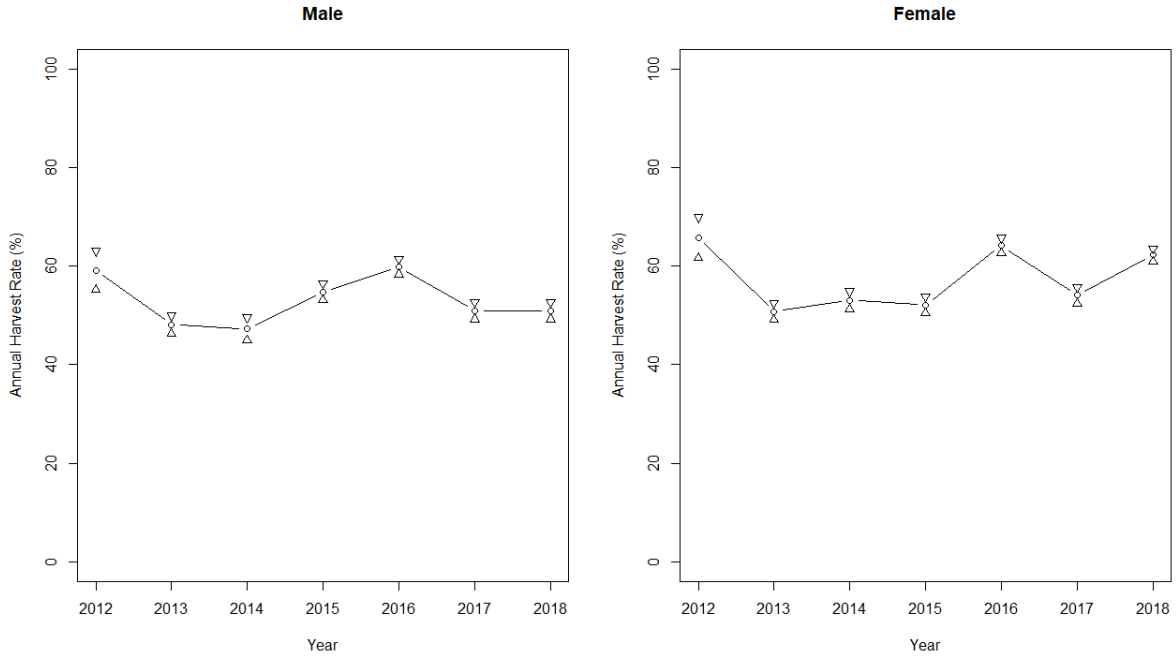

Figure 2. Chapman-Robson derived estimates of annual harvest rate for lobster from quayside sampling for the period 2012-2018. Includes 95% confidence intervals.

Sustainability: Models were developed in consideration of the Food and Agriculture Organisations (FAO's) recommended MSY target, which identifies that a stock subject to exploitation should retain a minimum of 35 % of the stock's unfished level of spawning stock biomass to remain sustainable (35 % Virgin SpR, Caddy & Mahon 1995[1]). Adapted age-based Thompson – Bell (predictive) models were utilized to assess mortality and survivorship for a cohort through multiple years (FAO methodology, as detailed in Sparre & Venema 1998[2] and King 1995[3]).

Models were developed for both sexes as relative estimates, predicting the impact of mortality rates (F) ranging from 0 to 1.5 on the spawning stock biomass for a nominal population of 1,000 individuals. The input parameters included: natural mortality of 0.15, average animal weights identified through quayside sampling and female functional maturity proportions identified during the 2007-2010 offshore study. Males were assumed to be mature from 87 mm and females at 90mm carapace length, with male and female assessments using age ranges from 6-13 and 7-14 years respectively. Chapman-Robson derived mortality estimates from 2016-18 are presented within the models for context in relation to MSY estimates (Figure 3).

Table 2. Thompson-Bell model estimates of relative levels required to achieve MSY.

Model	2018 F estimate	Current % of virgin SSB retained	Increase in SSB to achieve 35 % (MSY)	MSY F estimate	Relative decrease in F to achieve MSY
Male	0.92	10%	236%	0.23	75%
Female	1.33	8%	316%	0.27	79%

[1] Caddy JF and Mahon R (1995). Reference points for fisheries management. FAO Fisheries Technical Paper. 347 83pp, Rome, FAO ftp//ftp.fao.org

[2] Sparre UPE and Venema SC (1989) FAO methodology found in, Introduction to tropical fish stock assessment. Part 1 Manual FAO Fish. Tech. Pap. 306:337

[3] King M (1995) FAO methodology found in, Fisheries Biology, assessment and management. Fishing News Books, Blackwell Science Ltd, Oxford UK.

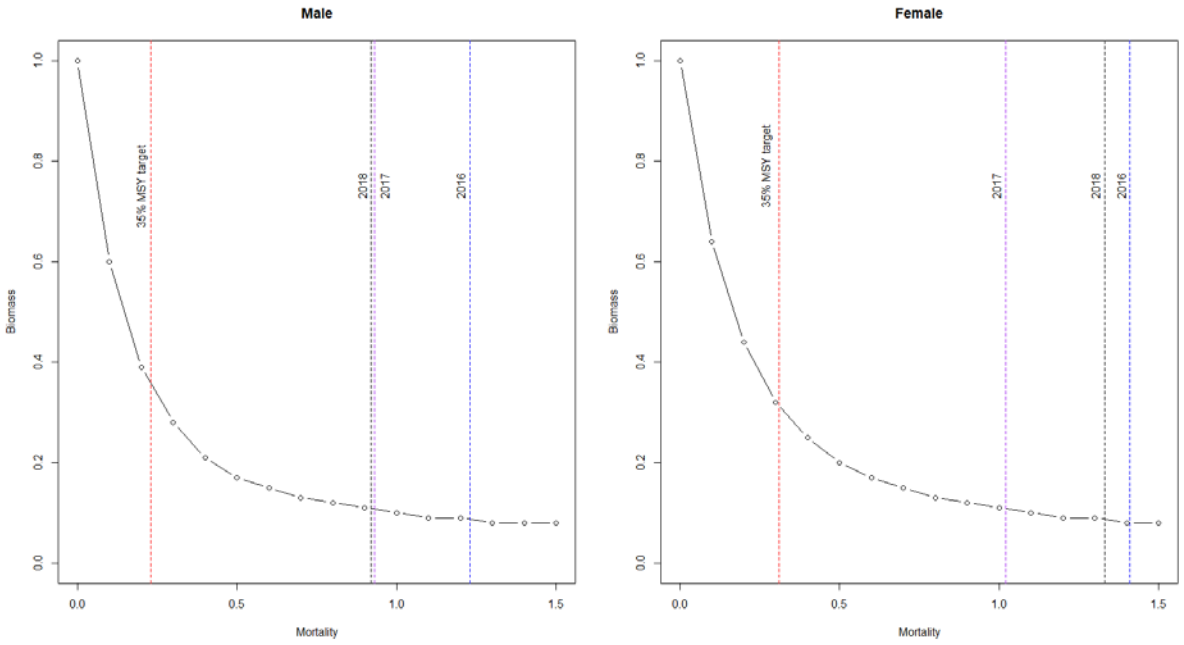

Figure 3. Plots of mortality estimates for 2016-2018 in relation to MSY target derived from Thompson-Bell model.

Conclusion: The status of lobster stocks in the NEIFCA district is low, with both male and female fishing mortality rates above the maximum reference point of 15% Virgin SpR. A significant increase in SSB and/or reduction in fishing mortality would be required to achieve MSY.

Table 3: Multiple indictor framework

Multiple Indicator Framework													Value Ref	Data Source
Fishery Overview	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Total Landings (NEIFCA)	406	413	511	444	545	575	576	605	539	525	542	492	Tonnes	NEIFCA MSAR collation
MMO Bridlington Landings	X	X	362	322	366	375	362	421	405	410	453	297	Tonnes	MMO Annual Stats
Total Effort (Hauled)	3.5	3.5	3.4	3.9	4.2	4.0	4.3	4.2	4.5	4.3	4.2	3.9	Million	NEIFCA MSAR collation
Total Effort (Pots Set)	85	91	73	83	74	73	87	85	92	90	83	81	Thousand	NEIFCA MSAR collation
Q3 Catch Distribution	62	67	67	66	64	62	57	60	58	62	61	54	Q3 %	NEIFCA MSAR collation
Primary Reference Points	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Annual Mortality Rate - Males	55	58	57	x	x	59	48	47	55	60	51	51	%	CR - Quayside sampling
Annual Mortality Rate - Females	67	71	66	x	x	66	51	53	52	64	54	62	%	CR - Quayside sampling
LPUE 36 F0	140	180	270	210	180	200	240	120	200	212	195	166	KG/1000ph	NEIFCA MSAR collation
LPUE 36 E9	170	130	180	130	150	140	170	130	180	202	202	177	KG/1000ph	NEIFCA MSAR collation
LPUE 37 E9	110	110	140	100	120	120	110	150	105	115	136	126	KG/1000ph	NEIFCA MSAR collation
LPUE 38 E8	70	80	110	60	70	80	50	140	60	69	67	65	KG/1000ph	NEIFCA MSAR collation
LPUE 38 E9	90	60	60	50	100	110	100	160	70	85	80	89	KG/1000ph	NEIFCA MSAR collation
Economic	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Average Annual Price	12.20	11.79	9.00	9.91	10.28	9.75	10.54	9.72	9.49	12.00	13.18	14.48	£	MMO GCV / Kg
Gross Catch Value	4.95	4.90	4.60	4.40	5.60	5.60	6.10	5.19	4.20	6.30	7.14	7.13	Million	MMO Annual Stats
No. Vessels	171	225	150	168	158	161	159	181	177	193	213	178	#	NEIFCA Effort Survey
No. Employment	376	406	407	391	389	424	406	376	376	432	471	420	#	NEIFCA Effort Survey
Biometric	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Average Carapace Length M (mm)	92	92	94	x	94	96	96	98	95	95	97	96	mm	CR - Quayside sampling
Average Carapace Length F (mm)	91	91	92	x	93	93	97	95	95	94	95	94	mm	CR - Quayside sampling
Max Carapace Length M (mm)	126	116	153	x	127	128	150	162	160	195	156	165	mm	CR - Quayside sampling
Max Carapace Length F (mm)	110	188	127	x	111	122	206	148	170	192	182	162	mm	CR - Quayside sampling
Sex Ratio (% Female)	x	x	x	x	44%	49%	58%	64%	54%	50%	56%	57%	%	CR - Quayside sampling
Proportion Crippled (%)	x	x	x	x	2.2%	1%	5%	5%	7%	5%	5%	4%	%	CR - Quayside sampling
Proportion Berried (F-FB %)	x	x	x	x	x	x	23%	17%	33%	30%	N/A	N/A	%	CR - Quayside sampling

North Eastern IFCA

Edible Crab - Stock Summary 2018

Overview: Reported landings into the major ports within the NEIFCA District (Hartlepool, Whitby, Scarborough, Bridlington) were 3,850 tonnes in 2018, with a first sale value of £7.86 million. A further 2,901 tonnes were landed into Grimsby, the majority of which is thought to have originated from outside the 6NM limit. The fishery currently supports 178 vessels and 420 fishermen (Appendix A).

Changes to management: As of 1st of January 2016 the Minimum Landing Size (MLS) for edible crab caught in the NEIFCA District was increased from 130mm to 140mm. Mandatory escape gaps were also introduced over the course of 2016. These changes in management must be taken into account when comparing pre/post-2016 data.

Sampling Programmes: NEIFCA target the fishery through dedicated surveys, including quayside sampling and offshore surveys. Monthly sampling is undertaken at three key home ports across our jurisdiction, with sampling providing information on size, sex and condition composition. Offshore surveys provide information on capture rates, recruit and pre-recruit composition, individual weights, seasonal and spatial distribution.

Table 1: Sample numbers used in the NEIFCA *C. pagarus* stock assessment.

Year	Number of animals	Number of samples	Sampled weight (kg)
2012	1,158	16	415
2013	4,746	44	2,426
2014	2,794	36	1,186
2015	8,038	82	4,436
2016	7,832	90	4,802
2017	7,523	72	4,773
2018	7,552	88	4,552

Size Composition: The decreasing trend in median size observed during quayside sampling up to 2015 has been halted by the increase in the minimum size to 140mm. The subsequent uplift appears to be more pronounced for males than for females, but appears to have at least stabilised.

Males Females

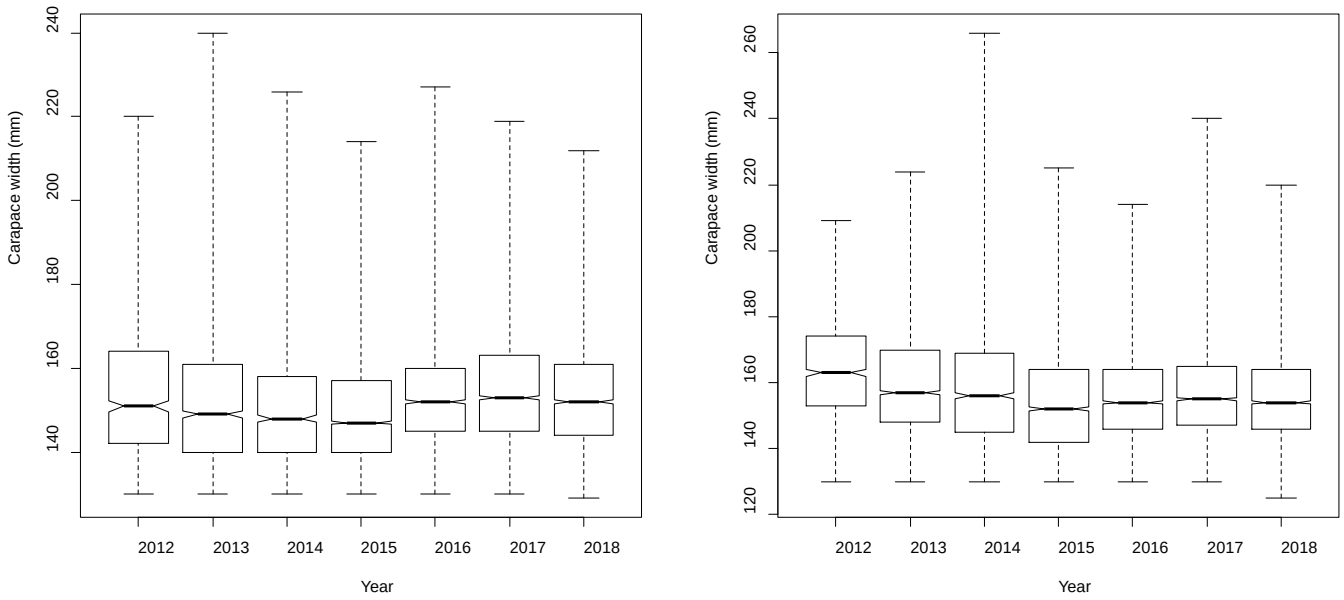

Figure 1. Box and whisker plots of edible crab carapace width from quayside sampling for the period 2012-2018.

Mortality: The increasing trend in annual harvest rates for both sexes up to 2016 has either been reversed or at least stabilised for the time being. Annual harvest rate for males remains at 49%, down from the 52% reported for 2015 & 2016, while the female rate saw a slight reduction in 2018 at 47%.

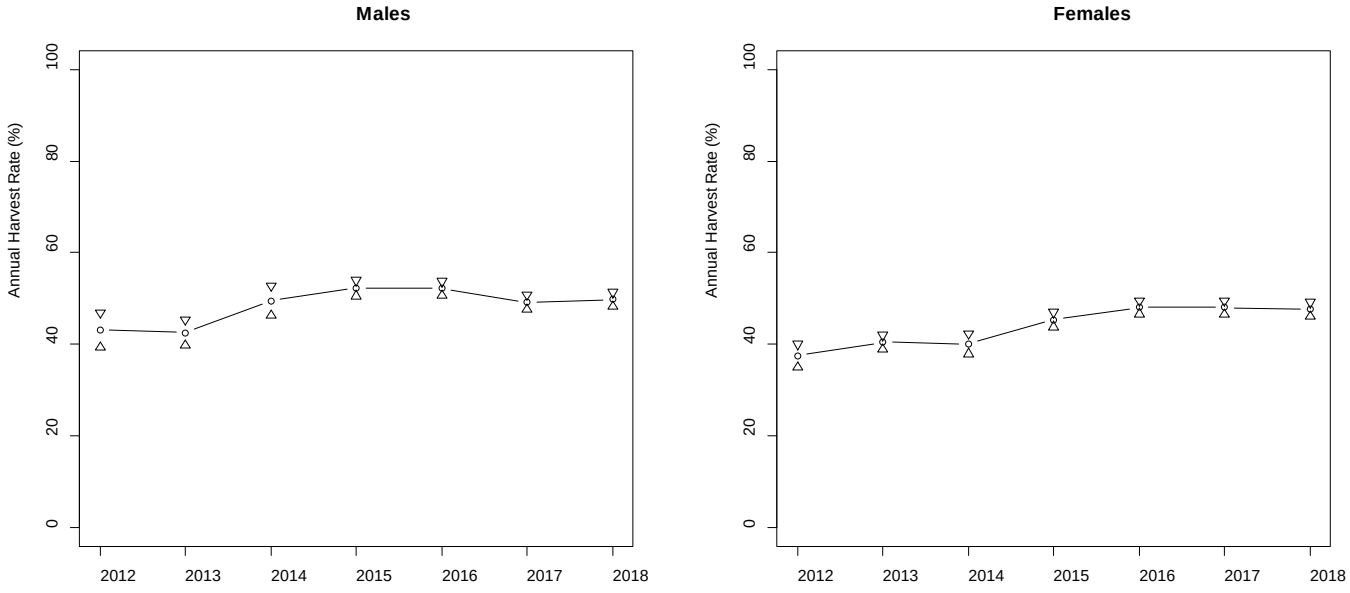

Figure 2. Chapman-Robson derived estimates of annual harvest rate for edible crab from quayside sampling for the period 2012-2018. Includes 95% confidence intervals.

Sustainability: Models were developed in consideration of the Food and Agriculture Organisations (FAO's) recommended MSY target, which identifies that a stock subject to exploitation should retain a minimum of 35 % of the stock's unfished level of spawning stock biomass to remain sustainable (35 % Virgin SpR, Caddy & Mahon 1995[1]). Adapted age-based Thompson – Bell (predictive) models were utilized to assess mortality and survivorship for a cohort through multiple years (FAO methodology, as detailed in Sparre & Venema 1998[2] and King 1995[3]).

Models were developed for both sexes as relative estimates, predicting the impact of fishing exploitation rates (F) ranging from 0 to 1.5 on the spawning stock biomass for a nominal population of 1,000 individuals. The input parameters included a natural mortality of 0.2 with average animal weights identified through quayside sampling. Both sexes are considered to be fully mature at a carapace width of 140mm, with male and female assessments using an age range of 5 to 8. Chapman-Robson derived mortality estimates for 2018 are presented within the models context in relation to MSY estimates (Figure 3).

Table 2. Thompson-Bell model estimates of relative levels required to achieve MSY.

Model	2018 F estimate	Current % of virgin SSB retained	Increase in SSB to achieve 35 % (MSY)	MSY F estimate	Relative decrease in F to achieve MSY
Male	1.00	25%	40%	0.45	55%
Female	0.93	24%	44%	0.43	53%

[1] Caddy JF and Mahon R (1995). Reference points for fisheries management. FAO Fisheries Technical Paper. 347 83pp, Rome, FAO ftp//ftp.fao.org

[2] Sparre UPE and Venema SC (1989) FAO methodology found in, Introduction to tropical fish stock assessment. Part 1 Manual FAO Fish. Tech. Pap. 306:337

[3] King M (1995) FAO methodology found in, Fisheries Biology, assessment and management. Fishing News Books, Blackwell Science Ltd, Oxford UK.

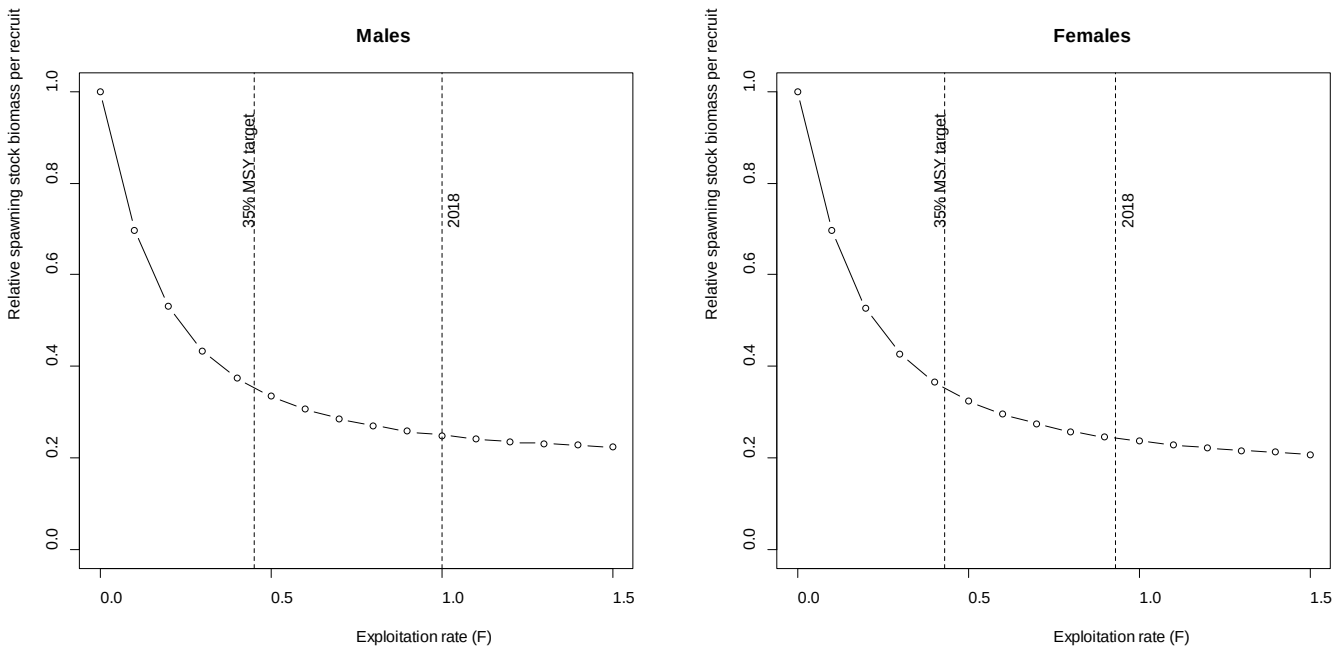

Figure 3. Plots of mortality estimates for 2018 in relation to MSY target derived from Thompson-Bell model.

Conclusion: The status of the crab stock within the NEIFCA district is considered fairly low. Mortality rates are above the level needed to achieve MSY but are below the maximum reference point of 15% Virgin SpR.

Appendix A: The Multiple Indicator Framework (MIF) for *C. pagarus* in the NEIFCA district.

Multiple Indicator Framework													Value Ref	Data Source
Fishery Overview	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Total Landings (NEIFCA)	*1,175*	*791*	*1,144*	*1,563*	*1,350*	*1,730*	*2,226*	*1,695*	*1,818*	*1,599*	*1,394*	*1,594*	Tonnes	NEIFCA DEFRA
MMO Bridlington Landings	*1,679*	*1,260*	*1,423*	*1,755*	*1,576*	*2,284*	*1,849*	*2,134*	*2,053*	*2,485*	*2,045*	*2,563**	Tonnes	MMO Stats
MMO Scarborough Landings	*176*	*139*	*147*	*150*	*187*	*259*	*694*	*754*	*370*	*626*	*562*	*768**	Tonnes	MMO Stats
MMO Whitby Landings	*376*	*211*	*260*	*233*	*230*	*374*	*675*	*494*	*483*	*369*	*418*	*418**	Tonnes	MMO Stats
MMO Hartlepool Landings	*x*	*18*	*9*	*11*	*14*	*19*	*30*	*35*	*29*	*29*	*20*	*101**	Tonnes	MMO Stats
MMO Grimsby Landings	*x*	*484*	*460*	*555*	*483*	*610*	*1,087*	*1,453*	*1,803*	*2,329*	*2,517*	*2,901**	Tonnes	MMO Stats
Total Effort (Hauled)	*3.5*	*3.5*	*3.4*	*3.9*	*4.3*	*4.0*	*4.3*	*3.8*	4.5	4.4	4.3	3.9	Million	NEIFCA DEFRA
Total Effort (Pots Set)	*85*	*91*	*73*	*83*	*74*	*73*	*87*	*85*	*92*	90	*83*	*81*	Thousand	Effort Survey
Q1 Catch Distribution (% of Annual Total)	*16*	*18*	*16*	*15*	*17*	*22*	*8*	*12*	*13*	*15*	*14*	*9*	Q1 %	NEIFCA DEFRA
Q2 Catch Distribution (% of Annual Total)	*24*	*33*	*29*	*30*	*35*	*30*	*33*	*24*	*25*	*26*	*21*	*30*	Q2 %	NEIFCA DEFRA
Q3 Catch Distribution (% of Annual Total)	*29*	*31*	*27*	*32*	*27*	*24*	*41*	*39*	*37*	*40*	*39*	*39*	Q3 %	NEIFCA DEFRA
Q4 Catch Distribution (% of Annual Total)	*31*	*18*	*28*	*23*	*21*	*24*	*18*	*24*	*26*	*26*	*25*	*23*	Q4 %	NEIFCA DEFRA
Primary Reference Points	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Annual Mortality Rate - Males	*x*	*x*	*x*	*x*	*x*	*43*	*43*	*49*	*52*	*52*	*49*	*50*	%	CR - QS sampling
Annual Mortality Rate - Females	*x*	*x*	*x*	*x*	*x*	*38*	*40*	*40*	*45*	*48*	*48*	*48*	%	CR - QS sampling
LPUE 36 F0	*471*	*418*	*813*	*970*	*652*	*919*	*877*	*814*	*857*	*745*	*737*	*806*	KG/1000ph	NEIFCA DEFRA
LPUE 36 E9	*164*	*202*	*177*	*171*	*145*	*256*	*275*	*169*	*157*	*155*	*128*	*207*	KG/1000ph	NEIFCA DEFRA
LPUE 37 E9	*227*	*185*	*233*	*309*	*241*	*262*	*649*	*561*	*295*	*329*	*415*	*397*	KG/1000ph	NEIFCA DEFRA
LPUE 38 E8	*168*	*116*	*342*	*169*	*87*	*91*	*129*	*171*	*73*	*102*	*105*	*81*	KG/1000ph	NEIFCA DEFRA
LPUE 38 E9	*346*	*108*	*76*	*93*	*104*	*140*	*470*	*352*	*334*	*301*	*255*	*234*	KG/1000ph	NEIFCA DEFRA
Economic	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**			
Average Annual Price	*1.00*	*0.88*	*1.01*	*0.98*	*1.07*	*1.13*	*1.13*	*1.14*	*1.14*	*1.23*	*1.52*	**	£	MMO GCV / Kg
Gross Catch Value	*1.18*	*2.23*	*2.42*	*2.75*	*2.83*	*4.29*	*5.16*	*5.75*	*5.63*	*7.41*	*8.63*	**	£ Million	MMO Annual Stats
No. Vessels	*197*	*193*	*205*	*196*	*191*	*194*	*204*	*181*	*177*	*194*	*213*	*178*	#	Effort Survey
No. Employment	*376*	*406*	*407*	*391*	*389*	*424*	*406*	*376*	*376*	*432*	*471*	*420*	#	Effort Survey
Biometric	***2007***	***2008***	***2009***	***2010***	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
Average Carapace Length M (mm)	*x*	*x*	*x*	*x*	*151*	*156*	*153*	*151*	*149*	*154*	*155*	*154*	mm	NEIFCA QS
Average Carapace Length F (mm)	*x*	*x*	*x*	*x*	*159*	*165*	*160*	*158*	*154*	*156*	*157*	*156*	mm	NEIFCA QS
Max Carapace Length M (mm)	*x*	*x*	*x*	*x*	*215*	*220*	*240*	*226*	*214*	*227*	*219*	*212*	mm	NEIFCA QS
Max Carapace Length F (mm)	*x*	*x*	*x*	*x*	*208*	*209*	*224*	*266*	*225*	*214*	*240*	*220*	mm	NEIFCA QS
Sex Ratio (% Female)	*x*	*x*	*x*	*x*	*55*	*65*	*70*	*61*	*51*	*54*	*53*	*52*	%	NEIFCA OS
Proportion Crippled (%)	*x*	*x*	*x*	*x*	*2*	*1*	*4*	*4*	*9*	*8*	*7*	*<1*	%	NEIFCA QS
Proportion Nuns (%)	*x*	*x*	*x*	*x*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	%	NEIFCA QS

*Figure includes velvet crabs – to be updated once national annual fisheries statistics released

**To be updated when national annual fisheries statistics released

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

State of the Fisheries Report 2019

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To present the key findings of the research and provide copies of the 2019 State of the Fisheries report.

B. **Recommendation**

That members note the report and provide feedback.

1. **Background**

1.1 At the last meeting of the Science Advisory Group on 14 March 2019, Officers were asked to evidence the status of fish stocks found within the district, their sustainability and socio-economic importance in order to justify current strategic research priorities and to present the results to the full Authority during the June 2019 meeting.

1.2 It was not possible to give the planned presentation during this meeting due to time constraints, therefore the report is presented to the Science Advisory Group for consideration and discussion.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

North Eastern IFCA

Inshore Fisheries and Conservation Authority




State of the fisheries

2019

This report has been prepared by North Eastern Inshore Fisheries and Conservation Authority with all reasonable care and attention to detail. All information provided is the best available at the time of production.

Date submitted:	01/03/2019
Report compiled by:	TS, JB, AB, CF
Quality control by:	
Approved by & date:	
Version:	1

For any other use of this material please contact the Chief fishery officer through www.ne-ifca.gov.uk or by writing to;

North Eastern IFCA
Town Hall
Bridlington
East Riding of Yorkshire
YO16 4LP

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1. Introduction

This report is aimed to give an overview of the current state of fisheries in the region of the North Eastern IFCA (NEIFCA) district. The primary source of data used was official landing statistics obtained by data requests to the Marine Management Organisation (MMO). These statistics were supplied in two formats:

- By landing port for the period 2008-2017
- By ICES statistical rectangle for the period 2012-2017

Landings by port included data for foreign vessels landing into the ports included in the study. The data was filtered to remove these and only landings associated with UK flag vessels is presented. Incidental landings associated with the gear type categories 'other mobile gears', 'other passive gears' and 'unknown' where also excluded.

A subset from the national port landings data set was selected for the analysis, including:

- Bridlington
- Filey
- Flamborough
- Grimsby
- Hartlepool
- Hornsea
- Hull
- Immingham
- Middlesborough
- Newcastle
- North Shields
- North Sunderland
- Redcar
- Scarborough
- Seaham
- South Shields
- Staithes
- Sunderland
- Whitby
- Withernsea

Although not located within the geographic area of the NEIFCA district, data for Newcastle and North Shields were included due to their proximity and the potential to include landings captured within NEIFCA jurisdiction. Although there is potential for landings into ports further up the Northumberland coast (such as Blyth) to have originated from within the NEIFCA district, these have not been included in the analysis. There is also potential for a significant proportion of landings into Grimsby to have been captured outside of the study area. These uncertainties have been reduced by correlating port landings with spatially referenced ICES rectangle landings data.

The data available by ICES rectangle covers a shorter time period than that available by port. A subset of regional ICES rectangles was selected for the study and further distinguished into two categories (Figure 1). 'Inshore' ICES were taken as those 5 rectangles traditionally used within the lobster and crab Multiple Indicator Frameworks (MIF) as an indication of landings originating from within the NEIFCA district. While the proportion of the area of each rectangle falling within NEIFCA jurisdiction varies, this constitutes the best available spatially referenced data.

A selection of 'Offshore' ICES were selected based on Officers knowledge of areas utilised or potentially utilised by local vessels. This does not, however, constitute an exhaustive list of ICES rectangles utilised by vessels operating from ports within the NEIFCA district.

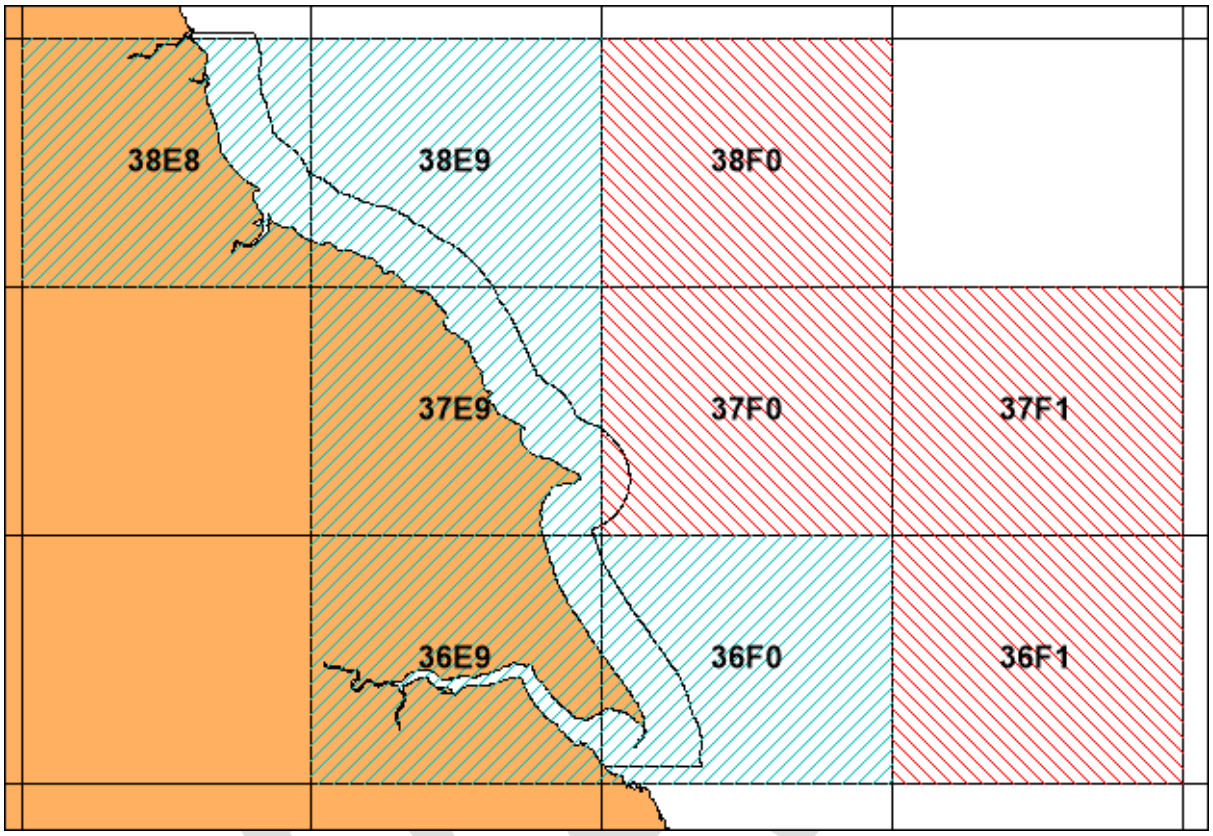

Figure 1. Inshore (Blue) and Offshore (Red) ICES statistical rectangles used for the purposes of this study.

2. Regional fisheries

The primary gear types utilised by regional fisheries are pots and traps, demersal trawl/seines and dredges (Figure 2). Port landings from pots and traps have increased significantly from 3,248 tonnes in 2008 to 8,243 tonnes in 2017. Dredge caught landings between 2008 and 2010 did not exceed 400 tonnes but have since increased as well, with 2,665 tonnes landed in 2017. Average annual demersal trawl/seine landings are in the region of 5,000 tonnes.

Data by ICES rectangles since 2012 further highlights the increase in landings from pots and traps, with both inshore and offshore landings have increasing by c. 1,600 and 1,100 tonnes respectively (Figure 3 & Figure 4). Data for dredging follows the same trend for both inshore and offshore ICES, with an increase in landings up to 2015. Landings fell in 2016, coinciding with the introduction of dredge management within 6NM, but have subsequently increased again albeit not to pre-management levels. Despite a noticeable increase in offshore landings in 2013, demersal trawl/seine landings have decreased by 68% for inshore ICES and 61% for offshore ICES when compared to 2012 levels.

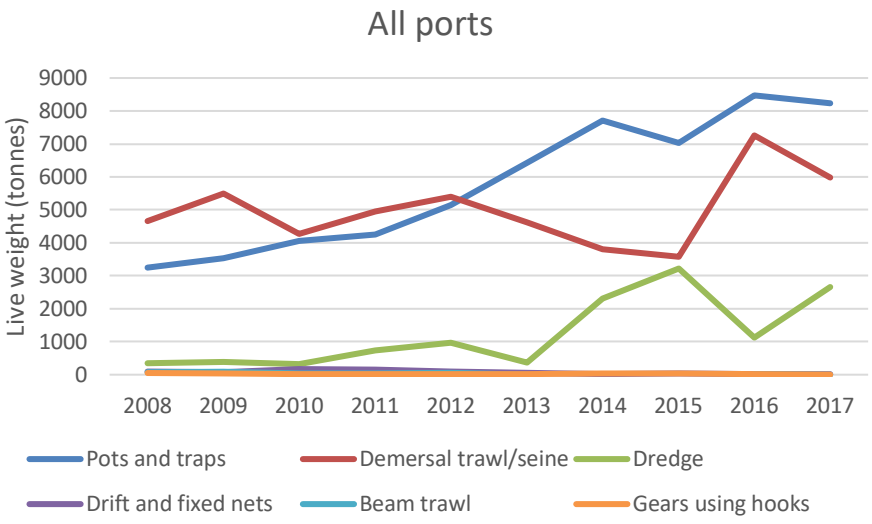

Figure 2. Landings for all ports by gear type for the period 2008-2017.

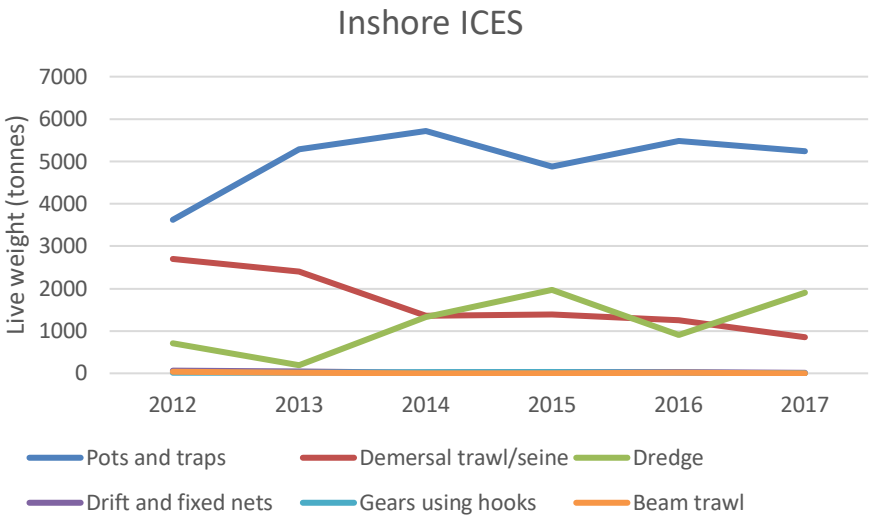

Figure 3. Landings from inshore ICES by gear type for the period 2012-2017.

