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The Finest Salmon from
SCOTLAND

Commercial Fisheries Impact Assessment

North Gravir, Isle of Lewis

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Glossary of Abbreviations and Terms

Abbreviation / Term	Definition
#	Number
%	Percentage
£	Great British Pound
€	Euro
°	Degrees
3D	Three Dimensional
CnES	Comhairle nan Eilean Siar
Application	The Town and Country Planning (Scotland) Act 1997 planning application for the North Gravir fish farm
BFS	Bakkafrost Scotland Ltd.
CAR	The Water Environment (Controlled Activities) (Scotland) Regulations 2011
CFIA	Commercial Fisheries Impact Assessment
CoGP	Code of Good Practice for Scottish Finfish Aquaculture
Development Area	The Red Line Boundary of the Proposed Development under The Town and Country Planning (Scotland) Act 1997
DSA	Detailed Study Area
ECP	Escapes Contingency Plan
EIA Regulations	The Town and Country Planning (Environment Impact Assessment) (Scotland) Regulations 2017
EmBz	Emamectin Benzoate
EQS	Environmental Quality Standard
FAO	Food and Agriculture Organization
FMA	Farm Management Area
Hrs	Hours
ICES	International Council for the Exploration of the Seas
ID	Identification
ISLM	Integrated Sea Lice Management
Kg	Kilogram
Km	Kilometre
Km^2	Kilometre Squared
LOA	Length Overall
m	Metre
MHWS	Mean High Water Springs
MLHS	Mean Low Water Springs
MMO	Marine Management Organisation
MNWFA	Mallaig North West Fisheries Association
NAFC	North Atlantic Fisheries College
ng/kg	Nanogram per kilogram
NLB	Northern Lighthouse Board
NS9415:2021	Norwegian Technical Standard NS9415:2021 - Floating Aquaculture Farms
PPM	Planned Preventative Maintenance
Proposed Development	The North Gravir fish farm
ROV	Remotely Operated Vehicle

Abbreviation / Term	Definition
SDM	Standard Default Method
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SGMD	Scottish Government's Marine Directorate
SI	Statutory Instrument
SLMS	Sea Lice Management Strategy
STS	Technical Standard for Scottish Finfish Aquaculture
SWFPA	Scottish White Fish Producers Association
T	Tonne
UKHO	United Kingdom Hydrographic Office
UKTAG	United Kingdom Technical Advisory Group
VMS	Vessel Monitoring System
WEI	Wave Exposure Index
WMP	Waste Management Plan
WSA	Wider Study Area
µg/l	Microgram per Litre

1. Introduction

This Commercial Fisheries Impact Assessment (CFIA) has been prepared by Bakkafrost Scotland Limited (BFS) to support the submission of a planning application (the Application) under the Town and Country Planning (Scotland) Act 1997 (as amended) and The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations) for a new Atlantic salmon marine fish farm. The North Gravir fish farm (the Proposed Development) will be located off the east coast of the Isle of Lewis. The CFIA is intended to provide the consenting authority, Comhairle nan Eilean Siar Council (CnES), with sufficient objective data to assess the potential magnitude of interactions between the Proposed Development and the local inshore commercial fishing industry, and to allow CnES to come to a reasoned determination on the significance of effects prior to consenting the Proposed Development.

1.1 Proposed Development Overview

The Proposed Development will be comprised of five 200 m circumference circular pens, held within a single group, arranged in one line of five and moored within a 120 m x 120 m grid. A feed barge will be permanently moored to the south of the grid. Under The Town and Country Planning (Scotland) Act 1997 all equipment will be installed and maintained within the red line boundary (the Development Area[1]) which covers an area of 1.02 km². A maximum biomass of 4,680 T is proposed. A visual representation of the Proposed Development is shown in **Figure 1.1**.

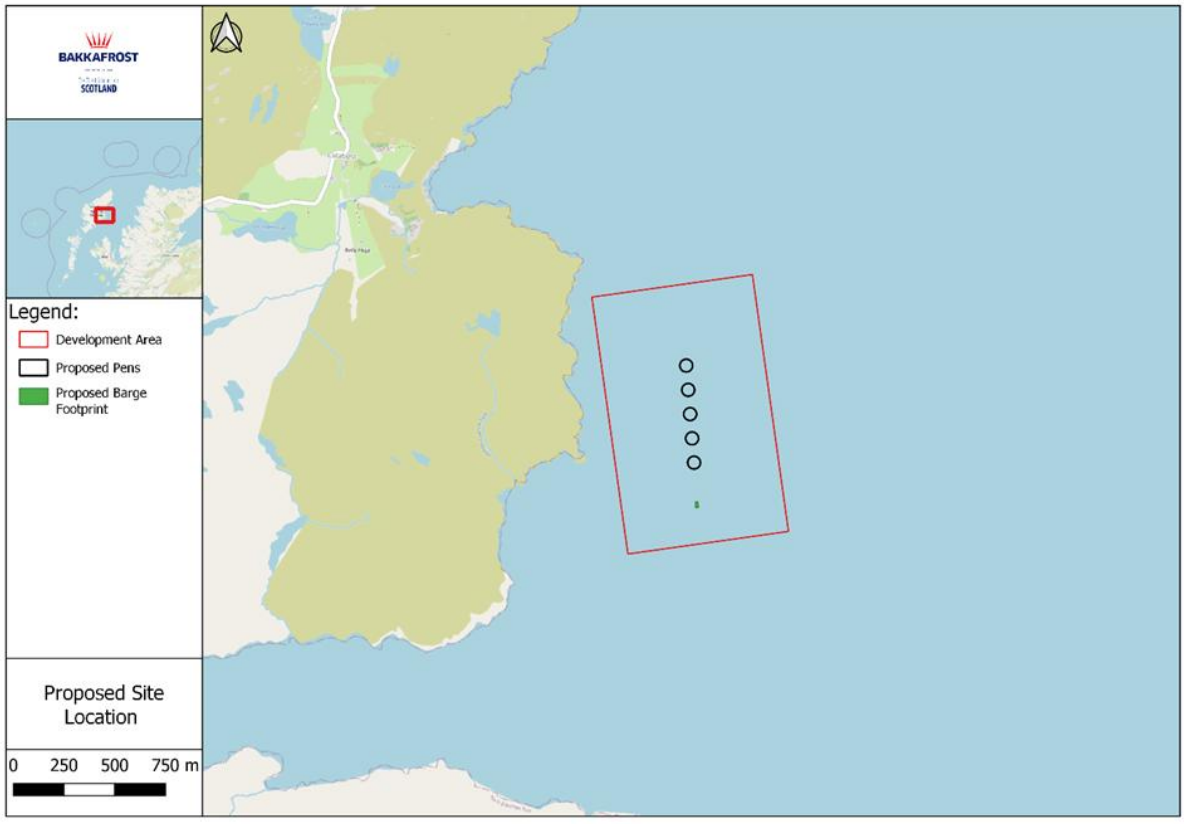


Figure 1.1: Proposed Development location and layout[2].

1.2 Objectives

In order to ensure a robust assessment, the following objectives have been set out:

[1] The Development Area also represents the same spatial extent of the proposed mooring area, and therefore these terms are interchangeable.

[2] Map data copyrighted OpenStreetMap contributors and available from https://www.openstreetmap.org

- Identify the relevant study areas;
- Conduct a thorough baseline assessment of commercial inshore fishing activity within the identified study areas;
- Identify the potential impact pathways between the Proposed Development and the local inshore fishing industry; and
- Assess and determine the significance of each potential impact pathway in regard to the EIA Regulations.

2. Assessment Methodology

The project-wide generic approach to assessment is set out in **Sub-Section 2.4.1** of the EIAR. The assessment methodology for commercial fisheries is consistent with the approach.

2.1 Study Areas

The Proposed Development is located within the Food and Agriculture Organisation (FAO) Major Fishing Area 27, Subarea 27.6.a. For the purposes of recording fisheries statistics, International Council for the Exploration of the Seas (ICES) subarea 27.6.a is divided into ICES statistical rectangles, which measures 1 degree of longitude by 0.5 degrees of latitude, which equates to approximately 30 nm x 30 nm at 60°N.

The Proposed Development is located entirely within ICES rectangle 45E3 (the Detailed Study Area (DSA)) and only occupies 0.06 % of the marine spatial extent of 45E3. The DSA is shown in **Figure 2.1**. In order to understand fishing activity in the waters adjacent to the Proposed Development, baseline data have also been gathered and analysed for the surrounding area comprised of ICES rectangles 45E3, 45E4, 44E3, and 44E4 (the Wider Study Area (WSA)). The WSA is also shown in **Figure 2.1**. The justification for defining the WSA is that it aligns with the scale of statistical landings data and covers a wider area than the Proposed Development and DSA, ensuring that potential implications of displacement of fishing activity can be adequately understood.

Figure 2.1: Commercial fisheries detailed and wider study area[2].

2.2 Assessment of Potential Impacts and Effects

The method for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this CFIA to assign values to the sensitivity of receptors and the magnitude of potential impacts.

2.2.1 Sensitivity of Receptors

The sensitivity of the baseline condition, including the importance and sensitivity of identified receptors on or near to the Proposed Development will be assessed in line with best practice guidance, legislation, statutory designations and professional judgement. **Table 2.1** details the general framework for determining the sensitivity of receptors.

Table 2.1: Framework for determining receptor sensitivity.

Sensitivity of Receptor	Definition
Very High	Receptor is extremely vulnerable to impacts that may arise from the project and recoverability is long term or not possible. And/or: No alternative fishing grounds are available.
High	Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible.

Sensitivity of Receptor	Definition
	And/or: Negligible alternative fishing grounds are available.
Medium	Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. And/or: Low levels of alternative fishing grounds are available and/or fishing fleet has low operational range.
Low	Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability. And/or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.
Negligible	Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. And/or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.

2.2.2 Magnitude of Impact

The magnitude of potential impacts is identified through consideration of the Proposed Development, the degree of change to the baseline condition predicted as a result of the Proposed Development, the duration and reversibility of the potential impact, using professional judgement, best practice guidance and legislation. **Table 2.2** details the general framework for determining the magnitude of a potential impact.

Table 2.2: Framework for determining the magnitude of potential impacts.

Magnitude of Potential Effect	Definition
High	Impact is of long-term duration (e.g., greater than eight years duration) and/or is of extended physical extent; and/or Impact is expected to result in one or more of the following: • Substantial loss of target fish or shellfish biological resource (e.g., loss of substantial proportion of resource within the study area); • Substantial loss of ability to carry on fishing activities (e.g., substantial proportion of effort within the study area); and

Magnitude of Potential Effect	Definition
	• Substantial loss of economic value of commercial landings, that is nationally/regionally significant.
Medium	Impact is of medium-term duration (e.g., less than eight years) and/or is of moderate physical extent; and/or Impact is expected to result in one or more of the following: • Partial loss of target fish or shellfish biological resource (e.g., moderate loss of resource within the study area); • Partial loss of ability to carry on fishing activities (e.g., moderate reduction of fishing effort within the study area); and • Partial loss of economic value of commercial landings, that is locally significant.
Low	Impact is of short-term duration (e.g., less than two to three years) and/or is of limited physical extent; and/or Impact is expected to result in one or more of the following: • Minor loss of target fish or shellfish biological resource (e.g., minor loss of resource within the study area); • Minor loss of ability to carry on fishing activities (e.g., minor reduction of fishing effort within the study area); and • Minor loss of economic value of commercial landings that is not locally significant.
Negligible	Impact is of very short-term duration (e.g., less than one year) and/or physical extent of impact is negligible; and/or Impact is expected to result in one or more of the following: • Slight loss of target fish or shellfish biological resource (e.g., slight loss of resource within the study area); • Slight loss of ability to carry on fishing activities (e.g., slight loss of fishing effort within the study area); and • Slight loss of economic value of commercial landings.

If impacts of zero magnitude (i.e., none/no change) are identified, this will be made clear.

2.2.3 Significance of Effect

A combination of the sensitivity of the receptor and the magnitude of the potential impacts will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. **Table 2.3** summarises guidance criteria for assessing the overall effect and whether this is significant.

Table 2.3: Framework for assessment of the significance of potential effects.

Magnitude of Impacts	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

For the purposes of this CFIA, potential effects predicted to have a significance of either '**Major**' or '**Moderate**' are considered to be '**significant**', with effects predicted to be either **'Minor'** or **'Negligible'** being **'non-significant'** in relation to the EIA Regulations.

Zero magnitude of change upon a receptor will result in no effect, regardless of the receptor sensitivity.

2.2.4 Data Sources

To ensure that a representative baseline assessment and subsequent impact assessment could be carried out, this CFIA has utilised a range of publicly available data sources. All data sources are listed within **Table 2.4**.

Table 2.4: Data sources utilised to inform this CFIA.

Data Source	Temporal Period	Source	Description
United Kingdom Sea Fisheries Statistics 2023[3]	2019 to 2023	Marine Management Organisation (MMO)	This dataset provides information on fishing activity for all UK commercial fishing vessel landings plus foreign vessel landings into UK ports for the period 2019 to 2023. Landings data are available for both the 12 m Length Overall (LOA) and under and over 12 m LOA UK fishing fleet.
2021 VMS Data Product[4]	2009 to 2020	ICES	ICES Secretariat has collected relevant VMS and logbook data to produce, as a technical

[3] Marine Management Organisation (MMO): (2024). UK sea fisheries annual statistics report 2023. [online] GOV.UK. Available at: https://www.gov.uk/government/statistics/uk-sea-fisheries-annual-statistics-report-2023

[4] ICES. 2021. OSPAR request on the production of spatial data layers of fishing intensity/pressure. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, sr.2021.12. [Online] Available at: https://doi.org/10.17895/ices.advice.8297

Data Source	Temporal Period	Source	Description
			service to OSPAR, updated spatial data layers on fishing intensity/pressure. This dataset covers 12 m LOA and over fishing vessels only.
Gridded Fisheries Data within Scottish Waters for Scottish Fishing Vessels 12 m LOA and Under[5]	2018 to 2022	Scottish Government's Marine Directorate (SGMD)	Catch and sales data linked to the daily fishing position has been extracted from the Compass database for the period 2017 to 2021 within a bounding box of -10W to 0E and 54N to 62N. Provides spatial information on the fishing activity patterns of 12 m LOA and under fishing vessels.
ScotMap – Inshore Fisheries Mapping Project in Scotland[6]	2007 to 2011	SGMD	Spatial information on the fishing activity of Scottish fishing vessels under 15 m LOA (inclusive of 12 m LOA and under vessels). ScotMap provides information on the monetary value, relative importance (relative value) and the usage (number of fishing vessels and crew) of seas around Scotland.

[5] Scottish Government's Marine Directorate (SGMD): Fishing Statistics - Gridded fisheries data within Scottish waters for Scottish fishing vessels under 12m overall length - annual averages 2017 to 2021. [Online] Available at: https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/Marine_Scotland_FishDAC_12436

[6] Scottish Government's Marine Directorate (SGMD): ScotMap - Inshore Fisheries Mapping Project in Scotland. [Online] Available at: https://marine.gov.scot/information/scotmap-inshore-fisheries-mapping-project-scotland

3. Consultation and Engagement

This Section presents the outcome of, and the BFS response to, the CnES Scoping Opinion relevant to commercial fisheries, whilst also providing detail on the informal pre-application consultation and engagement undertaken with commercial fisheries stakeholders.

BFS submitted a formal Screening and Scoping Request (22/00290/FFSCSC) to CnES in June 2022. A Scoping Opinion was received from CnES in December 2022.

BFS has engaged in pre-application consultation with the commercial fishing industry. This engagement was initiated prior to the submission of the Screening and Scoping Request for the Proposed Development. As such, this pre-application engagement provided both BFS and the commercial fishing industry with the potential to constructively engage in discussions with key aspects being fed back into the design of the Proposed Development.

All consultation and engagement initiated by BFS followed guidance set out in 'Scotland's Fishing Industry – Guidance for Decision Makers and Developers'[7]. This document was developed by the North Atlantic Fisheries College (NAFC) Marine Centre in partnership with the Scottish Fishermen's Federation (SFF) and the SGMD. This document was published in 2017.

BFS has and will continue to consult and engage with the following associations, and representative bodies:

- Mallaig & North West Fishermens Association (MNFWA);
- Western Isles Fisheries Association (WIFA);
- Scottish White Fish Producers Association (SWFPA); and
- Outer Hebrides Regional Inshore Fisheries Group (OHRIFG).

Table 3.1 provides a summary of the consultation and engagement undertaken by BFS in relation to the Proposed Development.

[7] North Atlantic Fisheries College (NAFC): Scotland's Fishing Industry – Guidance for Decision Makers and Developers. [Online] Available at: https://fiscot.org/wp-content/uploads/2019/06/FIS014-Guidance-for-Developers.pdf

Table 3.1: Summary of consultation and engagement related to the Proposed Development.

Consultee	Consultation Stage	Summary of Main Comments	Project Response	Cross Reference	Any Outstanding Issues
CnES	Scoping Opinion (22/00290/FFSCSC)	The main comments raised by CnES are detailed below: • The assessment should consider potential conflict with established marine users and should detail the outcome of consultation with representative bodies, including the WIFA and OHRIFG; and • The applicant should seek to design the Proposed Development in a way that minimises impacts on navigation and on other marine users, including commercial fishing interests.	BFS has considered the potential impact on commercial inshore fishing activity. Pre-application engagement with the relevant commercial fisheries stakeholder started prior to the submission of the Screening and Scoping Request, this is detailed in **Section 3** of this CFIA. Embedded mitigation (**Section 4**) has been built into the design and operation of the Proposed Development that is anticipated to reduce or avoid potential impacts on commercial fisheries. A detailed baseline assessment of commercial fishing activity is presented in **Section 5**. Fisheries with the potential to be impacted by the Proposed Development are identified in **Section 6**, along with the relevant potential impacts. **Section 7** provides a full assessment of the magnitude of the potential impact along with a determination on the level of significance of the effect in relation to the EIA Regulations.	**Section 3**; **Section 4**; **Section 5**; **Section 6**; and **Section 7**.	No
MNWFA; and SWFPA		A joint response from MNFWA and SWFPA was received, the main comments are detailed below: • Concern that commercial fisheries in the area were not consulted with during the site selection process. • Highlights the importance of the Proposed Development area for use by individuals at times of high strong westerly and northerly winds. • Provided images of chat plotter data indicating vessel activity with the Proposed Development area.	Following discussions with MNFWA one individual provided images of chart plotter data indicating vessel activity with the Proposed Development area, sufficient robust objective data, that could be evidenced, was not shared with BFS. As such, fishing activity in the area was estimated based upon the best publicly available data. During a meeting held by BFS on 12 August 2022, alternative site locations were presented for comment by attendees. No feedback was given on these site locations, as such none were deemed suitable.	**Section 3**; and **Section 4**.	No

Consultee	Consultation Stage	Summary of Main Comments	Project Response	Cross Reference	Any Outstanding Issues
WIFA	Pre-application (email)	The main comments raised by this consultee are detailed below: • WIFA indicated that if earlier discussions, with fishers, had taken place regarding the Proposed Development a more suitable site could have been mutually agreed; • WIFA highlight that marine debris from aquaculture operations poses a risk to safe navigation for fishing vessels; • WIFA highlights concern over the relevance of ScotMap data used to identify fishing activity due to the age of the data; • WIFA also state that brown carb and Nephrops fishing grounds would also be lost which are need to support new facility built in Stornoway; and • WIFA are concerned that the continual need to treat the stocked salmon with various medicines may be negatively impacting commercial fishery stocks and therefore having a negative economic impact on commercial fisheries.	During a meeting held by BFS on 12 August 2022. alternative site locations were presented for comment by attendees. No feedback was given on these site locations, as such none were deemed suitable. As part of the EIAR a full commercial fisheries assessment was carried out using various and more up to date sources of information to ensure an accurate picture of current fishing activity was assessed for impact.	**Appendix U;**	N/A
OHRIFG		The main comments raised by this consultee are detailed below: • BFS did not engage with marine stakeholders prior to submitting the application. • Site identification was based on outdated data (ScotMap, VMS), which does not reflect current fishing activity. • The site was historically important for commercial fishing (scallop dredging, static gear for brown crab, prawns, and prawn trawling). • Concerns raised over economic loss for the fishing industry, including local businesses like MacDuff Shellfish. • The Proposed Development site is critical for fishing safety and gear hauling, especially during inclement weather. • Concerns about disturbance from salmon farm traffic and noise affecting marine tourism. • Calls for earlier engagement with the fishing community on potential future salmon farming sites.	OHRIFG held a meeting on 8 July 2022, with representatives from BFS in attendance for the purpose of discussing the proposed North Gravir site. During a meeting held by BFS on 12 August 2022, alternative site locations were presented for comment by attendees. No feedback was given on these site locations, as such none were deemed suitable. As part of the EIAR a full commercial fisheries assessment was carried out using various and more up to date sources of information to ensure an accurate picture of current fishing activity was assessed for impact.	**Appendix U;**	N/A

4. Embedded Mitigation

An outline of the embedded mitigation measures anticipated to avoid, reduce or compensate potential impacts on commercial fisheries, which may otherwise lead to significant effects, in line with the mitigation hierarchy identified in PAN 1/2013[8], is presented in **Table 4.1**.

[8] Scottish Government: Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment. [Online] Available at: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/

Table 4.1: Summary of the embedded mitigation measures and their relevance to the identified impacts of the Proposed Development.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
Proposed Development Lifespan	Whilst the Proposed Development is intended to be operational over the long-term with no defined decommissioning phase defined, the Proposed Development is completely reversible, with no permanent physical impacts on the seascape and navigational safety.	Exclusion, Access, Displacement and Associated Economic Loss; Gear Snagging, Entanglement and Navigational Safety; and Changes to the Local Environment.
Development Location	The development location has been selected to minimise disruption and disturbance to other marine users, as best as possible. The hydrographic characteristics of the development location also help to mitigate potential benthic impacts of the Proposed Development.	Exclusion, Access, Displacement and Associated Economic Loss; Gear Snagging, Entanglement and Navigational Safety; and Changes to the Local Environment.
Farm Design and Layout	The Proposed Development will have fewer, larger pens. The rationale for this design and layout decision includes mitigating impacts on other marine users (including commercial fisheries) by proposing an efficient and tidy Development Area.	Exclusion, Access, Displacement and Associated Economic Loss; Gear Snagging, Entanglement and Navigational Safety; and Changes to the Local Environment.
Navigational Marking and Lighting	The Proposed Development will be marked and lit in accordance with the requirements of the Northern Lighthouse Board (NLB).	Gear Snagging, Entanglement and Navigational Safety.
Registration with United Kingdom Hydrographic Office (UKHO)	The UKHO will be notified of the Proposed Development, if consented, to allow for all nautical charts to be updated with the Proposed Development, to ensure that all mariners are aware of the presence of the Proposed Development.	Gear Snagging, Entanglement and Navigational Safety.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
Licence to Deposit Any Substance or Object in the Scottish Marine Area	SGMD are the regulatory authority for the installation of farming equipment in the marine environment, which they regulate via a Marine Licence, under Part 4 (Marine Licencing) of the Marine (Scotland) Act 2010. The purpose of the licence is to primarily ensure that all navigational issues have been fully considered before equipment is deposited on the seabed. An application will be submitted to the SGMD for a new Marine Licence for the Proposed Development. The Marine Licence determination process includes a thorough consultation period before the licence is determined to ensure that all the views of relevant stakeholders have been sufficiently considered. The Marine Licence will contain a number of conditions, that specify, for example, any lighting or marking and notification requirements.	Gear Snagging, Entanglement and Navigational Safety.
Marine Vessel Training and Competency Programme	BFS farm staff will be provided with sufficient training, to ensure both theoretical and practical competence prior to piloting a BFS marine vessel.	Gear Snagging, Entanglement and Navigational Safety.
Infrastructure Maintenance	Daily checks on all surface infrastructure will be carried out as part of the routine containment checks, with any maintenance work being commissioned as required. This will ensure that all surface equipment is maintained in a good state of repair and is therefore unlikely to become detached during inclement weather. At the end of each production cycle the grid and mooring system will be fully inspected, with maintenance work being commissioned as required. Additionally, a full remote operated vehicle (ROV) survey of the grid and mooring system will be undertaken to determine the condition of all the component parts. In the event that the ROV survey finds that maintenance work is required, this will be commissioned to ensure that the grid and mooring system is operating at full capacity. The ROV survey will also record the co-ordinate positions of the mooring anchors. If the ROV survey finds that the mooring anchors have moved, since installation, to a location outwith the Development Area, BFS will commission a contractor to lift and re-set the anchors within the Development Area.	Gear Snagging, Entanglement and Navigational Safety.
Escapes Contingency Plan (ECP)	The Escapes Contingency Plan (**Appendix E**), whilst designed to avoid and reduce the potential for escape events, also covers the inspection and maintenance schedule for the	Gear Snagging, Entanglement and Navigational Safety.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
	Proposed Development. This document designed specifically for the Proposed Development will ensure that all scheduled inspections and maintenance are adhered to, thereby avoiding or reducing the potential for infrastructure to become detached from the Proposed Development.	
Marine Litter	Through Salmon Scotland's Sustainability Charter, BFS has pledged to prevent farm debris from entering the marine environment and to recover any that has, regardless of the source of the marine debris. Pledge 2.10 states "Take every step possible to avoid marine debris from our farms and recover any items promptly regardless of origin." A dedicated inbox - reportdebris@salmonscotland.co.uk – has been created for reporting marine litter.	Gear Snagging, Entanglement and Navigational Safety.
Data Sharing with Commercial Fisheries Stakeholders	If the Proposed Development is consented, BFS will communicate with all relevant commercial fishery stakeholders and provide co-ordinates on the boundary points of the Development Area and also the specific locations of the mooring lines and anchors to ensure vessels fishing in the vicinity of the Proposed Development are fully aware of potential snagging points. This will allow static gear fishing vessels to manoeuvre safely and set creels within the Development Area, reducing the potential for displacement and exclusion.	Exclusion, Access, Displacement and Associated Economic Loss; and Gear Snagging, Entanglement and Navigational Safety.
Embedded Mitigation Specific to Organic and Chemical Discharges		
Feed Control and Monitoring	Fish feed used by BFS across all marine farming operations has been developed to mimic the natural diet of Atlantic salmon, and is highly digestible, helping to improve the FCR. BFS focuses on ensuring an optimal diet is produced and provided to the stocked fish. This optimised feed ensures efficient nutrient conversion, meaning that the amount of soluble nutrients released as waste is minimised.	Changes to the Local Environment.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
	Feeding will be in accordance with established guides and staff will be able to adapt the feeding regime as necessary, for example, if weather conditions are temporarily affecting feeding behaviour. Feeding operations will be conducted from the feed barge or the shorebase where feed input can be adjusted as required and high-definition cameras, within each pen, allow for close monitoring of the feed response. This allows for real-time adjustments and cessation of feeding when required, thus reducing feed wastage and minimising the potential for organic deposition beneath the pens. Farm staff will also receive specific in-house training as part of the bespoke Marine Competency Framework.	
Pellet Detection Software	BFS is implementing 'Observe' pellet detection software across all marine farms, including the Proposed Development. This software is intended to improve the efficiency of feeding operations, with the aim of reducing the amount of feed pellets used allowing BFS to be more sustainable both economically and environmentally. The software does this by alerting feed technicians to overfeeding events via the high definition camera system as well as through a reporting function that analyses data to show trends. The system also utilises AI to determine if the stocked Atlantic salmon are being underfed. The primary aim of the deployment of this software is to maximise fish growth as well as to reduce the amount of excess feed being distributed to fish, which is anticipated to reduce potential organic deposition impacts on the benthos.	Changes to the Local Environment.
NewDEPOMOD Modelling	The NewDEPOMOD standard default method (SDM) is a risk assessment tool and is considered to be conservative in nature. As required for new farms, the SDM approach has been used for the Proposed Development. NewDEPOMOD modelling for the Proposed Development has been undertaken for both organic (carbon) deposition and in-feed residue deposition.	Changes to the Local Environment.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
	NewDEPOMOD organic deposition model runs were iterated up in biomass in order to calculate the maximum passing biomass in relation to the SEPA mixing zone criteria. NewDEPOMOD model outputs and the accompanying NewDEPOMOD Modelling Report (**Appendix K**) for a maximum passing biomass of 4,680 T have been submitted to and approved by SEPA. The NewDEPOMOD outputs indicate that at a biomass of 4,680 T the average depositional intensity within the mixing zone will be 360 $g/m^2/yr^{-1}$, a value far below the depositional intensity threshold of 4,000 $g/m^2/yr^{-1}$, whilst the mixing zone's spatial extent has been modelled at 117 % of the permissible 120 %.	
Environmental Quality Standards (EQS)	SEPA regulates the quantity of discharges of waste (organic material, in-feed residue, and bath medicines) by imposing conditions on the use of these products such that either the area or time over which they may have an impact is restricted. EQSs are safe concentrations for substances and have been set to be protective of all species in the environmental matrix where exposure is likely to be highest. Discharge limits for the Proposed Development represent discharge quantities that have been modelled and show full compliance to the relevant EQSs.	Changes to the Local Environment.
Fallowing	Fallowing between production cycles is best practice within the Scottish finfish aquaculture industry. Fallowing provides an opportunity for benthic communities within the mixing zone of a fish farm to recover. Impacts on benthic faunal communities within the mixing zone as a result of organic deposition during a production cycle are anticipated to be temporary and reversible in nature. Furthermore, residues from in-feed interventions also have the opportunity to degrade during the fallow period. At present, SEPA require that there is a minimum period of 28 consecutive days between every production cycle during which no commercial species shall be kept onsite. The current production plan for the Proposed Development means that a fallow period of 28 days will take place between final harvesting and restocking at the start of the next production cycle. Therefore, the fallow period is likely to be greater than the 28 day minimum stipulated by SEPA within the CAR licence.	Changes to the Local Environment.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
Enforcement	Existing regulation, the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), provides an effective method of controlling the use of sea lice medicines, whilst promoting the use of biological and mechanical intervention methods. SEPA require benthic monitoring to take place on all operational fish farms, within a defined temporal period. This monitoring regime is designed to ensure that the fish farm's operational mixing zone complies with SEPA criteria and does not exceed the maximum allow mixing zone extent. In the worst-case scenario, SEPA has enforcement powers to decrease the maximum biomass, if a fish farm is deemed to continuously not comply with benthic EQS.	Changes to the Local Environment.
Sea Lice Management Strategy (SLMS)	The SLMS provides an overarching framework of strategic principles under which sea lice will be managed across all BFS marine fish farms, with the primary aim of achieving zero ovigerous sea lice, particularly during the wild salmon out-migration period. The SLMS is comprised of two key aspects: • Adherence to the Farm Management Area (FMA) requirements (Code of Good Practice for Scottish Finfish Aquaculture (CoGP) compliance); and • Implementation of available sea lice management measures. The sea lice management measures include: • Treatment forecasting (end of cycle review); • Treatment Plan (real-time); • Pre-transfer preparation; • Biological – cleanerfish; • Production planning; • Mechanical – freshwater; • Mechanical – thermal (e.g., thermolicing); • Mechanical – water jets (e.g., hydrolicing); • Medicinal; • Efficacy testing;	Changes to the Local Environment.

Embedded Mitigation Measure	Description	Relevant Impact Pathways
	• Stock movements; • Harvest plan; • Genetics; and • Research and development.	
Integrated Sea Lice Management (ISLM) Plan	The ISLM Plan has been developed to provide guidance on how the sea lice management strategy (SLMS) measures will be implemented across BFS marine farms. The aim of the ISLM Plan is to actively reduce the use of medicinal products (which will reduce the amount potentially discharged from the Proposed Development), prioritising the use of biological controls, freshwater interventions and mechanical interventions.	Changes to the Local Environment.

5. Baseline Condition

5.1 Overview of Landings

The DSA shown within **Figure 2.1** illustrates that the Proposed Development is located within ICES rectangle 45E3. Whilst the Proposed Development occupies 0.06 % of the available 1,716.37 km^2 marine area within 45E3, landings data for 45E3 are useful in helping to understand the key fisheries operating within the DSA.

Landings, by Scottish registered fishing vessels, from 45E3, between 2019 and 2023, were dominated by shellfish species, with a mean annual landed weight of 660.00 T and a mean annual landed value of £3,471,312.21. Over the same period pelagic landings from 45E3 had a mean annual weight of 103.98 T and a mean annual value of £83,072.89. Mean annual demersal landings from 45E3 during the same period were considerably lower at 23.43 T and a value of £ 210,862.59. As illustrated in **Figure 5.1** and **Figure 5.2,** landings of shellfish from 45E3 have remained fairly consistent over the five year period, with the exception of a drop off in annual landed value in 2020, which is likely a result of the COVID-19 pandemic. In the following three years (2021, 2022 and 2023) shellfish value increased to pre-2020 levels.

As illustrated in **Figure 5.1** and **Figure 5.2,** pelagic landings from 45E3 displayed significant interannual variation, with a landed weight range of 408.83 T and a landed value range of £320,314.25. These data therefore indicate that pelagic fisheries within 45E3 are highly sporadic and may not represent a significant fishery within 45E3. Demersal landings from 45E3 also displayed significant interannual variation, with a landed weight range of 50.01T and a landed value range of £435,903.08. These data therefore indicate that pelagic fisheries within 45E3 are highly sporadic and may not represent a significant fishery within 45E3.

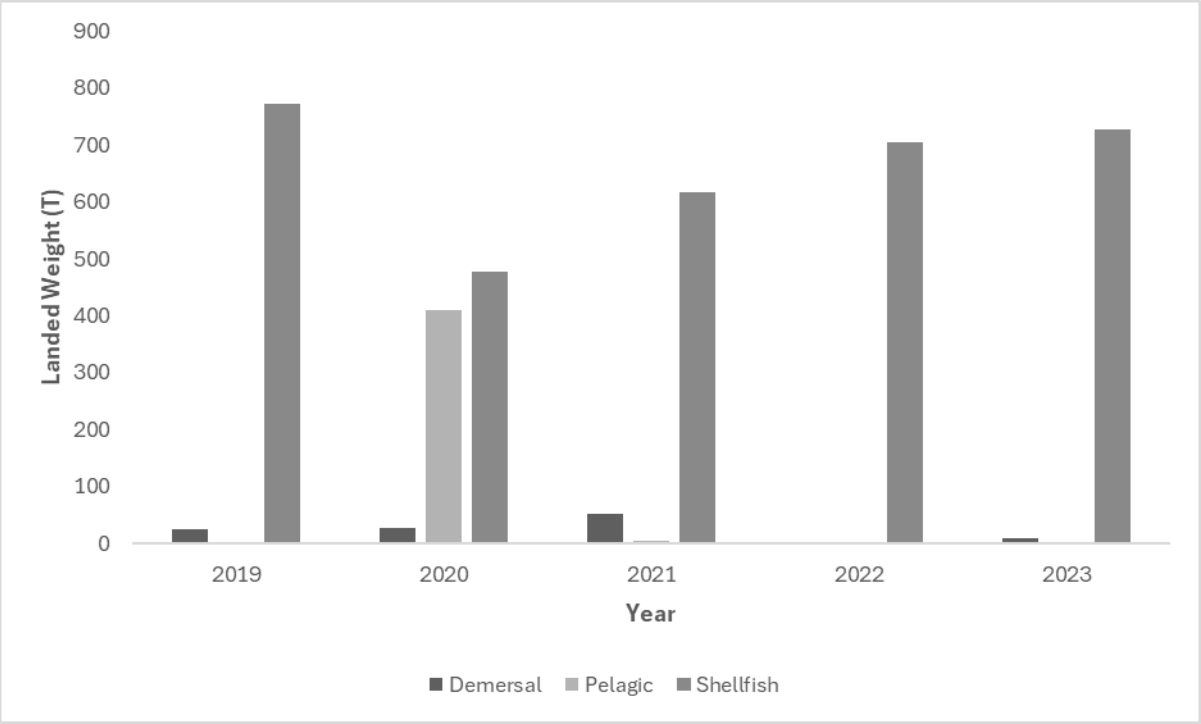


Figure 5.1: Annual landed weight (T) by species group landed by Scottish registered fishing vessels from ICES rectangle 45E3.

