CAITHNESS – MORAY HVDC REINFORCEMENT

FISHERIES SOCIO-ECONOMIC REVIEW

Revision	Date	Prepared by	Reviewed by	Approved By
1	05/02/16	[redacted]		

Contents

GLOSSARY

ABB	ABB AB (the Contractor)
FLMAP	Fisheries Liaison & Mitigation Action Plan
FLM	Fisheries Liaison Manager
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables
FLR	Fisheries Liaison Representative
HVDC	High Voltage Direct Current
ICES	International Council for the Exploration of the Sea
IFG	Inshore Fisheries Group
SCUK	Subsea Cables UK
SDR	Source Data Recording
SFF	Scottish Fishermen's Federation
SHET	Scottish Hydro Electric Transmission Plc. (The Client)
SSE	Scottish & Southern Energy
UKHO	United Kingdom Hydrographic Office

1 INTRODUCTION

1.1 FOREWORD

This report sets out the potential interactions between commercial marine fisheries and the Moray HVDC Reinforcement subsea cable circuit ("the cable").

SHET were granted authorisation from the regulator, ofgem, in Summer 2014 to proceed to project implementation (i.e. construction, commissioning and operation). The project is required to improve and reinforce the electricity transmission connection between Caithness & Moray (and onwards to the rest of the UK electricity network) to enable connection with new renewable generation capacity.

1.2 PURPOSE OF REPORT

The potential effects of the cable on marine activities and the marine environment were previously considered in two separate assessments. The first, for the southern section of the cable (from Portgordon to a point north of Smith Bank) was conducted in 2009 with subsequent updates and the second, for the northern section of cable (from Noss Head to a point north of Smith Bank) was conducted in 2011 by Aquatera Ltd. In both cases these gave explicit consideration of the potential impacts of the project works on commercial fisheries.

Since this time there have been some changes in project specification and Marine Scotland have therefore requested an updated socio-economic impact assessment of the proposed cable route be submitted. This report therefore builds on these two earlier assessments and describes the key elements of the cable project in the context of commercial fisheries in the Moray Firth and addresses the potential interaction between the cable and current and future commercial fisheries activity. The report sets out the methodology by which this analysis has been done and details the proposed mitigations in relation to the installation and operation of the cable.

1.3 SCOPE

This report focuses on potential impacts on commercial marine fisheries only. This includes both the fishery undertaken by the local inshore fleet as well as the fishery undertaken by the larger offshore fleet, which may be based (home port) elsewhere in Scotland or the UK.

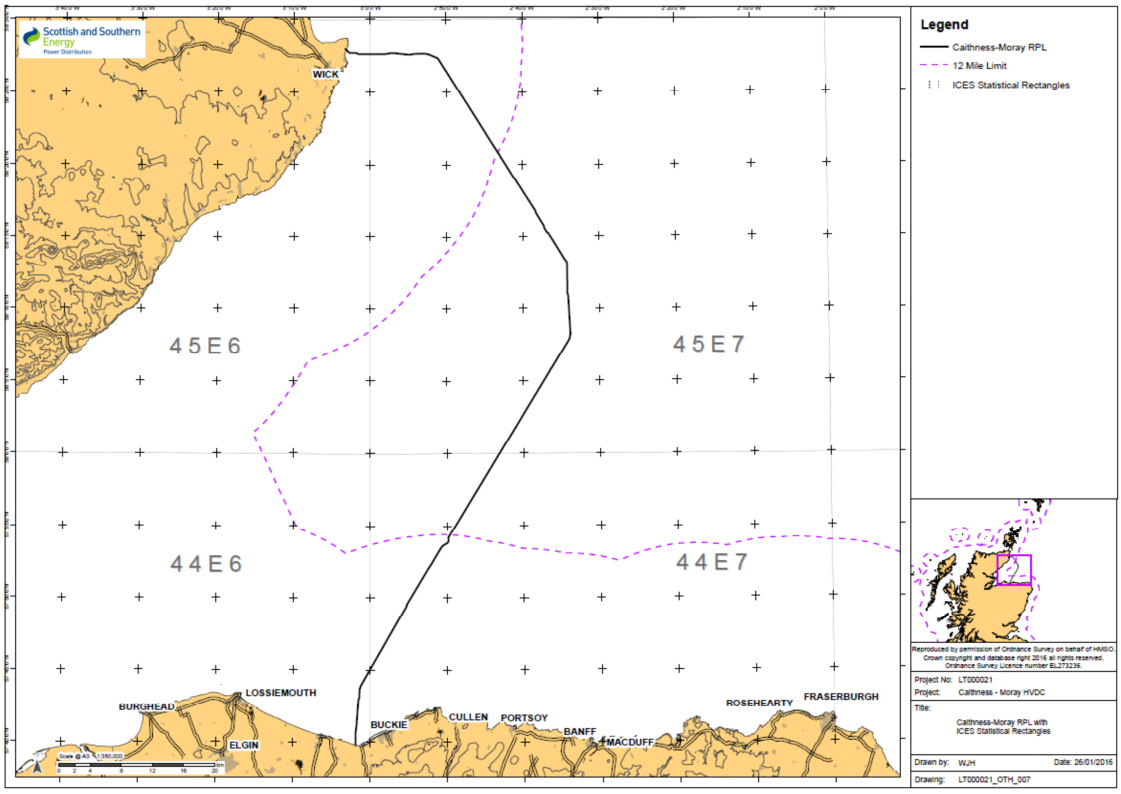
This report will not seek to determine the biological impact on the proposed development on fish resources, as this has already been determined in assessments referred to above. Instead, this report will seek to highlight the potential social and economic consequences of any such biological change, as well as quantifying the impact on the fleet from temporary displacement of fishing effort or loss of fishing gear.

Although from a biological and direct economic perspective the impacts on commercial fisheries may appear fairly local around the cable route, it is important that potential knock-on consequences in the wider area are also considered, for example from the effects of displaced fishing effort or the potential for upstream and downstream economic impacts being felt at some distance – notably at landing ports.

From a fisheries management perspective, the proposed development is in International Council for the Exploration of the Sea (ICES) Division IVa, in the North Sea ecoregion. This division represents the scale at which pressure (quota) stocks are typically managed and

how quotas are allocated. However, for the purposes of data collection and analysis ICES also has a finer scale grid of statistical rectangles and much of the data used for analysis in this report comes from the scale of the statistical rectangle. The Moray Firth comprises rectangles 44E7, 44E6, 45E7 and 45E6.

Figure 1: Chart showing proposed cable route and ICES statistical rectangles



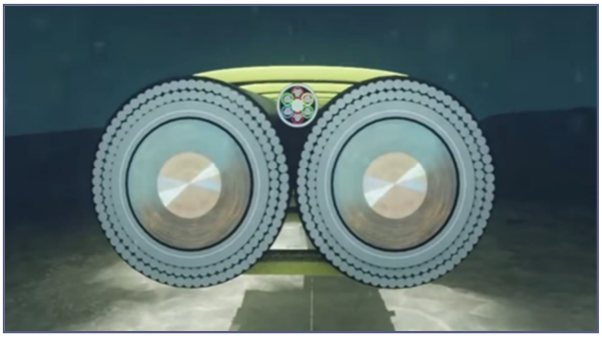
1.4 PROPOSED WORKS

ABB have been appointed as the Contractor by SHET for the HVDC portion of the project (including subsea and land cable and HVDC converters). The proposal is to install an HVDC electricity transmission cable circuit across the Moray Firth between Noss Head near Wick in Caithness and Portgordon in Moray. The circuit comprises two HVDC cables and a single fibre optic cable. The three cables will be bundled together and will be installed wherever possible in a trench. The overall subsea cable length is 113km. The cable route is shown in Figure 2 below.

In brief, the proposed cable laying method will involve boulder clearance and the creation of a temporary 1.8m deep trench across the Moray Firth by a trenching plough. The cables will then be laid in this trench. The trench will then be mechanically backfilled and any areas of cable that are not buried to a depth of at least 1m will be protected using rock armour.