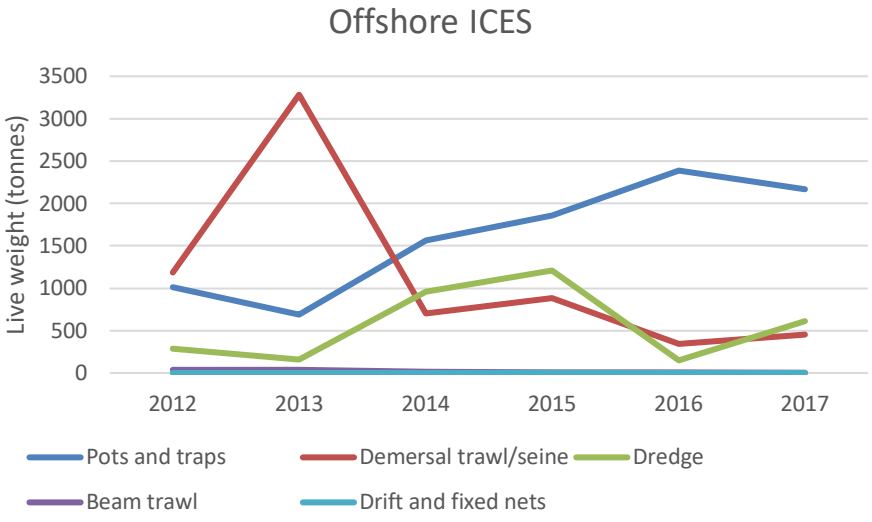

Figure 4. Landings from inshore ICES by gear type for the period 2012-2017.

A further valuable source of information are the sightings of fishing vessels made by North Eastern Guardian III as it transits the district. By standardising these sightings against patrol vessel effort, a picture of the spatial distribution and intensity of active fishing effort can be produced. Figure 5 shows the aggregated sightings by fishing method made from NEGIII for the period 2011-2016. Potting is clearly the most ubiquitous fishing method undertaken within the district. Its distribution is widespread and intensity is highest along the Holderness Coast.

Dredging sightings includes data from before the current management regime was introduced in 2015. The grounds within the district are focussed in the area between Whitby and Filey, extending seaward from around the 3NM line, although intensity is highest beyond 6NM between Scarborough and Flamborough Head.

Trawling is characterised by two distinct fisheries. North east of the Tees estuary, the edge of the Farne Deeps *Nephrops* fishery operates primarily on muddy ground. Trawling also occurs along the North Yorkshire coast from Staithes to Flamborough Head.

Netting is known to occur throughout the district, with observed concentrations around the River Wear, Tees bay and inshore along the North Yorkshire coast. Long lining has been observed around Whitby but is known to occur down to Flamborough Head at low intensity. Long lining is also known to have been carried out historically in the Humber Estuary.

It is not possible to disaggregate commercial and recreational angling sightings within the data. Fishing with rod and line occurs throughout the district at low intensity.

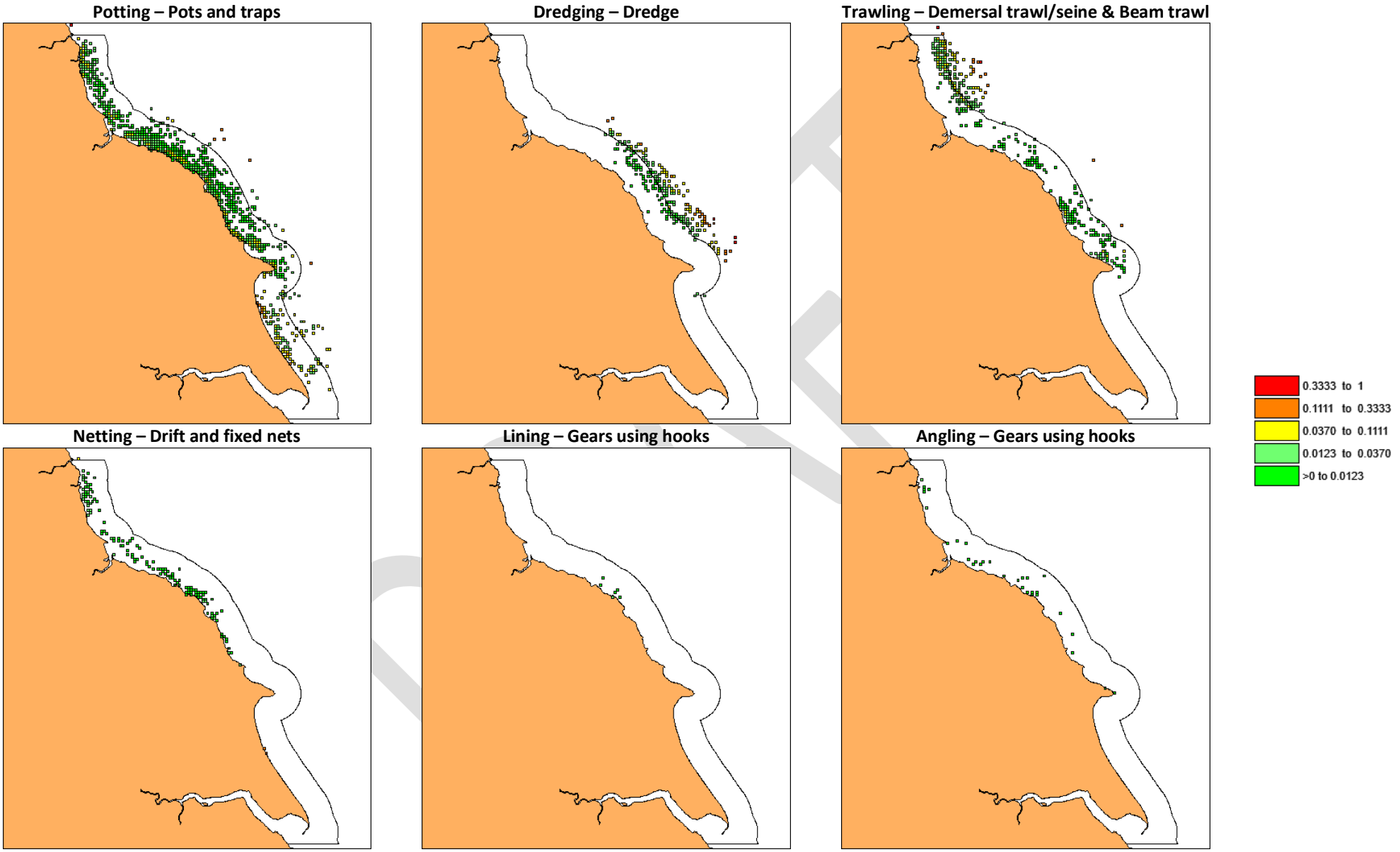

Figure 5. Standardised effort sightings by gear type for the period 2011-2016 with associated gear types from data utilised in the current study.

3. Pots and traps

The value of landings from the potting fleet has increased in line with landings (Figure 6) and totalled over £23 million in 2017. The continued increase in landings from pots and traps can be almost entirely attributed to increased landings of edible crabs into ports in the District, which have increased by 143% since 2009 (Figure 7). Lobster landings have increased by 55% since 2008, with 997 tonnes landed in 2017.

Since 2013 whelk landings have exceeded lobster landings, increasing by 287% since 2008 (Figure 7). Total whelk landings for 2017 were 1,262 tonnes while the combined total attributed to ICES rectangles in the current study for the same year were 704 tonnes, 87% of which were captured in the Holderness offshore fishery in either 36F0 or 36F1. Landings reported directly to NEIFCA for 2017 totalled 105 tonnes.

Bridlington remains the largest port in terms of landings (Figure 8), with 3,231 tonnes landed in 2017. The majority of landings into Bridlington are edible crabs while whelk landings have exceed lobster landings since 2010 (Figure 9). Landings into Grimsby were relatively stable before 2012 and have remained so for lobsters. Whelk and edible crab landings however have increased significantly (Figure 10). Edible crab landings into Grimsby between 2009 and 2017 have increased by 452%. It is understood that the majority of landings into Grimsby originate from outside the District.

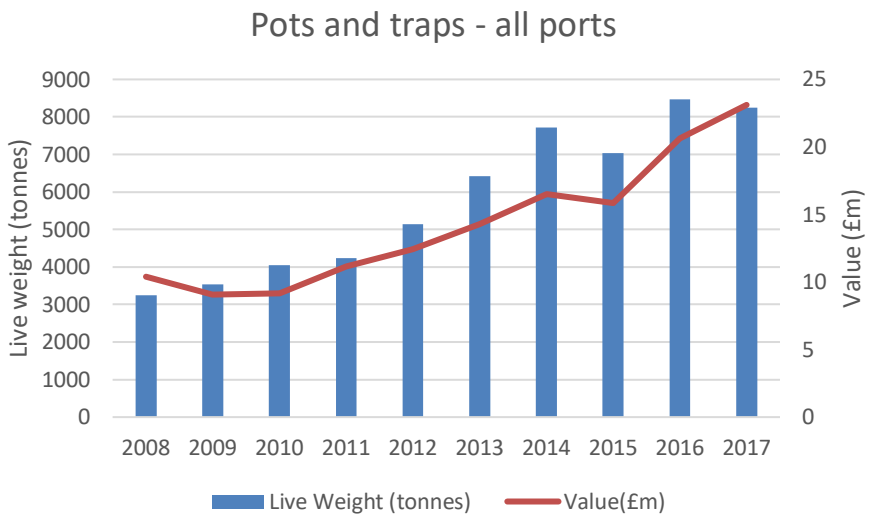

Figure 6. Landings into all ports captured by pots and traps for the period 2008-2017 and their first sale value.

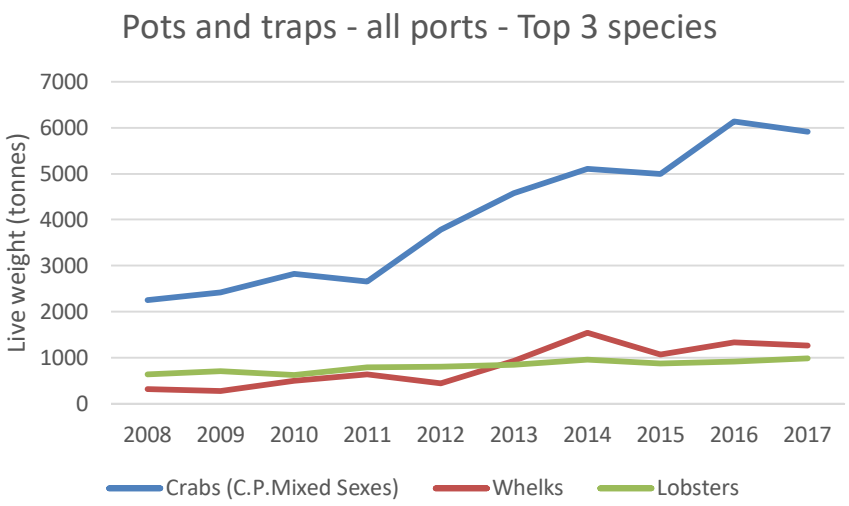

Figure 7. Landings into all ports captured by pots and traps for the period 2008-2017 and their first sale value. N.B. Live weight for crabs in 2008 includes values for both edible (*Cancer pagurus*) and velvet (*Necora puber*) crabs. 2009 velvet crab landings were 78 tonnes and have decreased over time to 26 tonnes in 2017.

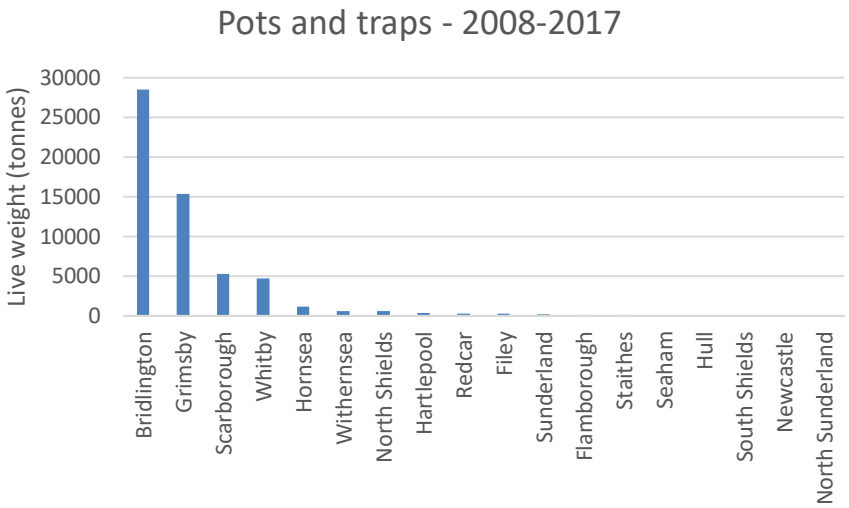

Figure 8. Aggregated landings for the period 2008-2017 from pots and traps into all ports.

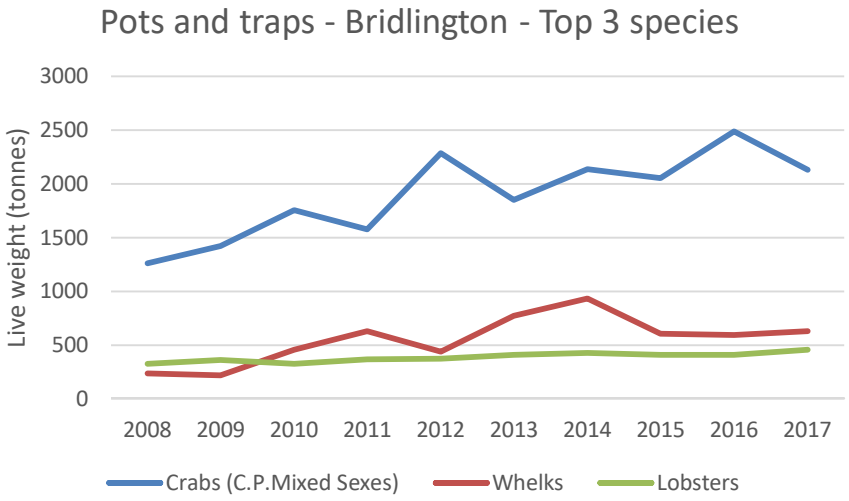

Figure 9. Landings of edible crabs, lobsters and whelks into Bridlington captured by pots and traps for the period 2008-2017. N.B. Live weight for crabs in 2008 includes values for both edible (*Cancer pagurus*) and velvet (*Necora puber*) crabs. Velvet crab landings between 2009 and 2017 range between 12 and 47 tonnes.

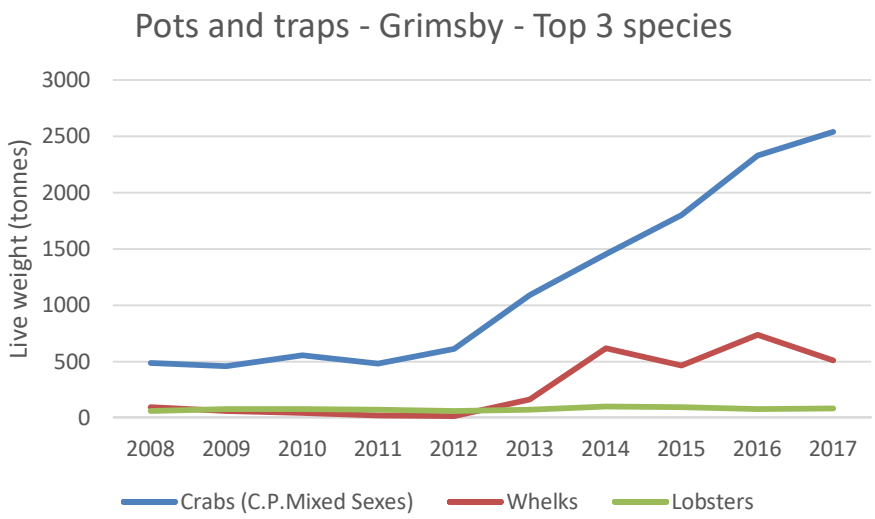

Figure 10. Landings of edible crabs, lobsters and whelks into Grimsby captured by pots and traps for the period 2008-2017.
N.B. Live weight for crabs in 2008 includes values for both edible (*Cancer pagurus*) and velvet (*Necora puber*) crabs. Velvet crab landings between 2009 and 2017 range between 1 and 37 tonnes.

Landings of crab into Scarborough rose significantly between 2012 and 2014, before a sharp decrease in 2015 (Figure 11) coinciding with the influx of scallop dredgers in North Yorkshire (see Figure 14, Section 4). Crab landings recovered somewhat in 2016 and have stabilised since then. Lobster landings also decreased in 2015, although to a lesser extent than crab. There has been an overall increasing trend in the volume of lobster landings, which have increased by 209% since 2008. Whelks were not a feature of the landings in to Scarborough during the study period until 2017 when 125 tonnes were landed. Periodic landings have been observed by Officers on the quayside since then and it is believed that an offshore fishery may be developing.

Whitby crab landings peaked in 2013 at 674 tonnes, but have since demonstrated a decreasing trend with landings of 417 tonnes in 2017 (Figure 12). Lobster landings follow the same increasing trend as other ports with a 58% increase since 2008.

Data for landings by ICES rectangles highlights the growth in the offshore fisheries, particularly crab, off Flamborough Head (37F0) and the Holderness offshore grounds (36F0 and 36F1) (Figure 13).

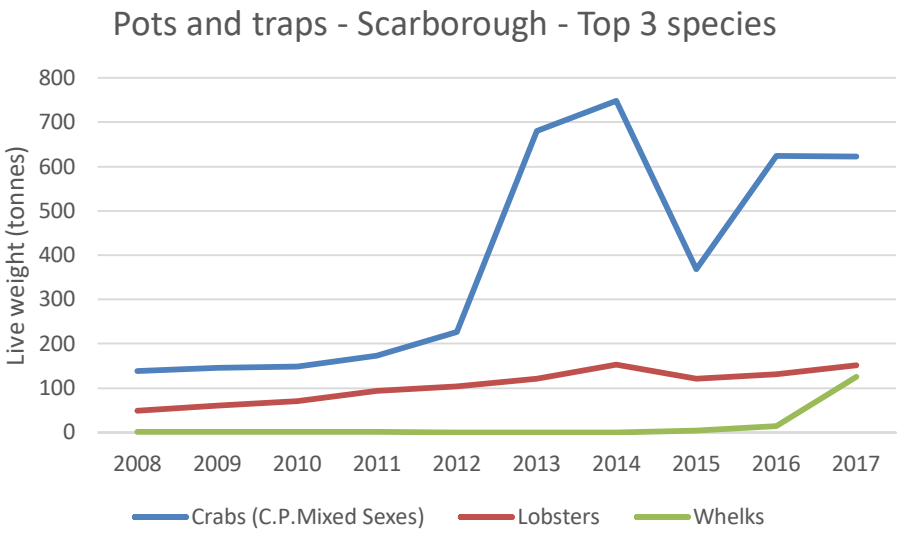

Figure 11. Landings of edible crabs, lobsters and whelks into Scarborough captured by pots and traps for the period 2008-2017.
N.B. Live weight for crabs in 2008 includes values for both edible (*Cancer pagurus*) and velvet (*Necora puber*) crabs. Velvet crab landings between 2009 and 2017 range between 0 and 0.4 tonnes.

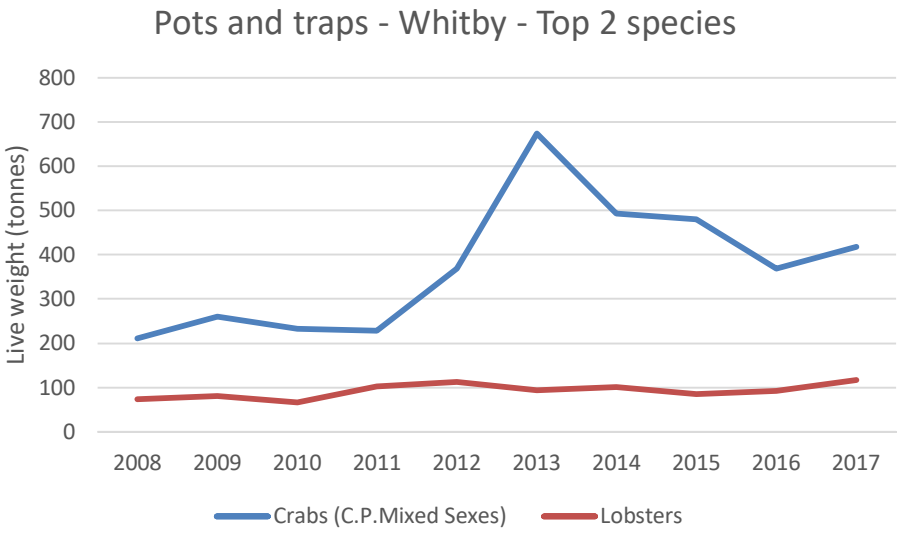

Figure 12. Landings of edible crabs and lobsters into Whitby captured by pots and traps for the period 2008-2017.
N.B. Live weight for crabs in 2008 includes values for both edible (*Cancer pagurus*) and velvet (*Necora puber*) crabs. Velvet crab landings between 2009 and 2017 range between 0 and 6.5 tonnes.

A **B**

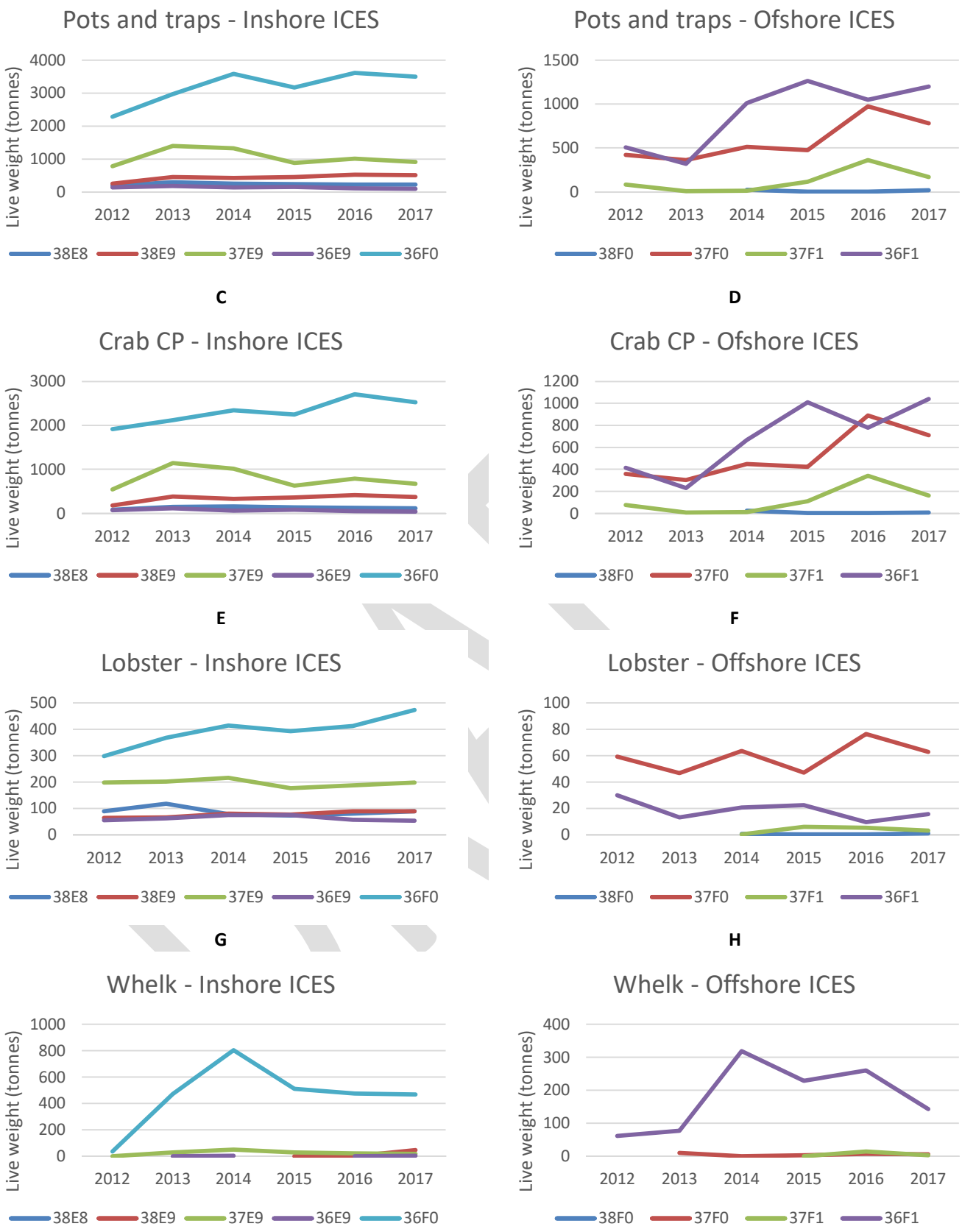

Figure 13. Landings from pots and traps by ICES rectangles included in the study for the period 2012-2017. Data is separated into inshore and offshore ICES including: aggregated landings (A & B), edible crab (C & D), lobsters (E & F) and whelks (G & H).

4. Dredge

A more detailed analysis of the development of the regional dredge fishery can be found in the 2018/19 Annual Research Report. Dredge landings peaked in 2012 with an increase in scalloping effort in the south of the District before the more significant expansion of the North Yorkshire fishery in 2014/15 (Figure 14). Landings into ports for 2017 represent a 652% increase compared to 2008 and were valued at £6.8 million. King scallops account for 99.5% of the landed species.

Scarborough landings peaked at 2,021 tonnes in 2015 before falling to 578 tonnes in 2016 (Figure 15). This fall was also reflected in the data for ICES rectangle 37E9 (Figure 16A), which encompasses the North Yorkshire grounds. It is believed that the introduction of dredge management measures within 6NM in 2015 is the driver behind the reduction in landings, highlighting the value of the grounds within NEIFCA jurisdiction.

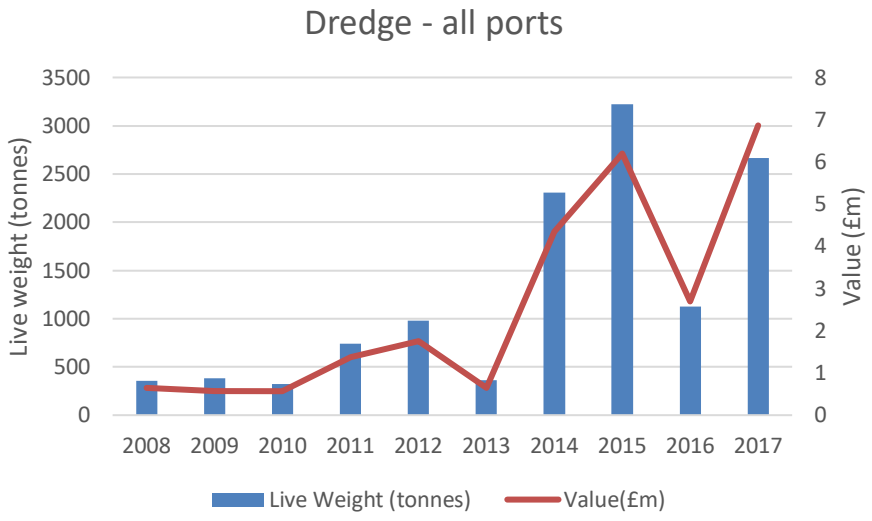

Figure 14. Landings into all ports captured by dredge for the period 2008-2017 and their first sale value.

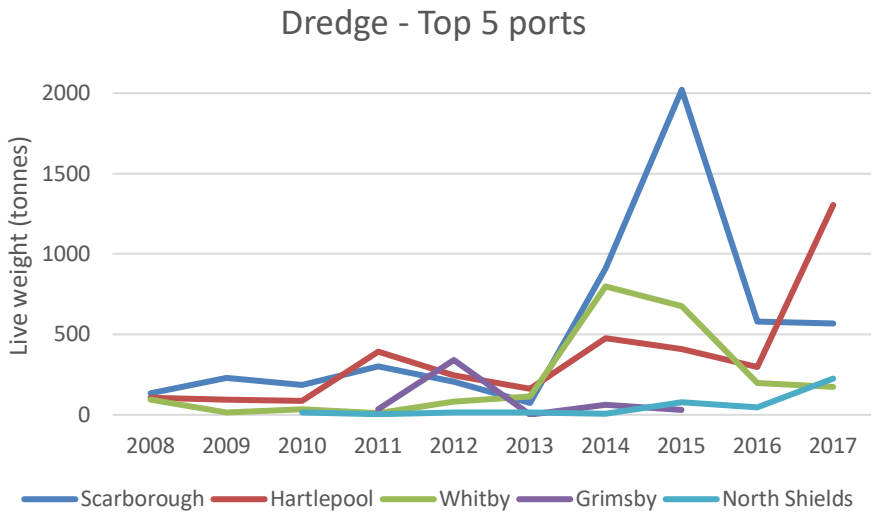

Figure 15. Landings into the top 5 ports captured by dredge for the period 2008-2017.

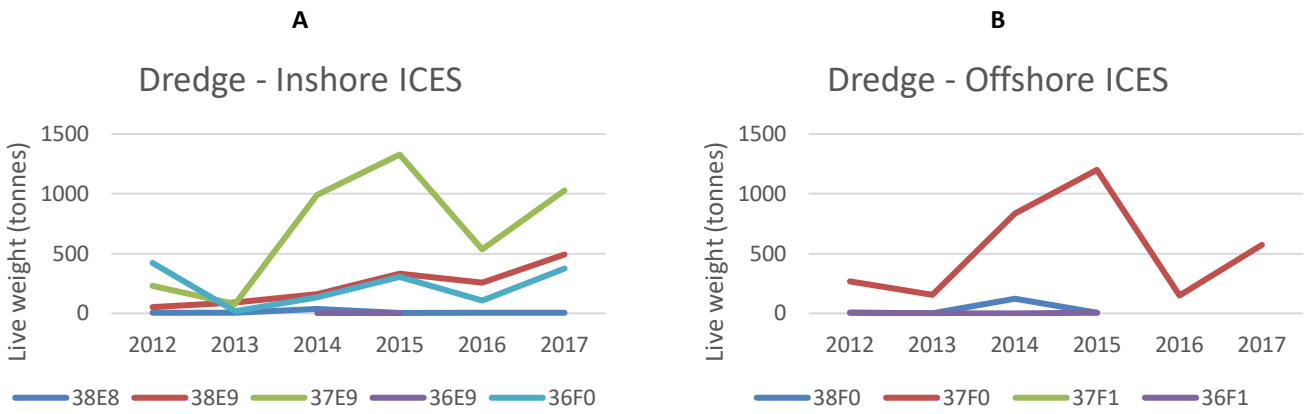

Figure 16. Dredge captured landings by both inshore (A) and offshore (B) ICES rectangles for the period 2012-2017.

5. Demersal trawl/seine

While landings reported under this category could be captured by either demersal (otter) trawl or seine nets, no significant seine net fishery is known to be operating. It is assumed that landings relate specifically to otter trawling. Landings have fluctuated year on year, with average annual landings of 5,000 tonnes (Figure 17). In 2017, the value of trawl landings made into ports was £12.5 million.

The two ports with the highest cumulative landings were North Shields and Grimsby (Figure 18), typically for *Nephrops* and cod respectively (Figure 18 and Figure 19). The increase in regional landings in 2016 can be attributed to cod landed into Grimsby in that year. Other species typically landed in the trawl fishery include whiting, plaice and haddock. There has been a decreasing trend in the volume of these species landed into the district by trawl since 2008 (Figure 21).

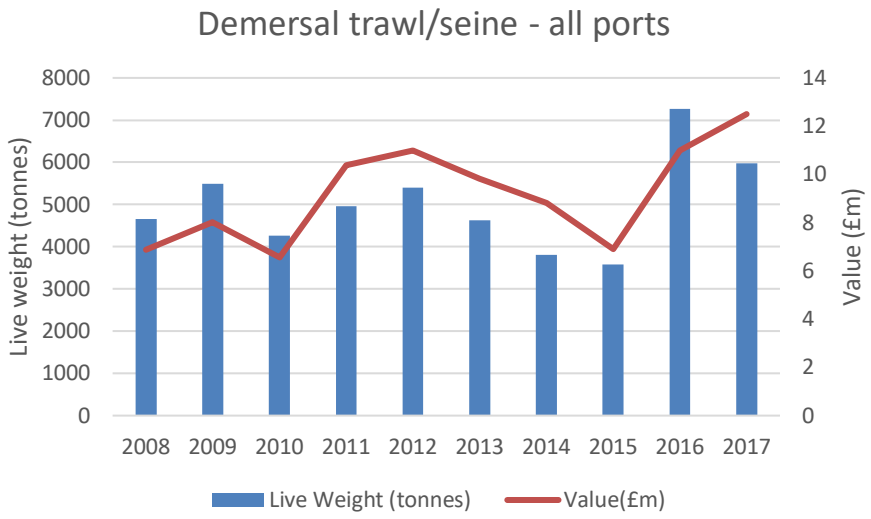

Figure 17. Landings into all ports captured by dredge for the period 2008-2017 and their first sale value.

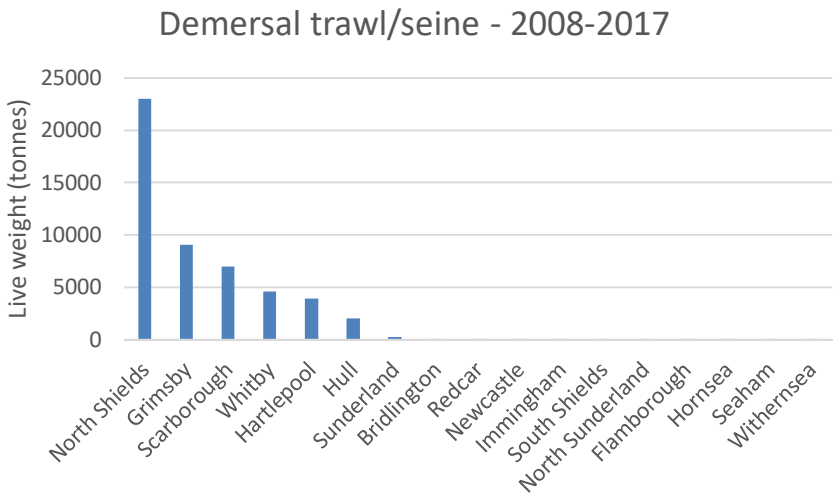

Figure 18. Combined landings into ports captured by demersal trawl/seine during the period 2008-2017.

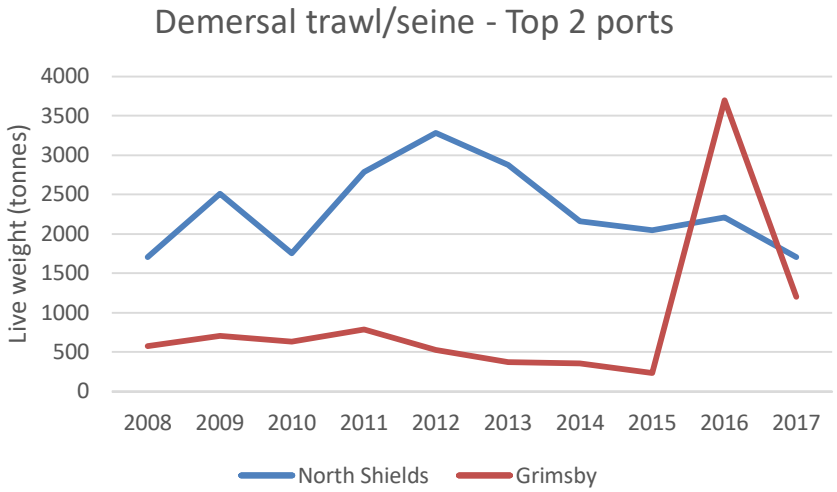

Figure 19.Landings into North Shields and Grimsby captured by demersal trawl/seine for the period 2008-2017.

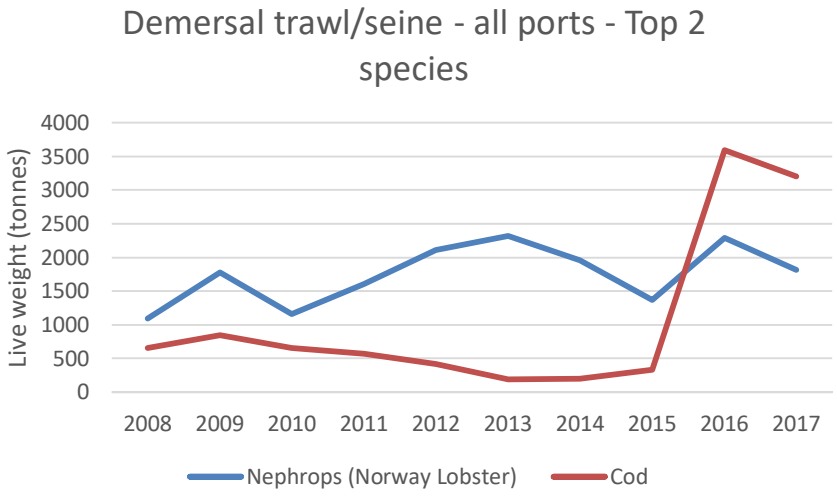

Figure 20. Landings of *Nephrops* and cod into all ports captured by demersal trawl/seine for the period 2008-2017.

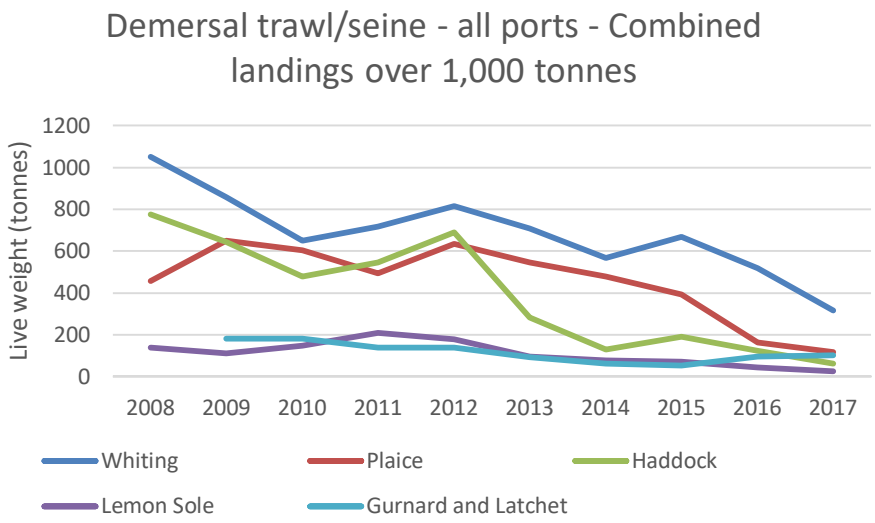

Figure 21. Significant landings into all ports (combined landings of over 1,000 tonnes) of species captured by demersal trawl/seine for the period 2008-2017.
Excludes *Nephrops* and cod which are displayed in Figure 18.

Landings into the other main ports highlight the decline of the Whitby trawl fleet, with landings falling from 1,324 tonnes in 2008 to only 23 tonnes in 2017 (Figure 22). Hartlepool landings have remained relatively stable over the study period and now consist almost entirely of *Nephrops* and whiting (Figure 23). Landings into Scarborough have been bolstered by an increase in *Nephrops* landings in recent years, despite a decreasing trend for other species (Figure 24).