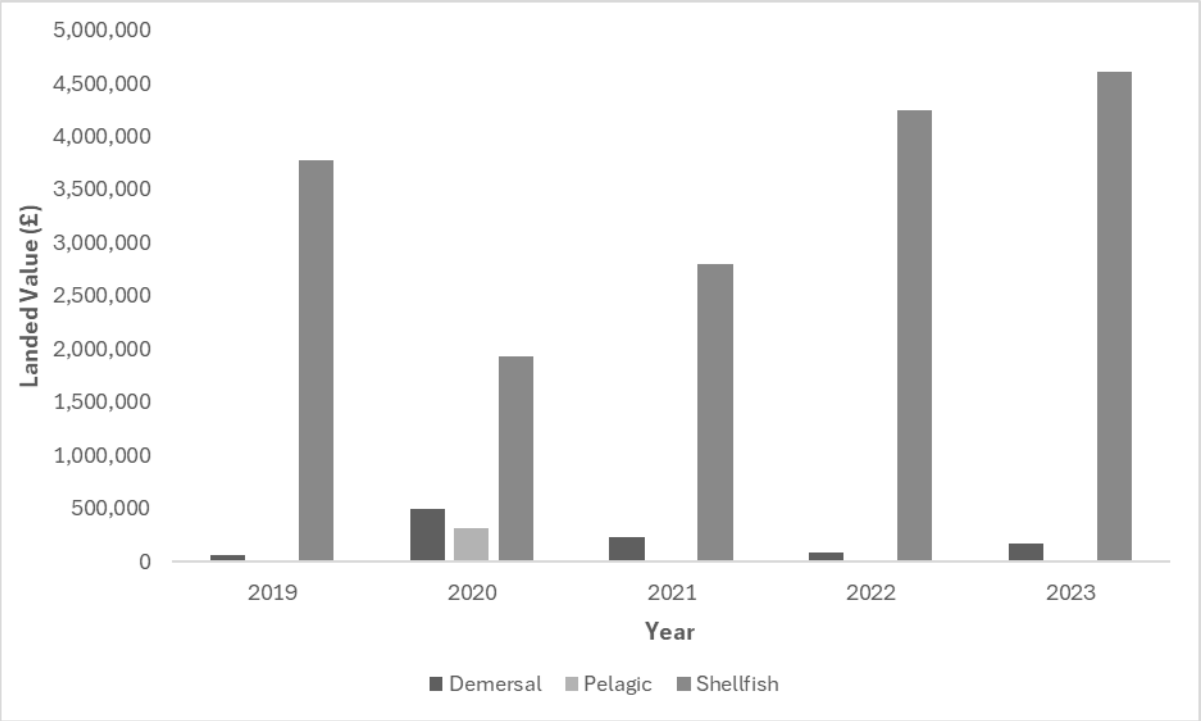


Figure 5.2: Annual landed value (£) by species group landed by Scottish registered fishing vessels from ICES rectangle 45E3.

Figure 5.3 and **Figure 5.4** display landed weight and value by species (all species groups) caught by Scottish registered fishing vessels from 45E3, between 2019 and 2023, inclusive. Both landed weight and value are dominated by the same six species; Nephrops, brown crab, King scallops (hereafter referred to as scallops), velvet crabs, European lobster (hereafter referred to as lobster), and razor clam. Throughout the temporal period, landings by weight of Nephrops accounted for the highest mean annual landed weight at 383.1 T. In terms of landed value, Nephrops also accounted for the highest mean annual landed value at £ 2,361,916.75. With the exception of 2020, landed value of Nephrops has remained fairly consistent across the temporal period.

Whilst these data indicate that razor clam support significant fisheries within 45E3, it has been determined that this fishery is not associated with the Development Area.

The Scottish razor clam fishery is strictly regulated through The Razor Clams (Prohibition on Fishing and Landing) (Scotland) Order 2017. Within this Order it states that fishing for razor clams (*Ensis spp.*) within the Scottish zone is prohibited, but that this prohibition does not apply to; any operations involving fishing for razor clams which, under the authority of the Scottish Ministers, are conducted for the purpose of scientific investigation and to the fishing for razor clams by hand in tidal waters. Within the Order, tidal waters are defined as between the mean high water springs (MHWS) and mean low water springs (MLWS) boundary. As such, the Scottish razor clam, by hand, fishery does not have connectivity with the Proposed Development.

Furthermore, since 2018, and set to end on 31 January 2025, there has been a trial on electrofishing for razor clams in certain areas of the Scottish zone. These zones relevant to 45E3 are displayed in **Figure 5.5**. As can be seen, whilst these zones are located within 45E3, they do not overlap with the Development Area and therefore this fishery does not have connectivity with the Proposed Development.

Based upon data presented within **Figure 5.1** to **Figure 5.4** the key species caught from 45E3 and likely to be targeted within the Development Area are; Nephrops, brown crab, King scallops, velvet crabs and lobster. The identification of these key species aligns with key species identified through consultation and engagement within the commercial fishing industry, with the addition of velvet crab.

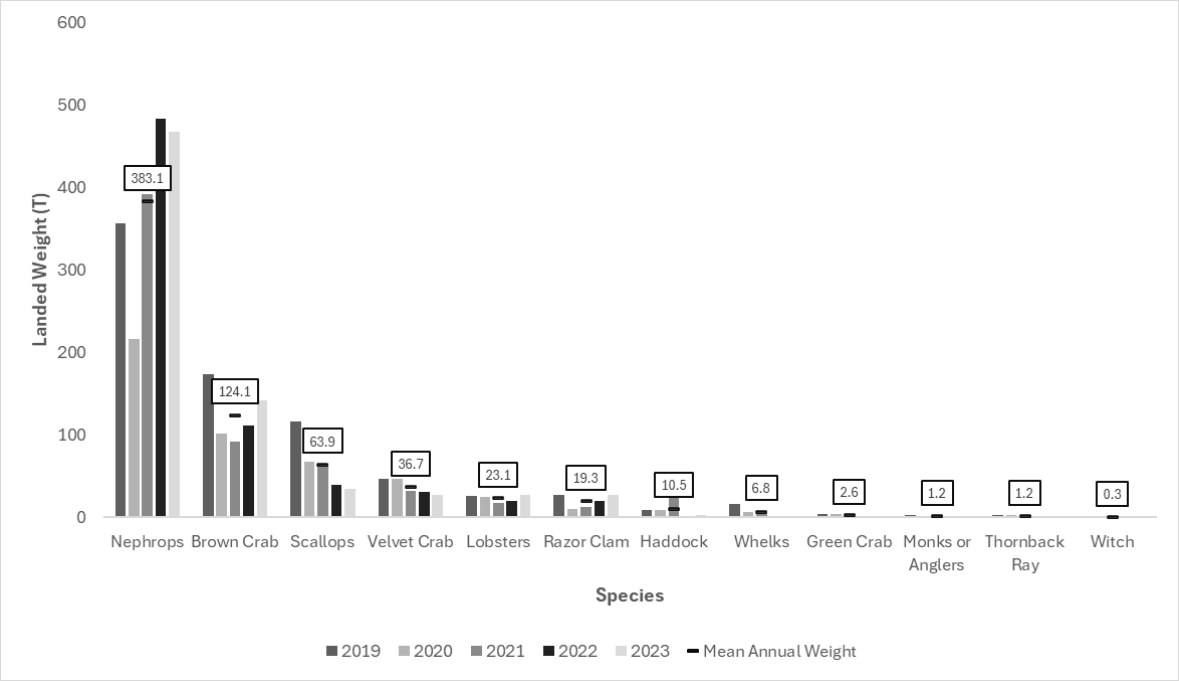


Figure 5.3: Annual landed weight (T) of top 12 species caught from ICES rectangle 45E3, by Scottish registered fishing vessels.

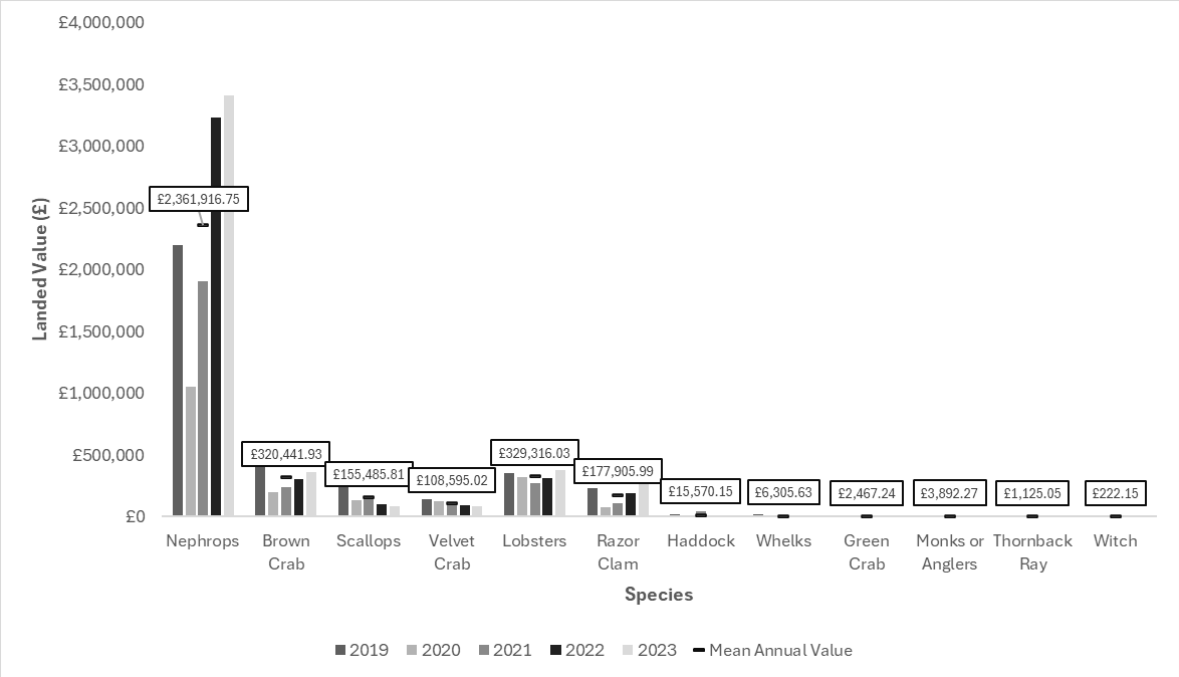


Figure 5.4: Annual landed value (£) of top 12 species caught from ICES rectangle 45E3, by Scottish registered fishing vessels.

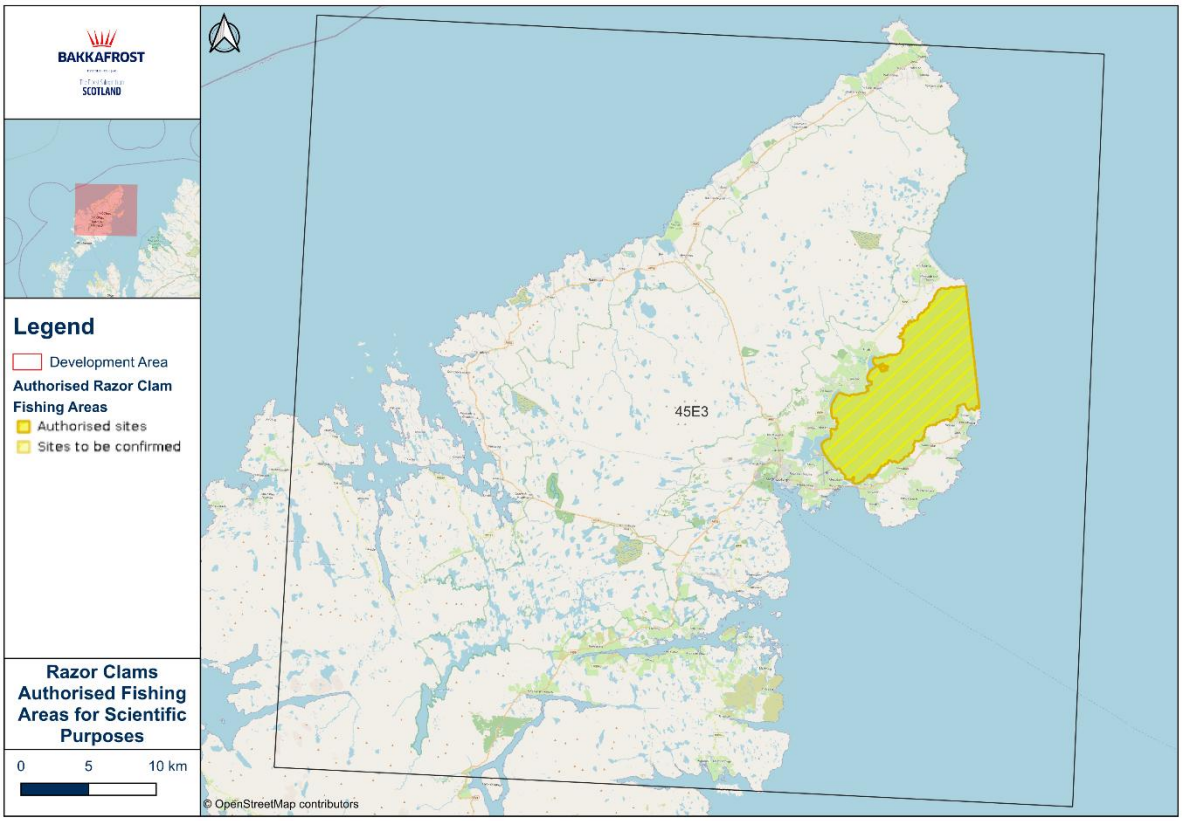


Figure 5.5: Location of razor clam electrofishing zones within 45E3.

5.2 Key Species and Gears

Figure 5.6 displays the percentage contribution of specific gear types towards the total mean annual landed value of the key species within the DSA, between 2019 and 2023. As can be seen, landed value is dominated by demersal trawls, and pots and traps, which accounts for 50.64 and 40.72% respectively. This is followed by dredges, which accounts for 8.51%. Pelagic trawls and other passive gears all contribute negligibly to the total mean annual landings of the key species from 45E3.

Figure 5.7 and **Figure 5.8** illustrate the landed weight and value contribution of the key species by 12 m LOA and under, and over 12 m LOA fishing vessels. As can be seen across the complete temporal period, both 12 m LOA and under, and over 12 m LOA fishing vessels, made landings from 45E3. However, landings by over 12 m LOA fishing vessels dominated landed weight and landed value from 45E3, contributing 63.12 % of the mean annual landed weight and 62.52 % of the mean annual landed value. Values remained consistent throughout the temporal period, however, landings by over 12 m LOA experienced a decline in 2020, in terms of landed value and amount. This is likely as a result of the COVID-19 pandemic. However, landed values have since recovered in 2021, 2022 and 2023.

Figure 5.9 shows the percentage contribution of mean annual landed weight for the key species landed from 45E3 by gear type. These data indicate that 45E3 supports a significant pots and traps fishery for; brown crab, velvet crab, lobster, and Nephrops, a demersal trawl fishery for Nephrops, and a dredging fishery for scallops

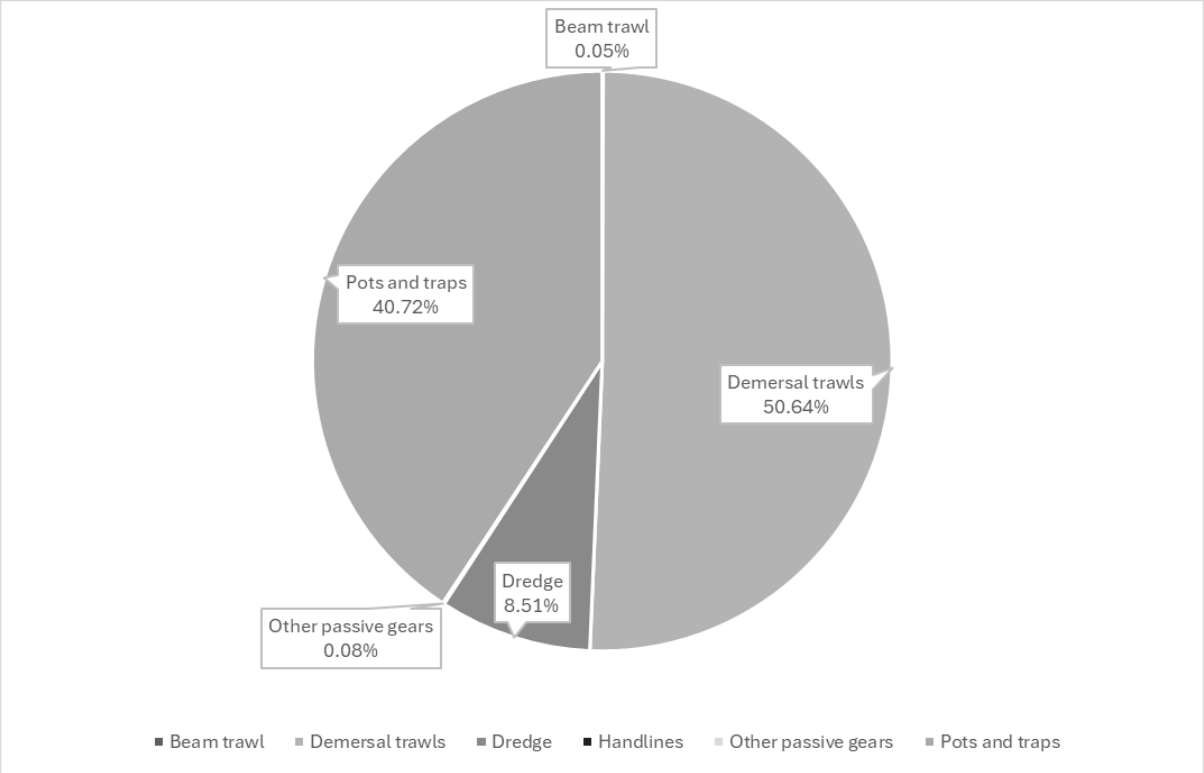


Figure 5.6: Summary of the percentage contribution of gear types to the mean annual landed value from 45E3 between 2019 and 2023 (inclusive).

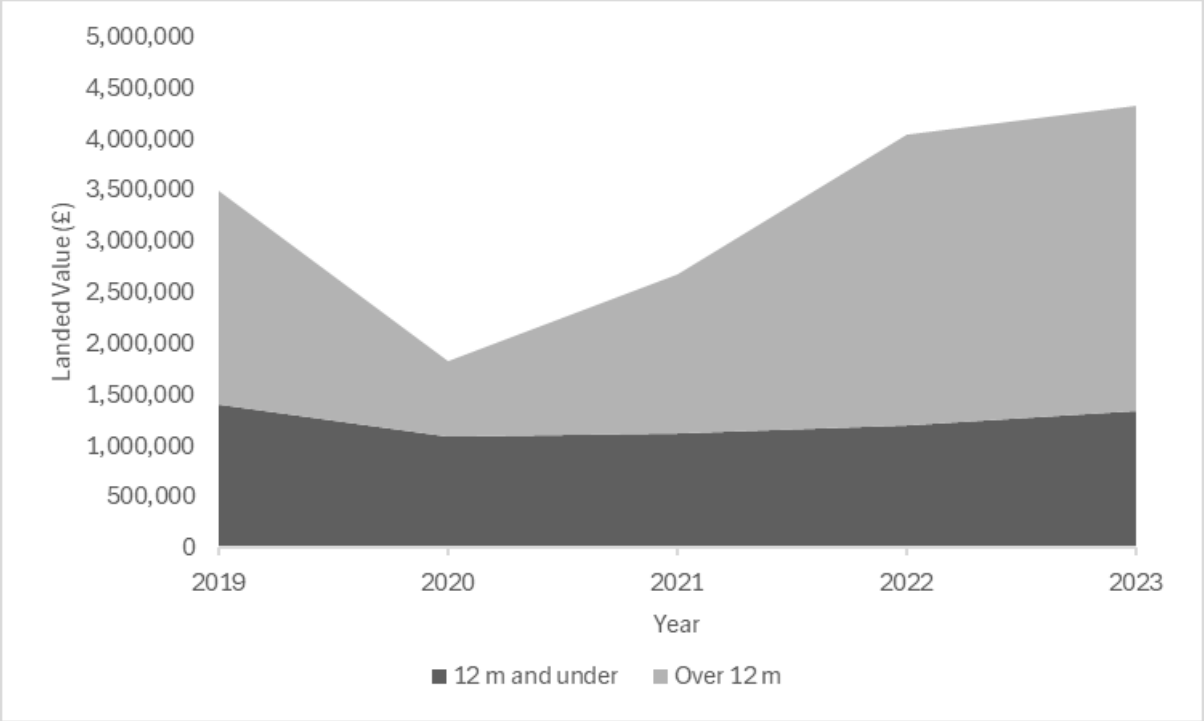


Figure 5.7: Annual landed weight (T) by Scottish registered fishing vessels from ICES rectangle 45E3 between 2019 and 2023 (inclusive).

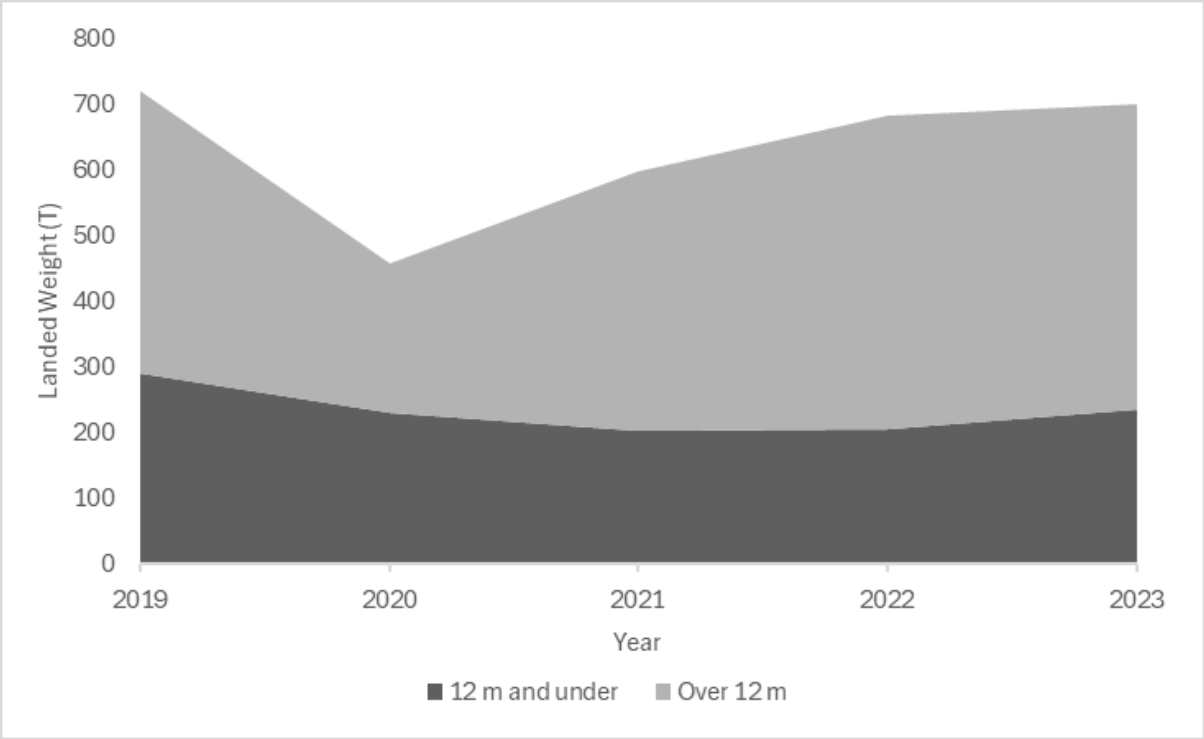


Figure 5.8: Annual landed value (£) by Scottish registered fishing vessels from ICES rectangle 45E3 between 2019 and 2023 (inclusive).

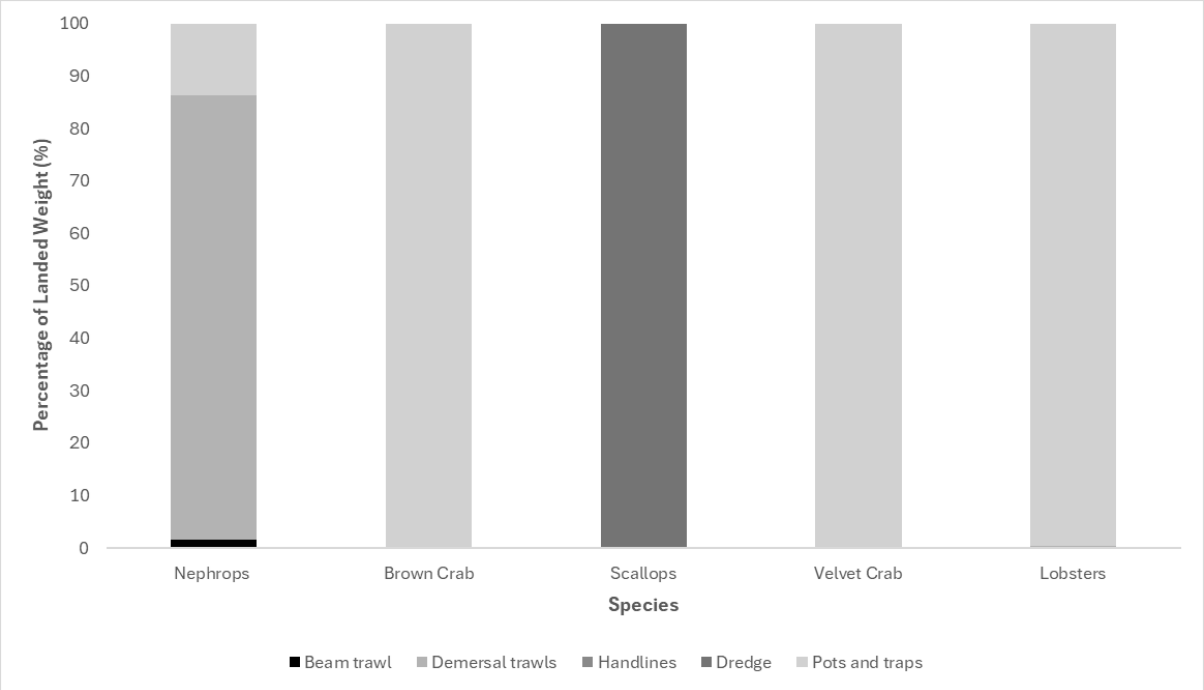


Figure 5.9: Percentage contribution of the mean annual landed weight of key species landed within 45E3 by gear type.

5.2.1 Mobile Gear Fisheries

5.2.1.1 Nephrops Demersal Trawl Fishery

A demersal trawl is a cone shaped net that is towed on the seabed, with the mouth of the net held open by a pair of otter boards. Typically, a Nephrops trawl net will have a headline height of 1.0 to 1.2 m, this relatively low height is designed to target Nephrops on the seabed, whilst minimising round fish bycatch, as these species usually swim higher off the seabed. Sweeps and bridles are also used between the

wings of the net and the otter boards to herd fish into the net, these can range from 35 to 140 m in length on either side of the net. This enables other bottom-dwelling fish, such as flatfish and monkfish, to be caught, to boost landings associated with this gear type. However, Nephrops do not respond well to herding, with the effective herding area for Nephrops being only a few metres ahead of the wings of the net. **Figure 5.10** and **Figure 5.11** illustrate the typical configuration and components of a demersal otter trawl, whilst **Figure 5.12** provides an example of a typical trawl vessel.

Figure 5.13 and **Figure 5.14** present the landed weight and value of Nephrops landed from 45E3 by Scottish registered demersal trawl vessels by month. As can be seen, landings of Nephrops display a steady trend through the first five months of the year then a distinct peak between June and August. There is a notable reduction in landings from September to December.

In general, demersal trawling is an activity that is undertaken by larger vessels, over 12 m LOA, within 45E3. **Figure 5.15** and **Figure 5.16** present the landed weight and value of Nephrops caught by Scottish registered 12 m LOA and under, and over 12 m LOA, trawl vessels from 45E3. As can be seen, the majority of landings, both weight and value, are associated with over 12 m LOA vessels. Across the temporal period the mean annual landed weight and value were 304.92 T and £1,697,356.13. This accounts for 94.54 % of the total mean annual landed weight and 94.20 % of the total mean annual landed value of Nephrops caught via demersal trawl in 45E3.

Figure 5.17 presents the landed weight and value of Nephrops caught by Scottish registered 12 m LOA and under, and over 12 m LOA, trawl vessels from the WSA, inclusive of the DSA. As can be seen, across the WSA, landings are dominated by over 12 m LOA trawl vessels. Across the four ICES rectangles of the WSA, the 12 m LOA and under mean annual landed weight and value was 20.70 T and £112,223.19, whilst the over 12 m LOA mean annual landed weight and value was 231.18 T and £1,300,988.38.

As such, based upon these data, the 12 m LOA and under Nephrops trawl fishery has been scoped out of further assessment, whilst the over 12 m LOA Nephrops trawl fishery has been scoped in for further assessment.

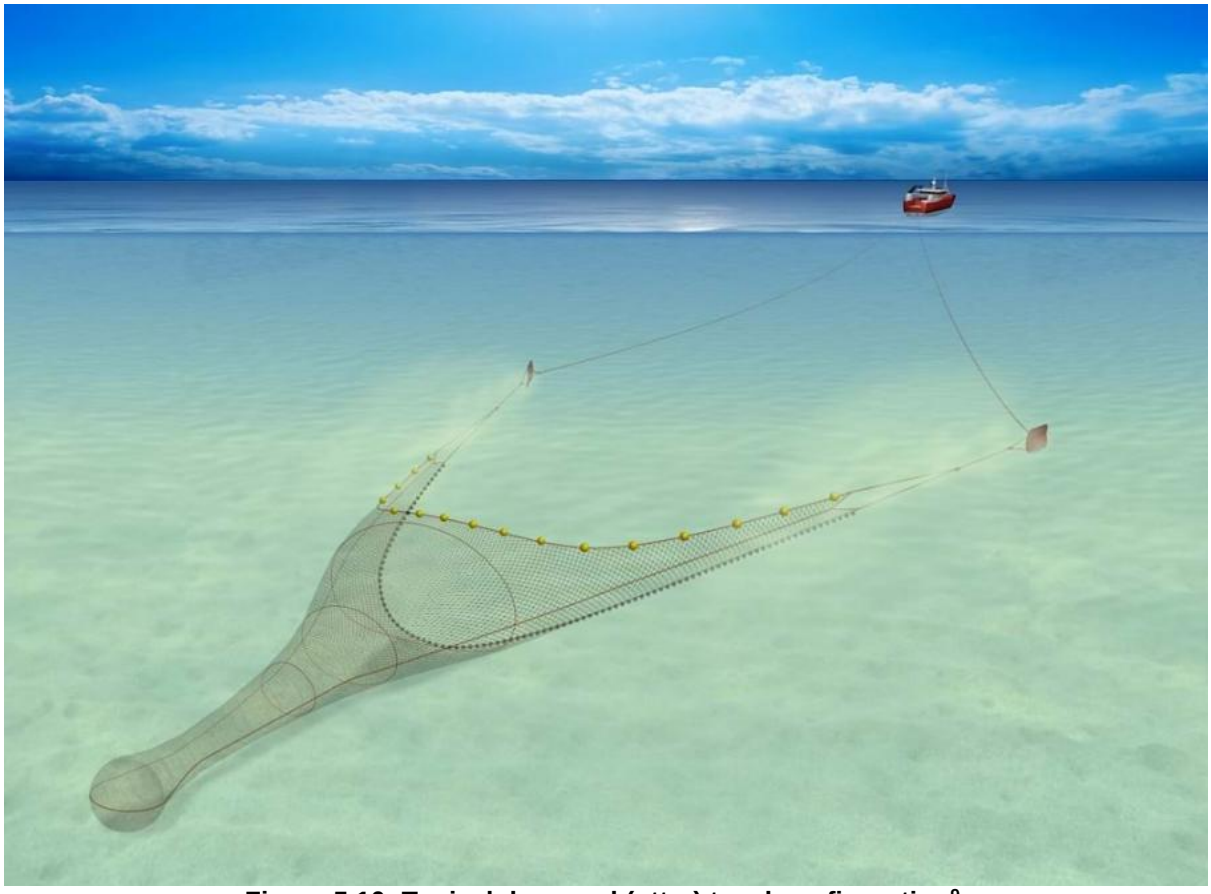


Figure 5.10: Typical demersal (otter) trawl configuration[9].

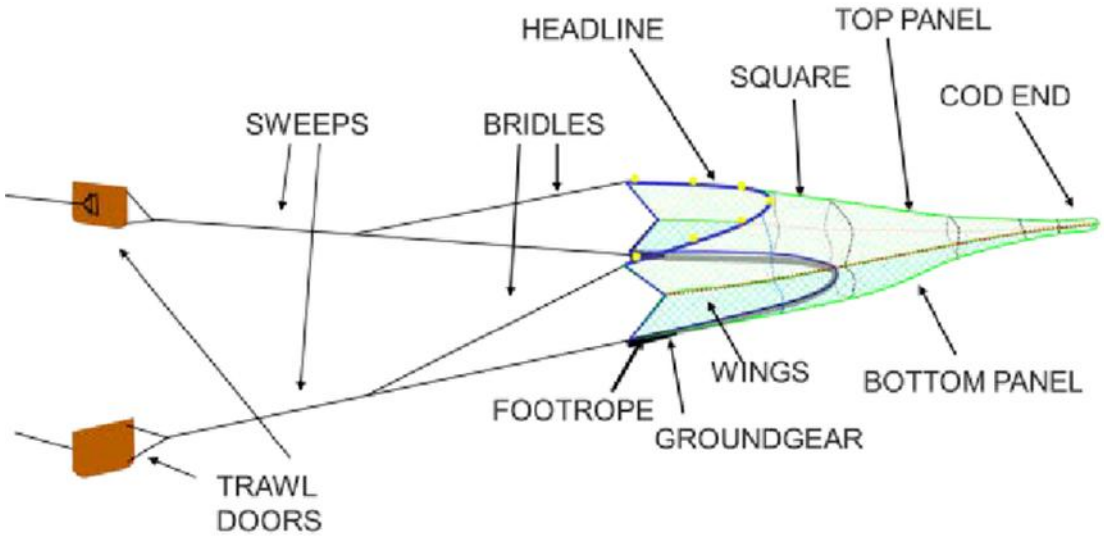


Figure 5.11: Diagram outlining the basic components of an otter trawl[10].

[9] Seafish. Demersal Trawl – General. [Online] Available at: https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/demersal-trawl-general/

[10] Grieve, C., Brady, D. and Polet, H., 2014. Review of habitat dependent impacts of mobile and static fishing gears that interact with the sea bed. Mar Steward Counc Sci Ser, 2, pp.18-88.

Figure 5.12: Example of a typical trawl vessel (Source: MarineTraffic.com).

