Land's End and Cape Bank Site of Community Interest MMO Fisheries Assessment

1. Summary

Table 1 shows a summary of the outcomes of this assessment of the impact of fishing in the Cape Bank portion of the Land's End and Cape Bank Site of Community Interest (SCI). Fishing using bottom towed gear was not considered as part of this assessment because it is prohibited at Cape Bank.

Table 1: Summary of assessment

Features (sub-features)	Activity/gear	Part A outcome	Part B outcome	In-combination assessment
Reef (Circalittoral rock and infralittoral rock)	Pots/creels	LSE	No adverse effect	No adverse effect
	Gill nets			
	Trammel nets			
	Entangling nets			
	Cuttle pots	No LSE		
	Fish traps			
	Demersal drift nets			
	Demersal longlines			
	Beach seines/ring nets			
	Shrimp push-nets			
	Fyke and stakenets			
	Bait Dragging			
	Commercial diving			

2. Introduction

Table 2 shows the name and legal status of the site.

Table 2: Site details

Name and legal Status of site(s):	Name of site(s)	Legal status
	Land's End and Cape Bank	SCI

The Land's End and Cape Bank (SCI) lies to the west of the Land's End peninsula and extends to almost 22 km from the coast. The reefs are completely submerged features composed almost entirely of granite. The site has two main reef areas; upstanding reef fringing the coast (the Lands

End part of the site) and upstanding reef further offshore that is roughly aligned with the coastline (the Cape Bank part of the site).

The reef within the Cape Bank part of the site is of particular conservation interest. The crescent shaped system of offshore upstanding rocky reefs stretches for 35 km. The reef here is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities.

The south westerly position of the site on the British coast means that these reefs are exposed to the full force of the waves, strong tidal currents and oceanic swells coming in from the Atlantic. The site is found in a fully marine environment and there are no major freshwater run-off sources from the land.

Table 3 shows the features for which the site has been designated and associated conservation objectives.

Table 3: Designated features and conservation objective

Feature	Sub-feature	Matrix sub-feature	High level conservation objective
1170 Reefs	Circalittoral rock	Subtidal bedrock reef	Subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring: • the extent and distribution of qualifying natural habitats • the structure and function (including typical species) of qualifying habitats • the supporting processes on which qualifying natural habitats rely
	Infralittoral rock		

2.1. Reefs

Reefs in the Land's End and Cape Bank SCI are an outstanding example of Annex 1 reef habitat in a European context (Birchenough *et al*, 2008). The influence of the relatively warm waters from the Gulf Stream and the Lusitanian current from the south, give a distinct character to the communities with species such as sea fans, cup corals and soft corals, some of which are of high conservation importance (Irving, 1996).

The reefs are primarily granite with two main areas, the coastal upstanding rocky reef and the offshore upstanding rocky reef. Both reefs are a mosaic of infralittoral and circalittoral rock, although infralittoral rock dominates the coastal reef and circalittoral rock dominates the offshore reef.

The offshore reef extends in a broad, arching crescent from around Bann Shoal in the north of the site, out past Cape Cornwall Bank and back towards the Longships reef. This reef is roughly aligned with the coastline and makes up the Cape Bank section of the site. It is 12 km at its widest point (Axelsson and Dewey, 2011).

The Cape Bank offshore reef is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities.

Cape Bank lies in ICES rectangle 29E4 and across two administrative areas: 0-6 nautical miles (nm) and 6-12 nm (see chart 1).

Sub-feature: Circalittoral rock

Circalittoral rocky reef is predominantly found in a crescent shaped system and forms the major conservation interest at the Land's End and Cape Bank site. The offshore reef includes a rock platform, found at approximately 45 to 55 m depth, which is the base for three steep rocky ridges which run for 20 km along the reef. The ridges are over 1 km wide and climb up to 25 m from the rock platform (Birchenough *et al*, 2008).