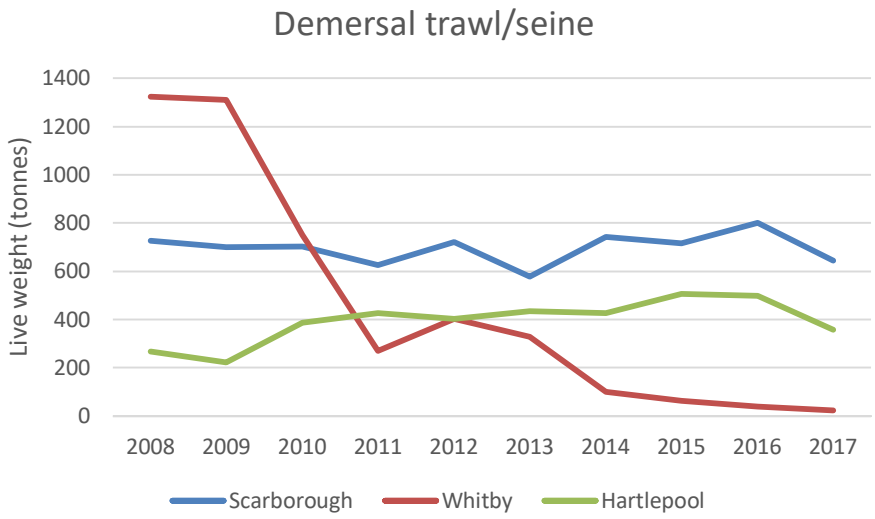

Figure 22. Landings into Scarborough, Whitby and Hartlepool captured by demersal trawl/seine for the period 2008-2017.

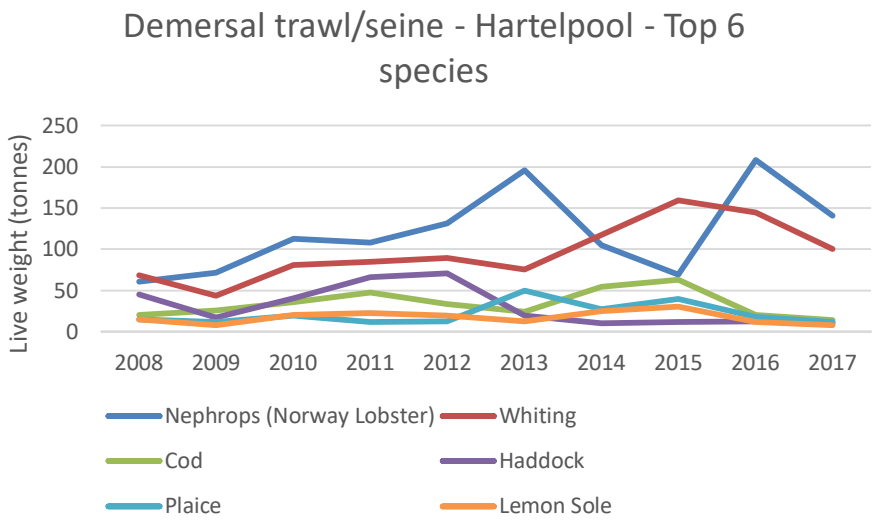

Figure 23. Top six species captured by demersal trawl/seine landed into Hartlepool for the period 2008-2017.

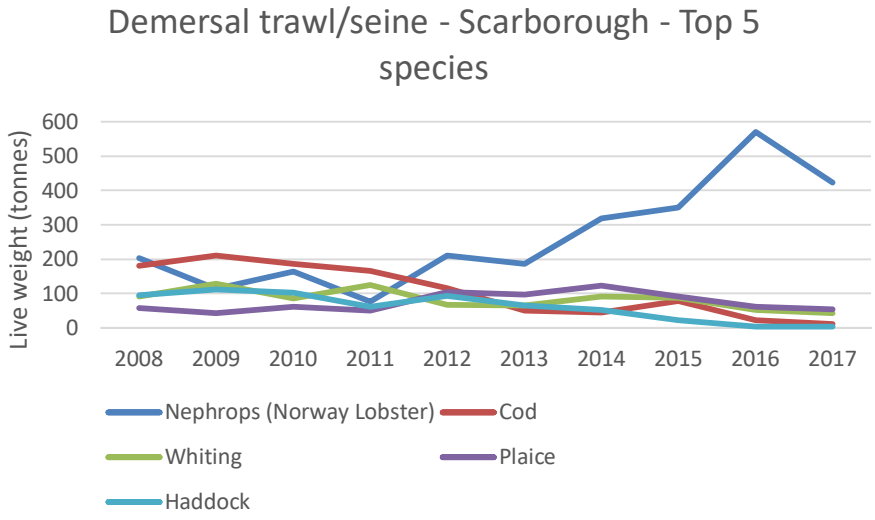

Figure 24. Top five species captured by demersal trawl/seine landed into Scarborough for the period 2008-2017

Data for the inshore ICES rectangles highlight declines in landings for 38E8 and 38E9 (Figure 25). Catches here consist almost entirely of *Nephrops* and whiting (Figure 26 & Figure 27). A significant peak in landings in 2013 from 37E9 can be seen in the data for the offshore ICES (Figure 28). This is attributed to significant landings of herring (1,343 tonnes) and sand eels (1,212 tonnes).While these were captured by UK vessels, it is not reflected in the port data and must therefore have been landed elsewhere.

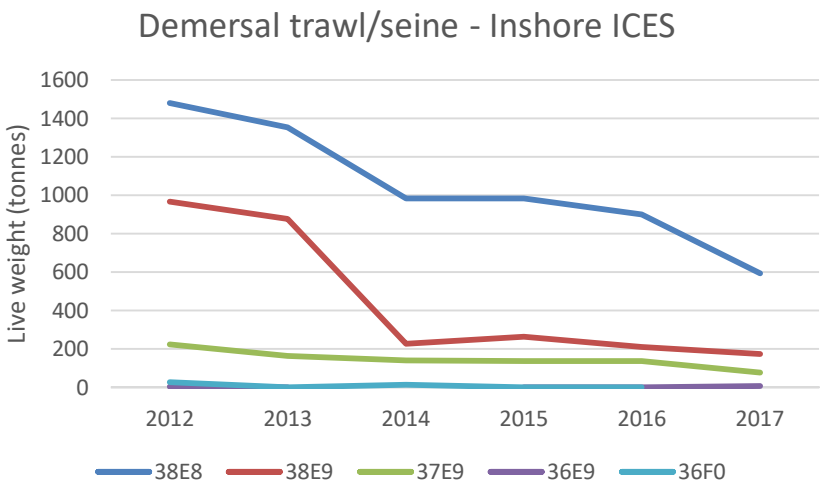

Figure 25. Landings from inshore ICES rectangles captured by demersal trawl/seine for the period 2012-2017.

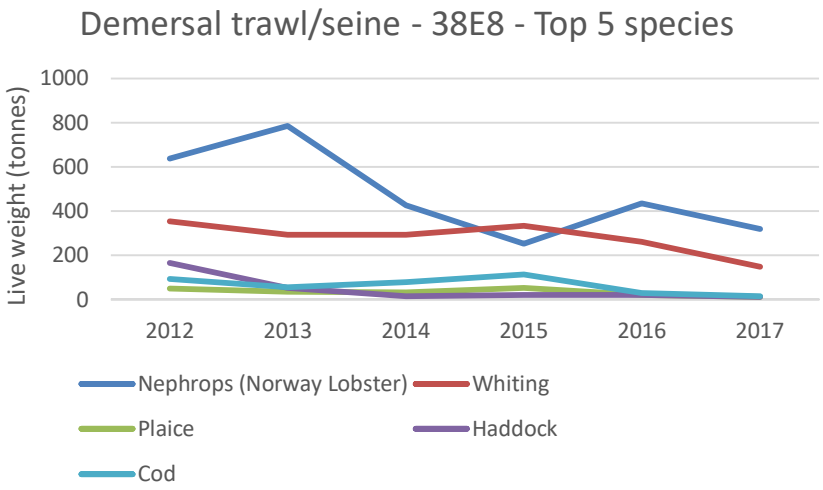

Figure 26. Top five species captured by demersal trawl/seine and landed from ICES rectangle 38E8 for the period 2012-2017.

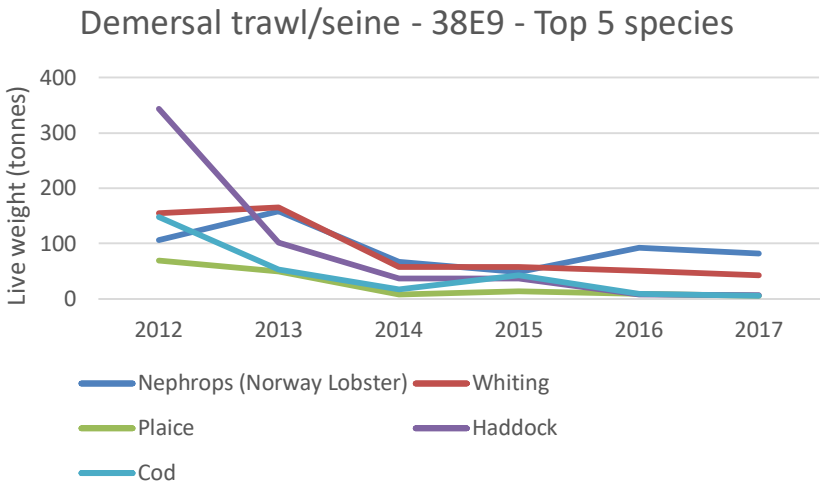

Figure 27. Top five species captured by demersal trawl/seine and landed from ICES rectangle 38E9 for the period 2012-2017.

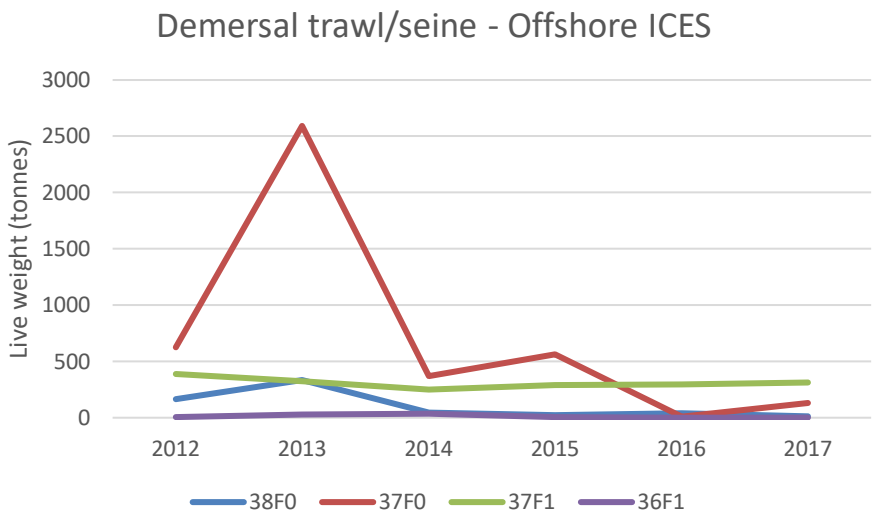

Figure 28. Landings from offshore ICES rectangles captured by demersal trawl/seine for the period 2012-2017.

6. Drift and fixed nets

Landings from nets peaked in 2010 at 170 tonnes but has since reduced to less than 16 tonnes in 2017 (Figure 29). The net fishery is primarily targeted at cod, which accounts for over 55% of landings. Other fin fish species landed include whiting, pollack, turbot, bass, sole and ling. While the data contains landings for edible crab, lobsters and whelks, this is thought to be a reporting anomaly where landings have been attributed to nets rather than pots (Figure 30).

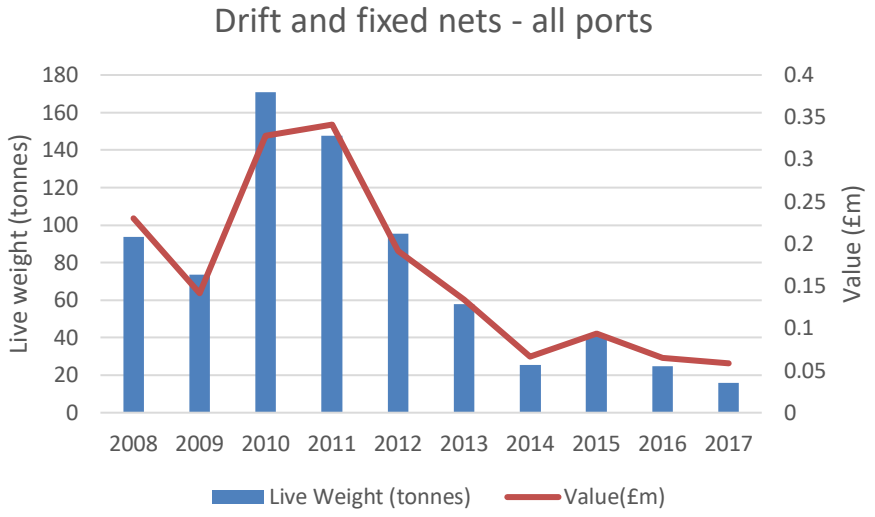

Figure 29. Landings into all ports captured by drift and fixed nets for the period 2008-2017 and their first sale value.

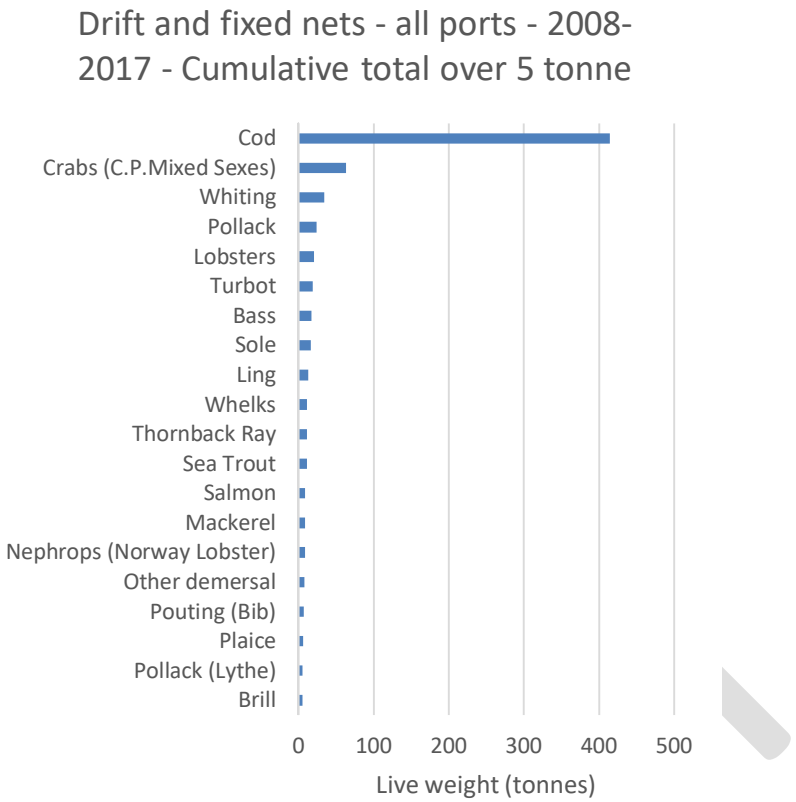

Figure 30. Landings of species with a cumulative total over 5 tonnes captured by drift and fixed nets for the period 2008-2017.

The ports with the highest cumulative landings over the study period were Whitby and Scarborough (Figure 31). Both ports follow the same decreasing trend in landings over time with a modest uplift in 2015/2016 (Figure 32). Effort is restricted to the inshore ICES rectangles, primarily 37E9 and 38E8 (Figure 33). It is likely that the availability of cod quota for small vessels who normally fish with pots is the limiting factor controlling netting effort.

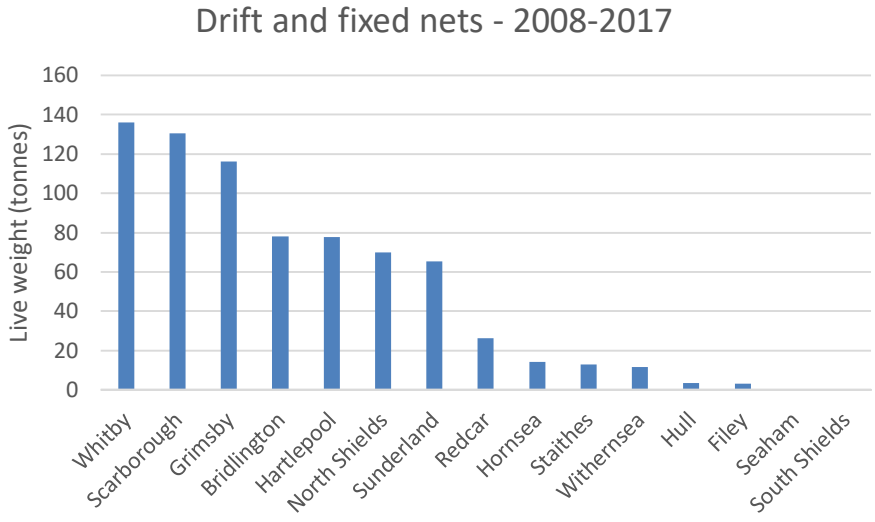

Figure 31. Combined landings into ports captured by drift and fixed nets for the period 2008-2017.

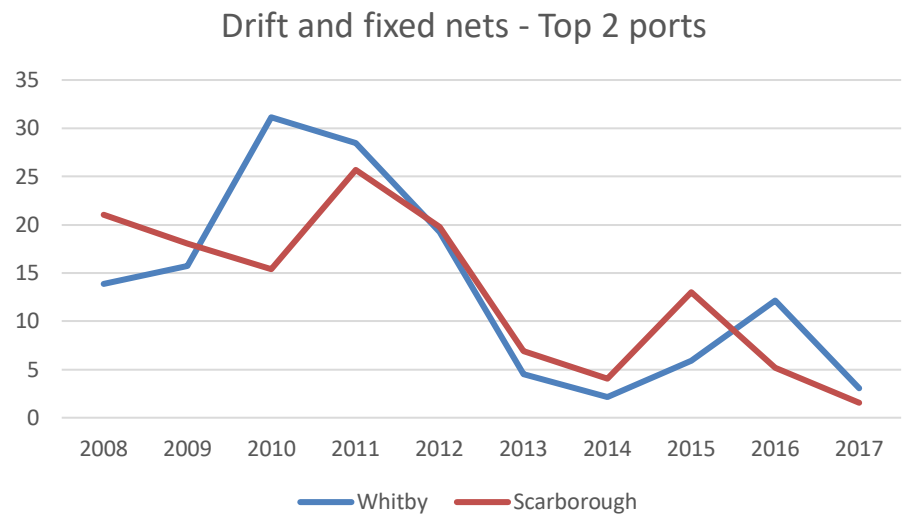

Figure 32. Landings into Whitby and Scarborough captured by drift and fixed nets for the period 2008-2017.

A **B**

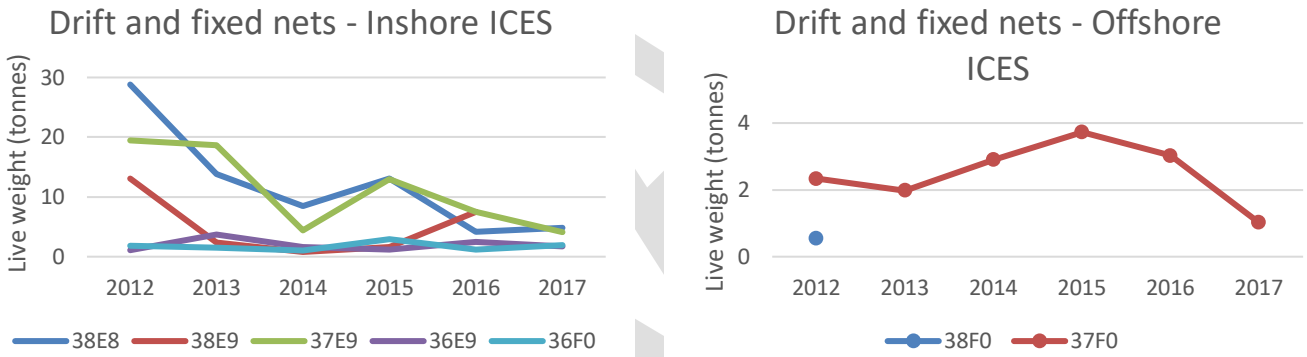

Figure 33. Landings from inshore (A) and offshore (B) ICES rectangles captured by drift and fixed nets for the period 2012-2017.

7. Beam trawl

Beam trawl landings were sporadic over the study period (Figure 34). Landings of brown shrimps into Grimsby between 2008 and 2011 account for almost 73% of all beam trawl landings into ports over the study period (Figure 35). The only other significant landings consisted of *Nephrops* and plaice into Scarborough and Hartlepool in 2012.

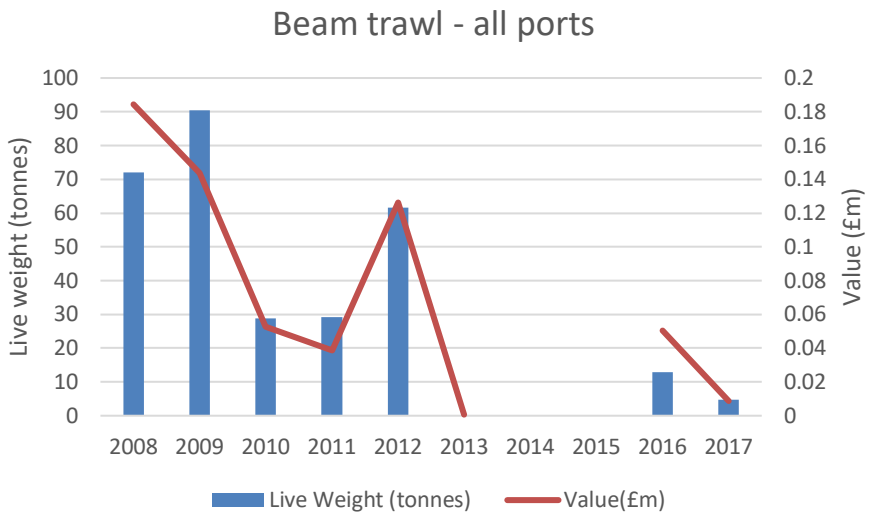

Figure 34. Landings into all ports captured by beam trawl for the period 2008-2017 and their first sale value.

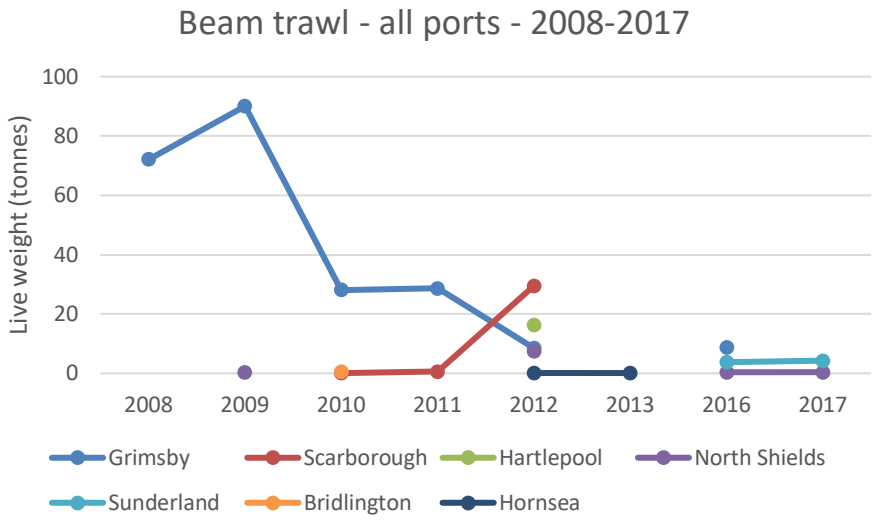

Figure 35. Landings by port captured by beam trawl for the period 2008-2017

8. Gears using hooks

The primary method employed for capture with hooks is thought to be long lining. Landings into the district are sporadic and typically range between 10 and 40 tonnes (Figure 36). Species captured include cod, mackerel and whiting (Figure 37) with incidental capture of other species. Grimsby had the highest cumulative landings (Figure 38) correlating with cod captures from 36F0 (Figure 39), likely to have originated from within the Humber Estuary. Landings into Scarborough and Whitby consist almost exclusively of cod. There have been no significant landings into Scarborough since 2012. As with nets, the availability of quota is likely inhibiting the use of this gear type.

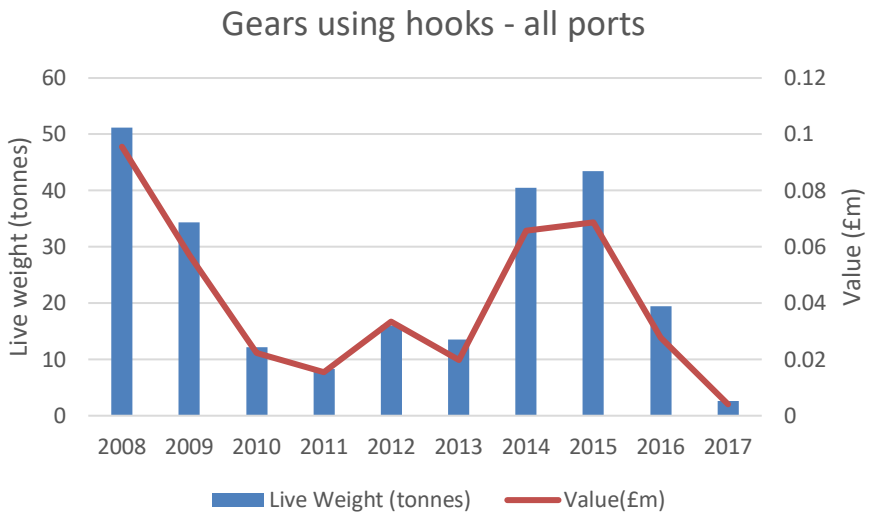

Figure 36. Landings into all ports captured by gears using hooks for the period 2008-2017 and their first sale value.

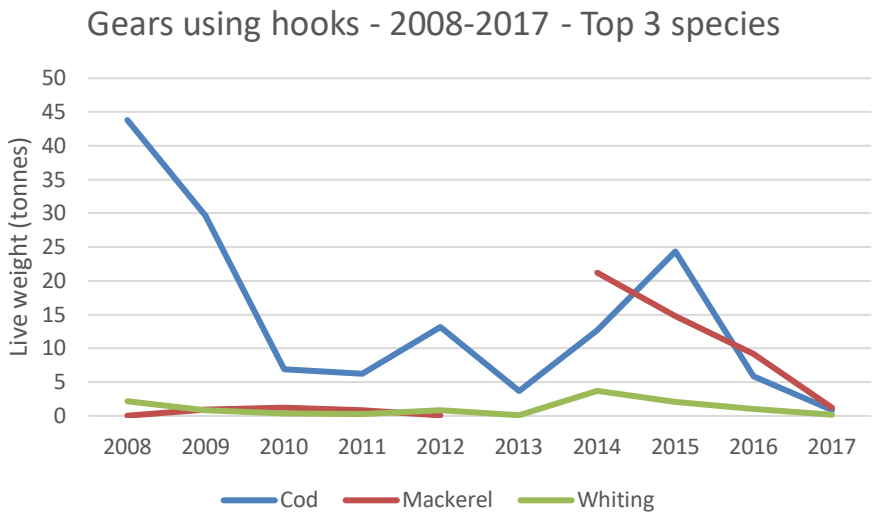

Figure 37. Landings of the top three species landed into ports captured by gears using hooks for the period 2008-2017.

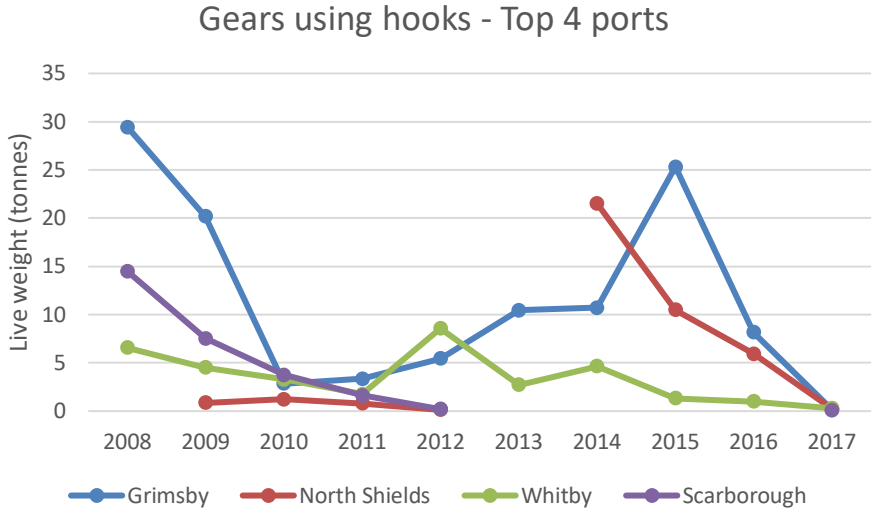

Figure 38. Landings captured by gears using hooks into the top four ports for the period 2008-2017.

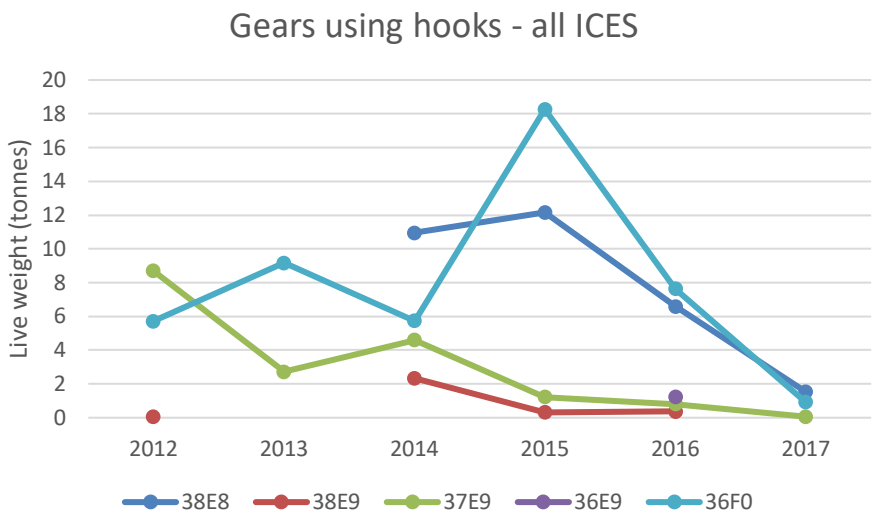

Figure 39. Landings captured by gears using hooks by ICES rectangle for the period 2012-2017.

9. State of the Fisheries

Research and evidence priorities for NEIFCA continue to be lobsters, edible crabs and scallops. The most recent assessments of these fisheries are presented in the 2018/19 Annual Research Report and 2018/19 Scallop Dredge Fishery Report.

Both NEIFCA and Cefas assessments consider the status of the lobster stock to be low and not reaching targets for MSY. NEIFCA data for 2017 suggests that the introduction of mandatory escape gaps in all pots is having a positive impact, reversing the long term trend of increasing harvest rate and reducing mortality estimates towards sustainable levels.

Both NEIFCA and Cefas assessments consider the status of the Edible crab stock to be fairly low. Mortality rates are considered to be high, around the maximum reference point limit for both males and females. It is thought that the increase in the landings size to 140mm and the introduction of escape gaps has contributed to the stabilisation of harvest rates within the district and the impact of these measures will continue to be monitored.

In addition to research on the local scallop fishery, Cefas have begun data collection in order to carry out the first stock assessment of scallops in the North Sea. NEIFCA has benefitted from ongoing dialogue and support from Cefas during the development of the dredge fishery and its assessment. Data collected is shared with Cefas to help improve the evidence base for any future assessments.

The status of the whelk and velvet crab fisheries are not currently assessed. Officers sit on the recently formed Whelk Working Group which consists of regulators, researchers and stakeholders and aims to address key data deficiencies and identify potential management.

The majority of stocks exploited in the district are assessed at the regional seas level. NEIFCA is situated within ICES subarea 4, division b (central North Sea, IVb, Figure 40), which

extends from the south of the district to near Peterhead in northeast Scotland, and across the North Sea to Denmark.

The Greater North Sea is one of the most productive areas in European waters, with 1,762 Ktonnes of total landings in 2015 (Figure 41). Under the Marine Strategy Framework Directive (MSFD, Descriptor 3 – Commercial fish and shellfish) stocks are assessed against targets for Good Environmental Status (GES). For 54 stocks assessed in 2015, 23 had adequate information available in order to determine GES (Figure 42). For a detailed assessment of marine fish stock status under MSFD see https://www.eea.europa.eu/data-and-maps/indicators/status-of-marine-fish-stocks-3/assessment-1.

The International Council for the Exploration of the Sea (ICES) publishes its advice in November each year to inform annual fisheries negotiations in December. Relevant species information for the North Sea has been provided in Table 1. Links to the original data sources is provided for Members information[1][2].

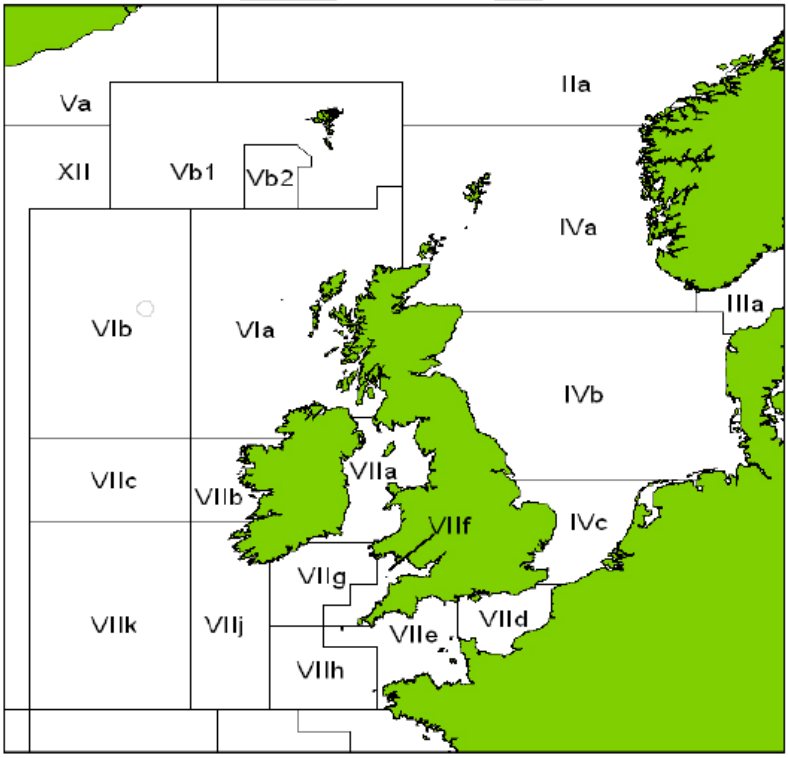

Figure 40. ICES subarea and divisions for waters around the UK.
https://www.gov.scot/publications/scottish-sea-fisheries-statistics-2006/pages/52/

[1] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/GreaterNorthSeaEcoregion_FisheriesOverview.pdf

[2] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.6.pdf

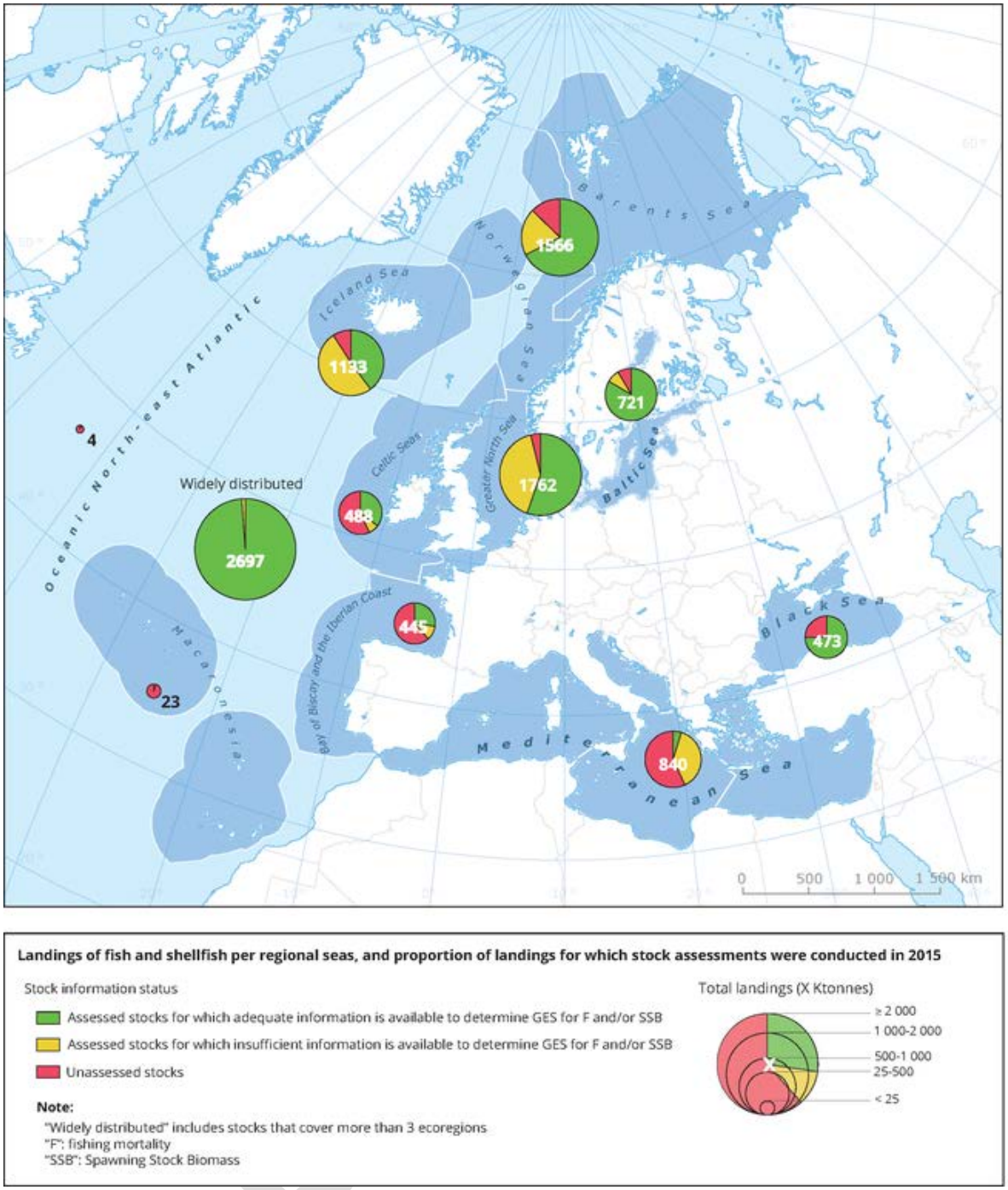

Figure 41. Landings of fish and shellfish per regional sea, and proportion of landings for which stock assessments are available.

