MARINE ENERGY WALES

MARINE ENERGY TEST AREA (META)

Environmental Impact Assessment

Chapter 11:
Commercial Fisheries

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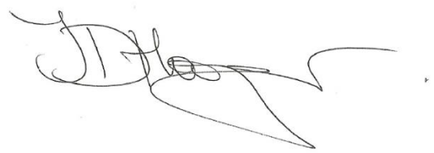

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Glossary

Term	Definition
Anadromous	Migrating up rivers from the sea to spawn.
Automatic Identification System	A system used in commercial fishing to allow environmental and fisheries regulatory organizations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels.
Catadromous	Migrating down rivers to the sea to spawn
Cefas	A marine and freshwater science research centre
Gear type	The method/equipment used for fishing.
Gill net	Fishing net set vertically in the water so that fish swimming into it are entangled by the gills in its mesh.
ICES statistical rectangles	Defined areas, 1-degree longitude x 0.5-degree latitude equalling approximately 30 x 30 nm used for fisheries statistics.
Industrial fishery	Highly mechanised commercial fishing operations whose ultimate products are principally fishmeal and fish oil.
Landings	Quantitative description of amount of fish returned to port for sale, in terms of value or weight.
Otter trawl	A net with large rectangular boards (otter boards) which are used to keep the mouth of the trawl net open. Otter boards are made of timber or steel and are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, pushes them outwards and prevents the mouth of the net from closing.
Pelagic	Of or relating to the open sea.
Pelagic trawl	A net used to target fish species in the mid water column.
Scallop dredge	A method to catch scallop using steel dredges with a leading bar fitted with a set of spring loaded, downward pointing teeth. Behind this toothed bar (sword), a matt of steel rings is fitted. A heavy net cover (back) is laced to the frame, sides and after end of the mat to form a bag.
Spawning	The act of releasing or depositing eggs (fish).
Steaming	Commercial fishing vessel in transit to fishing grounds.
Stock assessment	An assessment of the biological stock of a species and its status in relation to defined references points for biomass and fishing mortality.
String	A series of static fishing gear (pots) joined together to form a single deployable linear line of pots.
Total Allowable Catches	Total Allowable Catches are catch limits, expressed in tonnes or numbers that are set for some commercial fish stocks.

Acronyms

Acronym	Description
AIS	Automatic Identification System
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CIA	Cumulative Impact Assessment
DEFRA	Department for Environment, Food and Rural Affairs
EC	European Commission
EMP	Environmental Management Plan
EU	European Union
EIA	Environmental Impact Assessment
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authorities
META	Marine Energy Test Area
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MOD	Ministry of Defence
MPCP	Marine Pollution Continency Plan
MCZ	Marine Conservation Zone
NPS	National Policy Statement
NRW	Natural Resources Wales
PDE	Project Design Envelope
Spp.	Species
UK	United Kingdom
WFA	Welsh Fishermen's Association
WFSA	Welsh Federation of Sea Anglers
WMFAG	Welsh Marine Fisheries Advisory Group
WWSFA	West Wales Shellfisherman's Association

Units

Unit	Description
€	Euro
£	Great British pound
hours	hours
kg	kilograms
km	kilometres
kw/hr	Kilowatt/hour

Unit	Description
m	metres
mm	millimetres
NM	Nautical Mile
tonne	Metric Tonne

11. COMMERCIAL FISHERIES

11.1 Introduction

11.1.1.1 This chapter of the Environmental Statement presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the META project on commercial fisheries. Specifically, this chapter considers the potential impact of the offshore component of META project during its installation, operation and maintenance, and decommissioning phases.

11.1.1.2 For the purpose of this chapter, commercial fishing is defined as any form of fishing activity legally undertaken for taxable profit. Recreational fishing is addressed in chapter 16: Other Users. Navigational aspects related to fishing vessels are addressed in chapter 12: Shipping and Navigation. The assessment presented is informed by the following technical chapters:

- Chapter 8: Fish and Shellfish; and
- Chapter 12: Shipping and Navigation.

11.2 Purpose of this chapter

11.2.1.1 The primary purpose of the Environmental Statement is to support the marine consents for the META project, which are outlined in chapter 1: Introduction.

11.2.1.2 It is intended that the Environmental Statement will provide statutory and non-statutory consultees with sufficient information to determine the potential significant impacts of the META project on the receiving environment and will inform the issue of appropriate consent and/or licences by the regulatory authorities. It will also inform any consent conditions.

11.2.1.3 In particular, this Environmental Statement chapter:

- Presents the existing environmental baseline established from desk studies, and consultation;
- Presents the potential environmental effects on commercial fisheries arising from the META project, based on the information gathered and the analysis and assessments undertaken;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

11.2.2 Study area

11.2.2.1 The port of Milford Haven is considered a major port within the Department of Environment, Food and Rural Affairs (DEFRA) network of commercial landings recording. Statistics for the major ports are published annually by DEFRA, and for the major sea areas defined by the International Council for the Exploration of the Sea (ICES). The ICES and DEFRA landing and fishing effort data is sufficient to provide a high degree of confidence in the commercial fisheries baseline characterisation. Whilst the study area overlaps with ICES rectangles 31E4 and 31E5 (Figure 11.1~~Figure 11.1~~), these rectangles have not been included within the baseline characterisation due to insufficient number of days fished or due to minimal overlap with the commercial fisheries study area. Inclusion of these ICES rectangles may result in an unrealistic assessment as a result of skewed analysed data on the study area and META sites.

11.2.2.2 The commercial fisheries study area overlaps with ICES rectangles 32E4 (34,150,000,000 m^2) and 32E5 (1,220,000,000 m^2). For context, the commercial fisheries study area is 1,739,760,000 m^2 (37.5% of 32E4 and 32E5 combined) and broken down by site: Dale Roads (site 7; 195,565 m^2) and East Pickard Bay (site 8; 1,230,000 m^2) combined overlap with 32E4 by 0.042%, and Warrior Way (site 6; 93,000 m^2) area overlaps with 32E5 by 0.0076%, resulting in a total overlap of 0.0328% for both ICES rectangles by the META project (Figure 11.1~~Figure 11.1~~).

11.2.2.3 Commercial fishing can be spatially and temporally variable, and primarily dependent on fish stocks, therefore, for the META project commercial fisheries EIA the following study area was identified (Figure 11.1~~Figure 11.1~~):

- The commercial fisheries study area – this was defined as the area encompassing the META phase 2 sites, and the area in the immediate vicinity of the intertidal area. The study area will also include the upper reaches of the Milford Haven waterway (hereafter referred to as the Waterway), the western and eastern Cleddau rivers, Daugleddau, Milford Haven waters, and all associated tributaries, extending from the mouth of the Milford Haven, between St Govan's Head and Skomer Island, out to 12 NM.

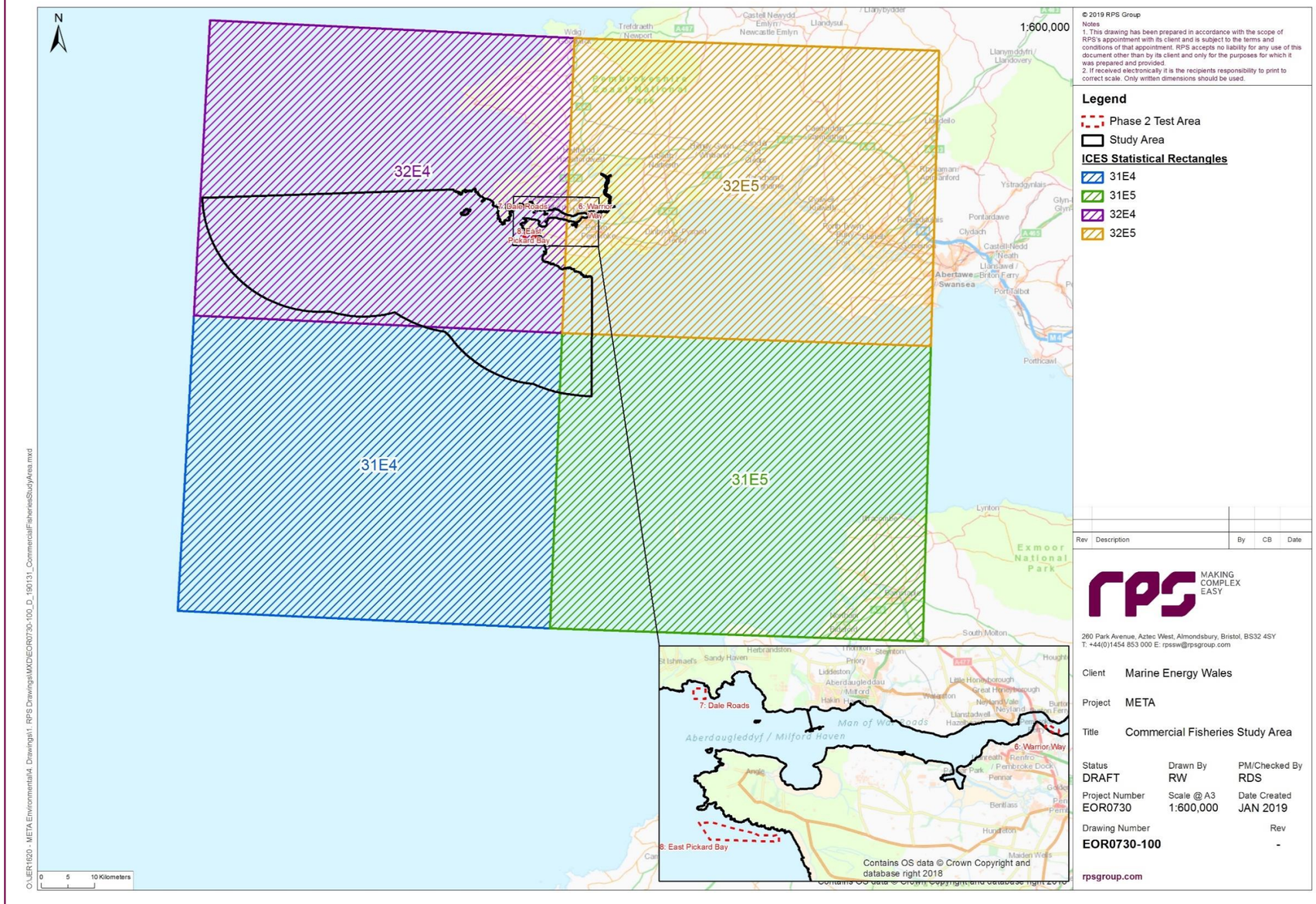

Figure 11.1: The commercial fisheries study area for the META project (inset) and showing the location of Warrior Way (site 6), Dale Roads (site 7), and East Pickard Bay (site 8) within the Waterway, and the associated ICES Statistical Rectangles.

11.3 Policy context

11.3.1 National Policy Statements

11.3.1.1 Planning policy on renewable energy infrastructure, specifically in relation to commercial fisheries, is contained in the overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3, DECC, 2011b). How the META project has considered and complied with the UK Marine Policy Statement and the Draft Welsh National Marine Plan has been considered in chapter 3: Needs and Alternatives, Tables 3.1 and 3.2 respectively, and have not been reiterated here.

11.3.1.2 NPS EN-3 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 11.1~~Table 11.1~~.

11.3.1.3 NPS EN-3 also highlights several factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 11.2~~Table 11.2~~ below.

Table 11.1: Summary of NPS EN-3 provisions relevant to commercial fisheries.

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
Consultation	
Early consultation should be undertaken with statutory advisors and with representatives of the fishing industry which could include discussions of impact assessment methodologies. Where any part of a proposal involves a grid connection to shore, appropriate inshore fisheries groups should also be consulted (paragraph 2.6.127 of NPS EN-3).	Engagement with the local and regional industry over the period May 2017 to present (see section 11.4).
Where a number of offshore marine projects have been proposed within an identified zone, it may be beneficial to undertake such consultation at a zonal, rather than a site-specific, level (paragraph 2.6.128 of NPS EN-3).	Consultation has been undertaken both at a site-specific level and over a wider study area (see section 11.4).
Baseline data	
Robust baseline data should have been collected and studies conducted as part of the assessment (paragraph 2.6.129 of NPS EN-3).	In addition to recent official landings and surveillance data and data from published reports have been used to establish baseline data (see section 11.6).
Safety zones	
Where there is a possibility that safety zones will be sought around offshore infrastructure, potential effects should be included in the assessment on commercial fishing (paragraph 2.6.130 of NPS EN-3).	The need for safety zones has been considered by the navigational risk assessment (NRA) which has been completed for the META (chapter 12: Shipping and Navigation, Appendix 12.1). The NRA results have been taken into account within the commercial fisheries assessment (section 11.10 *et seq.*). Consultation has also been undertaken with the Maritime and Coastguard Agency (MCA) (see chapter 12: Shipping and Navigation).
Where the precise extents of potential safety zones are unknown, a realistic worst-case scenario should be assessed. Applicants should consult the MCA (paragraph 2.6.131 of NPS EN-3).	
It is assumed there would be a safety zone around marine renewable devices during installation, operation and maintenance and decommissioning at each META project site.	

Table 11.2: Summary of NPS EN-3 policy on decision making relevant to commercial fisheries.

Summary of NPS EN-3 policy on decision making	How and where considered in the Environmental Statement
Commercial fisheries	
The Local Planning Authority should be satisfied that the site selection process has been undertaken in a way that reasonably minimises adverse effects on fish stocks, including during peak spawning periods and the activity of fishing itself (paragraph 2.6.132 of NPS EN-3).	The site selection process has been discussed in chapter 3: Needs and Alternatives, with fishing activity in section 11.6.2 *et seq.* and spawning periods in chapter 8: Fish and Shellfish.
The Local Planning Authority should consider the extent to which the proposed development occupies any recognised important fishing grounds and whether the project would prevent or significantly impede protection of sustainable Commercial Fisheries or fishing activities (paragraph 2.6.132 of NPS EN-3).	The extent to which META impacts on recognised fishing grounds has been considered and consultation with fishing stakeholders has taken place in order to fully understand any potential impacts (see section 11.4).
The Local Planning Authority should be satisfied that the applicant has sought to design the proposal having consulted representatives of the fishing industry with the intention of minimising the loss of fishing opportunity taking into account effects on other marine interests (paragraph 2.6.133 of NPS EN-3).	
Mitigation for commercial fisheries	
Any mitigation proposals should result from the applicant having detailed consultation with relevant representatives of the fishing industry (paragraph 2.6.134 of NPS EN-3).	Consultation is integral to the assessment of impact on commercial fisheries for META. META consultation with UK stakeholders from the fishing community is on-going (see section 11.4). Embedded mitigation is also provided in section 11.9.

11.4 Consultation

11.4.1.1 A summary of the key issues raised during consultation specific to commercial fisheries is outlined below, together with how these issues have been considered in the production of this Environmental Statement chapter.

11.4.1.2 Table 11.3~~Table 11.3~~ below summarises the issues raised relevant to commercial fisheries, which have been identified during consultation activities undertaken to date. Table 11.3~~Table 11.3~~ also indicates either how these issues have been addressed within this Environmental Statement or how the Applicant has had regard to them.

Table 11.3: Summary of key consultation issues raised during consultation activities undertaken for the META project relevant to fish and shellfish.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
03/05/2017	Welsh Government (Phil Marshall) – Personal communications	Potting level is high with in the Waterway with gill nets present.	No issued raised, however, loss of 'fishing opportunity' will be assessed in section 11.10.2.20
22/08/2017 & 31/1/19	West Wales Shellfisherman's Association - engagement with representatives	No issues raised.	No response given.
		Potting and angling in the Waterway and spider fish crabbing in sandy areas of East Pickard Bay	Loss of fishing opportunity to be assessed in section 11.10.2.20
09/11/2018	Welsh Marine Fisheries Advisory Group (WMFAG) and the Welsh Fishermen's Association (WFA) – introductory meeting for feedback	Potential loss of 'fishing opportunity'	Potential loss of 'fishing opportunity' will only occur during the installation of devices within the consented area. This has been considered further in section 11.10.2.20
20/11/2018	Welsh Federation of Sea Anglers – Discussion of META sites	All deployments are marked, and angling community notified	Measures adopted as part of the project will ensure a 'Notice to Mariners' will be sent out and all devices will be demarked by buoys. See Table 11.11~~Table 11.11~~.
01/04/2019	NRW – Scoping Opinion	The report identifies which impact pathway have been scoped in and the justification for that. However, those impact pathways that have been scoped out have not been included so it is difficult to determine if everything has been considered.	Impact of accidental pollution scoped out in commercial fisheries but assessed in Fish and Shellfish. Text added to Table 11.7~~Table 11.7~~ chapter 11: Commercial Fisheries to justify. Obstruction of fishing vessel transit routes is scoped out as it is deemed to be covered under chapter 12: Shipping and Navigation.
01/04/2019	NRW/MMO - Scoping Opinion	The Environmental Statement submitted must demonstrate consideration of the points raised in this scoping opinion. It is recommended that a table is provided in the Environmental Statement summarising the scoping opinion comments and how they are addressed in the Environmental Statement.	Table 11.3~~Table 11.3~~ provides the key consultation issues raised through consultation.
01/04/2019	NRW/MMO - Scoping Opinion	No comments were received from consultees in relation to commercial fisheries and we have no comment to make on this section of the report. The Environmental Statement should however include an assessment of impacts on commercial fisheries, as set out in the scoping report.	The ES includes an assessment of impacts in section 11.10 *et seq.*

11.5 Methodology to inform the baseline

11.5.1 *Desktop study*

11.5.1.1 Information on commercial fisheries within the commercial fisheries study area was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 11.4~~Table 11.4~~ below.

11.5.1.2 In addition, consultation with Welsh fisheries has been pertinent in both ground-truthing the data sources in Table 11.4~~Table 11.4~~ and understanding temporal and spatial patterns of fishing activity.

Landing statistics

11.5.1.3 Landings data for all species are collected via the European Union (EU) logbooks scheme and recorded by ICES statistical rectangle and stored in the EU Data Collection Framework database, accessible through the EU Joint Research Committee. Landings data have been collated for all ICES statistical rectangles that overlap the commercial fisheries study area, as shown in Figure 11.1~~Figure 11.1~~.

11.5.1.4 Landing statistics for UK registered vessels were obtained from the Marine Management Organisation (MMO) with the following parameters: year; gear type; ICES rectangle; species; landed weight (tonnes) and value (£). This data was collated across nine-year period (2009 to 2017) to ensure reflection of long-term trends. Landing statistics include all landings by that country's nationally registered vessels into the port of Milford Haven. The following parameters were examined: year; gear type; ICES rectangle; species; value (£); and landed weight (tonnes).