The reef is characterised by cup corals such as *Caryophyllia smithii* occurring alongside sponges and Ross 'coral' *Pentapora fascialis*, the bryozoan *Porella compressa* and crustose communities on wave-exposed circalittoral rock. Bryozoan and hydroid turf communities, as well as areas grazed by echinoderms are present together with the echinoderm *Echinus esculentus* and the rock-boring sponge *Cliona celata* (Birchenough *et al*, 2008). Water movement by currents and wave action also encourages dense growths of sponges, sea squirts, anemones and soft corals (Irving, 1996). Other notable species include the pink sea fan *Eunicella verrucosa*.

2.2. Scope of this assessment

The geographic scope of this assessment covers the Cape Bank portion of the site (hereafter 'Cape Bank'). Interactions between fishing gears and features in the Land's End portion of the site will be assessed by Cornwall Inshore Fisheries and Conservation Authority.

All fishing activity/feature interactions at this site identified as 'amber' in the matrix of fisheries gear types and European marine site protected features (hereafter 'the Matrix') were considered for inclusion in this assessment. Fishing activity-feature interactions identified as 'green' are also assessed if there are in-combination effects with other activities.

Table 4 shows the fishing activities with amber interactions assessed at Cape Bank. The 'matrix gear type' column shows the categories used in the Matrix. These are matched to the 'aggregated method' categories used in Natural England conservation advice.

Table 4: Fishing activities with amber interactions included for assessment

Feature	Matrix Gear Type	Natural England Aggregated Method
Reef	Pots/creels (crustacean/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Anchored nets/lines
	Trammel nets	
	Entangling nets	
	Demersal drift nets	
	Demersal longlines	
	Beach seines/ring nets	Shore-based activities
	Fyke and stakenets	
	Commercial diving	Diving

Commercial sea fishing has the potential to vary in nature and intensity over time. This assessment considers a particular range of recent and likely future activity based on activity levels and type as identified in section 4.1.

To ensure that the conservation objectives of the site are not hindered should future activity occur outside of this range, MMO will monitor activity at this site, and will review this assessment should certain conditions be triggered. See section 8 for more information on ongoing monitoring and control at this site.