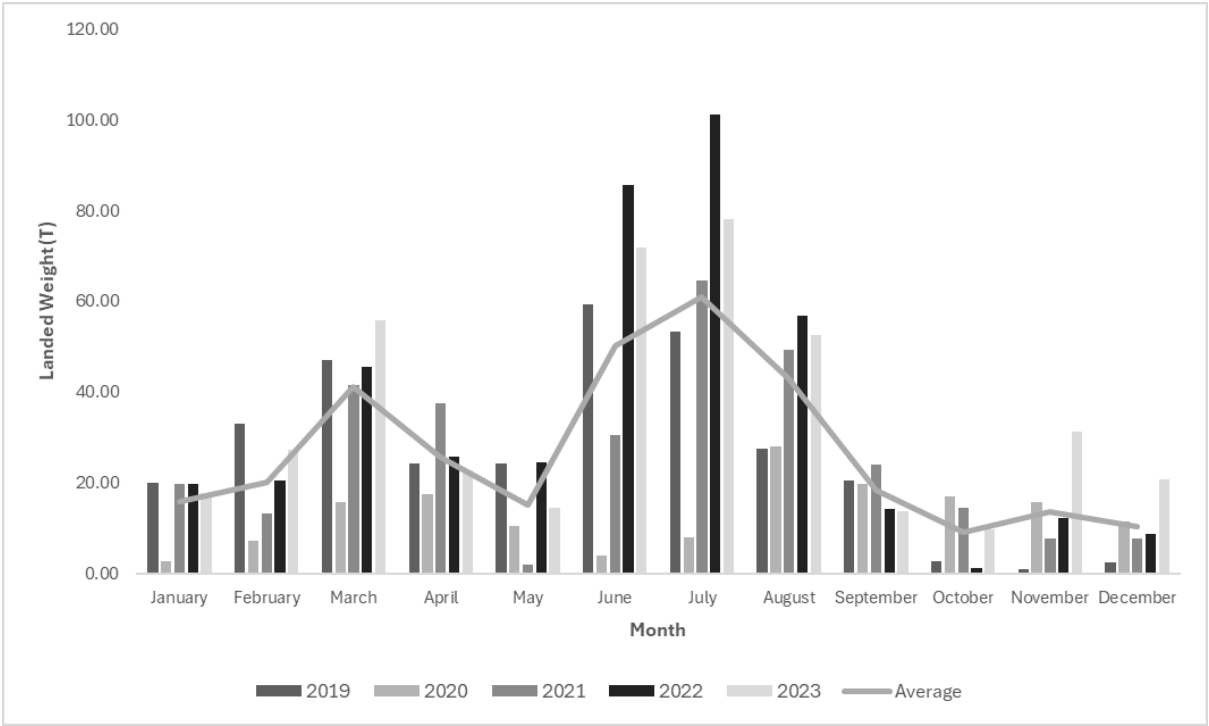


Figure 5.13: Monthly landed weight of Nephrops from 45E3 caught by Scottish registered demersal trawl vessels (2019 to 2023).

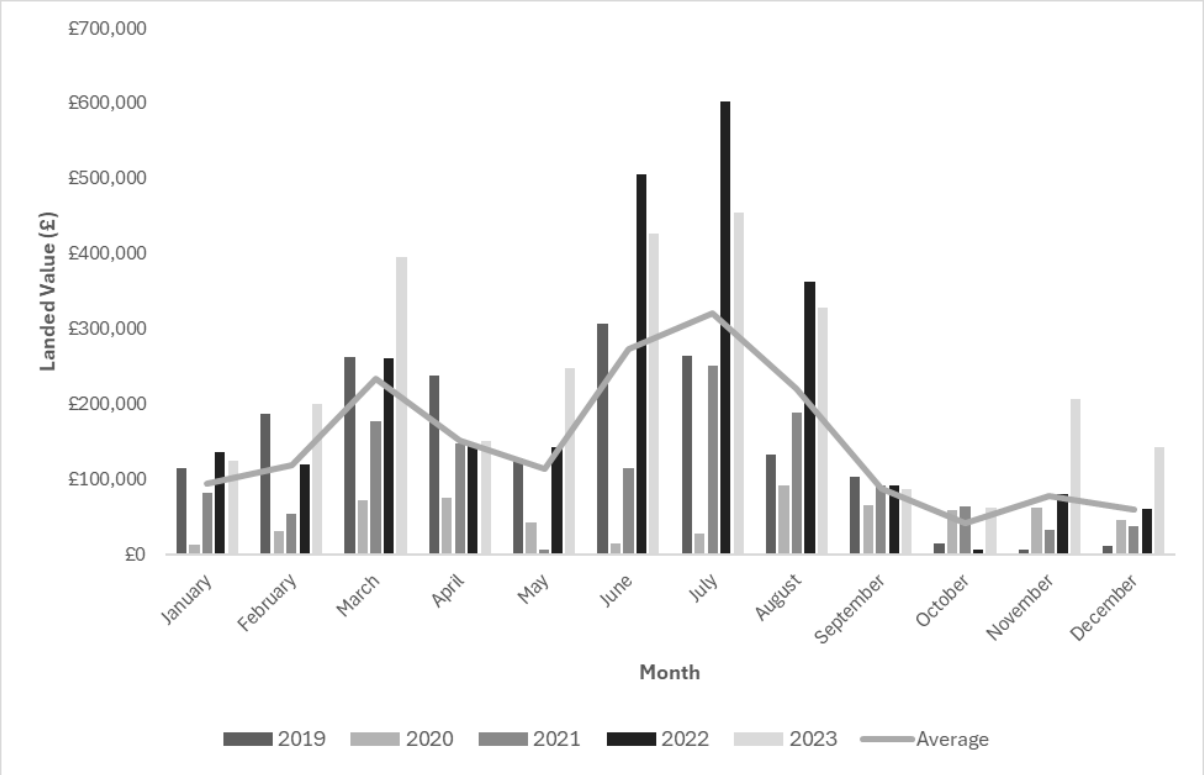


Figure 5.14: Monthly landed value of Nephrops from 45E3 caught by Scottish registered demersal trawl vessels (2019 to 2023).

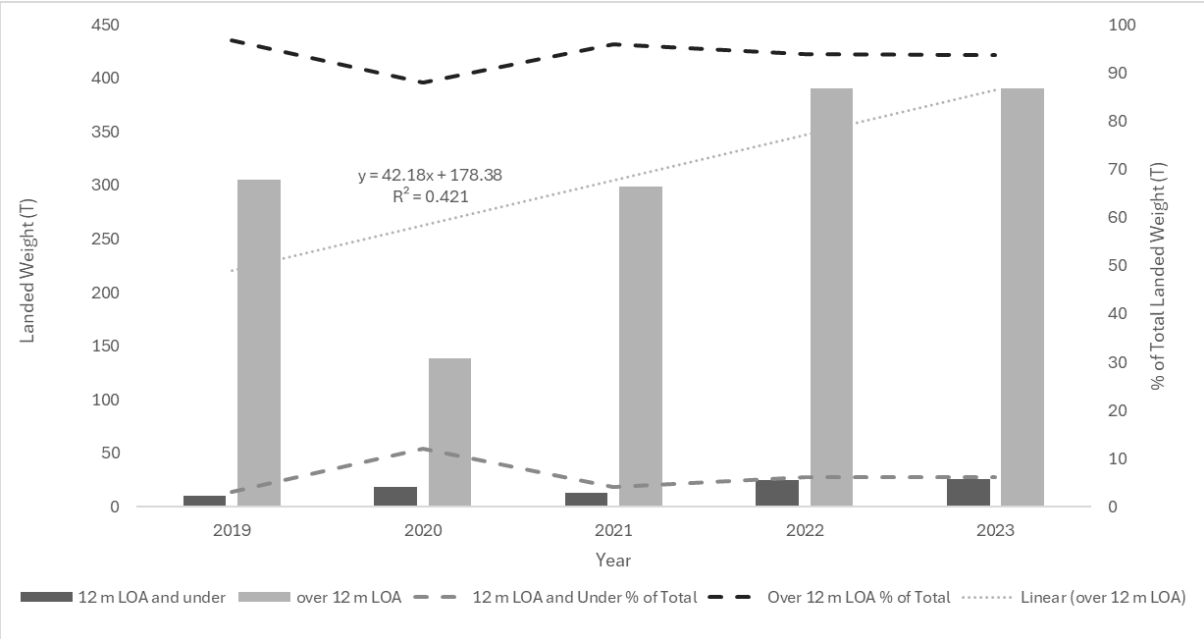


Figure 5.15: Landed weight (T) of Nephrops caught from 45E3 by 12 m LOA and under and over 12 m LOA Scottish registered demersal trawl vessels.

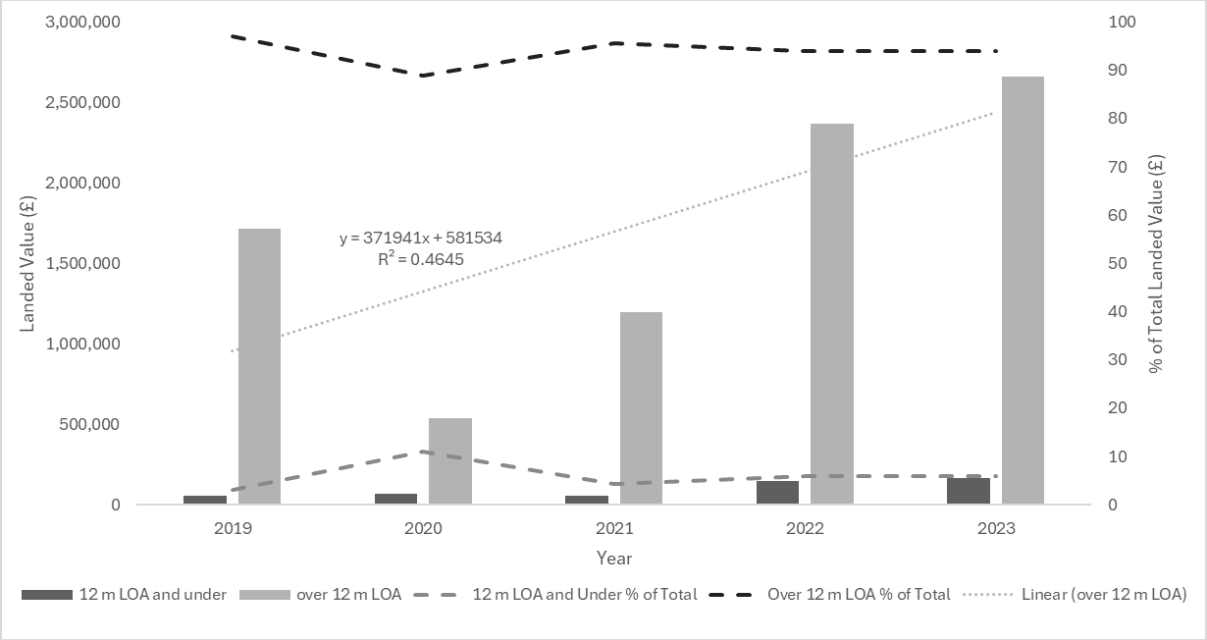
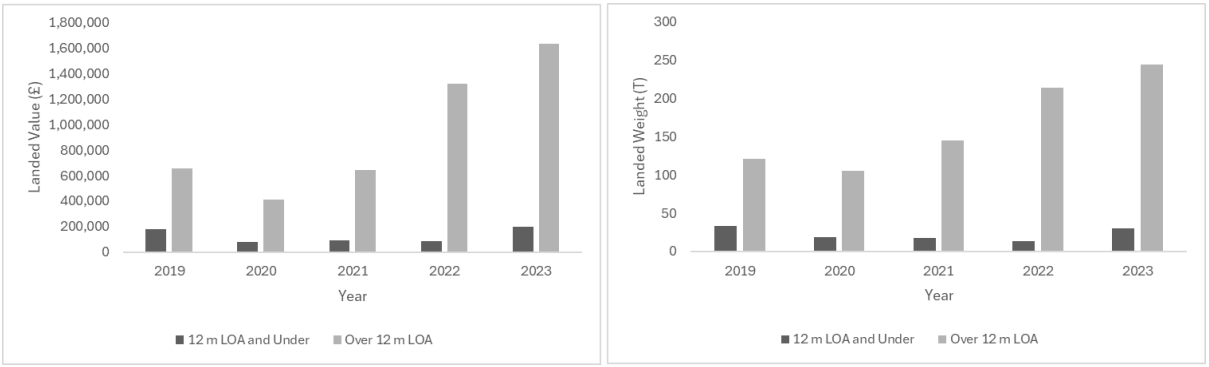
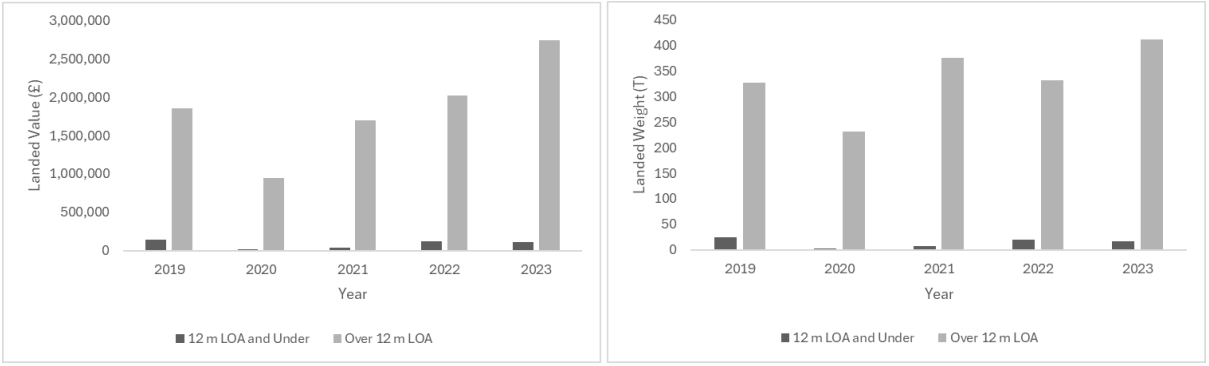


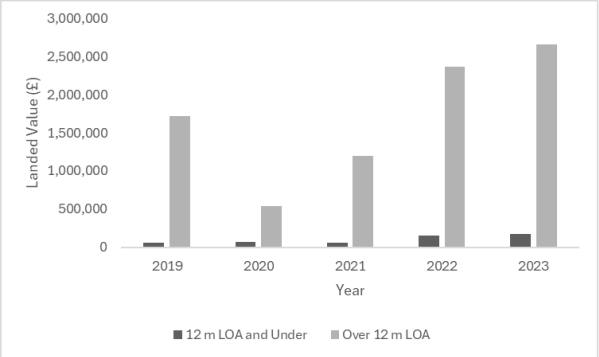
Figure 5.16: Landed value (£) of Nephrops caught from 45E3 by 12 m LOA and under and over 12 m LOA Scottish registered demersal trawl vessels.

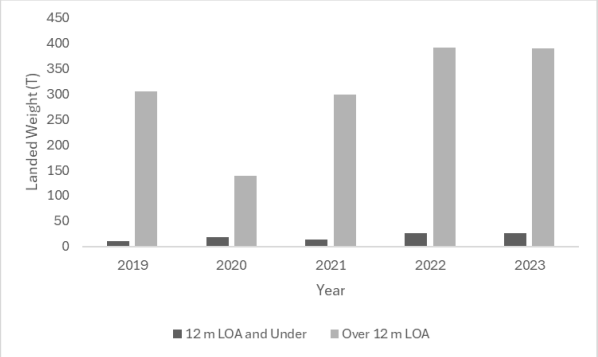


a) 44E3

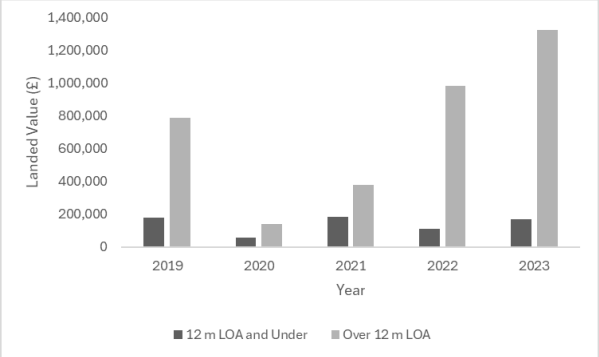


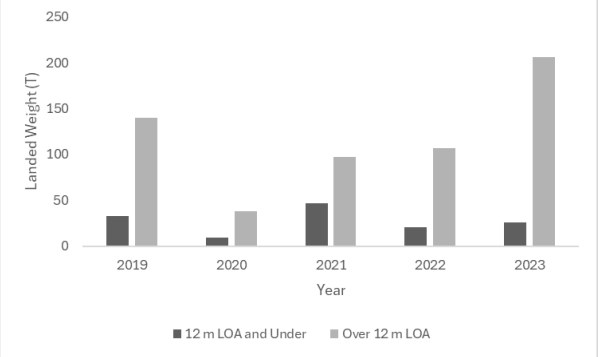
b) 44E4





c) 45E3





d) 45E4

Figure 5.17: Summary of landed weight (T) (left) and landed value (£) (right) of Nephrops caught by 12 m LOA and under and over 12 m LOA Scottish registered demersal trawl vessels from the ICES rectangles within the WSA (44E3, 44E4, 45E3, and 45E4).

5.2.1.2 Scallop Dredging

A dredge is a rigid structure with a chain mail collecting bag, towed on the seabed to target scallops. Generally used by towing several dredges side by side behind the vessel. The dredges are triangular frames, about 750 mm wide, with a toothed bar in front to flip scallops from the seabed into a collecting bag. This bag is made of chain mesh at the bottom and netting on top. Multiple dredges are towed behind a heavy steel bar, with the number depending on the vessel's power and deck length, ranging from 3 to 4 on small boats to 18 to 20 on larger vessels. These vessels resemble beam trawlers but use a steel bar with dredges instead. Other dredges are used in the UK to target different shellfish, such as larger, lighter dredges for queen scallops, and specific styles for oysters and mussels. The size selectivity of scallop dredges is regulated by chain ring size, and only about 20 mm of the 120 mm teeth penetrate the seabed to flick scallops out. There are strict regulations on dredge size and number in different UK areas. **Figure 5.18** illustrates the typical configuration and components of a dredger, **Figure 5.19** shows and example of a typical over 12 m LOA scallop dredging vessel.

Figure 5.20 and **Figure 5.21** present the landed weight and value of scallops landed from 45E3 by Scottish registered dredging vessels by month. As can be seen, landings of Nephrops display a steady trend from January to June, with a reduction in landings for July, before increasing again from August to December. Across the temporal period the mean annual landed weight and value were 61.74 T and £ 149,660.54.

Figure 5.22 Error! Reference source not found. presents the landed weight and value of scallops caught by Scottish registered 12 m LOA and under and over 12 m LOA trawl vessels from the WSA, inclusive of the DSA. As can be seen, across the WSA, landings are dominated by over 12 m LOA trawl vessels. Across the four ICES rectangles of the WSA, the 12 m LOA and under mean annual landed weight and

value was 2.76 T and £6,674.45, whilst the over 12 m LOA mean annual landed weight and value was 86.76 T and £194,764.21.

As such, based upon these data, the 12 m LOA and under scallop trawl fishery has been scoped out of further assessment, whilst the over 12 m LOA scallop trawl fishery has been scoped in for further assessment.

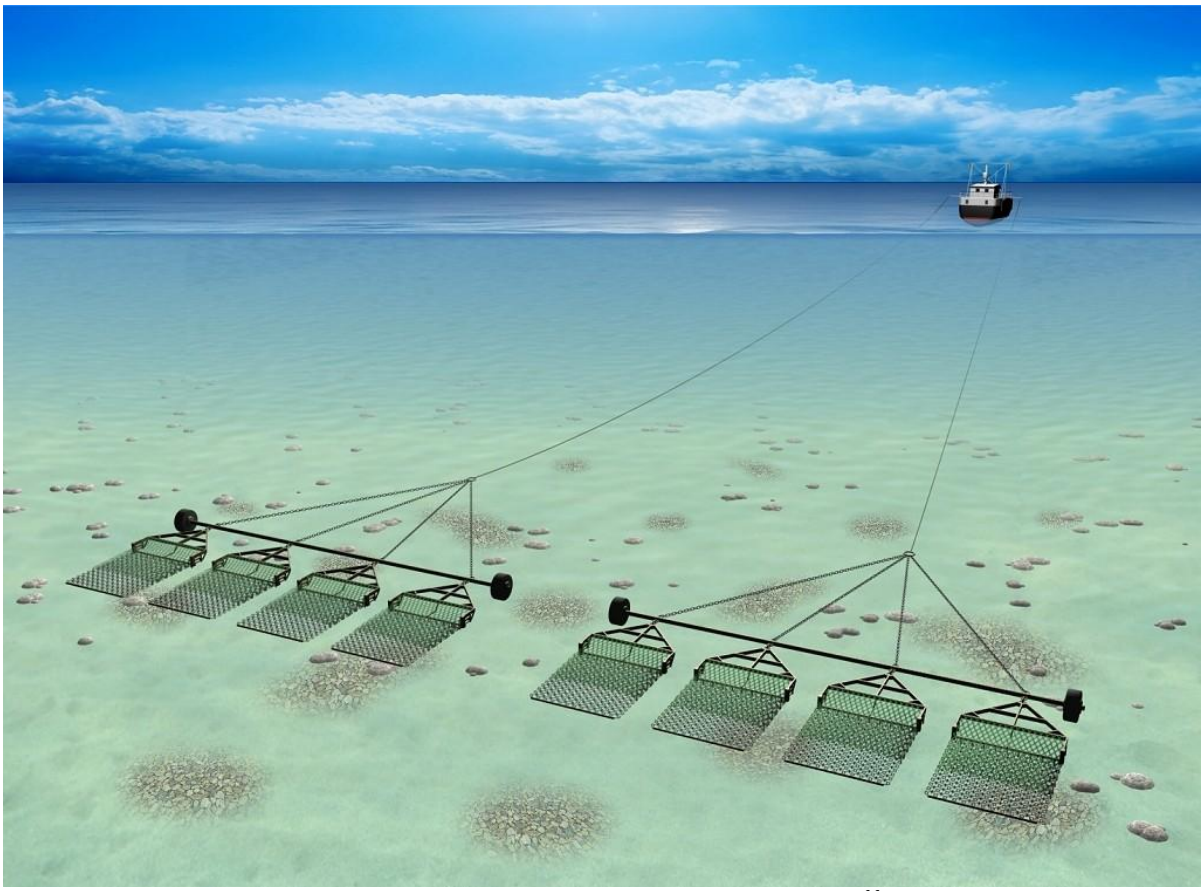


Figure 5.18: Typical Dredger configuration [11]

[11] Seafish. (2024). *DRB - Scallop Dredge | Seafish)*. [online] Available at: https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/drb-scallop-dredge/#gear-classification [Accessed 20 Aug. 2024].

Figure 5.19: Example of a typical over 12 m LOA scallop dredging vessel (Source: MarineTraffic.com)

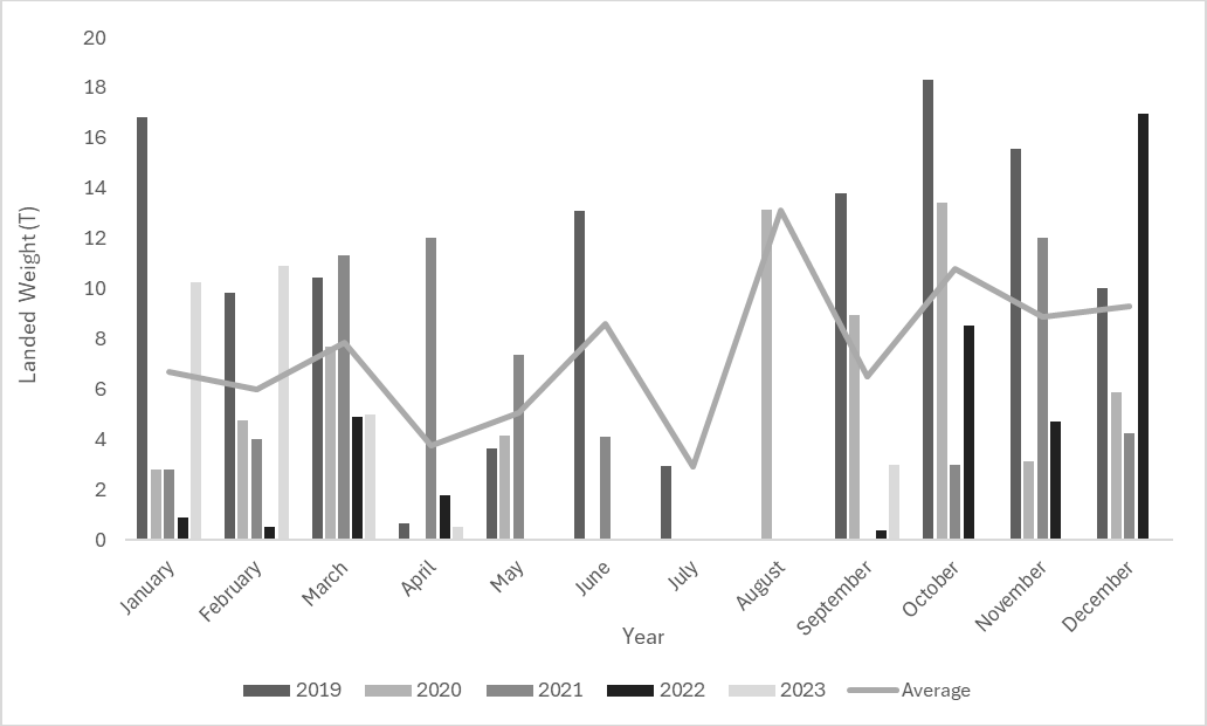


Figure 5.20: Monthly landed weight of scallops from 45E3 caught by Scottish registered dredging vessels (2019 to 2023).

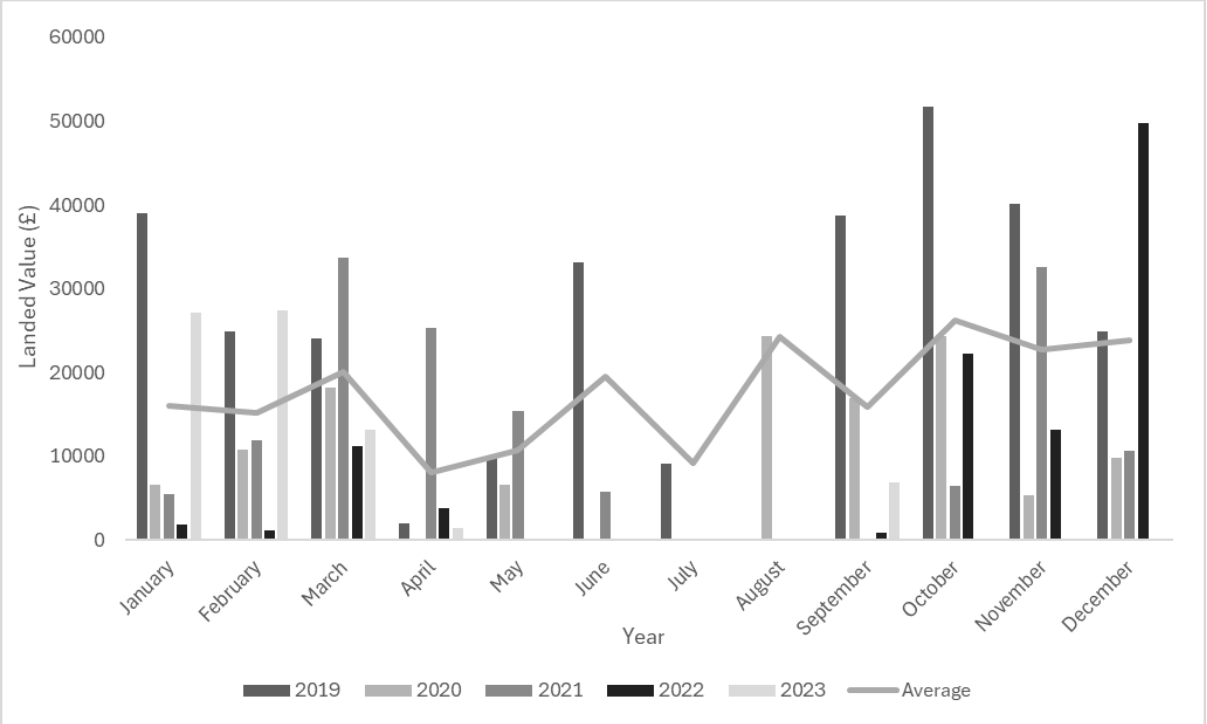
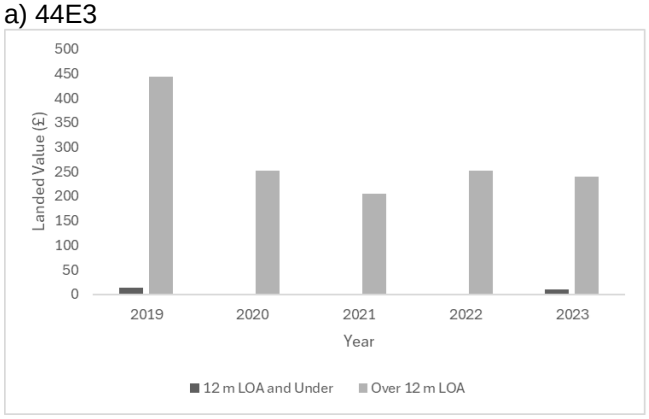
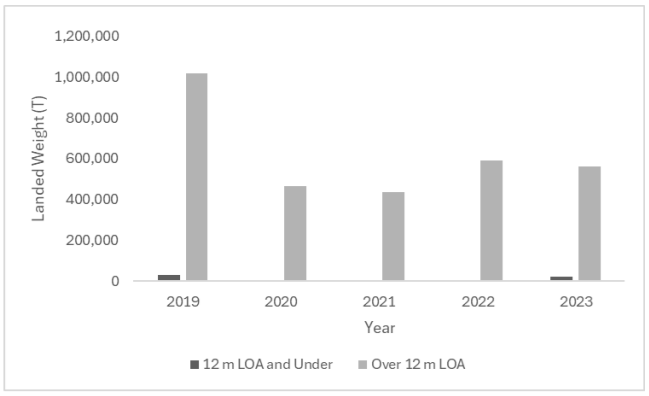


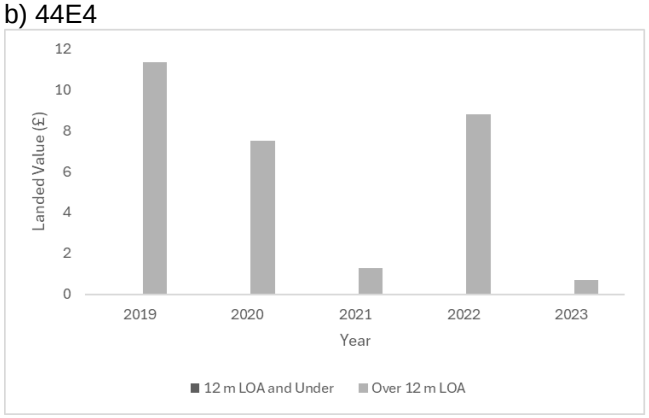
Figure 5.21: Monthly landed value of scallops from 45E3 caught by Scottish registered dredging vessels (2019 to 2023).

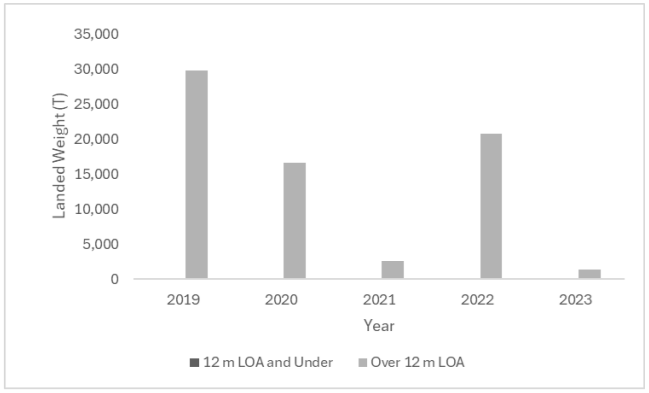
a) 44E3



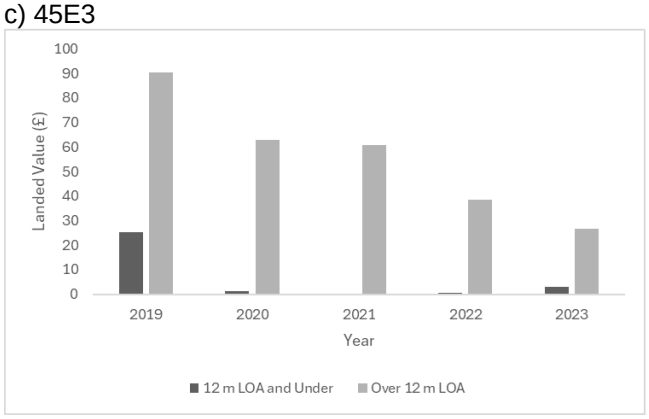


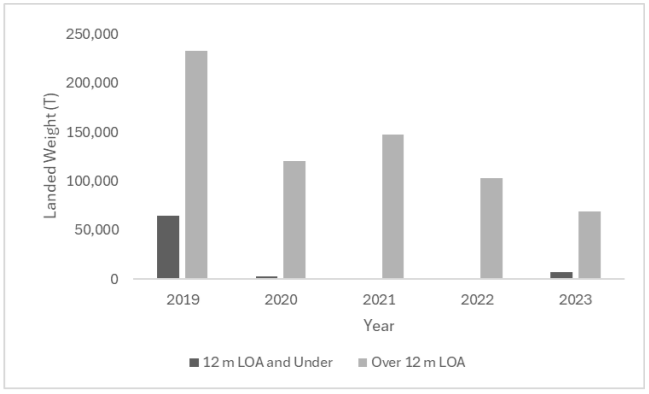
b) 44E4



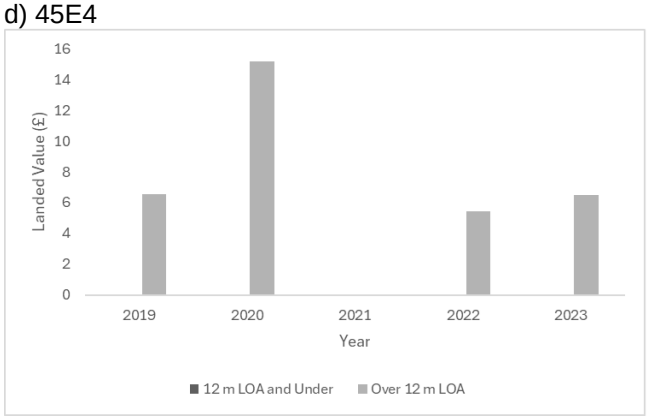


c) 45E3





d) 45E4



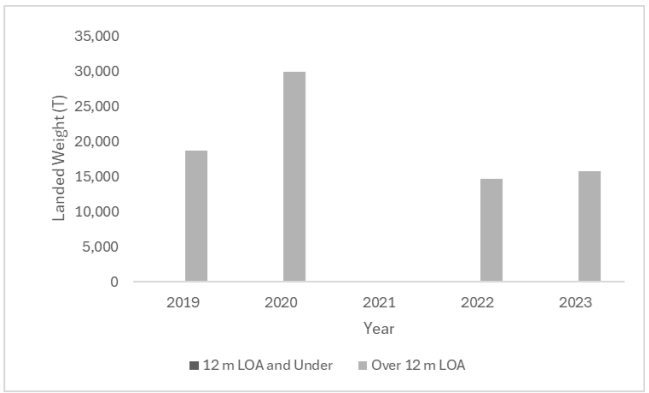


Figure 5.22: Summary of landed weight (T) (left) and landed value (£) (right) of scallops caught by 12 m LOA and under and over 12 m LOA Scottish registered demersal trawl vessels from the ICES rectangles within the WSA (44E3, 44E4, 45E3, and 45E4).

5.2.2 Static Gear Fisheries

5.2.2.1 Scottish Pots and Traps Fishery

Pots and traps gear deployed by UK fishing vessels differ in their shape, size, and construction material depending on the target species and fishing practice. However, all pots will be similar in that they will have at least one tapered entrance, which is designed to make it easy for the target species to enter the pot, but difficult to escape. Pots are baited typically with some species of fish. However, this depends on the target species.

There are two principal methods for deploying ('shooting') pots. Pots can either be shot individually, or more commonly they can be shot in fleets, where a number of pots are attached to a single leader rope which is laid on the seabed, with the leader being marked at both ends by buoys.