This figure shows landings of commercial fish and shellfish per regional sea, and the proportions of landings for which stock assessments were conducted in 2015. A distinction is made between the landings for (1) assessed stocks for which adequate information is available to determine good environmental status (GES) for fishing mortality (F) and/or reproductive capacity (spawning stock biomass (SSB)); (2) assessed stocks for which insufficient information is available to determine GES for F and/or SSB; and (3) unassessed stocks (for further information see EEA CSI032, 2018, Methodology section, on how this distinction is made, and European Commission Decision 2017/848/EU on criteria and methodological standards on GES of marine waters).

https://www.eea.europa.eu/data-and-maps/figures/total-catch-in-ices-and-gfcm-fishing-regions-of-europe-in-4

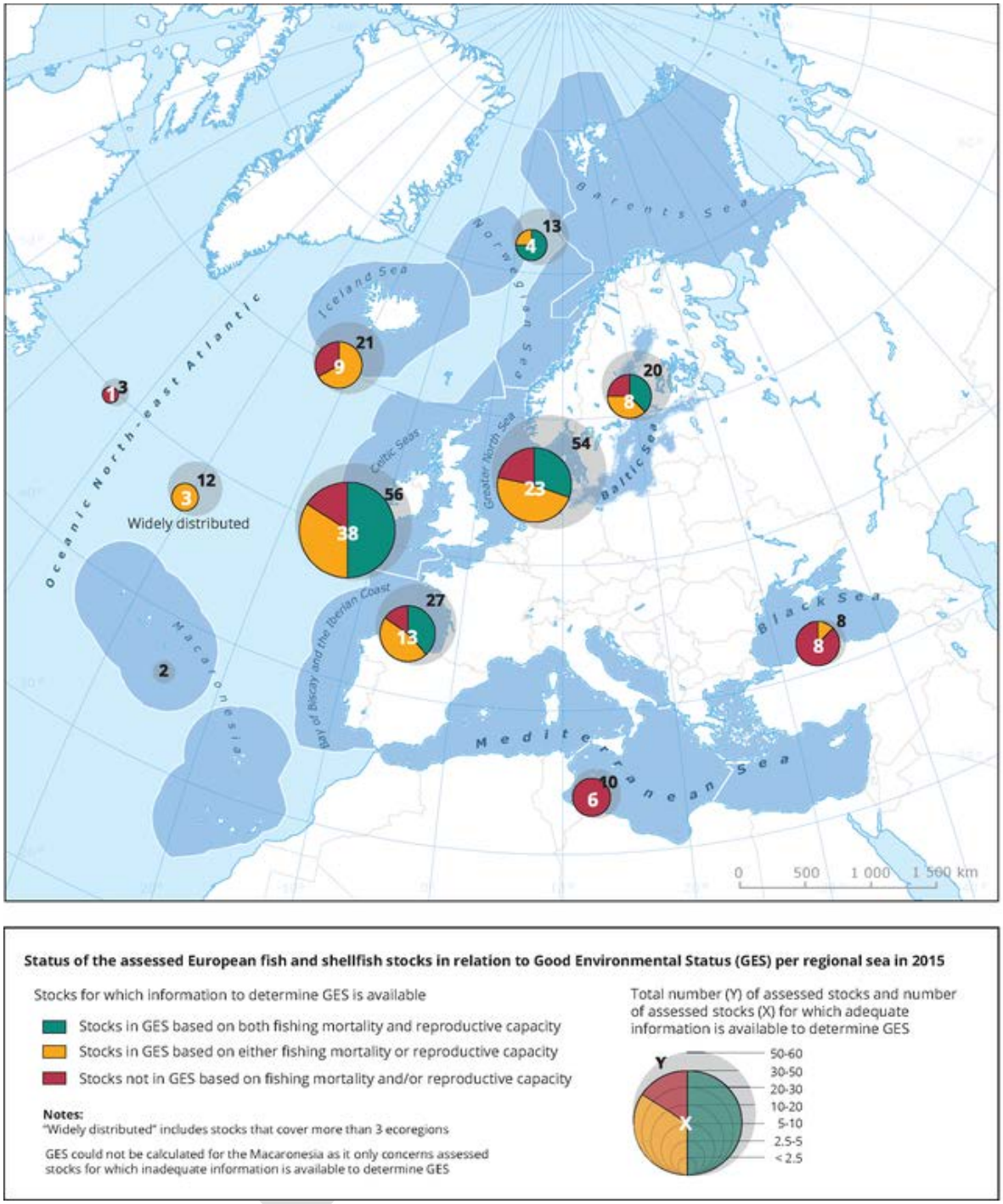

Figure 42. Status of the assessed European fish stocks in relation to Good Environmental Status per regional sea.

This figure shows the status of the assessed European fish stocks in relation to 'Good Environmental Status' (GES) per regional sea in 2015. Stocks for which adequate information is available to determine GES for fishing mortality (F) and/or reproductive capacity (spawning stock biomass (SSB)) are included in this figure (i.e. total number of assessed stocks). A distinction is made between stocks (1) in GES, based on both fishing mortality and reproductive capacity; (2) in GES, based on either fishing mortality or reproductive capacity; and (3) not in GES, based on fishing mortality and/or reproductive capacity (see the Methodology section for further information on how GES is determined). As assessments are carried out in a multiannual cycle within the Mediterranean, the number of stocks included for the Mediterranean depends on the period covered.
https://www.eea.europa.eu/data-and-maps/figures/status-of-fish-stocks-in-5

Table 1. Status summary of Greater North Sea stocks in 2018 relative to maximum sustainable yield (MSY) and the ICES precautionary approach (PA). Grey represents unknown reference points. For MSY: green represents a stock that is fished below FMSY or the stock size is above MSY Btrigger; red represents a stock that is fished above FMSY or the stock size is lower than MSY Btrigger. For PA: green represents a stock that is fished below Fpa or the stock size is above Bpa; yellow represents a stock that is fished between Fpa and Flim or the stock size is between Blim and Bpa; red represents a stock that is fished above Flim or the stock size is below Blim. Stocks having a fishing mortality rate at or below Fpa and a stock size above Bpa are defined as being inside safe biological limits. Grey represents stocks for which reference points are unknown. SBL = safe biological limits; MSFD = Marine Strategy Framework Directive; D3C1 = MSFD indicator for fishing mortality; D3C2 = MSFD indicator for spawning-stock biomass; GES = good environmental status.

Stock code and name	Fish category	Reference point	SBL	Fishing pressure			Stock size			MSFD descriptor		
				2015	2016	2017	2015	2016	2017	2015	2016	2017
bll.27.3a47de **Brill** in Subarea 4 and divisions 3.a and 7.d-e (North Sea, Skaggerak and Kattegat, English Channel)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
bss.27.4bc7ad-h **Seabass** in divisions 4.b-c, 7.a, and 7.d-h (central and southern North Sea, Irish Sea, English Channel, Bristol Channel, Celtic Sea)	demersal	PA	✗	✗	✓	✓	✗	✗	✗	✓	✗	✗
cod.27.47d20 **Cod** in Subarea 4, division 7.d, and subdivision 20 (North Sea, eastern English Channel, Skagerrak)	demersal	MSY	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
dab.27.3a4 **Dab** in Subarea 4 and division 3.a (North Sea, Skagerrak and Kattegat)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
dgs-nea **Spurdog** in Subareas 1-10, 12 and 14 (the Northeast Atlantic and adjacent waters)	elasmobranch	MSY	?	✓	✓	✓	✗	✗	✗	✓	✗	✗
ele.2737.nea **European eel** throughout its natural range	demersal	PA	?	?	?	?	✗	✗	✗	?	✗	?
fle.27.3a4 **Flounder** in Subarea 4 and division 3.a (North Sea, Skagerrak and Kattegat)	benthic	MSY	?	✓	✓	✓	?	?	?	✓	?	?

Stock code and name	Fish category	Reference point	SBL	Fishing pressure			Stock size			MSFD descriptor		
				2015	2016	2017	2015	2016	2017	2015	2016	2017
had.27.46a20 **Haddock** in Subarea 4, division 6.a and subdivision 20 (North Sea, West of Scotland, Skagerrak)	demersal	MSY	✓	✗	✗	✗	✗	✓	✓	✗	✓	✗
her.27.3a47d **Herring** in Subarea 4 and divisions 3.a and 7.d, autumn spawners (North Sea, Skagerrak and Kattegat, eastern English Channel)	pelagic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
hke.27.3a46-8abd **Hake** in Subareas 4, 6 and 7 and divisions 3.a, 8.a-b and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)	demersal	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
hom.27.3a4bc7d **Horse mackerel** in divisions 3.a, 4.b-c, and 7.d (Skagerrak and Kattegat, southern and central North Sea, eastern English Channel)	pelagic	MSY	?	?	✗	✗	?	?	?	✗	?	?
lem.27.3a47d **Lemon sole** in Subarea 4 and divisions 3.a and 7.d (North Sea, Skagerrak and Kattegat, eastern English Channel)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
mac.27.nea **Mackerel** in Subareas 1-8 and 14 and division 9.a (the Northeast Atlantic and adjacent waters)	pelagic	MSY	✗	✗	✗	✗	✓	✓	✗	✗	✗	✗
mur.27.3a47d **Striped red mullet** in Subarea 4 and divisions 7.d and 3.a (North Sea, eastern English Channel, Skagerrak and Kattegat)	demersal	MSY	?	✗	✗	✗	?	?	?	✗	?	?

Stock code and name	Fish category	Reference point	SBL	Fishing pressure			Stock size			MSFD descriptor		
				2015	2016	2017	2015	2016	2017	2015	2016	2017
*nep.fu.6 ***Nephrops*** in division 4.b, Functional Unit 6 (central North Sea, Farn Deeps)	crustacean	MSY	?	✗	✗	✓	✗	✗	✓	?	?	?
ple.27.420 **Plaice** in Subarea 4 (North Sea) and subdivision 20 (Skagerrak)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
pok.27.3a46 **Saithe** in Subareas 4, 6, and division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)	demersal	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
san.sa.1r **Sandeel** in divisions 4.b and 4.c, Sandeel Area 1r (central and southern North Sea, Dogger Bank)	demersal	MSY	?	?	?	?	✗	✓	✓	?	✓	?
sol.27.4 **Sole** in Subarea 4 (North Sea)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
spr.27.4 **Sprat** in Subarea 4 (North Sea)	pelagic	MSY	?	?	?	?	✓	✓	✓	?	✓	?
tur.27.4 **Turbot** in Subarea 4 (North Sea)	benthic	PA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
usk.27.3a45b6a7-912b **Tusk** in Subareas 4 and 7-9, and divisions 3.a, 5.b, 6.a, and 12.b (Northeast Atlantic)	demersal	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
whb.27.1-91214 **Blue whiting** in Subareas 1-9, 12, and 14 (Northeast Atlantic and adjacent waters)	pelagic	MSY	✓	?	✗	✗	?	✓	✓	✗	✓	✗
whg.27.47d **Whiting** in Subarea 4 and division 7.d (North Sea and eastern English Channel)	demersal	MSY	✓	✗	✗	✗	✗	✓	✓	✗	✓	✗
wit.27.3a47d **Witch** in Subarea 4 and divisions 3.a and 7.d (North Sea, Skagerrak and Kattegat, eastern English Channel)	benthic	MSY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

*** Data incorporated from http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.6.pdf**

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

Dredge Area Camera Assessment

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To provide initial results of the dredge area assessment work for discussion.

B. **Recommendation**

That members note the reports and provide comment for taking the work further.

1. **Background**

1.1 Due to concerns regarding potential habitat impacts arising from the permitted dredge fishery, a comparison between video footage captured in 2016 and 2019 has been carried out.

1.2 Video footage was broken down into 4 minute segments and the abundance of species or species groups present was recorded. Data was assess for three treatment areas, 1)within the northern permitted area, 2) outside the 6NM limit, and 3) within the 6NM limit but outside the permitted dredge areas. Data was standardised to relative abundance per 100m of video tow. Total species diversity and abundance of *Alcyonium digitatum* was assessed.

1.3 The report presents the initial findings to the group for discussion. No conclusions have been drawn at this point. Suggestions for progressing the work are encouraged.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

North Eastern Inshore Fisheries and Conservation Authority

Dredge Area Camera Assessment

2019

Date submitted:	
Report compiled by:	
Quality control by:	
Approved by & date:	
Version:	1

North Eastern IFCA

Town Hall

Bridlington

East Riding of Yorkshire

YO16 4LP

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Indicator species 3

Introduction

Concerns have been raised surrounding the impacts of dredging activity on benthic habitats within the current permitted areas. This report outlines the results of work undertaken to compare video footage captured in 2016 following a period of closure to all dredging activity, and footage from 2019.

Methodology

Survey

Towed camera sled footage was captured using North Eastern Guardian III. A subset of footage captured in 2019 was assessed against similar footage captured in 2016.

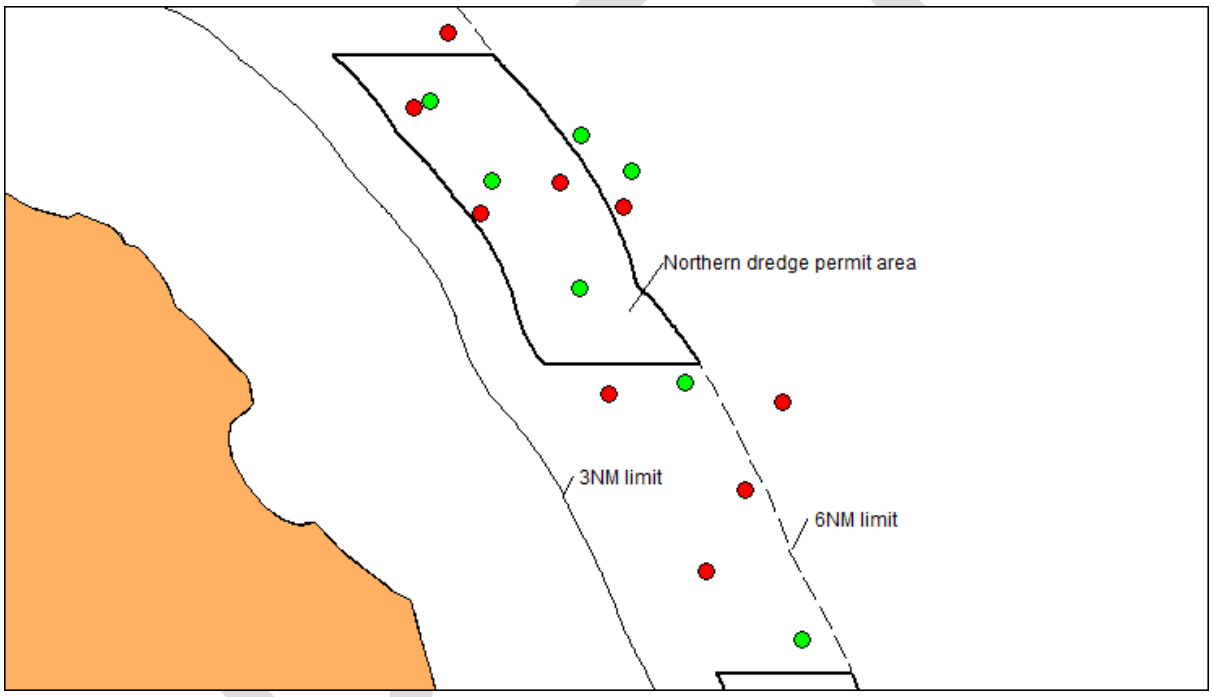

Figure 1. Survey tow midpoints for 2016 (red) and 2019 (green).

Analysis

Video clips were broken down into 4 minute clips and species counts made. Clips were assigned codes and transect distance was calculated in GIS using GPS coordinates noted from the video overlay system. Species observation counts were standardised to numbers observed per 100m.

Data acquired was broken down into three comparative zones, inside the northern permitted area, outside 6NM and inside 6NM but outside the permitted area. Areas in the southern permitted area were not utilised due to lack of 2016 data available for comparison.

Diversity, abundance and evenness were calculated using the Shannon Wiener function.

Results

Diversity and Abundance

In total, 6,124 individual animals have been observed during both the 2016 and 2019 surveys from 15 species or faunal groups (Figure 2). Starfish species were overwhelmingly dominant with European lobsters seen once each year.

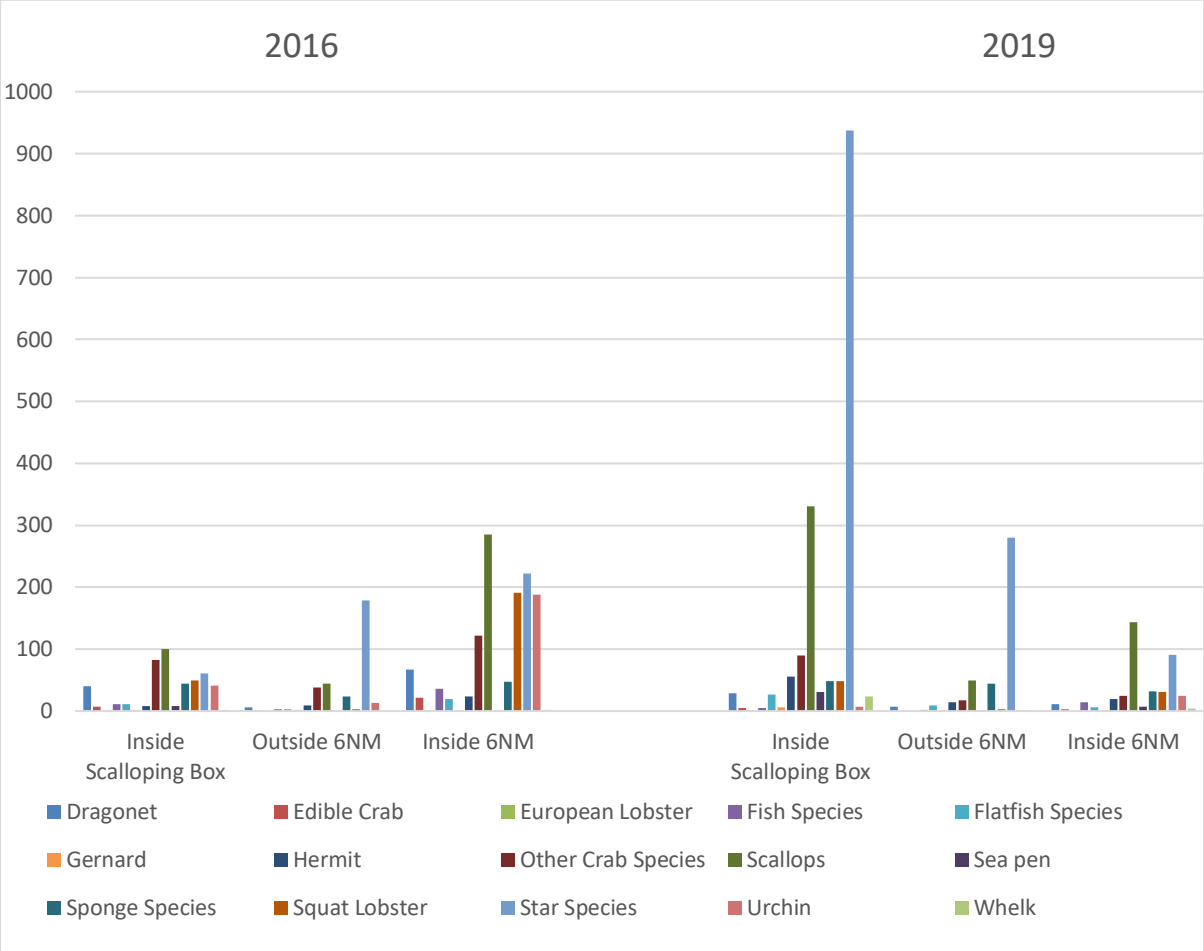

Figure 2 Relative abundance of species/species groups observed per 100m of video tow by treatment area and by year.

Diversity outside 6NM was already low in 2016 and appears to have fallen lower in 2019 along with the abundance of some of the species present with the exception of starfish species numbers which have experienced a dramatic increase.

Edible crab and European lobster observations were made in 2019 for inside the scalloping box in 2019 where 2016 had no European lobster sightings. Scallop observations increased in 2019 for inside the scalloping box while they remained consistent outside 6NM from 2016 to 2019. Inside 6NM shows a decrease in scallop observations during the 2019 survey from the 2016.

The area inside the scallop box had the highest diversity and abundance of species index in 2016 with the highest value for community evenness. The lowest diversity is seen outside 6NM along with having the lowest evenness value in 2016.This is also the case 2019 where both values fall dramatically lower (Table 1).

Table 1. Shannon-Wiener diversity index for each treatment area with evenness measurement.

	Diversity		**Evenness**	
	2016	**2019**	**2016**	**2019**
Permitted area	2.21	1.47	0.84	0.54
Outside 6NM	1.53	1.25	0.62	0.49
Inside 6NM	2.07	2.00	0.79	0.76

In 2019 the highest diversity is seen inside 6NM for 2019, although this value has fallen by 0.7 from 2016; however, a relatively high evenness across the community is maintained. The value for inside the scalloping box has fallen a considerable amount in 2019 compared to the previous survey year and this is accompanied by a decline in evenness score.

Indicator species

The abundance of the soft coral *Alcyonium digitatum*, commonly known as dead man's fingers (hereafter abbreviated to DMF) was used as a simple indicator to assess potential impacts. Abundance observed on the video clips was standardised to the number per 100m the video was towed, with an average figure taken for all clips within a treatment area.

Alive DMF were classified as those that were either erect or with their polyps out and visible indicating that they were still functional. Abundance was higher within the permitted area compared to other areas within the district, but had still decreased since 2016 (Figure 3). There was very little change in the numbers observed for sites within the 6NM but outside the permitted areas. The number observed beyond the 6NM increased the most between 2016 and 2019, potentially indicating a reduction in dredge effort over that period.

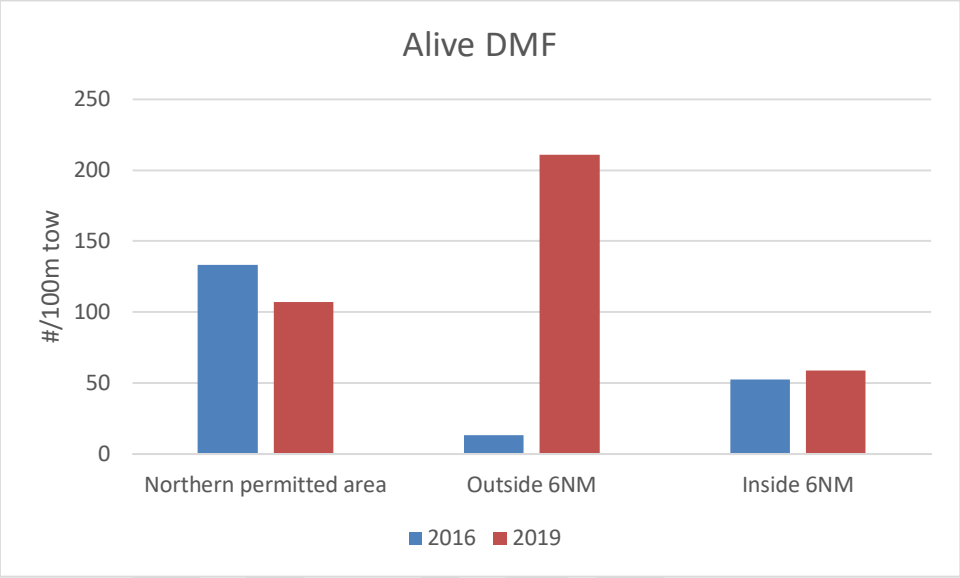

Figure 3. Average abundance of alive *A. digitatum* per 100m of video tow observed within each treatment area in 2016 and 2019.

Damaged DMF were classified as those that were not erect and did not have their polyps out (Figure 4). There was little change in abundance within the permitted dredge area between 2016 and 2019. Outside the permitted area within the district there was a modest increase, whilst a significant reduction outside the district may again suggest a reduction in effort beyond 6NM.

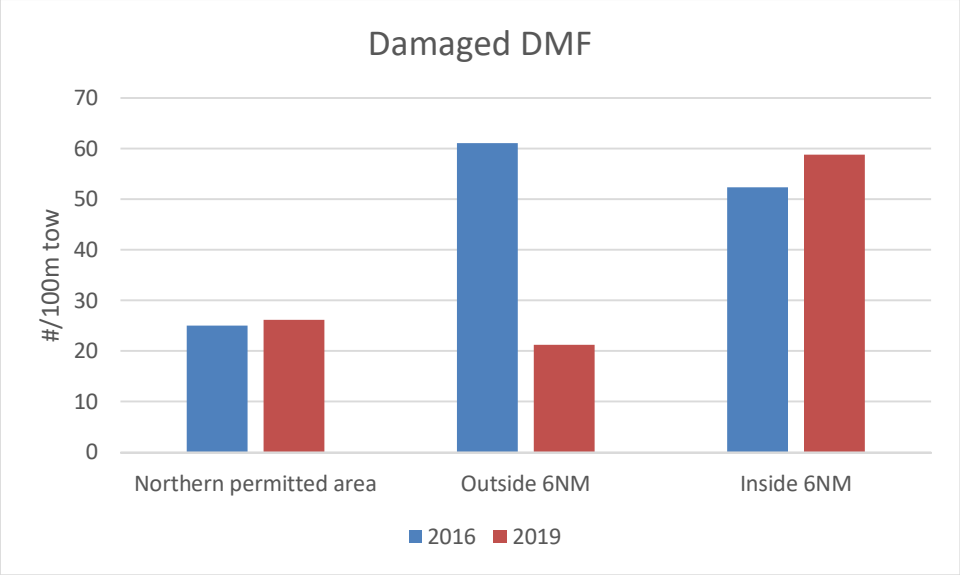

Figure 4. Average abundance of damaged *A. digitatum* per 100m of video tow observed within each treatment area in 2016 and 2019.

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

Humber Eelgrass Monitoring 2019

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To present the results of the 2019 eelgrass monitoring survey within the Humber Estuary European Marine Site.

B. **Recommendation**

That members note the report.

1. **Background**

1.1 As a result of the revised approach to commercial fisheries in European Marine Sites, management was introduced in January 2014 to protect eelgrass (*Zostera* spp) beds at Spurn Point in the Humber Estuary from potentially damaging activites.

1.2 Annual surveys are carried out in partnership with the Yorkshire Wildlife Trust to map the extent and distribution of eelgrass in order to ensure that appropriate management is in place.

1.3 Survey results for 2019 show a 350% increase in extent since surveys began in 2013. The core eelgrass bed in the south of the management area is considered stable, while cover in the north and central areas is subject to more significant annual variation.

1.4 Should eelgrass abundance outside the current management area stabilise in subsequent surveys, consideration should be given to changing the boundary through a revised byelaw.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

North Eastern IFCA

Inshore Fisheries and Conservation Authority




Humber Eelgrass Monitoring Report

2019

Date submitted:	14/08/2019
Report compiled by:	CF
Quality control by:	TS
Approved by & date:	
Version:	1

North Eastern IFCA

Town Hall

Bridlington

East Riding of Yorkshire

YO16 4LP

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Introduction

North Eastern Inshore Fisheries and Conservation Authority (NEIFCA) is one of ten such Authority's established in October 2010 under provisions contained within the Marine and Coastal Access Act 2009. On the 1st April 2011, the Authority assumed full statutory responsibility for managing the exploitation of sea fisheries resources within its jurisdiction.

To assist focus on the positive delivery of their statutory duties, IFCA's have agreed the following national vision which has been adopted by NEIFCA:

"Inshore Fisheries and Conservation Authority's will lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry."

During the 1930s a wasting disease saw the demise of much of our seagrass beds around the UK coast and are now considered nationally rare and highly protected if present.

Ecology

Dwarf Eelgrass *(Z. noltei)* can be found in shallow estuarine intertidal bays often growing in dense beds or scattered clumps ideally suited to muddy sediments or fine sands of the intertidal area. It is typically found in high abundance on the upper shore forming a 'band' around the shoreline with other species of seagrass. *Z. noltei* can grow subtidally in deeper water where salinity is lower, however it is adversely impact by high levels of nutrient and turbidity.

It is an important habitat feature providing spawning, nursery and refuge areas for fish, foraging grounds for birds such as dark-bellied brent geese *Branta bernicla*, pochard *Aythya farina* and wigeon duck *Anas Penelope*, all of which are known to feed over mudflats on green plants like eelgrass as well as gutweed *Ulva intestinalis*.

These beds also help in the stabilisation of sediment in the area, contributing to primary productivity ad acting as a defence against erosion from wave action against the shore. However, the sensitivity of this species to smothering as a result of shifting sediment is high, with the capacity to recover from such circumstances low.

Spurn Point has a long-standing *Z. noltei* bed which has been recognised since 2013. This location has been subject to wash overs in the past, where the sea on the opposite side of the dunes breaks through the dunes smothering the eelgrass beds, with the most recent occurring in 2014. The Humber is also known for high turbidity and water movement, making conditions less favourable for seagrass growth further offshore.

Current management

The known presence of eelgrass at Spurn Point on the Humber Estuary called for the introduction of the **XXIX Humber Estuary Fishing Byelaw** in order to protect the beds and prohibits all fishing activity activities other than fishing with a rod and line within a specified area.

An annual survey is undertaken in spring in partnership with the Yorkshire Wildlife Trust to monitor the growth and distribution of eelgrass within the bylaw box.

Methodology

Survey

Z. noltei survey work at Spurn Point was carried out during low water on 05/07/2019. In total 6 people (3 IFC officers and 3 YWT officers) undertook the survey, each using a GPS tracker to mark either a clump or bed of seagrass along a transect 50m apart from either side and walking in a zig zag fashion to increase distance covered within the bylaw box.

Analysis

GIS analysis is undertaken by the Yorkshire Wildlife Trust. In order to make useful comparisons year on year both area and point data are analysed on a presence/absence basis within a 10m2 grid system. It is acknowledged that this method does not allow for specific measurements of individual beds but it does provide a better means to assess the overall relevant extent of *Zostera* spp within the byelaw box. It accounts for the variable distribution and density of presence data being recorded as a single point. It also provides a method of standardising point and polygon data, to help understand the extent of *Zostera* spp in the byelaw box between and within years.

Results

2019 survey results have seen a 350% increase of occupied 10m grid squares since the first survey undertaken in 2013. After a decrease in seagrass extent in 2018, which was similar to the 2014 survey coverage, there has been a 245% increase on the number of occupied grid cells for 2019 making this year the most successful year for seagrass extent (Figure 1).

As seen in Figure 2 the central area of the bylaw box has seen a significant increase in seagrass coverage showing recovery from the 2014 wash over where there was a loss of coverage due to smothering of the bed. Some seagrass is now considered to be stable (Figure 3) as it has been seen over multiple surveys.

Since 2017 seagrass has been seen past the boundary of the byelaw box. This has significantly increased in 2019 with sightings being made further north of the box where it hasn't been seen before.

There have also been losses in seagrass coverage in the north of the box closer to the shore (Figure 3), while gains have been made further out. Large beds of stable seagrass can be seen in the south of the box.

Much of the seagrass in the south of the box is deemed stable and has been seen there since the 2013 survey (Figure 4). This is potentially due to the fact that this area is slightly more sheltered in comparison to the rest of the box, where sediments are more exposed to wave action.

Much of the seagrass seen in the central and north of the box has been seen over the last two years, with the majority of the grass outside of the box being seen for the first time in 2019.

Figure 1 Eelgrass extent 2013 – 2018, Yorkshire Wildlife Trust 2019

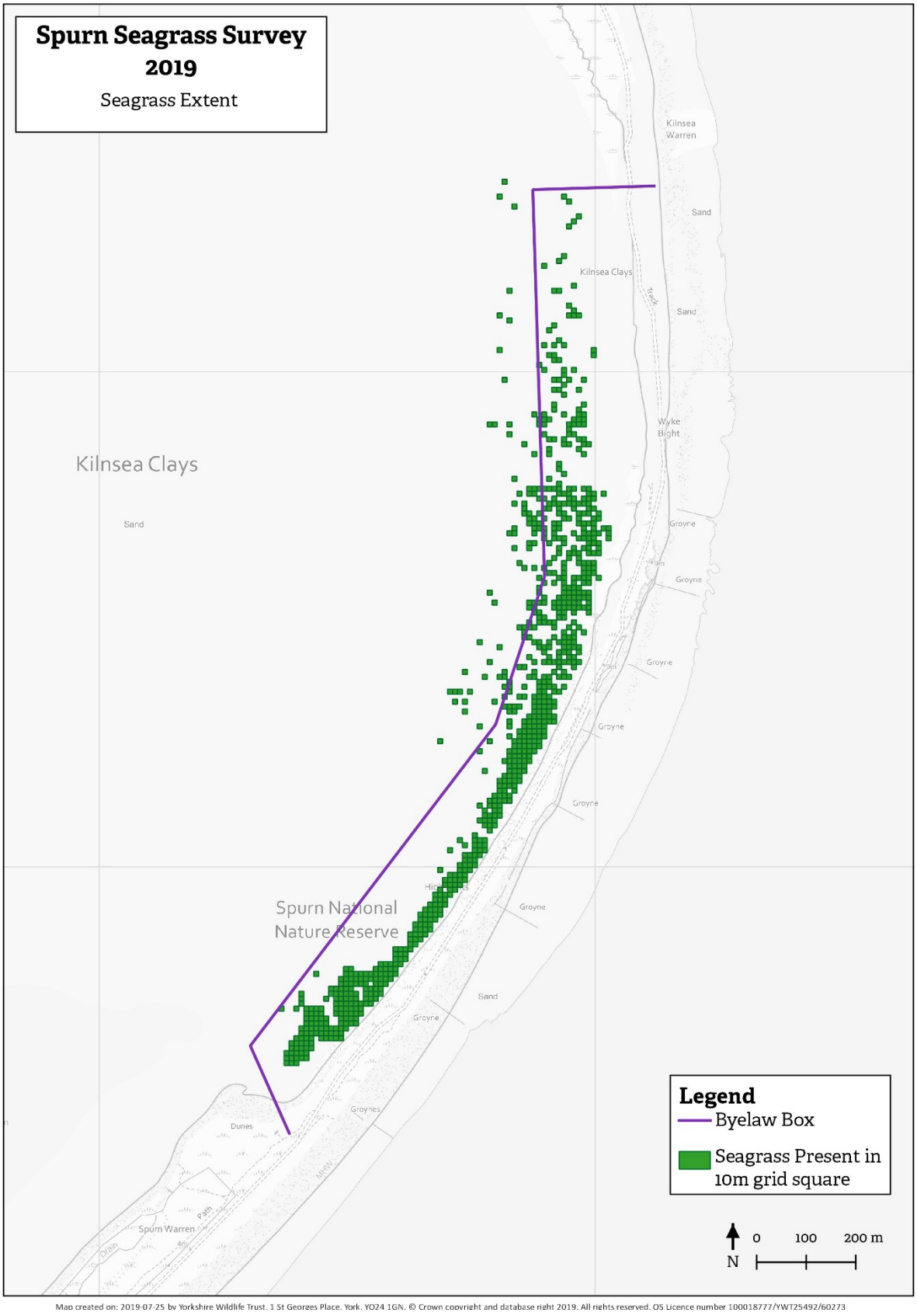


Figure 2 Eelgrass extent 2019, Yorkshire Wildlife Trust 2019

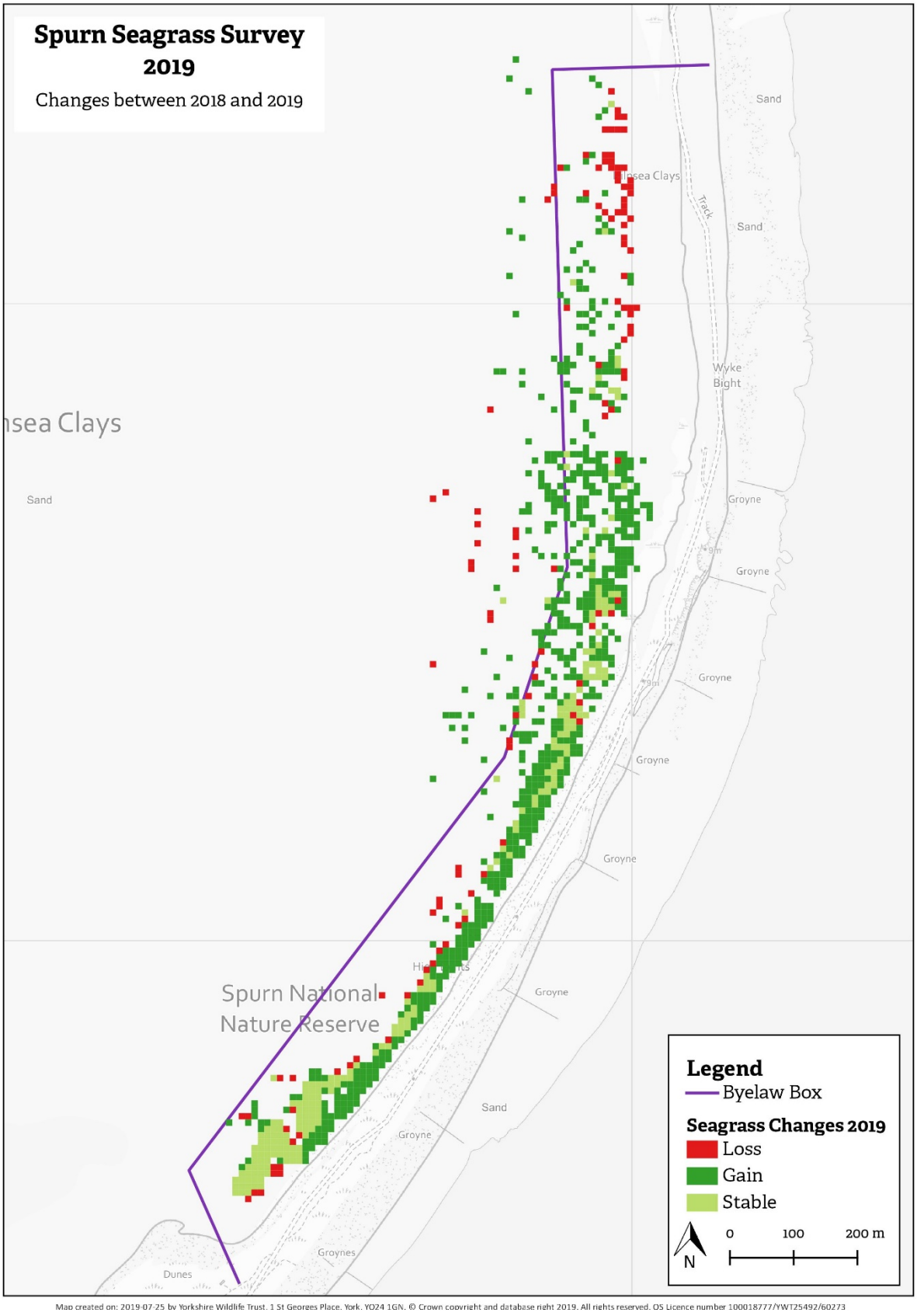


Figure 3 Seagrass changes between 2018 and 2019, Yorkshire Wildlife Trust 2019

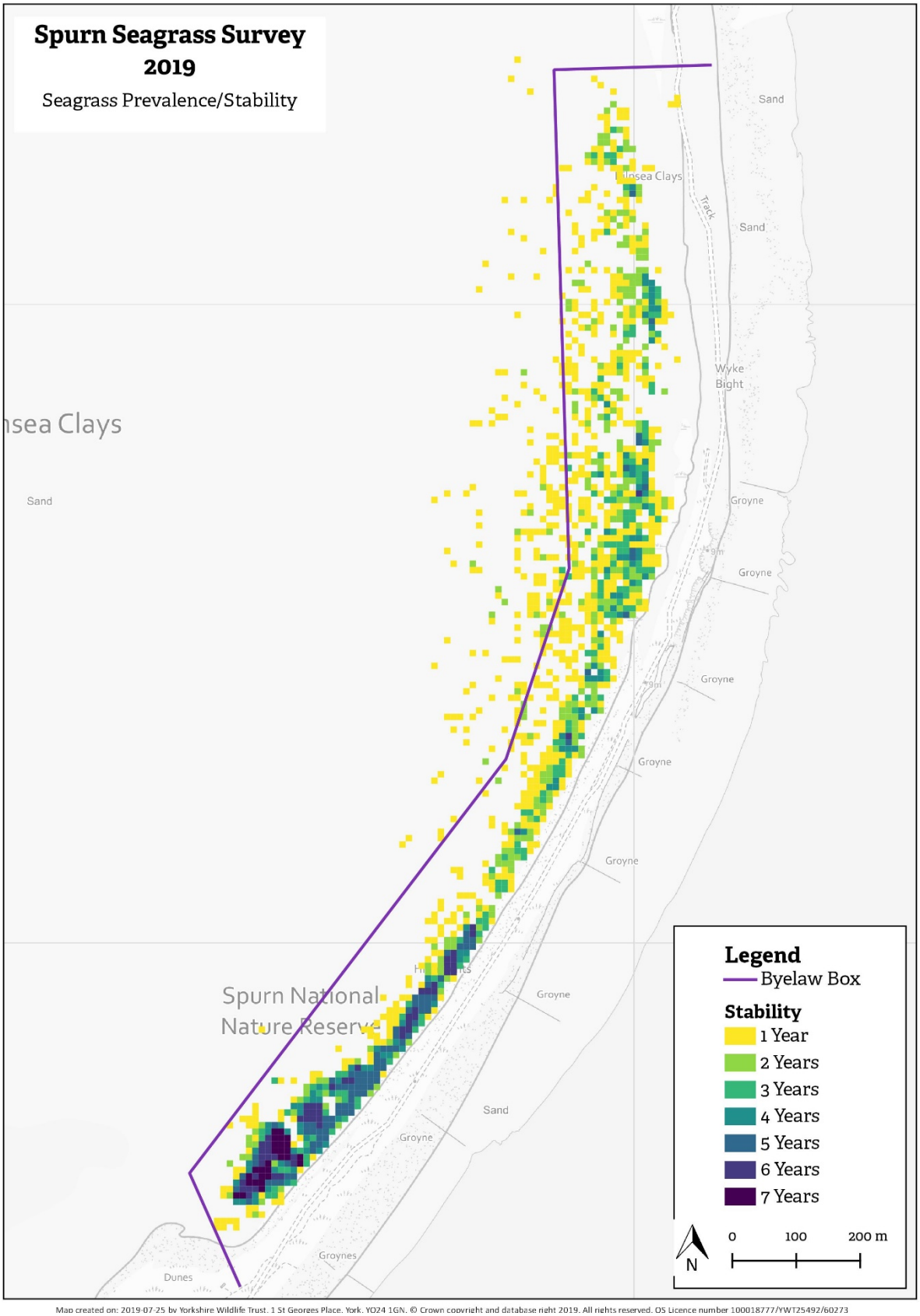


Figure 4 Seagrass stability since 2013, Yorkshire Wildlife trust 2019

Conclusion

Consideration to extending the bylaw box may be given should the gain in extent and coverage seen in the 2019 prevail into the 2020 survey. Such successful growth of seagrass could show that management efforts set in place are effective in the conservation of the species as well as conditions in the area being more favourable than in the past.