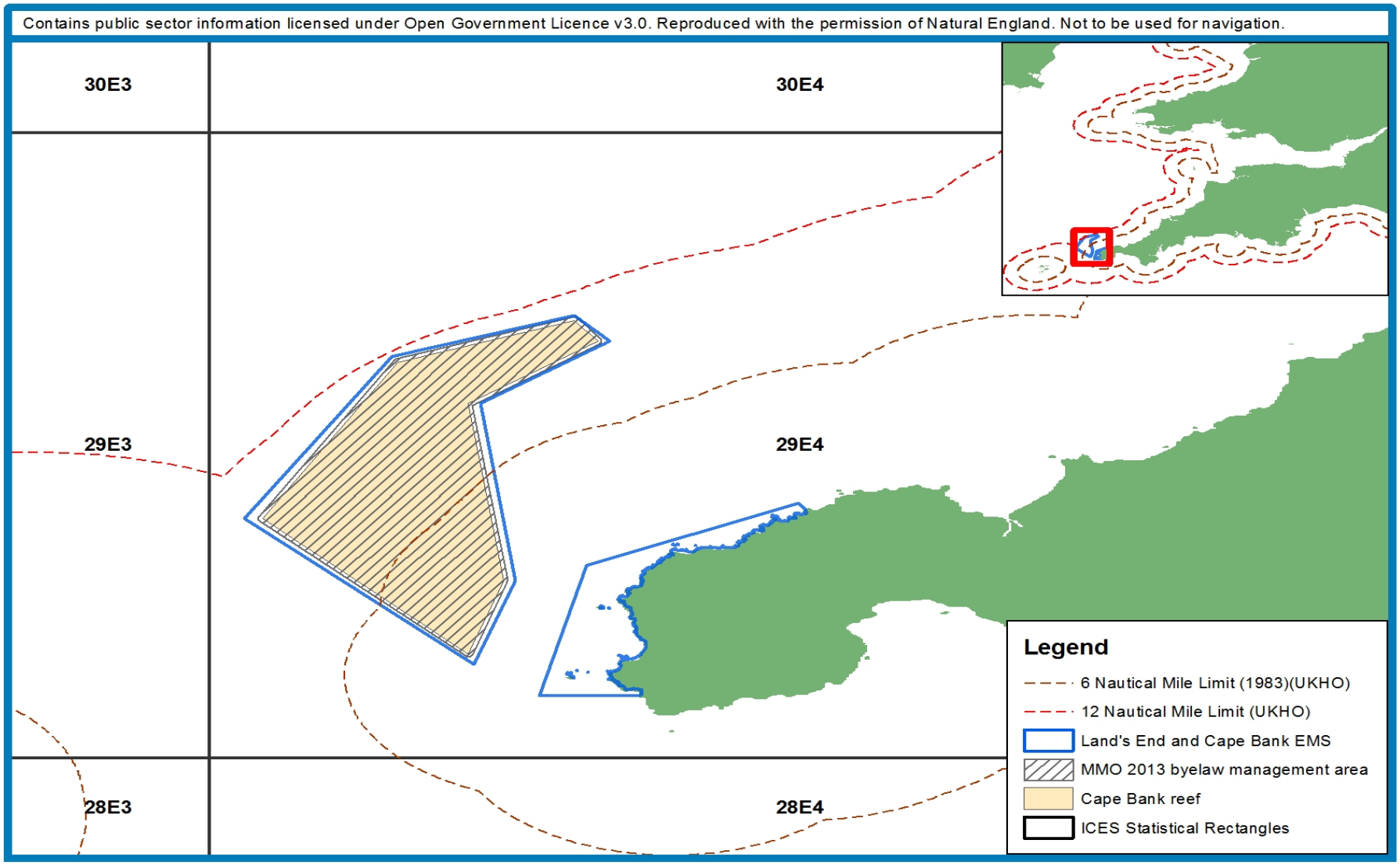


Chart 1 showing Land's End and Cape Bank SCI

3. Part A Assessment

Table 5 shows the Natural England conservation advice package used to inform this assessment.

Table 5: Advice packages used for assessment

Feature	Package	Link
Reef	Land's End and Cape Bank conservation advice (draft)	www.gov.uk/government/publications/marine-conservation-advice-for-candidate-special-area-of-conservation-lands-end-and-cape-bank-uk0030375

Part A of this assessment was carried out in a manner that is consistent with the likely significant effect test required by article 6(3) of the Habitats Directive[1].

For each fishing activity, a series of questions were asked[2]:

1. Does the activity take place, or is it likely to take place in the future?
2. What are the potential pressures exerted by the activity on the feature?
3. Are the effects/impacts of the pressures likely to be significant?

For each activity assessed in Part A, there were two possible outcomes for each identified pressure-feature interaction:

The pressure-feature interactions were not included for assessment in Part B if:

1. the feature is not exposed to the pressure, and is not likely to be in the future; or
2. the effect/impact of the pressure is not likely to be significant.

The pressure-feature interactions were included for assessment in Part B if:

1. the feature is exposed to the pressure, or is likely to be in the future; and
2. the potential scale or magnitude of any effect is likely to be significant; or
3. it is not possible to determine whether the magnitude of any effect is likely to be significant.

3.1. Activities not taking place

Table 6 shows activities which are excluded from further assessment as they do not take place and are not likely to take place in the future.

Table 6: Activities not taking place and not likely to take place in the future

Feature	Gear type	Justification
Reef	Beach seines/ring nets	Cape Bank is approximately 10 km offshore and so not subject to shore based activities

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN

[2] The test for likely significant effect under article 6(3) of the Habitats Directive is not required for activities which are directly connected to or necessary to the management of the site. Fishing activities are considered to be not directly connected to or necessary to the management of the site unless otherwise indicated.

	Fyke and stakenets	
	Bait dragging	Bait dragging does not place in the UK outside of Poole Harbour.
	Cuttle pots	Gear codes used in gear register and logbooks do not distinguish cuttle pots from crab/lobster pots. However, expert opinion from MMO officers states with high confidence that cuttle pots are not used at this site.
	Fish traps	Fish traps are used in rivers and estuaries therefore this site is not a suitable location for this gear.
	Demersal drift nets	Demersal drift nets are not only suitable on clean ground and tend to be used on sandbanks or occasionally in estuaries. This site is not suitable for use due to the uneven rocky seabed.
	Demersal longlines	VMS data and expert opinion from MMO coastal officers show that demersal longlines are not used at this site.
	Commercial diving	The site is not suitable for commercial dive fishing due to distance offshore (approximately 10km), the strong tidal currents and waves, and depth of 25-50m.