The number of pots in a fleet depends on a number of factors including; the type of pots used, the target species, the size and design of the fishing vessel, the type of seabed, and the preference of the crew of the fishing vessel. In general the number of pots in a fleet can range from five in inshore lobster fisheries to over 100 in offshore crab fisheries and Nephrops fisheries. Small inshore fishing vessels are more likely to shoot pots individually. **Figure 5.23** illustrates the typical configuration of a fleet of pots, whilst **Figure 5.24** provides examples of typical pots and traps fishing vessels.

Figure 5.25 displays the mean monthly landed weight and value of key species targeted by the pots and traps fishery within 45E3. As can be seen, brown crab are landed throughout the year, however, landings peak between September and January. Velvet crab are also landed throughout the year, with an increase in landings noted from August onwards and peak landings in December. Landings of lobster are highly seasonal and peak between July and September, outwith this period landings are negligible to low with the exception of December 2021 which showed an isolated increased landing value. Nephrops are also landed throughout the year, with peaks associated with March and April.

Figure 5.26 displays the landed weight and value of the key species caught via pots from 45E3, by Scottish registered 12 m LOA and under and over 12 m LOA vessels. Landings of the key species have been dominated by 12 m LOA and under vessels. Mean annual landed weight and value for 12 m LOA and under vessels across the temporal period was 199.31 T and £1,080,371.52, this accounts for 84.32 % of the total mean annual landed weight and 83.52 % of the total mean annual landed value of the key species via pots and traps (12 m LOA and under and over 12 m LOA pots and traps landings). These data indicate that landings, both weight and value, experienced a slight decrease in 2020. Whilst, landed weight has remained at levels similar to 2020, landed value has since shown a slight increase.

Figure 5.27 displays the contribution to total landed weight and value made by the key species caught by Scottish registered 12 m LOA and under vessels in 45E3. In terms of landed weight of the key species, brown crab landings have dominated with a mean annual weight of 99.23 T. However, annual landed weight and value of brown crab has experienced a slight decrease throughout the temporal period, decreasing by 24.79 % and 33.05 % respectively. Landings of velvet crab, lobster and Nephrops have remained steady over the temporal period.

Figure 5.28 displays the landed weight and value of the key species caught by Scottish registered 12 m LOA and under and over 12 m LOA pots and traps vessels from the WSA. These data indicate that over the temporal period (2019 to 2023) 44E4 supported the most economically valuable pots and traps fishery, with a mean annual landed weight and value of 332.48 T and £2,629,139.29. The high mean annual landed value of 44E4 is the result of significant landings of Nephrops, with a mean annual landed weight and value of 176.49 T and £2,131,818.29.

Based upon data presented in this Sub-Section, the 12 m LOA and under pots and traps fishery has been scoped in for further assessment, whilst the over 12 m LOA pots and traps fishery has been scoped out of further assessment.

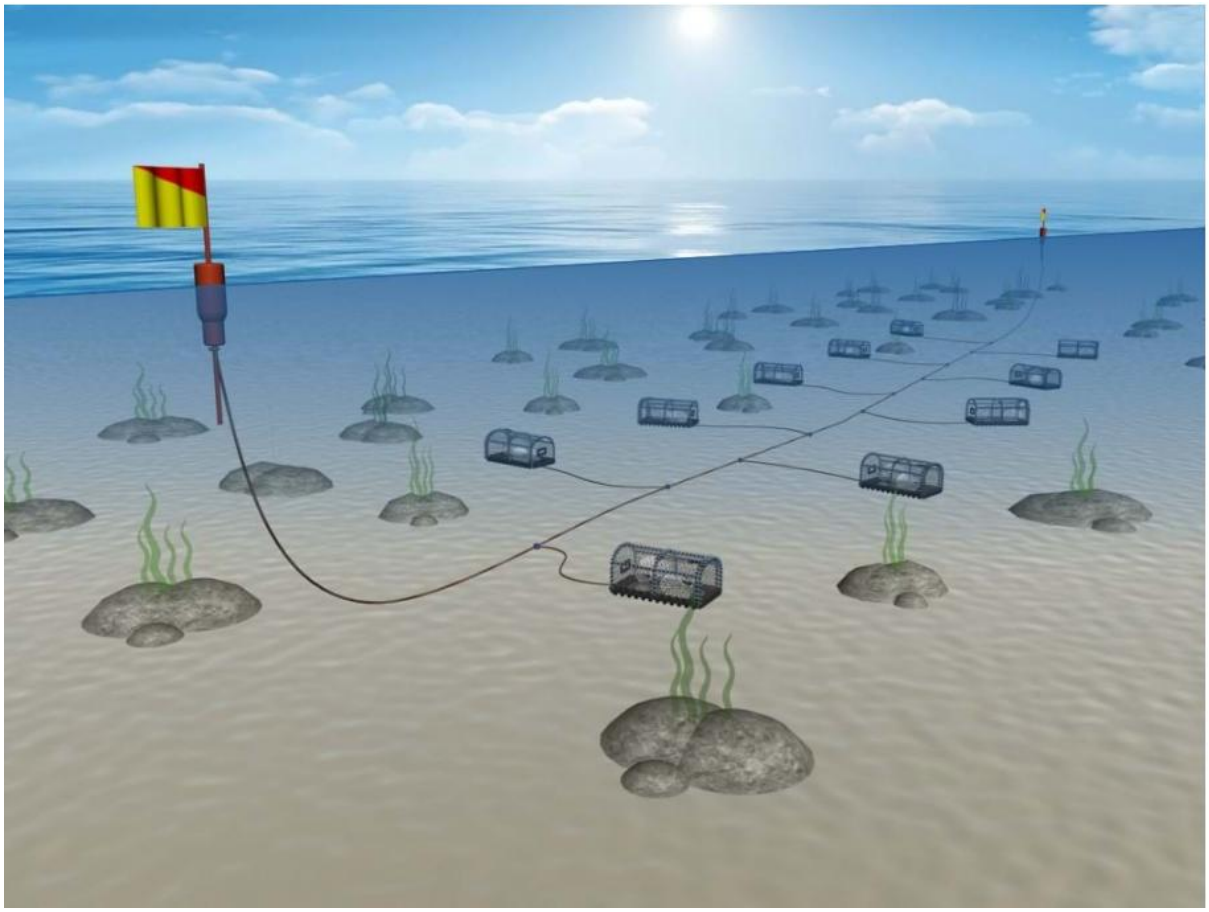
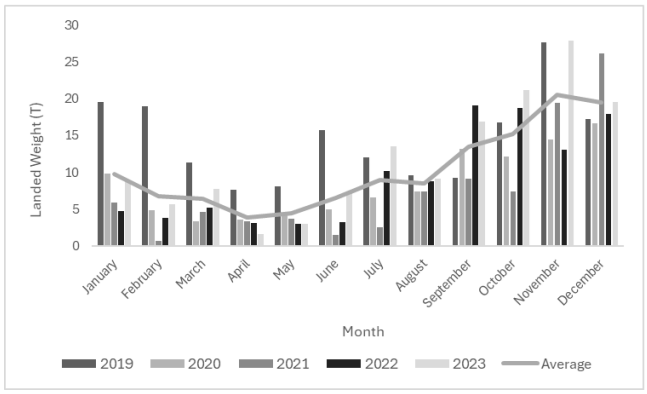
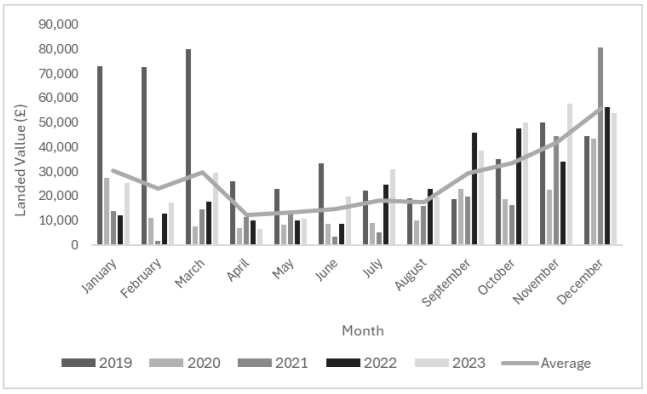


Figure 5.23: Typical configuration of pots and traps gear deployed in a fleet with marker buoys located at both ends of the leader rope[12].

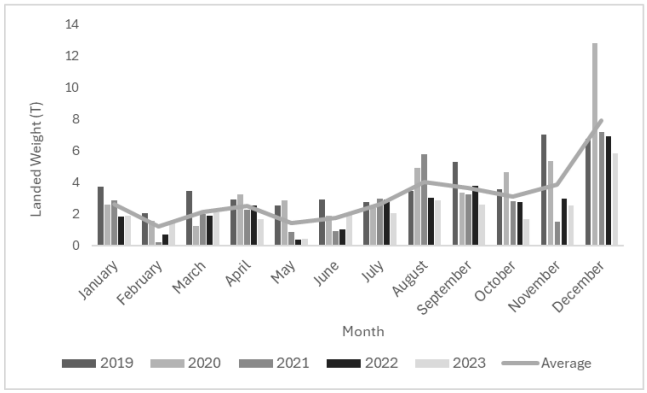
Figure 5.24: Example of a typical over 12 m LOA (left) and a 12 m LOA and under (right) pots and traps vessel (Source: MarineTraffic.com).

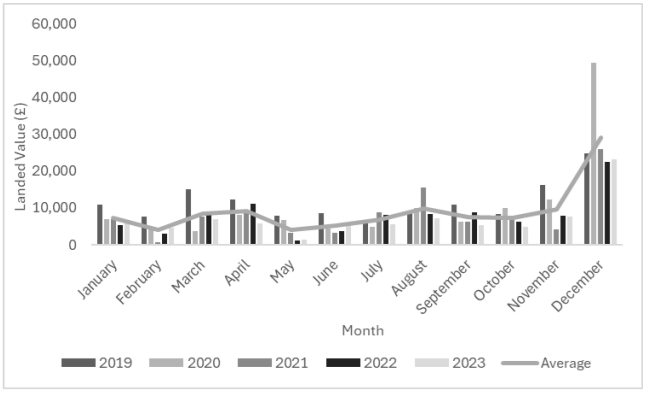
[12] Seafish. Pots and Traps – General. [Online] Available at: https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/pots-and-traps-general/#:~:text=Pots%20and%20traps%20are%20generally,behaviour%20of%20its%20target%20species.



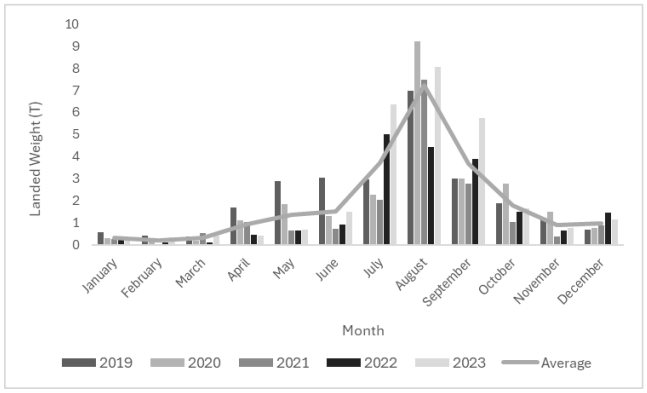


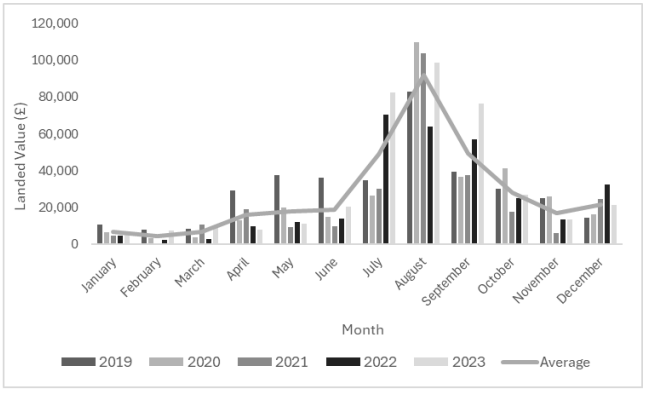
a) Brown crab



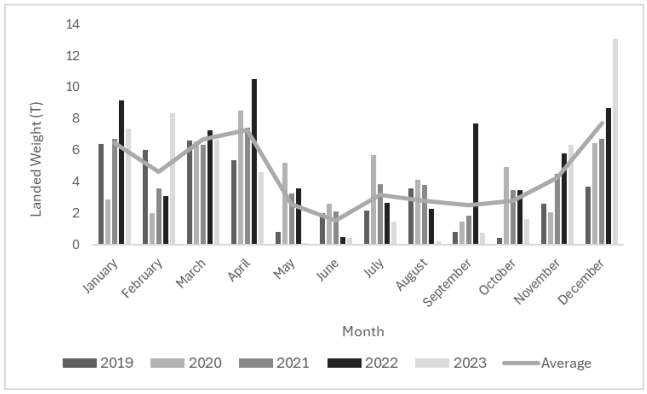


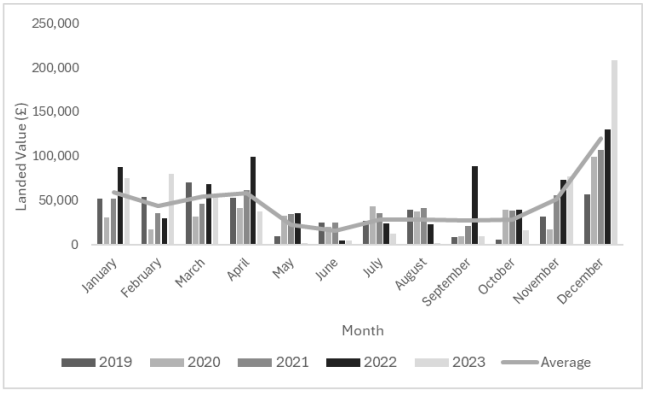
b) Velvet crab





c) Lobster





d) Nephrops

Figure 5.25: Summary of the landed weight (T) (left) and landed value (£) (right) by month of the key species targeted by Scottish registered pots and traps vessels within the DSA (45E3).

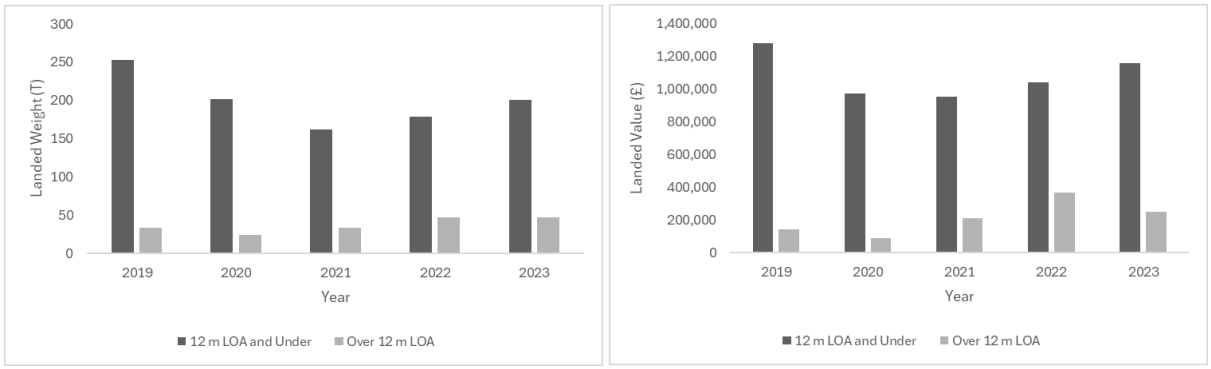


Figure 5.26: Landed weight (T) (left) and value (£) (right) of the key species caught by Scottish registered 12 m LOA and under and over 12 m LOA pots and traps vessels from 45E3.

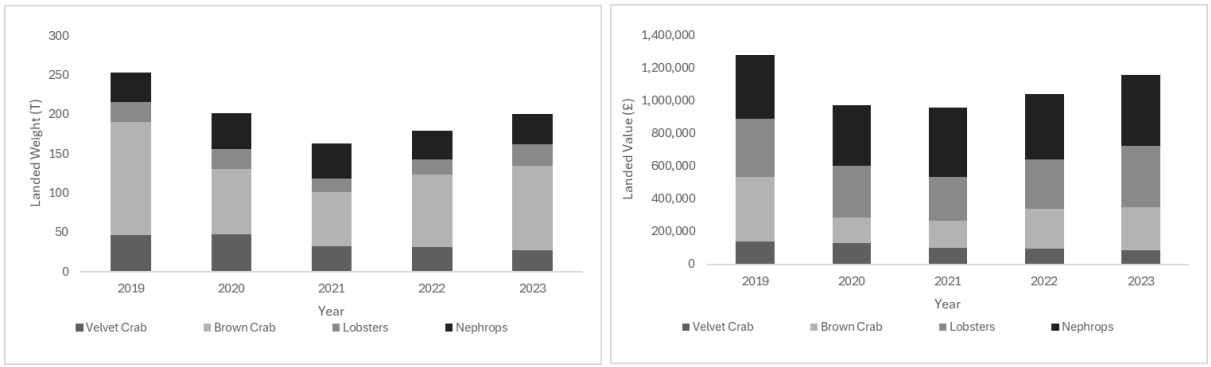
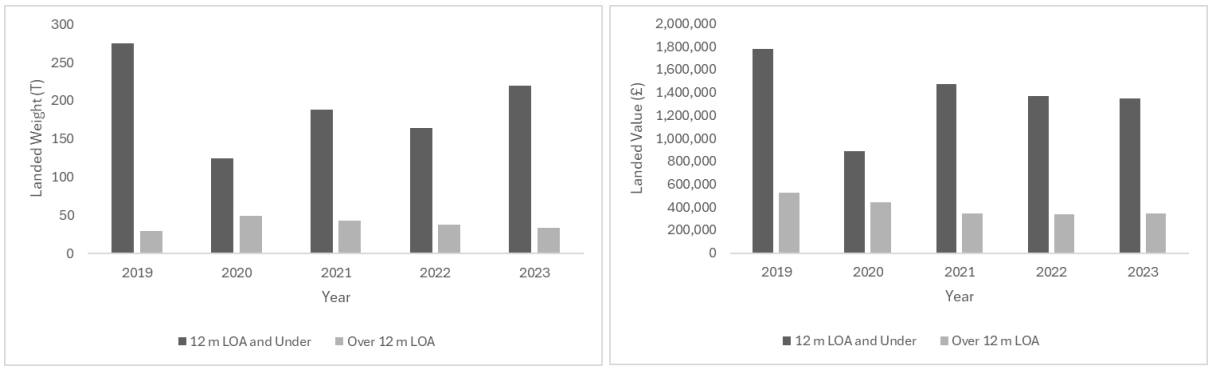
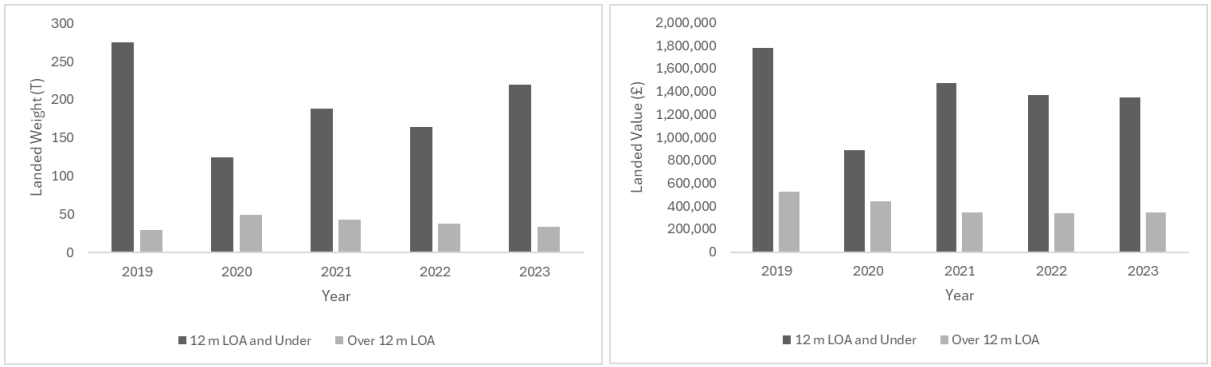


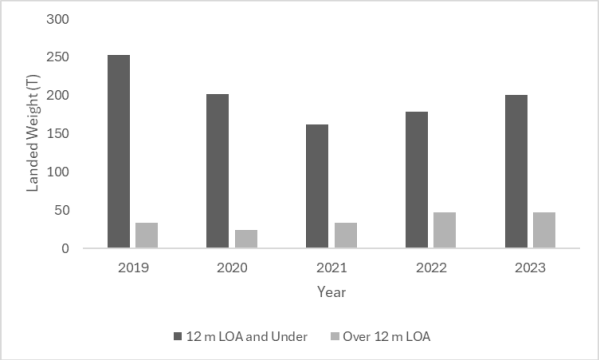
Figure 5.27: Contribution of the key species to the total landed weight (T) (left) and value (£) (right) caught by Scottish registered 12 m LOA and under pots and traps vessels from 45E3.

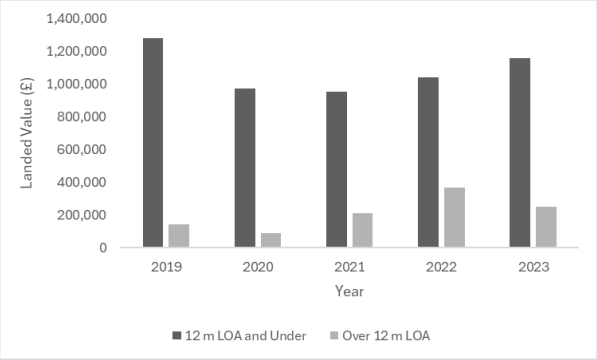


a) 44E3

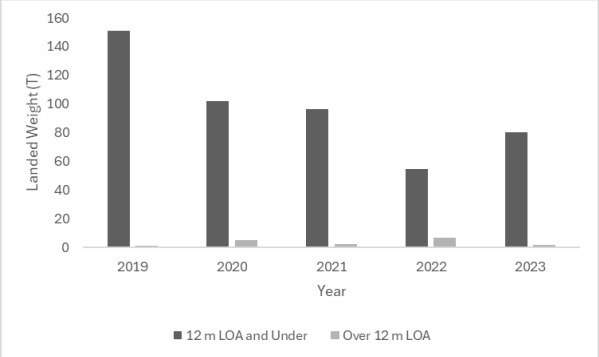


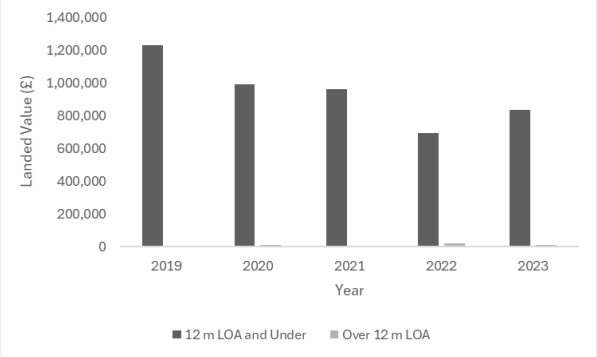
b) 44E4





c) 45E3





d) 45E4

Figure 5.28: Landed weight (T) (left) and value (£) (right) of the key species caught by 12 m LOA and under and over 12 m LOA Scottish registered pots and traps vessels from the ICES rectangles within the WSA (44E3, 44E4, 45E3, and 45E4).

5.2.3 Key Local Ports

As detailed in **Figure 5.29** there are four fishing ports located within the DSA, these include, from north to south; Carloway, Bernera, Breasclete, and Stornoway. The fishing port of Stornoway is the closest port to the Proposed Development, at 16.55 km to the north.

Figure 5.30 displays annual landed weight and value of the key species, caught by over 12 m LOA Nephrops demersal trawl and scallop dredge vessels, along with 12 m LOA and under pots and traps vessels. As illustrated in **Figure 5.30,** landings, in terms of both weight and value, of the key species varied depending on the port of landing. Stornoway is the most productive ports in the DSA, whilst landings into Breasclete were negligible.

Figure 5.31 illustrates the landed weight and value of each key species into the fishing ports within the DSA, by over 12 m LOA demersal trawl and dredging vessels and 12 m LOA and under pots and traps vessels. As can be seen, the contribution of each key species to total landings into the ports varies considerably.

Based upon data presented in **Figure 5.29** to **Figure 5.31,** in combination with information provided by local commercial fisheries stakeholders, the port of Stornoway has been identified as the most significant port within the DSA, particularly in relation to the Proposed Development.

Figure 5.32 illustrates the relative contribution of the various ICES rectangles from which relevant vessels (12 m LOA and under pots and traps vessels and over 12 m LOA demersal trawl and dredging vessels) landing into Stornoway caught the key species. As can be seen there is great variation in terms

of the relative contribution of the ICES rectangles. For all the key species targeted by pots and traps, demersal trawls and dredging, the DSA (45E3) contributed the most significant value.

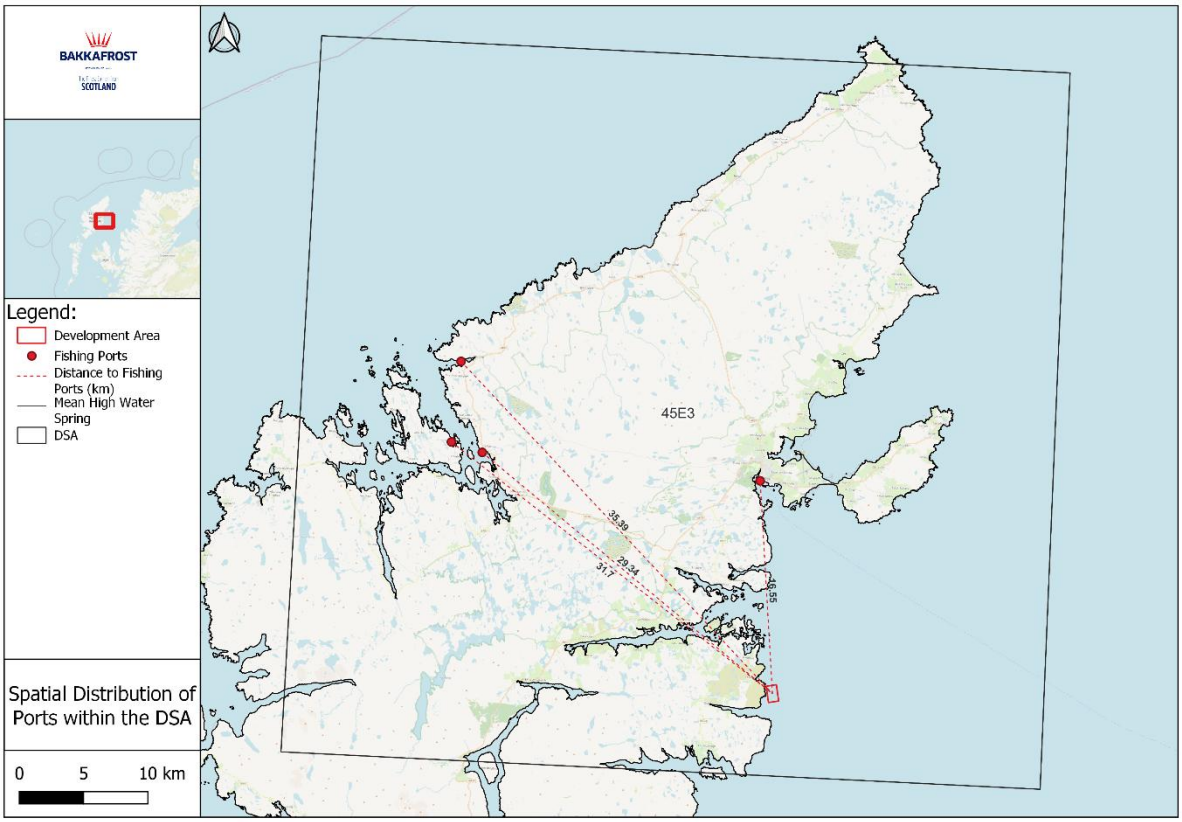


Figure 5.29: Spatial distribution of fishing ports within the DSA in relation to the Proposed Development Error! Bookmark not defined.**.**

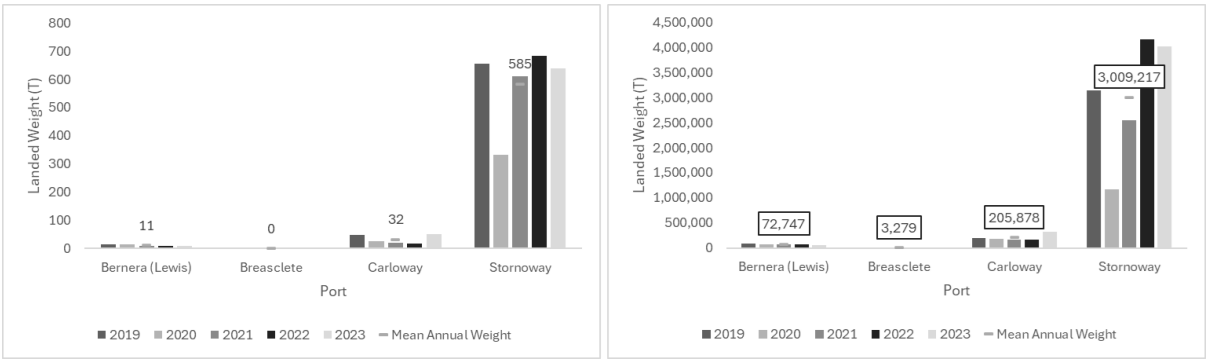


Figure 5.30: Annual landed weight (T) (left) and value (£) (right) of the combined key species into the local ports within the DSA.

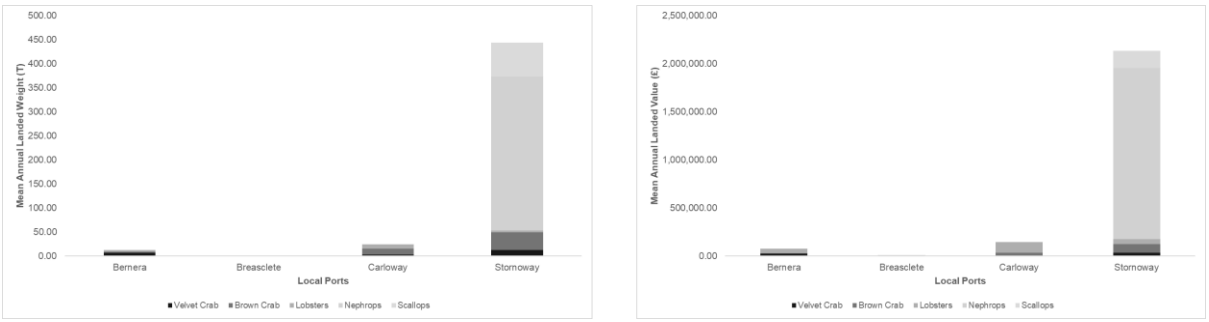
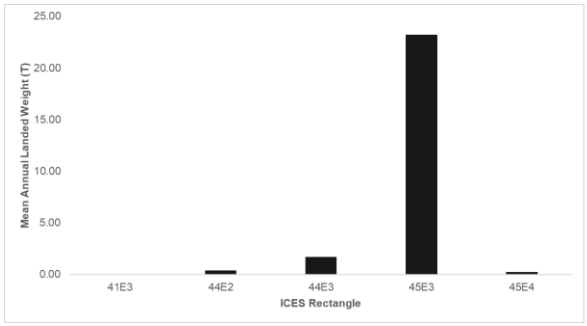
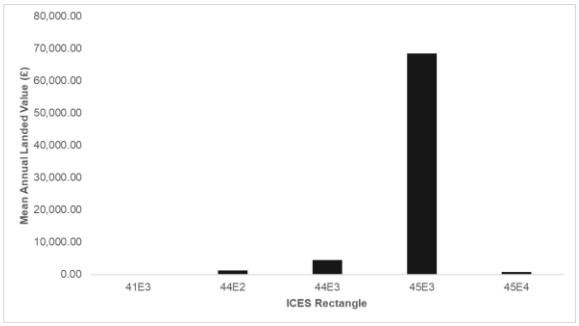
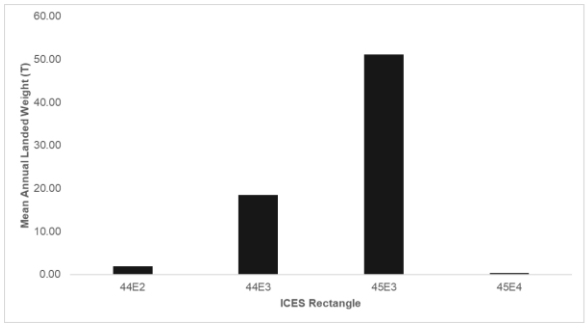


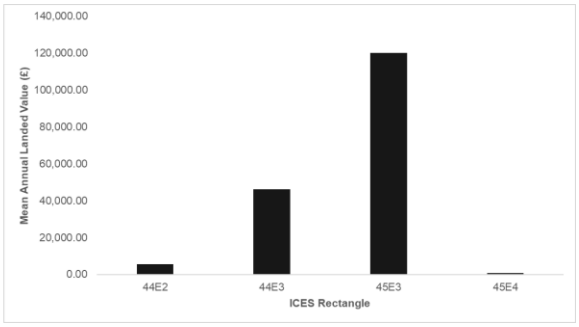
Figure 5.31: Mean annual landed weight (T) (left) and value (£) (right) of each key species into the local ports within the DSA.



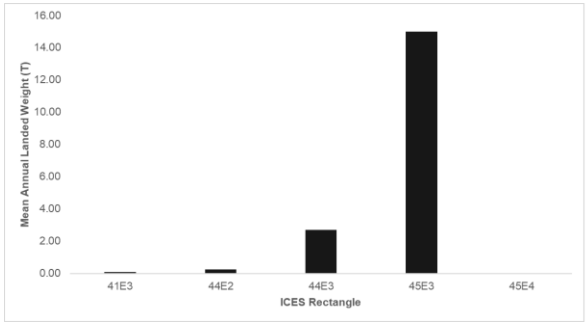


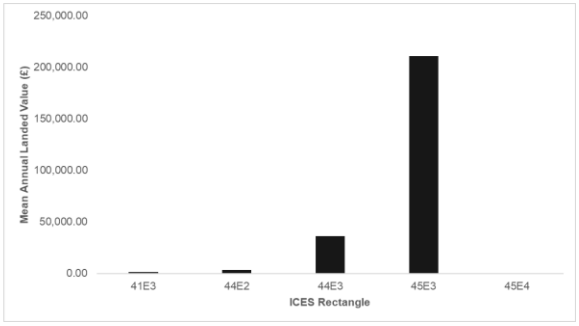
a) Velvet Crab



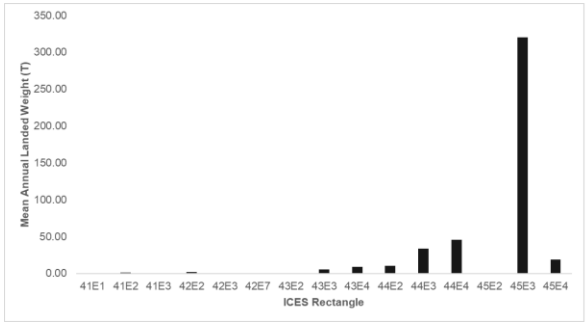


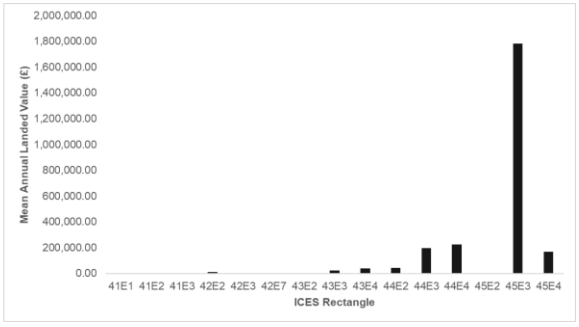
b) Brown Crab



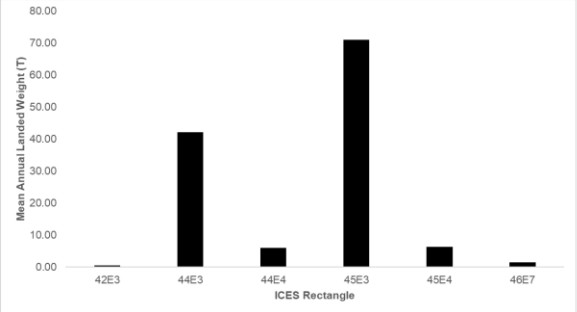


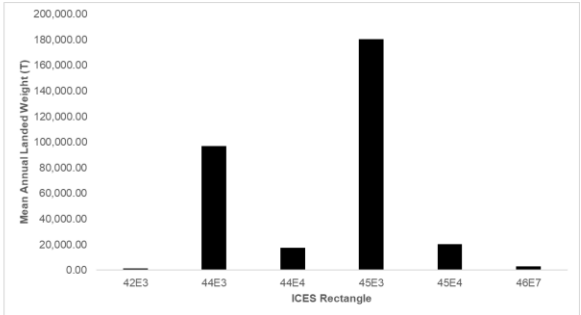
c) Lobster





d) Nephrops





e) Scallops

Figure 5.32: ICES rectangle contribution towards the mean annual landed weight (T) (left) and value (£) (right) of the key species landed into Stornoway.