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

NEIFCA Byelaws Update

Report by the Senior Environmental and Scientific Officer

A. Purpose of Report

To update members on all current fisheries byelaw work streams.

B. Recommendation

1. That members note the report.

1. Background

1.1 Byelaw XXVIII Crustacea Conservation Byelaw 2018

1.1.1 This new byelaw regulation was made by the Authority at its meeting on 14 June 2018 (minute record 52 refers). It retains, updates and rationalises existing management regulations covering the exploitation of lobster, edible crab, velvet crab and nephrops within the Authority's district and includes the following key revisions:

- Incorporates existing protections for 'V' notched lobsters which are currently provided for in a separate byelaw regulation.
- Incorporates existing protections for egg bearing lobsters which are currently provided for in an emergency byelaw regulation which will expire on 17 October 2018. This includes new protection for lobsters displaying mutilated pleopods.
- Specifies a new vessel length size for shell fishing of 10 m overall length within 3 nautical miles with additional protections for all existing vessel operators who currently operate within the 3 mile limit under a 'sunset' provision.
- Specifies a new protection for 'soft' lobsters
- Specifies a new maximum pot frame size of 50 cm H x 60 cm W x 110 cm L.

1.1.2 The byelaw has now been confirmed by Defra and came into force on 8 August 2019.

1.2 Byelaw XXIX Humber Estuary Fishing Byelaw 2016

1.2.1 The byelaw, which was formally made by the Authority on 27 April 2016 as a result of the revised approach to commercial fisheries in European Marine Sites, establishes trawling management within the Humber Estuary EMS. Trawling will be prohibited with the

exception of a 'sunset' list of current permit holders that can demonstrate a track record of fishing within the Estuary

1.2.2 The byelaw has now been confirmed by Defra and came into force on 15 August 2019.

1.3 EMERGENCY BYELAW 'Fish, Mollusc and Crustacea Minimum Size byelaw 2019'

1.3.1 Until recently, IFCAs were empowered to enforce minimum sizes in relation to commercial and recreational fisheries imposed by Council Regulation (EC) No 85/98. On 14 August 2019, the European Council adopted new technical conservation regulations, replacing EC 850/98 which in turn resulted in IFCAs losing both their powers to enforce the new regulations and ability to apply them to non-commercial fisheries.

1.3.2 In conjunction with Northumberland, Eastern and Kent & Essex IFCAs and in full Consultation with Authority members, NEIFCA made an emergency byelaw which re-established minimum conservation reference sizes for certain marine organisms across it's district, replicating the provisions of EC 850/98.

1.3.3 By working in partnership with neighbouring IFCAs, we were able to maintain the protective effect provided by the minimum size rules along the East coast of England and the Eastern channel. The byelaw also ensured consistent application of the regulations to recreational fishers as well as the prohibition on the transport, sale and storage of undersize marine organisms.

1.3.4 Copies of the byelaw and the supporting RIA are attached for members information.

1.4 AIS, Catch Returns and Fixed Netting Byelaw Regulations

1.4.1 The above three byelaw regulations, made during April 2016, remain outstanding having been sent to Defra during February 2019 for final confirmation. Officers continue to work with NEIFCA legal to actively lobby and press Defra for their final confirmation.

Contact Officer
David McCandless, Chief Fishery Officer
Ext. 3690

Inshore Fisheries and Conservation Authority

North Eastern Inshore Fisheries and Conservation Authority

MARINE AND COASTAL ACCESS ACT 2009 (c.23)

FISH, MOLLUSC AND CRUSTACEA MINIMUM SIZE EMERGENCY BYELAW 2019

The Authority for the North Eastern Inshore Fisheries and Conservation District, in exercise of the power conferred by section 157 of the Marine and Coastal Access Act 2009 makes the following byelaw for that District.

Interpretation

1. In this byelaw-

a) "the Authority" means the North Eastern Inshore Fisheries and Conservation Authority as defined in articles 2 and 4 of the North Eastern Inshore Fisheries and Conservation Order 2010 (S.I. 2010 No. 2193);

b) "District" means the North Eastern Inshore Fisheries and Conservation District as defined in articles 2 and 3 of the North Eastern Inshore Fisheries and Conservation Order 2010 (S.I. 2010 No. 2193);

c) "Live bait" means fish that are:

(i) used only as a hook bait for the capture of other fish; and
(ii) retained on a vessel or within the District's waters; and
(iii) released alive into the fishery when no longer required; and
(iv) not landed or removed from the fishery

Catch Prohibitions and Restrictions

2. This byelaw does not apply where the landing obligation under Article 15 of Regulation (EU) 1380/2013, or any subsequent regulation that requires marine organisms to be landed, applies.

3. Subject to paragraphs 2, 4 and 8, no person shall remove from the fishery, retain on board, tranship, land, transport, store, sell, display or offer for sale, any of the species named in paragraph 7 that measure less than the sizes specified but shall return them immediately to the sea.

4. Paragraph 3 shall not apply to: horse mackerel and mackerel, within a limit of 10 % by live weight of the total catches retained on board of each of these species. The percentage of undersized herring, horse mackerel or mackerel shall be calculated as the proportion by live weight of all marine organisms on board after sorting or on landing. The percentage may be calculated on the basis of one or more representative samples. The limit of 10 % shall not be exceeded during transhipment, landing, transportation, storage, display or sale.

5. The marine organisms described in paragraph 7 shall be measured in accordance with Schedule 1.

6. Named crustaceans and named molluscs for which a minimum conservation reference size is established in paragraph 7 may only be retained on board whole and may only be landed whole with the exception of the Norway lobster.

7. Species and specified minimum sizes

   (a) Named Fish Species

Bass *(Dicentrarchus labrax)*	42 cm
Cod *(Gadus morhua)*	35 cm
Sole *(Solea* spp.*)*	24 cm
Haddock *(Melanogrammus aeglefinus)*	30 cm
Hake *(Merluccius merluccius)*	27 cm
Herring *(Clupea harengus)*	20 cm
Horse mackerel *(Trachurus* spp.*)*	15 cm
Ling *(Molva molva)*	63 cm
Mackerel *(Scomber* spp.*)*	30 cm
Megrim *(Lepidorhombus* spp.*)*	20 cm
Plaice *(Pleuronectes platessa)*	27 cm
Pollack *(Pollachius pollachius)*	30 cm
Saithe *(Pollachius virens)*	35 cm
Whiting *(Merlangius merlangus)*	27 cm

(b) Named Mollusc Species

Octopus *(Octopus vulgaris)*	750 grams
Queen scallop *(Chlamys* spp.*)*	40 mm
Razor clam *(Ensis* spp.*)*	100 mm
Scallop *(Pecten maximus)*	100 mm
Short-necked clam *(Ruditapes philippinarum)*	35mm
Whelk *(Buccinum undatum)*	45 mm

(c) Named Crustacea Species

Crawfish *(Palinurus* spp.*)*	95mm
European lobster *(Homarus gammarus)*	87 mm
Norway lobster *(Nephrops norvegicus)*	
Total length	85 mm
Carapace length	25 mm
Tail	46 mm
Spinous spider crab *(Maia squinado)*	
Male	130 mm
Female	120 mm
Velvet swimming crab *(Necora puber)*	65 mm

8. The following named species below the minimum sizes specified in paragraph 7 may be used as 'live bait'

   (a) Horse Mackerel *(Trachurus trachurus)*
   (b) Mackerel *(Scomber scomber)*

I hereby certify that the above byelaw was made and agreed by North Eastern Inshore Fisheries and Conservation Authority on Tuesday 13 August 2019.

David Thomas McCandless
Chief Officer to North Eastern Inshore Fisheries and Conservation Authority

This byelaw comes into force on 14 August 2019 and will remain in force for a period not exceeding 12 months unless extended or revoked by the Secretary of State.

Explanatory Note

(This note is not part of the Byelaw)

This byelaw makes provision to prohibit the removal from the North Eastern IFC District of marine organisms below specified sizes.

The byelaw provisions shall not apply to any marine organisms caught that are subject to Article 15 of Regulation (EU) 1380/2013 or any subsequent regulation that requires fish to be retained and landed in order to prohibit discarding at sea.

The byelaw includes methods of measurement according to the anatomy of the named species.

The byelaw contains provisions for the retention of live named fish species below the minimum size that may be used as live bait when fishing for predatory fish species.

Schedule

Measurement of the size of a marine organism

1. The size of any fish shall be measured, as shown in Figure 1 for illustrative purposes, from the tip of the snout to the end of the tail fin.

2. The size of a European lobster shall be measured, as shown in Figure 2 for illustrative purposes, as the length of the carapace, parallel to the midline, from the back of either eye socket to the distal edge of the carapace.

3. The size of a Norway lobster (*Nephrops norvegicus*) shall be measured, as shown in Figure 3 for illustrative purposes, either:
    a. as the length of the carapace, parallel to the midline, from the back of either eye socket to the midpoint of the distal dorsal edge of the carapace, or
    b. as the total length, from the tip of the rostrum to the rear end of the telson, not including the setae.
    c. In the case of detached Norway lobster tails; from the front edge of the first tail segment present to the rear end of the telson, not including the setae. The tail shall be measured flat, unstretched and on the dorsal side.

4. The size of a crawfish (*Palinurus* spp.) shall be measured, as shown in Figure 4 for illustrative purposes, as the length of the carapace from the tip of the rostrum to the midpoint of the distal edge of the carapace.

5. The size of a spinous spider crab (*Maja squinado*) shall be measured, as shown in Figure 5 for illustrative purposes, as the length of the carapace, along the midline, from the edge of the carapace between the rostrums to the posterior edge of the carapace.

6. The size of a velvet swimming crab (*Necora puber*) shall be measured, as shown in Figure 6 for illustrative purposes, as the maximum width of the carapace measured perpendicular to the antero-posterior midline of the carapace, excluding the spines.

7. The size of any bivalve mollusc shall be measured, as shown in Figure 7 for illustrative purposes, across the longest part of the shell.

8. The size of a whelk shall be measured, as shown in Figure 8 for illustrative purposes, as the length of the shell.

Figure 1 Fish species

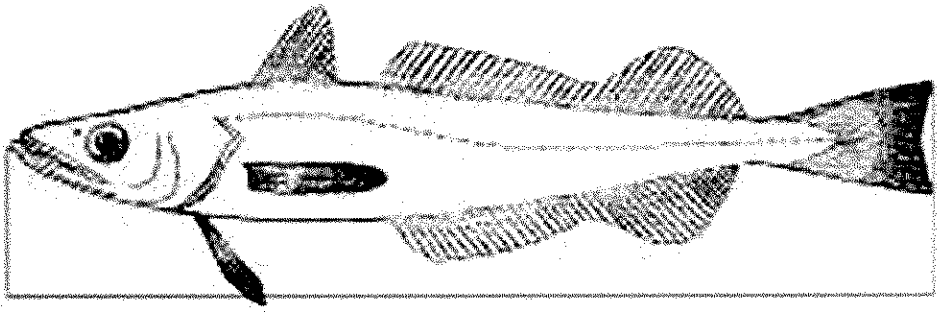


Figure 2 European lobster
(*Homarus gammarus*)

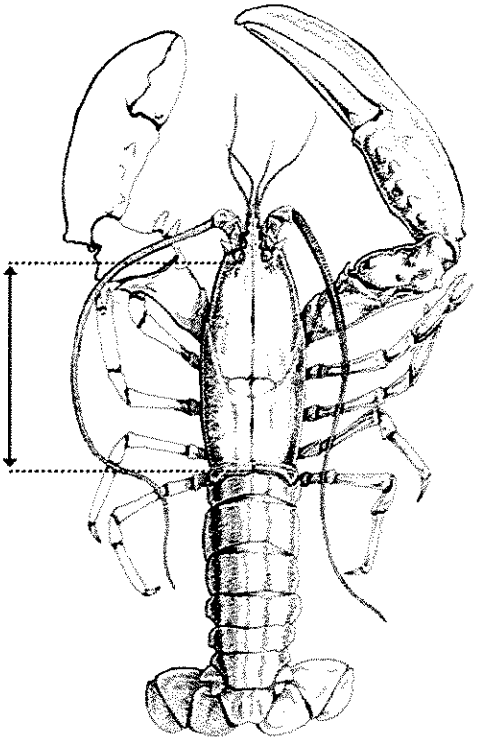


Figure 3 Norway lobster
(*Nephrops norvegicus*)

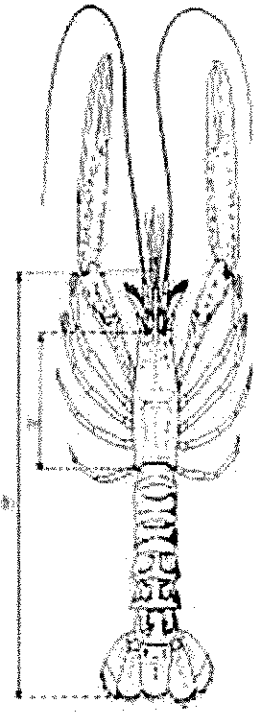


Figure 4 Crawfish
(*Palinurus* spp.)

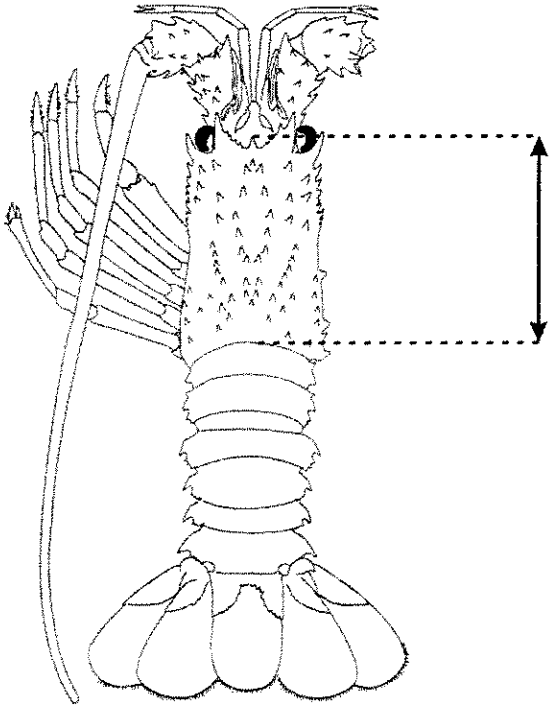


Figure 5 Spinous spider crab
(*Maja squinado*)

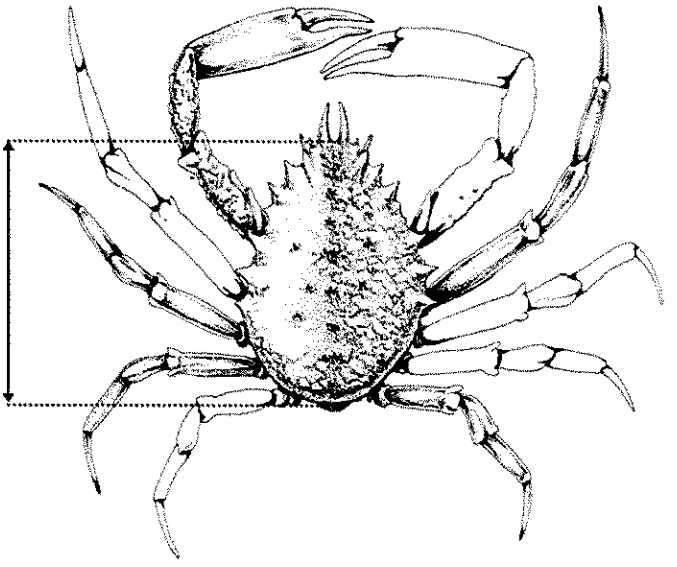


Figure 6 Velvet swimming crab
(*Necora puber*)

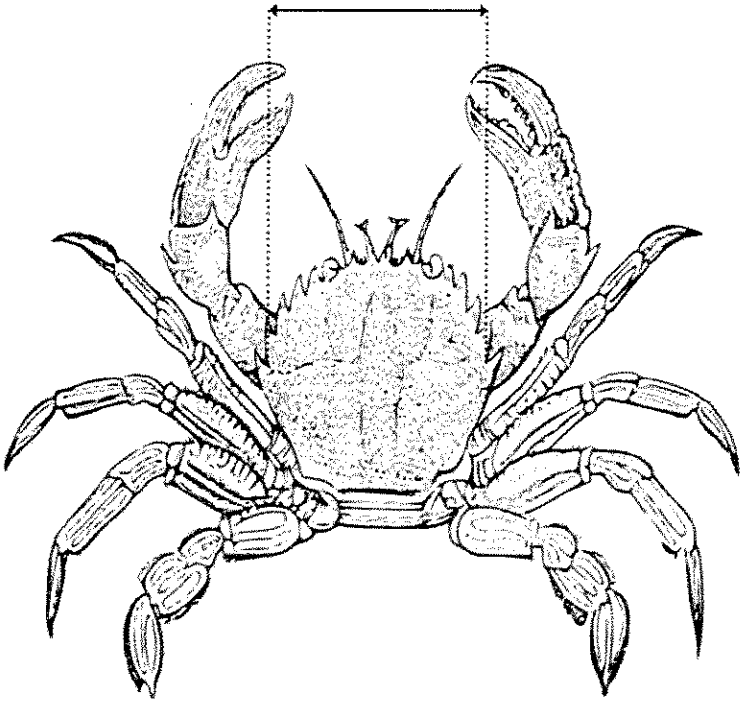


Figure 7 Bivalve molluscs

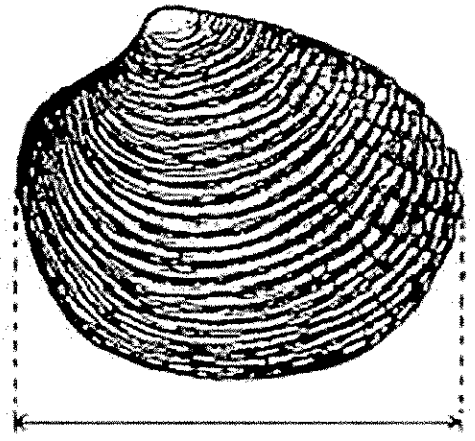
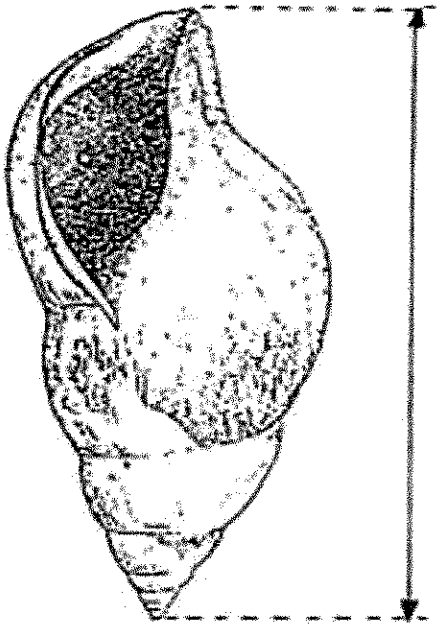


Figure 8 Whelk
(*Buccinum undatum*)



Title: EMERGENCY BYELAW 'Fish, mollusc and crustacea minimum size byelaw 2019'

IA No:

Lead department or agency: NEIFCA

Other departments or agencies: MMO,NE

Impact Assessment (IA)

Date: 13/08/2019

Stage:

Source of intervention: Domestic

Type of measure: Emergency Byelaw

Contact for enquiries: 01482 393515

Summary: Intervention and Options

RPC Opinion: **N/A**

Cost of Preferred (or more likely) Option

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
NA	NA	NA	No	NA

What is the problem under consideration?

Inshore Fisheries and Conservation Authorities's (IFCAs) are empowered to enforce minimum sizes in relation to commercial and recreational fisheries imposed by Council Regulation (EC) No 850/98. However this legislation is soon to be revoked and replaced by legislation for which Inshore Fisheries and Conservation Officers (IFCOs) do not have powers to enforce. In addition, the legislation which replaces 850/98 represents deregulation which would diminish the effectiveness of minimum sizes as a measure and particularly in relation to recreational fishing.

Why is government intervention necessary?

Management of fisheries by prohibiting the removal of undersize individuals is an important tool in ensuring long-term, sustainable fisheries. North Eastern IFCA's ability to enforce such is crucial to meeting duties under MaCAA and the Marine Strategy framework directive. The implementation of the new regulations represents a risk to such.

What are the policy objectives and the intended effects?

It is proposed that an emergency byelaw is implemented which has the effect of replicating the provisions of 850/98 in so far as they are applied to minimum sizes. This would include retaining prohibitions on the transhipping, landing, transporting, storing, selling and displaying or offering for sale undersize marine organisms and its application to recreational fisheries. In addition, an emergency byelaw would replicate other administrative elements of the original and current regulations (for example, an undersize allowance of 10% for certain pelagic species).

Legal advice has been sought to the effect that the circumstances reflect the criteria set in s.157 of MaCAA to implement an emergency byelaw i.e. that there is an urgent need for the byelaw and that the circumstances could not reasonably have been foreseen. This is underpinned by the importance of minimum sizes in fisheries management including the contribution of the recreational fishing sector to fishing mortality and given that IFCA's were made aware of the 'new' regulations on 29th May 2019 without sufficient time to implement a conventional byelaw.

The proposed byelaw will apply minimum conservation reference sizes to all species which have them under 850/98 / 1241/2019 and which are known to have been caught from within the North Eastern IFCA district since 2012. This includes some species which are not likely to be of particular importance to recreational fishing but reflects the paucity of information on a species by species basis for recreational fishing (i.e. an unknown level of risk to each fishery) and that the purpose of the byelaw is to replicate the protective effect (whether limited or not) of the original regulations which would otherwise be lost. The wording of the byelaw also takes into account the landing obligation in relation to certain commercial catches so as to ensure no conflict between the byelaw and current EU regulations.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

0. Do nothing/rely on MMO cross warranting
1. Emergency byelaw
2. Voluntary measures

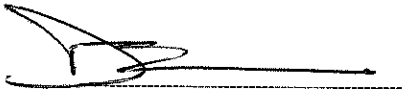
'Do nothing' is not considered an option because of the percieved level of risk to the exploited fisheries outlined within this assessment. MMO Cross warranting can play a supplementary role but will not in itself cover the perceived level of risk across all sectors of the fishing industry and any agreed voluntary measures would not be respected or enforceable. Option 1 therefore, is considered the most effective option to ensure long-term, sustainable fisheries and effective enforcement of MCRS.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 12 months

The proposed management regulation is an emergency byelaw which will be monitored continuously by officers and formally reviewed before August 2020. A new byelaw provision will be produced in the interim period.

Does implementation go beyond minimum EU requirements?			**Yes**		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** **Yes**	**< 20** **Yes**	**Small** **Yes**	**Medium** **Yes**	**Large** **Yes**
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** **N/A**	**Non-traded:** **N/A**	

I have read the impact assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Chief Officer:  Date: 13/08/2019

Summary: Analysis & Evidence Policy Option 1

Description:

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV) (£m[1])		
			Low: Optional	**High:** Optional	**Best Estimate:**

COSTS (£m)	Total Transition[2] (Constant Price) Years	Average Annual[3] (excluding transition) (Constant Price)	Total Cost[4] (Present Value)
Low	NA	Optional	Optional
High	NA	Optional	Optional
Best Estimate	NA	**Optional**	

Description and scale of key monetised costs by 'main affected groups'

The byelaw merely replicates the current provisions in EC 850/98, ensuring continuity of protective measures. Therefore, no financial implications are anticipated.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate			

Description and scale of key monetised benefits by 'main affected groups'

Other key non-monetised benefits by 'main affected groups'

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5%

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Eqivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: N/A	**Benefits:** N/A	**Net:** N/A[5]	No	N/A

[1] Net Benefit - value of the total monetised benefits minus the total monetised costs. All monetised costs and benefits should be expressed in £m . In order to compare options you need to adjust the estimates by discounting the impacts to the same point in time, to estimate the Present Value (PV) of the impacts (see main evidence section for explanation).

[2] Transient, or one-off costs or benefits that occur, which normally relate to the implementation of the measure. Non-quantified transient or one-off costs should be documented in the non-monetised section

[3] Average Annual, These are the costs and benefits that will reoccur in every year while the policy measure remains in force (although the scale of the impact may change over time) and so should not include transition costs. These are expressed as an annual average (over the life of the policy). i.e. undiscounted.

[4] i.e. discounted as with NPV

Evidence base

1. Introduction

IFCA's are empowered to enforce minimum sizes in relation to commercial and recreational fisheries imposed by Council Regulation (EC) No 850/98. However this legislation is soon to be revoked and replaced by legislation for which Inshore Fisheries and Conservation Officers (IFCOs) do not have powers to enforce. In addition, the legislation which replaces 850/98 represents deregulation which would diminish the effectiveness of minimum sizes as a measure and particularly in relation to recreational fishing.

2. Rationale for intervention

Management of fisheries by prohibiting the removal of undersize individuals is an important tool in ensuring long-term, sustainable fisheries. North Eastern IFCA's ability to enforce such is crucial to meeting duties under MaCAA and the Marine Strategy framework directive. The implementation of the new regulations represents a risk to such.

Therefore, it is proposed that an emergency byelaw is implemented which has the effect of replicating the provisions of 850/98 in so far as they are applied to minimum sizes. This would include retaining prohibitions on the transhipping, landing, transporting, storing, selling and displaying or offering for sale undersize marine organisms and its application to recreational fisheries. In addition, an emergency byelaw would replicate other administrative elements of the original and current regulations (for example, an undersize allowance of 10% for certain pelagic species).

Legal advice has been sought to the effect that the circumstances reflect the criteria set in s.157 of MaCAA to implement an emergency byelaw i.e. that there is an urgent need for the byelaw and that the circumstances could not reasonably have been foreseen. This is underpinned by the importance of minimum sizes in fisheries management including the contribution of the recreational fishing sector to fishing mortality and given that IFCA's were made aware of the 'new' regulations on 29th May 2019 without sufficient time to implement a conventional byelaw.

3. Policy objectives and intended effects

The byelaw will apply minimum conservation reference sizes to all species which have them under 850/98 / 1241/2019 and which are known to have been caught from within the North Eastern IFCA district since 2012. This includes some species which are not likely to be of particular importance to recreational fishing but reflects the paucity of information on a species by species basis for recreational fishing (i.e. an unknown level of risk to each fishery) and that the purpose of the byelaw is to replicate the protective effect (whether limited or not) of the original regulations which would otherwise be lost. The wording of the byelaw also takes into account the landing obligation in relation to certain commercial catches so as to ensure no conflict between the byelaw and current EU regulations.

4. Background

As part of the IFCA's remit to manage fisheries within the IFC District, IFCAs can enforce some European and National fisheries legislation in addition to their own byelaws. This includes measures implemented through Council Regulation (EC) No 850/98 of 30 March 1998 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms[6] (850/98 hereafter). IFCA's are empowered to enforce measures from 850/98 under the Sea Fishing (Enforcement) Regulations 2018[7]. 850/98 includes the establishment of Minimum Conservation Reference Sizes (MCRS) - minimum sizes that fish and shellfish can be removed from the fishery - in addition to requirements relating to gear construction such as mesh sizes etc.

Matter under consideration

Regulation (EU) 2019/1241[8] was published by the European Union on 25 July 2019. These regulations deal broadly with managing fishers, applying an eco-system approach as well as providing for 'regional' management of fisheries across Europe. The intentions of this legislation come from reformed Common Fisheries Policy. Importantly, these regulations revoke and replace the measures implemented through 850/98. Officers have identified some key differences in the legislation compared to 850/98:

- Establishes that the MCRS apply only in relation to commercial fishing;
- Removes the prohibition on the transhipping, landing, transporting, storing, selling and displaying or offering for sale undersize marine organisms;
- Removes the requirement that crab species are to be landed whole with the exception of edible crab claws of no more than 5% by weight of total catch of crab or parts thereof;
- Allows any undersize marine organism not subject to landing obligations to be used as live bait (whereas previously it was limited to sardines, anchovy, horse mackerel and mackerel).

In addition, whilst the Sea Fishing (Enforcement) Regulations 2018 (which give IFCAs powers to enforce EU regs) allow for amendments for regulations, it does not have a mechanism to allow for superseding legislation. As such, at the time that 2019/1241 takes effect, IFCAs will no longer have powers to enforce any of the Technical Conservation measures, including MCRS. As a result, IFCA's powers will be significantly diminished. There will be no effective IFCA enforcement regime in respect of undersized fish for recreational anglers and no enforcement in respect of trans-shipment, landing, transporting, storing, displaying and offering for sale. This would cause enforcement issues in circumstances where there is insufficient evidence to demonstrate retention on board a vessel, and it would be almost impossible to enforce against end users such as restaurants and wet fish shops, transport companies, and processors found with fish which are outside the landing obligation below the MCRS.

Proposed solution

To implement an Emergency Byelaw under s.157 MaCAA with the effect of maintaining the effects of 850/98 with regards to the above identified differences to maintain the protective effect and enforceability of minimum sizes as a fisheries management tool.

The intention of the byelaw is to apply minimum size regulation to recreational fisheries and to provide the ancillary provisions which were within 850/98 in relation to transport and retention of undersize marine organisms which made the original regulations effective. The byelaw is worded to align with the application of the landing obligation (i.e. allows for certain catches to be exempt from a minimum size by virtue of 1380/2013) and replicates allowance for a percentage of undersize fish for certain pelagic catches.
It should be noted that the MMO are capable of issuing 'cross-warrants' which provide IFCOs powers to enforce additional legislation. This would enable IFCOs to enforce the new regulations (2019/1241 etc.) but it would not remedy the above identified issues in relation to the effectiveness and enforceability of MCRS nor its applicability to recreational fishing.

IFCA's can implement emergency byelaws if circumstances reflect that set out in s.157 MaCAA i.e. that:
The authority considers there to be an urgent need for the byelaw and;
The need for the byelaw could not have reasonably been foreseen.
Rationale for both elements are set out below.

---

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31998R0850
[7] http://www.legislation.gov.uk/uksi/2018/849/made
[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1241

Urgent need for the byelaw

The importance of minimum sizes

The removal of fish only once they have reached a minimum size (usually related to a breeding size) is a common fisheries management measure used around the world[9][10]. As a management measure it is relatively cheap, simple, effective to apply and easy for fishers to understand why this is used as a management measure.

There has been a move away from managing fisheries using a minimum size regime which requires commercial fishers to discard dead, undersize fish. This is set out in the reformed common fisheries policy and implemented through 1380/2013 as the 'landing obligation'. The landing obligation removes the incentive to catch undersize fish through requiring that they are landed and counted against quota but crucially that they are not sold for human consumption. The landing obligation applies to finfish rather than shellfish (crustacea, molluscs) as a reflection of their high incidental mortality – i.e. large percentages of finfish perish after being caught regardless of their being returned to the sea. Enforcement activity of minimum sizes in relation to crustacea and molluscs are important aspects of North Eastern IFCA's compliance regime and in particular in relation to the crab and lobster fisheries throughout the district. In addition, the landing obligation does not apply to recreational fishing activity. As such, maintaining the disincentive to take and retain undersize relies solely on the enforcement of a minimum size by prohibiting their removal. It is also worth noting that rod and line fishers (the primary recreational fishery) generally have higher survivability than other commercial fishing gears (e.g. trawls, static nets etc.) increasing the effectiveness of a minimum size as a management tool.

The loss of the ability to enforce minimum sizes would significantly diminish North Eastern IFCA's ability to meet its obligations under MaCAA and the Marine Strategy Framework Directive i.e. long-term, sustainable fisheries. An emergency byelaw is considered the most effective way of achieving this because the use of MMO cross-warrants will enable only the enforcement of minimum sizes through 1380/2013 which significantly diminishes the effectiveness of the enforcement of minimum sizes and would not apply to recreational fishing.
N.B. It should be noted that the proposed emergency does not intend to conflict with the landing obligation – paragraph 2 of the emergency byelaw applies the prohibition in paragraph 3 (of removing undersize fish etc.) only to catches where the landing obligation doesn't apply.

Importance of MCRS in relation to recreational fisheries

Unfortunately, accurate national or regional information about angling activity around the coast and at sea is relatively sparse. Sea Angling 2012[11] was established to find out how many people go sea angling in England, how much they catch, how much is released, and the economic and social value of sea angling. The surveys also met UK obligations under European law to estimate recreational catches of several species including bass and cod. Data were collected from over 11,000 sea anglers in England through an Office of National Statistics (ONS) household survey, face-to-face interviews with anglers by Inshore Fisheries and Conservation Authorities (IFCA), catch diaries and online surveys. The findings give a good national overview of the English angling sector and give a good indication of the amount of annual fishing effort. More up-to-date feedback from the recreational fishing sector suggests that there has been a steady decline in angling numbers since 2012. A summary of the results is set out below:

The surveys estimated there are 884,000 sea anglers in England, with 2% of all adults going sea angling. These anglers make a significant contribution to the economy - in 2012, sea anglers resident in England spent £1.23billion on the sport, equivalent to £831million direct spend once imports and taxes had been excluded.

[9] [1]New South Wales Recreational Saltwater Fishing Guide. (2018) NSW Department of Primary Industries. ISBN web 978-1-76058-242-5
[10] 2FLORIDA SALTWATER RECREATIONAL 2019. FISHING REGULATIONS. Florida Fish and Wildlife Conservation Commission. Issued: Jan. 1, 2019
[11] Armstrong M., Brown A., Hargreaves J., Hyder K., Pilgrim-Morrison S., Munday M., Proctor S., Roberts A. & Williamson K. (2012) Sea Angling 2012 – a survey of recreational sea angling activity and economic value in England. Defra - contract MF1221.

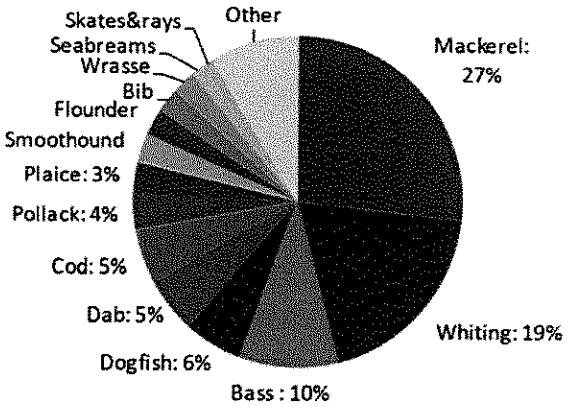
This supported 10,400 full-time equivalent jobs and almost £360 million of gross value added (GVA). Taking indirect and induced effects into account, sea angling supported £2.1billion of total spending, a total of over 23,600 jobs, and almost £980 million of GVA. Angling 2012

Almost 4 million days of sea angling were recorded over the year.

Shore fishing was the most common type of sea angling – almost 3 million angler-days compared with 1 million for private or rented boats and 0.1 million on charter boats.

Anglers had most success on charter boats, catching 10 fish per day on average compared with around 5 from private boats and only 2 from the shore.

The most common species caught, by number, were mackerel and whiting, (below).



Shore anglers released around 75% of the fish caught, many of which were undersized, and boat anglers released around 50% of their fish.

The recreational shellfish fishery within the NEIFCA district is one of the largest in the UK and is managed through a dedicated permit scheme with 2,496 permits issued in 2019. Permit holders can set a maximum of 10 pots, with further restrictions placed on catch limits and the capture of shellfish using nets. Minimum size regulations help manage this activity.

The importance of minimum sizes is also recognised by the recreational angling community.
Angling Trust website[12] *(19/7/19)*
"Minimum landing sizes are used all over the World and are just one of a number of tools used to manage fish stocks. However, as a common-sense approach to conservation and an easy concept to understand (protecting immature fish) they have become particularly favoured by recreational anglers with an interest in conservation and sustainable management of fish stocks."
"The angling Trust encourages all anglers to Give Fish A chance and apply voluntary minimum retention sizes which exceed the EU's and allow all fish retained the chance to have bred at least once."
The minimum size legislation also applies to a long list of molluscs and crustacea including, whelks, edible crabs, lobsters and a number of clam species.

Effective enforcement of MCRS

The new regulations require only that catch of marine organisms below the MCRS '*shall not be retained on board, but shall be returned immediately to the sea*'[13]. Notwithstanding that this effectively rules out its application to fishing from shore (including what may be commercial fishing), it also removes the prohibition on the transhipping, landing, transporting, storing, selling and displaying or offering for sale undersize marine organisms. This would cause enforcement issues in circumstances where there is insufficient evidence to demonstrate retention on board a vessel and would make it is almost impossible to enforce against end-users such as restaurants and wet fish shops, transport companies, and processors found with fish which are outside the landing obligation below the MCRS.