3.2. Potential pressures exerted by the activities on the feature

For the remaining activities, potential pressures were identified using the Natural England conservation advice package identified in table 5 and associated advice on operations tables. All pressures identified other than those categorised as 'not relevant' were included.

Table 7 shows the potential pressures identified.

Table 7: Potential pressures for anchored nets and traps on reef

Feature	Aggregated method	Potential pressures
Reef	Anchored nets **and** Traps	Abrasion/disturbance of the substrate on the seabed surface
		Deoxygenation
		Hydrocarbon & PAH contamination
		Introduction or spread of non-indigenous species
		Litter
		Organic enrichment
		Penetration, abrasion or disturbance of seabed sub-surface substrate
		Removal of non-target species
		Removal of target species
		Synthetic compound contamination contamination
		Transition elements & organo-metal contamination

3.3. Significance of effects/impacts

To determine whether each potential effect or impact is likely to be significant, the sensitivity assessments and risk profiling of pressures from the advice on operations section of the Natural England conservation advice package were used.

Table 8 identifies the pressures from particular gears which are likely to have a significant effect on each feature. Where a pressure from a particular gear is identified as not likely to have a significant effect, justification is provided. Features with similar sensitivities have been considered together.

To ensure the effects of fishing activities in-combination with other activities (including other fishing activities) are fully assessed the pressures from amber activities which are not likely to cause a significant effect but which do interact with the feature are identified in table 16.

These pressures are considered in the in-combination aspect of the part B assessment (section 4.4).

Table 8: Summary of pressures from specific activities on circalittoral rock and infralittoral rock and taken to Part B

Potential pressures	**Traps**	**Anchored nets**		
	Pots/creels	Gill nets	Trammel nets	Entangling nets
Abrasion/disturbance of seabed surface substrate	LSE - from gear and associated lines or anchors			
Deoxygenation	No LSE – Cape Bank is subject to strong tides and currents. Fishing activity at Cape Bank is spread throughout the site and is of a type which does not involve high levels of discards			
Hydrocarbon & PAH contamination	No LSE – Deliberate releases are already prohibited. Accidental discharges from fishing vessels leading to significant releases are extremely rare.			
Introduction/spread of non-indigenous species	No LSE – The significant vector for non-indigenous species is ballast water. All fishing vessels under 45 metres length have solid ballast[3]. No vessels over 45 metres length fish at this site.			
Litter	No LSE – The strong tidal currents and oceanic swells at the site make it unlikely that lost gear will persist at the site for long enough to cause a significant impact.			
Organic enrichment	No LSE – Cape Bank is subject to strong tidal currents. Fishing activity at Cape Bank is spread throughout the site and is of a type which does not involve high levels of discards			
Penetration, abrasion or disturbance of seabed sub-surface substrate	No LSE – The risk of this is primarily from vessel anchors, but due to the size of vessels fishing in Cape Bank (under 20m) and the nature of the substrate (rock) mean that a significant impact is not likely			
Removal of non-target species	LSE – Pots and associated lines may remove branching epifauna.	LSE – nets may catch crustacea or entangle and remove branching epifauna identified.		
Removal of target species	LSE – Edible crab, European lobster and spiny lobster, are targeted.			
Synthetic compound contamination	No LSE – Potential source is from vessel hull antifouling treatments. TBT has been banned on vessels under 25m since 1987. Copper wash can enter the marine environment but due to the strong tidal currents at this site, they are not likely to accumulate here.			
Transition elements & organo-metal contamination				

[3] www.gov.uk/government/uploads/system/uploads/attachment_data/file/441098/MGN_501_Combined.pdf

4. Part B Assessment

Part B of this assessment was carried out in a manner that is consistent with the appropriate assessment required by article 6(3) of the Habitats Directive.

Table 9 shows the fishing activities and pressures included for assessment in part B. Pressures with similar potential impacts to a particular feature were grouped to save repetition during this assessment.