Surveys will be undertaken to verify cable position, mechanical backfill and rock placement profiles.

Figure 2: Cable bundle cross-section



2 METHODOLOGY

Data has been collated from appropriate local, national and international sources and corroborated at a local scale through stakeholder consultation (carried out as part of earlier assessments). This data has been combined with expert knowledge and interpretation of applicable research findings. Baseline information has been used to build a picture of the existing fishery in the Moray Firth.

All potential impacts are highlighted – detailing when and where any such impacts may occur and how they might be mitigated, with consequences quantified in relevant terms. The process used to assess the significance of impacts is detailed below, along with details of terminology.

2.1 DATA COLLECTION

The table below provides a summary of the key data sources used to inform the conclusions of the socio-economic impact assessment.

Table 1: Key data sources used to inform baseline & impact assessment

Data Source	Spatial coverage	Author	Year
VMS (spatial data)	ICES rectangle	Marine Scotland (Compliance)	2014
Inshore Fishing Activity (Scotmap)	Moray Firth	Marine Scotland	2013
Landings	ICES rectangle	Scottish Government, Fisheries Statistics	2014
Fleet register	UK wide over 10m and under 10m – refined by home port.	Marine Management Organisation Statistics and Analysis Team	2016

Data limitations and uncertainty

A key risk in assessing the current commercial fisheries in the Moray Firth, and assessment of potential impacts, is of failing to correctly interpret fisheries data. Landing statistics are reported by ICES rectangles, an area approximately 30 nautical miles squared (30 minutes of latitude x 1° longitude). As such, any landings data for 4 ICES rectangles of the Moray Firth will relate to catches from a wide range of fishing grounds and a diverse range of fleets. While this will include landings from the cable route, these will be hidden by larger scale landings (in both geographic and volume terms). ICES landings data can therefore only be used to provide important contextual information as well as valuable understanding of landing patterns.

More detailed statistical understanding can be obtained from MMO data on recorded landings by local ports, however, this may also include landings by inshore and offshore vessels, so must again be carefully interpreted. Other data such as VMS traces can provide a useful indication of fishing vessel movements, but as these are only in use on larger (+12m) vessels, this will not record movements of the local inshore fleet, operating in smaller vessels. Finally, more recent data from the ScotMap project provide spatial information on the fishing activity of Scottish-registered commercial fishing vessels under 15 m in overall

length. The ScotMap data was collected during face-to-face interviews with individual vessel owners and operators and relates to fishing activity for the period 2007 to 2011.

2.2. IMPACT ASSESSMENT

The key task of the commercial fisheries socio-economic assessment is to determine the significance of any impacts on the commercial fishing industry. Where considered appropriate, mitigation measures are proposed for specific impacts, with the significance of those impacts reassessed once mitigation is in place.

The significance of impact is determined by combining the scale of impact, with the sensitivity of the receptor (in this case commercial fishing).

Magnitude of Impact x Sensitivity of Receptor = Significance of Impact

Magnitude of impact is first determined by examining both the spatial and temporal scale of impact along with the level of intensity, as detailed below. From a commercial fisheries perspective, the scale of impact relates to impact on the fleet (such as fishing patterns, landings or fleet size).

Table 2: Definition of magnitude of impact

	Spatial Scale	Temporal scale	Intensity
Very high	Impact within wider area.	Recovery > 15yrs	Very evident within space and time frame.
High	Impact within study region.	Reversible within 1-5 years	Some evidence within space and time frame.
Medium	Impact at development site.	Reversible in less than 1 yr.	Low detectability
Low	Undetectable	Undetectable	Undetectable

Sensitivity of the receptor to the impact is then determined. This essentially seeks to determine the capacity of the commercial fishing industry to accommodate the potential impacts. The level of sensitivity is determined by considering likely change on fishing patterns, landing and fleet size, as set out.

Table 3: Definition of sensitivity to impact

	Fishing patterns	Landings	Fleet size
Very high	Significant change affecting whole fleet	Significant change – composition and value.	Permanent change
High	Some change – affecting a few local boats.	Some change – composition, not value	Temporary change
Medium	Minor change – occasionally affecting a few local boats.	Change undetectable in normal variations in landing patterns.	No change
Low	No change	No change	No change

Finally, the outcome of the magnitude of impact and the sensitivity of the fleet to that impact are combined to determine the overall significance levels. Significance is graded as being

major, moderate, minor or negligible. The matrix for determining the level of significance is set out below.

Table 4: The significance of an impact from each combination of sensitivity and magnitude

Sensitivity	Magnitude			
	Very high	**High**	**Medium**	**Low**
Very high	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Minor
Medium	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible

3 FISHERY INTERACTIONS

3.1 FISHERIES MANAGEMENT LEGISLATION & FRAMEWORK

In this section, some background to the fisheries management framework – including key roles and responsibilities, and underlying legislation is presented.

Fisheries management (EU)

The UK is a Member State of the European Union, and its fisheries are therefore subject to the principles and practices of the Common Fisheries Policy (CFP) of the EU. Although there is reasonable scope for local management (see below), this must be done within the overarching context and rules of the CFP. The scope of the CFP extends to conservation, management and exploitation of living aquatic resources and aquaculture, as well as processing and marketing of fishery products, both within EU waters and by any member state vessel or national – with due regard to the UN Convention on the Law of the Sea (UNCLOS) and without prejudice to the primary responsibility of the flag State. Outside the CFP framework other EU legislation dealing with habitats and species protection also has binding relevance to fisheries management and to fishermen.

National fisheries management

The responsibility for implementation of the CFP in Scotland has been devolved to the Scottish Government (The Scotland Act 1998), meaning that Scottish ministers are responsible for the regulation (licensing & enforcement) of sea fishing within the Scottish Zone of the British Fishery Limits (200 mile zone). Within the 12nm zone, the Scottish Government also has the ability to take non-discriminatory fishery conservation measures although the EU retains the right to undertake certain direct legislation, even in member states inshore waters.

In general, the only areas where the European Commission adopts measures which have effect within 12 miles are in relation to fleet, Total Allowable Catch (TAC) and gear – principally in relation to the management of pressure stocks. From the perspective of fisheries in the Moray Firth, the EU would only play a key role in the determination of catch restrictions on a relatively limited relevant range of demersal species such as haddock and whiting, pelagic species (i.e herring) and finally shellfish (*Nephrops norvegicus)* which is the only EU quota shellfish species caught in the Moray Firth.

All the remaining species which are caught in the Moray Firth are not governed by quota (although some effort restrictions may apply) – these include – scallop, crab, velvet crab, lobster, whelks, monk / anglers. Therefore, of those species caught in the Moray Firth area in any significant numbers, it is only nephrops and haddock that are managed by EU quota restrictions. For these species the EU will play a lead and active role in determining gear specifications and catch limits, while Marine Scotland could play a supplementary role in non-conflicting management initiatives. For all of the other species caught in anything like significant numbers in the Moray Firth, the EU plays comparatively limited active role (other than generic fleet and gear rules) and any management initiatives would be most likely to come from Marine Scotland.

In practice, the tools available to Marine Scotland to undertake management initiatives are limited. The key statutory instruments available to Scottish ministers are the Inshore Fishing (Scotland) Act 1984, which enables ministers to prohibiting certain fishing activities, and the

Sea Fisheries (Shellfish) Act 1967 which essentially allows areas of seabed (out to 6nm) to become an isolated management unit for shellfish species (either a several or regulating order), with management responsibility passing to a grantee. In the Moray Firth there are only a few applicable management actions, under either of these instruments. As a result, the management for most relevant species in the wider region, is mainly in the form of generic fleet and gear management rather than fisheries specific management.

One exception to this, which applies across Scotland, is dredge fisheries for scallops, which are subject to specific Scottish legislation (The Prohibition of Fishing for Scallops (Scotland) Order 2003), restricting the number of dredges that can be used per side of a vessel.