Table 11.4: Summary of key desktop reports.

Title	Source	Year	Author
Landings data (ICES rectangles: 32E4 and 32E5)	Marine Management Organisation	2009-2017	MMO
Crab and lobster stock assessments	Cefas	2014	Cefas
Vessel AIS data	ABPmer	2017	ABPmer
Wales Marine Planning Portal	Welsh Government	Compiles a series of relevant data sources	British Crown and OceanWise Ltd.
National Biodiversity Network (NBN) Gateway	NBN Atlas	Compiles a series of relevant data sources	Faber Maunsell and Metoc Plc

Automatic Identification System data

11.5.1.5 All EU fishing vessels (i.e. fishing vessels flying the flag of an EU Member State), and third-party fishing vessels operating in EU waters, that are ≥ 12 m in length, are required to have an AIS on board. This reports the vessels' position to fisheries management authorities, in the case of EU fishing vessels, every two hours. Since 1 January 2012, this obligation has applied to vessels that are ≥ 12 m in length (before 1 January 2012 it applied to vessels ≥ 15 m in length, see Council Regulation (EC) No 1224/2009). However, the MMO does not yet include AIS data for vessels between 12 to 14.9 m within its datasets; therefore, all MMO AIS data (2011 to 2017) presented within this chapter includes vessels that are ≥ 15 m in length.

11.5.1.6 A vessel's range varies due to weather conditions and skipper preferences as well as technical aspects such as power, but it is generally the case that vessels < 12 m in length fish within 20 NM offshore. Vessels ≥ 12 m in length can and do fish further afield, but in recent years many skippers have altered fishing patterns to favour fishing grounds closer to home ports due to increased fuel prices and time at sea restrictions (vessels being permitted a specific number of days at sea). This has particularly affected vessels operating mobile gears with high fuel demands, such as beam trawlers.

11.5.1.7 Although figures mapping AIS data may appear to show inshore areas as having lower (or no) fishing activity compared within offshore areas, this is not the case because AIS data do not include vessels typically operating in inshore area (i.e. typically vessels < 15 m in length). This is particularly important when assessing the activity across the META project. Consultation has been key throughout the EIA process to determine extent and distribution of activity by the < 15 m fleet.

11.5.1.8 The MMO collate AIS data for UK registered vessels by aggregating the number of position plots by general gear type in a grid of ICES rectangles approximately 30 NM x 30 NM. This has been integrated with landings values and landed fish weight. These data have been analysed across a nine-year period from 2009 to 2017.

11.6 Baseline environment

11.6.1.1 This section characterises the existing environment within the commercial fisheries study area in which the META project will be located as illustrated in Figure 11.1~~Figure 11.1~~ and described in section 11.2.2.

11.6.2 Commercially important species

11.6.2.1 Species predominantly caught within the commercial fisheries study area are shellfish and demersal fish species. Pelagic species are primarily caught out with the commercial fisheries study area, although there are small scale fisheries within the Waterway for some pelagic species. Migratory species are caught in low number by sea anglers within the Waterway.

Shellfish

11.6.2.2 The EC Shellfish Waters Directive (79/923/EEC), adopted 30th October 1979, aims to protect or improve shellfish waters in the UK to support shellfish life and growth, therefore contributing to the high quality of shellfish products directly edible by humans. Shellfish harvesting sites are classified from A to C according to the EU Food Hygiene Regulations (852/2004, 853/2004 and 854/2004) implemented in Wales through the Food Hygiene (Wales) Regulations 2006 (SI 2006/31). Grade A sites do not require pre-treatment and grade C sites require intensive purification. A fourth category exists, whereby harvesting is prohibited within these areas (Figure 11.2~~Figure 11.2~~).

11.6.2.3 There are two areas within Waterway that have been designated as shellfish waters under this Directive. The waters within the Carew river were designated shellfish waters from 11th October 1999. The Milford Haven Cleddau (east and western Cleddau rivers) was also designated in 1999, however, following a review of designations in 2003/2004, the area was extended in March 2004 (Figure 11.2~~Figure 11.2~~).

11.6.2.4 Historically, the Waterway has been harvested for wild cockles (*Cardiidae*) and Pacific oyster *Crassostrea gigas* and in recent years the fisheries market has grown to include permits for carpet shell clam *Ruditapes decussatus*, razor clam *Pharidae* spp. and native oyster *Ostrea eduli* (Cefas, 2012). Overall, the large area, diverse marine habitats and sediment types of the Waterway has resulted in colonisation by a variety of shellfish species and, in addition to those species mentioned above, mussel *Mytilus edulis*, lobster *Homarus gammus* and prawn *Palaemon serratus* also occur in the region, some of which have conservation and commercial interests (see section 11.6.4 for landed catches and value of species).

Demersal fish species

11.6.2.5 Flatfish and rays (principally thornback ray *Raja clavata*) are taken in fixed nets, and otter and beam trawls from spring through to the end of the year. Boats using gill nets and otter trawls take cod *Gadus morhua* and whiting *Merlangius merlangus* during the colder months. Large-meshed tangle nets are used for rays and large flatfish such as turbot *Scophthalmus maximus* (Pawson *et al.*, 2002). The ray fishery within the Waterway has expanded since the mid-1980s and is mostly fished by three larger trawlers that work between 3 to 6 NM from shore (Grey, 1995). Beach and beach seine nets set along sandy shores are tended to at low tide and commonly take flatfish such as flounders, dabs and plaice (see section 11.6.3.7 for more information on fishing grounds and gear type used).

Pelagic fish species

11.6.2.6 Adult fish visiting the estuary seasonally to feed include Atlantic mackerel *Scomber scombrus* (August to October) and monkfish *Lophius piscatorius* (summer to autumn). Mullet *Mugil cephalus*, Atlantic herring *Clupea harengus*., plaice *Pleuronectes platessa*, sole *Solea vulgaris*, turbot, brill *Scophthalmus rhombus* and mackerel are taken in the Waterway from the estuary mouth up to the Cleddau bridge using gill and tangle nets (Pawson *et al.*, 2002).

11.6.2.7 The presence of a local race of herring in waters of the Daugleddau (distinguished by its spring spawning habit between February and April with spawning peaking in March), supports a fishery which uses bottom-set gill nets and is centred around Llangwm (Pawson *et al.*, 2002).

11.6.2.8 Gill netting for bass *Dicentrarchus labrax* and mullet (*Mugilidae*) also takes place but, in order to protect salmon and sea trout, it is not permitted upstream of the Cleddau Bridge. An area in Pembroke Bay around the power station outfall is a designated bass nursery area where fishing for sea fish from a boat is prohibited between 1 May and 31 October (see chapter 8: Fish and Shellfish).

Migratory fish species

11.6.2.9 Seven compass nets are licensed to take salmon and sea trout in the upper regions (beyond the Cleddau bridge) of the Waterway from 1 June to 31 August (Walmsley and Pawson, 2007). The Waterway acts as a migration corridor for anadromous[1] species (sea trout *Salmo trutta* and Atlantic salmon *Salmo salmo*) and the catadromous[2] species European eel *Anguilla anguilla* moving in and out of the Cleddau rivers (NRW, 2017). There is an established migratory fishery in both the eastern and western Cleddau rivers, although little specific information is available (Hobbs and Morgan, 1992).

[1] Species that migrate from sea to freshwater environments for spawning.

[2] Species that migrate from freshwater to sea to spawn

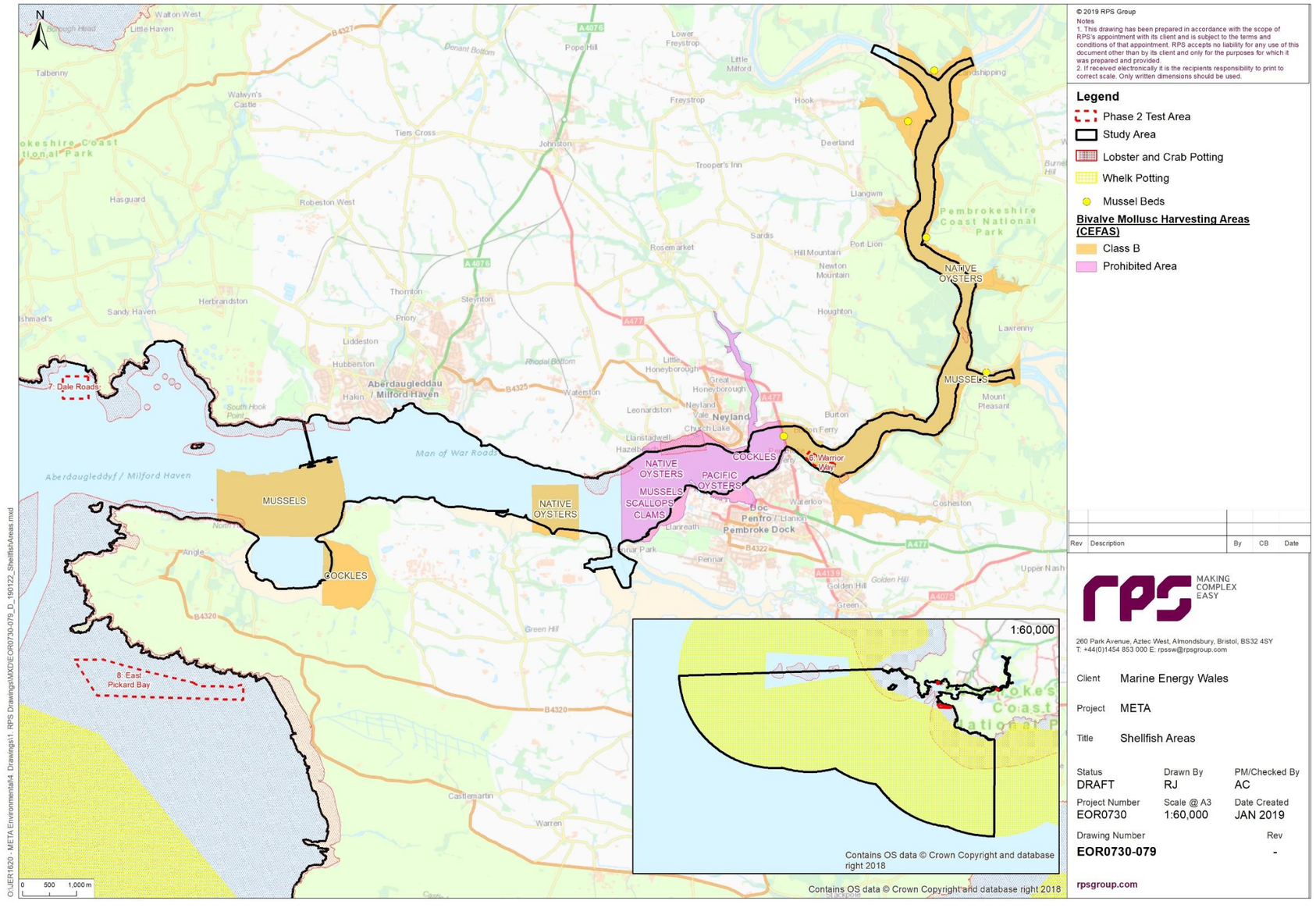

Figure 11.2: Shellfish harvesting areas with EC Shellfish Waters Directive classifications. Species identified which may be harvested within each Class B Bivalve Mollusc Harvesting Area (orange) are listed under each area identified. The area identified as a Prohibited Bivalve Mollusc Harvesting Area (pink), the species listed within this pink area may not be harvested at any time.

11.6.3 Commercial fishing fleet

11.6.3.1 Compared to the rest of the UK, Wales has the largest percentage of boats below ten metres in length and the largest numbers of part-time fishermen (Terry *et al.* 2017). As a result, the Welsh fishery is dominated by small-scale vessels which predominantly fish demersal species and shellfish within the Welsh inshore fishing region, with the most landed species into Welsh ports by UK vessels being shellfish species, including scallops, whelks and crabs (see section 11.6.4 for landings data). The Welsh fishing feet operates from ports all over Wales, with the most active ports including Milford Haven, Fishguard, Holyhead, Saundersfoot and Swansea (Pantin *et al.* 2015).

11.6.3.2 A review undertaken by Walmsley and Pawson (2007) between 2006 to 2007 described an offshore fleet of around 43 British-registered vessels of Spanish ownership or origin, based in Milford Haven port. These boats fish within the commercial fisheries study area, Bristol Channel and south Ireland, and land their catches at Milford Haven (see section 11.6.4 for landings data).

11.6.3.3 Three or four local inshore trawlers, between 8-12 m length, fish within the commercial fisheries study area for demersal fish (Walmsley and Pawson, 2007). One or two vessels dredge for scallops during the winter outside of the restricted area, and set long lines for spurdogs *Squalus* spp., thornback rays, cod, conger eel *Conger* spp. and common ling *Molva molva* (Walmsley and Pawson, 2007). Approximately forty vessels are involved in the potting fishery, with only two vessels >10 m length. The larger vessels are able to set up to 1200 pots, known as 'strings', out to approximately 48 km offshore (Walmsley and Pawson, 2007). Smaller vessels set pots within a few miles of the coast for lobster, brown crab *Cancer pagurus* and velvet crab *Necora puber*, in often crowded fishing space (consultation - Welsh government: Table 11.3~~Table 11.3~~). Many of the <10 m vessels are involved in netting within rocky areas for crawfish (*Astacoidea*) and spider crabs *Maja squinado*.

11.6.3.4 Consultation with local stakeholders has revealed high fishing activity present at the mouth of the Waterway but decreases further up-stream in the Waterway within the commercial fisheries study area. Welsh Marine Fisheries Advisory Group (WMFAG), West Wales Shellfisherman's Association (WWSFA) and the Welsh Fishermen's Association (WFA) indicated that high shellfish potting activity is present along the East Pickard Bay (site 8) coastline, predominately on the rocky outcrops, with some fixed netting. No trawling or drift nets are present within the area. Dale Roads (site 7) has a high volume of coastal fishing activity, mostly shellfish pots. Warrior Way (site 6) has limited fishing and is used predominately by sea anglers. The Welsh Federation of Sea Anglers (WFSA) confirmed casting from shore at East Pickard Bay (site 8), and that fishing activity is common at Soldier Rock on the western side of Lindsway Bay (approximately 550 m west of Dale roads (site 7). Activity at Warrior Way (site 6) is predominately night fishing accessed from the shore-line, no boat-based commercial fishing is present due to tidal activity.

Traditional fishing grounds

11.6.3.5 A review of the Wales Marine Planning Portal identifies several traditional fishing grounds found within the commercial fisheries study area. These include trawling, nets, potting, hand gathering and other (handlining and jigging, commercial rod and line, drift lines, longlining, oyster cultivation, fish cages). For the purposes of this chapter, the 'other' category will be excluded as data is limited for landed take and value of catch.

11.6.3.6 The light otter trawl is a cone-shaped net used throughout the commercial fisheries study area (Figure 11.3~~Figure 11.3~~), the net is towed by small to large vessels (MMO, 2014). 'Wings' are used to keep the mouth of the net open and tickler wires to catch primarily demersal fish species. Heavy beam and larger otter trawls are found to the south and west border of the commercial fisheries study area along the 12 NM territorial waters boundary. Light otter trawl can only be used on open areas of sandy-gravelly sediment as rocky substrate would result in the snagging of the equipment.

11.6.3.7 Three types of nets are used within the commercial fisheries study area, these are bottom set, beach and beach seine nets (Figure 11.4~~Figure 11.4~~). Bottom set nets utilise weights and floats with a fine mesh net to catch demersal species. Beach and beach seine nets are predominately used close to shore within the intertidal to subtidal areas and can be deployed by hand or via boat. The net utilises weights and floats to create an area to entrap mainly fish species within the inshore area, nets can be deployed on all substrate types. Shellfish are rarely caught using this method as there is sufficient room under the net for shellfish species to escape.

11.6.3.8 Pots are deployed within the commercial fisheries study area to target certain shellfish including lobster, crab species, whelk (*Buccinidae*) and prawn species (Figure 11.5~~Figure 11.5~~). Pots are generally barrel shape, made of varying material with an invaginated cone opening to permit lobsters entering but prevent them escaping and can be species specific, subject to mesh type and the size of the opening used. Pots are generally deployed over rocky substrate where crabs and lobsters have a preference for rocky reef habitat (Howard and Bennett, 1979). There is a small prawn potting site found approximately 130 m to the north of Warrior Way (site 6) and is approximately 18,000 m^2 (Figure 11.5).

11.6.3.9 Hand gathering is present within specific areas of the Waterway and at Freshwater West bay, subject to access to sites and dependent on tides (Figure 11.6~~Figure 11.6~~). Hand gathering includes the take of cockles, mussels *Mytilus edulis*, periwinkles *Littorina littorea* and razor clam. This fishery occurs within the intertidal regions of the Waterway, where individuals are able to reach the fishing grounds i.e. water depth or tidal movements may restrict individuals from harvesting shellfish.