Table 9: Fishing activities and pressures included for part B assessment

Natural England Aggregated Method	Fishing gear type	Pressures
Traps	Pots/creels (crustacean/gastropods)	• Abrasion/disturbance of seabed surface substrate • Removal of target species • Removal of non-target species
Anchored nets	Gill nets	
	Trammel nets	
	Entangling nets	

The important targets for favourable condition were identified within Natural England's conservation advice supplementary advice tables. 'Important' in this context means only those targets relating to attributes that will most efficiently and directly help to define condition. These attributes should be clearly capable of identifying a change in condition.

Table 10 shows which targets were identified as important. The impacts of pressures on features were assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives.

Table 10: Important favourable condition targets for identified pressures

Attribute	Target	Importance/justification
Distribution: presence and spatial distribution of reef communities	Maintain the presence and spatial distribution of reef communities.	Important for all pressures identified.
Extent and distribution	Maintain the total extent of reef habitat at 24,938ha, and spatial distribution as defined on the map, subject to natural variation in sediment veneer.	Identified pressures cannot damage or destroy rocky habitat
Structure/function: presence and abundance of key structural and influential species	Maintain or recover or restore the abundance of listed species, to enable each of them to be a viable component of the habitat	Key species not identified therefore cannot be assessed.
Structure: Non-native species and pathogens	Restrict the introduction and spread of non-native species and pathogens, and their impacts.	Excluded in Part A assessment.
Structure: physical structure of rocky substrate	Maintain the surface and structural complexity, and the stability of the reef structure.	Pressures do not alter physical structure.
Structure: species composition of component communities	Maintain the species composition of component communities.	Important for all pressures identified.
Supporting processes: energy / exposure	Maintain the natural physical energy resulting from waves, tides and other water flows, so that the exposure [High / Medium] does not cause alteration to the biotopes, and stability, across the habitat.	Pressures cannot change energy/exposure.
Supporting processes: physico-chemical properties	Maintain the natural physico-chemical properties of the water.	Pressures do not affect physic-chemical properties.
Supporting processes: sedimentation rate	Maintain the natural rate of sediment deposition.	Important. Abrasion/ disturbance of the surface of the seabed may affect sedimentation rate.
Supporting processes: water quality - contaminants	Restrict aqueous contaminants to levels equating to (High / Good) Status (according to Annex VIII and X of the Water Framework Directive), avoiding deterioration from existing levels	Pressures do not affect water quality.
Supporting processes: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.	Pressures do not affect water quality.
Supporting processes:	Maintain water quality, specifically mean winter dissolved inorganic	Pressures do not affect water quality.

water quality - nutrients	nitrogen (DIN) at a concentration equating to High Ecological Status (mean winter DIN is < 12 µM for coastal waters), avoiding deterioration from existing levels.	
Supporting processes: water quality - turbidity	Maintain natural levels of turbidity across the habitat.	Not relevant. Pressures do not affect water quality.

4.1. Activity description: Traps and anchored nets

Fisheries Access/existing management

UK vessels operate throughout this site. Fishing vessel from France (targeting demersal fish, lobster and spiny lobster[4]) and Belgium (demersal fish only) also have access rights to fish in the 6 to 12nm part Cape Bank.

The use of bottom towed fishing gear within most of Cape Bank (encompassing all of the reef area) has been prohibited since 2013 by the MMO Land's End and Cape Bank European Marine Site (Specified Area) Bottom Towed Fishing Gear Byelaw[5].

Several relevant Cornwall IFCA byelaws[6] apply to the part of Cape Bank within 6nm:

1. 'Bass Fishery' defining minimum size for taking of bass
2. 'Berried Lobster and Crawfish' prohibiting the taking of berried (egg-bearing) lobsters and spiny lobster (crawfish)
3. 'Crabs' defining minimum sizes for taking of crabs
4. 'Crawfish' defining minimum size for taking of spiny lobster (crawfish)
5. 'Lobster, Crawfish and Crab Fishing for Profit Permit Byelaw' requiring any commercial fishing of lobster, spiny lobster (crawfish) or crab to require a permit
6. 'Lobster' defining minimum size for taking of lobsters
7. 'Methods of Fishing (Dredges) Byelaw' defining gear specifications and other conditions for the use of dredges for fishing
8. 'Parts of Crab' restricting the landing of parts of edible or spider crabs detached from the body
9. 'Parts of Escallops Byelaw' prohibiting the catching of parts of an escallop detached from the shell
10. 'Protection of V-notched Lobsters' prohibiting the removal of V-notched or mutilated lobsters
11. 'Purse Seine and Ring Nets' restricting the use of purse seine and ring nets
12. 'Scallop Dredge (Limited Fishing Time) Byelaw' limiting the fishing time for scallop dredging
13. 'Shellfish Boats' limiting the overall length of vessels used to fish for shellfish
14. 'Specified Fish Sizes' defining the minimum sizes for the taking of several fish species
15. 'Spider Crabs' defining the minimum size for the taking of spider crab
16. 'Trawling' limiting the overall length of vessels fishing using a trawl

Under the Western Waters (ICES Area VII) 2016 edible and spider crab effort annual limit[7] , vessels fishing for edible crab or spider crab in ICES Area VII are limited to 190 days at sea during 2016. Cape Bank lies within ICES Area VII.

[4] *Palinurus elephas*, also known as crawfish
[5] www.gov.uk/government/publications/lands-end-and-cape-bank-european-marine-site-specified-areas-bottom-towed-gear-byelaw
[6] Copies of Cornwall IFCA byelaws are available online: www.cornwall-ifca.gov.uk/Byelaws_Regulations
[7] www.gov.uk/guidance/manage-your-fishing-effort-western-waters-crabs

Evidence Sources

To determine the levels of fishing activity, the following evidence sources were used:

- vessel monitoring system (VMS) data
- fisheries landings data (logbooks and sales records)
- Fishermap stakeholder mapping report (Natural England 2012a)
- a Defra commissioned report collating fisheries sightings data from MMO and IFCA compliance monitoring (reference: MB0117)
- expert opinion from MMO marine officers, inshore fisheries and conservation officers
- fishing industry information

Table 11 summarises the description, strengths and limitations of some of the evidence sources used. For more information about the evidence sources used, please see appendix 1: MMO methodology.

Table 11: Summary of generic confidence associated with fishing activity evidence

Evidence source	Confidence	Description, strengths and limitation
VMS data	High / Moderate	• Confidence in VMS is high for describing activity relating to larger vessels (>15m). But VMS information was not developed specifically for management of MPAs, and does not describe activity in smaller vessels. • There are assumptions in the processing that speed of <6 knots is "fishing speed". • VMS records the location, date, time, speed and course of the a vessel. Fishing gear information has to be linked to the VMS data itself by either matching it's logbook information where possible, using the fleet register which may not be up to date or local marine officer knowledge of the said vessel.
Fishermap	Low	• The data were collected in 2012 and are therefore relatively dated. • A condition of the research was that only those interviewees who explicitly gave permission for their data to be shared would have their own mapping represented in the final product shared with third parties. This equated to approximately 50% of responses.
Defra 2015 (MB0117)	Moderate	• Based on recent work to describe fishing activity, but is limited by raw data and other limitations highlighted in the report.
Expert judgement	Low / Moderate	• This depends on the area, and the knowledge of the area from MMO and IFCA staff.

VMS and fisheries landings data

VMS and landings data have been included from 2009 to the most up to date information available in order to provide at least five years of data for analysis. UK VMS data are available up to and including 2014. Non-UK VMS and UK landings data are available up to and including 2013.

Charts showing patterns of VMS reports at Cape Bank are displayed in annexes 2a to 2g. Annexes 2a to 2e show VMS data for vessels of 15 metres length and over. Due to the roll out of VMS to the 12 to 15 metre fleet, annex 2f shows data from 2014 which include some vessels between 12 and 15 metres length. Annex 2g shows non UK VMS data only within the Land's End and Cape Bank SCI.