5.3 Spatial Analysis of Inshore Commercial Fishing Activity

5.3.1 Mobile Gear Fisheries

5.3.1.1 Nephrops Demersal Trawl Fishery

5.3.1.1.1 Over 12 m LOA Fishing Vessels

Nephrops are a mud burrowing marine decapod crustacean. As such their distribution is constrained by the spatial extent of suitable muddy sediment, within which Nephrops construct their burrows. Therefore, fishing vessels targeting Nephrops are likely to display a spatial distribution that positively correlates with the spatial extent of suitable Nephrops habitat.

Figure 5.33 presents the spatial extent of suitable Nephrops habitat in addition to burrow density within areas of suitable habitat. As can be seen, the Proposed Development is located on the edge of a large section of suitable habitat, that extends from the east coast of the Isle of Lewis out into the Minch. This section of suitable Nephrops habitat covers a significant portion of the Minch. Other suitable habitat areas are located to the south in the Little Minch, where suitable Nephrops habitat is present off the coast of the south of the Harris and North Uist, and to the north of the Isle of Skye.

As such, within the DSA, and particularly the WSA, it is considered that there is an extensive resource of suitable Nephrops habitat.

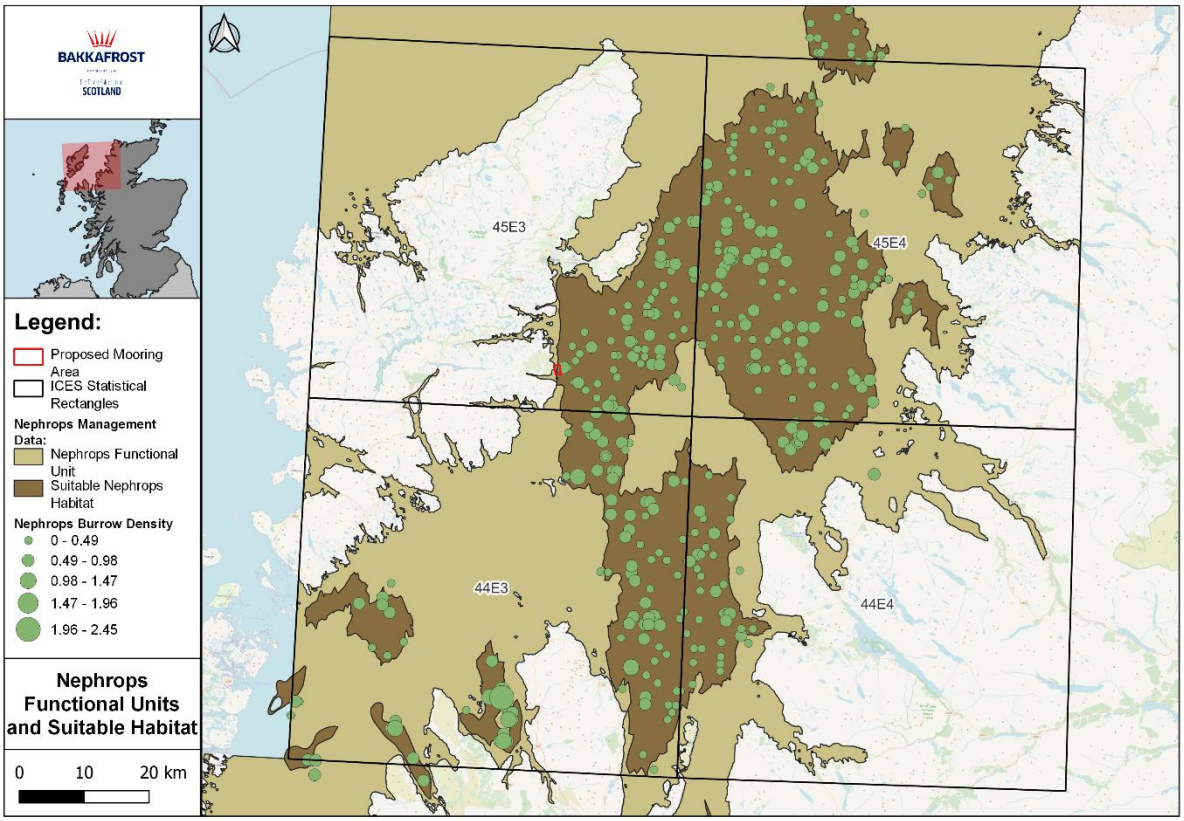


Figure 5.33: Spatial distribution of suitable Nephrops habitat within the DSA and WSA[13].

As of 2012 all vessels of 12 m LOA and over must be fitted with VMS units. VMS is a form of satellite tracking that uses transmitters on board fishing vessels. This system is a legal requirement under EC Regulation No. 2244/2003 and Scottish Statutory Instrument (SI) 392/2004. VMS units onboard fishing vessels automatically send data on vessel identification, geographical position, date and time of fixing position, and course and speed. VMS data must be transmitted from a fishing vessel at least once every two hours (hrs). It is important to note that UK vessels may only power down their VMS unit whilst in port. Therefore, VMS data for the 12 m LOA and over fishing fleet is considered representative of fishing activity.

5.3.1.1.1.1 ICES 2021 Data Product

To better understand Nephrops trawling activity within the DSA and WSA, spatial layers on fishing intensity produced by ICES[14] as a technical service to OSPAR have been analysed. These spatial layers were produced using VMS and logbook data to produce spatial information on the fishing intensity at a resolution of 0.05° x 0.05° c-squares which, at 60°N, are approximately 15 km^2 in surface area. Therefore, these data provide a much better resolution for determining fishing intensity in comparison to ICES statistical rectangle data. It is considered that these data provide an accurate and representative baseline for the Nephrops trawling activity of fishing vessels of 12 m LOA and over.

Each ICES c-square holds data on the swept area, which is the cumulative area contacted by fishing gear over the period of a year. The swept area ratio (SAR) is the swept area divided by the surface area of the c-square cell; the SAR is used as a measure of fishing intensity. ICES calculated the area contacted by fishing gear through assessment of VMS data, which provided geographically distinct

[13] Scottish Government Marine Directorate: Norway Lobster (Nephrops norvegicus) – Functional Units and Suitable Habitat in Scottish and Adjacent Waters. [Online] Available at: https://marine.gov.scot/maps/334
[14] ICES. 2021. OSPAR request on the production of spatial data layers of fishing intensity/pressure. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, sr.2021.12. https://doi.org/10.17895/ices.advice.8297

points for which speed and course are available at intervals of maximum two hrs, in combination with information on vessel size and fishing gear type, which were derived from logbook data.

Figure 5.34 displays the 2020 SAR for 12 m LOA and over vessels fishing with trawling for Nephrops within the DSA and WSA. Of note is the fact that 99.25% of the Proposed Development does not overlap with a c-square for 12 m LOA and over demersal trawl activity. Therefore, based upon these data demersal trawling has not occurred within the vast majority the Development Area over the period covered by these data (2020).

Within the DSA these data highlight that it supported moderate levels of fishing effort in 2020. Within the DSA fishing hrs peak at 323.45 hrs and landed value peaks at £24,453.49 (€29,600.22). This value is associated with a c-square (7500:486:12:2) to the northeast of the Proposed Development, this can be seen in **Figure 5.34.**

Within the context of the WSA (**Figure 5.34**), there is an extensive area of high fishing effort located within the Minch between the Isle of Lewis, the northwest coast of the mainland of Scotland, and down toward the north of the Isle of Skye. Within this area mean fishing hrs peak at 214.41 hrs and mean landed value peaks at £32,292.99 (€39,089.69). These figures are associated with a c-square (7500:485:205:4) within the outer reaches of Loch Inver, on the northwest coast of mainland Scotland within 45E4.

These data indicate that within the context of the WSA, this extensive area the Little Minch is of higher economic value than the area around the Proposed Development.

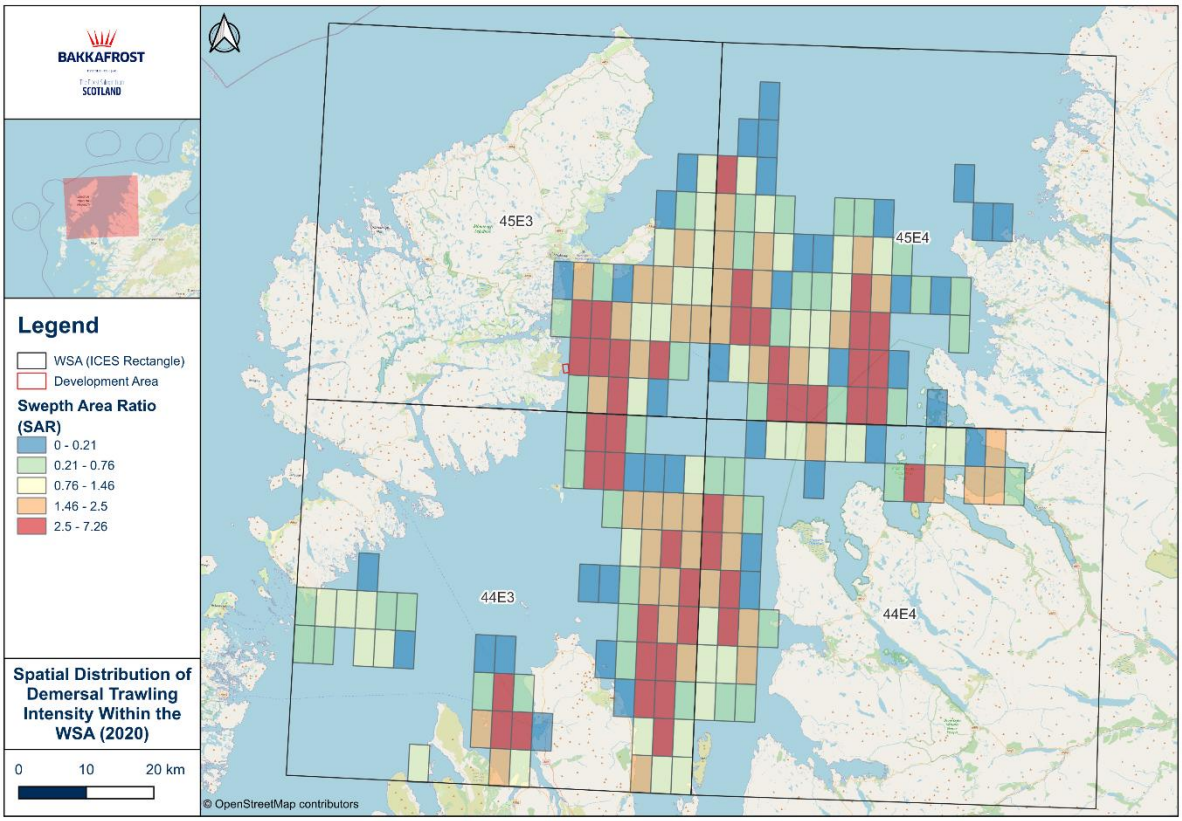


Figure 5.34: Spatial distribution of 12 m LOA and over demersal trawling intensity within the DSA and WSA in 2020.

5.3.1.1.1.2 ICES 2018 Data Product

Whilst the 2021 ICES data product failed to identify significant dredging activity within the Development Area of the Proposed Development, the 2018 data product does indicate that a degree of demersal trawling activity has taken place within the Development Area, as this data product indicates that the Proposed Development overlaps with a c-square (7500:486:103:4).

To better understand the discrepancy between the 2018 and 2021 data products, BFS contacted ICES directly and received the following explanation:

"Because the requested data structure changed between data calls (in this case, to include an extra field identifying individual vessels consistently over time, to try and minimise the number of c-squares which have to be aggregated in any final output for containing too few individuals) The data call was issued for all years from 2009 onwards, incorporating this new field. VMS and logbook data is processed at country level and submitted to ICES as an aggregated data product. ICES provides a workflow script which will work on standard data formats, but their use is not mandatory, and some countries have bespoke systems. A change such as this could come about, for example, if a country uses a different approach to classifying fishing activity between the two data calls, so a different cut-off speed to delineate fishing and steaming is implemented. It should be noted that the examples given date from 2009, when the data quality is felt to be weakest."

Based upon this response, BFS believes that the 2021 data product represents a more accurate analysis of fishing activity in comparison to this 2018 data product. However, the decision was made to incorporate the 2018 data product into the baseline assessment to allow a detailed comparison against the spatial patterns in fishing activity identified by the 2021 data product.

Figure 5.35 to Figure 5.38 display the SAR for all c-squares where fishing activity by 12 m LOA and over demersal trawling vessels occurred between 2014 and 2017, inclusive. Throughout the temporal period, fishing intensity remained consistent within the waters of the Minch between the Isle of Lewis, the west coast of mainland Scotland, and down to the north coast of the Isle of Skye.

the Proposed Development is located within two c-squares, that support mean fishing hours of 72.22 hrs and 399.86 hrs, mean landed value of £2,395.52 (€2,878.15) and £18,076.37 (€21,718.22), and mean landed weight of 1,097.73 and 8,540.26 kg. However, despite it over lapping two c-squares, only 0.75% of the total Proposed Development will be located in the c-square indicating higher fishing value to the east of the Proposed Development. In addition to this, no mooring anchors will be located within that c-square. As such, these data indicate that the Proposed Development is largely not located within the high fishing effort and landings Nephrops trawling grounds for 12 m LOA and over fishing vessels associated with Stornoway.

As such, within the context of the WSA, the Proposed Development is not located over high effort fishing grounds for the 12 m LOA and over Nephrops trawling fleet.

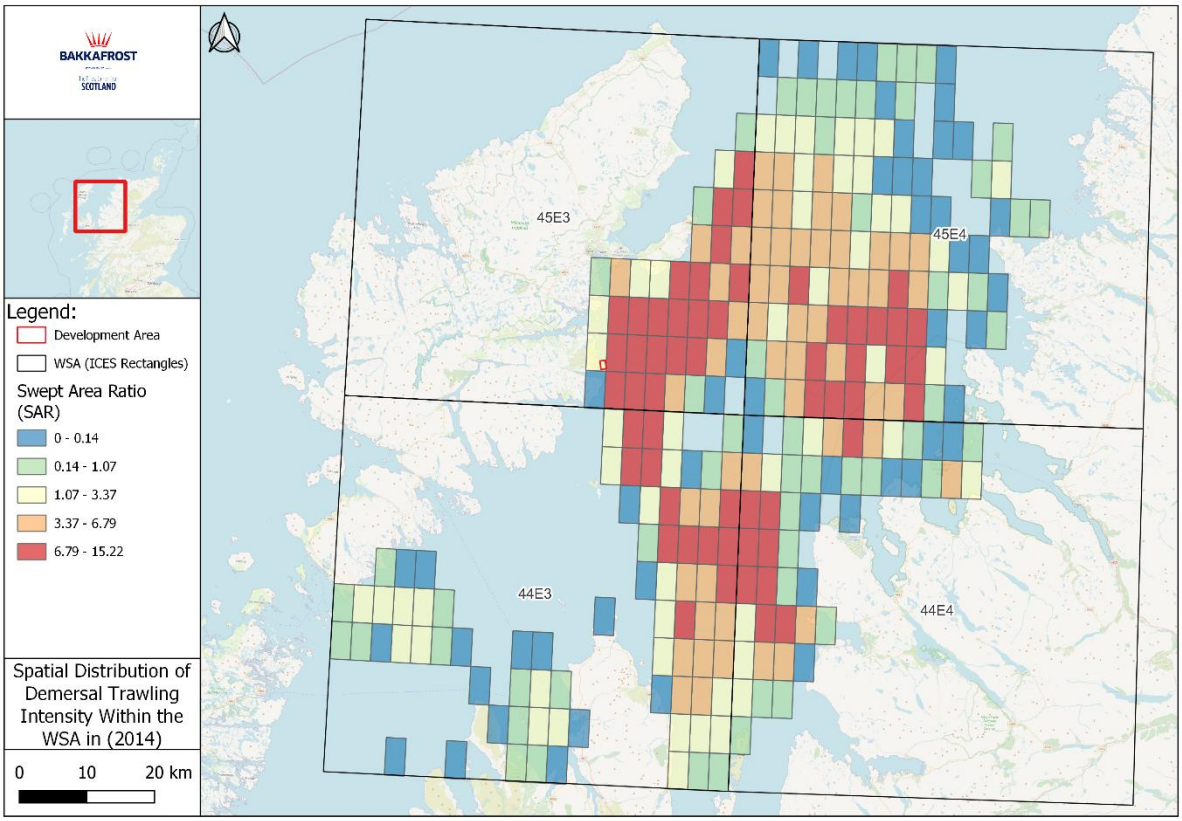


Figure 5.35: Spatial distribution of 12 m LOA and over trawling intensity within the DSA and WSA in 2014[2,]Error! Bookmark not defined..

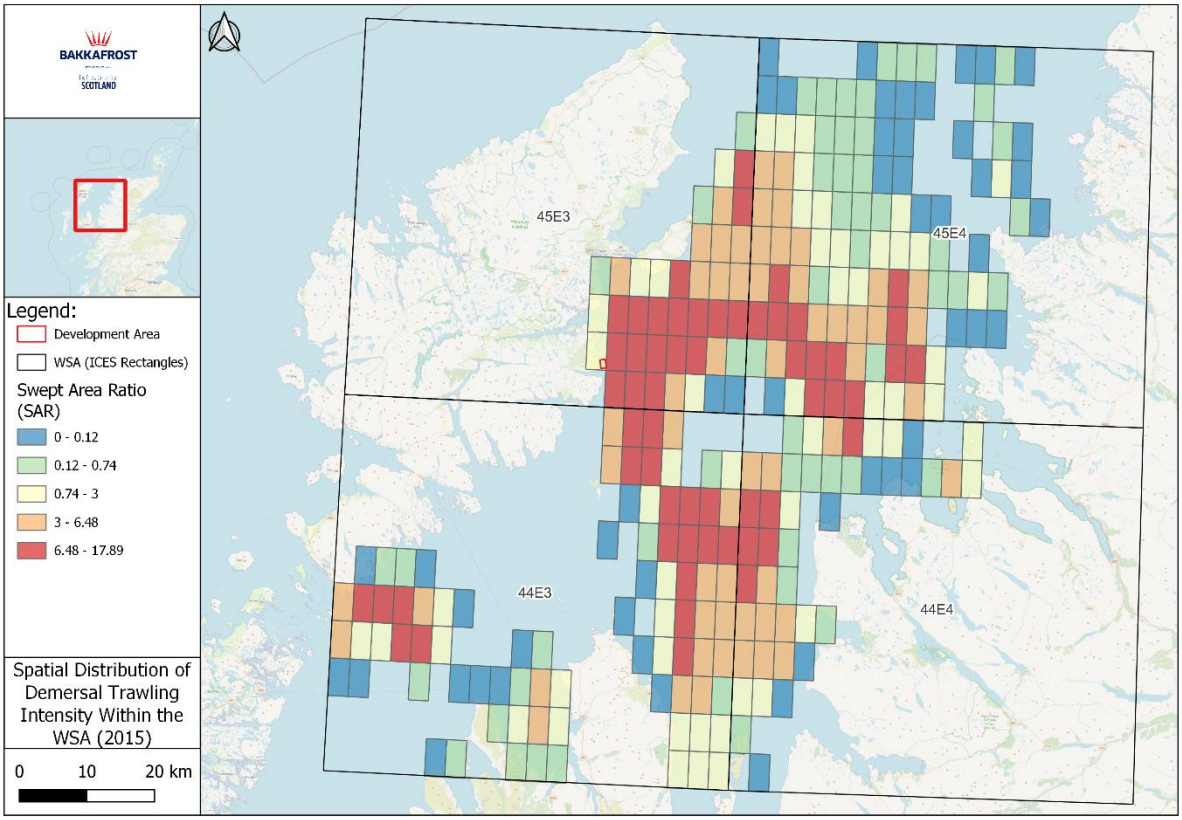


Figure 5.36: Spatial distribution of 12 m LOA and over trawling intensity within the DSA and WSA in 2015[2,]Error! Bookmark not defined..

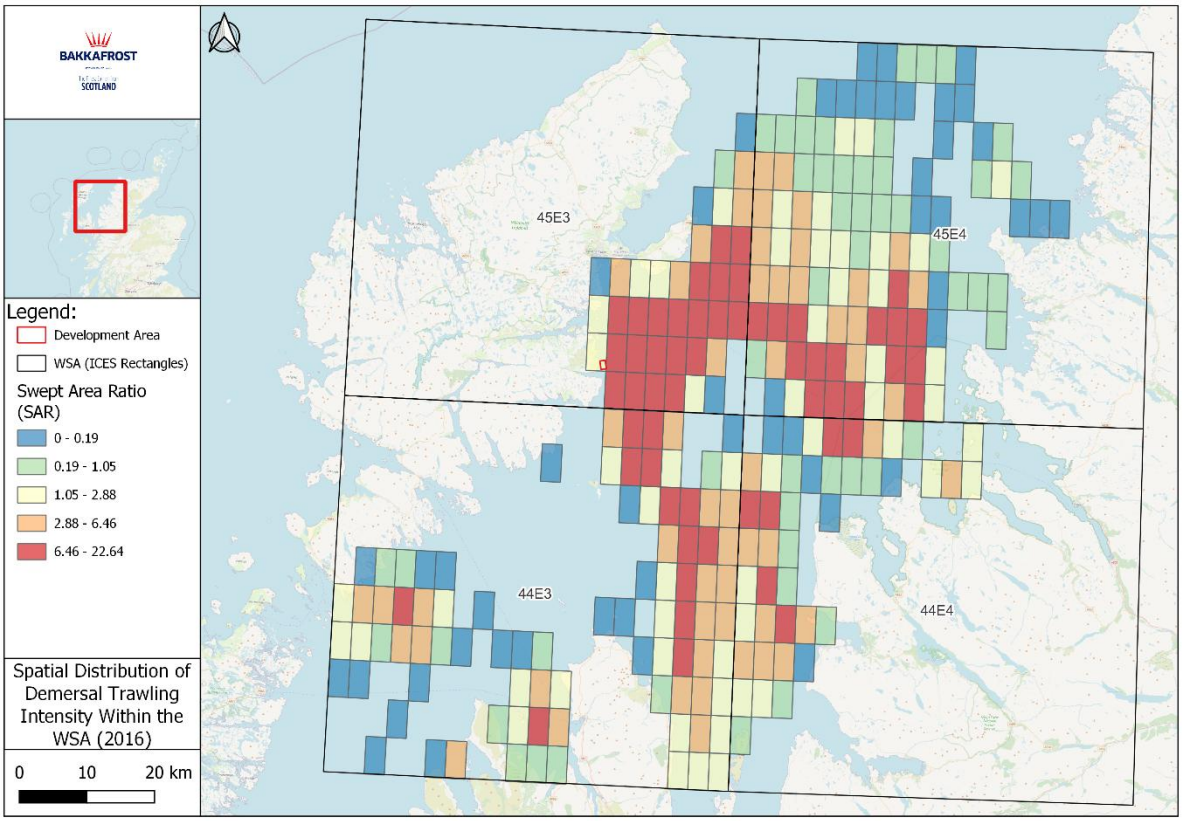


Figure 5.37: Spatial distribution of 12 m LOA and over LOA trawling intensity within the DSA and WSA in 2016[2],Error! Bookmark not defined..

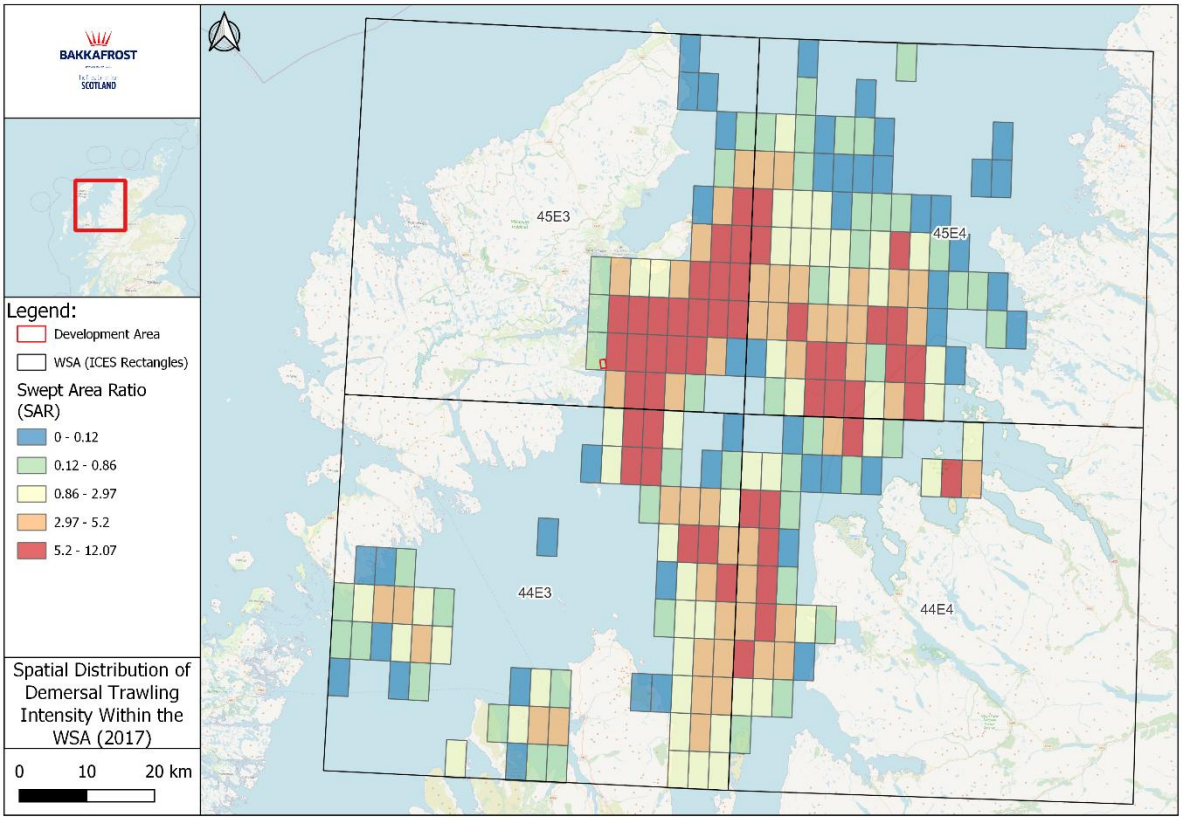


Figure 5.38: Spatial distribution of 12 m LOA and over LOA trawling intensity within the DSA and WSA in 2017[2],Error! Bookmark not defined..

5.3.1.2 Scallop Towed Dredge Fishery

5.3.1.2.1 Over 12 m LOA Fishing Vessels

5.3.1.2.1.1 ICES 2021 Data Product

To better understand scallop dredging activity within the DSA and WSA, spatial layers on fishing intensity produced by ICES[15] as a technical service to OSPAR have been analysed. These spatial layers were produced using VMS and logbook data to produce spatial information on the fishing intensity at a resolution of 0.05° x 0.05° c-squares which, at 60°N, are approximately 15 km^2 in surface area. Therefore, these data provide a much better resolution for determining fishing intensity in comparison to ICES statistical rectangle data. It is considered that these data provide an accurate and representative baseline for the scallop dredging activity of fishing vessels of 12 m LOA and over.

Each ICES c-square holds data on the swept area, which is the cumulative area contacted by fishing gear over the period of a year. The swept area ratio (SAR) is the swept area divided by the surface area of the c-square cell; the SAR is used as a measure of fishing intensity. ICES calculated the area contacted by fishing gear through assessment of VMS data, which provided geographically distinct points for which speed and course are available at intervals of maximum two hrs, in combination with information on vessel size and fishing gear type, which were derived from logbook data.

Figure 5.39 displays the 2020 SAR for 12 m LOA and over vessels fishing with trawling for Nephrops within the DSA and WSA. Of note is the fact that 99.25% of the Proposed Development does not overlap with a c-square for 12 m LOA and over demersal trawl activity. Therefore, based upon these data demersal trawling has not occurred within the vast majority the Development Area over the period covered by these data (2020).

Within the DSA these data highlight that it supported moderate levels of fishing effort in 2020. Within the DSA fishing hrs peak at 76.85 hrs and landed value peaks at £10,675.37 (€12,900.17). This value is associated with a c-square (7500:486:112:4) to the northeast of the Proposed Development, this can be seen in **Figure 5.39.**

Within the context of the WSA (**Figure 5.39**), there is an extensive area of high fishing effort located within the Little Minch between the Isle of Harris and the northwest coast of the Isle of Skye, this area covers approximately 780 km^2 and represents a significant fishing ground for 12 m and over scallop dredge vessels. Within this area fishing hrs peak at 340.06 hrs and mean landed value peaks at £84,091.19 (€101,616.21). These figures are associated with a c-square (7500:476:487:1) within the outer reaches of Loch Snizort, to the north of the Ascrib Islands within 44E3.

These data indicate that within the context of the WSA, this extensive area the Little Minch is of higher economic value than the area around the Proposed Development.

[15] ICES. 2021. OSPAR request on the production of spatial data layers of fishing intensity/pressure. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, sr.2021.12. https://doi.org/10.17895/ices.advice.8297

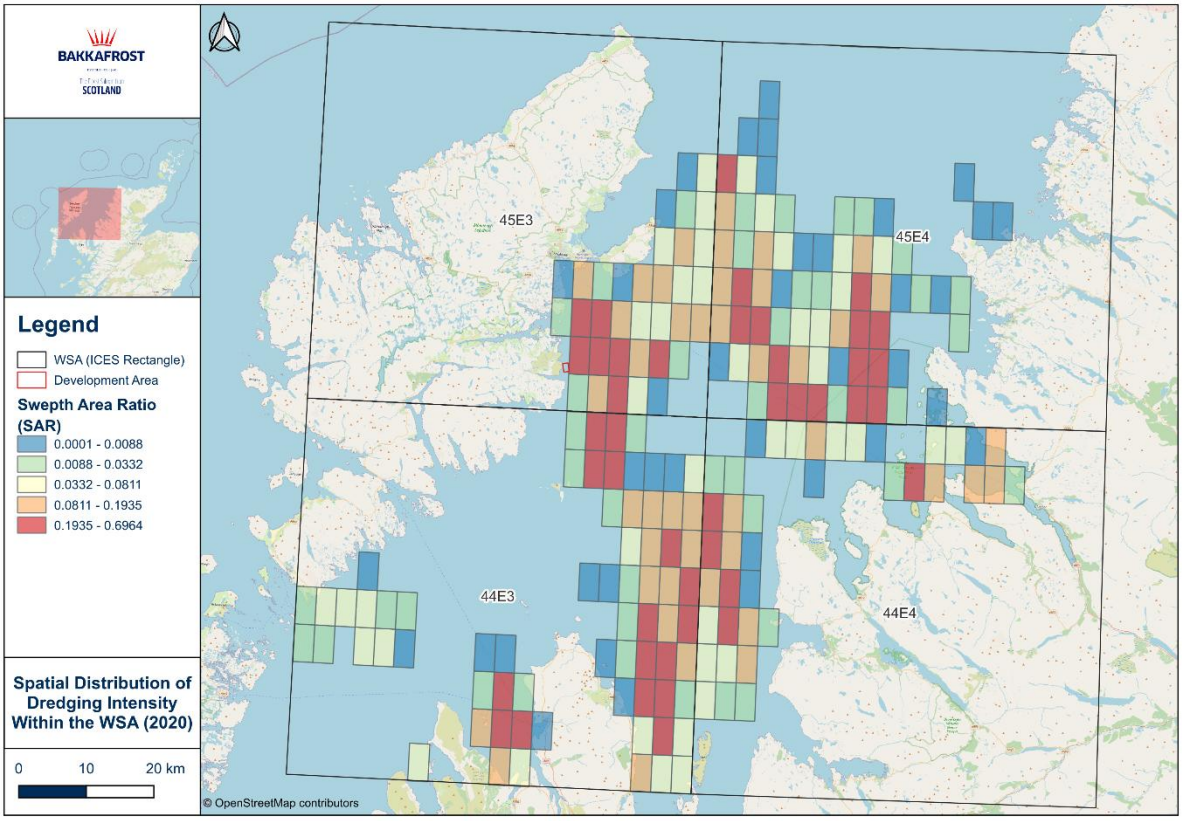


Figure 5.39: Spatial distribution of 12 m LOA and over dredging intensity within the DSA and WSA in 2020.

5.3.1.2.1.2 ICES 2018 Data Product

Whilst the 2021 ICES data product failed to identify significant dredging activity within the Development Area of the Proposed Development, the 2018 data product, does indicate that a degree of dredging activity has taken place within the Development Area, as this data product indicates that the Proposed Development overlaps with a c-square (7500:486:103:4).

To better understand the discrepancy between the 2018 and 2021 data products, BFS contacted ICES directly and received the following explanation:

"Because the requested data structure changed between data calls (in this case, to include an extra field identifying individual vessels consistently over time, to try and minimise the number of c-squares which have to be aggregated in any final output for containing too few individuals) The data call was issued for all years from 2009 onwards, incorporating this new field. VMS and logbook data is processed at country level and submitted to ICES as an aggregated data product. ICES provides a workflow script which will work on standard data formats, but their use is not mandatory, and some countries have bespoke systems. A change such as this could come about, for example, if a country uses a different approach to classifying fishing activity between the two data calls, so a different cut-off speed to delineate fishing and steaming is implemented. It should be noted that the examples given date from 2009, when the data quality is felt to be weakest."

Based upon this response, BFS believes that the 2021 data product represents a more accurate analysis of fishing activity in comparison to this 2018 data product. However, the decision was made to incorporate the 2018 data product into the baseline assessment to allow a detailed comparison against the spatial patterns in fishing activity identified by the 2021 data product.

Figure 5.40 to Error! Reference source not found. display the SAR for all c-squares where fishing activity by 12 m LOA and over dredging vessels occurred between 2014 and 2017, inclusive. As can be seen, fishing intensity experienced a degree of interannual variation, with the area experiencing high to very high fishing intensity in 2015, followed by negligible to low fishing intensity in both 2016 and 2017. During 2016 and 2017, fishing intensity increased within the waters of the Little Minch between the Isle of Harris and the Isle of Skye. In general, the specific areas of elevated fishing activity identified within the 2021 ICES data product, Little Minch, and the north of the Isle of Skye are also identified within the 2018 ICES data product.