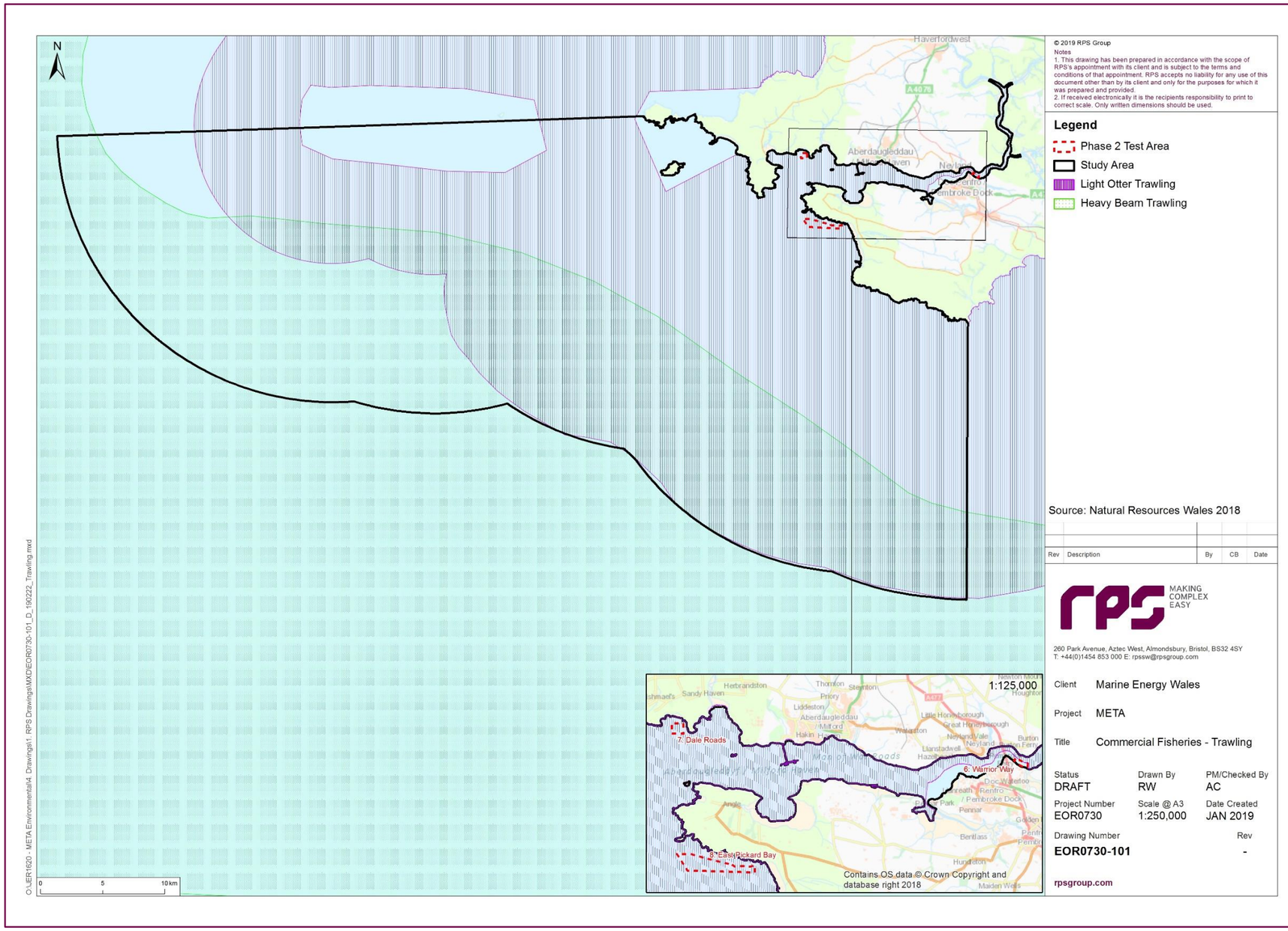

Figure 11.3: Commercial trawling gear used throughout the commercial fisheries study area.

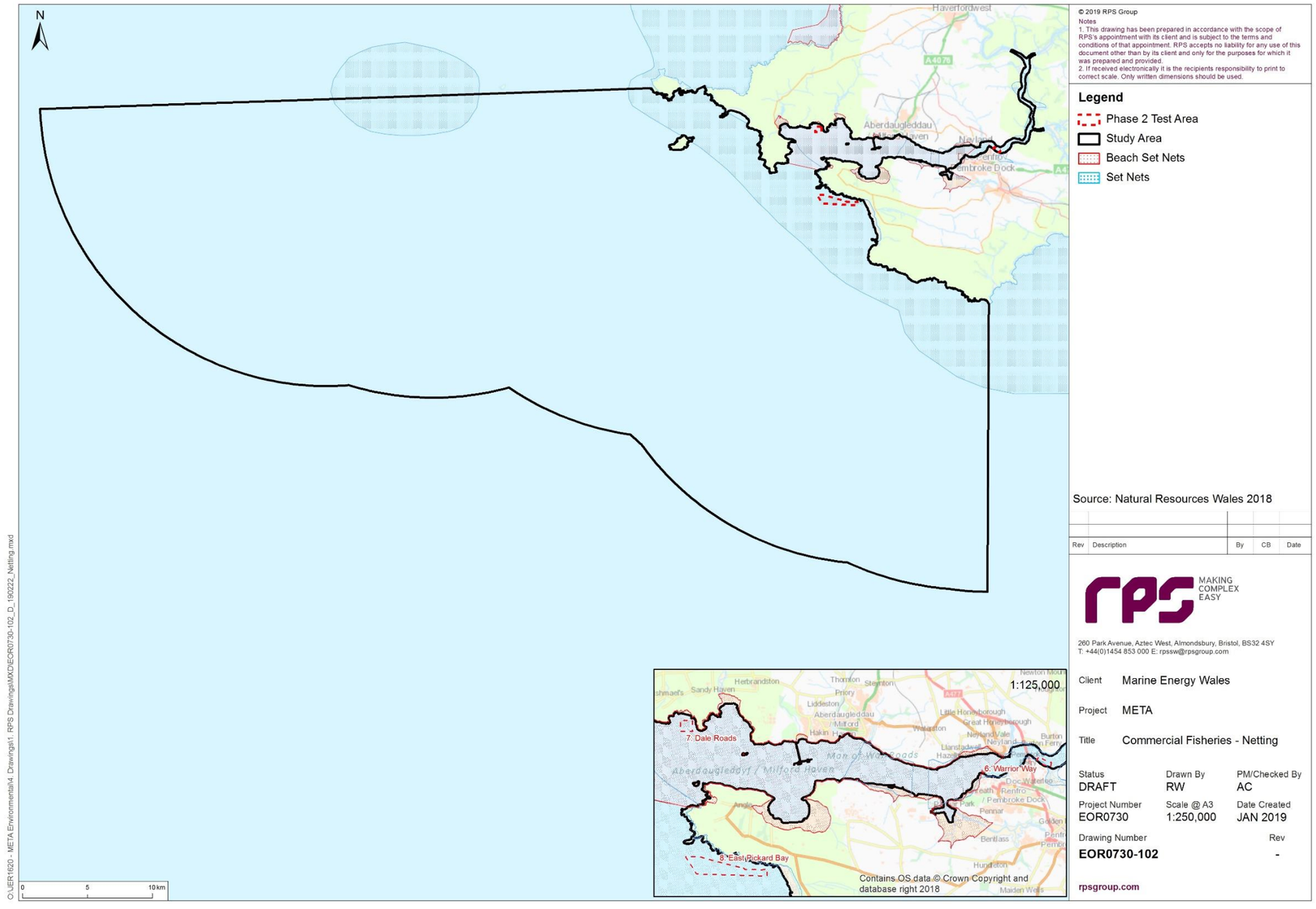

Figure 11.4: Commercial netting gear used throughout the commercial fisheries study area.

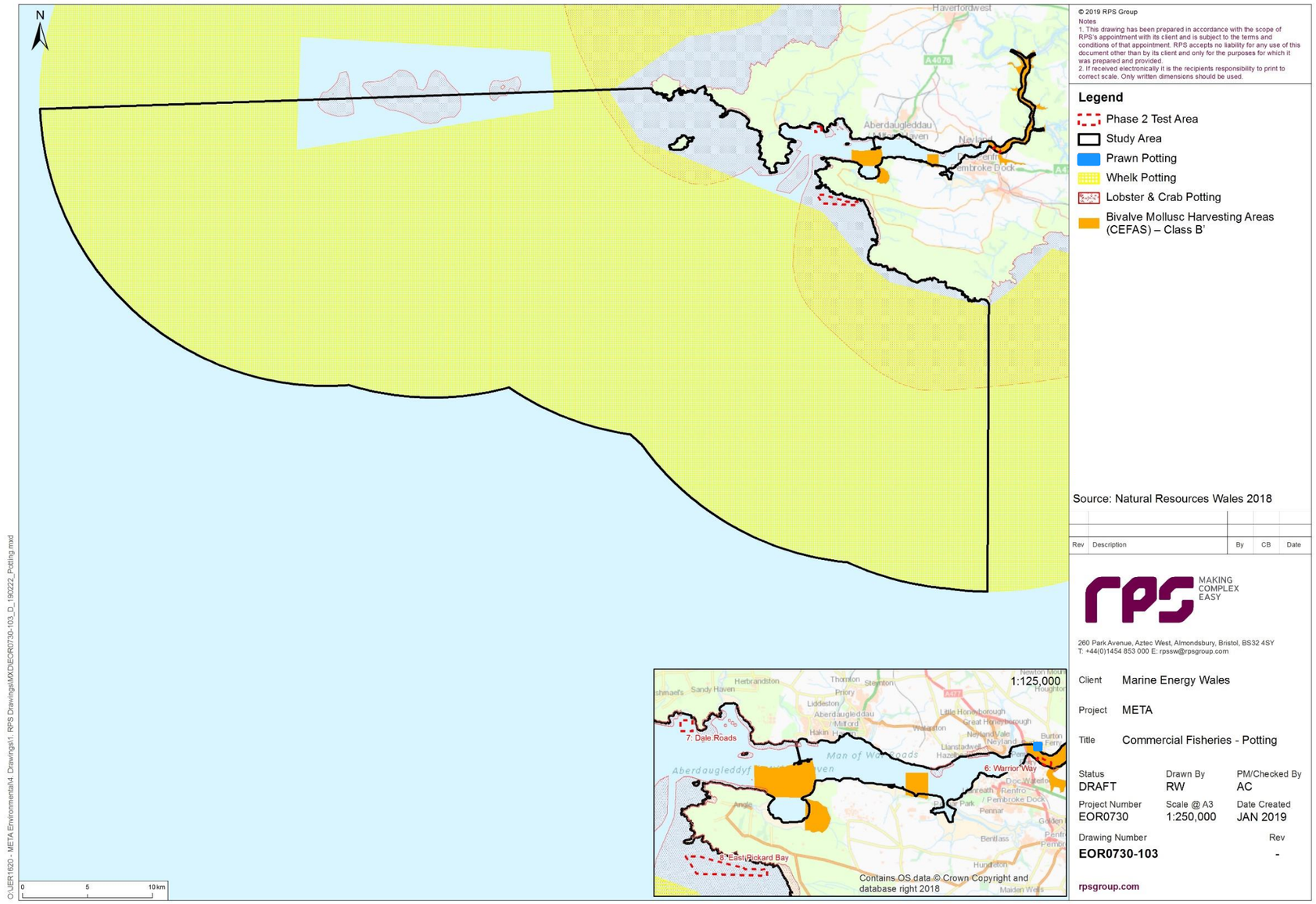

Figure 11.5: Commercial potting gear used throughout the commercial fisheries study area.

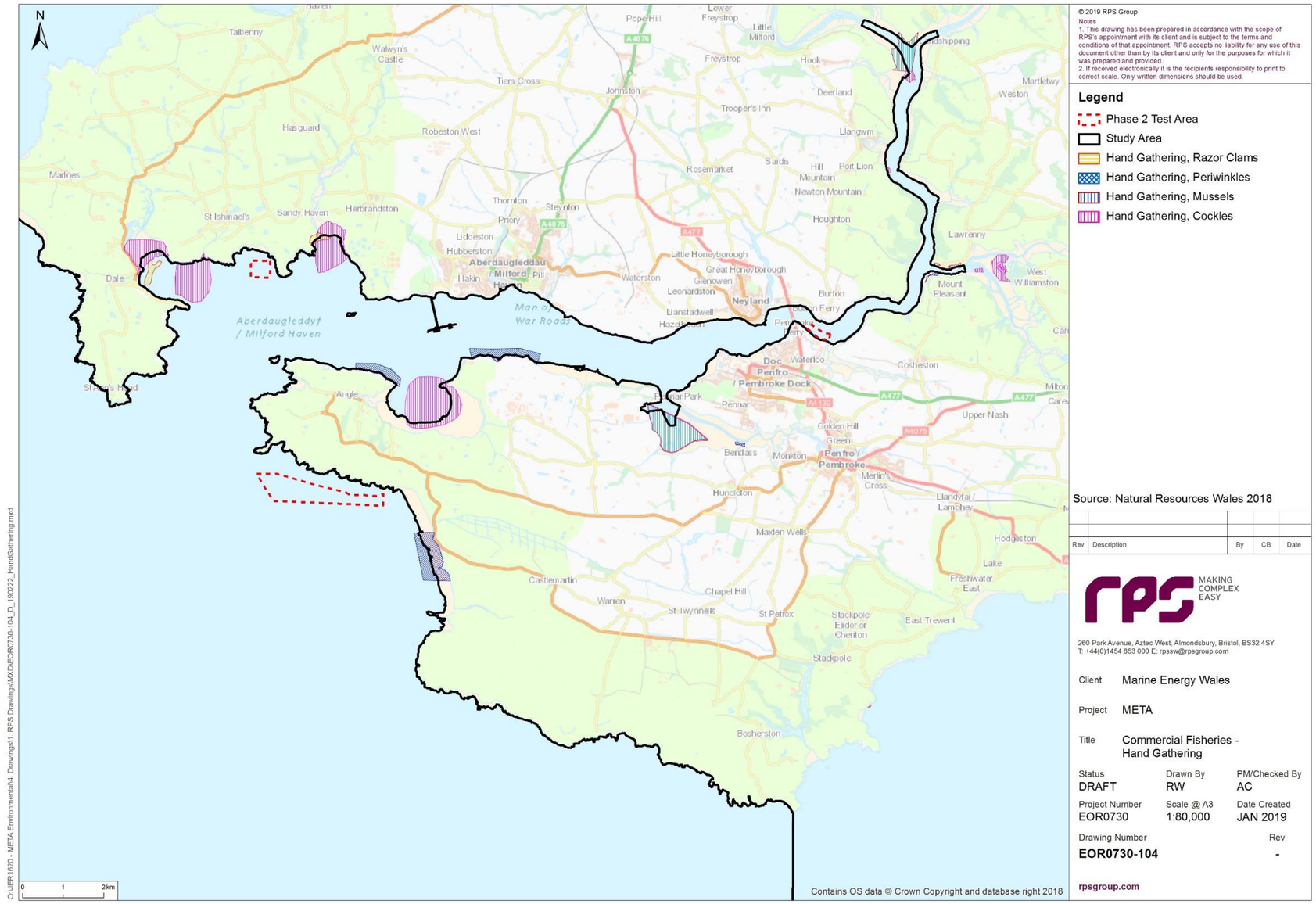

Figure 11.6: Commercial hand gathering locations within the commercial fisheries study area.

11.6.4 Landings activity

11.6.4.1 The total fish and shellfish landed weight across the commercial fisheries study area by year (Figure 11.7~~Figure 11.7~~) indicates a consistent level of catch (tonnes) from 2010 – 2017, with 2009 representing the introduction and implementation of the Marine Coastal Access Act 2009. The Marine Coastal Access Act 2009 established an independent body, the 'Marine Management Organisation'. This organisation has defined UK marine areas, introduced a new system of marine planning and provided greater fisheries enforcement powers for the purposes of enforcing sea fisheries legislation resulting in a more consistent landed weight from 2010 onwards.

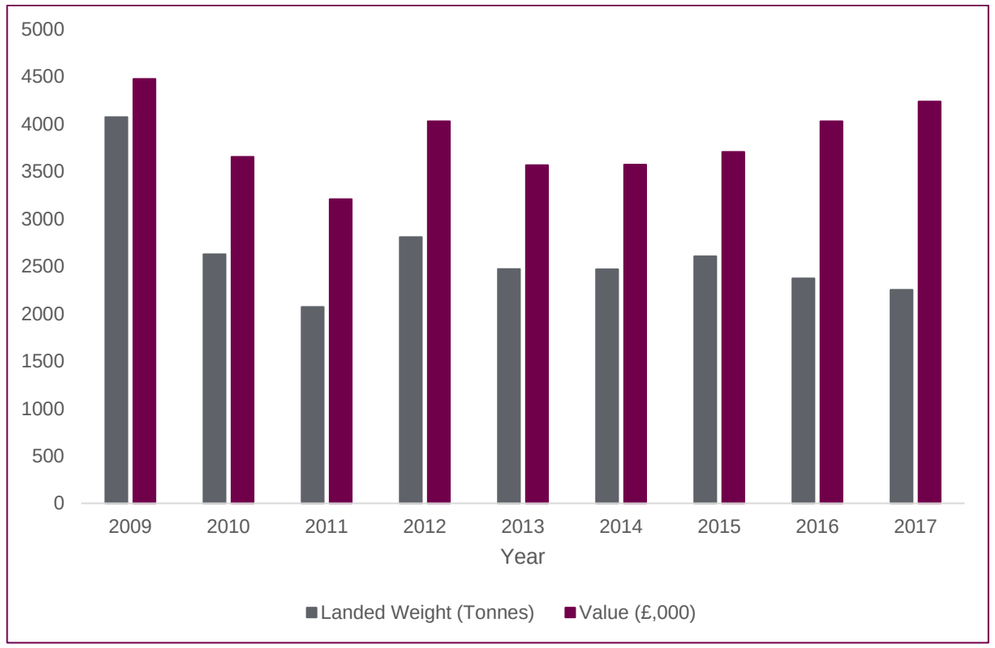

Figure 11.7: Total fish and shellfish landings from the UK fleet landings per year for ICES rectangle 32E4 and 32E5 (based on nine-years data from 2009 – 2017) (data source: UK gov. database, 2018).

11.6.4.2 Landings from the commercial fisheries study area had an average annual value of £3,831,315.35 over nine years. Figure 11.8~~Figure 11.8~~ shows the top ten species by average annual proportion that were caught over the nine years of data amounting to £3,625,611.28.

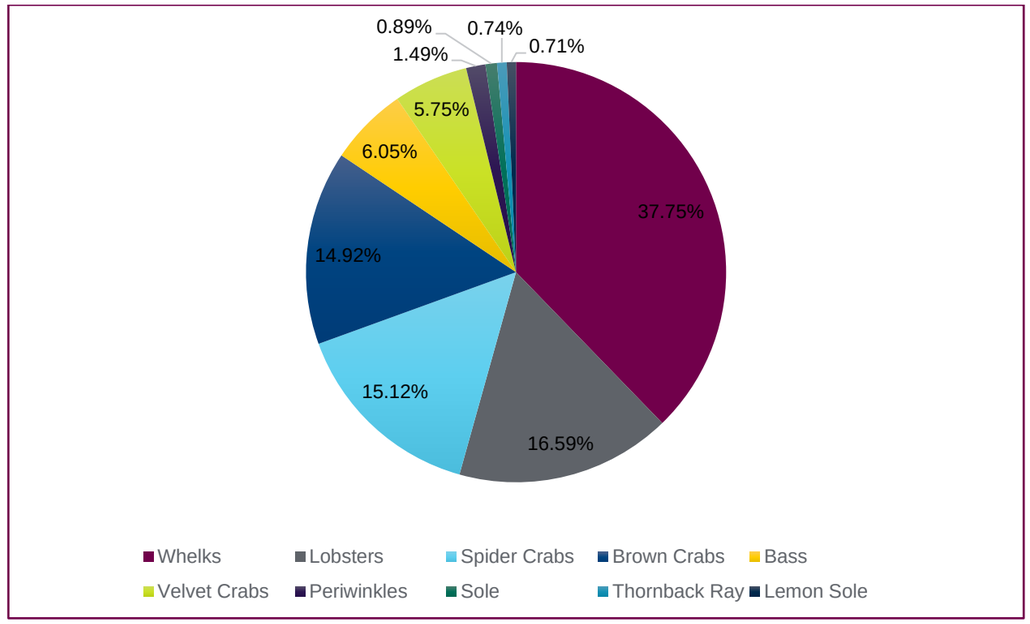

Figure 11.8: Average annual proportion of landings value by species for both ICES rectangles 32E4 and 32E5 (based on nine-years data from 2009 – 2017) (data source: UK gov. database, 2018).