Local fisheries management

A new management structure is also evolving within the Scottish Inshore Zone; namely Inshore Fishery Groups (IFGs). These are local partnership led groups, designed to provide the fishing industry with a strong and effective voice in shaping management proposals. Although the groups do not have any statutory or regulatory power, management proposals which arise from the groups, and which have the consensus of the wide range of fishery and stakeholder groups are likely to be given favourable consideration by the Scottish Government. The IFGs have sought to develop management plans for inshore fisheries in their area out to 6nm, reflecting local priorities, but also incorporating national goals and obligations. This will be primarily shaped by the Executive committee of the IFG – essentially, commercial fishing interests drawn from Fishermen's Associations, and a spokesperson for non affiliated fishermen – with guidance from the Advisory Group, which comprises of Marine Scotland, Scottish Natural Heritage and other relevant bodies.

The cable route lies entirely within the jurisdiction of the Moray Firth and North Coast IFG.

3.2 CURRENT FISHERIES STATUS

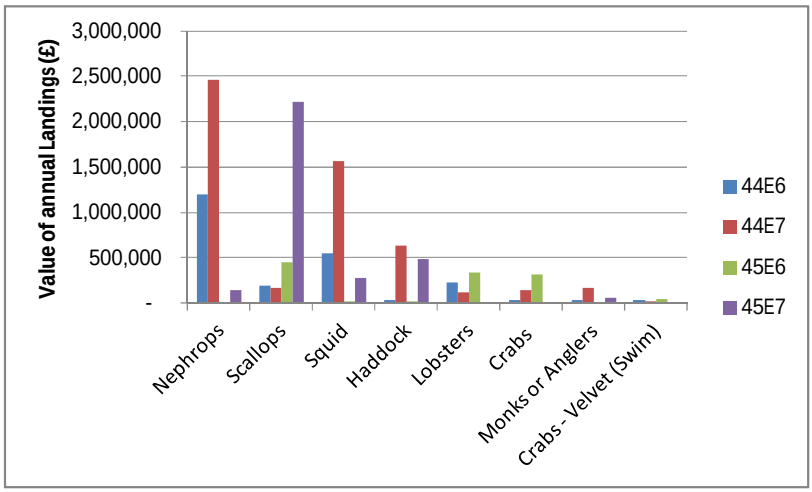
The following section of the report is derived from the Moray Firth Connection Hub & Caithness subsea HVDC Cable Environmental Statement Volume 1, completed by Aquatera Ltd in October 2011, with landings data updated from the 2014 UK landing statistics.

Value of landings

Like most inshore waters around the UK, the Moray Firth supports a diverse and active fishery, with demersal, shellfish and pelagic resources all targeted by a wide range of vessels, many on a seasonal basis. All are regulated by the Scottish Government who gather data on vessel movements (using the satellite based Vessel Monitoring System - VMS) and landings as a key part of their national fisheries management strategy. Voyages and landings data are attributed to ICES statistical rectangles. The Moray Firth comprises rectangles 44E7, 44E6, 45E7 and 45E6 (see figure 1). The cable route crosses all 4 of these statistical rectangles although it is mostly within 45E7, with a lesser proportion crossing 44E7 and only a small overlap in the nearshore with rectangles 44E6 and 45E6.

Data on landings value for 2014 indicates that the total first sale value of catches from the 4 ICES rectangles which make up the Moray First was £12.3 million. Within the Moray Firth, rectangles 44E7 and 45E7 – the outer Moray Firth - are of greatest economic significance, with first sale value of landings of £5.5million and £3.2 million respectively. In terms of first sale value, the Nephrops mobile gear fishery (in particular in rectangle 44E7 – the North Moray Coast) is the most important at over £3.8 million, followed by the scallop dredge fishery (in particular in rectangle 45E7 – the Outer Moray Firth) at over £3 million and the squid trawl fishery at nearly £2.5 million (see figure 3).

Figure 3: Chart of value of landings of different (main) species within the Moray Firth (2014).



In terms of first sale value it can also be seen that the inshore fleet (under 10m vessels) account for a far smaller share of landings value (see figure 4), however, purely reviewing first sale value may underestimate the relative importance of the inshore fleet in terms of local employment and local economic benefits.

Figure 4: Chart of relative contribution of over and under 10m vessels to landed value in the Moray Firth (2014).

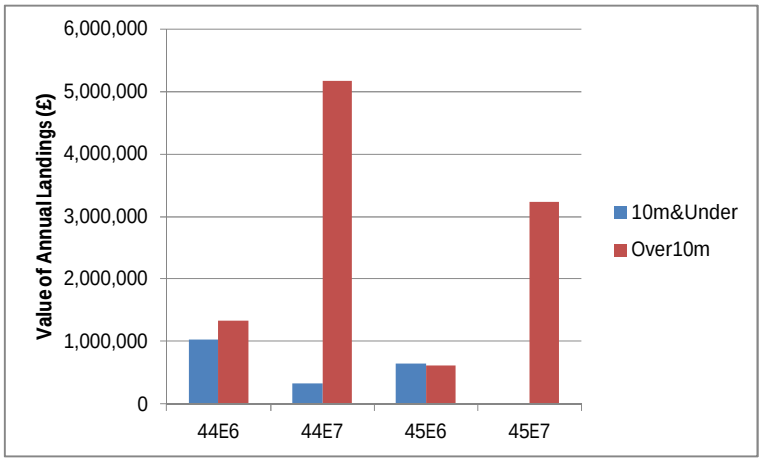
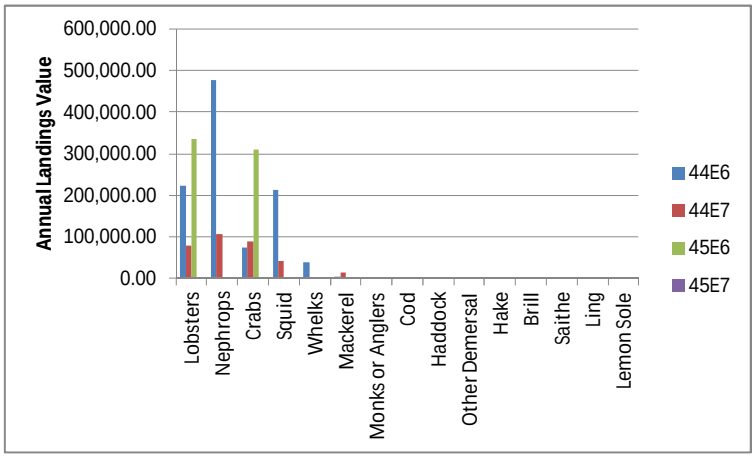


Figure 5: Chart of species landed value for the under 10m fleet in the Moray Firth (2014).



For inshore (under 10m fisheries) the key fisheries are for high value shellfish such as lobster, Nephrops, crab and squid (figure 5). The majority of inshore landings are from pots and creels. In particular there is an important static gear inshore fishery for crab and lobster in rectangle 45E6 (i.e. on the Caithness Coast). However, it cannot be assumed that there is a simple division of under 10m vessels using static gears and over 10m using mobile gears, as there is also significant catches of Nephrops and squid in 44E6 (the inner Moray Firth).

The squid fishery targets the long-finned squid *Loligo forbesi*. Its spatial pattern of abundance varies seasonally; hence the fishery is a seasonal one, with spring catches in the outer Moray Firth, and summer/autumn catches along the southern coast of the Moray Firth between Lossiemouth and Fraserburgh. The catch peaks round September/October.

Spatial Distribution of Fishing Effort

Detailed knowledge of where shellfish are caught is more difficult to monitor since the smaller vessels (<12m length) engaged in static gear shellfisheries are not fitted with VMS equipment. As part of the investigations to inform the 2011 Environmental Statement, Aquatera sought information from the Scottish Fishermen's Federation, the Moray Firth Inshore Fisheries Group and the Wick Harbour office. These are described below. Additionally, since that time, further improved spatial data has become available for under 15m vessels from the Marine Scotland 'ScotMap' project[1] (these are provided in Appendix 1).