In regard to the c-square identified within the 2018 ICES data product that overlaps with the Proposed Development, fisheries statistics indicate low levels of fishing effort and landings. For the period 2014 to 2017, inclusive, mean SAR was 0.02, Mean landed weight was 2,974 kg, mean landed value was £4,825.49 (€5,789), and mean fishing hours was 4 hrs. it is important to note that only 2015 displayed any catch data out of these 4 years, indicating low fishing effort in this area c-square.

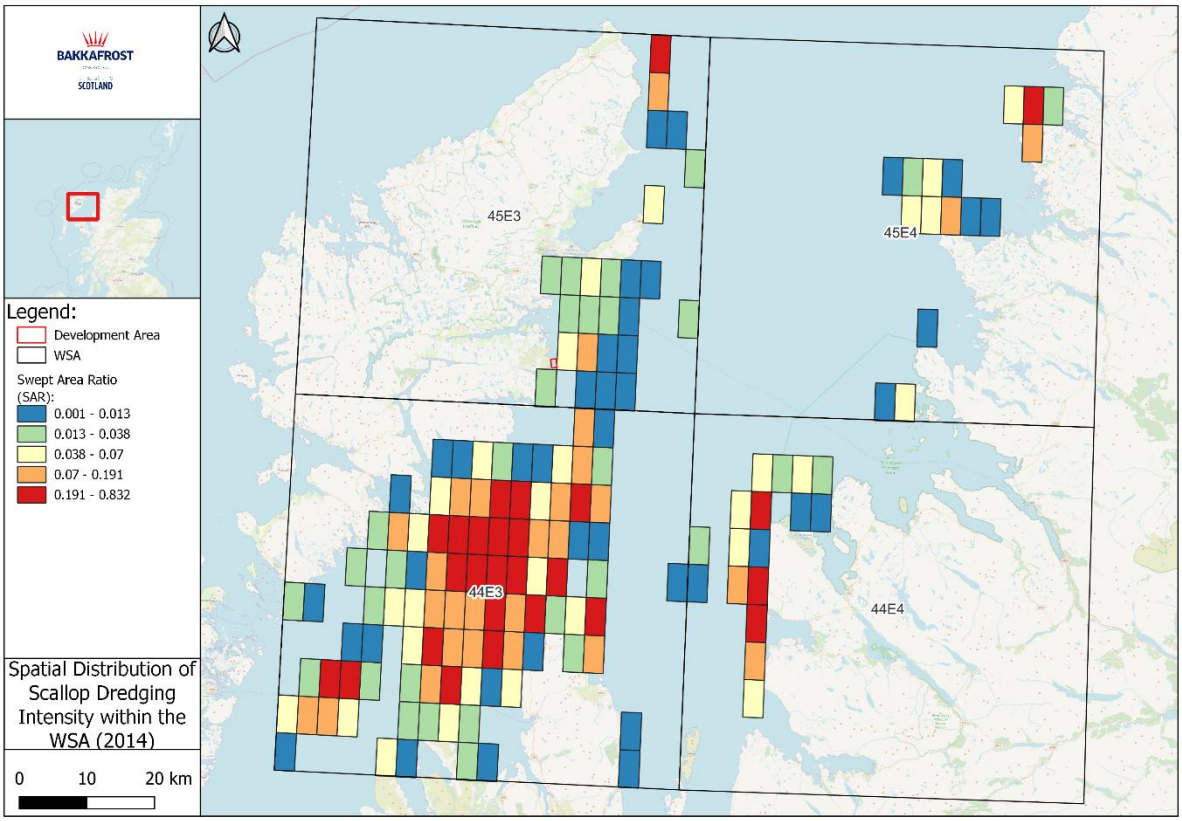


Figure 5.40: Spatial distribution of 12 m LOA and over LOA dredging intensity within the DSA and WSA in 2014[Error! Bookmark not defined.]**.**

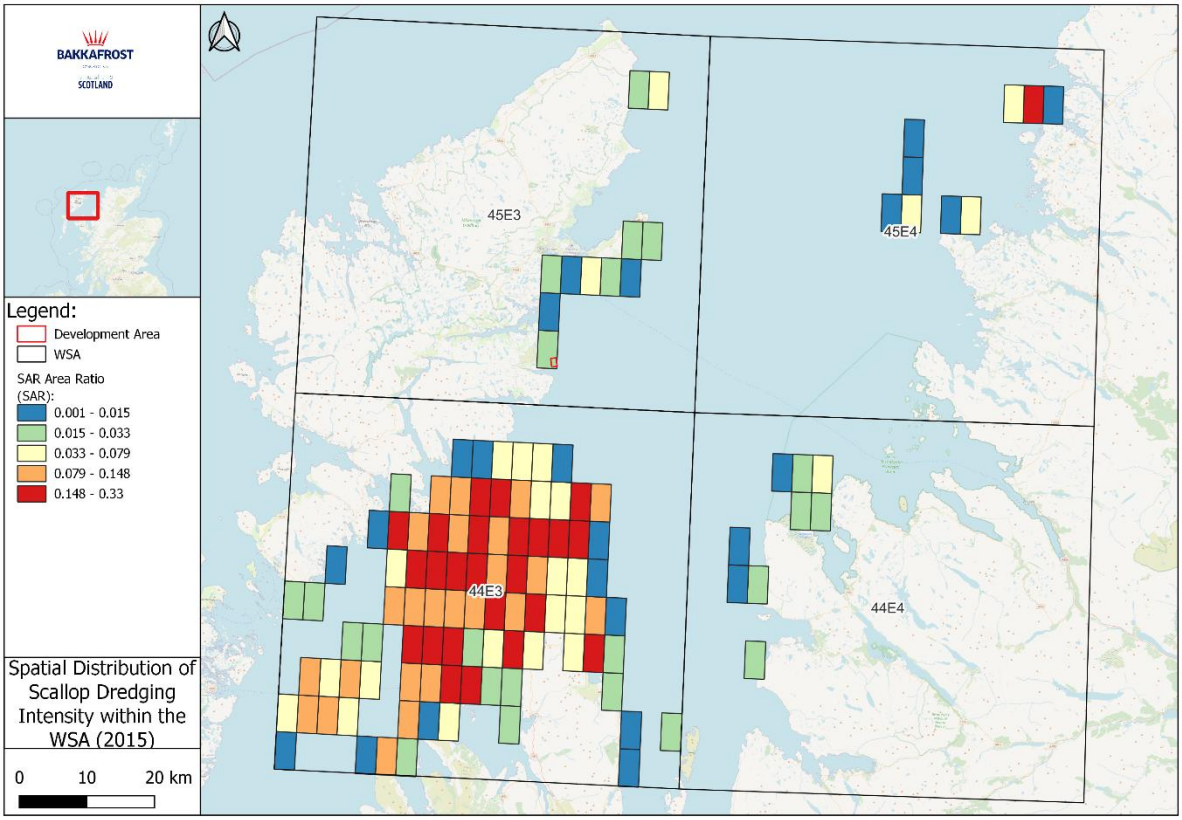


Figure 5.41: Spatial distribution of 12 m LOA and over LOA dredging intensity within the DSA and WSA in 2015[Error! Bookmark not defined.]**.**

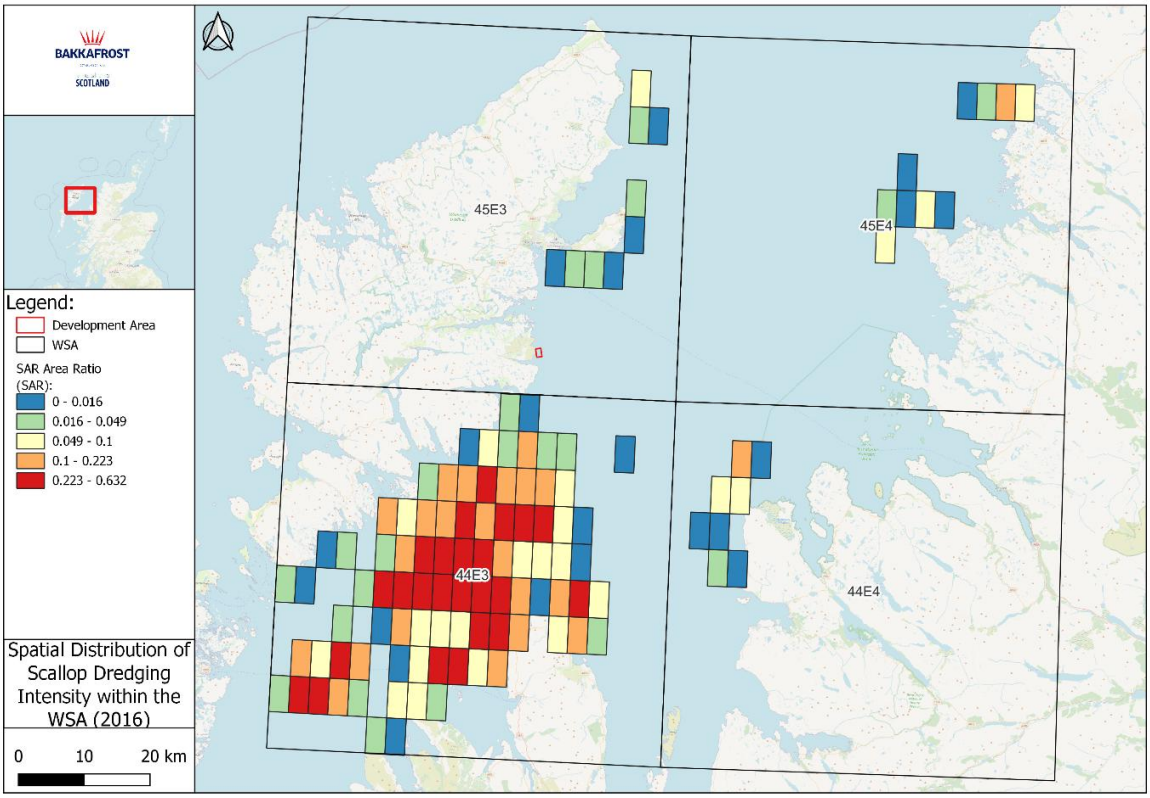


Figure 5.42: Spatial distribution of 12 m LOA and over LOA dredging intensity within the DSA and WSA in 2016 Error! Bookmark not defined.**.**

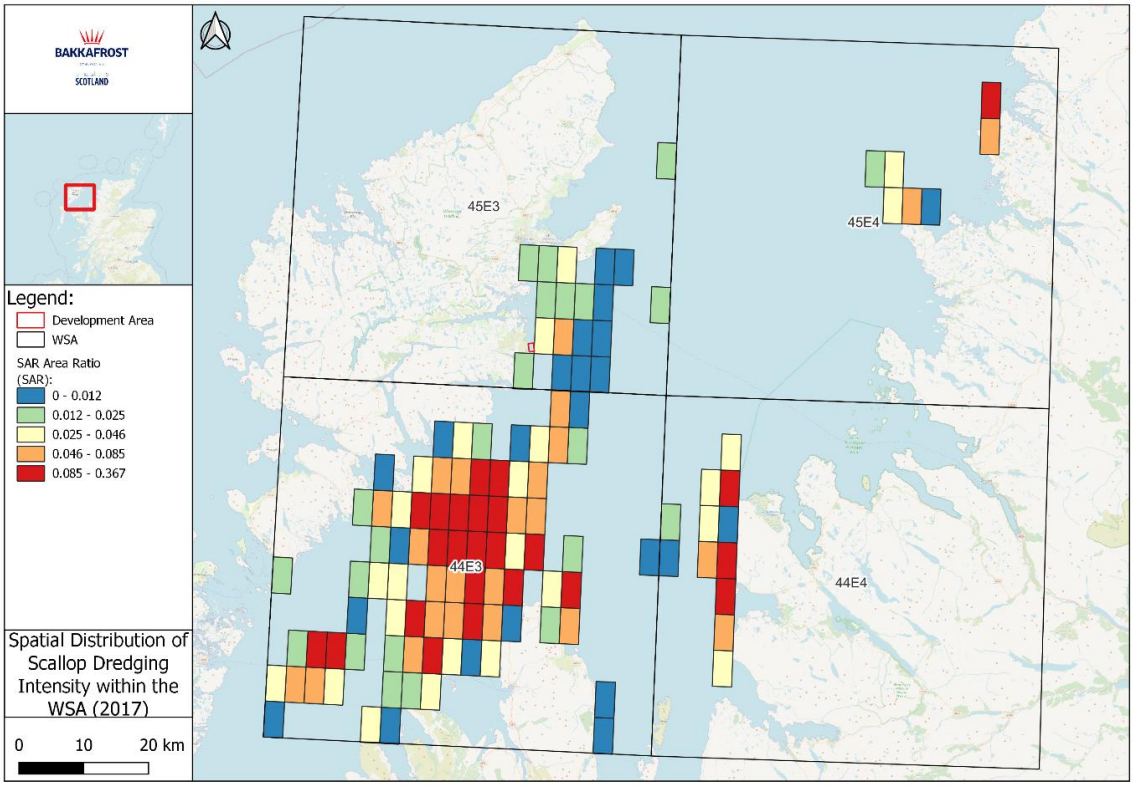


Figure 5.43: Spatial distribution of 12 m LOA and over LOA dredging intensity within the DSA and WSA in 2017 Error! Bookmark not defined.**.**

5.3.2 Static Gear Fisheries

5.3.2.1 Pots and Traps Fishery

5.3.2.1.1 12 m LOA and Under Fishing Vessels

At present all fishing vessels that are under 12 m LOA are not required to be fitted with VMS units. As such, under 12 m LOA fishing vessels are not represented within VMS datasets.

Therefore, in order to help identify the spatial distribution of fishing effort and landings, BFS has utilised an aggregated dataset based upon Fish 1 forms and paper logbooks[16], in addition to ScotMap[17] outputs.

5.3.2.1.1.1 Scottish Government Fish 1 Form and Paper Logbook Spatial Data

Owners and masters of Scottish fishing vessels that are under 12 m must declare a latitude and longitude position for each fishing day, which represents the location where the majority of the landings were taken. These data have been recorded since 2016 for vessels submitting Fish 1 forms and from 2018 for vessels submitting paper logbooks. These latitude and longitude positions have been allocated to c-squares of 0.05 x 0.05 decimal degrees. Where there are less than five vessels in a c-square, the values have been redacted and coded as -999. This dataset covers the period 2018 to 2022 (inclusive).

The pots and traps fishing method category covers; creels for crabs, lobsters and Nephrops, whelk pots, and wrasse traps. Therefore, this dataset is considered to adequately cover the key species targeted by pots and traps gear relevant to this CFIA.

Figure 5.44 and **Figure 5.45** illustrate the spatial distribution of potting fishing effort and landings within the DSA and WSA. Within both the DSA and WSA the spatial distribution of fishing effort and landings is fairly extensive; however, a number of the c-squares support less than five vessels and so have been redacted. This low number of vessels indicates that fishing effort and therefore landings are likely to be low within these redacted c-squares. Within the DSA there are specific areas that support elevated fishing effort and landings. These areas include sheltered and inshore waters off the east coast of the Isle of Lewis, and down along the coast towards Harris.

Within these specific areas, annual fishing days range from one to 173, annual landed weight ranges from 348 kg to 33,082 kg, and annual landed value ranges from £1,567.00 to £67,868.00. The area directly surrounding the Proposed Development shows a mean annual fishing days of 91, a landed weight of 15,148 kg, and a landed value of £51,099.00.

Within the context of the WSA, there are also a number of specific areas that support elevated fishing effort and landings. One of these areas within the WSA is associated with the west coast of the Isle of Lewis, within this area annual fishing days peak at 150, landed weight peaks at 7,835 kg, and annual landed value peaks at £22,555.00.

Other areas of elevated effort and landings are associated with the north west coast of Scotland, where annual fishing days peak at 197, landed weight peaks at 41,311 kg, and mean annual landed value peaks at £269,523.00. As well as an area off Ullapool, where annual fishing days peak at 159, landed weight peaks at 31,307 kg, and mean annual landed value peaks at £186,058.00.

[16] Scottish Government: Fishing Statistics - Gridded fisheries data within Scottish waters for Scottish fishing vessels under 12m overall length - annual averages 2018 to 2022. [Online] Available at: https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/Marine_Scotland_FishDAC_12436

[17] Scottish Government: ScotMap Inshore Fisheries Mapping in Scotland: Recording Fishermen's use of the Sea. [Online] Available at: https://data.marine.gov.scot/dataset/scotmap-inshore-fisheries-mapping-scotland-recording-fishermen%E2%80%99s-use-sea

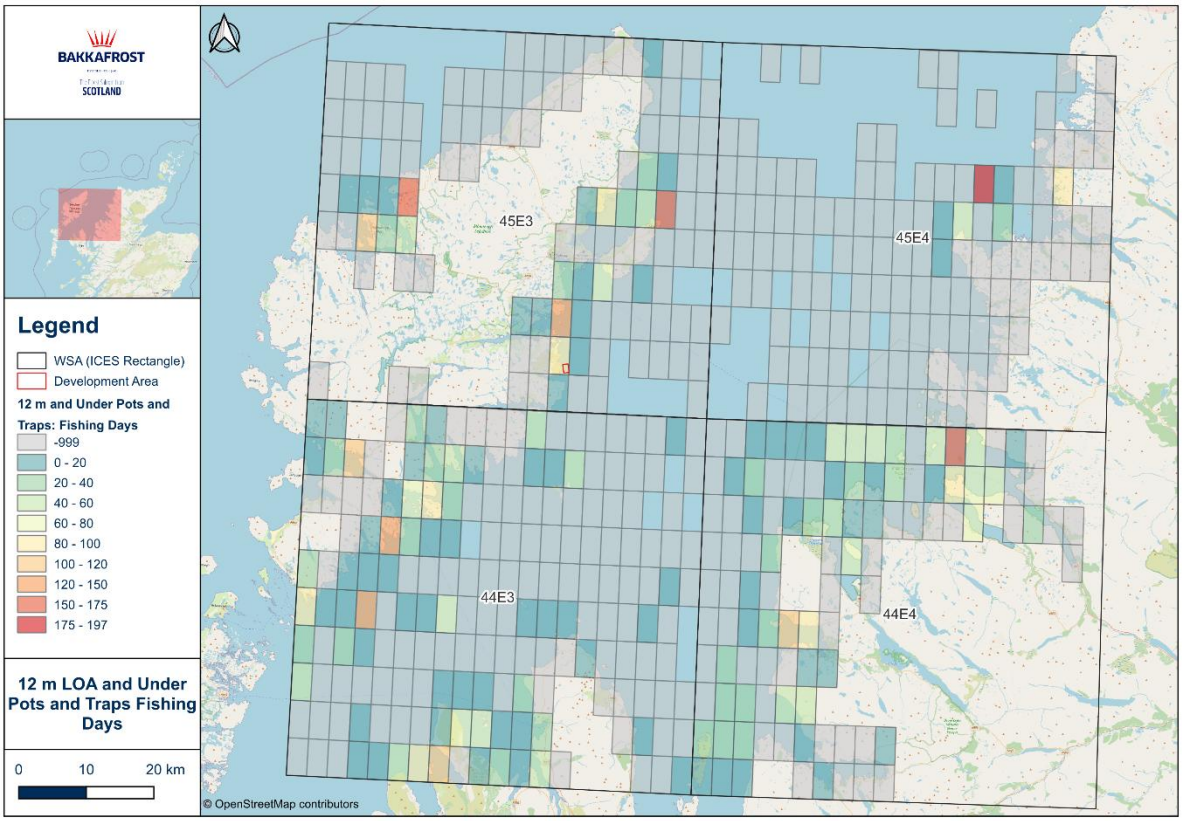


Figure 5.44: Spatial distribution of mean fishing days of under 12 m LOA pots and traps vessels within the DSA and WSA[5].

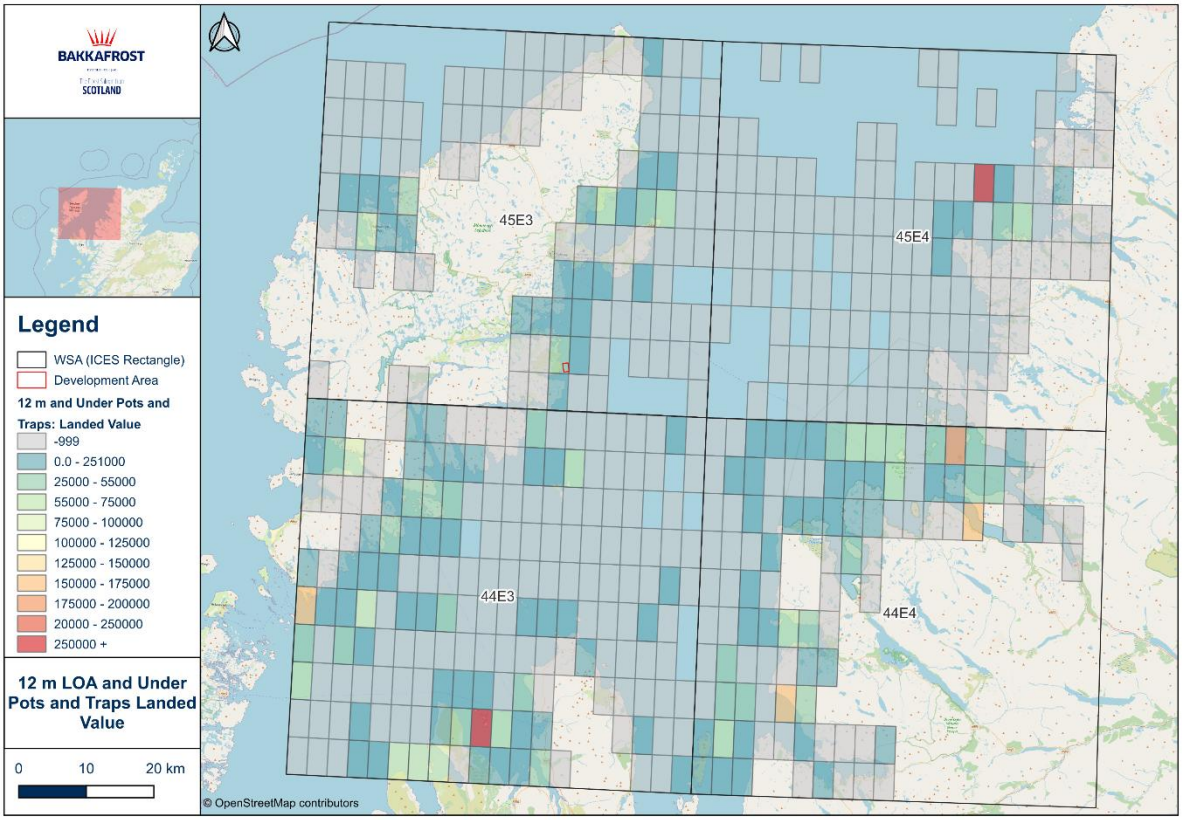


Figure 5.45: Spatial distribution of mean landed value of under 12 m LOA pots and traps vessels within the DSA and WSA[5].

5.3.2.1.1.2 ScotMap Fisheries Data

In addition to the more contemporary fisheries data presented within **Sub-Section 5.3.2.1.1.1**, BFS has also reviewed ScotMap data for crab, and lobster pots and Nephrops pots within the DSA and WSA. These data provide an indication of the spatial distribution of crab, lobster and Nephrops potting vessels that are under 15 m LOA, as such these data are likely to represent vessels within the under 12 m LOA length grouping. ScotMap data covers the period 2007 to 2011 (inclusive).

These data have predominantly been reviewed to allow a comparison to the Fish 1 form and paper logbook c-squares data, and to validate spatial patterns noted within this dataset.

5.3.2.1.1.2.1 Crab and Lobster Pots

Figure 5.46 illustrates the spatial distribution of crab and lobster potting vessels within the DSA and WSA. Within the immediate area of the Proposed Development the ScotMap data indicates that five crab and lobster potting vessels operate. However, a greater number of vessels are operating further north up the coast of the Isle of Lewis within 45E3 where ten fishing vessels are active. There is an area of higher vessel density to the south of the Proposed Development along the east coast of Isle of Lewis within rectangle 44E3 which supports the greatest density of crab and lobster potting vessels, with up to 17 vessels operating within individual ScotMap cells. Within 44E3, there are high vessel numbers along the northwest coast of the Isle of Skye.

Figure 5.47 illustrates the monetary value of crab and lobster potting within the DSA and WSA. The Proposed Development overlaps with two ScotMap cells but sits largely within an area of moderate value (£1,793), and the cells immediately adjacent are also of moderate to low value. The cells located in the south of the DSA represent the highest value ground associated with the Isle of Lewis with a maximum monetary value of £4,992. This indicates that, whilst the development location is utilised for crab and lobster potting, it is outwith the most important grounds associated with the Isle of Lewis. Within 44E4, the northwest coast of mainland Scotland off Port Henderson represents high value ground with individual ScotMap cells reporting values of up to £7,570. The highest value crab and lobster potting ground is located off the southeast coast of the Isle of Lewis with values of up to £8,846 reported. This ScotMap data indicates that, whilst the Proposed Development will be located on fishing ground utilised for crab and lobster potting, it does not represent unique high value ground, with locations within 44E4 and specifically 44E3 supporting higher value ground.

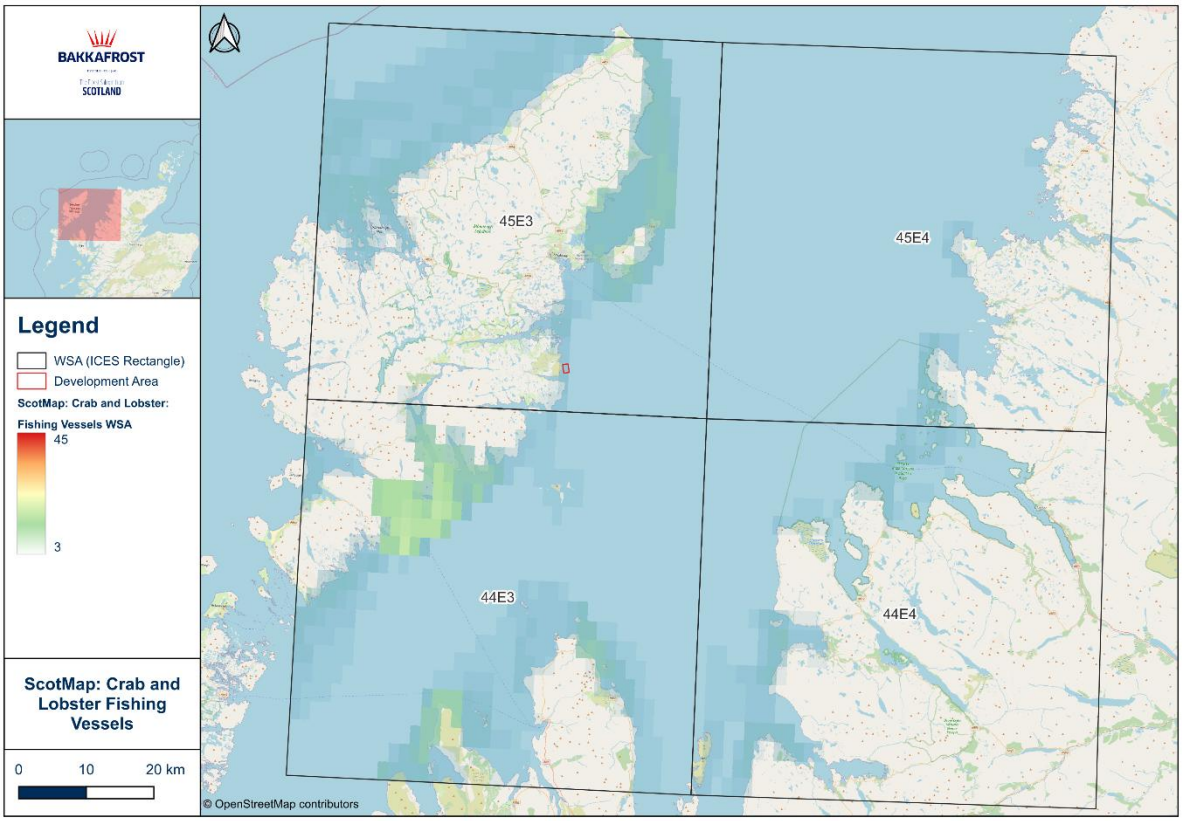


Figure 5.46: ScotMap number of crab and lobster potting vessels within the DSA and WSA.

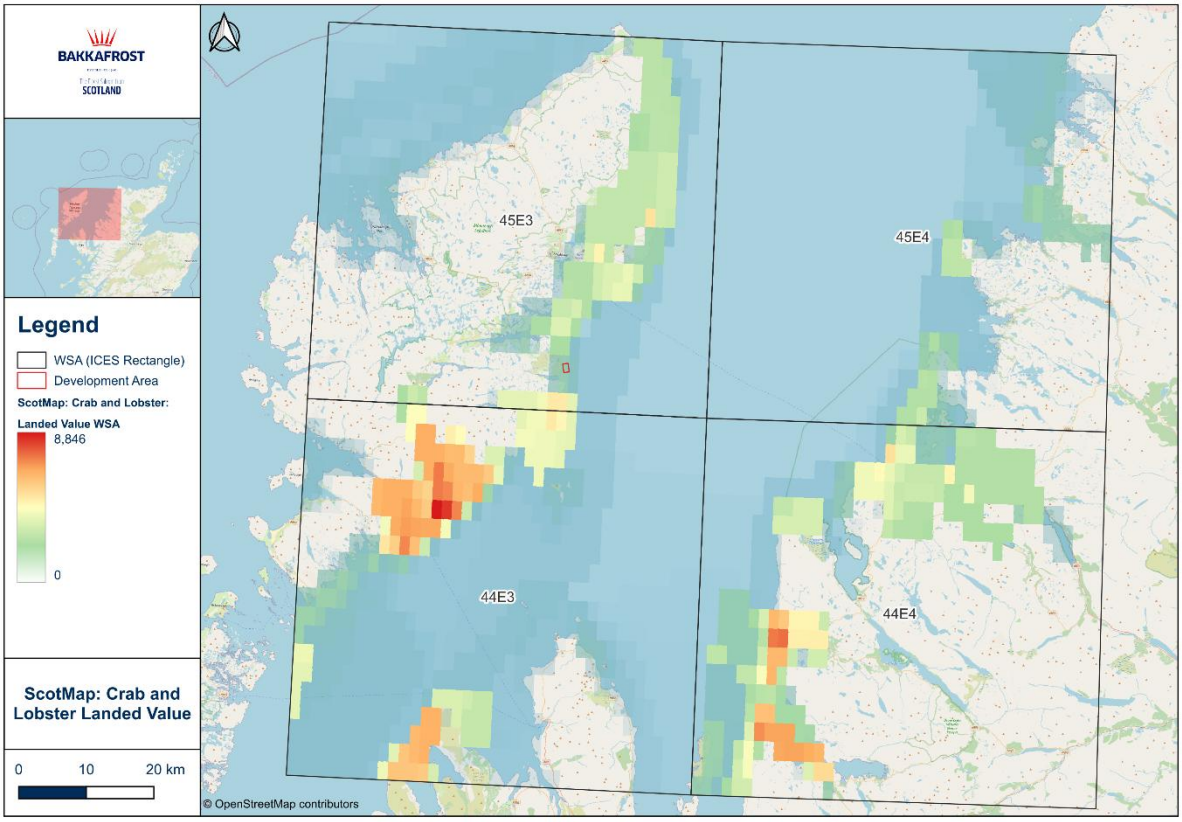


Figure 5.47: ScotMap monetary value of crab and lobster potting within the DSA and WSA.

5.3.2.1.1.2.2 Nephrops Pots and Traps

Figure 5.48 illustrates the spatial distribution of the number of Nephrops potting vessels within the DSA and WSA. The DSA (45E3) appears to show widespread vessel presence throughout the marine areas. The Proposed Development overlaps with two ScotMap cells, which indicate that five to six Nephrops potting vessels fish the location. To the south there is an area that spreads from the southern coast of the Isle of Lewis to Harris within 44E3 that seems to be a focal point for higher vessel numbers, with 14 vessels reported to fish the area across multiple ScotMap cells. Within 44E4 there is another focal point, associated with the northwest coast of mainland Scotland, where up to 15 vessels are reported to fish across multiple ScotMap cells. ScotMap data for 45E4 indicates moderate spatial distribution of potting vessels, although no individual ScotMap cell reports vessel numbers greater than six.

Figure 5.49 illustrates the monetary value of Nephrops potting across the DSA and WSA. The Proposed Development overlaps with two ScotMap cells but sits largely within an area of moderate value (£1,447.41). The cells directly south of the Proposed Development are of moderate value, with peak values of £5,540.15. Similarly to the pattern in vessel numbers shown in **Figure 5.48**, there is an area of increased monetary value that spans from the southern coast of the Isle of Lewis to Harris within 44E3, monetary value within these C and is consistently above £5,000 for several ScotMap cells within the area. The highest value is found on the west coast Scotland, off the coast of Ullapool, where ScotMap cells peak at £51,801.88.

This ScotMap data indicates that, whilst the Proposed Development will be located on fishing ground utilised for Nephrop potting, it does not represent unique high value ground, with locations within 44E4 and specifically 44E3 supporting higher value ground.

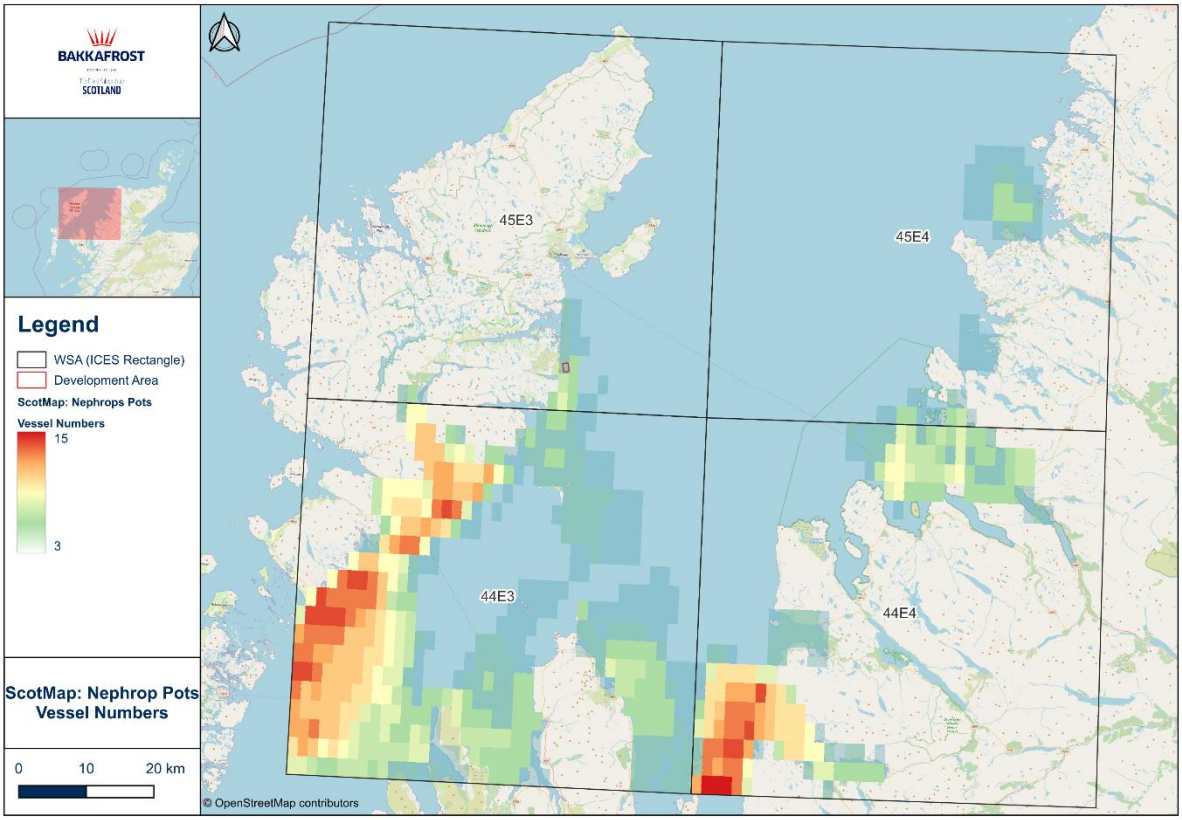


Figure 5.48: ScotMap spatial distribution of the number of vessels engaged in Nephrops potting within the DSA and WSA.