11.6.4.3 Of these top ten species, shellfish dominate the landings, accounting for 91.6% of the annual value. Whelk, lobster *Homarus gammarus,* spider crabs and brown crab accounted for 84.4% of the annual value and the remaining 7.2% was accounted for by velvet crab and periwinkles. Bass, thornback ray and sole and lemon sole *Microstomus kitt*, all demersal species, comprise 8.4% of the annual value.

11.6.4.4 The annual average for other species caught, amounted to £205,704.06 of the £3,625,611.28. Species caught included the native oyster, mullet, cod, whiting and plaice (see Appendix 11.1)

11.6.5 Fishing effort

11.6.5.1 Fishing vessel effort data was collected between 2011 – 2014, for fishing vessels greater than 15 m. This dataset shows the average fishing activity (effort[3] in kw/hr) for UK commercial fishing vessels of greater than 15 m in length and that are deemed to have been fishing[4]. The fishing effort over a three year period within the commercial fisheries study area indicates 0-2,500 kw/hr. Data collected in 2016 also shows similar levels of relatively low fishing vessel effort (0-2,500 kw/hr), when compared to areas further out west from the commercial fisheries study area (160,000 – 320,000 kw/hr; Figure 11.9~~Figure 11.9~~).

[3] Fishing effort is an aggregate measure of the activity of fishing vessels in a given sea area. It may be measured as the total time spent at sea (in hours or days), as the sum of the products of fishing capacity and time at sea for each vessel.

[4] The MMO assumes fishing behaviour when vessels are travelling at a speed between 1-6 knots, regardless of gear type. Greater than 6 knots indicate vessel steaming.

11.6.5.2 AIS fishing vessel data (greater than 15 m) collected by ABPmer (2017) in 2015 indicates an average weekly vessel density of zero – five vessels throughout the commercial fisheries study area. The vessel density increases (10 – 25 vessels) upon arrival into the Waterway which is to be expected as vessels are returning from their fishing grounds to land catch at the port of Milford Haven (Figure 11.10~~Figure 11.10~~)

11.6.5.3 Consultation with local stakeholders, as described in section 11.6.3.4, has not revealed specific vessel numbers (for vessels less than 15 m in length) but that vessel effort at Warrior Way (site 6) is limited to shoreline fishing due to the high tidal currents (no commercial vessel activity). At Dale Roads (site 7) high levels of coastal fishing occur in the area and pots are placed along the coastline. East Pickard Bay (site 8) has potting fisheries throughout the rocky coastline but again no vessel numbers have been provided.

11.6.5.4 In addition, chapter 12: Shipping and Navigation describes vessel movements throughout the Waterway. In summary, for fishing vessel activity, few fishing vessel tracks were recorded within or in the vicinity of the three test site areas. Tracks were mainly recorded passing from Milford Haven Docks to sea, with no evidence of active fishing. This aligns with stakeholder consultation responses.

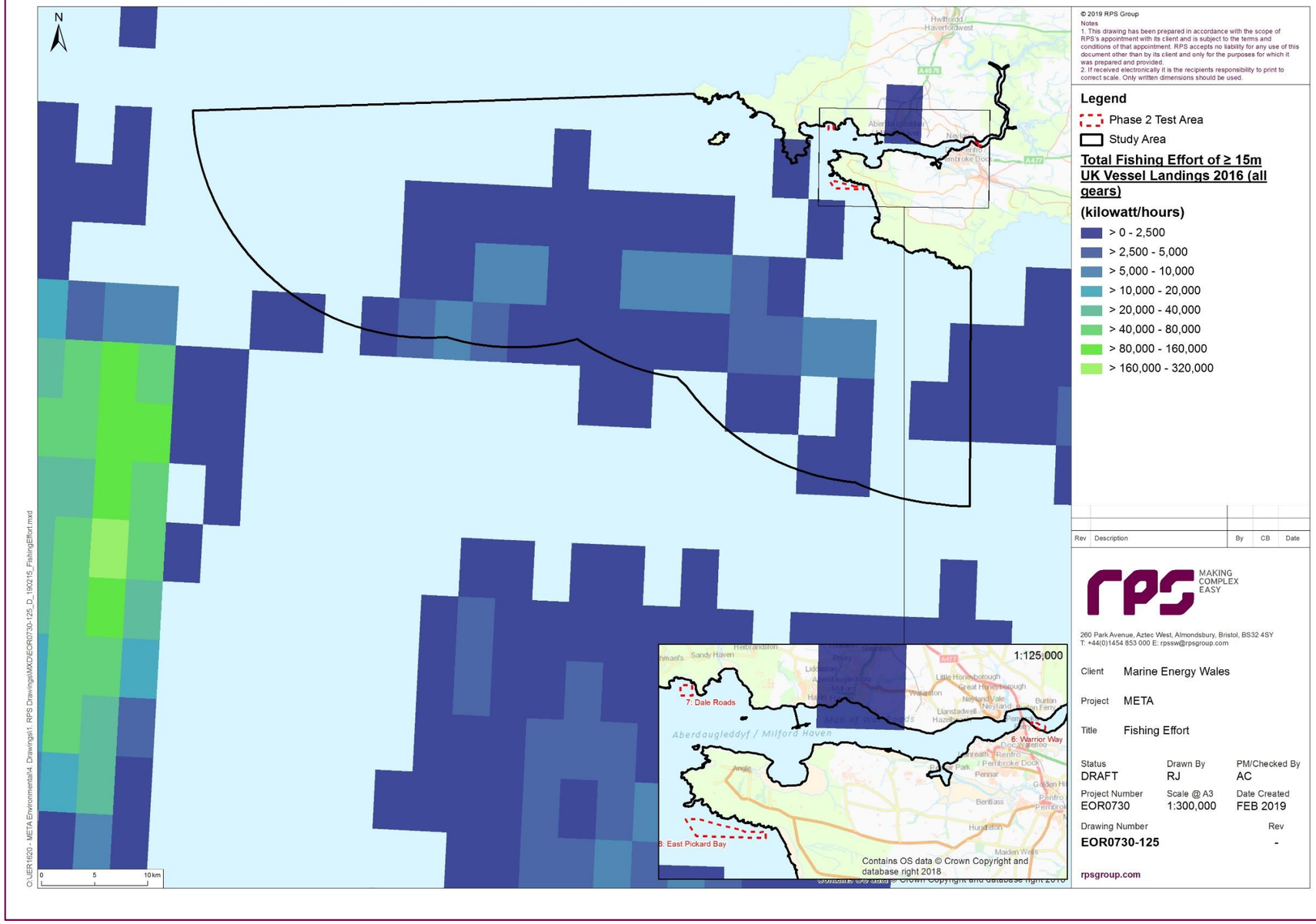

Figure 11.9: Fishing effort in 2016 in kw/hr within the commercial fishing study area (gaps indicate no information available).

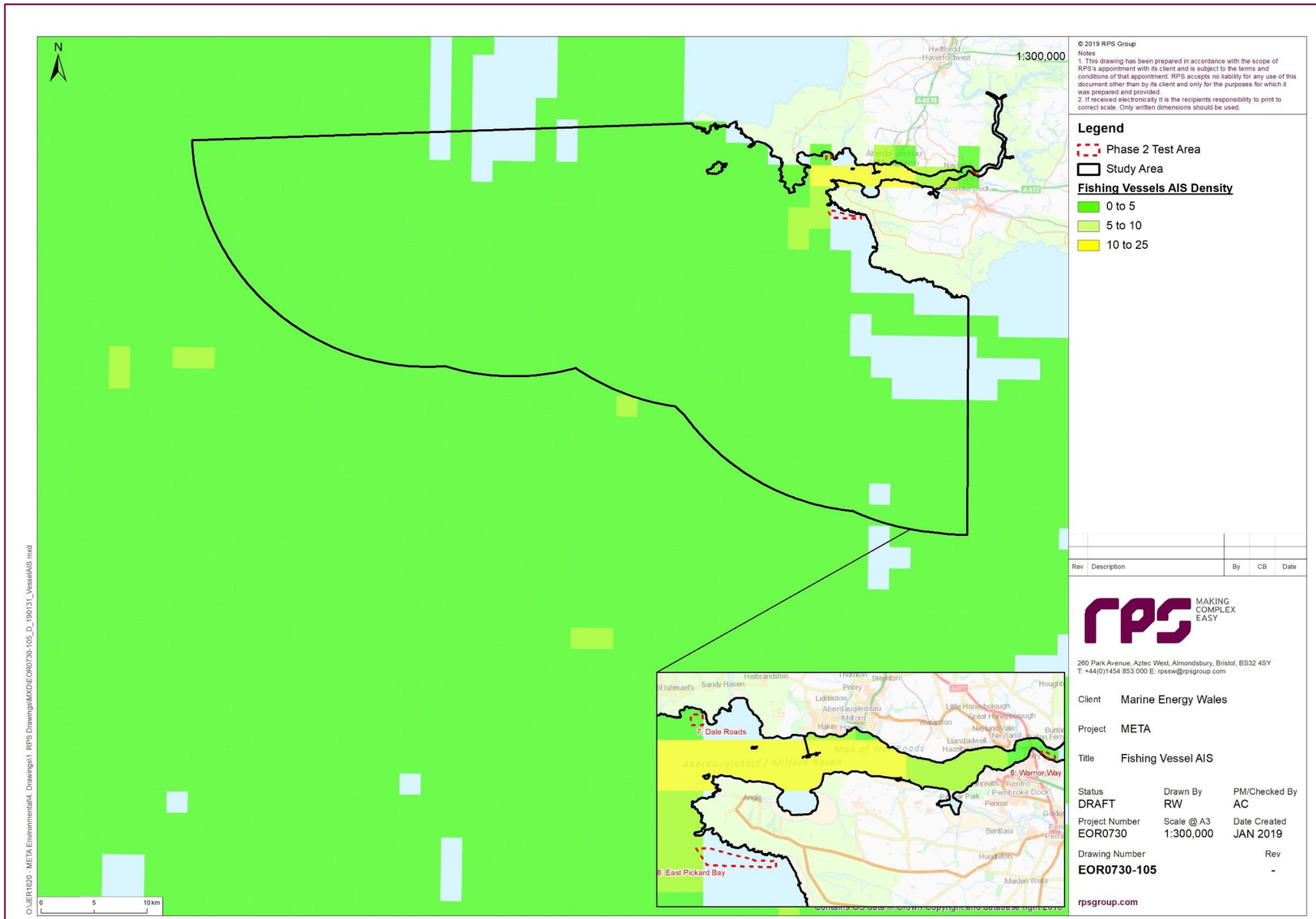

Figure 11.10: AIS data for 2015 indicating fishing vessel density within the commercial fisheries study area (please note that both figures are of different years and not directly comparable).

11.6.6 Key commercial fisheries

11.6.6.1 Key commercial fisheries have been identified following the interrogation of the last nine years of landings, value, and fishing effort. The Wales Marine Planning Portal 'Sea Fish Atlas'[5] has provided additional data on the following key commercial fisheries:

- Potting;
- Hand gathering; and
- Trawling and netting.

11.6.6.2 These key commercial fisheries have been based on the caught species representing 94.5% (£3,625,611.28) of the total average value of fish caught over the nine years of data interrogated.

11.6.6.3 The key commercial fisheries primarily constitute the shellfish species whelks, lobsters, spider crabs, brown crab, velvet crabs and periwinkles. Demersal fish species, including bass, thornback ray, sole and lemon sole, are the main species targeted within the commercial fisheries study area (Figure 11.11~~Figure 11.11~~).

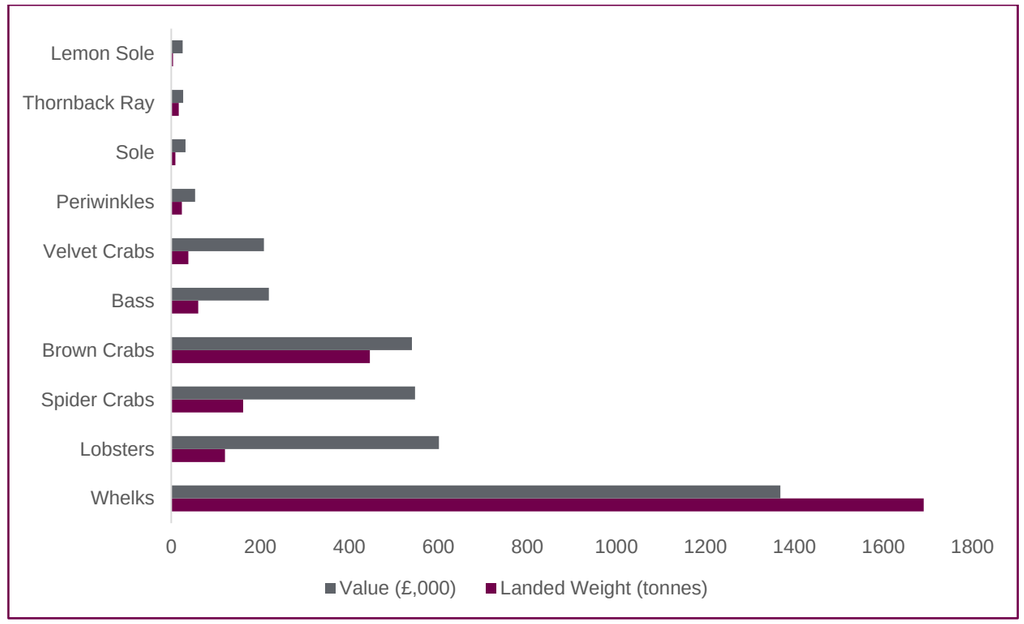

Figure 11.11: Average landed weight and value for key species fished within the commercial fisheries study area. (based on nine-years data from 2009 – 2017) (data source: UK gov. database, 2018).

11.6.6.4 Based on the characterisation above, the key commercial species have been amalgamated into commercial fishery groupings of similar/representative gear type used to catch fish and shellfish and are presented in Table 11.5. A summary for these groupings is also provided in this table. The factors considered as part of the assessment include:

- Fishing grounds which overlap with the META sites;
- Fishing restrictions;
- Landed weight (tonnes) and time spent fishing (fishing effort); and
- Value of the fishery.

Table 11.5: Summary of key receptors within the META commercial fisheries study area. Average annual values of fisheries are based on ICES rectangles 32E4 and 32E5.

Fishery	Representative species	Annual average value of fishery (£,000)	Summary

[5] The Sea Fish Atlas provides information on indicative areas for fisheries to occur, this has been based on local fishermen, fishery officers, fishery regulators and other marine users.

Potting	Whelks Lobster Spider Crab Brown Crab Velvet Crab	3267.81	Potting is the largest of the commercial fisheries within the commercial fisheries study area and has the highest commercial value in this area. Potting sites can be found throughout the study area along coastlines and over rocky reef habitats.
Hand Gathering	Periwinkles	53.90	Hand gathering is a small-scale fishery that operates within the commercial fisheries study area but have low commercial value in relation to other shellfish fisheries. Shellfish are predominately collected by hand along the coast where access permits.
Trawling and Netting	Bass Thornback Ray Sole Lemon Sole	303.89	Trawling and netting is a medium scale fishery that operated throughout the study area but has a low commercial value when compared to the potting fishery. Fish species are caught using a wide range of fishing equipment and extensively fished beyond the commercial fisheries study area.

11.6.7 Future baseline scenario

11.6.7.1 The (Marine Works (EIA) Regulations 2007 (as amended)) requires that *"a description of the relevant aspects of the current state of the environment (baseline scenario), and an outline of the likely evolution thereof without implementation of the project, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*" is included within the Environmental Statement.

11.6.7.2 In the event that the META project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

11.6.7.3 Commercial fishery patterns change and fluctuate based on a range of natural and fisheries management-controlled factors. For example, fluctuation in the biomass of individual species stocks in response to status of the stock, recruitment, natural disturbances (e.g. due to storms, sea temperature etc.), and changes in fishing pressure may affect fishing stock. Changes in the total allowable catches by fisheries management may lead to the relocation of effort, and/or an overall increase/decrease of effort e.g. the decrease in fish caught following the introduction of the Marine Coastal Access Act 2009 in 2009 (Figure 11.7~~Figure 11.7~~). The potential restriction by environmental management of certain fisheries within protected areas can lead to a change in fishing behaviour e.g. prohibition of bivalve species throughout the Waterway (Figure 11.2~~Figure 11.2~~). Improved efficiency and gear technology within fishing fleets is constantly evolving to reduce operational costs. Seafood buyers more frequently requesting certification of the sustainability of fish and shellfish products, such as the Marine Stewardship Council certification, industry is adapting to improve fisheries management and wider environmental impacts. Finally, variation in fish market value can determine how commercial fishing fleets respond, increasing a focused effort on higher value target species when demand is high.

11.6.7.4 Considering the variations and trends in commercial fishing activity are an important aspect of the baseline assessment and forms the principle reason for assessing a minimum of five years of baseline data (Seafish, 2012). For certain fisheries, and/or upon the request of fisheries stakeholders, it is appropriate to analyse a longer time-period to ensure long-term trends inform the assessment. This may be due to natural biological cycles of the target species or management control factors.

11.6.7.5 Given that more than a minimum five-year period has been assessed for commercial fisheries, the future baseline scenario is expected to remain consistent with the baseline provided in section 11.6. Commercial fishing landed weight and value are expected to remain consistent with the graph values provided in Figure 11.7~~Figure 11.7~~; with variations on the proportion of fish and shellfish caught in Figure 11.8~~Figure 11.8~~ due to the aforementioned factors in section 11.6.7.3.

11.6.8 Data limitations

11.6.8.1 Limitations of landings data include the spatial size of ICES rectangles (e.g. the commercial fisheries study area is 37.5% of the area of the ICES rectangles; section 11.2.2.2). This can misrepresent actual activity across the META project and care is therefore required when interpreting these data.

11.6.8.2 A further limitation of landings data is the potential under-reporting of landings associated with potting vessels, which may occur as a result of estimating catches (as opposed to accurate weighing), and not reporting catches that fall below the acceptable limit as defined within the UK Registration of Buyers and Sellers.