A quick analysis has also been carried out of the UK Fishing fleet registry[2]. This data is divided into under 10m and over 10m UK vessels registers. There are challenges in interpreting the UK vessel registry as this does not give an indication of the level of vessel activity, nor does the 'Administrative Port' or 'Homeport' always provide an accurate and up to date indication of actual base of the vessel, far less fishing location. For under 10m vessels, it is perhaps more likely that homeport will be a useful proxy indicator for fishing location, given that these vessels are less likely to be highly mobile.

The two closest homeports to both inshore areas of the cable route are Wick, in Caithness and Buckie, in Moray. The UK fleet register shows 5 under 10m vessels with a registered homeport of Wick and 44 under 10m vessels with a registered homeport of Buckie. In practice, initial consultations indicate that the level of inshore fishing at the southern end of the cable route (near Portgordon) is likely to be less than indicated by the registered Buckie

[1] http://www.gov.scot/Topics/marine/science/MSInteractive/Themes/ScotMap
[2] https://www.gov.uk/government/collections/uk-vessel-lists

inshore fleet size, whereas the level in the northern end of the cable route (near Noss Head) maybe slightly greater than indicated by the registered Wick inshore fleet. This illustrates the need for caution in interpreting the fleet registry and the need for effective local consultation.

For the over 10m fleet, the fleet registry may be a less useful indicator of vessels fishing patterns, given their ability to travel greater distances to fish. Nonetheless, this indicates 19 over 10m vessels with a registered homeport of Buckie and 3 with a registered homeport of Wick. Adding other Moray Firth ports, such as Lybster, Macduff, Burghead and Whitehills, results in an overall Moray Firth resident over 10m fleet of 38 vessels[3]. Interestingly however, out of these 38, only 4 have shellfish licences (which would be required to trawl for Nephrops) and 3 have scallop licences (which would be required for scallop dredging), even though we know these to be important elements of overall catches in the study area. This is an indication that vessels with registered homeports outside of the Moray Firth are likely an important contributor to overall landings.

By contrast and more qualitatively, it was estimated by the 2011 Aquatera impact study that approximately 40 to 50 creel boats are currently working the Moray Firth north coast, although not all of these are likely to be full-time fishermen. Approximately 30-40 trawlers work the outer Moray Firth, most of which are greater than 15m length. This study also undertook a comparison of 2009 government records of voyages for vessels >15m length with the total number of voyages[4]. This indicated that the majority of fishing vessel activity within the study region was undertaken by vessels without VMS equipment (mandatory on vessels over 15m at the time of the study). For example, data from ICES rectangle 45E7 in 2009, shows a total of 225 vessels with catch within the 12 mile limit, of which only 86 were above 15m; thus 139 were smaller boats (<15m). This suggests that though larger vessels contribute the highest first sale landings value, in terms of vessel numbers and vessel activity smaller vessels are likely to be most likely to interact with the cable route.

There is no separation of static and mobile gear in the Moray Firth, but fishermen work together within the mixed waters. While static gear is laid out all year round, there are many more boats deploying strings of creels in the summer months than winter, and they are joined by dredges of all sizes for the intense summer scallop fishery.

3.3 IMPACT ON FISHERIES

The following section of the report is derived from the for the Moray Firth Connection Hub & Caithness subsea HVDC Cable Environmental Statement Volume 1, completed by Aquatera Ltd in October 2011, although this has been substantially updated and amended where necessary.

The proposed cable route will unavoidably cross some important fishing grounds in the Moray Firth, including demersal trawl grounds, scallop grounds and inshore shellfish grounds. The principal fishing activity along the cable route is dredging for scallops (*Pecten maximus*) in the central part of the Firth and trawling for *Nephrops norvegicus* (Dublin bay prawns or langoustines), particularly in the waters just offshore of the southern and northern ends of the cable. Potting activity is concentrated in inshore waters close to the cable landfalls targeting shellfish such as lobster (*Homarus gammarus*), brown crab (*Cancer pagurus*) and *Nephrops*.

[3] This does not include the 70 over 10m vessels with a registered homeport of Fraserburgh, but which is more distant from the cable route.

[4] This analysis was not repeated at the time of this updated impact assessment, partly because since that time the ScotMap project has provided greater insight into the level of inshore activity.

The potential effects of the project on the commercial fishing industry, which have been considered as part of this assessment include direct loss of earnings due to loss of fishing grounds, or through biological impacts on target species leading to a fall in landings or a loss of product quality. Slightly more indirect, but still none the less potentially important impacts include the effect on other fishing grounds of displaced fishing effort, and the effects on the fleet of any direct contact between fishing vessels or fishing gear and project infrastructure.

In all cases these potential effects apply, to a greater or lesser degree during installation and operation. Additionally, these potential impacts apply to a variety of fleet sectors – ranging from local inshore vessels to large vessels.

Simple analysis of the following potential impacts has been undertaken, using the methodology described in section 2 of this report:

Installation:

1. Impact of exclusion from fishing grounds during installation.
2. Impact of displacement of fishing effort during installation.
3. Impact of physical interaction between installation works and fishing gear
4. Impact of biological changes (abundance / range / behaviour) of target species

Operation:

5. Impact of Exclusion from fishing grounds post installation
6. Impact of displacement of fishing effort
7. Impact of physical interaction between fishing gear and cable asset
8. Impact of biological changes (abundance / range / behaviour) of target species

In the following pages, each of these impacts is discussed in turn, highlighting the ‘Magnitude of Impact’, the ‘Sensitivity of Receptor’ (i.e. fishing) and the resulting ‘Significance of Impact’. Supporting justification is provided and, where deemed appropriate, proposed mitigation is outlined. In all cases, further detail on the exact approach to these mitigations is set out in the supporting Fisheries Liaison and Mitigation Action Plan (FLMAP).

1. Impact of exclusion from fishing grounds during installation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
Medium	Medium	Minor

Proposed Mitigation

- A Fisheries Liaison Manager (FLM) has been appointed by SHETL
- Effective liaison with industry will be maintained with clear communication (further details provided in the FLMAP).
- Ensure an efficiently managed installation programme to minimise timespan.
- Minimise time between trenching, cable laying and recovering.

Justification

- To most commercial mobile fisheries in the area, loss of access to the cable installation route is not anticipated to lead to a change in earnings. A safe navigational passage will be maintained both into and out of the Moray Firth, therefore the only loss of grounds will be in the immediate vicinity of the cable route. In all cases, productive grounds for the same target species are widely dispersed away from the cable route. The magnitude of effect is therefore generally considered to be medium, and the resulting impacts are considered to be minor and will not lead to levels of impact deemed to be significant – with no impact of fleet size, employment patterns and no discernible change in landing patterns above natural variability.
- The cable emergence points are located some distance from shore and outside the main creel potting areas which concentrate along the rock/sand interface, nearer to shore. However, the works at the borehole and cable laying near the coast may have potentially increased level of impact to a small number of creel fishing vessels working the close inshore areas. This is particularly in the cases where creel fishermen are required to move their pots during the installation process to less productive nearby grounds. However, no creel boat will have all of it's gear on the cable route and it will not lead to any reduction in fleet size.
- With timely liaison and advance notice of planned sea area restrictions (facilitated by the proposed mitigation measures), it is anticipated that the residual effects on fishing, particularly to coastal creeling, will be reduced.
- It is anticipated that through effective communication and the proposed mitigation measures, the loss of access to fishing grounds will lead to changes within normal business variability, corresponding to a low magnitude effect.

2. Impact of displacement of fishing effort during installation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
Medium	Medium	Minor

Proposed Mitigation

- A Fisheries Liaison Manager (FLM) has been appointed by SHETL
- Effective liaison with industry will be maintained with clear communication (further details provided in the FLMAP).
- Ensure an efficiently managed installation programme to minimise timespan.
- Minimise time between trenching, cable laying and recovering..