Catch inspections typically take place on quaysides as vessels are landing. However, market inspections, inspection on stalls or fish shops and inspections of catch loaded into vehicles or in the process of being

[12] https://www.anglingtrust.net/page.asp?section=163
[13] Article 15(12) 1380/2013 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R1380

loaded are also an important part of the compliance regime and has encouraged best practice. The protective effect and effectiveness of enforcement of minimum sizes are therefore greatly diminished by the new regulations and urgent action would be required to remedy this to avoid impacts on the sustainability of stocks.

Application to all species for which MCRS applies and which are landed within the North Eastern IFC District

The proposed byelaw seeks to replicate the protective effect in place under 850/98. To this end, the byelaw applies to species which have an MCRS and are evidenced to have been landed within the North Eastern IFC District. This is determined using the Marine Management Organisation landing dataset 2012 to 2017 (inclusive).

Whilst the level of risk is likely to vary between species, the previous regime had a level of protective effect on all species. The impacts of recreational fishing in particular are relatively unknown on a species by species basis. It is considered reasonable to maintain the current protective effect for species which are fished within the district as a reflection of this uncertainty and the precautionary approach advocated through the Common Fisheries Policy.

In addition, the timeframe for implementing the emergency byelaw do not allow for further investigation on a species by species basis. The generality of the byelaw reflects that the urgency of the circumstances do not allow for further investigation or justification of specific provisions.

Need for the byelaw could not have reasonably been foreseen.

IFCA's were made aware of the wording of the new regulations on the 29th March 2019 including confirmation from the MMO that such did not apply to recreational fishing.

The process for making IFCA byelaws (as set out in Defra guidance[14]) typically takes in excess of 12 moths. As such, IFCAs could not conceivably responded to the issues identified with a conventional byelaw prior to the implementation of the new regulations.

In addition, IFCAs were informally told that the UK negotiating position was for the new regulations to clarify their application to recreational fishing and it was expected to be the case. As such, the current circumstances are considered to fulfil this criterion in the context of the time required to implement a conventional byelaw.

Impacts on stakeholders

The proposed byelaw is considered to have no impacts on stakeholders. This reflects that the effects of the byelaw reflect those presently in place and are no stricter than had been the case.

The options

Option 0: Do nothing/rely on MMO cross warranting

If new legislation was not in place and supported by education and enforcement there is a significant likelihood of increased landings of fish and shellfish that are immature and have not bred yet. This could reduce the spawning stock biomass of a range of stocks and could affect the long-term health of a number of important stocks. Without an emergency byelaw there would be no legal way of continuing to enforce these minimum sizes.

In officers experience, the taking of small and undersized fish is an action that we get a significant number of phone calls and emails about. To the general public minimum sizes are an important and easy to understand management measure. The removal of such a measure would likely be seen as perverse for regulators charged with protecting fish stocks.

Minimum size legislation also helps create a greater consistency between the commercial and non-commercial sectors targeting the same species, and it helps avoid any tension between commercial fisher's landing to a MCRS and recreational fishers landing exactly the same fish but at a much smaller size.

[14] https://www.gov.uk/government/publications/ifca-byelaw-guidance

In addition, reliance on MMO cross warranting would only enable enforcement under the new regulations which do not include the prohibitions on transport etc. of undersize marine organisms. This greatly diminishes the effectiveness of the MCRS measures in relation to both commercial and recreational catch and represents a reputational risk to North Eastern IFCA (i.e. an inability to take enforcement action as a result of ineffective measures).

Option 1: Emergency bylaw
Ensure long-term, sustainable fisheries and effective enforcement of MCRS whilst a permanent legislative solution is developed.

Option 2: Voluntary measures
A number of national and local angling associations, clubs and charter boats have their own set of minimum sizes which they fish to. These voluntary measures are useful and within clubs can be strictly adhered to. However, the number of people in fishing clubs continues to drop and enforcement has shown that there is a minority of people that will fish to their legal limit. Without specific legislation it is officers' opinion that there would be significant amounts of immature fish being caught and landed.

Conclusion

Recommended option: *Emergency byelaw*

NORTH EASTERN INSHORE FISHERIES AND CONSERVATION AUTHORITY

Report to: Science Advisory Group
6 September 2019

Licensing and consents update

Report by the Senior Environmental & Scientific Officer

A. **Purpose of Report**

To update members on licencing and consent applications considered by Officers since the last Science Advisory Group meeting.

B. **Recommendation**

That members note the report.

1. **Licensing and consents**

1.1 As a relevant authority, NEIFCA is consulted on developments within and abounding the district, including the issuing of marine consents or licenses. Applications relating to marine developments can be numerous and each one is considered both independently and cumulatively with any other neighbouring activities. Authority Officers also often play an active role in working groups established for the monitoring and surveillance of developments. The following applications were reviewed between March and September 2019.

Reference	Date responded
North Sunderland Harbour steps construction, Seahouses A	04/03/2019
River Hull+: Crown Dock North Bridge	04/03/2019
Hull River Defence	05/04/2019
Grand sluice, Boston	05/04/2019
South Withernsea coastal defences	05/04/2019
Teesside AMP	10/05/2019
River Hull scheme, Corsair, angling platforms	10/05/2019
Withernsea Long Sea Outfall	10/05/2019
Tees inter terminals jetty upgrade	10/05/2019
Marsden lifeguard station and Redwell steps	21/05/2019
Neptune deep water test tank	21/05/2019
Grimsby river terminal expansion	21/05/2019
Welwick to Skeffling MRS	07/06/2019
Outstrays MRS	07/06/2019
Scott Street Bridge dismantlement and replacement	07/06/2019
South Bank Wharf Development, River Tees	04/07/2019
North Sunderland Harbour Steps Construction B	11/07/2017

Humber Gateway Offshore Wind Farm Marine License	11/07/2019
Lower Steenbergs Yard Development, River Tyne	11/07/2019
Westermost Rough Offshore Windfarm, post construction fisheries report	13/08/2019
South Bank Wharf Development, River Tees site investigation	22/08/2019

1.2 Copies of the Westermost Rough OWF fisheries report are presented for members information, along with Officers response to the consultation including comments and suggestions for the next monitoring report.

1.3 In addition, Orsted (formerly Dong energy) have begun early phase consultation regarding Hornsea 4 Offshore Wind Farm. While the windfarm itself is situated outside NEIFCA jurisdiction, the planned export cable route will make landfall on the East Yorkshire coast requiring works within the district. Officers are awaiting the forthcoming environmental impact assessment and will update members as more information becomes available.

Contact Officer

Tim Smith
Senior Environmental & Scientific Officer
Ext 3692

Westermost Rough Offshore Wind Farm

Fish and Fisheries in the region of the offshore wind farm

A desktop study covering the period 2010 -2017 (Before and after construction)

Report produced by West of Morecambe Fisheries Ltd, December 2018
(Version 002)

Executive Summary

The Westermost Rough Offshore Wind Farm

Construction of the Westermost Rough offshore wind farm (WMR OWF) began in early 2014 and was completed when the farm became fully operational in July 2015 (Figure 1, Figure 2). The wind farm consists of 35 turbines, each generating 6 MW of power, collectively sufficient power to meet the demand of more than 150,000 homes. The wind farm is located in water depths of between 10 to 20 m (below chart datum).

The Marine Licence and WMR OWF

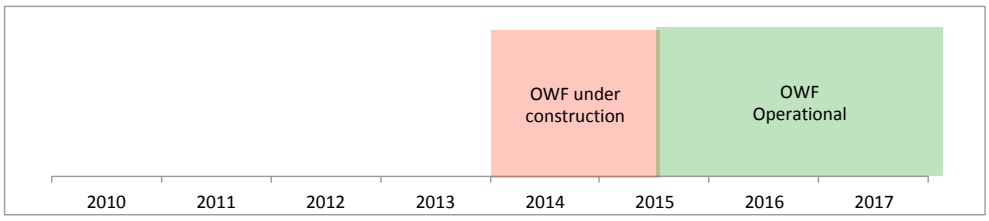
The Marine License issued by the Marine Management Organisation (MMO) for the WMR OWF stipulates that desk-based studies be undertaken (pre- and post-construction) to characterise the fish populations in the wind farm area. The results of these desk-based studies are to be reported upon in 2013, 2016, 2017 and 2018. The work reported here, aims to fulfil this Marine License obligation for 2017. Further details on this Marine Licence are given in Section 1. The objective of the desk-based study as stated in the Marine Licence is:

'*To determine the potential impact on shellfish/fisheries at the site. This objective leads to the following null-hypothesis that the establishment of Westermost Rough Offshore Wind Farm does not lead to significant changes in the shellfish/fisheries at the site'.*

Fisheries data examined in this work

This study examines both commercial fisheries landings (fisheries-dependent) and survey trawl catches (fisheries-independent) time-series data throughout the period 2010–2017. This time-series covers the pre-construction, construction and operational phases of the Westermost Rough offshore wind farm (Figure 1), so provides the reader with an overview of fisheries and fish populations in the area and vicinity throughout that period. The data used in this study originate from ICES rectangle 36F0 (Figure 2) and have been sourced from ICES, Cefas and the MMO. NEIFCA were unable to provide any data for the study.

Figure 1. The study period and timings when the WMR OWF was constructed and became operational



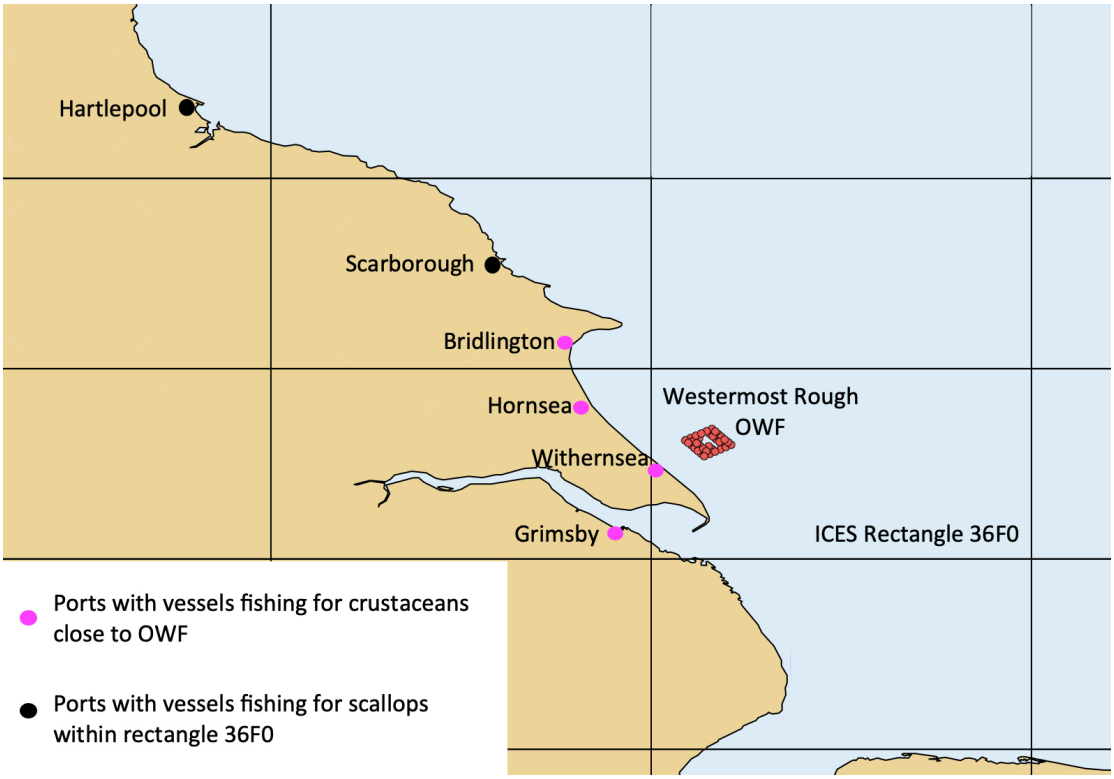
Commercial Fisheries near to the OWF

The Westermost Rough OWF is located within ICES rectangle 36F0 (herein referred to as 36F0), and landings of shellfish consistently dominate fisheries landings and activity in that area. The wind farm turbines are sited in an area of seabed covering 35km^2 in total, which is approximately 1% of the total area of 36F0.

Bridlington, Hornsea, Withernsea and Grimsby are the ports that are home to many of the commercial fishing vessels operating within or close to the Westermost Rough OWF (Figure 2). Fisheries landings into these ports are dominated by lobsters and crabs, which are caught in baited pots.

Fishing for scallops by vessels rigged with towed dredges is also carried out in 36F0, and these are landed into Scarborough, Hartlepool and sometimes Grimsby (Figure 2). Whelks are also caught and landed from this rectangle.

Figure 2. Fishing ports with fishing vessels active in the Westermost Rough offshore wind farm and 36F0 area

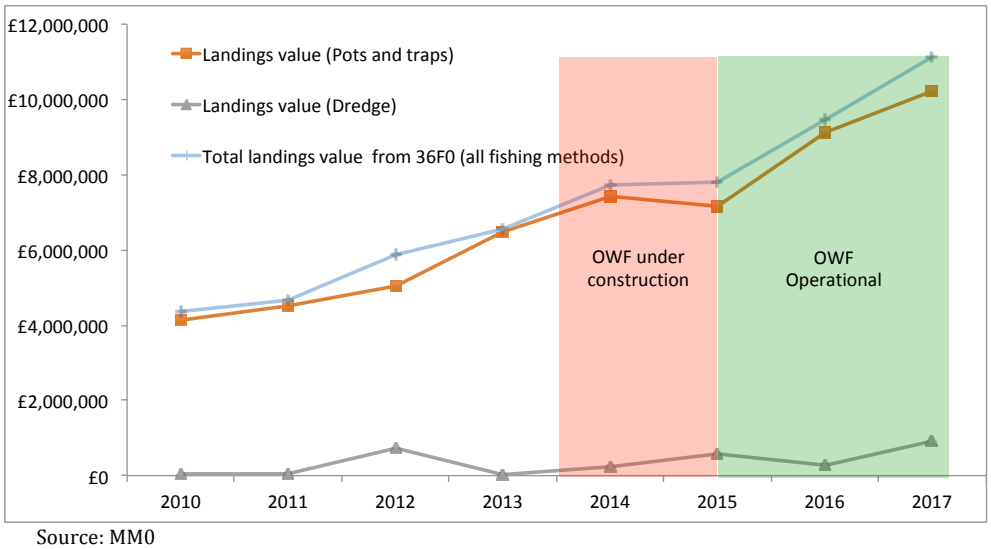


Commercial Fisheries Landings

Overall, the revenues and commercial fisheries landings originating from 36F0 increased steadily throughout the study period, primarily driven by increases in shellfish landings (Figure 3 and Figure 4).

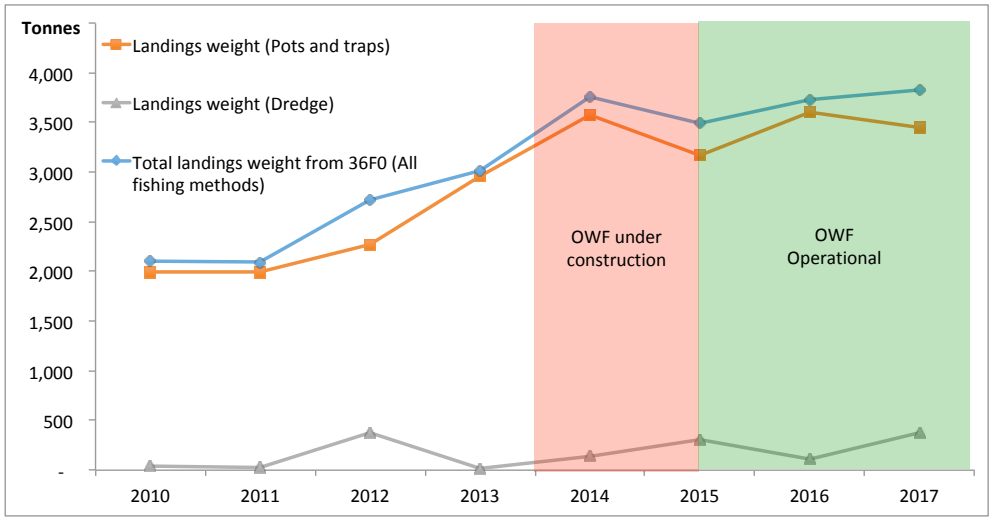
The patterns of landings throughout the study period are somewhat mixed, but appear to largely demonstrate increases in landings after the OWF was constructed (2014-2017 inclusive) when compared to before the OWF was constructed (2010 -2013 inclusive) (Table 1). There are however, some reported declines in landings in both Hornsea and Withernsea (Table 1), which are the two fishing ports in closest proximity to the OWF (Figure 2).

Figure 3. The historical value of fisheries landings sourced from 36F0 by different fishing methods



Source: MM0

Figure 4. The historical weight of fisheries landings sourced from 36F0 by different fishing methods



Source: MMO

Table 1. A comparison of commercial fisheries metrics from before and after the OWF construction

Metric No	Port	Metric (Tonnes landed)	Period (1) **Before Construction** 2010 – 2013 (inclusive) Sum total of tonnes landed from 36F0 during the period	Period (2) **After Construction** 2014-2017 (inclusive) Sum total of tonnes landed from 36F0 during the period	Amount of increase or decrease in sum total (tonnes) landed observed in Period (2) compared to Period (1)
1	All ports	Total landings	9,931	14,809	4,878
2	All ports	Caught in pots	9,234	13,803	4,569
3	All ports	Caught by dredge	466	919	453
4	All ports	Edible crab	6,898	9,791	2,893
5	All ports	Whelks	1,027	2,256	1,229
6	All ports	Lobsters	1,213	1,692	479
7	All ports	Scallops	466	920	454
8	Bridlington	All species	6,405	8,481	2,076
9	Bridlington	Edible crab	4,586	5,381	795
10	Bridlington	Whelks	851	1,799	948
11	Bridlington	Lobsters	889	1,238	349
12	Grimsby	All species	2,639	4,895	2,256
13	Grimsby	Edible crab	1,947	4,075	2,128
14	Grimsby	Whelks	177	371	194
15	Grimsby	Lobsters	163	228	65
16	Grimsby	Scallops	169	153	(16)
17	Hornsea	All species	246	196	(50)
18	Hornsea	Edible crab	166	72	(94)
19	Hornsea	Lobsters	80	122	42
20	Withernsea	All species	253	264	11
21	Withernsea	Edible crab	174	204	30
22	Withernsea	Lobsters	78	61	(17)
23	Scarborough	All species	162	444	282
24	Scarborough	Scallops	134	309	175
25	Scarborough	Whelks	0	77	77
26	Scarborough	Edible crab	22	30	8
27	Scarborough	Lobsters	4	26	22
28	Hartlepool	All species	79	342	263
29	Hartlepool	Scallops	58	342	284

Key: **Black** denotes an increase after OWF construction **Red** denotes a decrease after OWF construction

Discussion (Commercial Fisheries Landings from 36F0)

In general, fisheries landings can be highly variable and may rise and fall for a multitude of reasons. These reasons can include changes in fisher behaviour, fishing patterns, fishing effort, fishing opportunities, fishing costs (fuel, bait, crew, etc.), economic returns for fishers, the use of new fishing technological advances, access to fisheries markets. Changes in fisheries legislature and management can also affect landings. Natural variations in weather patterns, oceanographic patterns, recruitment of new juveniles into a fishery, spawning success rates, predation within the ecosystem, the availability of food, growth rates, and disease can affect the integrity of fish stocks and ultimately the dependant fisheries and their landings.

During the construction of the WMR OWF (approx. 18 months), access to fishing grounds inside the OWF was severely restricted for safety reasons, however this restriction was lifted and fishing resumed within the OWF once it became operational. The wind farm is sited in an area of seabed that equates to around 1% of the total seabed in ICES rectangle 36F0, and the impact, if any, upon commercial fisheries and stocks of this construction has been hitherto unknown.

At the macro level reported in this work (i.e. ICES rectangle), the commercial fisheries landings from 36F0 have steadily risen throughout the study period. There appears to be little to indicate that the construction and operation of the OWF has had any significant detectable deleterious effect upon commercial fisheries operating in ICES rectangle 36F0.

It appears more likely that any impact upon fisheries arising from the OWF, should it exist, has been localised and /or minor in magnitude and may not detectable by commercial fisheries landings data, even at the fairly high resolution of ICES rectangle presented here. In addition, the compounding effects of the many variables that can affect fisheries landings (as described above in the upper paragraph) may mask minor impacts.

The parallel CPUE (Catch per Unit Effort) fieldwork study[1] being undertaken and reported upon separately is controlling for such variables (as described in the upper paragraph) and will provide a significantly more localised and sensitive quantification of any potential impact that the OWF may have had upon shellfish stocks and the fisheries. This significant study is due to be completed in 2019.

[1] Ørsted in conjunction with the local fishermen's organisation (HFIG) are presently undertaking fieldwork surveys to gather carefully controlled CPUE fisheries-independent data on crustacean stocks in and around WMR OWF both pre- and post-construction. These surveys and data are reported on separately and are due to be completed in 2019. These fieldwork surveys should result in definitive peer-reviewed scientific publications that describe CPUE of the key crustacean target species at the spatial micro-level within the Westermost Rough OWF area. The findings from the fieldwork surveys will inform on the magnitude of any OWF impact upon CPUE if such exists and will significantly complement the macro-data presented here in this work.

Survey Trawl Catches (Fish species in ICES rectangle 36F0)

The time-series of the relevant ground trawl survey data provided by Cefas/ICES revealed that 60 fish species, six species of squid and seven of shellfish were caught throughout the study period in the locality of the Westermost Rough OWF. The bulk of the catches (97–99%) in the trawl surveys were dominated consistently from 2010 to 2017 by the same eight species. The age and length structure of the eight species also appears to have remained relatively constant throughout (see sections 4.3 and 4.4).

Table 2. A comparison of metrics obtained from survey trawl data before and after the OWF construction

Metric No	Metric (description)	Period (1) **Before Construction** 2010 – 2013 (inclusive)	Period (2) **After Construction** 2014-2017 (inclusive)
1	No. of species present during both Period (1) & (2)	48	48
2	No. of species present only during one Period	8	16
3	Shannon Diversity Index score on diversity & abundance	1.7	1.7
4	Bray Curtis Similarity Index score comparing both Periods		85% similar
5	% of trawl catch comprised of these eight key fish species*	98%	99%
6	Average age of Whiting (years)	2	2
7	Average age of Plaice (years)	3	3
8	Average age of Mackerel (years)	2	2
9	Average age of Sprat (years)	2	2
10	Average age of Herring (years)	1	1
11	Average length of Dab (cm)	16	16
12	Average length of Lesser weever (cm)	11	11
16	Average length of Grey gurnard (cm)	20	19
17	Average length of Horse mackerel (cm)	25	23

*Eight key fish species: Whiting, mackerel, sprat, herring, dab, lesser weever, grey gurnard, horse mackerel

Discussion (Survey trawl catches of fish in ICES rectangle 36F0)

Although the source data has limitations (see section 4.1.1), the analysis of the survey trawl data here did not detect any significant differences in fish assemblages before and after the OWF was constructed (Table 2).

Recommendation

It is recommended that CPUE fieldwork surveys[2] once completed in 2019, be used in conjunction with this work (repeated again in 2019, with additional data from 2018) to provide an informed evaluation on the potential impact of the Westermost Rough OWF upon commercial fisheries.

[2] Ørsted in conjunction with the local fishermen's organisation (HFIG) are presently undertaking fieldwork surveys to gather carefully controlled CPUE fisheries-independent data on crustacean stocks in and around WMR OWF both pre- and post-construction. These surveys and data are reported on separately and are due to be completed in 2019. These fieldwork surveys should result in definitive peer-reviewed scientific publications that describe CPUE of the key crustacean target species at the spatial micro-level within the Westermost Rough OWF area. The findings from the fieldwork surveys will inform on the magnitude of any OWF impact upon CPUE if such exists and will significantly complement the macro-data presented here in this work.

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1. Introduction

1.1 The Westermost Rough Offshore Wind Farm

Construction of the Westermost Rough offshore wind farm began in early 2014 and was completed when the farm became fully operational in July 2015 (Figure 1, Figure 2). The wind farm consists of 35 turbines, each generating 6 MW of power, collectively sufficient power to meet the demand of more than 150,000 homes. The wind farm is located in water depths of between 10 to 20 m (below chart datum).

1.2 Fisheries data examined in this work

This study was undertaken to satisfy the terms of a Marine License (see section 2.1) and examines both fisheries landings (fisheries-dependent) and survey trawl catches (fisheries-independent) time-series data throughout the period 2010–2017. This time-series covers the pre-construction, construction and operational phases of the Westermost Rough offshore wind farm (Figure 1), so provides the reader with an overview of fisheries and fish populations in the area and vicinity throughout that period. The data used in this study have been sourced from ICES, Cefas and the MMO. NEIFCA were unable to provide any data for the study.

2. Background and purpose of this document

2.1 The Marine Licence and WMR OWF

The Marine License issued by the Marine Management Organisation (MMO) for the WMR OWF stipulates that desk-based studies be undertaken (pre- and post-construction) to characterise the fish populations in the wind farm area. The results of these desk-based studies are to be reported upon in 2013, 2016, 2017 and 2018. The work reported here, aims to fulfil this Marine License obligation for 2017.

2.1.1 The purpose of this work and the relevant Marine License

The purpose of this work is to satisfy the relevant requirements of the Marine Licence as detailed in the Environmental Monitoring Programme (EMP) for the WMR OWF. Specifically, this work aims to fulfil post construction survey conditions for Ørsted (formerly DONG Energy) under Section 5 and Annex 1: Marine Fish of the WMR ML L/2011/00305/12 and proposed monitoring outlined under Objective 2, Section 5.2.3 of the associated EMP. The relevant excerpts from the Marine Licence and EMP are given below.

2.1.2 Relevant excerpts from the Marine License WMR ML L/2011/00305/12

Marine Licence ANNEX 1: *The Westermost Rough site area supports shellfish/fisheries; surveys to examine the potential impacts on these fisheries should be undertaken. This should include a robust baseline and post construction surveys. The details of these surveys must be agreed with the Licensing Authority.*

The objective of the desk based study: *To determine the potential impact on shellfish/fisheries at the site. This objective leads to the following null-hypothesis that the establishment of Westermost Rough Offshore Wind Farm does not lead to significant changes in the shellfish/fisheries at the site.*

The method to be used: *To characterise the adult fish population in the wind farm area it is proposed to undertake a desk based study based on published data on the fish and shellfish populations in the area*[3].

[3] The MMO has in June 2013 emphasised the importance of sandeel (Ammodytidae spp.) and herring (*Clupea harengus*), however the pre-construction monitoring report concluded that the Westermost Rough Offshore Wind Farm does not support key sandeel habitats and that herring larvae or commercial stocks are not abundant within the Westermost Rough Offshore Wind Farm site. Sandeel and herring will thus *not* be species of particular interest in the post-construction monitoring, but any landing data on the species shall be included in the study, as shall any other fish species.

3. Fisheries dependant data

3.1 Source data and limitations

In this section, the commercial fisheries landings reported from 36F0 are listed and discussed. The Marine Management Organisation (MMO) has collected these fisheries landings data from the 36F0 over the study period of 2010–2017. The data do not describe CPUE (Catch per unit effort), because such data are not collected[4]. However, the data presented here detail the quantities landed into the ports of interest and do provide a valuable macro-overview of fishing activity in the vicinity of the OWF and within 36F0.

3.2 Historical fisheries landings from 36F0 during the period 2010 - 2017

Both Table 3 and Table 4 demonstrate that pots and traps have consistently been the fishing method that accounts for the bulk of fishery landings (*circa* 93%) from this ICES rectangle throughout the study period. This statement corroborates fisheries liaison experience by Westermost Rough OWF personnel and also the data presented in Table 7 and Table 8, which reported that Bridlington, Grimsby, Hornsea and Withernsea have fishing fleets operating pots in closest proximity to the wind farm. Table 5 and Table 6 also provide evidence that shellfish are the most important group commercially landed from the entire 36F0.

Table 3. The historical value (£ million) of fisheries landings sourced from 36F0 by fishing method

Fishing method	2010	2011	2012	2013	2014	2015	2016	2017
Pots and traps	4.12	4.50	5.05	6.48	7.43	7.17	9.12	10.23
Dredges	0.06	0.06	0.74	0.03	0.25	0.58	0.27	0.90
Other fishing methods*	0.18	0.12	0.09	0.04	0.06	0.05	0.06	0.01
Total landings value from 36F0 (All fishing methods combined)	4.36	4.68	5.88	6.54	7.74	7.80	9.45	11.14

* Includes demersal otter trawls, beam trawls, seines, long lines, gill nets, trammel nets, drift nets.
Source: MMO

Table 4. The historical weight (tonnes) of fisheries landings from 36F0 by fishing method

Fishing Method	2010	2011	2012	2013	2014	2015	2016	2017
Pots and traps	1,996	1,995	2,277	2,966	3,580	3,163	3,609	3,451
Dredge	37	32	379	18	135	303	109	372
Other fishing methods*	69	68	61	34	40	27	16	4
Total landings value from 36F0 (All fishing methods combined)	2,101	2,096	2,717	3,017	3,755	3,494	3,733	3,827

* Includes demersal otter trawls, beam trawls, seines, long lines, gill nets, trammel nets, drift nets.
Source: MMO

There are also, however, many tonnes of scallops that are reportedly caught in 36F0 and that are not landed into the local ports of Bridlington, Hornsea and Withernsea. These landings of scallops are detailed in Table 6 and are a relatively important component of fishing activity within this ICES rectangle and are most commonly landed into Scarborough, Hartlepool and Grimsby. Whelks are also targeted in 36F0 and are landed into Bridlington, Grimsby and more recently into Scarborough.

Table 5. Historical landings (tonnes) from 36F0 by species category (2010 – 2017)

Species category	2010	2011	2012	2013	2014	2015	2016	2017
Shellfish	2,056	2,054	2,660	3,000	3,719	3,467	3,726	3,821
Demersal fish	46	41	36	17	26	23	7	6
Pelagic fish	<1	<1	21	<1	11	4	<1	<1

Source: MMO

Overall, the data presented in Figure 5, Table 3 to Table 8 indicate that revenues and landings weight within 36F0 increased steadily throughout the study period and are primarily driven by rises in shellfish landings. Demersal trawling, beam trawling, gill netting and long lining are of minor importance within 36F0 and together constitute around 1% of overall fishing activity in the area.

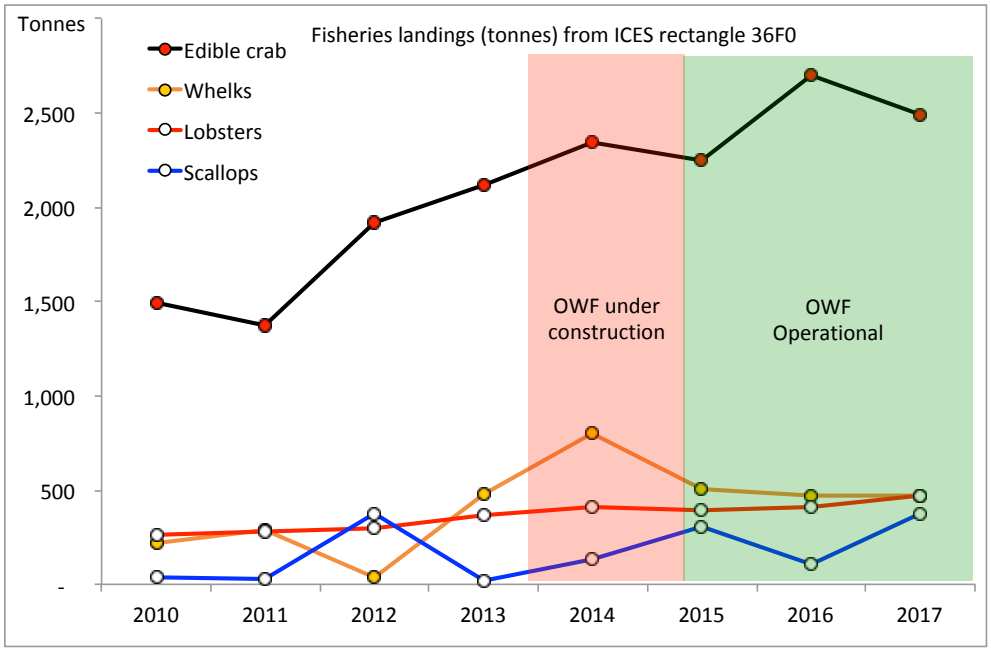
[4] Ørsted in conjunction with the local fishermen's organisation (HFIG) are undertaking fieldwork surveys to gather carefully controlled CPUE fisheries-independent data on crustacean stocks in and around WMR OWF both pre- and post-construction, these surveys and data are reported on separately.

Table 6. Historical landings (tonnes) from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010-2017)
Edible crab	1,491	1,375	1,917	2,115	2,349	2,249	2,704	2,489	67%
Whelks	217	291	36	483	804	510	473	469	13%
Lobsters	263	284	298	368	413	393	413	473	12%
Scallops	37	32	379	18	136	303	109	372	6%
Other species (n=59)	94	114	87	34	53	39	34	25	2%

Source: MMO

Figure 5. Commercial fisheries landings (most commonly landed species) from 36F0 (2010 – 2017)



Source: MMO

Table 7. Historical landings (tonnes) to the ports from 36F0 (2010 – 2017)

Port of landing	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed from 36F0
Bridlington	1,495	1,424	1,655	1,831	2,381	2,088	2,108	1,904	60%
Grimsby	469	497	660	1,013	1,081	983	1,335	1,496	30%
Scarborough	18	30	87	27	104	180	61	99	2%
Withernsea	30	60	94	69	85	77	80	22	2%
Hornsea	44	71	73	58	36	44	53	63	2%
Hartlepool	30	9	29	11	3	92	23	224	2%
Other ports (n=29)	16	5	119	7	65	30	74	19	1%

Source: MMO

Table 8. Historical landings value (£ million) to the ports from 36F0 (2010 – 2017)

Port of landing	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed from 36F0
Bridlington	3.05	3.11	3.63	4.35	4.99	4.96	5.68	6.60	63%
Grimsby	0.83	0.96	1.38	1.61	1.90	1.77	2.38	3.00	24%
Hornsea	0.21	0.24	0.22	0.24	0.22	0.26	0.49	0.58	4%
Withernsea	0.11	0.27	0.29	0.26	0.29	0.21	0.33	0.14	3%
Scarborough	0.03	0.06	0.14	0.05	0.21	0.35	0.25	0.21	2%
Hartlepool	0.08	0.02	0.04	0.02	0.00	0.18	0.06	0.53	2%
Other ports (n=29)	0.05	0.01	0.18	0.01	0.13	0.08	0.27	0.08	1%

Source: MMO

3.3 Fisheries landings in the ports close to the Westermost Rough offshore wind farm

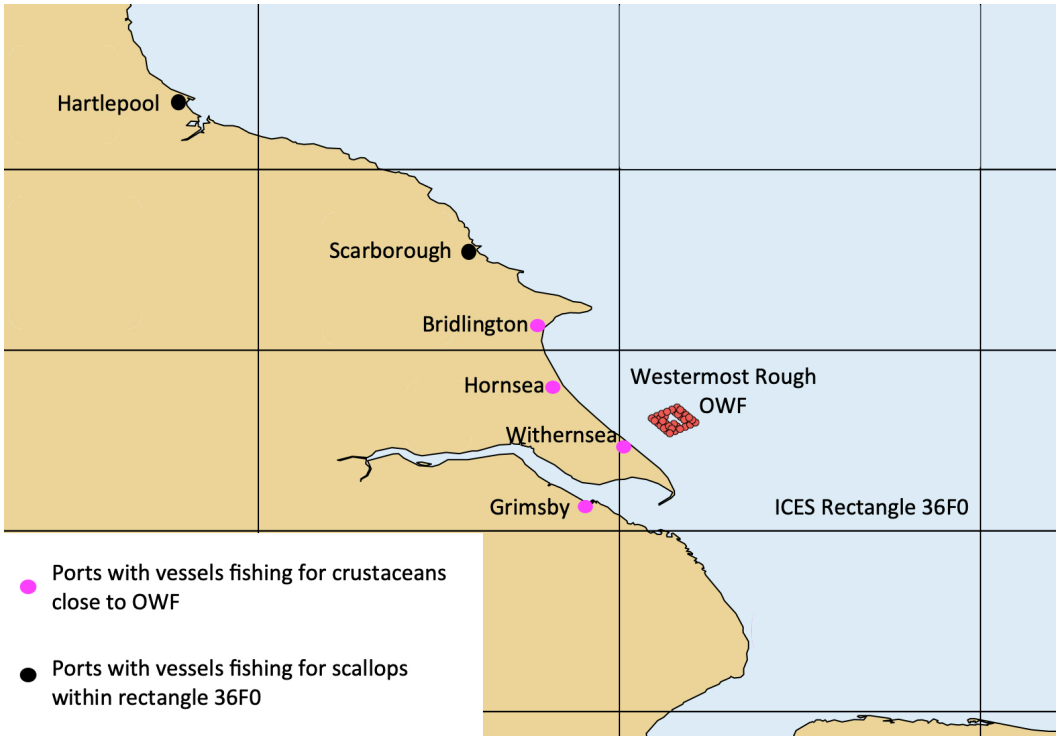
The fisheries operational in and around the Westermost Rough offshore wind farm (WMR OWF) almost all use static fishing gear, deploying baited pots to target the abundant crustacean populations that inhabit the area. The fisheries primarily target edible crab (*Cancer pagurus*) and lobster (*Homarus gammarus*) and essentially, the same type of baited pot is used to catch these species, although fishermen will use different baits, depending upon their own preferences and experiences. Lobster is of particular importance because of its high market value.

During pre-construction, construction and throughout the operational phase of the WMR OWF, Ørsted has closely and continuously liaised with all the fishers operating in and around the wind farm. These fishers (some 50 vessels in total) all target the crustaceans mentioned above, using baited pots, and operate from Bridlington, Grimsby, Hornsea and Withernsea (Figure 6).

Whelks (*Buccinum undatum*) are also caught within 36F0 in baited pots of varying designs and are landed regionally into both Bridlington and Grimsby. Whelks are widely distributed and are a relatively low value mollusc, when compared to lobsters and crabs.

Scallop dredge fishing vessels also operate within rectangle 36F0 and harvest scallops (*Pecten maximus*), but fish further away from the potting grounds and the OWF itself. This is to avoid fishing gear conflict and entanglement that can result when potting and scallop dredging are conducted in the same area and same time. Scallop dredgers working in 36F0 mainly land their catches in Scarborough, Hartlepool and Grimsby.

Figure 6. Fishing ports with fishing vessels active in the Westermost Rough offshore wind farm and 36F0 area



3.3.1 Landings into Bridlington from 36F0

Bridlington is a fishing port almost exclusively catering for potting vessels. The Bridlington fishing fleet is heavily dependent upon the fish resources with 36F0 and in 2017, approximately 60% of Bridlington landings (tonnes) originated from this ICES rectangle (MMO).