11.6.8.3 Limitations of AIS data are primarily focused on the coverage being limited to vessels length of ≥ 15 m (noting that while vessels ≥ 12 m require AIS, data is not available for under 15 m vessels). It is important to be aware that where mapped AIS data may appear to show inshore areas as having lower (or no) fishing activity compared within offshore areas, this is not the case because AIS data do not include vessels typically operating in inshore areas (i.e. which typically comprises of vessels <15 m in length). Consultation has been key throughout the EIA process to determine extent and distribution of activity by the <15 m fleet (Table 11.3~~Table 11.3~~).

11.6.8.4 The Sea Fishing Atlas layer used in the Wales Marine Planning Portal, was compiled by NRW in 2010 from information collected between 2000 and 2005 from various sources, including fishermen, fishery officers and fishery regulators and other marine users, may now be considered out of date and the locations of actual fishing activity, uncertain. However, the grounds presented can still be used as an indicative fishing activity area in Welsh inshore waters (Figure 11.3~~Figure 11.3~~ - Figure 11.6~~Figure 11.6~~).

11.7 Key parameters for assessment

11.7.1 *Maximum and most likely design scenario*

11.7.1.1 The maximum scenarios identified in Table 11.6~~Table 11.6~~ have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (chapter 2: Project Description). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here, be taken forward in the final design scheme.

11.7.1.2 The most likely design scenarios identified in Table 11.6~~Table 11.6~~ have been selected as those having the potential to result in the most likely effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (chapter 2: Project Description). Effects of greater adverse significance are outlined under the maximum design scenario.

11.7.2 Impacts scoped out of the assessment

11.7.2.1 On the basis of the baseline environment and the project description outlined in chapter 2: Project Description, a number of impacts are proposed to be scoped out of the assessment for commercial fisheries. These impacts are outlined, together with a justification for scoping them out, in Table 11.7~~Table 11.7~~.

Table 11.6: Maximum and most likely design scenarios considered for the assessment of potential impacts on commercial fisheries.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
Installation phase			
Temporary interference to traditional fishing grounds.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment, site preparation. • Up to one device deployment occurring at any one time (which may occupy all or part of the water column and demarked by up to four navigational marker buoys). A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. • Up to four device deployments in a 12-month period. • Potential for advisory clearance distance around installation activities. • Up to five vessels utilised at any one time for deployment and retrieval operations with up to 20 deployment and 20 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible. **Dale Roads (site 7)** • Scaled or full-scale wave energy converter (WEC) devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to two device deployments in a 12-month period. • Potential for advisory clearance distance around installation activities. • Up to five vessels utilised at any one time for deployment and retrieval operations with up to 20 deployment and 20 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to four device deployments in a 12-month period. • Up to five vessels utilised at any one time for deployment and retrieval operations with up to 40 deployment and 40 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment, site preparation. • Up to one device deployment occurring at any one time (which may occupy all or part of the water column and demarked by up to four navigational marker buoys). A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. • Up to two device deployments in a 12-month period. • Potential for advisory clearance distance around installation activities. • Up to three vessels utilised at any one time for deployment and retrieval operations with up to 20 deployment and 20 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible. **Dale Roads (site 7)** • Scaled or full-scale wave energy converter (WEC) devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to one device deployment in a 12-month period. • Potential for advisory clearance distance around installation activities. • Up to three vessels utilised at any one time for deployment and retrieval operations with up to 20 deployment and 20 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to one device deployment in a 12-month period. • Up to three vessels utilised at any one time for deployment and retrieval operations with up to 20 deployment and 20 retrieval vessel movements in a 12-month period, restricted to ~~daylight hours~~daylight hours, wherever possible. •	The maximum potential impact on temporary interference to traditional fishing grounds during installation and decommissioning activities will result from the maximum vessel traffic associated with installation and decommissioning of devices and the maximum number of device deployments at each META site. The most likely potential impact on temporary interference to traditional fishing grounds during installation and decommissioning activities from the reduced number of vessel movements associated with installation and decommissioning of devices under the ML scenario, and the most likely number of device deployments predicted at each META site.
Temporary loss of traditional fishing ground	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment, site preparation. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment, site preparation. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water.	The maximum potential impact on temporary loss of traditional fishing grounds during installation and decommissioning activities will result from the installation and decommissioning of devices, the maximum number of device deployments and mooring spreads associated with installation vessels at each META site. The most likely potential impact on temporary loss of traditional fishing grounds during installation and decommissioning activities from the reduced mooring spreads associated with installation and decommissioning of devices under the ML scenario, and the most likely number of device deployments predicted at each META site.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
	• Up to four device deployments in a 12-month period. • Up to 330 m^2 from a 5 m buffer around device footprint (200 m^2) for seabed clearance activities. • Up to 150 m^2 vessel mooring spread for device installation and decommissioning activities. • Potential for advisory clearance distance around installation activities. • Access via Pembroke Port (vessel length up to 164 m). **Dale Roads (site 7)** • Scaled or full-scale wave energy converter (WEC) devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to 510 m^2 from a 5 m buffer around device footprint (600 m^2) for seabed clearance activities. • Up to 200 m^2 vessel mooring spread for device installation and decommissioning activities. • Installation of up to four pin piles per device via drilling, with associated Safety Zone likely to be required. • Potential for advisory clearance distance around installation activities. • Access via Pembroke Port (vessel length up to 164 m). **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to 121,873 m^2 of temporary disturbance at East Pickard Bay per testing scenario broken down as follows: – Up to 3,486 m^2 from a 10 m buffer around device footprint (8,000 m^2) for seabed clearance activities; and – Up to 120,000 m^2 from mooring spread for deployment vessels for up to two test activities at any one time. • Installation of up to four pin piles per device via drilling, with associated Safety Zone likely to be required. • Potential for advisory clearance distance around installation activities.	• Up to two device deployments in a 12-month period. • No seabed preparation required. • Up to 75 m^2 vessel mooring spread for device installation and decommissioning activities. • Potential for advisory clearance distance around installation activities. • Access via Pembroke Port (vessel length up to 30 m). **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • no seabed preparation required. • Up to 100 m^2 vessel mooring spread for device installation and decommissioning activities. • No pin piling required, no associated Safety Zones required. • Potential for advisory clearance distance around installation activities. • Access via Pembroke Port (vessel length up to 164 m). **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to one device deployment which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to 70,000 m^2 of temporary disturbance at East Pickard Bay from mooring spread for deployment vessels per test activity. • No pin piling required, no associated Safety Zones required. • Potential for advisory clearance distance around installation activities.	
Operation and maintenance phase			
Temporary interference to traditional fishing grounds.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water.	The maximum potential impact on temporary interference to traditional fishing grounds during operational activities will result from the maintenance of devices by vessels, the maximum number of device deployments and the navigational buoys at each META site. The most likely potential impact on temporary interference to traditional fishing grounds during operational activities from the reduced maintenance visits associated with operation of devices under the ML scenario, and the most likely number of device deployments predicted at each META site.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
	• Up to four device deployments in a 12-month period. • Up to 104 vessel visits in a 12-month period. • Up to five vessels utilised at any one time for operation and maintenance activity. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to two device deployments in a 12-month period. • Up to 104 vessel visits in a 12-month period. • Up to five vessels utilised at any one time for operation and maintenance activity. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to four device deployments in a 12-month period. • Up to 150 vessel visits in a 12-month period. • Up to five vessels utilised at any one time for operation and maintenance activity. • Operational testing throughout the year and not restricted to daylight hours, however maintenance activities will be restricted to ~~daylight hours~~daylight hours, wherever possible.	• Up to two device deployments in a 12-month period. • Up to 52 vessel visits in a 12-month period. • Up to three vessels utilised at any one time for operation and maintenance activity. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to one device deployment in a 12-month period. • Up to 52 vessel visits in a 12-month period. • Up to three vessels utilised at any one time for operation and maintenance activity. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to one device deployment in a 12-month period. • Up to 104 vessel visits in a 12-month period. • Up to three vessels utilised at any one time for operation and maintenance activity. • Operational testing throughout the year and not restricted to daylight hours, however maintenance activities will be restricted to ~~daylight hours~~daylight hours, wherever possible.	
Temporary loss of traditional fishing ground	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. • Up to four device deployments in a 12-month period. • Total area required for single device: up to 200 m^2 (seabed footprint). • Mooring spread of 150 m^2 for floating devices is within device seabed footprint. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to two device deployments in a 12-month period. • Total area required for single device: up to 600 m^2 (seabed footprint).	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. • Up to two device deployments in a 12-month period. • Total area required for single device: up to 100 m^2 (sea area/seabed footprint) • Mooring spread of 75 m^2 for floating devices is within device seabed footprint. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time (which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to one device deployments in a 12-month period. • Total area required for single device: up to 200 m^2 (seabed footprint).	The maximum potential impact on temporary loss of traditional fishing grounds during operational activities will result from the device area, the maximum number of device deployments and the mooring spreads at each META site. The most likely potential impact on temporary loss of traditional fishing grounds during operational activities from the reduced device area associated with operation of devices under the ML scenario, and the most likely number of device deployments predicted at each META site.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
	• Up to 200 m^2 mooring spread for floating devices is within device seabed footprint. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which ay occupying a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to four device deployments in a 12-month period. • Total area required for multiple devices: up to 10,250 m^2 (seabed footprint) + up to 500,000 m^2 mooring spread for floating devices. • As seabed footprint is within mooring spread, maximum scenario is therefore 500,000 m^2.	• Up to 100 m^2 mooring spread for floating devices is within device seabed footprint. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to one device deployed in a 12-month period. • Total area required for single device: up to 1,700 m^2 (seabed footprint) + up to 625 m^2 mooring spread for floating devices therefore. Mooring spread is within seabed footprint therefore maximum scenario is up to 1,700 m2.	
Damage to fishing equipment.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. • Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. Up to four device deployments in a 12-month period. • Total area required for single device: up to 200 m^2 (seabed footprint). Mooring spread of 150 m^2 for floating devices is within seabed footprint therefore not additive. • Up to 20 m length, 10 m width, 5 m rotor diameter and up to 2 m height above sea surface. • Speed of moving parts up to 5 m/s. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which ay occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to two device deployments in a 12-month period. • Total area required for single device: up to 600 m^2 (seabed footprint). • Up to 200 m^2 mooring spread for floating devices is within seabed footprint therefore not additive. • Up to 30 m length, 20 m width and up to 2 m height above sea surface. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to two device deployments at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to two tow tests in a 12-month period.	• Up to 15 years total duration of consent. **Warrior Way (site 6)** • Scaled or micro tidal devices, instruments, components and subassemblies, monitoring equipment. Up to one device deployment occurring at any one time which may occupy all or part of the water column and demarked by up to four navigational marker buoys. A minimum clearance of 2 m will be maintained between turbine blade tips and the surface of the water. Up to two device deployments in a 12-month period. • Total area required for single device: up to 100 m^2 (sea area/seabed footprint) Mooring spread of 75 m^2 for floating devices is within seabed footprint therefore not additive Up to 5 m length, 5 m width, 5 m rotor diameter and minimal height above sea surface/at sea surface. • Speed of moving parts up to 2 m/s. **Dale Roads (site 7)** • Scaled or full-scale WEC devices, research and monitoring methodologies. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, demarked by up to four navigational marker buoys. • Up to one device deployments in a 12-month period. • Total area required for single device: up to 200 m^2 (seabed footprint). • Up to 100 m^2 mooring spread for floating devices is within seabed footprint therefore not additive. • Up to 15 m length, 10 m width and at the sea surface. **East Pickard Bay (site 8)** • Scaled or full-scale WEC device testing and component testing for floating offshore wind technology, rock ballasting. • Up to one device deployment occurring at any one time which may occupy a significant proportion of the water column and may include surface-piercing, at surface and sub-surface components, demarked by up to four navigational marker buoys. • Up to one tow tests in a 12-month period. • Up to one moored or gravity-based device deployments in a 12-month period.	The maximum potential impact of damage to fishing equipment during operational activities will result from the device area, the maximum number of device deployments, the mooring spreads and location of device in the water column at each META site. The most likely potential impact of damage to fishing equipment during operational activities from the reduced device area associated with operation of devices under the ML scenario, and the most likely number of device deployments predicted at each META site. In addition, rock ballasting may be required for scour protection/moorings of devices at East Pickard Bay assuming up to 100 rock bags each with a diameter of up to 2 m. However, rock ballasting will only be placed directly on the device footprint, therefore representing no further risk to fisheries.

Potential impact	Maximum design scenario	Most likely design scenario	Justification
	• Up to four moored or gravity-based device deployments in a 12-month period. • Total area required for multiple devices: up to 10,250 m² (seabed footprint) + up to 500,000 m² mooring spread for floating devices. As seabed footprint is within mooring spread, maximum scenario is 500,000 m². • Up to 147 m length, 230 m width and up to 15 m height above sea surface[6].	• Total area required for single device: up to 1,700 m² (seabed footprint) + up to 625m² mooring spread for floating devices therefore not additive. • Up to 80 m length, 17 m width and minimal height above sea surface/at sea surface.	
Decommissioning phase			
Interference to traditional fishing grounds.	As per the Installation Phase.	As per the Installation Phase.	As per the Installation Phase.
Temporary loss of traditional fishing ground	As per the Installation Phase.	As per the Installation Phase.	As per the Installation Phase.

Table 11.7: Impacts scoped out of the assessment for commercial fisheries.

Potential impact	Justification
All phases	
Pollution from routine and accidental discharges.	An Environmental Management Plan (EMP), which will include a Marine Pollution Contingency Plan, (section Table 11.11~~Table 11.11~~) will be implemented to manage the risk of accidental pollution release into the Waterway. This will ensure that the likelihood of an accidental pollution event is greatly reduced. The potential impact of accidental pollution on fish and shellfish receptors is presented within chapter 8: Fish and Shellfish and has not been re-assessed in the current chapter. It is assumed that the significance of impact assessed with chapter 8: Fish and Shellfish will be the same for commercial fisheries.
Obstruction to regular fishing vessel transit routes	This impact will be assessed under chapter 12: Shipping and Navigation and has not been re-assessed here.

[6] A maximum scenario height of up to 15 m above sea surface will only apply in devices up to a maximum dimension scenario of 60 m length x 60 m width. Where maximum dimensions of a device are over 60 m length x 60 m width, a maximum height of 5 m above sea surface will be applied.

11.8 Impact assessment methodology

11.8.1 Overview

11.8.1.1 The commercial fisheries EIA has followed the methodology set out in Chapter 4: Environmental Impact Assessment Methodology. Specific to the commercial fisheries EIA, the following guidance documents have also been considered:

- Best Practise Guidance for Fishing industry Financial and Economic Impact Assessments (Seafish, 2012);
- Consenting, EIA and HRA Guidance for Marine Renewable Energy Developments in Scotland. Part Four – Wave and Tidal Annex (EMEC and Xodus, 2010); and
- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessment (Seafish, 2012).

11.8.2 Impact assessment criteria

11.8.2.1 The criteria for determining the significance of effects is a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude the of potential impacts and sensitivity of receptors. The terms used to define sensitivity and magnitude are based on those used in the Design Manual for Roads and Bridges methodology, which are described in further detail in Chapter 4: Environmental Assessment Methodology.

11.8.2.2 The criteria for defining magnitude in this chapter are outlined in Table 11.8~~Table 11.8~~ below.

Table 11.8: Definition of terms relating to the magnitude of impact.

Magnitude of impact	Definition used in this chapter
Major	Impact is of long-term duration (e.g. greater than 5 years duration) and/or is of extended physical extent; may result in substantial loss of target fish or shellfish biological resource (e.g. loss of substantial proportion of resource within project area), and /or substantial loss of ability to carry on fishing activities (e.g. substantial proportion of effort within project area). (Adverse)
	Large scale or major improvement of resource quality, measurable against biomass reference points, and/or extensive restoration or enhancement of habitats supporting commercial fisheries resources (Beneficial).
Moderate	Impact is of medium-term duration (e.g. less than 5 years) and/or is of moderate physical extent; may result in partial loss of target fish or shellfish biological resource (e.g. moderate loss of resource within project area), and/or partial loss of ability to carry on fishing activities (e.g. moderate reduction of fishing effort within project area). (Adverse)
	Moderate improvement of resource quality; and/or moderate restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)
Minor	Impact is of short-term duration (e.g. less than 6 months) and/or is of limited physical extent; may result in minor loss of target fish or shellfish biological resource (e.g. minor loss of resource within project area), and/or minor loss of ability to carry on fishing activities (e.g. minor reduction of fishing effort within project area). (Adverse).
	Minor benefit to or minor improvement of resource quality; and/or minor restoration or enhancement of habitats supporting commercial fisheries resources (Beneficial).
Negligible	Impact is of very limited duration (weeks/months) and/or physical extent of impact is very localised; may result in slight loss of target fish or shellfish resources within the project area only and/or slight loss of ability to continue fishing activities within the project area only. (Adverse).
	Very minor benefit to or very minor improvement of resource quality; and/or very minor restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)
No change	No change from baseline conditions.

11.8.2.3 The overall sensitivity of a receptor to an impact is identified in Table 11.9~~Table 11.9~~.

Table 11.9: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition used in this chapter
High	Receptor is highly 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
Medium	Receptor is vulnerable to impacts that may arise from the project and recoverability is of medium term. And/or: Moderate levels of alternative fishing grounds are available.
Low (or lower)	Receptor is not generally vulnerable to impacts that may arise from the project and recoverability is high. And/or: High levels of alternative fishing grounds are available.
Negligible	Receptor is not vulnerable to impacts that may arise from the project and recoverability is high. And/or: Extensive alternative fishing grounds available.

Significance

11.8.2.4 The significance of the effect upon commercial fisheries is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in Table 11.10~~Table 11.10~~. Where a range of significance of effect is presented in Table 11.10~~Table 11.10~~, the final assessment for each effect is based upon expert judgement.

11.8.2.5 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of the EIA Regulations.

Table 11.10: Matrix used for the assessment of the significance of the effect.

Sensitivity of receptor	Magnitude of impact: No change	Negligible	Minor	Moderate	Major
Negligible	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
Low	Negligible	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	Negligible	Negligible or minor	Minor	Moderate	Moderate or major
High	Negligible	Minor	Minor or moderate	Moderate or major	Major or substantial
Very high	Negligible	Minor	Moderate or major	Major or substantial	Substantial

11.9 Measures adopted as part of the META Project

11.9.1.1 As part of the project design process, a number of designed-in measures have been proposed to reduce the potential for impacts on commercial fisheries (see Table 11.11~~Table 11.11~~). As there is a commitment to implementing these measures, they are considered inherently part of the design of the META project and have therefore been considered in the assessment presented in section 11.10 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These measures are considered standard industry practice for this type of development.

Table 11.11: Designed-in measures adopted as part of the META project.