Justification

- Any displacement of effort caused by installation would be short lived – the installation phase is planned to last 9 months. The area of potential fishing affected by the installation works will be small, therefore the amount of displaced effort will be similarly small and given the intensity of fishing in adjacent waters any activity which would theoretically displaced, would have a low level of detectability.
- Those mobile vessels that are displaced, would typically fish elsewhere in the wider area for most of the year anyway, so it would only be their occasional fishing in the study region which might be displaced. The resulting increase in effort in the wider area would be insignificant and perhaps undetectable.
- For static gears, any pot gear which would be required to move during installation would likely move to grounds which is not currently occupied by other local pot fishermen. Therefore overall effort would remain unchanged.
- Given the low level of vessels that would be displaced and that those vessels could choose to fish in a wide variety of alternative places - all already actively fished it is anticipated that the displacement of effort would be largely undetectable against the variations in fishing levels in the alternative fishing grounds in the wider area.

3. Impact of physical interaction between installation works and fishing gear		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
Medium	Medium	Minor

Proposed Mitigation

- A Fisheries Liaison Manager (FLM) has been appointed by SHETL
- Effective liaison with industry will be maintained with clear communication (further details provided in the FLMAP).
- Provision of guard vessels during the construction works to prevent access by fishing vessels to the working area
- Fishing vessels should not encroach within 1 mile of installation works.

Justification

- All installation will be carried out following the project safety plan, which includes latest best practice measures such as appropriate equipment handling procedures; securing of materials on deck to prevent loss overboard; and containment of wastes on board vessels for appropriate disposal on return to port. This will safeguard against any loss of equipment which could pose a hazard to navigation.
- There remains a theoretic potential for impact between fishing gear and installation works. Vessels fishing close to the cable installation may be exposed to increased risk of gear coming in to contact with installation, for example in event of mechanical problems, resulting in the vessel drifting with the tide.
- This small risk of contact between fishing gear and the installation work would be unlikely cause detectable change in fleet patterns and any change would be both spatially and temporally restricted. Any change in behavior resulting from the apparent risk of contact would not result in a detectable change in overall landings in the wider area, and would not affect the overall number of fishing days.
- This is a low risk, with very few vessels exposed to the risk of contact between gear and construction works. Such contact would only be the result of rare mechanical failure, on a rare occasion when a vessel was fishing immediately uptide or up wind of the installation site. The consequence of any such contact is unlikely to cause significant damage to the fishing vessel or gear - but may cause delay to construction operations.

4. Impact of biological changes (abundance / range / behaviour) of target species during installation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
Medium	low	Negligible

Proposed Mitigation

- None required

Justification

- The direct biological impacts of construction were explored earlier in the licencing process. The consequences of any such biological changes are likely to be highly localised and small. Any impacts of noise, water chemistry, sedimentation patterns, turbidity may, as a worst case scenario impact some species in the immediate cable area, however, these are most likely to be benthic infauna which would cause stock level changes in any commercial fish species. Any such impacts (if any) would be reversible within a generation of any affected species.
- Fishing patterns are unlikely to be affected by changes to species abundance, range or behaviour resulting from installation works. In the unlikely event of changes in the quality of 'fishing' in the close vicinity of the cable route (reduced catches or poorer catch quality), then any such changes could at worst lead to less fishing in the study region, but would have no overall impact at the wider area level or on overall fleet size or landings.
- If there was a biological impact from installation this would likely be localised to the development site. If this change was detectable in catch composition or quality, then this would only affect a small number of vessels in the rare times when fishing closest to the cable route. If the change in catch composition was sufficient to lead to a revised fishing strategy (i.e. fishing elsewhere or targeting different stocks), it is unlikely that the change in fishing patterns or landings would be detectable above background variations.

5. Impact of Exclusion from fishing grounds during operation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
High	Medium	Minor

Proposed Mitigation

- Clear and effective communication of post-installation chart coordinates as detailed in the FLMAP
- Cable emergence points extended away from the shore to reduce potential for impact on inshore potting vessels

Justification

- Once the cable is installed and charted, there should be no trawl/dredge fishing activity over it (Subsea Cables UK "strongly advise against any type of fishing, whatsoever, where there is a known and charted cable"). This reflects the core legal principles relating to fishermen's responsibilities to avoid fouling and/or damaging submarine cables, set out in The United Nations Convention on the Law of the Sea (UNCLOS) 1982. In domestic legislation, further detail is provided in the Submarine Telegraph Act 1885, updated by the Merchant Shipping Act 1995, and the Telecommunications Act 1984.
- The only grounds actually closed to fishing during the operational phase would be immediately either side of the cable, which will be closed to fishing for the whole life of the project. This would mostly affect mobile demersal fisheries for nephrops and scallops, and to a lesser extent finfish, but would be less likely to affect pelagic or static gear fisheries.
- Inshore potting vessels would be expected to resume potting activities in close proximity to the cable route (in particular as the cable emergence points are located some distance from shore and outside the main creel potting areas which concentrate along the rock/sand interface, nearer to shore).
- The cable route occupies a small area of seabed compared to the available fishing grounds. The loss of the cable route fishing ground will not lead to any change in fleet size. This would not lead to a detectable change in landings or effort.
- Although a small corridor either side of the cable will be closed, this area is representative of the wider area so that the change of effort to other local fishing grounds will have no impact on fleet landings, fleet size or fishing activity - therefore is of only minor significance.

6. Impact of displacement of fishing effort during operation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
High	Medium	Minor

Proposed Mitigation

- Clear and effective communication of post-installation chart coordinates as detailed in the FLMAP
- Cable emergence points extended away from the shore to reduce potential for impact on inshore potting vessels

Justification

- Once the cable is installed and charted, there should be no trawl/dredge fishing activity over it (Subsea Cables UK "strongly advise against any type of fishing, whatsoever, where there is a known and charted cable"). This reflects the core legal principles relating to fishermen's responsibilities to avoid fouling and/or damaging submarine cables, set out in The United Nations Convention on the Law of the Sea (UNCLOS) 1982. In domestic legislation further detail is provided in the Submarine Telegraph Act 1885 and the Telecommunications Act 1984.
- This therefore has the potential to displace some fishing effort, potentially creating knock-on impacts on other fishing grounds.
- Any displacement of effort would be from a very small area (the cable route) and the displaced effort would be spread over the wider area. Any impact would last the lifetime of the project. Although given the small area closed to fishing, the amount of displaced effort will be similarly small.
- The amount of effort displaced into adjacent grounds will be small, with affected vessels already spending the majority of their fishing time in adjacent waters. This fractionally increased effort in adjacent waters will be largely undetectable and will have no detectable impact on stock status of target stocks in adjacent waters (no decrease in CPUE).
- Although the impact may be long lasting and widespread - it will be largely undetectable against background variations in landing patterns, and will not create a significant impact.

7. Impact of physical interaction between fishing gear and cable asset		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
High	Medium	Minor

Proposed Mitigation

- Cable burial to 1m (utilising either excavated arisings or rock or a combination of both)
- Cable protection with rock placement at emergence points. Rock berms will be designed to incorporate shallow approach and departure angles.
- Post installation survey and periodic inspection.
- Promoting cable awareness to fishermen (full details set out in the FLMAP – including publication of cable coordinates to UK Hydrographic Office and Kingfisher Information Service, meaning that on-board digital chart software will contain details of cable location).