Pot caught, lobsters and edible crab are the most important and valuable species, accounting for over 93% of the total value of landings into Bridlington from 36F0 throughout the study period (Table 9). Although whelks have accounted for 18% of the weight of landings into Bridlington throughout the study period (Table 10), their relative low value per Kg has resulted in a modest contribution (£) of approximately 6%.

It is notable that approximately 60% of the total landings originating from rectangle 36F0 have been landed into Bridlington throughout the study period 2010 – 2017 (Table 7, Table 9). Record high landings to Bridlington from rectangle 36F0 worth £6.6 million were reported in 2017 (Table 8, Table 9).

In general, fisheries landings from 36F0 into Bridlington have shown a general increase throughout the study period of 2010 – 2017 (Figure 7), during which time the OWF was constructed and became fully operational.

Table 9. Historical landings value (£ million) to Bridlington from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010-2017)
Lobsters	1.83	1.92	2.11	2.74	2.88	3.14	3.73	4.53	62.9%
Edible crab	1.07	0.97	1.47	1.34	1.56	1.48	1.58	1.71	30.7%
Whelks	0.12	0.16	0.02	0.25	0.52	0.32	0.34	0.33	5.7%
Velvet crab	0.01	0.05	0.03	0.01	0.02	0.01	0.03	0.03	0.5%
Demersal fish species (n=25)	0.02	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.2%

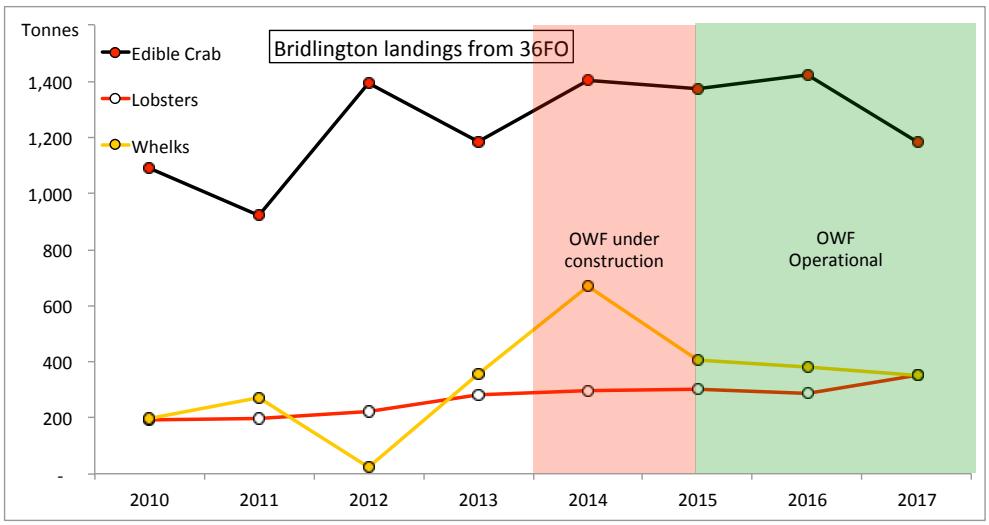
Source: MMO

Table 10. Historical landings (tonnes) to Bridlington from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Edible crab	1,089	920	1,391	1,186	1,405	1,372	1,422	1,182	67.0%
Whelks	197	273	24	357	667	405	378	349	17.8%
Lobsters	192	197	220	280	298	299	288	353	14.3%
Velvet crab	9	30	18	6	11	9	18	15	0.8%
Demersal fish species (n=25)	9	3	2	2	1	3	2	4	0.2%

Source: MMO

Figure 7. Bridlington fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

3.3.2 Landings into Grimsby from 36F0

Grimsby is a large a fish processing port, where most fish processed is transported in overland from other ports into Grimsby in refrigerated vehicles. The small fishing fleet based in Grimsby is fairly dependent upon the fish resources with 36F0 and in 2017, approximately 38% of Grimsby landings (tonnes) originated from this rectangle (MMO).

Throughout the study period (2010 – 2017), around 30% of the total landings (tonnes) sourced from 36F0 were landed to Grimsby (Table 7). Edible crab and lobster together, account for 89% (by value) / 85% (tonnes) of these landings (Table 11, Table 12).

Landings of edible crab have risen dramatically in the last fours years of the study period and landings are double those during of the first four years (Figure 8, Table 12). Landings of lobsters and whelks have been fairly consistent throughout, while scallop landings into Grimsby from 36F0 appear intermittent (Table 11, Table 12).

In general, fisheries landings from 36F0 into Grimsby have shown an increase throughout the study period of 2010 – 2017 (Figure 8), during which time the OWF was constructed and became fully operational.

Table 11. Historical landings value (£ million) to Grimsby from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 -2017)
Edible crab	0.33	0.40	0.51	1.06	1.09	1.02	1.70	2.02	59%
Lobsters	0.40	0.44	0.39	0.45	0.67	0.57	0.55	0.63	30%
Scallops	0	0	0.41	0	0.01	0.05	0	0.30	6%
Whelks	0.01	0.01	0.01	0.07	0.10	0.09	0.09	0.05	3%
Other species (n=42)	0.08	0.11	0.07	0.02	0.03	0.04	0.04	0.00	3%

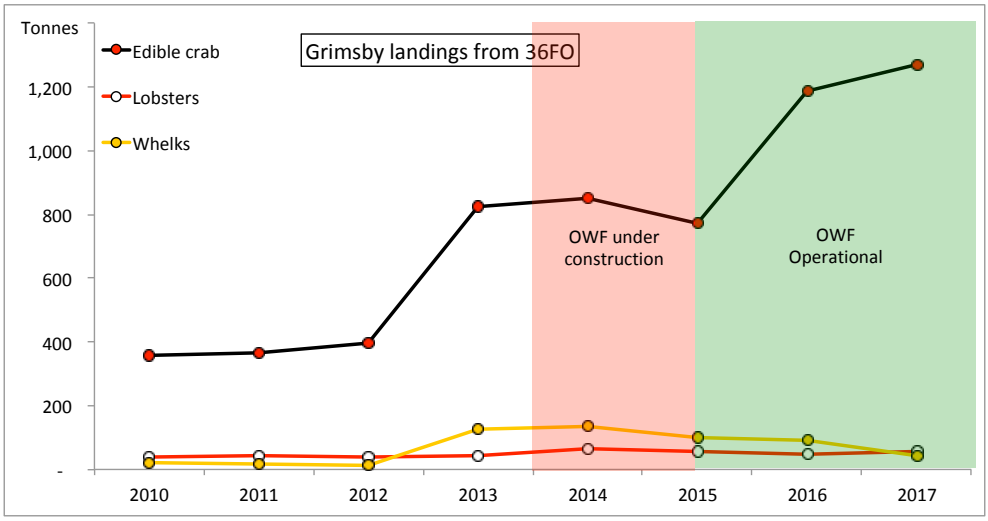
Source: MMO

Table 12. Historical landings (tonnes) to Grimsby from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010- 2017)
Edible crab	358	366	397	826	850	770	1,186	1,269	80%
Whelks	21	18	12	126	135	101	90	45	7%
Lobsters	41	42	38	42	67	56	49	56	5%
Scallops	0	0	169	0	2	28	0	123	4%
Other species (n=42)	49	71	44	19	28	27	9	3	3%

Source: MMO

Figure 8. Grimsby fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

3.3.3 Landings into Hornsea from 36F0

The Hornsea fishing fleet is quite dependent upon the fish resources with 36F0 and in 2017, approximately 55% of Hornsea landings (tonnes) originated from this rectangle (MMO).

The Hornsea fishing fleet is relatively small and all vessels are beach-launched and less than 10 m long. Landings into Hornsea account for around 2% of the total landings (tonnes) from 36F0 (Table 7) and show a mixed pattern throughout the period of study (2010 – 2017), during which time the OWF was constructed and became fully operational.

Edible crab landings into the port peaked in 2012, but then declined during the following two years, before stabilising at current levels (Figure 9, Table 14). Lobster catches have risen steadily since 2014 and account for much of the total landings value into the port (Table 13).

Table 13. Historical landings value (£ x 1,000) to Hornsea from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Edible crab	23	61	61	38	17	24	18	23	11%
Lobsters	189	183	161	201	199	238	470	553	89%
Other species (n=10)	<1	1	1	1	0	0	1	2	<1%

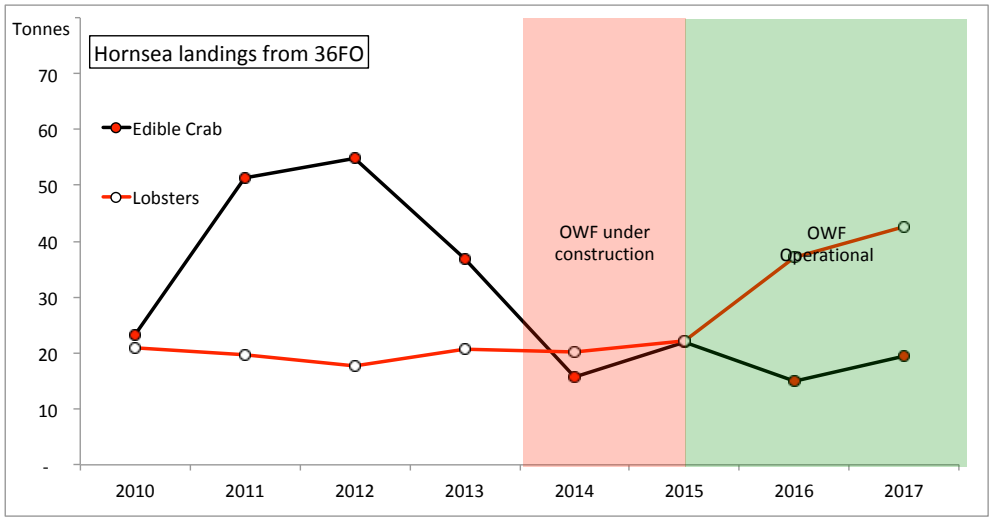
Source: MMO

Table 14. Historical landings (tonnes) to Hornsea from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Edible crab	23	51	55	37	16	22	15	19	54%
Lobsters	21	20	18	21	20	22	37	43	45%
Other species (n=10)	<1	<1	1	1	0	<1	1	1	1%

Source: MMO

Figure 9. Hornsea fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

3.3.4 Landings into Withernsea from 36F0

The small Withernsea fishing fleet is heavily dependent upon the fish resources with 36F0 and in 2017, approximately 80% of Withernsea landings (tonnes) originated from this rectangle (MMO).

The Withernsea fishing fleet is similar to that of the Hornsea fleet are all beach-launched vessels and less than 10 m long. Landings into Withernsea account for around 2% of the total landings (tonnes) from 36F0 (Table 7) and show a relatively stable pattern throughout from 2010 to 2016. However, in 2017 a sharp and as yet un-explained fall in landings was recorded (Figure 10, Table 15, Table 16).

The study period 2010 – 2017 covers the time during which time the OWF was constructed and became fully operational.

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Table 15. Historical landings value (£ x1,000) to Withernsea from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Edible crab	22	40	80	47	74	79	85	18	23%
Lobsters	89	228	208	211	214	129	241	125	76%
Other species (n=6)	0	2	2	0	0	2	0	0	<1%

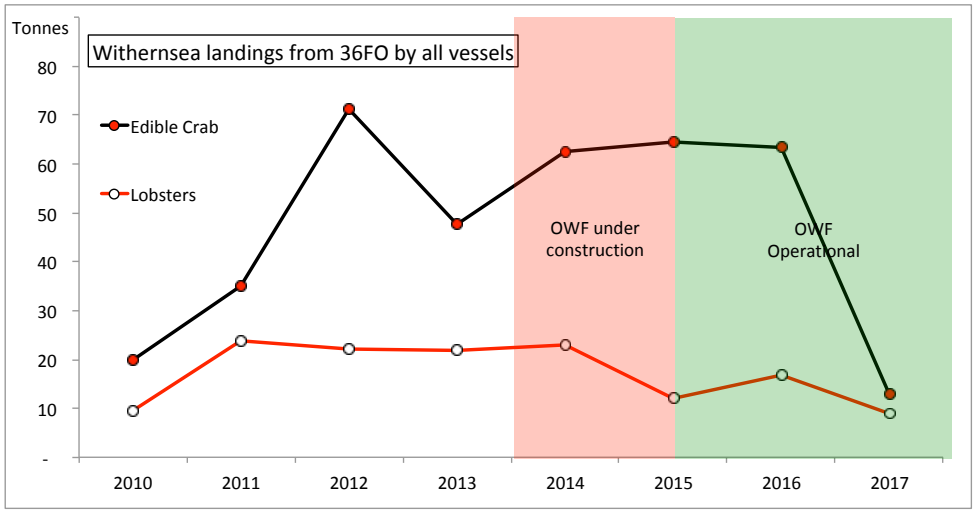
Source: MMO

Table 16. Historical landings (tonnes) to Withernsea from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Edible crab	20	35	71	48	63	65	63	13	73%
Lobsters	10	24	22	22	23	12	17	9	27%
Other species (n=6)	0	1	1	0	0	0	0	0	1%

Source: MMO

Figure 10. Withernsea fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

3.3.5 Landings into Scarborough from 36F0

The port of Scarborough is not heavily reliant upon commercial fisheries landings from 36F0 and in 2017, landings from 36F0 amounted to just 5% of the total landings into the port (tonnes) (MMO). Scallops, caught by dredging vessels, have been caught in peaks and troughs throughout the study period in 36F0, while lobster and edible crab landings have been steady throughout, albeit at low levels (Table 17, Table 18). Since 2016, whelks have been landed into Scarborough (Table 17, Table 18).

The study period 2010 – 2017 covers the time during which time the OWF was constructed and became fully operational (Figure 11). Overall, the commercial fisheries landings from 36F0 into Scarborough have more than doubled in the last four years (2014-2018) compared the first four years (2010 – 2013) in the study period (Table 17, Table 18).

Table 17. Historical landings value (£ x 1,000) to Scarborough from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Scallops	31	50	130	7	180	334	73	33	65%
Lobsters	<1	7	1	27	25	8	153	103	25%
Whelks	0	0	0	0	0	0	3	68	5%
Edible crab	0	2	3	20	10	2	17	6	5%
Other species (n=23)	2	0	2	0	<1	<1	1	1	<1%

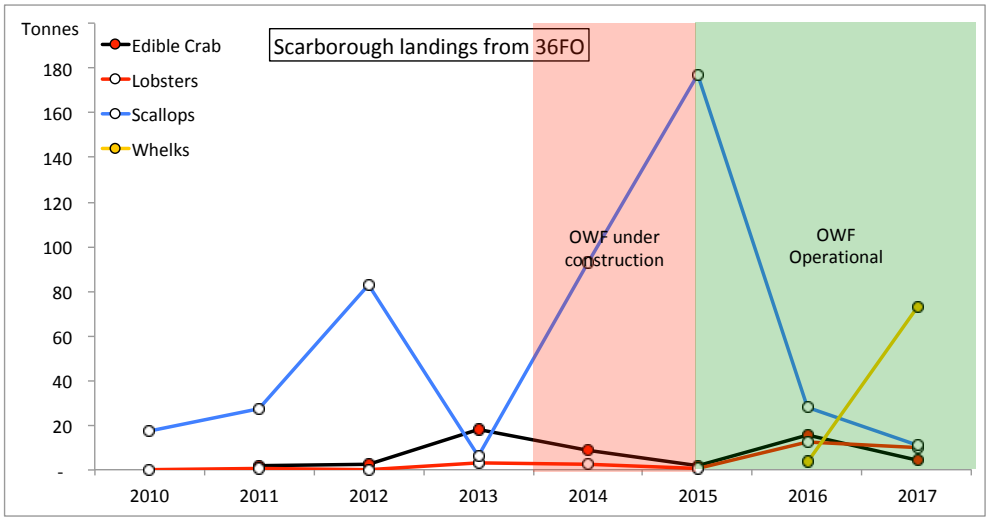
Source: MMO

Table 18. Historical landings (tonnes) to Scarborough from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017	% of total landed (2010 – 2017)
Scallops	17	28	83	6	93	177	28	11	73%
Whelks	0	0	0	0	0	0	4	73	13%
Edible crab	0	2	2	18	8	2	16	4	9%
Lobsters	<1	1	<1	3	3	1	12	10	5%
Other species (n=23)	1	<1	2	<1	<1	<1	1	<1	1%

Source: MMO

Figure 11. Scarborough fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

3.3.6 Landings into Hartlepool from 36F0

Scallop dredge fishing vessels land scallops to Hartlepool. Their landings from 36F0 have risen sharply throughout the study period (Table 19, Table 20, Figure 12).

Table 19. Historical landings value (£ x1,000) to Hartlepool from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017
Scallops	24	3	43	20	5	180	61	530
Other species (n=19)	57	20	0	0	0	0	0	0

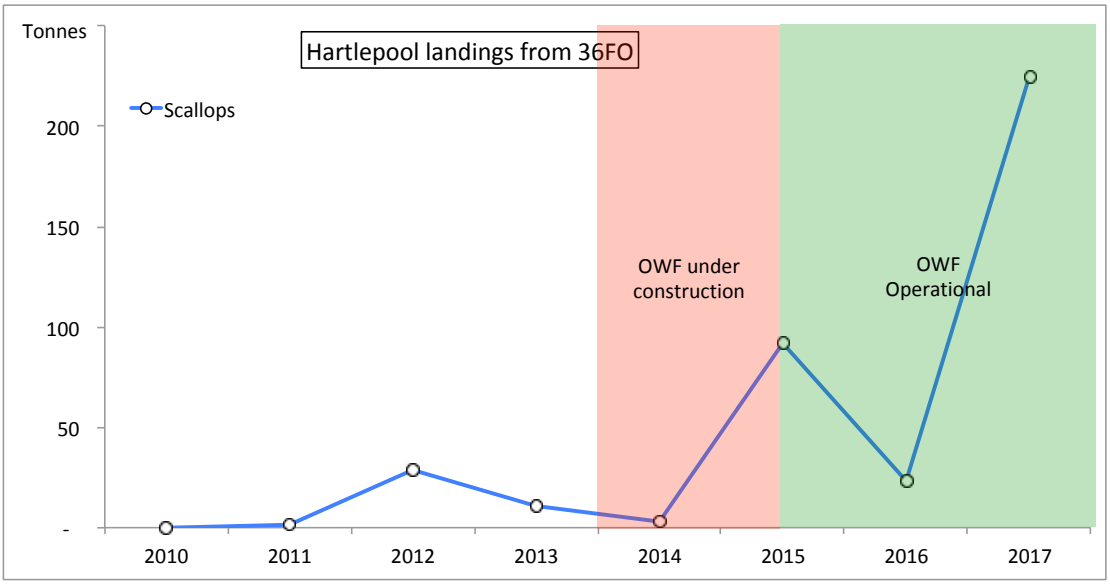
Source: MMO

Table 20. Historical landings (tonnes) to Hartlepool from 36F0 by species (2010 – 2017)

Species	2010	2011	2012	2013	2014	2015	2016	2017
Scallops	16	2	29	11	3	92	23	224
Other species (n=19)	14	7	0	0	0	0	0	0

Source: MMO

Figure 12. Hartlepool fisheries landings (tonnes) sourced from 36F0 (2010–2017)



Source: MMO

4. Fisheries-Independent Data

The Westermost Rough offshore wind farm (WMR OWF) is located within ICES (International Council for the Exploration of the Sea) rectangle 36F0 (Figure 13). There is in general a scarcity of fisheries-independent data on fish populations close to the wind farm or indeed within 36F0; this statement is particularly relevant to data collected consistently over a long time-period and to a consistent protocol.

4.1 ICES / Cefas annual North Sea groundfish trawl surveys

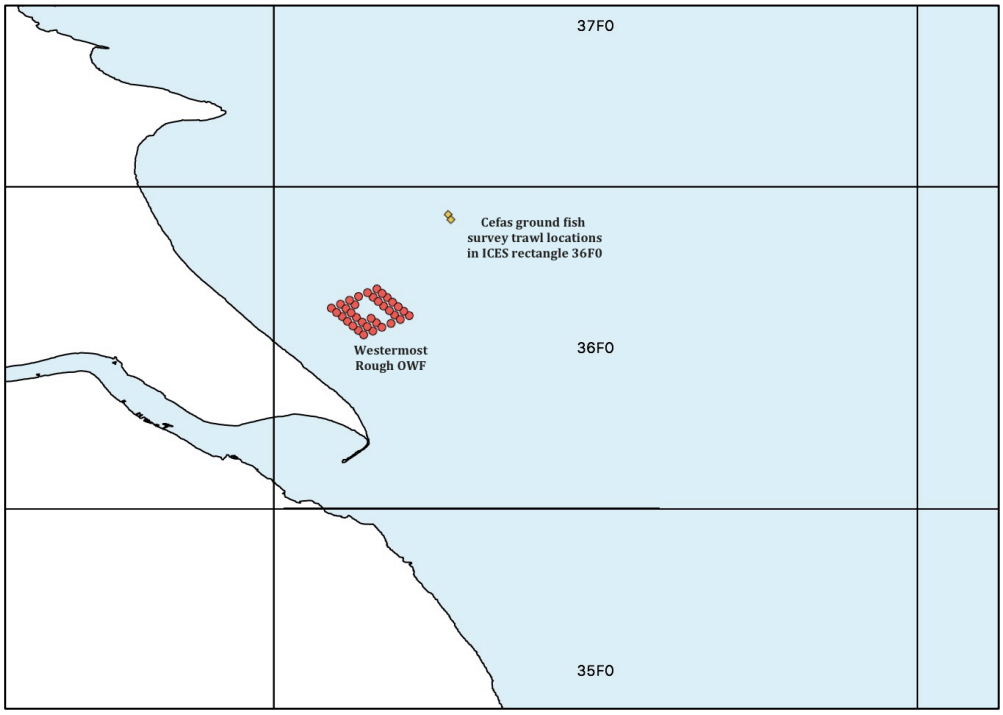
The Centre for Environment, Fisheries and Aquaculture Science (Cefas) has undertaken a groundfish trawl survey consistently each year throughout the North Sea, including 36F0, for about 50 years. The survey is performed by Cefas research scientists on board the organisation's own research vessel, currently the RV *Cefas Endeavour*, but previously on its predecessors, including the RV *Cirolana*. The survey is part of an international collaboration of marine fish population surveys undertaken by most of the nations bordering the North Sea and is co-ordinated by ICES.

During the Cefas survey, two stations within 36F0 are trawled and sampled routinely each year using a consistent protocol and standardised survey trawl (known as the GOV trawl, and used by all vessels throughout the time-series). The trawls are towed over the seabed with haul durations of typically 30 minutes to 1 hour. All catches of fish from the trawl are carefully analysed and documented. Cefas scientists then generate standardised CPUE data (Catch Per Unit Effort) for the species caught in the catches (Table 21). Samples of a selected group of species are also further examined to determine the age of the fish, leading to the production of additional CPUE-related age data and indices for those species (see section 4.3).

4.1.1 Data limitations

The data generated from the survey hauls over time at the two locations are presented here, and they represent the best available fisheries-independent time-series information on fish population structure within 36F0. The sampling stations are, however, located some distance from the Westermost Rough offshore wind farm and in deeper water (45 m below chart datum)(Figure 13), so interpretation of the data collected needs to be interpreted with this factor in mind.

Figure 13. The location of the Cefas annual groundfish trawl sampling sites in 36F0



Source: Cefas

Table 21. The CPUE (catch per unit effort) of fish, squid and shellfish species caught in 36F0.

Latin Name	Common Name	2010	2011	2012	2013	2014	2015	2016	2017
Merlangius merlangus	Whiting	25,531	7,423	5,815	10,482	12,477	4,397	17,636	10,613
Trachurus trachurus	Horse mackerel	6,011	74	3,246	146	1,497	2,477	5,209	7,265
Limanda limanda	Dab	1,211	7,854	1,368	1,469	3,121	2,153	2,893	1,405
Scomber scombrus	Mackerel	1,136	541	1,086	63	968	1,773	2,822	196
Eutrigla gurnardus	Grey gurnard	262	520	214	143	646	339	471	212
Sprattus sprattus	Sprat	1,950	9,023	400	3,243	282	16,117	362	4,837
Echiichthys vipera	Lesser weever	456	338	721	1,707	1,452	306	270	439
Pleuronectes platessa	Plaice	49	123	41	98	142	56	104	92
Microstomus kitt	Lemon sole	129	234	21	51	28	30	100	53
Clupea harengus	Herring	5,561	4,661	22	430	1,001	92	81	2,826
Agonus cataphractus	Pogge	59	39	76	33	26	47	80	32
Myoxocephalus scorpius	Sea scorpion	65	40	110	54	25	25	28	29
Callionymus lyra	Dragonet	43	59	30	57	23	19	36	39
Scyliorhinus canicula	Lesser spotted dogfish	2	2	4	1	51	2	32	12
Mullus surmuletus	Red mullet	1	16	-	1	5	31	13	17
Trisopterus minutus	Poor cod	96	112	32	158	47	8	10	20
Raja montagui	Spotted ray	1	5	-	1	-	-	6	2
Taurulus bubalis	Sea scorpion (Long spined)	-	-	2	1	1	-	6	-
Lophius piscatorius	Monk fish (Angler fish)	-	1	1	-	-	-	4	-
Melanogrammus aeglefinus	Haddock	-	-	1	-	-	-	4	5
Microchirus variegatus	Thickback sole	-	1	-	1	-	-	2	-
Enchelyopus cimbrius	Rockling (Four bearded)	-	1	2	-	1	-	2	-
Liparis liparis	Sea snail	1	-	-	-	-	-	-	-
Solea solea	Dover sole	3	10	-	6	1	-	2	1
Arnoglossus laterna	Scaldfish	-	1	1	4	8	3	2	1
Trisopterus luscus	Whiting-pout (Bib)	40	2	2	27	-	1	2	8
Pomatoschistus	Goby	-	-	-	-	-	-	2	-
Ciliata mustela	Rockling (Five bearded)	1	1	2	1	3	-	1	-
Engraulis encrasicolus	Anchovy	-	1	3	-	-	1	1	21
Amblyraja radiata	Thorny skate	1	-	-	-	-	1	1	-
Pholis gunnellus	Buttterfish	-	1	-	-	-	-	1	-
Mustelus asterias	Starry smooth hound	-	-	-	-	-	-	1	1
Gadus morhua	Cod	27	16	-	12	8	4	-	23
Buglossidium luteum	Solenette	5	-	4	7	11	16	-	-
Hippoglossoides platessoides	Long rough dab	9	9	-	8	-	3	-	-
Dicentrarchus labrax	Sea bass	9	5	-	1	-	-	-	1
Raja clavata	Thornback ray	5	1	1	2	2	2	-	1
Hyperoplus lanceolatus	Sandeel (Greater)	3	3	3	55	48	8	-	-
Phrynorhombus norvegicus	Norwegian topknot	-	1	8	-	-	-	-	-
Chelidonichthys cuculus	Red gurnard	1	1	2	1	-	2	-	-
Trisopterus esmarkii	Norway pout	1	-	-	-	-	4	-	4
Ammodytes tobianus	Lesser sandeel	-	-	2	1	1	-	-	-
Scophthalmus rhombus	Brill	-	-	2	-	1	-	-	-
Chelidonichthys lucerna	Tub gurnard	1	-	-	1	2	-	-	-
Leucoraja naevus	Cuckoo ray	-	1	1	-	-	-	-	-
Merluccius merluccius	Hake	1	-	-	-	1	-	-	-
Syngnathus typhle	Pipefish (Broad nosed)	-	-	2	-	-	-		
Platichthys flesus	Flounder	-	1	-	-	-	-	-	-
Callionymus reticulatus	Reticulated dragonet	-	-	-	-	-	1	-	1
Hyperoplus immaculatus	Greater sandeel (Corbin's)	-	-	-	1	-	-	-	-
Petromyzon marinus	Sea lamprey		-	1	-	-	-	-	-
Pollachius virens	Pollock	-	-	-	-	1	-	-	-
Sardina pilchardus	Pilchard	1	-	-	-	-	-	-	1
Scophthalmus maximus	Turbot	-	1	-	-	-	-	-	-
Syngnathus acus	Pipefish (Greater)	-	-	-	1	-	-	-	-
Zeugopterus punctatus	Topknot	-		-	1	-	-		
Alosa fallax	Shad (Twaite)	1	-	-	-	-	-	-	-
Gaidropsarus vulgaris	Rockling (Three bearded)	1	-	-	-	-	-	-	-
Spondyliosoma cantharus	Black sea bream	-	1	-	-	-	-		-
Buenia jeffreysii	Jeffrey's goby	-	-	-	-	-	-	-	1
Squids									
Loligo forbesii	Squid (Long Finned)	200	120	139	27	125	36	239	183
Alloteuthis subulata	Squid (Common)	5	-	24	-	36	30	10	10
Loligo vulgaris	Squid (European)	1	1	-	-	10	3	6	3
Todaropsis eblanae	Squid (Lesser flying)	-	-	-	-	1	1	2	-
Todarodes sagittatus	Squid (European flying)	-	1	-	-	-	-	-	-
Illex coindetii	Squid (Southern short fin)	-	-	1			-	-	1
Shellfish									
Cancer pagurus	Edible crab	10	12	22	44	38	25	48	71
Homarus gammarus	Lobster	6	21	3	8	7	1	9	9
Pecten maximus	King scallop	3	3	1	2	1	6	7	4
Necora puber	Velvet crab	-	-	-	-	-	4	12	446
Aequipecten opercularis	Queen scallop	20	-	-	-	-	-	-	-
Lithodes maja	King crab	-	-	-	-	-	2	-	-
Nephrops norvegicus	Norway lobster	1	-	-	-	-	-	-	-

Units: Sum of the No of fish caught per hour at the two sampling stations in 36F0
Source ICES / Cefas Research Vessel annual ground fish surveys

4.2 The most commonly caught species in the trawl surveys in 36F0

The survey catch records indicate that 60 species of fish, six species of squid and seven of shellfish have been caught in the Cefas trawl surveys in 36F0 since 2010 (Table 21). A basic analysis of the survey data indicates that it is largely similar throughout the study period, including both before (2010-2013) and after (2014-2017) the OWF was constructed. For example, the Bray-Curtis Index of Similarity ranks the survey trawl data from both time periods to be 85% similar. In addition, the survey trawl data from the two time periods (2010-2013 and 2014-2017), both score an identical 1.7 on the Shannon Diversity Index; an index that numerically describes diversity and abundance in biological communities.

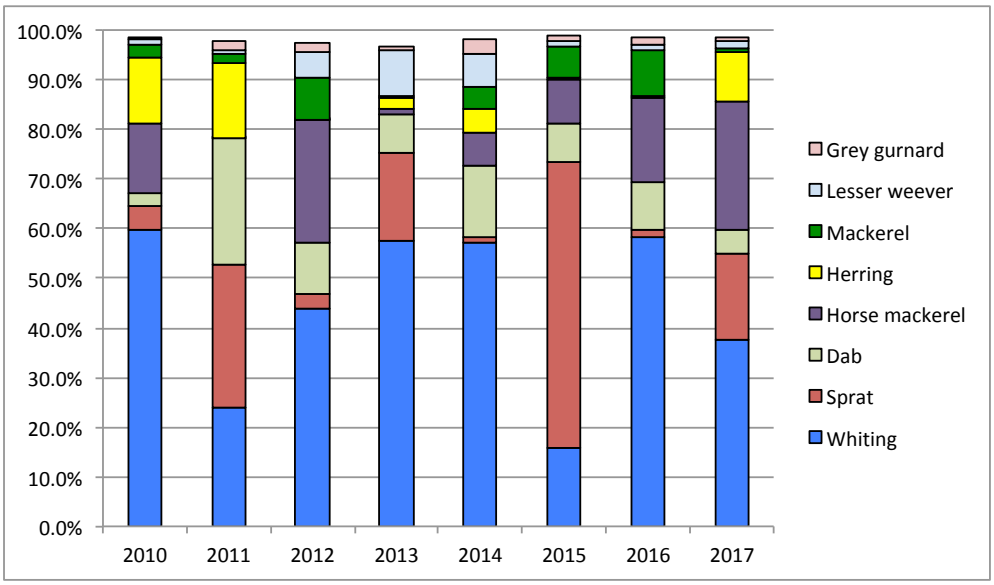
Eight fish species consistently accounted for the bulk (97–99%) of the annual survey fish catch since 2010 (Table 22 and Figure 14). The dominance of these eight fish species in the catches in the trawl surveys in 36F0 has remained unchanged and been a continuous feature throughout the study, i.e. before construction of the OWF, during construction and since the OWF has been operational (Figure 16). Of course, as with all such scientific and commercial surveys that occupy exactly the same station annually, the actual catches and the percentage each of the main species contribute to the total (or main-species) catches does vary over years, generally on the basis of geographical (usually environmentally driven) differences in distribution as well as fluctuations in the sizes of the annual year classes being targeted by the surveys.

Table 22. The most commonly caught fish species in the trawl surveys within 36F0

Latin Name	Common Name	2010	2011	2012	2013	2014	2015	2016	2017
Merlangius merlangus	Whiting	59.8%	23.9%	44.0%	57.4%	57.0%	15.7%	58.4%	37.7%
Sprattus sprattus	Sprat	4.6%	29.0%	3.0%	17.8%	1.3%	57.7%	1.2%	17.2%
Limanda limanda	Dab	2.8%	25.2%	10.3%	8.0%	14.3%	7.7%	9.6%	5.0%
Trachurus trachurus	Horse mackerel	14.1%	0.2%	24.5%	0.8%	6.8%	8.9%	17.3%	25.8%
Clupea harengus	Herring	13.0%	15.0%	0.2%	2.4%	4.6%	0.3%	0.3%	10.0%
Scomber scombrus	Mackerel	2.7%	1.7%	8.2%	0.3%	4.4%	6.4%	9.3%	0.7%
Echiichthys vipera	Lesser weever	1.1%	1.1%	5.5%	9.3%	6.6%	1.1%	0.9%	1.6%
Eutrigla gurnardus	Grey gurnard	0.6%	1.7%	1.6%	0.8%	3.0%	1.2%	1.6%	0.8%
% of the total CPUE		99%	98%	97%	97%	98%	99%	99%	99%

Units: Sum of the No. of the most commonly caught fish caught per hour at the two sampling stations in 36F0 expressed as a percentage of total catch CPUE
Source: ICES / Cefas

Figure 14. Most commonly caught fish species in trawl surveys in 36F0



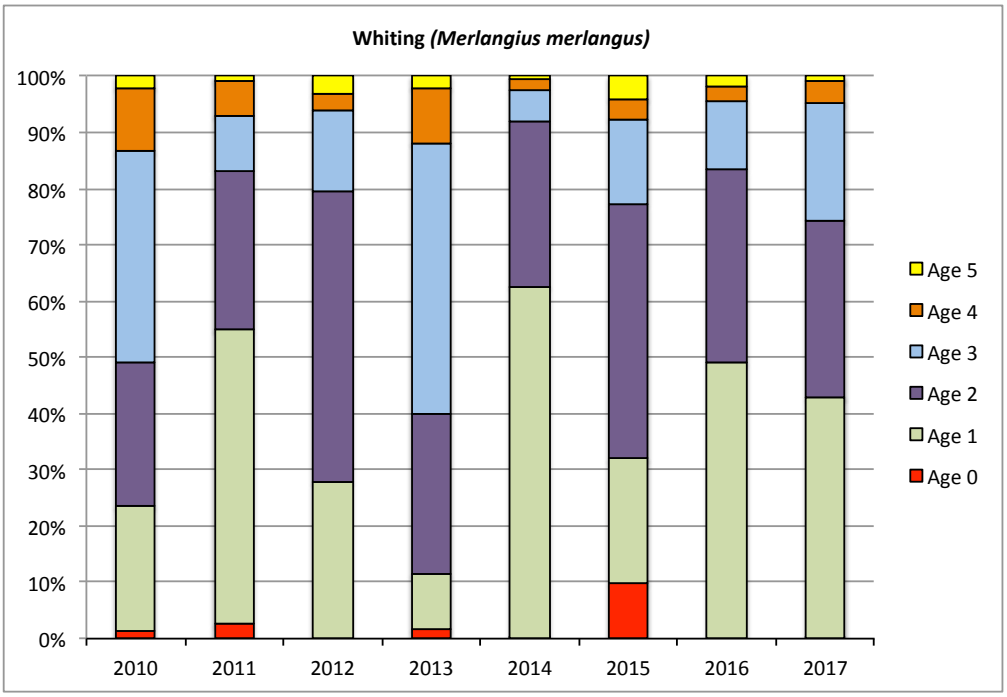
Units: Sum of the No. of most commonly caught fish caught per hour at the two sampling stations in 36F0 expressed as a percentage of total catch CPUE (Source: ICES / Cefas)

4.3 Age structure of commonly caught species[5] in trawl surveys within 36F0

4.3.1 Whiting (*Merlangius merlangus*)

Fish aged 1–3 years old have continually dominated the age structure of the whiting population throughout the North Sea (Figure 15 and Table 23). These ages have accounted for between 87 and 97% of the total whiting caught within the trawl surveys each year throughout the study period (2010–2017) (Figure 16). The average age of whiting caught during the 4-year period before construction, and the 4-year period after construction of the OWF, was 2 year old for both time periods.

Figure 15. Relative age structure of whiting caught in groundfish trawl surveys in 36F0



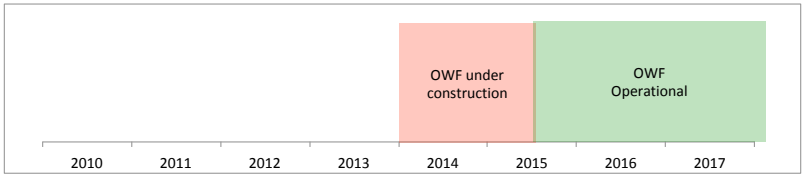
Units: Whiting caught at the two sampling stations in 36F0 broken down (%) into age group
Source: ICES / Cefas

Table 23. Relative age structure of whiting caught in groundfish trawl surveys in 36F0

Age of fish	2010	2011	2012	2013	2014	2015	2016	2017
Age 0	296	189	0	175	5	427	0	1
Age 1	5,564	3,836	1,613	994	7,780	961	8,501	4,461
Age 2	6,360	2,066	2,990	2,893	3,644	1,968	5,975	3,292
Age 3	9,389	718	825	4,907	682	654	2,128	2,166
Age 4	2,840	458	175	1,015	270	156	429	404
Age 5	505	65	181	204	51	178	315	104

Units: Sum of the No. of fish caught per hour at the two sampling stations in 36F0

Figure 16. The study period and timings when the WMR OWF was constructed and became operational

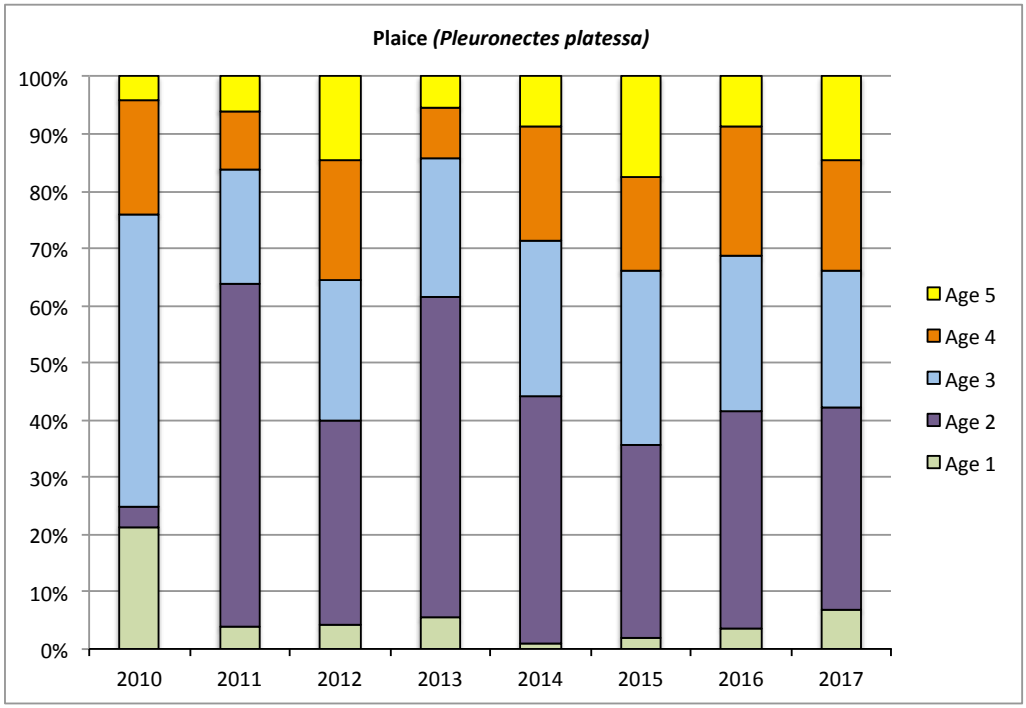


[5] Cefas and other nation's scientists only collect age data for a few specified fish species, as it is a resource-intensive process. Such age data is generally collected only on fish species subject to fish stock assessments as a result of their commercial fisheries importance.