Measures adopted as part of the META project	Justification
An EMP will be produced and followed. The EMP will cover the installation, operation and maintenance, and decommissioning phases of the META project and will also include a Marine Pollution Contingency Plan which will plan for accidental spills, address all potential contaminant releases and include key emergency contact details and process to follow in the event of accidental spill.	Measures will be adopted to ensure that the potential for release of pollutants from installation, operation and maintenance, and decommissioning is minimised. In this manner, accidental release of potential release of contaminants from vessels will be strictly controlled, thus providing protection for marine life across all phases of the project development.
Promulgation of information including regular Notices to Mariners, navigational aids and marine charting updates. Information and notices will also be posted at onshore locations, this may include signage if appropriate/possible.	Notices to mariners will be issued and sent directly to an email list of registered interested parties to help ensure that as many interested parties as possible are aware of the presence of infrastructure and the need to avoid the area during the period of deployment. Signage may help mitigate potential interactions between other sea users and device deployments.
Safety Zones may be applied for (as per the 2007 Safety Zone regulations cited in the justification column), around any pin piling activities during the installation phase.	Safety zones are established in the interests of safety to commercial fisheries receptors, in accordance with The Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007.
Advisory clearance distances are likely to be recommended around vessels undertaking installation, maintenance and decommissioning activities. The nature of the advisory clearance distances will be discussed and agreed with the MHPA on a case-by-case basis.	Advisory clearance distances are recommended in the interests of safety to other users, particularly navigational safety.

11.10 Assessment of significance

11.10.1.1 The impacts of the installation, operation and maintenance and decommissioning of the META project have been assessed on key commercial fisheries (Table 11.6~~Table 11.6~~). The potential impacts arising from the installation of the META project are listed in Table 11.6~~Table 11.6~~, along with the maximum and most likely design scenarios against which each potential impact has been assessed. An overall conclusion of significance of effect will be made for the META project (Warrior Way (site 6), Dale Roads (site 7); East Pickard Bay (site 8)).

11.10.1.2 A description of the potential effect on commercial fisheries receptors (Table 11.5) is given below.

11.10.2 Installation phase

Temporary interference to traditional fishing grounds

11.10.2.1 The nature of the marine renewable devices and associated ancillary operations means that from installation through to decommissioning, devices will be installed, maintained and removed via a vessel. This will result in an increase in the number of vessels within the META project area and may interfere with commercial vessels from fishing traditional grounds.

Magnitude of impact

Warrior Way (site 6)

11.10.2.2 The maximum design scenario for Warrior Way (site 6) is represented by one device deployment and may require up to five vessels for up to 20 deployment operations in a 12-month period. The most likely design scenario is represented by one device deployment and may require up to three vessels for up to 20 deployment vessel movements in a 12-month period. Over the entirety of the project (15 years), each scenario may require up to 300 device-deployment vessel movements operations. The single device, for both scenarios, will be demarked by up to four navigational marker buoys with works restricted to day light hours. Any temporary advisory clearance distance may extend beyond the device footprint of the installation area. The impact of any interference to traditional fishing grounds would be expected to be reversible as once the device has been installed, installation vessels will return to port. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be periodic vessel activity from the META project during this timeframe.

11.10.2.3 Warrior Way (site 6) is located within a relatively narrow section of the Waterway measuring approximately 340 m in width (from/to mean low water), however there is approximately 160 m (from consenting site boundary to low water) whereby commercial fishing vessels can sufficiently pass to reach traditional fishing grounds. Consultation with WFSA confirmed no boat-based fishing activity is present at Warrior Way (site 6) due to the strong currents generated by the high tidal ranges in the Waterway. Only night fishing accessed from the shore-line occurs near Warrior Way (site 6). AIS data indicated an average of 0.16 fishing vessels in the area per week. In addition, when no devices are deployed at Warrior Way (site 6), no exclusion zone will be in place, allowing all vessels to pass through the area as per the baseline.

11.10.2.4 The impact at Warrior Way (site 6) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore, considered to be negligible.

Dale Roads (site 7)

11.10.2.5 The maximum design scenario for Dale Roads (site 7) is represented by one device deployment and may utilise up to five vessels at any one time, with up to 20 deployment operations in a 12-month period. The most likely design scenario is represented by one device deployment and may utilise up to three vessels at any one time, with up to 20 deployment vessel movements in a 12-month period. Over the entirety of the project (15 years), both scenarios may require up to 300 device-deployment vessel operations. A single device (for both scenarios), will be demarked by up to four navigational marker buoys with works restricted to day light hours. Any temporary advisory clearance distance may extend beyond the device footprint of the installation area. The impact of any interference to traditional fishing grounds would be expected to be reversible as once the device has been installed, installation vessels will return to port. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be periodic vessel activity from the META project during this timeframe.

11.10.2.6 Dale Roads (site 7) is located within a bay where consultation with the WMFAG, WWSFA and WFA have indicated a high volume of coastal fishing activity, mostly shellfish pots. The WFSA confirmed that fishing activity is common at Soldier Rock on the western side of Lindsway Bay (approximately 550 m west of Dale roads (site 7). AIS data however indicates a low fishing vessel density of 0.083 vessels per week. In addition, when no devices are deployed at Dale Roads (site 7), no exclusion zone will be in place, allowing all vessels to pass through the area as per the baseline.

11.10.2.7 The impact at Dale Roads (site 7) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.10.2.8 The maximum design scenario for East Pickard Bay (site 8) is represented by two device deployments and may require up to five vessels at any one time for up to 40 deployment vessel movements in a 12-month period. The most likely design scenario is represented by one device deployment and may utilise up to three vessels at any one time, with up to 20 deployment vessel movements in a 12-month period. Over the entirety of the project (15 years), up to 600 device-deployment vessel movements under the maximum scenario, or up to 300 device-deployment vessel movements under the most likely scenario, may be required. A single device, for both scenarios, will be demarked by up to four navigational marker buoys with works restricted to day light hours. Any temporary advisory clearance distance may extend beyond the device footprint of the installation area. The impact of any interference to traditional fishing grounds would be expected to be reversible as once the device has been installed, installation vessels will return to port. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be periodic vessel activity from the META project during this timeframe.

11.10.2.9 East Pickard Bay (site 8) is located off the coast west of Freshwater West. Consultation with the WMFAG, WWSFA and WFA indicated that high shellfish potting activity is present along the East Pickard Bay (site 8) coastline, predominately on the rocky outcrops, with some fixed netting. AIS data indicates a fishing vessel density of 7.33 vessels per week. In addition, when no devices are deployed at East Pickard Bay (site 8), no exclusion zone will be in place, allowing all vessels to pass through the area as per the baseline.

11.10.2.10 The impact at East Pickard Bay (site 8) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of the receptor

Potting fishery

11.10.2.11 Warrior Way (site 6) is located approximately 160 m northwest of a lobster and crab potting site, and approximately 145 m south west of a prawn potting site. Dale Roads (site 7) is located approximately 15 m south west and 144 m south west of two lobster and crab potting sites. East Pickard Bay (site 8) directly overlaps with a lobster and crab potting area and is approximately 60 m north east of a whelk potting area. Warrior Way (site 6) and Dale Roads (site 7) do not directly overlap with any potting fisheries but are in close proximity to them and may cause potential indirect interference to vessels from reaching traditional fishing grounds. East Pickard Bay (site 8) overlaps with a lobster and crab potting site and may have a direct impact on the potting fishery.

11.10.2.12 The commercial potting fishery set pots over rocky reefs; a preferred habitat for adult lobsters and crabs (Howard and Bennet, 1979). Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) have been shown to have coarse sands, muddy sand substrates and coarse sands (chapter 7: Benthic Subtidal and Intertidal Ecology), and although these substrates do not represent preferred potting grounds, these sites are still used to some extend by the local potting fisheries. With prior knowledge of the impacted areas (i.e. deployment site,) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid areas during installation activities and exploit other similar habitats within the site.

11.10.2.13 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and there are considered to be high levels of alternative fishing grounds available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.10.2.14 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.10.2.15 Warrior Way (site 6) borders a light otter trawling area and is within a bottom set net area. Dale Roads (site 7) is located within a light otter trawl area and in a beach and beach seine net area. East Pickard Bay (site 8) directly overlaps with the light otter trawl area and the bottom set net area. All sites have a direct overlap with an aspect of the trawling and netting fishery and may cause potential indirect interference to vessels from reaching traditional fishing grounds. Consultation with WMFAG, WWSFA and the WFA indicated that whilst there are no trawling or drift nets present within East Pickard Bay (site 8), some fixed netting is present. Warrior Way (site 6) has limited fishing and is used predominately by sea anglers (section 11.6.5.3~~11.6.5.4~~. The WFSA confirmed that fishing activity is common at Soldier Rock on the western side of Lindsway Bay (approximately 550 m west of Dale Roads (site 7).

11.10.2.16 The commercial trawling and netting fishery are able to set equipment throughout the commercial fisheries study area and are not restricted to specific areas, such as the potting fishery. With prior knowledge of the impacted areas (i.e. deployment site,) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid areas during installation activities and exploit other similar habitats within the site.

11.10.2.17 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and there are high levels of alternative fishing grounds available. The sensitivity of the receptor is therefore, considered to be low.

Significance of the effect

Overall significance of effect

11.10.2.18 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor to all types of fishing activity is considered to be low and the magnitude of the impact is deemed to be negligible to minor. The effect will, therefore, be of negligible or minor adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

11.10.2.19 No further mitigation is suggested beyond that of the measure adopted as part of the project (Table 11.11~~Table 11.11~~).

Temporary loss of traditional fishing grounds

11.10.2.20 Installation activities such as device or navigational buoy anchoring, and the presence of marine renewable devices in the water column and sea bed, could have the potential to result in the loss of fishing grounds. To prevent the potential for vessel damage, an advisory clearance area may be implemented during the installation of marine devices. The presence of the marine device, ancillary operations and advisory clearance area during installation at META sites may result in the loss of commercial fishing vessels from traditional fishing grounds. A loss of fishing grounds could result in a decreased landed weight and therefore value.

Magnitude of impact

Warrior Way (site 6)

11.10.2.21 The maximum design scenario for Warrior Way (site 6) is represented by one device deployment which may have a total seabed clearance area of 330 m^2 and a vessel mooring spread of up to 150 m^2. The most likely design scenario is represented by one device deployment, no seabed clearance is required, however, a mooring spread of up to 75 m^2 may be required. For both scenarios, the single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The spatial extent of the single device in the maximum scenario at Warrior Way (site 6) is very small in the context of the proposed consenting area (0.35%) and approximately less than 0.0001% of the commercial fisheries study area. The impact of any temporary advisory clearance distances would be reversible as once the installation of the marine renewable device has been installed, these advisory clearance distances will be removed. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be temporary loss of traditional fishing grounds from the META project during this timeframe.

11.10.2.22 The impact at Warrior Way (site 6) for both the maximum and most likely design scenario is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Dale Roads (site 7)

11.10.2.23 The maximum design scenario for Dale Roads (site 7) is represented by one device deployment which may have a seabed clearance area of up to 510 m^2, an associated agreed safety zone for pin pilling and a vessel mooring spread of up to 200 m^2. The most likely design scenario is represented by one device deployment, with no seabed preparation however, up to 100 m^2 may be required for mooring spread. For both scenarios, the single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The spatial extent to install a single device for the maximum scenario at Dale Roads (site 7) is very small in the context of the proposed consenting area (0.26%) and approximately 0.00002% of the commercial fisheries study area. A Safety Zone is likely to be applied for around any pin pilling activities (maximum design scenario only). The impact of any temporary advisory clearance distances and safety zones would be reversible as once the installation of the marine renewable device has been installed, these advisory clearance distances and safety zones will be removed. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be temporary loss of traditional fishing grounds from the META project during this timeframe.

11.10.2.24 The impact at Dale Roads (site 7) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.10.2.25 The maximum design scenario for East Pickard Bay (site 8) is represented by two device deployments, which may have a total area of 121,873 m^2 including the mooring spread per testing scenario. The most likely design scenario is represented by one device deployment which may have a total area of 70,000 m^2 including the mooring spread. For both scenarios, the single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The spatial extent of a single device for the maximum scenario at East Pickard Bay (site 8) would occupy a small proportion of the proposed consenting area (9.91%), and approximately 0.007% of the commercial fisheries study area. A Safety Zone is likely to be applied for around any pin pilling activities (maximum design scenario only). The impact of any temporary advisory clearance distances and safety zones would be reversible as once the installation of the marine renewable device has been installed, these advisory clearance distances and safety zones will be removed. Installation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be temporary loss of traditional fishing grounds from the META project during this timeframe.

11.10.2.26 The impact at East Pickard Bay (site 8) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the receptor

Potting fishery

11.10.2.27 As described previously (section 11.10.2.11), the only overlap between the META sites and existing commercial fishing grounds is at the East Pickard Bay (site 8) with the potting fisheries using this site for lobster and crab.

11.10.2.28 A temporary loss of fishing grounds could lead to reduced catches of target species and therefore potential loss of earnings. The reduced catches will particularly affect those vessels that routinely place pots in East Pickard Bay (site 8). However, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to use other areas for deployment of pots, particularly given the extent of available potting habitat throughout the commercial fisheries study area (see *Figure 11.5*~~*Figure 11.5*~~).

11.10.2.29 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.10.2.30 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.10.2.31 As described in section 11.10.2.15, all sites have a direct overlap with an aspect of the trawling and netting fishery and may cause a potential loss of traditional fishing grounds.

11.10.2.32 The commercial trawling and netting fishery are able to set equipment throughout the commercial fisheries study area and are not restricted to specific areas, such as the potting fishery. Therefore, these fisheries are less likely to be sensitive to a temporary loss of traditional fishing ground. However, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid areas during installation activities and exploit other similar habitats within the site, particularly given the extent of available trawling and netting areas within the commercial fisheries study area (*Figure 11.3*~~*Figure 11.3*~~ and *Figure 11.4*~~*Figure 11.4*~~).

11.10.2.33 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore considered to be low.

Significance of the effect

Overall significance of effect

11.10.2.34 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible. The effect will, therefore, be of negligible or minor adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

11.10.2.35 No further mitigation is suggested beyond that of the measure adopted as part of the project (Table 11.11~~Table 11.11~~).

11.10.3 Operation and maintenance phase

11.10.3.1 The impacts of the operation and maintenance phase of the META project have been assessed on commercial fisheries. The environmental effects arising from the operation and maintenance of the META project are listed in Table 11.6~~Table 11.6~~ along with the maximum and most likely design scenarios against which each impact has been assessed.

Temporary interference to traditional fishing grounds

11.10.3.2 Operational activities such as device or navigational buoy anchoring, and the presence of marine renewable devices in the water column or on the sea bed, have the potential to adversely interfere with commercial fishing activity.

11.10.3.3 The nature of the marine renewable devices means that from installation through to decommissioning, devices will be installed, maintained and removed via a vessel, increasing the number of vessels within a given area. As a result, this may lead to an increased pressure on fishing effort where META sites are present, leading to vessels seeking alternate traditional fishing grounds and increasing competition with other fishing vessels.

Magnitude of impact

Warrior Way (site 6)

11.10.3.4 The maximum design scenario for Warrior Way (site 6) is represented by one device deployment and may require up to five vessels at any one time, with up to 104 vessel visits (return) in a 12-month period. The most likely design scenario is represented by one device deployment and may require up to three vessels at any one time, with up to 52 vessel visits (return) in a 12-month period. Over the entirety of the project (15 years), the maximum design scenario may require up to 1,560 vessel visits and the most likely scenario may require up to 780 vessel visits. For both scenarios, a single device will be demarked by up to four navigational marker buoys, and operational testing of the device may be throughout the year and not restricted to daylight hours. Maintenance activities will be limited to ~~daylight hours~~daylight hours, wherever possible, wherever possible. Any temporary advisory clearance distance would be removed following the completion of operation and maintenance operations.

11.10.3.5 As described in section 11.10.2.3, commercial fishing from vessel is highly unlikely to occur in the area due to relatively strong tidal currents.

11.10.3.6 The impact at Warrior Way (site 6) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore, considered to be negligible.

Dale Roads (site 7)

11.10.3.7 The maximum design scenario for Dale Roads (site 7) is represented by one device deployment and may require up to five vessels at any one time, with up to 104 vessel visits (return) in a 12-month period. The most likely design scenario is represented by one device deployment and may require up to three vessels at any one time, with up to 52 vessel visits (return) in a 12-month period. Over the entirety of the project (15 years), the maximum design scenario may require up to 1,560 vessel visits and the most likely scenario may require up to 780 vessel visits. For both scenarios, a single device will be demarked by up to four navigational marker buoys, and operational testing may be throughout the year and not restricted to daylight hours. Maintenance activities will be limited to ~~daylight hours~~daylight hours, wherever possible. Any temporary advisory clearance distance would be removed following the completion of operation and maintenance operations.

11.10.3.8 As described in section 11.10.2.6, high volumes of coastal fishing and potting occur at Dale Roads (site 7). However, AIS data shows low fishing vessel densities within the Dale roads site (site 7).

11.10.3.9 The impact at Dale Roads (site 7) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.10.3.10 The maximum design scenario for East Pickard Bay (site 7) is represented by up to two device deployments at any one time, with up to four device deployments over a 12- month period. This may require up to five vessels at any one time, with up to 150 vessel visits (return) in a 12-month period. The most likely design scenario is represented by one device deployment and may require up to three vessels at any one time, with up to 104 vessel visits (return) in a 12-month period. Over the entirety of the project (15 years), the maximum design scenario may require up to 2,250 vessel visits and the most likely scenario may require up to 1,560 vessel visits. For both scenarios, a single device will be demarked by up to four navigational marker buoys, and operational testing may be throughout the year and not restricted to daylight hours. Maintenance activities may be limited to daylight hours. Any temporary advisory clearance distance would be removed following the completion of operation and maintenance operations.

11.10.3.11 As described in section 11.10.2.9, potting and fixed nets are used throughout the area.

11.10.3.12 The impact at East Pickard Bay (site 8) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of the receptor

Potting fishery

11.10.3.13 As described in section 11.10.2.11 and 11.10.2.12, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid operational vessels and exploit other similar habitats within the site. Operation and maintenance vessels are expected to be on site for a very short period of time (days) and return to port once operations are complete.

11.10.3.14 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.10.3.15 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.10.3.16 As described in section 11.10.2.15 and 11.10.2.16, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid operational vessels and exploit other similar habitats within the site.

11.10.3.17 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Significance of the effect

Overall significance of effect

11.10.3.18 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be minor. The effect will, therefore, be of negligible or minor adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

11.10.3.19 No further mitigation is suggested beyond that of the measure adopted as part of the project (Table 11.11~~Table 11.11~~).