Justification

- The presence of any seabed cables creates a potential hazard to fishing gear. The risk of snagging can arise where cables lie exposed and perhaps even proud of the seabed, where the sediment has eroded away or cables have expanded and risen up out of the seabed.
- Once the cable is installed and charted, there should be no trawl/dredge fishing activity over it (Subsea Cables UK "strongly advise against any type of fishing, whatsoever, where there is a known and charted cable").
- The potential risk of impact between fishing gear and cable will exist throughout the whole lifecycle of the project, and although risk of contact will be restricted to the cable route, concern over the potential for impact may influence fishing patterns in a wider region. This may lead vessels to adjust fishing patterns if concerned about snagging the cable. However, all larger mobile gear vessels which would be most at risk of cable snagging have highly sophisticated digital chart software and GPS and this will enable the vessels location in relation to the cable to be clearly known at all times. In addition, the cable is buried (minimum 1m) therefore even in event of a vessels passing over the cable route, entanglement remains a low risk.
- Although the risk of impact may lead to a moderate change in fishing patterns, the small percentage of overall fishing time that would be affected means the overall effect would be of low significance. The overall fleet pattern of landings would be unchanged and individual vessel incomes should be largely unaffected.
- The implementation of the mitigation measures outline above should reduce the risk of fishing gear snagging on the cables.

8. Impact of biological changes (abundance / range / behaviour) of target species during operation		
Magnitude of Impact	Sensitivity of Receptor	Significance of Impact
Medium	Low	Negligible

Proposed Mitigation

- None required

Justification

- The direct biological impacts of the cable route were explored earlier in the licencing process. The consequences of any such biological changes are likely to be highly localised and negligible. There will be no noise, and no changes in water chemistry, sedimentation patterns, or turbidity. Therefore there are not anticipated to be any biological impacts on commercial fish species detectable at a stock level.
- No changes in species abundance, range or behaviour are anticipated as a result of cable operation. Therefore there will be no impact in the overall quality of 'fishing' such as reduced catches in the wider area or poorer catch quality.

4 CONCLUSION

The overall impacts of the proposals on fishing which have been considered relate to the loss of access to fishing grounds, impacts of displaced fishing effort on nearby grounds, safety issues associated with the presence of the offshore cables / installation works and biological impacts on fish stocks creating a knock-on impact on economic returns. In all cases these apply during installation and during cable operation.

It should be noted that this assessment explores the impact of this cable alone. No attempt has been made to determine the cumulative impact of all known cable and subsea installations, which overtime are likely to create an increasing level of potential impact on the fishing industry. This is considered to be outside of the remit of this particular report or SHET ltd.

In all cases an assessment of the scale of impact, coupled with fishing industry sensitivity to the impact results in a significance of impact rated no higher than “minor”. In some cases the scale of impact alone was considered to be high – however this was largely as a result of the long operational timespan of the cable and the wide spatial extent over which impact (however negligible) could potential occur. However, when coupled with ‘sensitivity’ (i.e. likelihood of creating detectable changes in fleet landing patterns, landings or fleet size) the resulting significance of impact was reduced.

A number of mitigation measures will be implemented to ensure safety and to minimise adverse impacts as a result of loss of access to fishing grounds. For each of the impacts which resulted in a ‘minor’ significance score, mitigation measures are stipulated. Full details on these mitigation measures are set out in the FLMAP. As a result, residual effects on fishing from the proposals are considered to be minor, and not significant.

In all cases it is anticipated that the presence of the cable will not lead to a significant change in vessel operating costs or vessel landings. None of the fisheries that are exploited along the cable route are narrowly spatially restricted and all operate over a much wider area. The larger offshore vessels target the fisheries using mobile gears. Therefore there is scope for effort to be accommodated by other extensive grounds on either side of the cable route, at no extra cost to the vessel. This would be unlikely to lead to any reduction in catch rates, income or employment.

For the inshore waters, the active creel fishery has a greater and more frequent overlap with the cable route. Given the more territorial nature of static gear fisheries, where gear in the water secures a patch of seabed for a given vessel, there is a potential that a small number of operators may be required to move fleets of creels to less favourable waters during installation.

Set against these potential costs, SHE Transmission considers that the project will have a long-term socio-economic benefit to the local communities and to the country as a whole as illustrated below.

Temporary construction jobs (circa 4 years duration) created on the project:

- Spittal Substation: 50 No.
- Spittal Converter: 150 No.
- Blackhillock Converter: 150 No.
- Caithness land cable: 50 No.
- Moray land cable: 50 No.
- Subsea cable: 50 No.