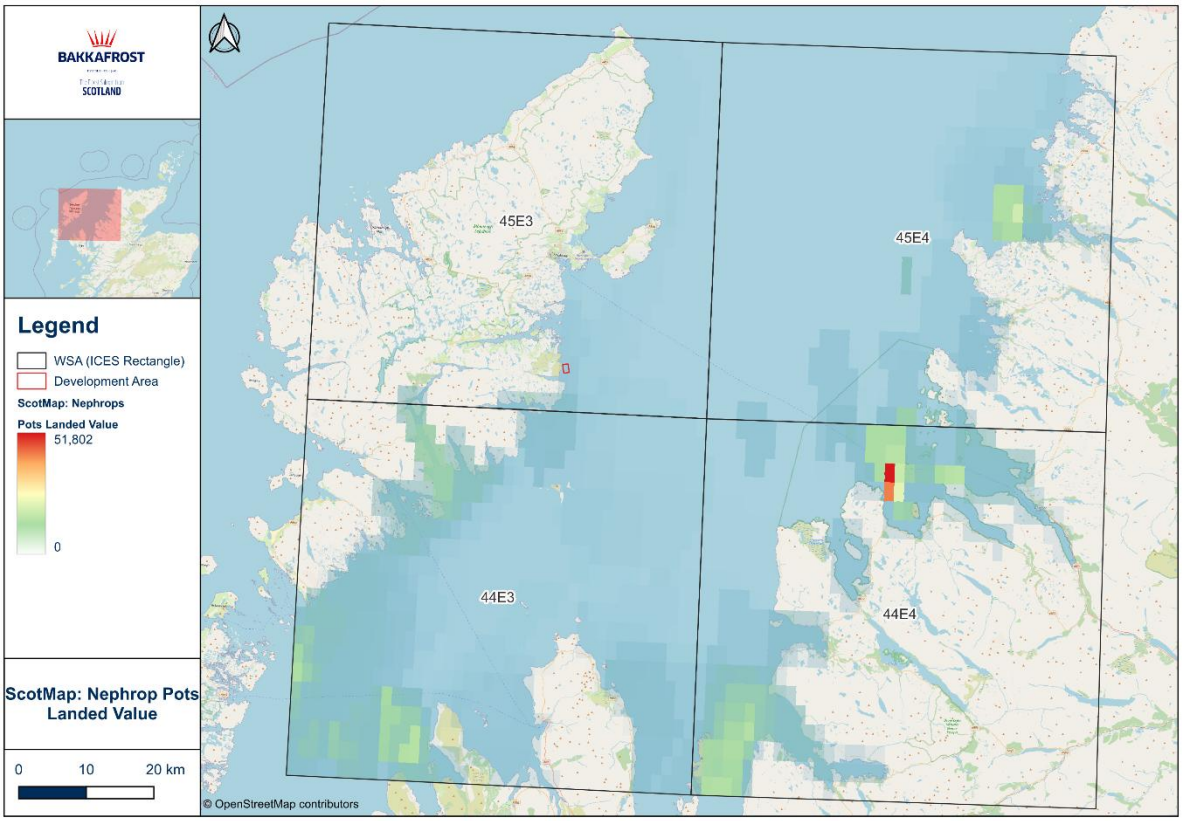


Figure 5.49: ScotMap spatial distribution of monetary value of Nephrops potting grounds within the DSA and WSA.

6 Identified Potential Impacts

Based upon the fisheries data reviewed and presented within **Section 5**, the following fisheries have been brought forward for detailed assessment:

- Mobile Gear Fisheries:
  - Over 12 m LOA Nephrops Demersal Trawl Fishery; and
- Static Gear Fisheries:
  - 12 m LOA and Under Pots and Traps Fishery (velvet crab, brown crab, lobster, and Nephrops).

Despite there being landings of scallops by over 12m dredging vessels it was determined through spatial analysis that the Development Area and more generally the DSA did not represent areas of significant fishing activity. As such, this fishery has been scoped out of further assessment.

There are several identified potential impact pathways between commercial fisheries and finfish aquaculture. These are outlined below:

- **Exclusion, access, displacement and associated economic loss:** Temporary or long-term exclusion from or reduction in access to existing fishing grounds, which may result in displacement of fishing vessels into adjacent fishing grounds. This potential impact may also have indirect economic impacts. Exclusion and reduction in access are related to the physical presence of aquaculture infrastructure within the marine environment;
- **Snagging gear, entanglement and navigational safety:** This may include snagging and entanglement of both static and mobile gear with aquaculture infrastructure such as mooring lines and anchors;
- **Change to the local environment:** Discharges of organic material and medicants may alter the composition of faunal communities beneath a fish farm; and

- **Pressure on harbour facilities:** The shared usage on the local harbour facilities by commercial fishing vessels and aquaculture vessels could potentially result in congestion.

However, as the Proposed Development will be serviced from the existing purpose built BFS shorebase, located approximately 17.75 km from the fishing port of Stornoway, it is determined that the Proposed Development will not result in pressure on communal harbour facilities. As such, this impact pathway is scoped out of further assessment.

7 Impact Assessment

7.1 Exclusion, Access, Displacement and Associated Economic Loss

7.1.1 Nature of Impact

The installation and subsequent operation of the Proposed Development could potentially result in the reduction of available fishing ground within the marine environment. The spatial extent of potential exclusion is influenced by the level of fishing effort and the method of fishing, with static gear vessels able to work within the Development Area of the Proposed Development, whilst mobile gear vessels are likely to be excluded from the entire Development Area. Therefore, the worst case scenario total area over which exclusion of fishing effort may occur is 1.02 km^2 (spatial extent of the Development Area). The potential reduction in area of fishing ground available to the commercial fishing industry could potentially also result in some degree of economic loss dependent on the relative value of the grounds encompassed by the Proposed Development.

7.1.2 Duration of Impact

The impact has been determined to be **long-term** but **temporary**. It is considered to be **long-term**, as the Proposed Development will be present within the marine environment for a continuous temporal period, resulting in the potential for impact across a significant temporal period. However, it is considered to be **temporary**, and fully reversible, as at the end of the lifecycle of the Proposed Development, all surface and sub-surface infrastructure will be removed, and the impact avoided.

7.1.3 Sensitivity of the Receptor

7.1.3.1 Mobile Nephrops Trawling Fishery

7.1.3.1.1 Over 12 m LOA Fishery

The over 12 m LOA Nephrops trawl fishery has been determined to be of **low sensitivity**. This level of sensitivity is based upon review of the baseline condition, which indicates that within the DSA and WSA there are areas outwith the Development Area that support high levels of fishing effort and landings. Therefore, these data indicate that there are high levels of available fishing ground outwith the Development Area, within both the DSA and WSA. Furthermore, over 12 m LOA vessels are also likely to have an increased operational range in comparison to 12 m LOA and under vessels and are therefore likely to be less constrained by small-scale displacement as they operate over large areas.

7.1.3.2 Static Pots and Traps Fishery

7.1.3.2.1 12 m LOA and Under Fishery

The 12 m LOA and under pots and traps fishery has been determined to be of **medium sensitivity**. This level of sensitivity is based upon review of the baseline condition, which indicates that within the DSA and WSA there are areas outwith the Development Area that support high levels of fishing effort and landings. Therefore, these data indicate that there are high levels of available fishing ground outwith the Development Area, within both the DSA and WSA. However, 12 m LOA and under vessels are likely

to have a reduced operational range in comparison to over 12 m LOA vessels, therefore they may be more constrained by small-scale displacement.

7.1.4 Magnitude of Unmitigated Impact

7.1.4.1 Mobile Nephrops Trawling Fishery

7.1.4.1.1 Over 12 m LOA Fishery

As detailed within **Sub-Section 5.2.1.1**, over 12 m LOA Nephrops trawl vessels contributed the majority of trawled Nephrops landings within 45E3, with a mean annual landed weight and value of 304.92 T and £1,697,356.13. With the exception of 2020, landings of trawled Nephrops across the temporal period have remained fairly stable.

Landings data for the four ICES rectangles that make up the WSA have also been examined in **Sub-Section 5.2.1.1**. These data indicate that within the WSA 44E4 supports the highest level of landed weight and value of Nephrops, caught by over 12 m LOA, Scottish registered, trawl vessels with a mean annual landed weight and value of 335.63 T and £1,850,602.77, this is only slightly higher than the mean annual landings for 45E3 recorded over the same period. Landings from 44E3 are lower than 45E3 (DSA) and landings from 45E4 are significantly lower in comparison to the other ICES rectangles within the WSA.

The majority of the Nephrops landings from over 12 m LOA fishing vessels, were landed into Stornoway port. These data, for Stornoway, therefore indicate that the Nephrops trawl fishery is a significant fishery for fishers operating out of the most productive waters, within the DSA, and closest fishing port to the Proposed Development.

Sub-Section 5.3.1.1, presents data on the spatial distribution of 12 m LOA and over Nephrops trawling fishing effort, and landings, within the DSA and the WSA. Within the DSA, there are extensive additional fishing grounds suitable for Nephrops trawling throughout the Minch. In addition, the Development Area is largely outwith the area which shows high levels of fishing activity.

On review of the 2021 ICES data product, providing mean trawling statistics for the year 2020 no fishing activity was identified within the majority of the Development Area, as no c-square overlapped with the 99.25% of the Proposed Development. However, the 2018 ICES data product did identify levels of fishing activity[18], as a c-square that overlaps with the Proposed Development was identified. Taking this into consideration, for the period of 2014 to 2017, the Proposed Development is located within two c-squares, that support mean fishing hours of 72.22 hrs and 399.86 hrs, mean landed value of £2,395.52 (€2,878.15) and £18,076.37 (€21,718.22), and mean landed weight of 1,097.73 and 8,540.26 kg. However, despite it over lapping two c-squares, only 0.75% of the total Proposed Development will be located in the c-square indicating higher fishing value to the east of the Proposed Development. In addition to this, no mooring anchors will be located within that c-square. As such, these data indicate that the Proposed Development is largely not located within the high fishing effort and landings Nephrops trawling grounds for 12 m LOA and over fishing vessels associated with Stornoway.

There is significant fishing effort throughout the WSA, higher fishing effort and landings area are identified to the south of the Proposed Development, associated with the waters east of the Isle of Lewis, out into the Minch. This area supports c-squares with mean fishing hours of up to 139.20 hrs and landed value of up to £40,872.27 (€49,106.81). Areas of high fishing effort also extend along the west coast of the mainland down to the north of the Isle of Skye, covering large portions of the Minch.

[18] An explanation provided by ICES has been given as to why this discrepancy in fisheries data is present between the 2018 and 2021 data products. This is provided in **Sub-Section** Error! Reference source not found..

The area off the coast of Ullapool supports c-squares with mean fishing hours of up to 475.25 hrs and landed value of up to £59,799.85 (€71,847.72).

Therefore, based upon these data, for both the DSA and WSA, it is determined that there are significant, productive fishing grounds for over 12 m LOA Nephrops trawling vessels.

These discrete higher fishing effort and landings areas reflect the spatial distribution of suitable Nephrops habitat within the DSA and WSA, as presented within **Figure 5.33**. As can be seen in **Figure 5.33** the Proposed Development sits partially within the eastern extent of a large area of suitable habitat covering 2,523.86 km^2. In comparison, the Development Area of the Proposed Development is 1.02 km^2, with only 0.47 km^2 of the Proposed Development falling within the habitat, this represents 0.02 % of the total spatial extent of the overlapping Nephrops habitat. As such, the installation and subsequent operation of the Proposed Development will not result in a significant reduction in the availability of suitable Nephrops habitat within the DSA and WSA. It is also important to note that the operation of the Proposed Development will not directly impact the distinct higher value fishing area within the DSA identified to the south of the Proposed Development.

The Proposed Development will be contained within a 1.02 km^2 Development Area, as indicated in **Figure 7.1**, this figure also illustrates the distribution of suitable Nephrops habitat within the overlapping c-squares. As can be seen the Proposed Development overlaps with 1.84 % (0.47 km^2 (Development Area) / 25.53 km^2 (Nephrops habitat)) of the total suitable Nephrops habitat held within the c-squares. This indicates that the majority of the Nephrops habitat, within these c-squares, will remain available to over 12 m LOA Nephrops trawl vessels. Furthermore, mobile gear fishing methods are more sensitive to displacement than static gear, as trawls cannot be towed within the Development Area due to the risk of snagging on sub-surface infrastructure. BFS will share the co-ordinates of the mooring lines and anchors, as installed, with the relevant fishing associations and representative bodies to ensure that Nephrops trawl vessels working in the vicinity can safety operate as close to the boundary of the Development Area as possible.

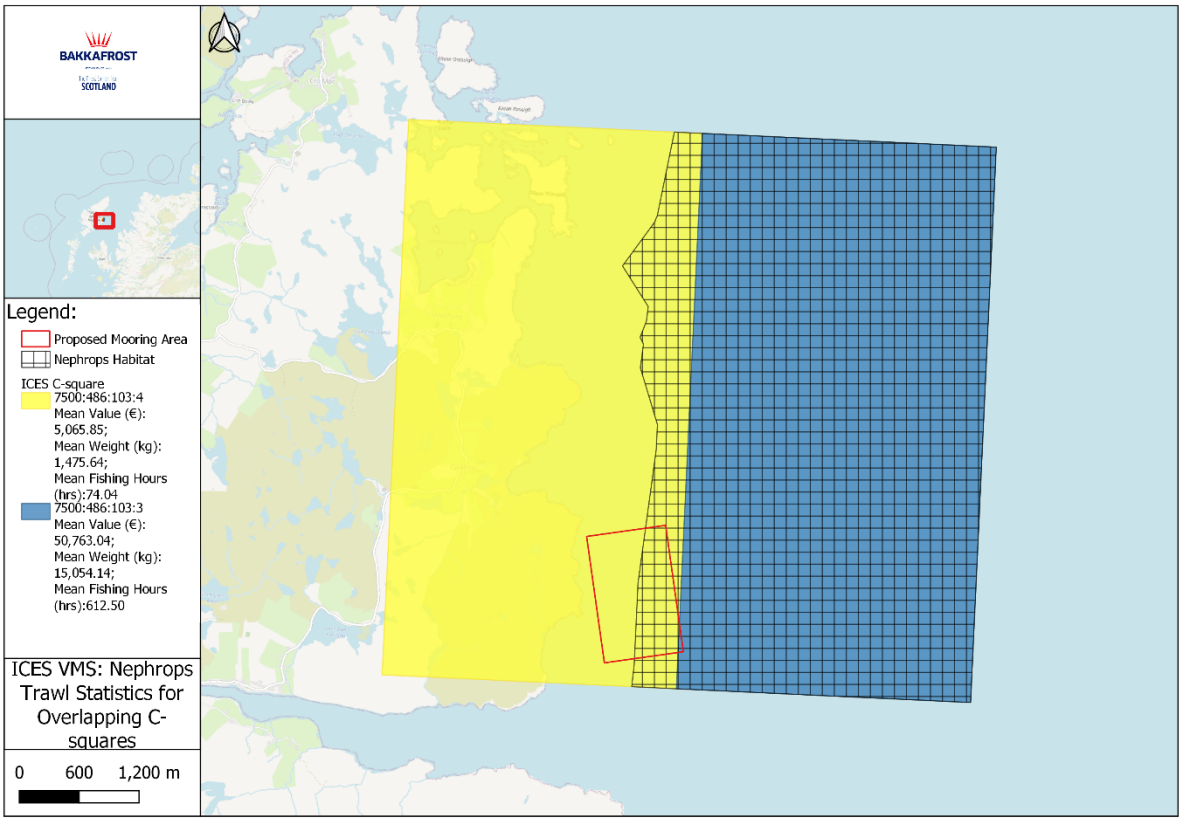


Figure 7.1: ICES VMS and logbook Nephrops trawl statistics for the c-squares that overlaps with the Proposed Development.

To determine the displacement of fishing effort (hours), and associated economic loss (landed value) associated with the total displacement (worst-case scenario) of the over 12 m LOA Nephrops trawl fishery from the 1.02 km^2 of the Development Area, an assessment has been undertaken based on the ICES aggregated VMS and logbook data (covering the period 2009 to 2017), which was reviewed to determine the baseline condition in **Sub-Section 5.3.1.1.1.2**. The Proposed Development overlaps with two c-squares, see **Figure 7.1**, one of which supports high mean fishing hours, landed weight and landed value in relation to the other c-squares identified within the DSA and the WSA.

Table 7.1 shows the calculated economic loss to the over 12 m LOA Nephrops trawl fishery as a result of total exclusion from the Development Area. The economic loss scenario presented within

Table 7.1 was based on the mean landed value of Nephrops for the c-square between 2014 to 2017 (inclusive). The calculations have determined that total exclusion from the extent of the Development Area would result in an annual loss of **£836.66** (converted from €1,005.22 on 19/11/2024), assuming that the Development Area within the two c-squares is fished.

As previously identified, the mean annual landed value of trawled Nephrops by over 12 m LOA vessels within 45E3 was £1,268,947.70. Therefore, the economic loss associated with the total exclusion of the over 12 m LOA Nephrops trawl fishery from the Development Area represents **0.08 %** of the mean

landed value within 45E3. As such, it is determined that the Development Area does not significantly contribute to the economic viability of the over 12 m LOA Nephrops trawl fishery within 45E3.

Table 7.1: Economic loss (mean landed value) calculations for the over 12 m LOA Nephrops trawl fishery as a result of total displacement from the Proposed Development.

Variables	C-Square: 7500:486:103:3	C-Square: 7500:486:103:4
Mean Landed Value (€)	50,763.04	5,065.86
Suitable Nephrops Habitat (km^2)	16.81	2.39
Area of Development Area (km^2)	0.01	0.46
Mean Value per Unit Area (€/km^2)	3,019.81	2,119.61
Mean Value of the Development Area (€)	30.20	975.02

Table 7.2 illustrates the calculated displaced fishing effort (mean fishing hours) as a result of all over 12 m LOA Nephrops trawling activity being fully excluded from the Development Area. The calculation has determined that displacement from the Development Area would result in the total displacement of **14.79 hrs** per annum of fishing effort. This represents **2.15 %** of the total fishing effort of the two overlapping c-squares. This indicates that the magnitude of displacement would likely be **negligible**.

Table 7.2: Fishing effort displacement (mean fishing hours) calculations for the over 12 m LOA Nephrops trawl fishery as a result of total displacement from the Proposed Development.

Variables	C-Square: 7500:486:103:3	C-Square: 7500:486:103:4
Mean Fishing Hours	612.50	74.04
Suitable Nephrops Habitat (km^2)	16.81	2.39
Area of Development Area (km^2)	0.01	0.46
Mean Fishing Hours per Unit Area (hrs/km^2)	36.44	31.37
Mean Fishing Hours of the Development Area (hrs)	0.36	14.43

As a result of the negligible level of displaced fishing effort (**14.79 hrs**) and the identification of comparable and higher effort and landings fishing grounds outwith the Proposed Development, both within the DSA and WSA, it is anticipated that these neighbouring fishing grounds will be able to absorb the displaced fishing effort. This is particularly the case as, within the DSA, vessels will still have access to 2,523.39 km^2 of suitable Nephrops habitat within the area directly adjacent to the Proposed Development and 293.46 km^2 of suitable Nephrops habitat in the northern Minch and 36.79 km^2 of suitable Nephrops habitat in the southern Minch. Therefore, the calculated economic loss is likely to be reduced, as a portion of the landed value is likely to be made up through the rebalancing of displaced fishing effort.

As a result, the overall magnitude of the impact is determined to be **negligible**.

7.1.4.2 Static Pots and Traps Fishery

7.1.4.2.1 12 m LOA and Under Fishery

As detailed within **Sub-Section 5.2.2.1**, 12 m LOA and under vessels contributed the majority of the pots and traps landings of the key species within the DSA (45E3), with a mean annual landed weight and value of 199.31 T and £1,080,371.52. Landings, in terms of weight and value, experienced a decrease in 2020, likely as a result of the COVID-19 pandemic. In the subsequent years (2021, 2022

and 2023) landed weight has remained fairly stable, whilst value has increased, this increase in value but stabilisation in weight has been achieved through increased price per T of the key species.

Landings data for the four ICES rectangles that make up the WSA have also been examined in **Sub-Section 5.2.2.1**. These data indicate that within the WSA 44E4 supports the highest level of landed weight and value of the key species with a mean annual landed weight 332.48 T, and a mean annual landed value of £2,629,139.29.

In addition, landings statistics for the key species caught by 12 m LOA and under pots and traps vessels indicate that 44E4 contributed the greatest to mean annual landed weight and value of pots and traps vessels, followed by 44E3. These two ICES rectangles cover the northwestern coastline of the mainland of Scotland. These data therefore indicate that 12 m LOA and under pots and traps vessels landing have significant, productive fishing grounds available within the WSA.

Sub-Section 5.3.2.1, presents data on the spatial distribution of 12 m LOA and under pots and traps fishing effort and landings within the DSA and the WSA. Through review of the relevant data it was possible to identify areas of higher importance to the 12 m LOA and under pots and traps fishery within both the DSA and WSA. Within the DSA areas were identified in association along the east and west coast of the Isle of Lewis. Within the DSA vessel numbers peaked to the north of Stornoway, with ten vessels operating within a single c-square. Within the DSA mean fishing days, mean landed weight and mean landed value peaked in association with the same area to the north of Stornoway, where a single c-square recorded values of 173 mean fishing days, 33,082 kg, and £67,868.00.

In comparison, the Proposed Development overlaps with two c-squares, the cell containing the majority of the site supports nine vessels, 91 mean fishing days, 15,148 kg of mean landed weight, and £51,099.00 of mean landed value.

Within the context of the WSA, similar or higher levels of fishing effort were noted in 45E4 and 44E4, which runs the length of the northwest coast of Scotland towards Skye, and within 44E3 which covers the east coast of the Isle of Harris. There are individual c-squares of higher value in each of these ICES rectangles. The mean high value in 45E4 supports seven vessels, 197 mean fishing days, 41,311 kg of mean landed weight, and £269,523.00 of mean landed value.

Therefore, based upon these data it is determined that the Proposed Development is located over an area of lower importance to 12 m LOA and under fishing vessels within the DSA and WSA, with extensive areas of higher importance fishing ground located within both the DSA and WSA.

ScotMap data presented within **Sub-Section 5.3.2.1.1.2** also indicate that the Proposed Development is located outwith high importance areas for both Nephrops, crab, and lobster pots and traps. Nephrops pots and traps data highlighted discrete areas of higher importance to the south of the Proposed Development along the east coast of the Isle of Lewis and Harris. Whilst crab and lobster ScotMap data identified higher importance areas to the north and south of the Proposed Development along the east coast of the Isle of Lewis and Harris. In general, ScotMap data for the period 2007 to 2011 (inclusive) identified similar areas of higher importance to pots and traps vessels as identified through the contemporary Fish 1 form and paper logbook dataset, which helps to validate the spatial pattern of pots and traps fishing activity within the DSA and WSA.

The Proposed Development will be contained within a 1.02 km^2 Development Area, as indicated in **Figure 7.2**. As can be seen the Proposed Development overlaps with 3.99 % (1.02 km^2 / 25.53 km^2) of

the total marine area of both c-squares. This indicates that the majority of the marine area will remain available to 12 m LOA and under pots and traps vessels. Furthermore, static gear fishing methods are less sensitive to displacement than mobile gear, as static gear vessels can set pots and traps within the Development Area in close proximity to sub-surface infrastructure. To facilitate this potential for co-existence BFS will share the co-ordinates of the mooring lines and anchors, as installed, with the relevant fishing associations and representative bodies to ensure that pots and traps vessels working in the vicinity can safety operate close to and within the Development Area.

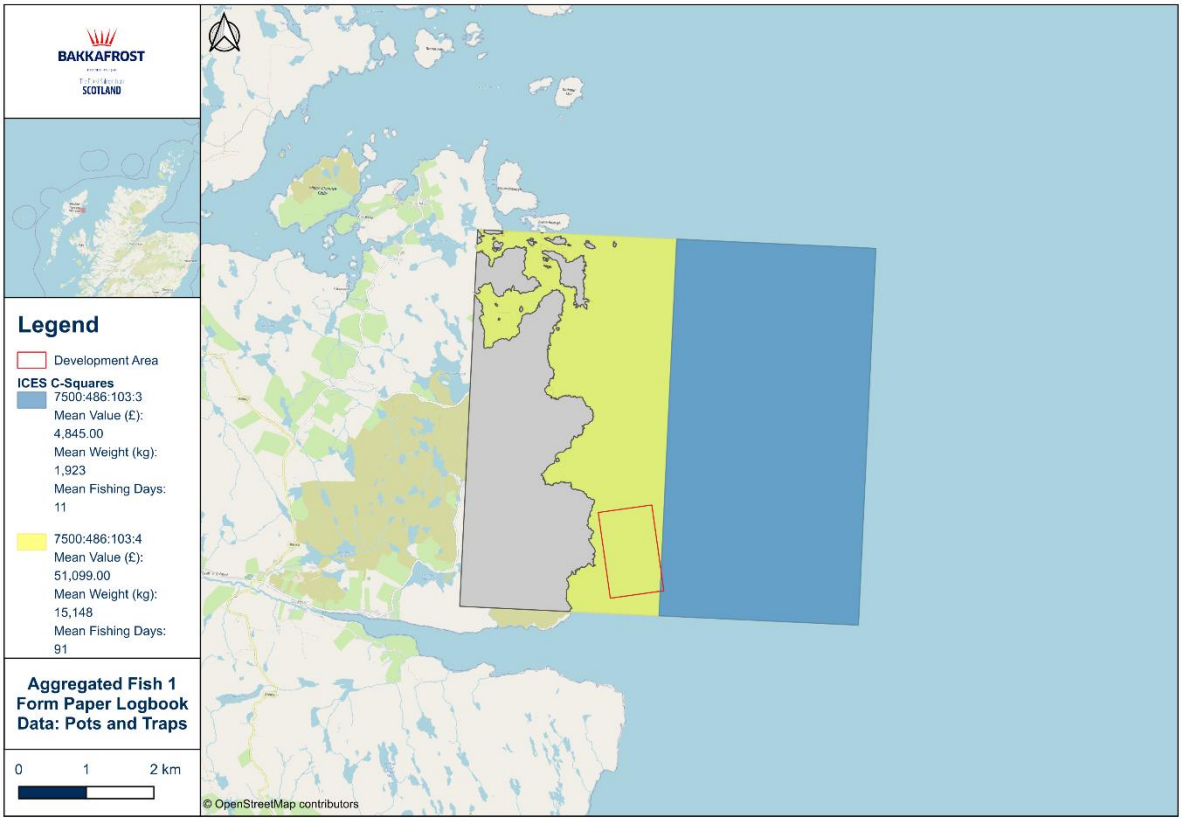


Figure 7.2: Aggregated Fish 1 form and paper logbook pots and traps statistics for the two c-squares that overlap with the Proposed Development.

To determine the displacement of fishing effort and associated economic loss as a result of the total exclusion (worst-case scenario) of the 12 m LOA and under pots and traps fishery from within the 1.02 km^2 Development Area, an assessment has been undertaken based on the 12 m LOA and under fisheries dataset published by the Scottish Government, which was reviewed to determine the baseline condition in **Sub-Section 5.3.2.1.1.1**. The Proposed Development overlaps with two c-squares, see **Figure 7.2**, the assessment of displacement has utilised data held within c-square 7500:486:103:4 and 7500:486:103:3 to help provide a conservative estimate of the magnitude of impact.

Table 7.3 illustrates the calculated impact likely to be experienced by the pots and traps fishery, in terms of displacement of fishing vessels, economic loss (reduction in landed value and weight), and fishing effort (displacement of fishing days) as a result of total displacement from the proposed Development Area (worst case scenario). These calculations assume that landings and effort are uniform across the marine area of the c-square.

Table 7.3: 12 m LOA and under pots and traps fishery landings and effort impact calculations.

Variables	Value		Variables	Value	
	7500:486:103:4	7500:486:103:3		7500:486:103:4	7500:486:103:3
Number of Fishing Vessels (#)	9	5	Mean Value (£)	£51,099.00	£4,845.00
Marine Area of C-Square (km^2)	9.1	16.43	Marine Area of C-Square (km^2)	9.1	16.43
Area of Development Area (km^2)	1.01	0.1	Area of Development Area (km^2)	1.01	0.1
Fishing Vessels per Unit Area (#/km^2)	0.99	0.30	Mean Value per Unit Area (£/km^2)	5,615.27	294.89
Fishing Vessels within Development Area (#)	1.00	0.03	Mean Value of the Development Area (£)	5,671.43	29.49
			Mean Value of the Development Area per Vessel (£)	630.16	5.90

a) Number of Vessels

b) Mean Landed Value

Variables	Value		Variables	Value	
	7500:486:103:4	7500:486:103:3		7500:486:103:4	7500:486:103:3
Mean Weight (kg)	15,148	1,923	Mean Fishing Days	91	11
Marine Area of C-Square (km^2)	9.1	16.43	Marine Area of C-Square (km^2)	9.1	16.43
Area of Development Area (km^2)	1.01	0.1	Area of Development Area (km^2)	1.01	0.1
Mean Weight per Unit Area (kg/km^2)	1,664.62	117.04	Mean Fishing Days per Unit Area (Fishing Days/km^2)	10.00	0.67
Mean Weight of the Development Area (kg)	1,681.26	11.70	Mean Fishing Days of the Development Area	10.10	0.07
Mean Weight of the Development Area per Vessel (kg)	186.81	2.34	Mean Fishing Days of the Development Area per Vessel	1.12	0.01

c) Mean Landed Weight

d) Mean Fishing Days

The calculations presented within **Table 7.3** have determined that total displacement of the pots and traps fishery from the Development Area (combined value of 7500:486:103:4 and 7500:486:103:3) would result in:

- The displacement of **1.03 fishing vessels**;
- The **economic loss of £5,700.92 per annum for all 14 fishing vessels operating within the c-squares or £636.06 per vessel**;
- A **reduction in landings of 1,692.97 kg per annum for all 14 fishing vessels operating within the c-square or a reduction of 189.15 kg per vessel**; and
- The **loss of 10.17 days of fishing effort per annum for all six fishing vessels or a loss of 1.14 days per vessel**.

The mean annual landings of the 12m LOA and under pots and traps fishery within 45E3 (2019 to 2023) was 199.31 T (199,314 kg) and £1,080,371.52. As such, the worst-case scenario economic loss as a result of the Proposed Development (£5,700.92) represents 0.53 % of the total 12 m LOA and under pots and traps fishery landings within 45E3. Therefore, it is determined that the fishing grounds beneath the Proposed Development are not of significant economic value to the local 12 m LOA and under pots and traps fishery.

Due to the small displacement of fishing effort (1.03 fishing vessels and 10.17 fishing days per annum for all 14 vessels or 1.14 days per vessel), it is anticipated that the neighbouring fishing grounds to the north and south, shown through publicly available data to be more productive than the grounds beneath the Proposed Development, will be able to absorb at least a portion of the displaced fishing effort. In addition, c-squares directly to the east and south show a decline in value, indicating that the northern half of the c-square may be more productive. Therefore, the calculated economic loss is likely to be reduced, as a portion of the landings are likely to be made up through the rebalancing of displaced fishing effort. Furthermore, as previously stated, in reality it is unlikely that the Proposed Development will result in the total displacement of the pots and traps fishery from the Development Area. As such, the calculated loss values are likely to be conservative in nature.

As a result, the overall magnitude of the impact is determined to be **negligible**.

7.1.5 Significance of Effect without Mitigation

7.1.5.1 Mobile Nephrops Trawl Fishery

7.1.5.1.1 Over 12 m LOA Fishery

In light of the assessed **low sensitivity** of the receptor and **negligible magnitude** of the impact, the effect of exclusion, access, displacement and associated economic loss is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.1.5.2 Static Pots and Traps Fishery

7.1.5.2.1 12 m LOA and Under Fishery

In light of the assessed **medium sensitivity** of the receptor and **negligible magnitude** of the impact, the effect of exclusion, access, displacement and associated economic loss is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.1.6 Mitigation

7.1.6.1 Mobile Nephrops Trawl Fishery

7.1.6.1.1 Over 12 m LOA Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.1.6.2 Static Pots and Traps Fishery

7.1.6.2.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.1.7 Significance of Residual Effect Post Mitigation

7.1.7.1 Mobile Nephrops Trawl Fishery

7.1.7.1.1 Over 12 m LOA Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.1.7.2 Static Pots and Traps Fishery

7.1.7.2.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.1.8 Cumulative Impact

Within a 5 km radius of the Proposed Development there are two additional fish farms, all owned and operated by BFS, details of which are provided below in **Table 7.4**. The planning boundaries for these farms (Gravir West and Gravir Outer) are adjoined, therefore they will be considered as one farm for this (hereafter 'Gravir').

Table 7.4: Summary of existing fish farms within 5 km of the Proposed Development.

Farm Name	FS Number	Distance (Site Centre to Site Centre) (km)	Direction (°)	Spatial Extent of Development Area (km²)
Gravir	FS0242	2.07	141°SW	0.517

As a result, the cumulative displacement of fishing activity must be assessed, to determine whether individual non-significant exclusion or reduction of access cumulatively results in significant effects due to the increased magnitude of the impact.

7.1.8.1 Mobile Nephrops Trawl Fishery

7.1.8.1.1 Over 12 m LOA Fishery

As can be seen in **Figure 7.3**Figure 7.3, only the Proposed Development overlaps with suitable Nephrops habitat within the waters off Loch Odhairn. Gravir does not overlap with a c-square containing catch data, which indicates that no fishing effort, between 2018 and 2021, occurred within the footprint of this farm.

As a result of the lack of connectivity between the existing fish farms and over 12 m LOA Nephrops trawling effort, this fishery has been scoped out of cumulative assessment.