Temporary loss of traditional fishing grounds

11.10.3.20 Operational activities such as device or navigational buoy anchoring, and the presence of marine renewable devices in the water column and sea bed, could have the potential to result in the loss of fishing grounds. A loss of fishing grounds could result in a decreased landed weight and therefore value.

11.10.3.21 The magnitude of the impact and sensitivity of receptor is expected to be the same or similar to the effects from installation. Therefore, the significance of effect is therefore negligible or minor adverse significance (see section 11.10.2.1 *et seq*).

Further mitigation and residual effect

11.10.3.22 No further mitigation is suggested beyond that of the measure adopted as part of the project (Table 11.11~~Table 11.11~~).

Damage to fishing equipment

11.10.3.23 Operational activities such as device or navigational buoy anchoring, and the presence of marine renewable devices in the water column and sea bed, could have the potential to result in damaging fishing gear leading to a loss in value to the fishery affected. These potential changes are outlined below.

Magnitude of impact

Warrior Way (site 6)

11.10.3.24 The maximum design scenario for Warrior Way (site 6) is represented by one device deployment which may have a total area of 200 m^2 including the mooring spread. The device may be in-situ for up to six months (with the device in the water for 100% of that time). The most likely design scenario is represented by one device deployment which may have a total area of 100 m^2 including the mooring spread. The device may be in in-situ for up to three months (with the device in the water for 80% of that time). Under both scenarios, only 50% of devices will touch the seabed. For both scenarios, a single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The spatial extent of a single device for the maximum scenario at Warrior Way (site 6) is very small in the context of the proposed consenting area (0.21%) and less than 0.0001% of the commercial fisheries study area. The operation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be the potential for damage to fishing equipment from the META project during this timeframe.

11.10.3.25 The impact at Warrior Way (site 6) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore, considered to be negligible.

Dale Roads (site 7)

11.10.3.26 The maximum design scenario for Dale Roads (site 7) is represented by one device deployment which may have a total area of 600 m^2 including the mooring spread. The device will be in-situ for up to 12 months (with the device in the water for 100% of that time). The most likely design scenario is represented by one device deployment which may have a total area of 200 m^2 including the mooring spread. The device will be in in-situ for up to six months (with the device in the water for 80% of that time). Under both scenarios, only 50% of devices will touch the seabed. For both scenarios, a single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The spatial extent of a single device for the maximum scenario at Dale Roads (site 7) is small in the context of the proposed consenting area (0.31%) and less than 0.0001% of the commercial fisheries study area. The operation of a single device at any one time may take place throughout the 15-year consent period, therefore there may be the potential for damage to fishing equipment from the META project during this timeframe.

11.10.3.27 The impact at Dale Roads (site 7) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.10.3.28 The maximum design scenario for East Pickard Bay (site 8) is represented by two device deployments at any one time which may have a total area of 33,910 m^2 (sea surface area). The maximum mooring spread for up to two devices is up to 500,000 m^2. A device will be in-situ for up to 18 months (with the device in the water for 100% of that time). The most likely design scenario is represented by one device deployment which may have a total area of 1,700 m^2 (seabed footprint) with a mooring spread of up to 625 m^2. The device will be in in-situ for up to 6 months (with the device in the water for 80% of that time). Under both scenarios, only 50% of devices will touch the seabed. For both scenarios, a single device will be demarked by up to four navigational marker buoys with works restricted to day light hours. The operation of a single device at any one time may take place throughout the 15-years consent period, therefore there may be the potential for damage to fishing equipment from the META project during this timeframe.

11.10.3.29 The impact at East Pickard Bay (site 8) for both the maximum and most likely design scenario is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Sensitivity of the receptor

Potting fishery

11.10.3.30 Damage to fishing pots will result in a direct loss of income through the loss of pots and the loss of potential shellfish income. As described in section 11.10.2.11 and 11.10.2.12, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid any marine devices left for testing and exploit other similar habitats within the site.

11.10.3.31 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.10.3.32 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.10.3.33 Any damage to nets may affect the direct income from the result of fish sales and costs of replacing the net. As described in section 11.10.2.15 and 11.10.2.16, with prior knowledge of the impacted areas (i.e. deployment site) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid any marine devices left for testing and exploit other similar habitats within the site.

11.10.3.34 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Significance of the effect

Overall significance of effect

11.10.3.35 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible. The effect will, therefore, be of negligible or minor adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

11.10.3.36 No further mitigation is suggested beyond that of the measure adopted as part of the project (Table 11.11~~Table 11.11~~).

11.10.4 Decommissioning phase

11.10.4.1 The impacts of the offshore decommissioning of the META project have been assessed on commercial fisheries. The environmental effects arising from the decommissioning of the META project are listed in Table 11.6~~Table 11.6~~ along with the maximum and most likely design scenarios against which each decommissioning phase impact has been assessed. The impacts during the decommissioning phase are expected to be of the same nature and magnitude as those predicted from the installation phase therefore the assessment of potential impacts on fish and shellfish presented with section 11.10.2 have been assumed for the decommissioning phase are not reiterated here.

11.11 Cumulative Impact Assessment methodology

11.11.1 Screening of other projects and plans into the Cumulative Effect Assessment

11.11.1.1 The Cumulative Impact Assessment (CIA) takes into account the impact associated with the META project together with other projects and plans. The projects and plans selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise. Each project has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

11.11.1.2 In undertaking the CIA for the META project, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the META project. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with the META project (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

11.11.1.3 Table 11.12~~Table 11.12~~ presents the projects that have been considered for inclusion in the META project CIA.

Table 11.12: List of other projects and plans considered within the CIA.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Date of installation/opertion	Further Consideration in Commercial Fisheries required?	Justification
Dredging sites									
Installation/ operation and maintenance	Neyland Yacht Haven ltd. - DML1743	1.1	12.3	10.5	No spatial overlap with consented areas. Potential for temporal overlap.	Dredge and disposal from Neyland Marina - annual volume 5500 m^3.	13/12/2017-12/12/2020	Yes	Dredging sites have the potential to temporaly overlap with the META sites and as such cumulative impacts may occur.
Installation/ operation and maintenance	Milford Haven Port Authority - DML1646	1.3	1.5	2.5	No spatial overlap with consented areas Temporal overlap with all sites.	Maintenance dredging throughout the Milford Haven. Annual volume 362500 m^3.	09/03/2017-08/03/2022	Yes	
Dredge disposal sites									
Installation/ operation and maintenance	Neyland dredge disposal site - LU190	0.5	12.4	10.5	No spatial overlap with any of the consented areas. Temporal overlap	Location: South of Neyland within the central channel of the Milford Haven, 0.22 nm diameter x 5 m depth. Status: Open	Not applicable	Yes	This dregde disposal site does temporally overlaps with the META sites and as such cumulative impacts may occur.
Installation/ operation and maintenance	Milford Haven Two dredge disposal site - LU169	26.7	20	15	No spatial overlap with any of the consented areas. Temporal overlap.	Location: To the south of Milford Haven dredge disposal grounds, unknown diameter x 50 m depth. Status: Open	Not applicable	Yes	This dregde disposal site does temporally overlaps with the META sites and as such cumulative impacts may occur.
Installation/ operation and maintenance	Milford Haven Three dredge disposal site - LU169	48.9	36	34.7	No spatial overlap with any of the consented areas. No temporal overlap.	Location: To the west of Milford Haven dredge disposal grounds, 1 nm diameter x unknown depth. Status: Open	Not applicable	Yes	This dregde disposal site does temporally overlaps with the META sites and as such cumulative impacts may occur.
Research									
Installation	Greenlink Interconnector Ltd. - RML1827	10.4	6	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap with East Pickard Bay.	Ground investigations	07-2018 - no end date given	Yes	Research operations are likely to have vessels present, with equipment for undertaking ground truthing surveys. As a result this may result in futher displacement of vessels in the area.
Installation	University College of Swansea - DEML1845	12.7	5.4	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap with East Pickard Bay.	Deposition and subsequent removal of marker buoys with environmental monitoring and mid-water settlement plates.	30/08/2018-29/08/2019	Yes	Vessels and equipment will be required for the placement of marker buoys. It is highly likely to have overlap with impacts.
Infrastructure									
Installation/ operation and maintenance / decommissioning	Greenlink Interconnector Ltd. - Government	10.4	6	0	Spatial overlap with East Pickard Bay (site 8). Temporal overlap will	The Project is a 500MW subsea electricity interconnector linking the power markets in Ireland and Great Britain and is planned for commissioning in 2023. As an EU Project of Common Interest, it is	07/2018 - ongoing	Yes	There is the potential for cumulative impact on commercial fisheries due the installation of the interconnector cable via vessels.

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Date of installation/opertion	Further Consideration in Commercial Fisheries required?	Justification
	reference: qA1296053				occur throughout the duration of the META project	one of Europe's most important energy infrastructure projects. The interconnector is planned to make Landfall at Fresh Water West beach to the south of the mouth of the Waterway.			
Installation/ operation and maintenance / decommissioning	Bombora Wave Energy	11.6	5.0	0	Spatial overlap with East Pickard Bay in intertidal area. Potential for temporal overlap	Bombora on- and off-shore infrastructure and deployment of Bombora mWave device at East Pickard Bay. This is to include device deployment (mWave device), installation of temporary communications cable between mWave device and temporary onshore control station to be located above East Pickard Bay, and installation and operation of temporary control station onshore. Laying of marine cable to shore and through intertidal area at East Pickard Bay to involve up to 3 days cable laying below MHWS using cable lay vessel and up to four vessels, including guard boat. Cable to be laid on seabed and kept in place in sandy sediment by using six, three tonne rock bags covering an area of 4.5 m^2 per rock bag. Where the marine cable traverses potential reefy habitat, it will follow natural rock channel. In the intertidal area, the cable will be laid through a natural gully, or up the vertical gully side and attached to the semi-vertical rock face with rock bolts using hand held tools. JCB will pull the cable through the intertidal area from a location above MHWS.	Q1 2020 - 2022	Yes	Bombora works are likely to cumulatively impact with the META project as spatial overlap is present
Ministry of Defence sites									
Installation/ operation and maintenance /Decommissioning	Ministry of Defence	8.1	5.5	0.0	Temporal overlap	The Castlemartin Range is located immediately south of the entrance to the Waterway and extends for up to 12 NM from the coast between Little Furznip (at the southern extent of Freshwater West) and St Govan's Head (Milford Haven Port Authority 2019). The southern boundary of the East Pickard Bay (Site 8) site is located adjacent to the northern boundary of the Castlemartin Military Practice Area D113A. The range at Castlemartin supports the training of military personnel (Army) in the firing of a range of munitions at land-based targets. The seaward danger area provides a safety zone for overfire and shrapnel which may result from the striking of target. The Castlemartin Range is used every day of the week and on some weekends.	N/A	Yes	Any military practises at sea will result in an exclusion zone from the area. A notice to mariners will be issued and fishing vessels will be excluded from the area.
Aquaculture projects									
Installation/ operation and maintenance	Pembrokeshire Scallops	15.3	1.8	3.9	Temporal overlap	The scallop farm is located within Castlebeach Bay, whereby a system of weighted ropes will be deployed for growing scallops and mix species of	Jan 2019 – Q4 2020 (possible renewal of licence)	Yes	There is potential for temporal overlap with Dale Roads (site 7) and as such will be taken forward for

Phase	Developer - Reference	Distance from Warrior Way (km)	Distance from Dale Roads (km)	Distance from East Pickard Bay (km)	Spatial/temporal overlap with the META project	Details	Date of installation/opertion	Further Consideration in Commercial Fisheries required?	Justification
						native algae. The farm will be serviced by vessels and divers.			assessment. Vessels will be used to service the aquaculture site.
Installation/ operation and maintenance	Tethys Oysters	8.9	5.1	2.6	Temporal overlap	The oyster farm is located on the eastern side of Angle Bay, whereby oysters are grown in baskets on metal supports. The farm will be serviced from the shore by foot.	Oct 2017 – Oct 2020 (possible renewal of licence)	Yes	There is potential for temporal overlap with the META project and as such will be included for assessment.
Pembroke Dock Marine Projects									
Installation/ operation and maintenance / decommissioning	Wave Hub Ltd. - SC1082	31.4	31.1	25.8	No spatial overlap with any consented areas. Potential for temporal overlap as the projects are linked.	Pembrokeshire Demonstration zone Scoping Report submitted The Project entails the development of 90 km2 of seabed with water depths of approximately 50 metres and a wave resource of approximately 19 kW/m; to support the demonstration of wave arrays with a generating capacity of up to 30MW for each project. Consent for this Project could be achieved in 2022, infrastructure could be built by 2024 and the first technology could be installed in 2025.	Jul-18	Yes	This project may result act in cumulation with impacts stated. Vessels are required to support the construction and operations of the site.

11.11.1.4 The potential impacts identified for assessment as part of the commercial fisheries CIA are:

- Displacement from traditional fishing grounds;
- Loss of traditional fishing grounds: and
- Damage to fishing equipment.

11.12 Cumulative Impact Assessment

11.12.1.1 A description of the significance of cumulative impacts upon commercial fisheries receptors arising from each identified impact is given below.

Displacement from traditional fishing grounds

11.12.1.2 Further displacement of the commercial fishing fleet from traditional fishing grounds as a result of cumulative impacts arising from projects that spatially and temporally overlap with the META project as listed in Table 11.12~~Table 11.12~~ have been assessed. The potential impacts of interference to traditional fishing grounds have been outlined in section 11.10.2.2 and are not reiterated here.

Magnitude of impact

11.12.1.3 Three dredging sites are currently active: DML1743, RML1462 and DML1646. DML1743 is a capital dredging operation located within Neyland marina and is expected to be competed in 2020. RML1462 is a capital dredging operation located in close proximity to Pembroke Dock and expected to be completed in 2022. DML1646 is a maintenance dredging operation and has multiple sites located throughout the Waterway with ongoing operations until 2022. Vessels associated with the dredging activities will be active within the dredging areas only, apart from transit to/from the dredging sites along pre-determined shipping routes. It is therefore considered unlikely that these vessels will interact with the vessels from the META activities and lead to cumulative effects.

11.12.1.4 Three dredge disposals sites are presently open/active. These are LU190 located in Neyland, LU169 has two sites located to the south and west of the Waterway (chapter 4: Figure 4.1). As above, vessels will be confined to the disposal sites and to shipping routes to and from Pembroke port, therefore, there is unlikely to be interaction with the vessels from META and therefore cumulative effects are not considered likely to occur.

11.12.1.5 Two research operations are currently in operation. The Greenlink Interconnector, ground investigation (RMI1827) is currently in progress (2018), however no information is given as to when the investigations will finish. University College of Swansea, settlement tiles (DEML1845) is currently in progress (2018) and expected to finish towards the end of 2019. For both projects, it can be expected that vessels will operate within the boundary presented in chapter 4: Figure 4.1.

11.12.1.6 The Greenlink Interconnector cable (qa1296053) directly overlaps with East Pickard Bay (site 8) and makes landfall at Freshwater West beach (chapter 4: Figure 4.1). Installation of the Greenlink Interconnector cable is anticipated to commence in 2020 and be completed in 2023 (Element Power, 2018), with works at the landfall at Freshwater West likely to take place over a much shorter period. It has been assumed that the cable will be trenched within the sand up to landfall, avoiding areas of rocky substrate. The project is currently in the process of submitting the planning application, with a submitted scoping report for review (Greenlink Scoping Report, 2018). The number of vessels predicted to be used are not provided within the scoping report, however the predicted vessel types are given, and include one or more of the following: cable lay vessel, cable lay barge, guard vessel and rock placement vessel. Installation of the cable will occur on a 24-hour basis to reduce navigational impact. Vessels can be expected to operate within the boundary presented in chapter 4: Figure 4.1.

11.12.1.7 The Ministry of Defence (MOD) practise areas are located just outside of the mouth of the Waterway and overlap in part with East Pickard Bay (site 8). Operations and vessels movements are unknown; however, it is likely that vessels will be excluded from the MOD area during practise operations.

11.12.1.8 The Pembrokeshire Scallops project is located within Castlebeach Bay - exact location and size of the site is to be confirmed. Vessel numbers that will service the site are unknown.

11.12.1.9 The Pembrokeshire Demonstration Zone (SC1082) project is 90 km^2 in area with the aim of supporting the demonstration of wave devices. Consent for this project could be achieved by 2022, with infrastructure being built in 2024 and full operation by 2025. The project is currently in the process of submitting a consent application (Q2 2019). No information has been provided on the number of vessels to be used throughout the project (Wave Hub, 2018).

11.12.1.10 The Bombora project is expected to install their marine renewable device (mWave) Q1 2020. The marine device will require installation of a temporary communications cable to shore which is expected to take up to three days to install, using up to four vessels (including a guard boat). The cable is 1.4 km in length and fixed to the seabed by rock bags. The cable will be laid on sandy sediments within the East Pickard Bay META test site (site 8) and within natural rock channels out with the META site. The cable will be removed following the 1.5 years proposed maximum deployment period.

Warrior Way (site 6)

11.12.1.11 Dredging activities and dredge disposal sites in proximity to Warrior Way (site 6) (Table 11.12~~Table 11.12~~) may result in further vessel interference to traditional fishing areas. The three sites where there is active dredging lie 1.1 to 1.3 km from Warrior Way (site 6) and therefore there is no spatial overlap in the installation areas. Similarly, the closest dredge disposal site lies 0.5 km from Warrior Way (site 6) whilst other 'open' dredge disposal sites are much further afield at distances of ~26 km or more (Table 11.12~~Table 11.12~~). Temporally, the active dredging will continue until 2022, and with the META project works due to commence installation and operation in 2019 there is the potential for overlap in the timings of these activities. Other activities where there is predicted to be a temporal overlap with Warrior Way (site 6) are the Greenlink Interconnector (10.4 km distance), Pembrokeshire Scallop project and the Pembrokeshire Demonstration Zone (24.5 km distance).

11.12.1.12 Vessel activity at the above projects is expected to be very localised, mainly within the site boundary, therefore are unlikely to interfere with commercial fishing vessel, which would avoid these areas. In addition, the spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.13 The cumulative impact at Warrior Way (site 6) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

Dale Roads (site 7)

11.12.1.14 Dredging activities and dredge disposal site temporally overlap with Dale Roads (site 7) (Table 11.12~~Table 11.12~~) and may result in further vessel interference to traditional fishing areas. The three sites where there is active dredging lie 1.5 to 12.3 km from Dale Roads (site 8) and therefore there is no spatial overlap in the installation areas. Similarly, the closest dredge disposal site lies 12.4 km from Dale Roads (site 7) whilst other 'open' dredge disposal sites are much further afield at distances of ~20 km or more (Table 11.12~~Table 11.12~~). Temporally, the active dredging will continue until 2022, and with the META project works due to commence installation and operation in 2019 there is the potential for overlap in the timings of these activities. Other activities expected to temporally overlap with Dale Roads (site 7) are the Greenlink Interconnector (6 km distance) and the Pembrokeshire Demonstration Zone (22.8 km distance). No projects directly spatially overlap with Dale Roads (site 6).