4.3.2 Plaice (*Pleuronectes platessa*)

The age structure of the plaice caught in the trawl surveys remained relatively consistent throughout the study period (2010–2017) (Figure 17, Table 24 and Figure 18). Again, it is mainly plaice aged 2–4 that dominate the catches. The average age of plaice caught during the 4-year period before construction of the OWF was 3 year old. This was also the case for plaice caught during the 4-year period after construction (2014-2017 inclusive).

Figure 17. Relative age structure of plaice caught in groundfish trawl surveys in 36F0



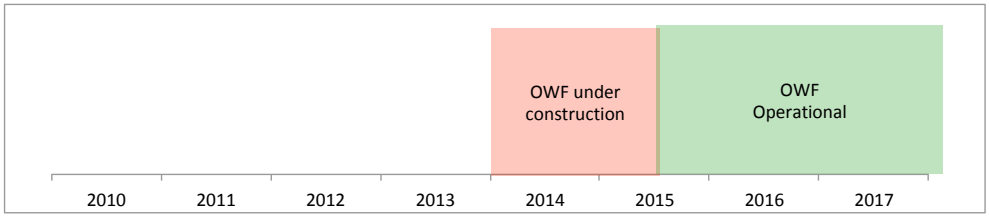
Units: Plaice caught at the two sampling stations in 36F0 broken down (%) into age group
Source: ICES / Cefas

Table 24. Relative age structure of plaice caught in groundfish trawl surveys in 36F0

Age of fish	2010	2011	2012	2013	2014	2015	2016	2017
Age 1	9	5	2	5	1	1	3	5
Age 2	2	71	13	52	56	17	31	27
Age 3	22	24	9	22	36	15	22	18
Age 4	9	12	8	8	26	8	18	15
Age 5	2	7	5	5	11	9	7	11

Units: Sum of the No. of fish caught per hour at the two sampling stations in 36F0

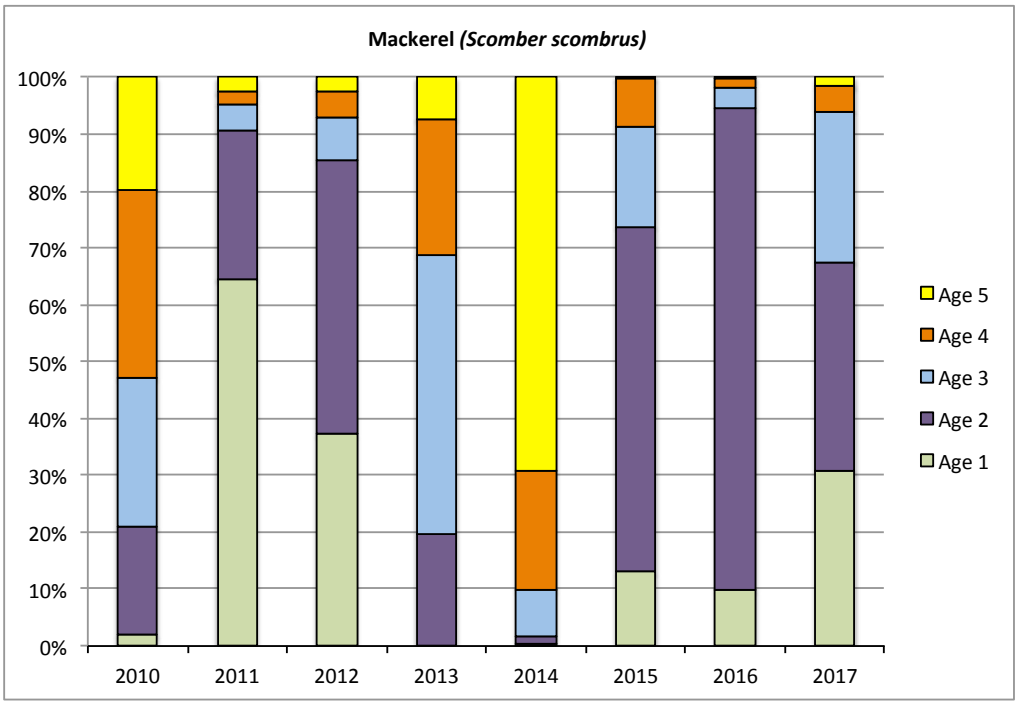
Figure 18. The study period and timings when the WMR OWF was constructed and became operational



4.3.3 Mackerel (*Scomber scombrus*)

Mackerel are shoaling pelagic fish (i.e. they live and feed in midwater, rather than near the seabed) and have been caught consistently throughout the study period of interest (2010–2017) (Figure 19, Table 25 and Figure 20). Fish 1–5 years old are the most common in the trawl surveys, and as with all pelagic species, annual year-class strength and/or geographic distribution are highly variable. The average age of mackerel caught during the 4-year period before construction of the OWF was 2 year old. Mackerel caught during the 4-year period after construction (2014-2017 inclusive) were also found to have an average age of 2 years.

Figure 19. Relative age structure of mackerel caught in groundfish trawl surveys in 36F0



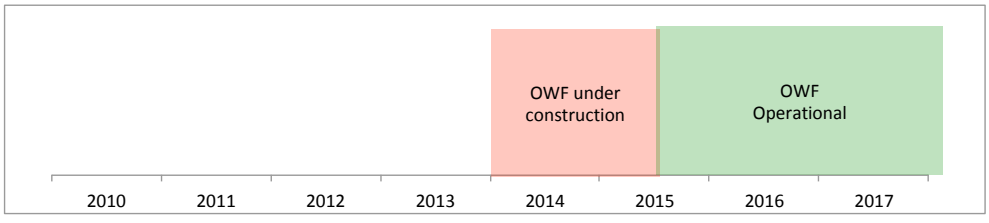
Units: Mackerel caught at the two sampling stations in 36F0 broken down (%) into age group
Source: ICES / Cefas

Table 25. Relative age structure of mackerel caught in groundfish trawl surveys in 36F0

Age of fish	2010	2011	2012	2013	2014	2015	2016	2017
Age 1	22	329	383	0	2	221	278	57
Age 2	201	133	496	9	10	1,036	2,365	68
Age 3	276	24	79	23	65	302	103	49
Age 4	350	10	45	11	162	142	44	8
Age 5	211	13	26	4	537	4	7	3

Units: Sum of the No. of fish caught per hour at the two sampling stations in 36F0

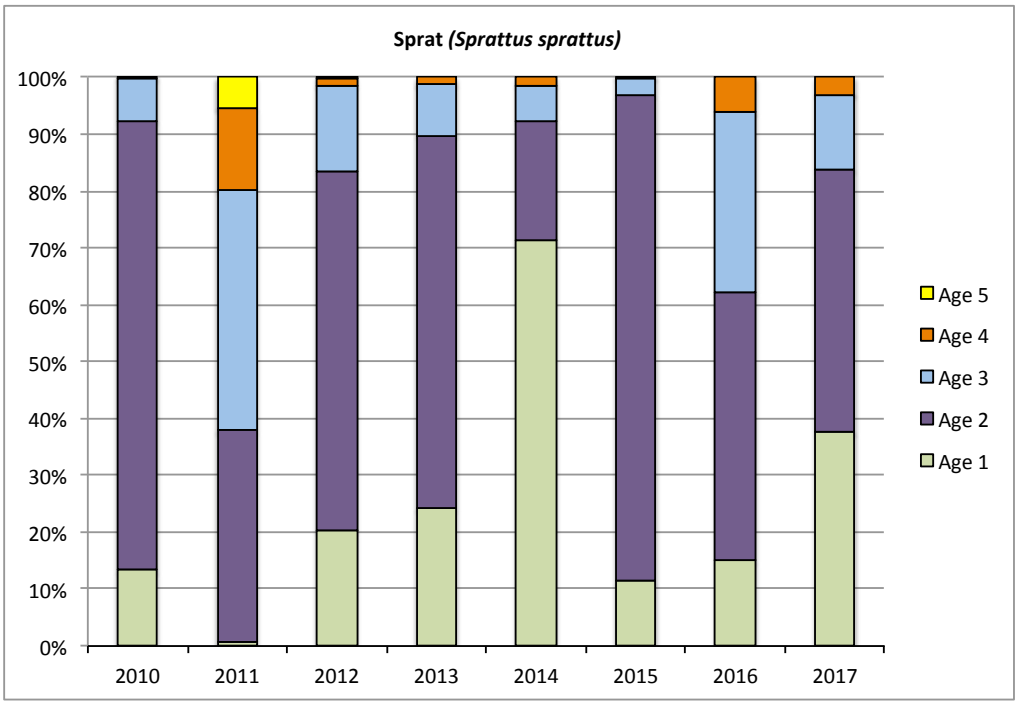
Figure 20. The study period and timings when the WMR OWF was constructed and became operational



4.3.4 Sprat (*Sprattus sprattus*)

Like mackerel, sprat is a pelagic fish species, but older fish are scarce given their importance as food (for other fish and seabirds). Catches of sprat have been a continuous feature of the survey trawl catches throughout the study period (2010–2017) (Figure 21, Table 26 and Figure 22), with fish 1–3 years old consistently dominating the catches. The average age of sprat caught during the 4-year period before construction of the OWF was 2 year old. This was also true for sprat caught during the 4-year period after construction (2014-2017 inclusive).

Figure 21. Relative age structure of sprat caught in groundfish trawl surveys in 36F0



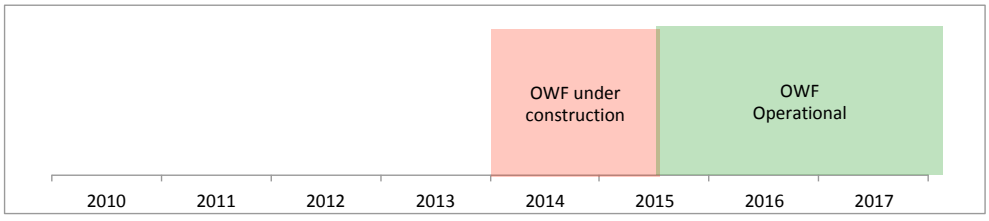
Units: Sprat caught at the two sampling stations in 36F0 broken down (%) into age group
Source: ICES / Cefas

Table 26. Relative age structure of sprat caught in ground fish trawl surveys in 36F0

Age of fish	2010	2011	2012	2013	2014	2015	2016	2017
Age 1	259	42	81	783	190	1,832	54	1,815
Age 2	1,541	3,208	251	2,126	57	13,754	171	2,232
Age 3	147	3,626	60	289	16	520	114	642
Age 4	3	1,243	5	43	4	11	23	148
Age 5	0	465	1	0	0	0	0	0

Units: Sum of the No. of fish caught per hour at the two sampling stations in 36F0

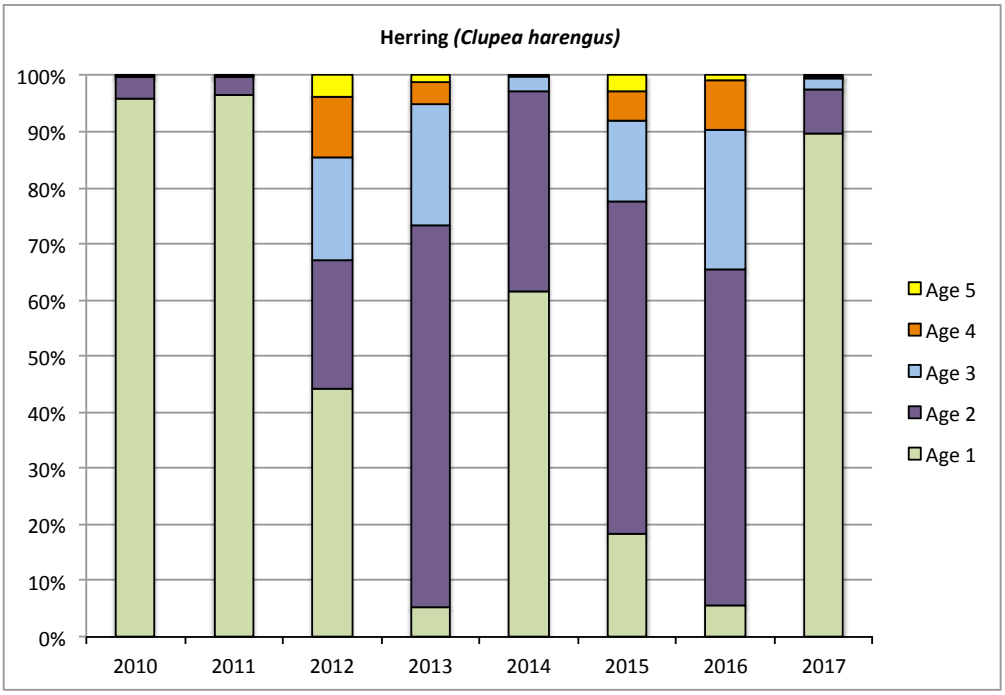
Figure 22. The study period and timings when the WMR OWF was constructed and became operational



4.3.5 Herring (*Clupea harengus*)

Herring, which school pelagically but spawn on the seabed, have been constant catches of survey trawls throughout the study period (2010–2017). (Figure 23, Table 27 and Figure 24). Since 2012, herring aged between 1 and 5 years have dominated the local trawl survey catches, though in 2010, 2011 and 2017, the catches were mostly 1-year-olds, in very high numbers relative to other years in the survey period. Such annual differences are well-known features of pelagic fish, as mentioned previously. The average age of herring caught during the 4-year period before construction of the OWF was 1 year old. This was also the same for herring caught during the 4-year period after construction (2014-2017 inclusive).

Figure 23. Relative age structure of herring caught in groundfish trawl surveys in 36F0



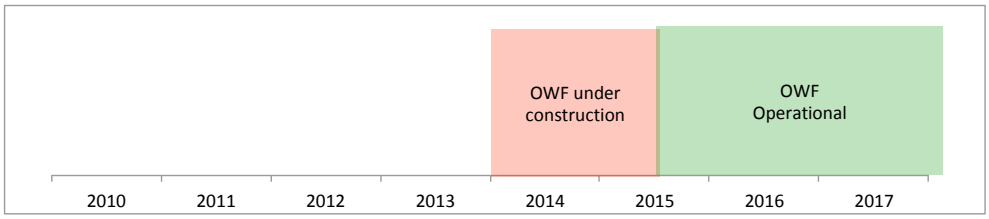
Units: Herring caught at the two sampling stations in 36F0 broken down (%) into age group
Source: ICES / Cefas

Table 27. Relative age structure of herring caught in groundfish trawl surveys in 36F0

Age of fish	2010	2011	2012	2013	2014	2015	2016	2017
Age 1	5,331	4,499	10	23	614	17	4	2,535
Age 2	213	151	5	292	354	55	49	221
Age 3	5	6	4	93	24	13	20	52
Age 4	6	4	2	17	3	5	7	12
Age 5	4	2	1	5	-	3	1	6

Units: Sum of the No. of fish caught per hour at the two sampling stations in 36F0

Figure 24. The study period and timings when the WMR OWF was constructed and became operational

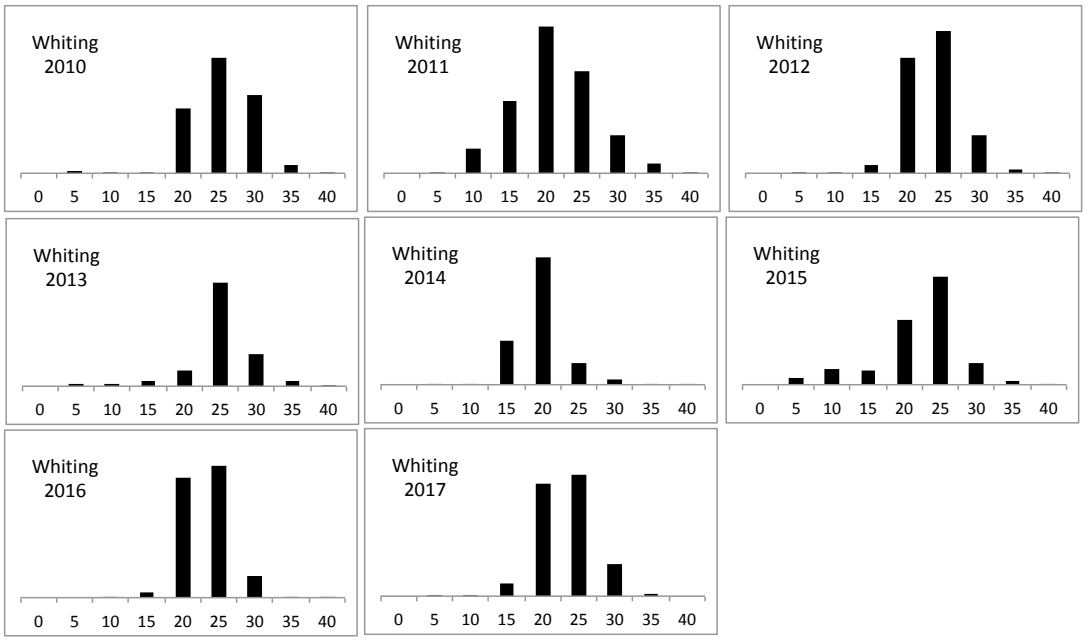


4.4 Length composition of the survey trawl caught fish in 36F0

4.4.1 Whiting (*Merlangius merlangus*)

The whiting population caught in the trawl surveys has consistently centred on a peak length of 20–25 cm (Figure 25) throughout the study period (2010 – 2017)

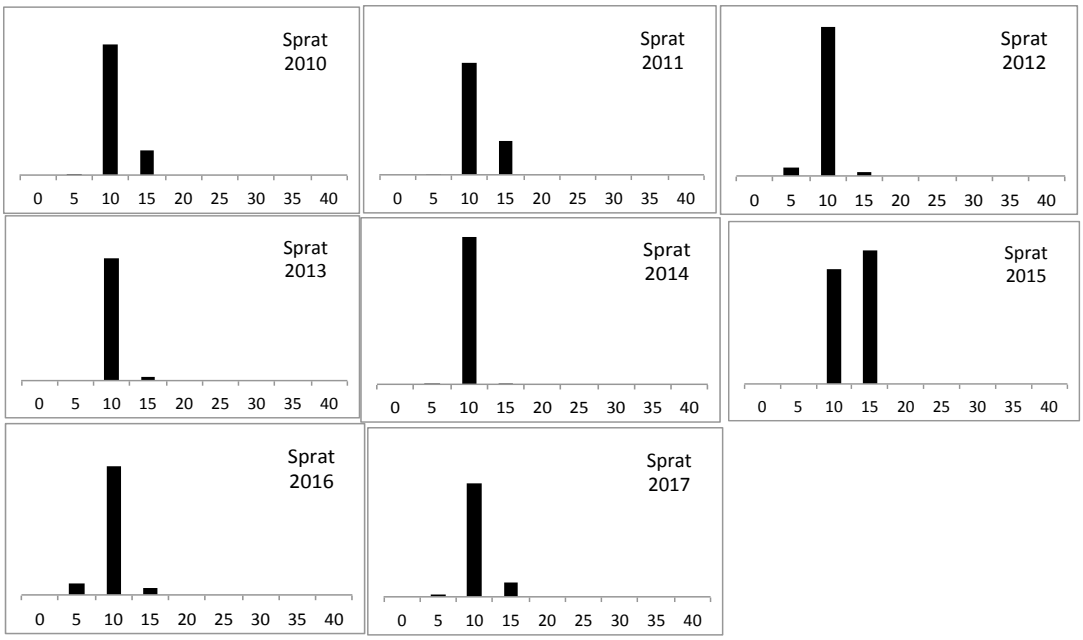
Figure 25. Whiting length-frequency distributions



4.4.2 Sprat (*Sprattus sprattus*)

Sprat peak length frequency distributions centred around 10 cm throughout the study period, with the exception of 2015, when slightly bigger fish dominated catches (Figure 26).

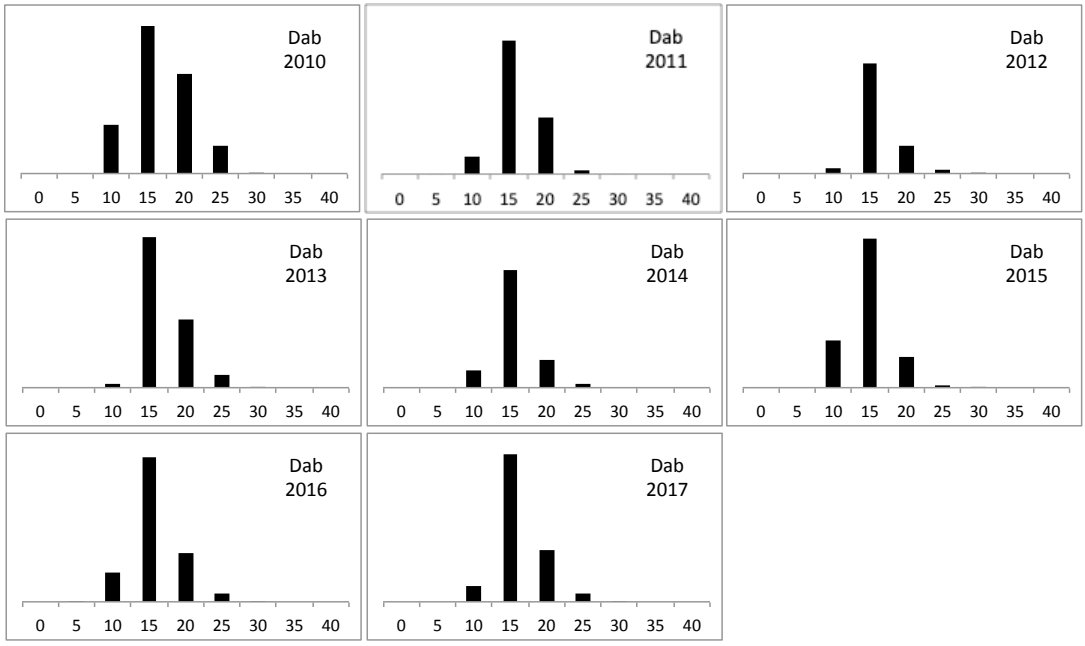
Figure 26. Sprat length-frequency distributions



4.4.3 Dab (*Limanda limanda*)

The length of dab caught in the trawl surveys has consistently peaked at around 15 cm throughout the study period (Figure 27), i.e. before construction of the OWF, during construction and since the OWF has been operational.

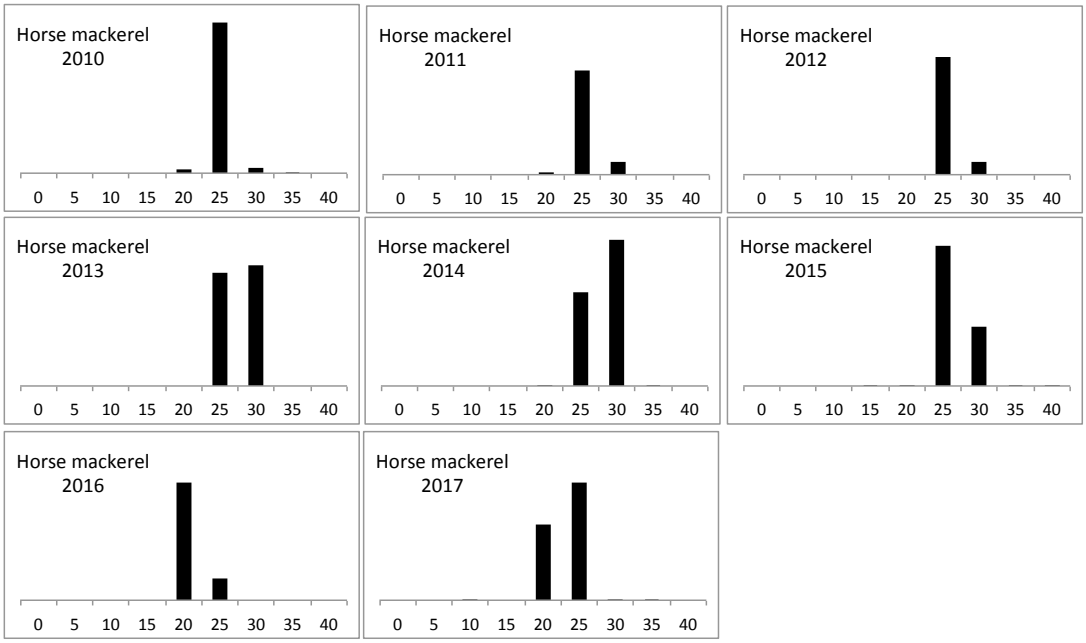
Figure 27. Dab length-frequency distributions



4.4.4 Horse mackerel (*Trachurus trachurus*)

The bulk of horse mackerel have been 20–30 cm long throughout the study period (Figure 28) i.e. before construction of the OWF, during construction and since the OWF has been operational.

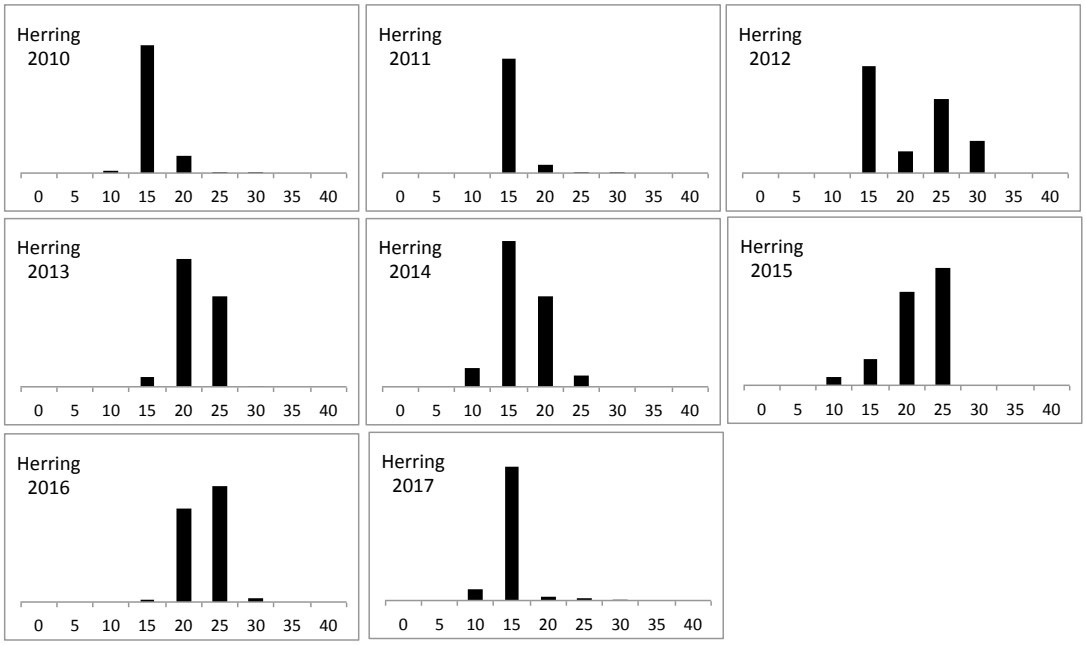
Figure 28. Horse mackerel length-frequency distributions



4.4.5 Herring (*Clupea harengus*)

Herring length frequency distributions in the trawl surveys have varied throughout the study period (Figure 29), depending on geographic distributions and year-class strengths.

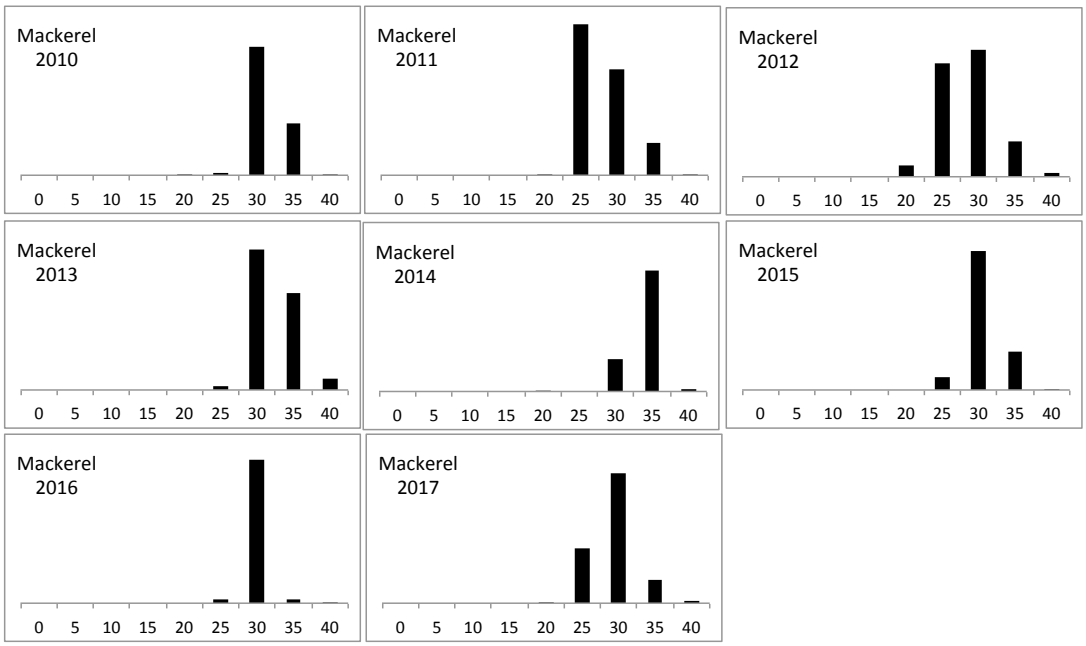
Figure 29. Herring length-frequency distributions



4.4.6 Mackerel (*Scomber scombrus*)

The length frequency of mackerel catches has peaked around 25–30 cm in most years throughout the study period (Figure 30).

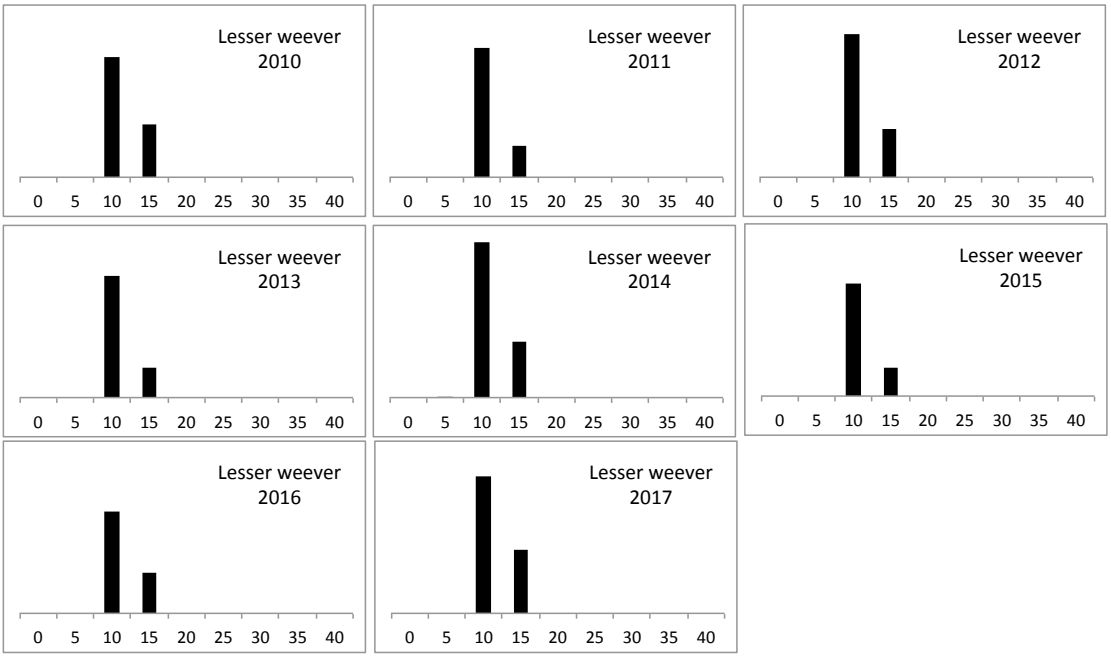
Figure 30. Mackerel length-frequency distributions



4.4.7 Lesser weever (*Echiichthys vipera*)

The length frequency of catches of the lesser weever has peaked at 10cm and remained consistent throughout the study period (Figure 31) i.e. before construction of the OWF, during construction and since the OWF has been operational.

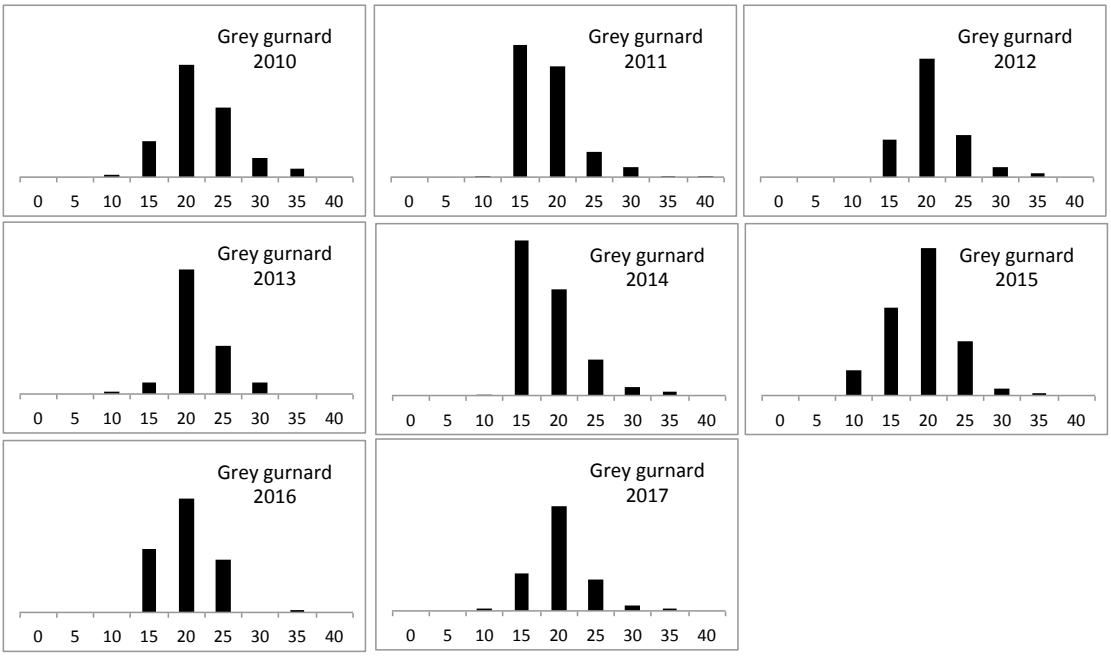
Figure 31. Lesser weever length-frequency distributions



4.4.8 Grey gurnard (*Eutrigla gurnardus*)

The length frequency of catches of the grey gurnard has remained similar throughout the study period, with peaks at around 15–20 cm (Figure 32), i.e. before construction of the OWF, during construction and since the OWF has been operational.

Figure 32. Grey gurnard length-frequency distributions



5. Appendix 1. Abbreviations used in this document

Cefas	The Centre for Environment, Fisheries and Aquaculture Science
CPUE	Catch per unit effort
ICES	International Council for the Exploration of the Sea
MMO	Marine Management Organisation
OWF	Offshore Wind Farm
WMR	Westermost Rough offshore wind farm
NEIFCA	North Eastern Inshore Fisheries and Conservation Authority
36F0	An area of the North Sea known as ICES rectangle 36F0

Clerk of the Authority
Caroline Lacey
County Hall, Beverley
East Riding of Yorkshire
HU17 9BA

North Eastern IFCA
Inshore Fisheries and Conservation Authority

Chief IFC Officer
David McCandless, MSc
Town Hall, Bridlington
East Riding of Yorkshire
YO16 4LP

Marine Management Organisation
PO Box 1275
Newcastle upon Tyne
NE99 5BN

Your ref: 34633/091124/12 L/2011/00305/12

Date: 13th August, 2019

Dear Lauren O'Connel,

Re: Westermost Rough Offshore Windfarm – Year 2 post-construction fisheries survey report

Thank you for the opportunity to comment on the above document. North Eastern Inshore Fisheries and Conservation Authority (NEIFCA) Officers have considered the information presented in the report, under provisions set out in the Marine and Coastal Access Act 2009, whereby IFCA's are responsible for the sustainable management of inshore sea fisheries resources and the marine environment within their jurisdictional area.

We welcome the report and acknowledge that it fulfils the licence requirement for 2017. It is also noted that a further report will be completed to fulfil the licence requirement for 2018. We request that the following points are considered in preparation of the 2018 report so that the impacts of the windfarm can be fully assessed.

NEIFCA collect catch return data from fishers holding a permit to fish with pots within the district; primarily targeting lobster and edible crab. Data could be provided on request and may offer a useful comparison to MMO collated data at an ICES rectangle level. Insights may be obtained when comparing the primarily inshore data reported to NEIFCA as the OWF straddles the 6NM boundary of the district.

Vessels operating from ports in the vicinity of the OWF will be impacted by its construction and operation to differing degrees. That being said, trends in landings from the relatively small ports of Hornsea and Withernsea will also be affected by changes in the number of vessels operating from them, perhaps more so than larger ports such as Bridlington. This may complicate any assessment of impacts arising from the OWF. The Seafish Industry Authority undertakes an annual fleet socio-economic survey and data from this could be assessed in conjunction with NEIFCA data for numbers of vessels landing into specific ports over the study period.

It is also worth considering that a significant edible crab fishery has developed further offshore than the OWF over the study period (anecdotally towards the eastern half of 36F0 and possibly into 36F1). The large increase in edible crab landings, into Grimsby in particular, are thought to originate in large part from this area. An assessment of VMS data available from the MMO and/or iVMS data available from fishers, potentially through discussions with the Holderness Industry Fishing Group (HFIG), would be a useful inclusion in any future report.

Finally, inclusion in the 2018 report of the key outputs of the HFIG CPUE fisheries-independent surveys would be a useful addition.

Yours sincerely

Tim Smith

Senior Environmental and Scientific Officer

North Eastern Inshore Fisheries and Conservation Authority

01482 393515