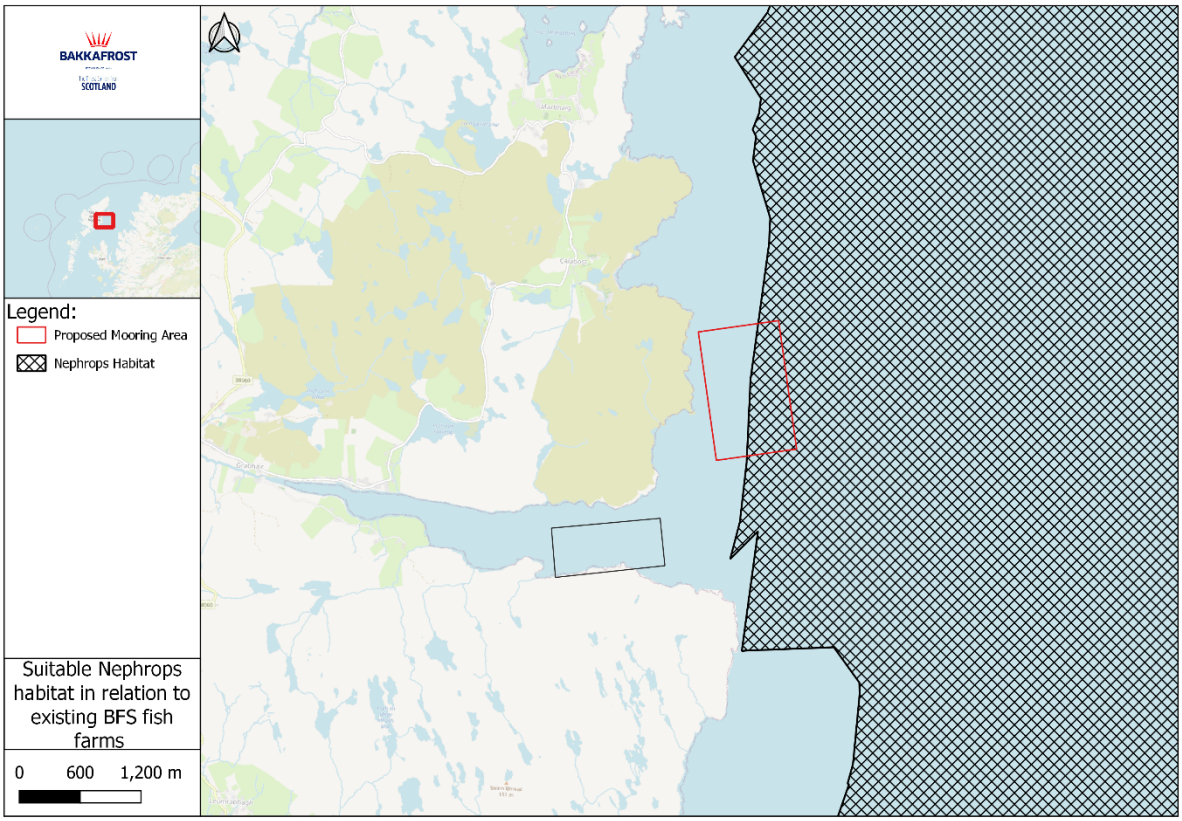


Figure 7.3: Suitable Nephrops habitat in relation to Proposed Development and existing BFS fish farms included within the cumulative assessment.

7.1.8.2 Static Pots and Traps Fishery

7.1.8.2.1 12 m LOA and Under Fishery

As detailed within **Sub-Section 7.1.4.2.1**, 12 m LOA and under pots and traps fishing effort and landings within the DSA are primarily constrained to the east coastline of the Isles of Lewis and Harris and the and the northwest coast of mainland Scotland, down to the north of the Isle of Skye. The Proposed Development overlaps with two c-squares, both of which support moderate effort and landings. Gravir is located within the c-square directly to the south of the Proposed Development. This c-square has a £8,880.00 landed value, 4,751 kg landed weight, and 14 fishing days. These data indicate that whilst 12 m LOA and under pots and traps fishing effort and landings are associated with the Proposed Development and existing Gravir farm, the farms are not located over unique high value fishing ground within the DSA and the WSA.

Calculations utilising the same methodology as presented within **Sub-Section 7.1.4.2.1**, have estimated that cumulative economic loss, in terms of landed value, would likely be **£6,264.04** per annum. In comparison, the total mean landed value of the three discrete c-squares included within this assessment is £64,824.00 per annum. Therefore, the estimated loss of landed value represents **9.66 %** of the total mean landed value of the three relevant c-squares. Furthermore, within 45E3, the 12 m LOA and under pots and traps fishery recorded a landed value of £1,080,371.52. As such, the estimated loss of landed value (**£6,264.04**) represents **0.58 %** of the mean annual landed value of the 12 m LOA and under pots and traps fishery within 45E3.

Calculations also estimated that the cumulative loss of fishing effort, in terms of fishing days, is likely to be **1.26 days**, as a result of total displacement from the cumulative Development Area of the Proposed Development, and Gravir. However, it is anticipated that the neighbouring fishing grounds, shown

through publicly available data to be more productive than the grounds to the north and south of the Proposed Development and the existing farm (**Sub-Section 5.3.2.1**) will be able to absorb at least a portion of the displaced fishing effort. Therefore, the calculated economic loss is likely to be reduced, as a portion of the landings are likely to be made up through the rebalancing of displaced fishing effort. Furthermore, as previously stated, in reality it is unlikely that the Proposed Development will result in the total displacement of the pots and traps fishery from the Development Area. As such, the calculated loss values are likely to be conservative in nature.

As such, the overall magnitude of the impact on the 12 m LOA and under pots and traps fishery is determined to be **negligible**.

7.1.8.3 Significance of Cumulative Effect without Mitigation

7.1.8.3.1 Static Pots and Traps Fishery

7.1.8.3.1.1 12 m LOA and Under Fishery

As a result, of the **negligible magnitude** of cumulative exclusion impacts on the 12 m LOA and under pots and traps fishery and the **medium sensitivity**, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.1.8.4 Mitigation

7.1.8.4.1 Static Pots and Traps Fishery

7.1.8.4.1.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.1.8.5 Significance of Residual Cumulative Effect Post Mitigation

7.1.8.5.1 Static Pots and Traps Fishery

7.1.8.5.1.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.2 Gear Snagging, Entanglement and Navigational Safety

7.2.1 Nature of Impact

Due to the physical presence of the Proposed Development within waters utilised for commercial fishing there is the potential for physical interaction between the Proposed Development infrastructure and the fishing gear deployed by fishers. The potential for interaction is higher in relation to the sub-surface infrastructure of a fish farm, with mooring lines and anchors extending out from the surface infrastructure. There is the potential for both static and mobile gear to snag on aquaculture infrastructure. Static creels can be set in clusters along a leader, these groups of creels can comprise ten to 25 creels, and in excess of 100 for larger vessels, set at regular intervals along the leader[12]. As a result, the leader, or individual creels, may be set over mooring lines or anchors, or during the soak period movement may result in snagging. Mobile gear is considered to be more susceptible to snagging and entanglement due to the nature of this fishing practice, with vessels requiring space to tow gear, therefore any alteration to the seabed of fishing grounds may result in snagging. In either scenario, snagging and entanglement of fishing gear may cause impacts to both economic viability and navigational safety.

There is also concern raised by the fishing industry over the potential interaction with aquaculture marine litter within the wider marine environment, as fishing vessels may catch discarded aquaculture

infrastructure which may cause damage to fishing vessels or fishing gear. Depending on the nature of the snagged marine litter this may be dangerous, especially for fishing vessels operated by a single fisher[19].

In general concerns are raised in relation to three aspects that can be controlled through best practice by aquaculture operators[19]:

- Inappropriate lighting;
- Farm infrastructure not being within the exact licensed co-ordinates; and
- Aquaculture marine litter.

This assessment will focus on these three key concerns raised by the fishing industry.

7.2.2 Sensitivity of Receptor

7.2.2.1 Mobile Nephrops Trawl Fishery

7.2.2.1.1 Over 12 m LOA Fishery

Due to the nature and operation of mobile demersal gear (Nephrops trawls) there is an increased vulnerability to this potential impact, as gear may be actively towed over sub-surface infrastructure potentially resulting in snagging and subsequent damage to gear and navigational safety. As such, the Nephrops trawl fishery is considered to be of **medium sensitivity**.

7.2.2.2 Static Pots and Traps Fishery

7.2.2.2.1 12 m LOA and Under Fishery

The static gear pots and traps fishery is likely to be of low vulnerability to this potential impact, as gear is placed on, and not towed along, the seabed. As such, it is less likely that gear will become snagged on sub-surface infrastructure. Moreover, as the gear is placed on the seabed, potential snagging is unlikely to result in navigational safety issues. As a result, the static gear pots and traps fishery is determined to be of **low sensitivity**.

7.2.3 Magnitude of Unmitigated Impact

All infrastructure scheduled for deployment at the Proposed Development has been designed and built to the Norwegian standard (NS9415:2021) and to withstand the specific environmental conditions that are likely to be experienced at the Proposed Development. Infrastructure specifications and attestations have been provided (**Appendix B** of EIAR) which detail the suitably of specific infrastructure, including pens, feed barge, and mooring system.

Furthermore, all infrastructure will be installed in accordance with the SGMD Technical Standard for Scottish Finfish Aquaculture (STS). Planned Preventative Maintenance (PPM) of the grid and mooring system will be undertaken at the end of each production cycle. The inspection will be undertaken by specialist competent contractors, who will carry out the inspection against the requirements of the STS. Any remedial work will be completed, and a 'Declaration of Compliance' will be issued by the specialist contractor stating that the inspected infrastructure meets the standards laid out within the STS.

The Proposed Development will be appropriately marked and lit, as required by the NLB. Through consultation with NLB during the Screening and Scoping phase, NLB have recommended that the pens are marked and lit by two yellow special mark poles fitted with yellow 'X' top-marks. Each light should display a character of flashing group four yellow every twelve seconds (FI (4) Y12s) with a nominal

[19] Poseidon. Co-existence of capture fisheries and marine aquaculture. Report, May 2022. [Online] Available at: https://www.crownestatescotland.com/resources/documents/co-existence-of-capture-fisheries-marine-aquaculture-review-of-measures-for-improved-co-existence-with-recommendations-for-adoption-in-scotland

range of 2 nautical miles and be installed above the 'X' top-mark. These marker poles will be positioned on the North East and South East seaward corners of the pen group. It is recommended that these be mounted onto the corner cushion buoys to give good visibility on approach to the site and the poles should be ≥75mm diameter, the 'X' topmark should be ≥ 75cm length by 15cm width. In addition, the feed barge is required to be lit by an all-round fitted white light, this light should be positioned at least 1 m above all other obstruction.

In addition to the above marking and lighting requirements, NLB also state that loose floating lines around the farm infrastructure are strongly discouraged as this can cause serious safety implications for other mariners. BFS will ensure that the Proposed Development will be maintained to a high standard. Daily containment checks will be carried out to ensure that all infrastructure is in a good state of repair, these daily checks will include checking for loose ropes and separated infrastructure, as this could be a sign of a containment issue. Where issues are identified, corrective and preventative measures will be undertaken.

The NLB also require BFS to undertake weekly checks of all marking and lighting equipment with records kept for review during NLB audits.

The above NLB requirements will be implemented as embedded mitigation at the Proposed Development, as outlined within **Section 4**.

To ensure the Proposed Development infrastructure is installed in accordance with the approved planning permission, the contractor commissioned to undertake the installation work will be sent the approved co-ordinates as well as an internal Site Position Record document. It is also communicated to the contractor that the infrastructure must be installed in accordance with the approved planning permission. On installation of the infrastructure the contractor will log the co-ordinates on their system and provide the installed co-ordinates to BFS on the Site Position Record document. At the end of each production cycle a full survey of the sub-surface grid and mooring system components will be undertaken via ROV. This survey will document the locations of the mooring anchors and also ensure that the mooring system is in a good state of repair. If the survey shows that the mooring anchors have shifted outwith the Development Area, BFS will commission a contractor to lift and reset the anchors within the approved Development Area. In the event that the survey findings indicate that the mooring anchors have shifted within the Development Area, the new anchor co-ordinates will be provided to the relevant fishing associations and representative bodies to ensure that fishers are aware of any potential snagging points within the consented Development Area.

Aquaculture marine litter resulting from the separation of infrastructure from the Proposed Development will be avoided and reduced through the adherence to best practice in terms of infrastructure specification and maintenance. All infrastructure to be installed at the Proposed Development has been designed and built to withstand the specific environmental conditions likely to be experienced at the development location, with specifications and attestations provided by the manufacturer (**Appendix B**). As detailed above, at the end of each production cycle an ROV survey will be undertaken to assess the condition of the grid and mooring system, with equipment being replaced, if needed. Daily surface checks are also carried out with maintenance scheduled as and when needed. Details of the inspection and maintenance schedule for all relevant infrastructure is provided in the ECP (**Appendix E**). In the event that any surface or sub-surface infrastructure becomes detached from the Proposed Development, every effort will be made to retrieve the item within a timely manner. As detailed within the Waste Management Plan (WMP) (**Appendix P**) for the Proposed Development, all detached and redundant infrastructure will be retrieved within 30 days of the replaced infrastructure being installed.

As a result of the information provided above and in **Section 4,** the probability and frequency of this impact occurring is determined to be **negligible**. Moreover, the total spatial extent over which fishing gear may become snagged or entangled is considered to be **negligible** in the context of available fishing grounds, as the Development Area is 1.02 km^2 in total extent.

As a result, the overall magnitude of the impact of snagging gear, entanglement and navigational safety is determined to be **negligible**.

7.2.4 Significance of Effect without Mitigation

7.2.4.1 Mobile Nephrops Trawl Fishery

7.2.4.1.1 Over 12 m LOA Fishery

In light of the assessed **medium sensitivity** of the receptor and **negligible magnitude** of the impact, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA regulations.

7.2.4.2 Static Pots and Traps Fishery

7.2.4.2.1 12 m LOA and Under Fishery

In light of the assessed **low sensitivity** of the receptor and **negligible magnitude** of the impact, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA regulations.

7.2.5 Mitigation

7.2.5.1 Mobile Nephrops Trawl Fishery

7.2.5.1.1 Over 12 m LOA Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.2.5.2 Static Pots and Traps Fishery

7.2.5.2.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.2.6 Significance of Effect Post Mitigation

7.2.6.1 Mobile Nephrops Trawl Fishery

7.2.6.1.1 Over 12 m LOA Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.2.6.2 Static Pots and Traps Fishery

7.2.6.2.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.2.7 Cumulative Impact

As identified within **Sub-Section 7.1.8**, there is one existing fish farm (Gravir), owned and operated by BFS within a 5 km radius of the Proposed Development. The presence of this farm in addition to the

Proposed Development therefore increases the cumulative spatial extent of fish farming operations within the waters off the east coast of the Isle of Lewis. As a result, fishing vessels operating within the area have the potential to snag or entangle gear on the cumulative fish farm infrastructure that may lead to reduced navigational safety or negative economic impacts, through damage to fishing gear and subsequent loss of earnings. In total the cumulative Development Area of the Proposed Development and Gravir is 1.54 km^2. As a result, the spatial extent of the impact has increased and therefore represents a **low** cumulative spatial extent when viewed in the context of fishing grounds identified within the DSA and WSA.

However, the same embedded mitigation proposed for the Proposed Development, within **Section 4**, is already implemented at the existing fish farms. In particular the existing fish farm is marked and lit in line with the requirements provided by NLB. As a result, of the implemented best practice embedded mitigation the probability and frequency of potential snagging or entanglement of fishing gear is determined to be **negligible**.

Therefore, despite the cumulative spatial extent representing an increase in relation to the Proposed Development in isolation, the embedded mitigation is considered sufficient to ensure that the overall magnitude of the cumulative impact is **negligible**.

7.2.7.1 Significance of Cumulative Effect without Mitigation

7.2.7.1.1 Mobile Nephrops Trawl Fishery

7.2.7.1.1.1 Over 12 m LOA Fishery

As a result, of the **negligible magnitude** of the potential impact on the 12 m LOA and under Nephrops trawl fishery and the **medium sensitivity**, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.2.7.1.2 Static Pots and Traps Fishery

7.2.7.1.2.1 12 m LOA and Under Fishery

As a result, of the **negligible magnitude** of the potential impact on the 12 m LOA and under pots and traps fishery and the **low sensitivity**, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.2.7.2 Mitigation

7.2.7.2.1 Mobile Nephrops Trawl Fishery

7.2.7.2.1.1 Over 12 m LOA Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.2.7.2.2 Static Pots and Traps Fishery

7.2.7.2.2.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.2.7.3 Significance of Residual Cumulative Effect Post Mitigation

7.2.7.3.1 Mobile Nephrops Trawl Fishery

7.2.7.3.1.1 Over 12 m LOA Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.2.7.3.2 Static Pots and Traps Fishery

7.2.7.3.2.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.3 Changes to the Local Environment

7.3.1 Nature of the Impact

The operation of the Proposed Development is likely to lead to a degree of increased deposition of organic material, namely uneaten feed and faeces. This increased deposition, if intense enough, may lead to the modification of the benthic environment and therefore associated benthic communities beneath the pens and within the local area.

The Proposed Development, through the Scottish Environment Protection Agency (SEPA) Controlled Activities Regulations (CAR) licence is permitted to discharge the following medicants into the water environment:

- SLICE (active ingredient: Emamectin Benzoate (EmBz));
- Salmosan (active ingredient: Azamethiphos); and
- Alphamax (active ingredient: Deltamethrin).

Whilst the Proposed Development will prioritise the use of non-medicinal interventions, such as combined gill health and sea lice freshwater interventions and mechanical interventions for sea lice removal, licenced medicants are anticipated to make up part of the ISLM Plan. These medicants have the potential to negatively impact arthropod crustacea within the immediate area, if concentrations are high enough, and therefore they may impact shellfish stocks.

7.3.2 Sensitivity of Receptor

7.3.2.1 Mobile Nephrops Trawl Fishery

7.3.2.1.1 Over 12 m LOA Fishery

There is the potential for Nephrops trawling grounds beyond the physical footprint of the Proposed Development to be impacted by the discharge and deposition of organic material and in-feed residues (SLICE), as well as the discharge and subsequent dispersion of bath medicines (Salmosan and Alphamax) within the water column. However, as detailed within the baseline condition, there are discrete high effort and landings Nephrops trawling grounds outwith the location of the Proposed Development. Therefore, it is determined that within the DSA and WSA there are moderate levels of alternative fishing ground available to this fishery. As such, the Nephrops trawl fishery are determined to be of low vulnerability and high recoverability. The Nephrops trawl fishery is therefore determined to be of **low sensitivity**.

7.3.2.2 Static Pots and Traps Fishery

7.3.2.2.1 12 m LOA and Under Fishery

There is the potential for shellfish pots and traps fishing grounds beyond the physical footprint of the Proposed Development to be impacted by the discharge and deposition of organic material and in-feed residues (SLICE), as well as the discharge and subsequent dispersion of bath medicines (Salmosan and Alphamax) within the water column. However, as detailed within the baseline condition, there are discrete high effort and landings pots and traps fishing grounds outwith the location of the Proposed Development. Therefore, it is determined that within the DSA and WSA there are moderate levels of alternative fishing ground available to this fishery. As such, the pots and traps fishery is determined to

be of medium vulnerability and medium recoverability. The pots and traps fishery is therefore determined to be of **medium sensitivity**.

7.3.3 Magnitude of Unmitigated Impact

7.3.3.1 Organic Deposition

The magnitude of organic deposition from the Proposed Development is regulated by SEPA through the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). As such SEPA limits the maximum area of the mixing zone, the area within which a degree of alteration to the benthic environment is likely. This limit is equivalent to an area encompassed by 100 m from the pen edge in all directions. Within the mixing zone the average depositional intensity threshold for organic material is normally 2,000 $g/m^2/yr^{-1}$ and the mixing zone extent must normally not exceed 100 % of the defined mixing zone area. However, as the development location has a wave exposure index (WEI) in excess of 3.81[20], the average depositional intensity threshold is increased to 4,000 $g/m^2/yr^{-1}$ and the permitted mixing zone extent is increased to 120 % of the mixing zone area.

The NewDEPOMOD modelling undertaken for the Proposed Development indicates that for the proposed biomass of 4,680 T the mixing zone extent would be 117.17 % of the permitted spatial extent. The depositional intensity within the mixing zone is also modelled to be well below the 4,000 $g/m^2/yr^{-1}$ threshold with a value of 360.2 $g/m^2/yr^{-1}$ modelled. Moreover, the impacts on the benthic environment are considered to be reversible, as recolonisation and recovery is likely to take place over defined temporal periods once the Proposed Development is decommissioned.

As a result, the overall magnitude of organic deposition is determined to be **negligible**.

7.3.3.2 SLICE (Emamectin Benzoate)

SLICE is an in-feed sea louse medicant, which is administered to the stock via medicated feed pellets. Post-intervention, SLICE may be deposited on the seabed via excretion of both faeces and urine from the treated stock or via settlement of uneaten medicated feed pellets. The active ingredient, EmBz, inhibits the nerve function in arthropods, which may lead to paralysis of the neuromuscular system[21], it also has low water solubility and therefore displays a high affinity with organic matter. As a result, there is the potential for negative impacts on non-target arthropod crustacea, that are commercially fished in the surrounding waters.

Since March 2023, SEPA have implemented an interim EQS for EmBz[22], based on the revised recommendations of the UK Technical Advisory Group (UKTAG), following public consultation in 2019 and an independent scientific peer review. The interim EQS for EmBz is applied to all proposed new or increased discharges of EmBz in all coastal waters. Scottish Ministers are yet to update their directions on environmental standards to SEPA, to incorporate directions on EmBz. The interim EQS is detailed in **Table 7.5**.

[20] Marine Directorate: National Marine Plan interactive: Wave Exposure Index (Contains information from the Scottish Association for Marine Science). [Online] Available at: https://marine.gov.scot/maps/780

[21] Daoud, D., McCarthy, A., Dubetz, C. and Barker, D.E., 2018. The effects of emamectin benzoate or ivermectin spiked sediment on juvenile American lobsters (Homarus americanus). Ecotoxicology and Environmental Safety, 163, pp.636-645. [Online] Available at: https://www.sciencedirect.com/science/article/pii/S0147651318305657

[22] Scottish Environment Protection Agency (SEPA). Emamectin Benzoate (EmBz) Interim Position Statement March 2023. [Online] Available at: https://www.sepa.org.uk/media/594684/position_statement_embz-march-2023-approved.pdf

Table 7.5: EmBz interim environmental quality standards.

Interim Environmental Quality Standard (EQS)	
Mixing Zone Edge	272 ng/kg of marine sediment (dry weight) (136 ng/kg (wet weight)

NewDEPOMOD modelling is used to determine the permissible quantity of SLICE, through the application of a mixing zone. The mixing zone is defined by the total area within which deposition of EmBz exceeds the interim EQS of 136 ng/kg (wet weight). The extent of the EmBz mixing zone shall not exceed an area equivalent to 100 m from the pen edge in all directions. NewDEPOMOD modelling iterated a quantity of EmBz that satisfies the mixing zone threshold. The interim EQS for EmBz is considered to be a safe concentration and has been set to be protective of all species within the environmental matrix where exposure is likely to be the highest. As a result of the EmBz NewDEPOMOD modelling indicating that the mixing zone threshold will be satisfied, the spatial extent of the potential impact of EmBz deposition is determined to be **negligible**.

As a result, the overall magnitude of the impact of SLICE (EmBz) on the over 12 m Nephrops trawl fishery, and the 12 m LOA and under pots and traps fishery is determined to be of **negligible**.

7.3.3.3 Salmosan Vet (Azamethiphos)

Salmosan vet is a bath intervention chemical that can be administered either via in-situ tarpaulin intervention or via ex-situ intervention in a wellboat. Under both circumstances the medicine is ultimately discharged into the marine environment. The active ingredient in Salmosan Vet, azamethiphos, is an organophosphate neurotoxic insecticide, which causes acetylcholinesterase inhibition, resulting in paralysis and eventual mortality of the target organism[23]. Azamethiphos is water soluble and therefore is likely to remain in the aqueous phase on entering the marine environment. As a result of this high water solubility azamethiphos is unlikely to accumulate in tissue or sediment[24]. Dispersion studies indicate that azamethiphos remains in the top 10 m of the water column where it decomposes via hydrolysis, into non-toxic derivatives, with azamethiphos having a half-life of 8.9 days[25].

Under current guidance, SEPA regulate discharges of azamethiphos against a three hour and 72 hour EQS. After a period of three hours from discharge azamethiphos concentrations must be ≤ 250 ng/l within the mixing zone area, calculated in BathAuto to be 238 m^2. After a period of 72 hours from discharge, azamethiphos concentrations must be ≤ 40 ng/l within a 0.50 km^2 extent. Both the three hour and 72 hour EQS have been set to provide protection to all marine organisms within the environmental matrix where exposure is likely to be highest. Detailed three dimensional (3D) marine modelling has been undertaken for the Proposed Development to determine the permissible quantity of azamethiphos for the Proposed Development that meets both the 3 hour (2700g) and 24 (900g) hour EQS.

As a result, the magnitude of the impact of Salmosan Vet (azamethiphos) on both the over 12 m Nephrops trawl fishery, and the 12 m LOA and under pots and traps fishery is determined to be of **negligible**.

[23] Baillie, A.C., 1985. The biochemical mode of action of insecticides. In Approaches to New Leads for Insecticides (pp. 9-18). Springer, Berlin, Heidelberg. [Online] Available at: https://link.springer.com/chapter/10.1007/978-3-642-70821-3_2
[24] Burridge, L.E., Lyons, M.C., Wong, D.K.H., MacKeigan, K. and VanGeest, J.L., 2014. The acute lethality of three anti-sea lice formulations: AlphaMax®, Salmosan®, and Interox® Paramove™ 50 to lobster and shrimp. Aquaculture, 420, pp.180-186. [Online] Available at: https://www.sciencedirect.com/science/article/abs/pii/S0044848613005735
[25] SEPA, 2008. Fish Farm Manual, Annex G. Models for assessing the- use of medicines in bath treatments. [Online] Available at: https://www.sepa.org.uk/media/114774/ffm_anx_g.pdf

7.3.3.4 AlphaMax (Deltamethrin)

Deltamethrin is a synthetic pyrethroid sea louse medicine. Deltamethrin is a neurotoxin which acts by interfering with the sodium and potassium channels in the peripheral and central nervous system of arthropod crustaceans[26]. Deltamethrin has a very low water solubility (<2 µg/l) and an octanol-water partition coefficient (log k_{ow}) of 4.6. It is internationally accepted that a log k_{ow} value of ≥ 3 indicates a potential for bioaccumulation[27].

Under current guidance, SEPA regulate discharges of deltamethrin against a six hour EQS, whereby after six hours the concentration of deltamethrin must be ≤ 6 ng/l within the mixing zone area, calculated via BathAuto to be 673 m^2. This EQS is set to provide protection to all marine organisms within the environmental matrix where exposure is likely to be highest. Detailed 3D marine modelling has been undertaken for the Proposed Development to determine the permissible quantity of deltamethrin for the Proposed Development that meets the EQS. This modelling recommended that the bath treatment consent for Deltamethrin be set at 51 g in six hours.

As a result, the magnitude of the impact of AlphaMax (deltamethrin) on the over 12 m Nephrops trawl fishery, and the 12 m LOA and under pots and traps fishery is determined to be of **negligible**.

7.3.4 Significance of Effect without Mitigation

7.3.4.1 Mobile Nephrops Trawl Fishery

7.3.4.1.1 Over 12 m LOA Fishery

In light of the assessed **low sensitivity** of the receptor and **negligible magnitude** of the impact, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.3.4.2 Static Pots and Traps Fishery

7.3.4.2.1 12 m LOA and Under Fishery

In light of the assessed **medium sensitivity** of the receptor and **negligible magnitude** of the impact, the effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.3.5 Mitigation

7.3.5.1 Mobile Nephrops Trawl Fishery

7.3.5.1.1 Over 12 m LOA Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.3.5.2 Static Pots and Traps Fishery

7.3.5.2.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

[26] Parsons, A.E., Escobar-Lux, R.H., Sævik, P.N., Samuelsen, O.B. and Agnalt, A.L., 2020. The impact of anti-sea lice pesticides, azamethiphos and deltamethrin, on European lobster (Homarus gammarus) larvae in the Norwegian marine environment. Environmental Pollution, 264, p.114725. [Online] Available at: https://www.sciencedirect.com/science/article/pii/S0269749120302451

[27] The Pesticide Manual: A World Compendium, In: Tomlin, C. (Ed.), Incorporating the Agrochemicals handbook.) British Crop Protection Council and Royal Society of Chemistry, 10th ed. Thornton Heath, UK.

7.3.6 Significance of Residual Effect Post Mitigation

7.3.6.1 Mobile Nephrops Trawl Fishery

7.3.6.1.1 Over 12 m LOA Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.3.6.2 Static Pots and Traps Fishery

7.3.6.2.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.3.7 Cumulative Impacts

As identified within **Sub-Section 7.1.8**, there is one existing fish farm (Gravir) within a 5 km radius of the Proposed Development. This fish farm is owned and operated by BFS. Therefore, cumulatively, there is the increased potential for discharge of both organic material and medicants into the wider marine environment. However, as identified within **Sub-Section 7.3.3**, SEPA regulates the discharges of both organic deposition and medicant discharge through individual fish farm CAR licences.

As highlighted in the individual assessment of the Proposed Development, BFS operate a ISLM Plan that prioritises the use of freshwater, mechanical and biological interventions over traditional medicinal interventions. As a result, the use of medicants for health interventions is greatly reduced. However, they are still likely to play a reduced role is the company's overall ISLM Plan. As previously identified the Proposed Development has been modelled, via NewDEPOMOD, for a proposed biomass of 4,680 T, at this biomass the mixing zone for organic deposition is predicted to be 117.17 % of the permissible 120 %. Benthic auditing carried out by SEPA indicates that Gravir returned compliant benthic results for the most recent assessments. As such, the farm is deemed to be in compliance with the respective CAR licences. As a result, it is determined that organic deposition is sufficiently reduced and mitigated through the SEPA thresholds and current fish farm performance to ensure impacts are limited to **negligible** magnitude.

SLICE (EmBz) discharges are regulated by SEPA through the individual farm CAR licences through the application of a mixing zone threshold, based on an EmBz EQS. All existing fish farms have a permitted quantity of EmBz. As the permitted quantity of EmBz is based on the EQS at the time of determination, it is considered that EmBz discharges from the two farms (Proposed Development and Gravir) are within acceptable limits and therefore the magnitude of cumulative SLICE (EmBz) discharge is determined to be **negligible** in overall magnitude.

Similarly, to SLICE, bath medicant quantities are determined and regulated by SEPA through the CAR licence. These quantities are based on compliance with relevant EQSs. The EQSs for bath medicants have been set to represent safe concentrations of each medicant to be protective of all species in the environmental matrix where exposure is likely to be highest. Therefore, despite cumulative bath medicant discharge representing larger volumes than that discharged from the Proposed Development in isolation, the overall magnitude is determined to be **negligible**, due to compliance with the EQSs.

7.3.7.1 Significance of Cumulative Effect without Mitigation

7.3.7.1.1 Mobile Nephrops Trawl Fishery

7.3.7.1.1.1 Over 12 m LOA Fishery

In light of the assessed **low sensitivity** of the receptor and **negligible magnitude** of the cumulative impact, the cumulative effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.3.7.1.2 Static Pots and Traps Fishery

7.3.7.1.2.1 12 m LOA and Under Fishery

In light of the assessed **medium sensitivity** of the receptor and **negligible magnitude** of the cumulative impact, the cumulative effect is determined to be of **negligible significance** and therefore **non-significant** in relation to the EIA Regulations.

7.3.7.2 Mitigation

7.3.7.2.1 Mobile Nephrops Trawl Fishery

7.3.7.2.1.1 Over 12 m LOA Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.3.7.2.2 Static Pots and Traps Fishery

7.3.7.2.2.1 12 m LOA and Under Fishery

No significant effect is anticipated, therefore, no additional mitigation measures above the embedded mitigation measures are required.

7.3.7.3 Significance of Residual Cumulative Effect Post Mitigation

7.3.7.3.1 Mobile Nephrops Trawl Fishery

7.3.7.3.1.1 Over 12 m LOA Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

7.3.7.3.2 Static Pots and Traps Fishery

7.3.7.3.2.1 12 m LOA and Under Fishery

No mitigation is required, as **no significant effect** was predicted. As such, **no significant residual effect** is predicted.

8 Conclusion

This CFIA focussed on the potential impacts that the Proposed Development, in isolation and in combination, may have on the commercially important fisheries operating within the vicinity of the Proposed Development.

Through consultation and engagement with local commercial fisheries stakeholders and the review of landings data, undertaken as part of the baseline assessment, the following fisheries were advanced for detailed assessment within the CFIA:

- Mobile Gear Fisheries:
  - Over 12 m LOA Nephrops Demersal Trawl Fishery.
- Static Gear Fisheries:
  - 12 m LOA and Under Pots and Traps Fishery (velvet crab, brown crab, lobster, and Nephrops).

The baseline condition for these specific fisheries indicated that the Proposed Development is located outwith discrete higher value fishing ground, within both the DSA and WSA. As such, it was determined that whilst the Proposed Development may potentially result in a degree of displacement of fishing effort

and associated economic loss, this would be negligible in comparison to the level of fishing effort and landings recorded outwith the footprint of the Proposed Development. For the mobile Nephrops trawl fishery, and the static pots and traps fishery it was determined that there were moderate levels of alternative fishing ground within the vicinity of the Proposed Development.

The worst case scenario of exclusion resulted in impacts of **negligible** overall magnitude in relation to both the over 12 m LOA Nephrops trawl fishery, and the 12 m LOA and under pots and traps fishery and therefore it has been determined that the effect of exclusion is likely to be **non-significant** in relation the EIA Regulations. Cumulative impacts were also determined to be **non-significant** in relation to the EIA Regulations.

Snagging or entanglement of both static and mobile fishing gear was also assessed in relation to the Proposed Development. Due to effective embedded mitigation, predominantly marking and lighting in line with the requirements of the NLB and an effective inspection and maintenance schedule, the overall magnitude of such impacts were determined to be **negligible**, and therefore the effect was determined to be **non-significant** in relation to the EIA Regulations. Cumulative effects were also determined to be **non-significant** in relation to the EIA Regulations.

Potential impacts on the local marine environment were determined to be sufficiently mitigated through compliance with relevant regulatory criteria and EQSs. As the modelling undertaken for the Proposed Development indicates compliance with all relevant EQSs the overall impact of the Proposed Development is considered to be **negligible**, and therefore the effect was determined to be **non-significant** in relation to the EIA Regulations. Cumulative effects were also determined to be **non-significant** in relation to the EIA Regulations.

As a result, it is concluded that the Proposed Development, either in isolation or cumulatively, is unlikely to result in impacts of sufficient magnitude to result in significant effect on the over 12 m LOA Nephrops trawl fishery and the 12 m LOA and under pots and traps fishery operating within the DSA or WSA.

9 Data Limitations and Uncertainties

A range of publicly available datasets informed both the baseline and impact assessment, these various datasets each have specific limitations and inherent uncertainties that must be taken into consideration. However, it is determined that these limitations do not undermine the robustness of the assessment. These include aspects such as:

- **ScotMap Data:** The ScotMap project provides spatial information on the fishing activity of Scottish registered commercial fishing vessels under 15 m LOA. Therefore, whilst 12 m LOA and under vessels are covered by ScotMap data, the data also covers vessels between 12 m LOA and under 15 m LOA. The data that underpins the ScotMap project were collected from face-to-face interviews with individual vessel owners and operators and relates to fishing activity for the period 2007 to 2011. Interviewees were asked to provide information relating to; the areas that they fish, their fishing vessels, species targeted, fishing gear used, and income from fishing. Responses were on a voluntary basis and for the Stornoway port district ScotMap data had a vessel coverage of 86 % (172/200). Whilst these ScotMap data therefore do not represent 100 % of fishing effort within the port district, it is considered that these data provide a good indication as to the spatial distribution of fishing effort throughout the marine environment as fishing effort is likely to be largely driven by the biology and ecology of the target species. However, these data are over ten years old and therefore may not accurately represent changes in fleet composition, stock abundance, and fishing practice. However, the

ScotMap data still provides a good indication of historic fishing intensity within the inshore region;

- **ICES VMS C-Square Fishing Intensity Data:** Data on fishing locations for under 12 m LOA vessels are not available, as VMS is not required on under 12 m LOA vessels. This introduces bias that is expected to be strongest in inshore waters. However, dependent on the composition of specific fishery fleets, the magnitude of the bias will vary. Data on value and weight received from various countries are not quality checked by ICES and may therefore be inconsistent;
- **Fish1 Forms and Paper Logbooks:** Whilst these fisheries data for the under 12 m LOA fleet covers a recent temporal range, 2018 to 2022. Co-ordinates are only input as a single latitude and longitude position for a full days fishing. Therefore, fishing activity may not be directly linked to this point location. However, the resolution of the data in 0.05 x 0.05 degrees in considered appropriate to provide a good representation of important and valuable fishing grounds. Within c-squares that support less than five vessels data has been redacted. Therefore, within regions that support relatively low (less than five vessels per c-square) fishing effort, data from this dataset are not available.