11.12.1.15 Vessel activity is expected to be similar to section 11.12.1.12, if not less due to the distance of Dale Roads (site 7) from these projects.

11.12.1.16 The cumulative impact at Dale Roads (site 7) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.12.1.17 Dredging activities and dredge disposal site in proximity to East Pickard Bay (site 8) (Table 11.12~~Table 11.12~~) may result in further vessel interference to traditional fishing areas. The three sites where there is active dredging lie 2.5 to 10.5 km from East Pickard Bay (site 8) and therefore there is no spatial overlap in the installation areas. Similarly, the closest dredge disposal site lies 10.5 km from East Pickard Bay (site 8) whilst other 'open' dredge disposal sites are further afield at distances of ~15 km or more (Table 11.12~~Table 11.12~~). Temporally, the active dredging will continue until 2022, and with the META project works due to commence installation and operation in 2019 there will be an overlap in the timings of these activities. Pembrokeshire Demonstration Zone (17.9 km distance) is also predicted to have a temporal overlap with East Pickard Bay (site 8).

11.12.1.18 Projects that have a spatial overlap with East Pickard Bay (site 8) include ground investigations for the Greenlink Interconnector cable, deployment of settlement tiles by University College of Swansea, the Greenlink Interconnector cable, Bombora and MOD operations. The ground investigations are expected to operate within the Greenlink Interconnector site boundary and overlaps with the most eastern section of East Pickard Bay (site 8) (chapter 4: Figure 4.1). The scoping report states that pre-installation surveys (ground investigation) will be undertaken three to six months before Greenlink Interconnector cable installation in 2020, however no specific construction plan for the works near the East Pickard Bay (site 8) have been provided. The deployment of settlement tiles overlaps with a small area, on the southern boundary of East Pickard Bay (site 8), this project is expected to finish in 2019. The Greenlink Interconnector cable overlaps with the most eastern section of East Pickard Bay (site 8) as per the ground investigation, with installation set to begin in 2020 with operation by 2023. The Bombora project aims to install the communications cable and mWave device in Q1 2020. For all projects there will be both a spatial and temporal overlap with the META project works, however works are of short-duration (three days installation period for the communications cable and two days to install the mWave device). Once projects reach completion, all installation vessels are expected to return to port with only operation and maintenance vessels being used intermittently in the area. The MOD exercises may exclude vessels from the area, however this is expected to be over a period of a few days at any one time. Once exercises have been completed, vessels will be allowed to return to the area.

11.12.1.19 Vessel activity at the above projects is expected to be localised within the sites and therefore are unlikely to interfere with commercial fishing vessels, which would avoid these areas. In addition, the spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.20 The cumulative impact at East Pickard Bay (site 8) is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of receptor

Potting fishery

11.12.1.21 It is anticipated that the potting fishery will be able to transit past and avoid any interaction with the META project and other projects during installation, and operation and maintenance activities. Other potting sites are available for the fishery within the area. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid any interference and exploit other similar habitats within the area.

11.12.1.22 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.12.1.23 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.12.1.24 The commercial trawling and netting fishery are able to set equipment throughout the commercial fisheries study area and are not restricted to specific areas, such as the potting fishery. It is anticipated that during the installation, and operation and maintenance of the META project and other projects, that this fishery will be able to avoid any interference with vessels. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid any interference and exploit other similar habitats within the area.

11.12.1.25 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Significance of effect

Overall significance of effect

11.12.1.26 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible to minor. The effect will therefore be of negligible to minor adverse significance, which is not significant in EIA terms.

[7] The Greenlink Interconnector project is a proposed subsea cable linking Ireland and Great Britain, area shown is an estimation of the Welsh section of the project.

Loss of traditional fishing grounds

Magnitude of impact

11.12.1.27 The three dredging sites: DML1743, RML1462 and DML1646 mentioned previously (paragraph 11.12.1.3) occupy areas of 59,800m^2, 5,500m^2, and 2,678,500 m^2 (at multiple sites) respectively. The active dredge disposals sites have site areas of 129,300 m^2 (LU190), 4,703,400 m^2 (LU 169 south) and 1,648,100 m^2 (LU 169 west) (chapter 4: Figure 4.1)

11.12.1.28 The Greenlink Interconnector ground investigation occupies a site area[7] of 145,550,000 m^2. University College of Swansea, settlement tiles have a site area of 84,700 m^2. For both projects, it can be expected that a temporary loss of fishing grounds may occur within the site boundaries presented in chapter 4: Figure 4.1.

11.12.1.29 The Greenlink Interconnector cable corridor directly overlaps with East Pickard Bay (site 8) and makes landfall at Freshwater West beach (chapter 4: Figure 4.1). The cable has been assumed to be trenched within the sand up to landfall, avoiding areas of rocky substrate. It has a site area[76] of 145,550,000 m^2. The project is currently in the process of submitting the planning application as of 2019, with a scoping report submitted for consultation (Greenlink Scoping Report, 2018) to the appropriate regulatory authorities.

11.12.1.30 The Pembrokeshire Scallops project is located within Castlebeach Bay within the Waterway - the exact location and size of the site is to be confirmed.

11.12.1.31 The Pembrokeshire Demonstration Zone (SC1082) project is 90 km^2 in area, with the aim of supporting the demonstration of wave devices. Consent for this project could be achieved by 2022, with infrastructure being built in 2024 and fully operation by 2025. The project is currently in the process of submitting a consent application (Q1 2019) (Wave Hub, 2018).

11.12.1.32 Bombora plan to install a temporary communications cable and mWave device in Q1 2020. The marine cable will be 1.4 km in length and fixed to the seabed using rock bags, on sandy sediments within the East Pickard Bay META site (site 8) and within natural rock channels out with the site. The cable will be removed following the 15 years consent period.

Warrior Way (site 6)

11.12.1.33 The location of other projects in relation to the META project, and the potential for temporal overlap, have been described in section 11.12.1.11. The area of fishing grounds that may be temporarily lost to the above CIA projects is expected to be very localised and of a temporary nature. In addition, extensive alternate fishing grounds are available. The spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.34 The cumulative impact at Warrior Way (site 6) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore considered to be negligible.

Dale Roads (site 7)

11.12.1.35 Location of other projects in relation to the META project and their temporal overlap have been described in section 11.12.1.14. The area of fishing grounds which may be temporarily lost due to cumulative impacts is expected to be similar to section 11.12.1.12, if not less due to the distance of Dale Roads (site 7) from these projects.

11.12.1.36 The cumulative impact at Dale Roads (site 7) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be negligible

East Pickard Bay (site 8)

11.12.1.37 Location of other projects in relation to the META project and their temporal overlap have been described in section 11.12.1.17. Projects that have a spatial overlap with East Pickard Bay (site 8) include ground investigations for the Greenlink Interconnector cable, deployment of settlement tiles by University College of Swansea, and the Greenlink Interconnector cable.

11.12.1.38 The ground investigations for the Greenlink Interconnector are expected to operate within the Greenlink Interconnector site boundary and overlaps by approximately 111,300 m^2 with the eastern most section of East Pickard Bay (site 8) (chapter 4: Figure 4.1).

11.12.1.39 The Greenlink Interconnector scoping report states that pre-installation surveys (ground investigation) will be undertaken three to six months before cable installation which is due to take place in 2020, however no specific construction plan for the works near the East Pickard Bay (site 8) is available.

11.12.1.40 The deployment of settlement tiles (Swansea University) overlaps with East Pickard Bay (site 8) by up to 84,700 m^2 on the southern boundary of this site. The Swansea University project is expected to finish in 2019 therefore there is the potential that there will be little or no temporal overlap with the META project. The Greenlink Interconnector cable overlaps with the most eastern section (117,000 m^2) of East Pickard Bay (site 8) as per the ground investigation, with installation set to commence in 2020, with full operation due by 2023.

11.12.1.41 The Bombora project plans to install a temporary communications cable and mWave device in Q1 2020. The marine cable will be 1.4 km in length and fixed to the seabed using rock bags, on sandy sediments within the East Pickard Bay META site (site 8) and within natural rock channels out with the site. The cable will be removed following the 1.5 years consent period. Installation of the cable is proposed to take up to 3 days in the marine environment, and the mWave device will take up to 2 days to install.

11.12.1.42 The area of fishing grounds that may be lost to the above projects is expected to be localised within the project site boundaries and will be temporary in nature. In addition, the spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.43 The cumulative impact at East Pickard Bay (site 8) is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of receptor

Potting fishery

11.12.1.44 It is anticipated that the potting fishery will be able to use other available potting sites other than those required by the META project and CIA projects during installation, and operation and maintenance, and decommissioning. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid any interference and exploit other similar habitats within the area.

11.12.1.45 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.12.1.46 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.12.1.47 Commercial trawling and netting fisheries are able to set equipment throughout the commercial fisheries study area and are not restricted to specific areas, such as the potting fishery. It is anticipated that during the installation, operation and maintenance and decommissioning of the META project and CIA projects, that these fisheries will be able to access other areas for fishing. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid any interference and exploit other similar habitats within the area.

11.12.1.48 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore considered to be low.

Significance of effect

Overall significance of effect

11.12.1.49 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible to minor. The effect will therefore be of negligible to minor adverse significance, which is not significant in EIA terms.

Damage to fishing equipment

11.12.1.50 Both the dredging activities and the dredge disposal sites have no impact pathway with CIA projects or the META project as mitigation measures will be in place to prevent any fishing vessels from accessing the sites during operations. Following cessation of works, no equipment would be left on the seabed therefore no residual potential to damage fishing equipment will remain.

11.12.1.51 Two research operations are currently in operation. The Greenlink Interconnector ground investigation (RMI1827) is currently in progress (2018) with a site area[8] of 145,550,000 m^2, it can be expected that no equipment is to be left on the seabed and therefore represents no risk to fishing vessels. University College of Swansea settlement tiles (DEML1845) is currently in progress (2018) and expected to finish towards the end of 2019, representing no temporal overlap and has a site area of 84,700 m^2. The presence of settlement tiles may represent a risk to fishing equipment, however mitigation measure would be expected to be in place to notify fishing vessels of the presence of these settlement tiles.

11.12.1.52 The Greenlink Interconnector cable directly overlaps with East Pickard Bay (site 8) and makes landfall at Freshwater West beach (chapter 4: Figure 4.1). Installation of the Greenlink Interconnector cable is anticipated to commence in 2020 and be completed by 2023 (Element Power, 2018), with works at the landfall at Freshwater West likely to take place over a much shorter period. It is assumed the cable will be trenched within the sand up to landfall, avoiding areas of rocky substrate and with a recommended burial depth of 1 m to 3 m below mean seabed level (Greenlink Scoping Report, 2018).

11.12.1.53 The Pembrokeshire Scallops project is located within Castlebeach Bay within the Waterway - the exact location and size of the site is to be confirmed. It is unknown if fishing would be excluded within the aquaculture site.

11.12.1.54 The Greenlink Interconnector cable corridor directly overlaps with East Pickard Bay (site 8) and makes landfall at Freshwater West beach (chapter 4: Figure 4.1). The cable has been assumed to be trenched within the sand up to landfall, avoiding areas of rocky substrate. It has a site area[76] of 145,550,000 m^2. The project is currently in the process of submitting the planning application as of 2019, with a scoping report submitted for consultation (Greenlink Scoping Report, 2018) to the appropriate regulatory authorities.

11.12.1.55 The Bombora project plan to install a marine communications cable and mWave device in Q 2020. The marine cable will be 1.4 km in length and fixed to the seabed using rock bags, on sandy sediments within the East Pickard Bay META site (site 8) and within natural rock channels out with the site. The cable will be removed following the 1.5 years consent period. Installation of the cable is proposed to take up to 3 days in the marine environment, and the mWave device will take up to 2 days to install.

Warrior Way (site 6)

11.12.1.56 Location of other projects in relation to the META project and their temporal overlap have been described in section 11.12.1.11. The potential to cause damage to fishing equipment by the above projects is expected to be very localised within the project sites and temporary in nature. Once the projects are operational; fishing vessels will be notified about the presence of any equipment on the seabed. The spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.57 The cumulative impact at Warrior Way (site 6) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

[8] The Greenlink Interconnector project is a proposed subsea cable linking Ireland and Great Britain, area shown is an estimation of the welsh section of the project.

Dale Roads (site 7)

11.12.1.58 The location of other projects in relation to the META project, and their temporal overlap with the META project have been described in section 11.12.1.14. The area of fishing grounds which may be temporarily lost is expected to be similar to section 11.12.1.56, if not less due to the distance of Dale Roads (site 7) from these projects.

11.12.1.59 The cumulative impact at Dale Roads (site 7) is predicted to be of very local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be negligible.

East Pickard Bay (site 8)

11.12.1.60 Location of other projects in relation to the META project and their temporal overlap have been described in section 11.12.1.17. Projects that have a spatial overlap with East Pickard Bay (site 8) include ground investigations for the Greenlink Interconnector cable, deployment of settlement tiles by University College of Swansea, the proposed Bombora Wave Energy project, and the Greenlink Interconnector cable.

11.12.1.61 The ground investigations for the Greenlink Interconnector are expected to operate within the Greenlink Interconnector site boundary and overlaps by approximately 111,300 m^2 with the eastern most section of East Pickard Bay (site 8) (Chapter 4: Figure 4.1).

11.12.1.62 The Greenlink Interconnector scoping report states that pre-installation surveys (ground investigation) will be undertaken three to six months before cable installation which is due to take place in 2020, however no specific construction plan for the works near the East Pickard Bay (site 8) is available.

11.12.1.63 The deployment of settlement tiles overlaps with 84,700 m^2 on the southern boundary of East Pickard Bay (site 8), this project is expected to finish in 2019. The Greenlink Interconnector cable overlaps with the most eastern section (117,000 m^2) of East Pickard Bay (site 8) as per the ground investigation, with installation is set to begin in 2020 and be operational by 2023. It can be expected that the Interconnector cable will be buried to a depth of 1 m to 3 m below mean seabed level and therefore not represent a risk to fishing equipment. For all projects there will be both a spatial and temporal overlap with the META project works.

11.12.1.64 The presence of the Bombora temporary marine communications cable has the potential to cause snagging of fishing gear, however only light otter trawling, set nets and lobster and crab potting are carried out in the East Pickard Bay (site 8) area (Figure 11.3~~Figure 11.3~~, Figure 11.4~~Figure 11.4~~, Figure 11.5~~Figure 11.5~~). The marine cable will only be deployed for a maximum of 18 months after which time it will be removed, and the risk of snagging will be removed. Notices to mariners will inform potential users of any infrastructure, including the mWave and marine portion of the communications cable. In addition, the marine portion of the communications cable will be kept in place on the seabed with rock bags, therefore potential for snagging of gear is minimised.

11.12.1.65 The area of fishing grounds that may be lost to the above projects is expected to be localised within the sites and temporary in nature. Once the projects are operational; fishing vessels will be permitted to return to site. In addition, the spatial extent of any impact will be small in the context of the available commercial fishing area and considering the background levels of vessels and port-related activity.

11.12.1.66 The cumulative impact at East Pickard Bay (site 8) is predicted to be of local spatial extent, long-term duration, intermittent and reversible. It is predicted that the cumulative impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of receptor

Potting fishery

11.12.1.67 It is anticipated that the potting fishery will likely be able to identify subsea equipment demarked by navigational buoys for the META project and other projects during installation, and operation and maintenance. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) potting vessels are likely to be able to avoid any damage to fishing equipment.

11.12.1.68 The potting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Hand gathering fishery

11.12.1.69 No impact pathway is expected as all sites are below the MLWS.

Trawling and netting fishery

11.12.1.70 The commercial trawling and netting fisheries are able to set equipment throughout the commercial fisheries study area and are not restricted to specific areas, such as the potting fishery. It is anticipated that the trawling and netting fishery will likely be able to identify subsea equipment demarked by navigational buoys for the META project and other projects considered within this CIA. These fisheries will also be able to access other areas for fishing. With prior knowledge of the cumulatively impacted areas (i.e. deployment site, cable routes) and measures adopted as part of the project (Table 11.11~~Table 11.11~~) trawling and netting vessels are likely to be able to avoid any damage to fishing equipment.

11.12.1.71 The trawling and netting fishery receptor is deemed to be of low vulnerability, high recoverability and high levels of alternative fishing grounds are available. The sensitivity of the receptor is therefore, considered to be low.

Significance of effect

Overall significance of effect

11.12.1.72 Overall, for Warrior Way (site 6), Dale Roads (site 7) and East Pickard Bay (site 8) and considering each respective maximum and most likely design scenario, the sensitivity of the receptor is considered to be low and the magnitude of the impact is deemed to be negligible to minor. The effect will therefore be of negligible to minor adverse significance, which is not significant in EIA terms.

11.13 Transboundary effects

11.13.1.1 Whilst other nations may fish within the ICES rectangles described, impacts to international commercial fisheries from the META project are expected to be similar to the impacts stated in the assessment. Considering no significant impacts were identified within the META assessment, significance of impact due to transboundary effects are expected to be negligible (adverse). Therefore, there is no potential for significant transboundary effects with regard to commercial fisheries from the META project upon the interests of other European Economic Area states.

11.14 Inter-related effects

11.14.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. There are not considered to be any potential commercial fisheries inter-related effects.

11.15 Conclusion and summary

11.15.1.1 Table 11.13~~Table 11.13~~ summarises the assessment of effects on commercial fisheries associated with the installation, operation and maintenance, and decommissioning of the META project.

Table 11.13: Summary of potential environment effects, mitigation and monitoring at the META project.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Installation phase							
Temporary interference to traditional fishing grounds	EMP	Minor (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Temporary loss of traditional fishing ground	EMP	Negligible (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Operation and maintenance phase							
Temporary interference to traditional fishing grounds	EMP	Minor (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Temporary loss of traditional fishing ground	EMP	Negligible (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Damage to fishing equipment	EMP	Negligible (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Decommissioning phase							
Temporary interference to traditional fishing grounds	EMP	Minor (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None
Temporary loss of traditional fishing ground	EMP	Negligible (adverse)	Low	Negligible or minor (adverse; not significant in EIA terms)	None	n/a	None

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