APPENDIX 1 – SCOTMAP CHARTS

Fig. A1: Chart of cable route and scallop dredge intensity

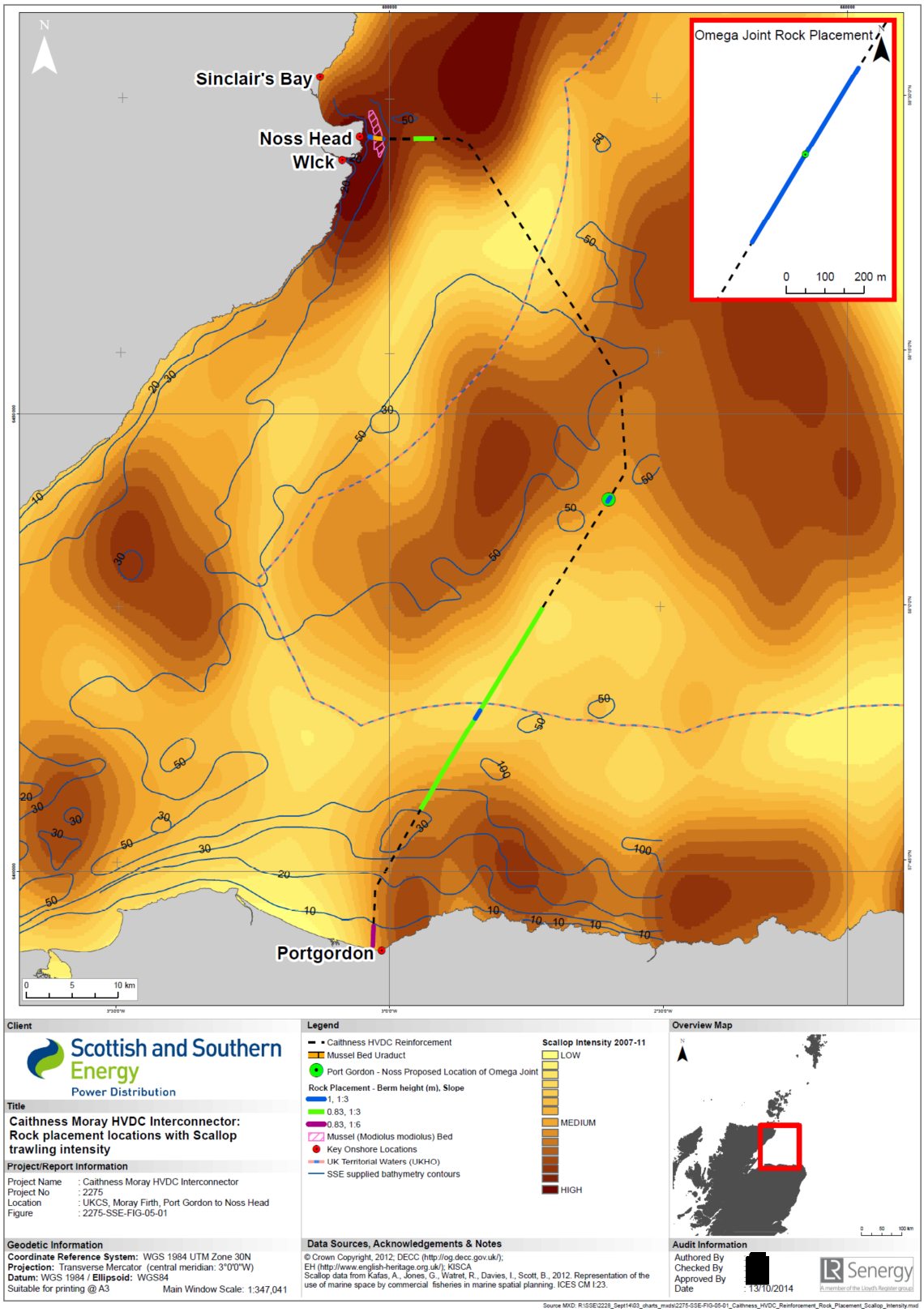


Fig. A2: Chart of trawl landings value

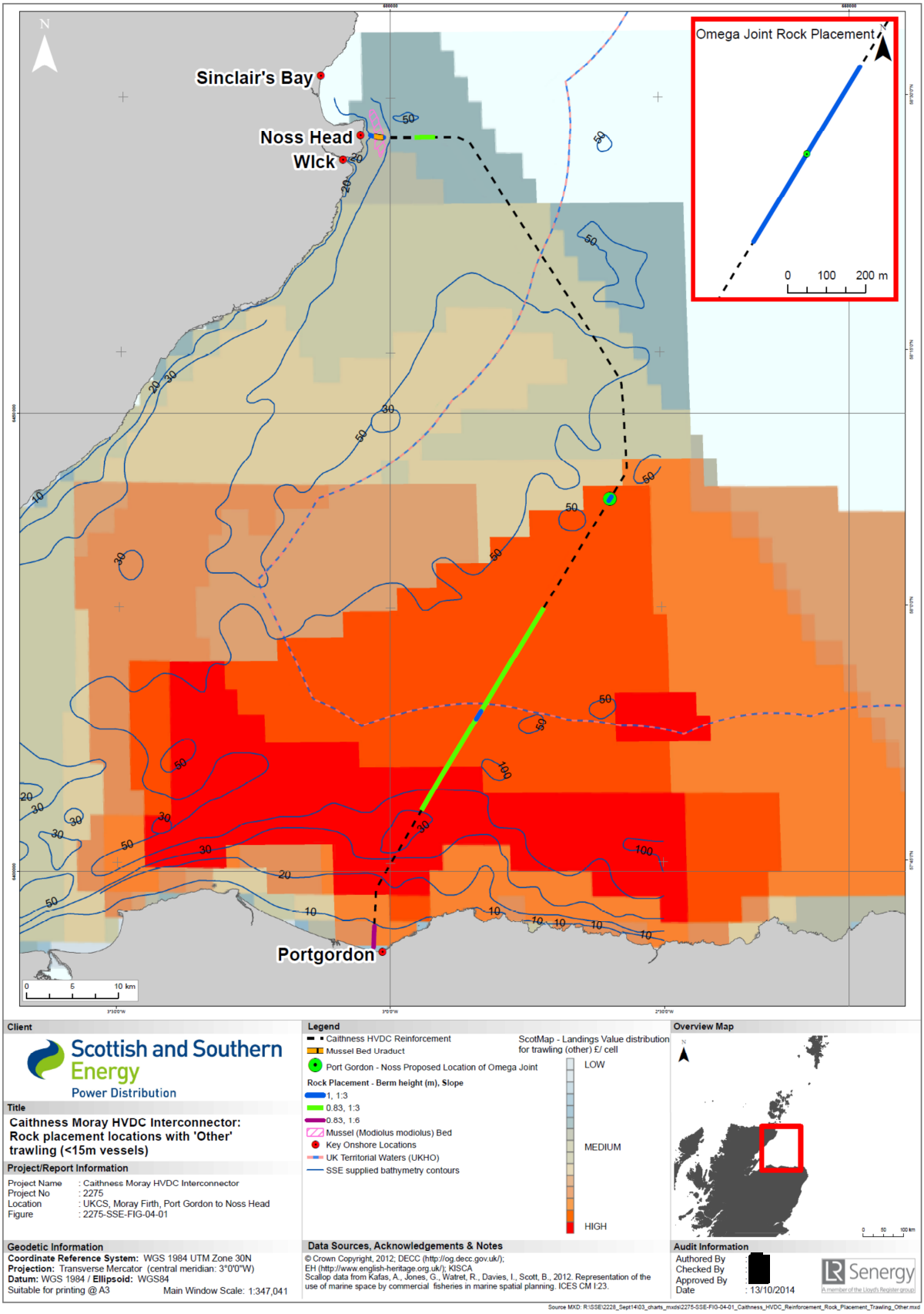


Fig. A3: Chart of Nephrops trawl landings value

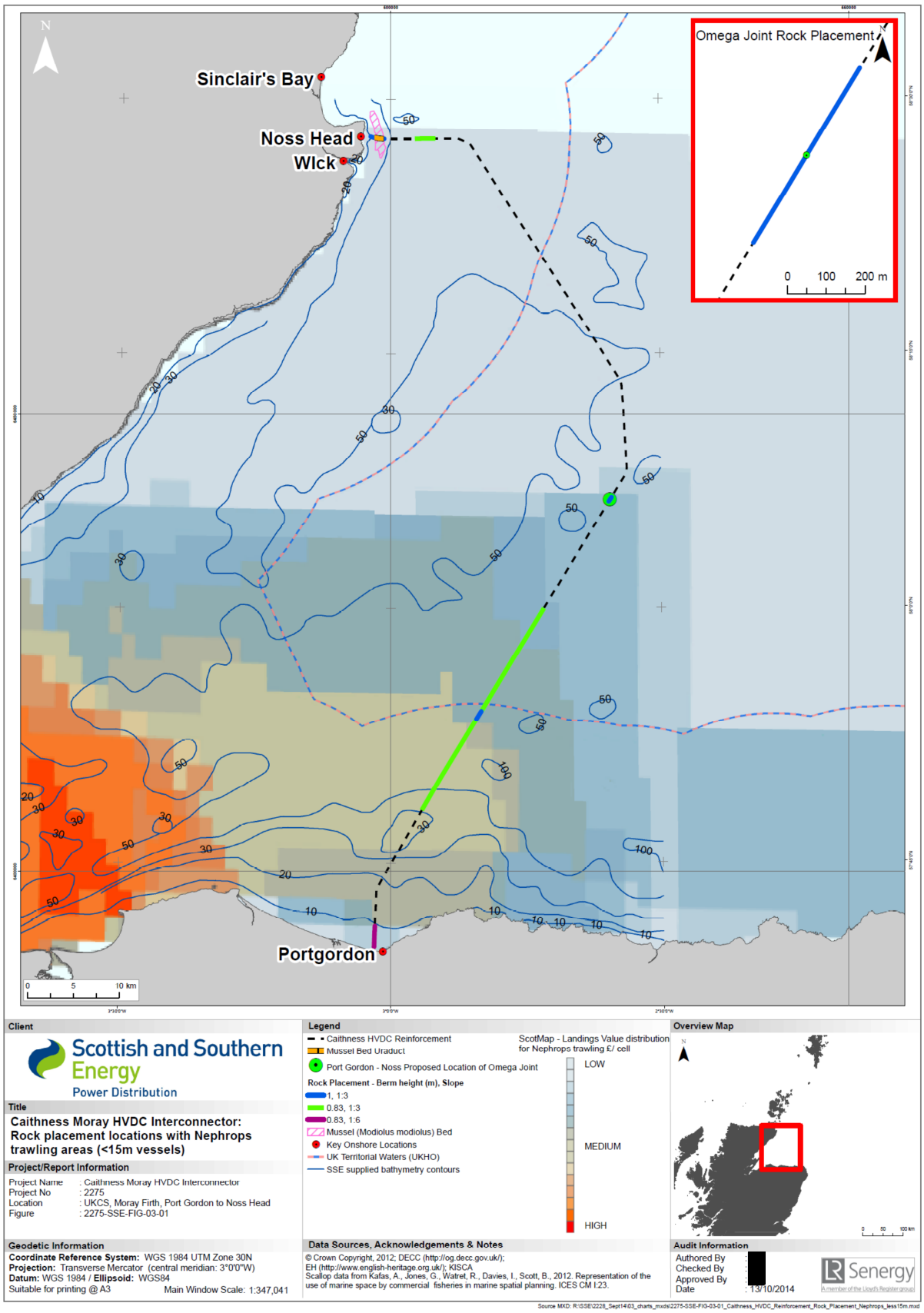
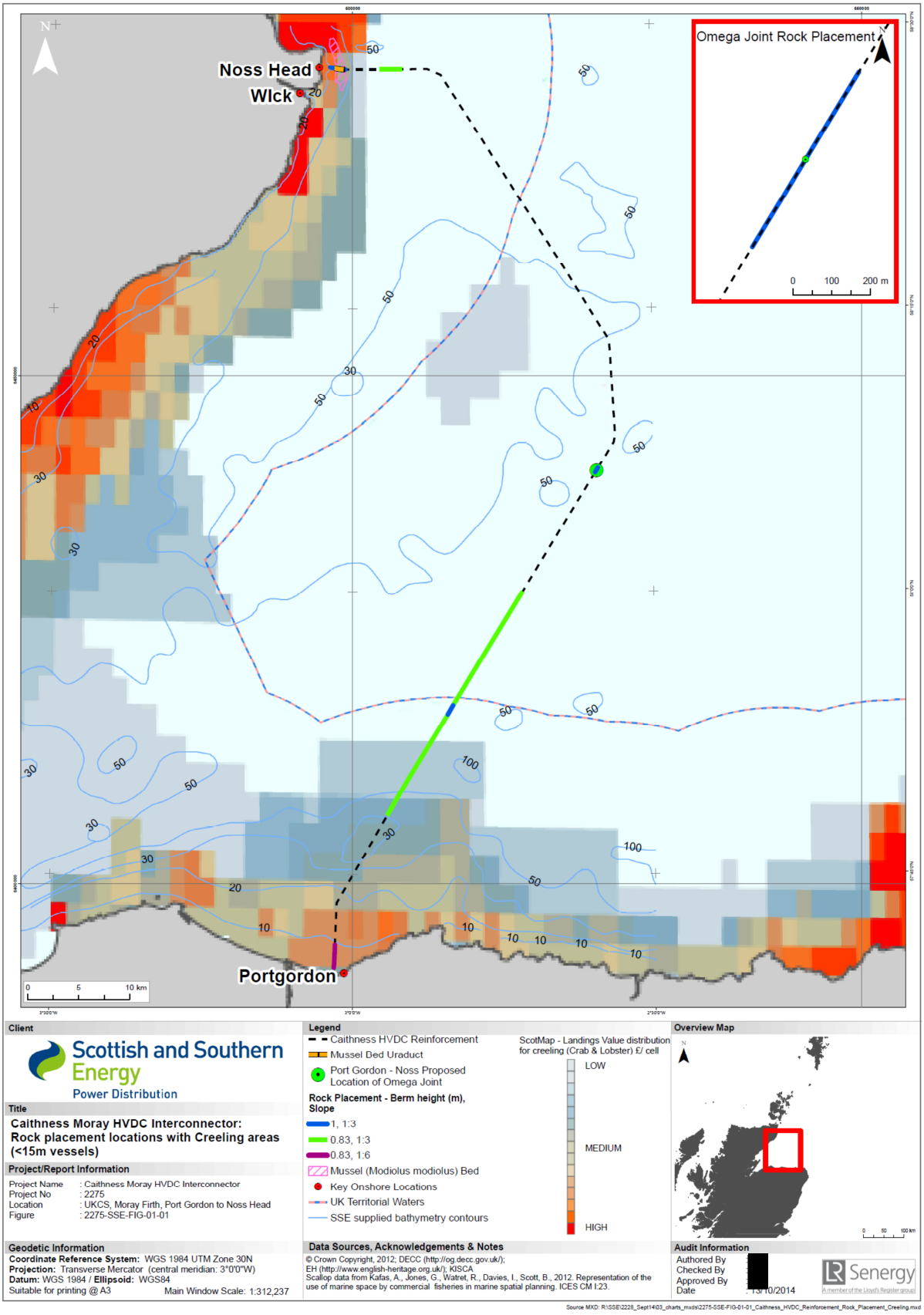
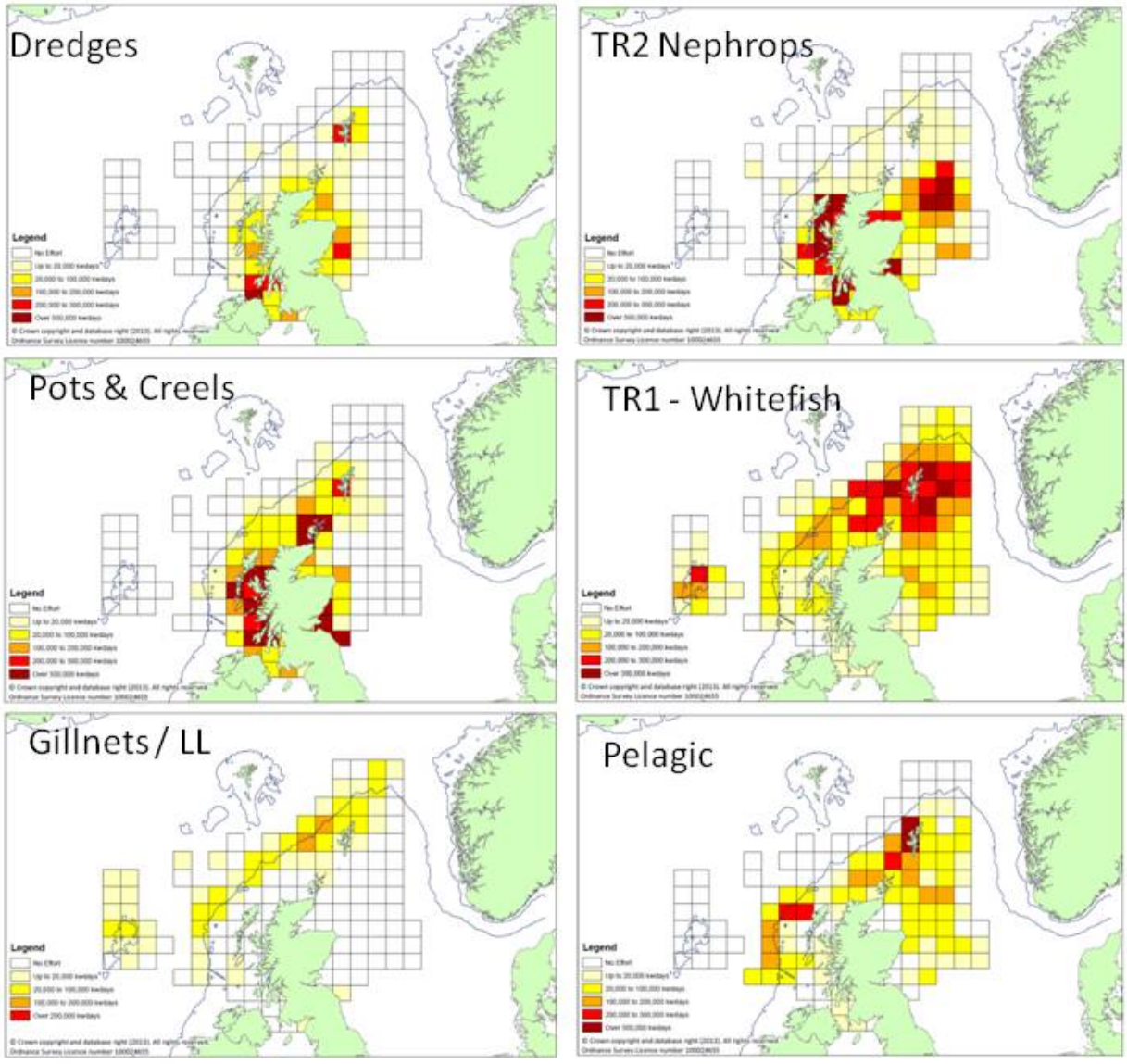


Fig. A4: Chart of Landings Value Distribution of creel fisheries (crab & lobster)



APPENDIX 2 – FISHING EFFORT CHARTS

The following charts show fishing effort in 2012 per ICES rectangle for UK vessels in Scottish waters[5].



[5] These are available to view online at: http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/Datasets/DistributionMaps/2012maps