Between 2010 and 2013 in ICES rectangle 29E4, over 15 metre vessels (ie those with VMS) were responsible for approximately 20% UK of landings by weight and 30% by value. The sea area of ICES rectangle 29E4 is divided roughly equally between areas inshore of 6nm (where under 15 metre vessels tend to be more active) and offshore of 6 nm (where over 15 metre vessels tend to be more active). Most of Cape Bank is offshore of 6 nm. Expert opinion confirmed that over 15 metre vessels make up the majority of fishing activity at this site. Therefore VMS data are likely to show the majority of activity at this site.

VMS data show very few reports from other Member States' vessels within Cape Bank at speeds indicative of fishing (0-6 knots), and show no continuous time series of VMS reports which would indicate fishing activity. The density of VMS reports in the 6-12nm portion of Cape Bank, (where French and Belgian vessels have fisheries access right) is also equivalent to the density in the 0-6 nm portion of Cape Bank, where only UK vessels have fisheries access rights. Due to the comparable densities of VMS reports across Cape Bank, it can be concluded with a high degree of certainty that the VMS reports under 6 knots from other Member States' vessels within Cape Bank are not associated with fishing. This is supported by the fact that the Cape Bank area is in a navigational route for vessels rounding Land's End, and is subject to strong tides which increase the likelihood of transiting vessels transiting at speeds less than 6 knots. Chart 2 shows all other Member State VMS reports from 2009 to 2013.

VMS data show UK vessels at fishing speeds throughout Cape Bank. Charts 3(a-f) show UK VMS reports from vessels using pots, nets or unknown gear for each year 2009-2014.

Estimates of levels of effort were made by using the time represented by each VMS report (half of the time difference between the subsequent and preceding reports) and multiplying this by the engine power of the vessel. This provides an approximate link to the capacity of the vessel as vessels with more engine power tend to be larger and therefore able to carry and use more or higher capacity gear. Figure 1 shows the effort estimates from all UK VMS vessels using pots, nets or unknown gears. Unlike the 2009 to 2013 data, the data for 2014 include several vessels in the 12 to 15m length range.

VMS data indicate that ten over 15 metre vessels fished using potting gear in Cape Bank. However five vessels accounted for 98 % of VMS potting effort (figure 2).

Figure 3 shows the seasonal pattern of fishing effort for each year analysed. Except for some extremely high levels of effort in March and April 2011, the general trend is of a moderate peak around May to July and slightly higher monthly effort levels from February to March than August to January. However there is considerable inter-annual variability.

Tables 12 and 13 show UK vessels' landings from ICES rectangle 29E4from 2009 to 2013 were caught using gill and entangling nets and pots.

Fishermap

Fishermap data do not show any vessel trips per day to Cape Bank by potters or netters. This could be because the skippers interviewed were not representative of activity in this area, or because there is no activity from under 15 metres vessels in this area. As most of this area is outside of 6nm, it is likely that activity from under 15 metres vessels is limited.

Fisheries sightings data

Fisheries sightings data are based on a Defra commissioned project (Vanstaen & Breen 2014) to collate sightings data from MMO, IFCA and Navy surveillance from 2010-2012 inclusive and create a gridded geographic data layer of sightings per unit effort. Charts showing sightings of vessels engaged in different kinds of fishing are displayed in annexes 2h and 2i. These data show some sightings for both netting and potting in certain parts of Cape Bank. However the majority of Cape Bank does not show any sightings. This could be a result of low levels of fishing activity, or could be an artefact of very sampling effort (ie low levels of activity by patrol vessels) in the 6-12 nm part of Cape Bank, relative to within 6 nm where IFCA patrol vessels are normally active.

Expert Opinion

Expert opinion indicated that around two large (15 to 20 metres) potting vessels targeting edible crab frequently operate all year in the 6-12 nm area of Cape Bank, using around 1600 pots per vessel. Around two smaller vessels pot for crabs throughout Cape Bank, during spring and summer.

Expert opinion indicated that entangling nets are the most common form of net at Cape Bank and are used by around three vessels (less than 219 nets per vessel) to target pollock, lobster, spiny lobster, blonde ray and anglerfish throughout the site from April to November.

Around two to three vessels under 15 metres also occasionally use gill nets at Cape Bank (120 to 219 nets per vessel) to target pollock during winter but only during calm weather.

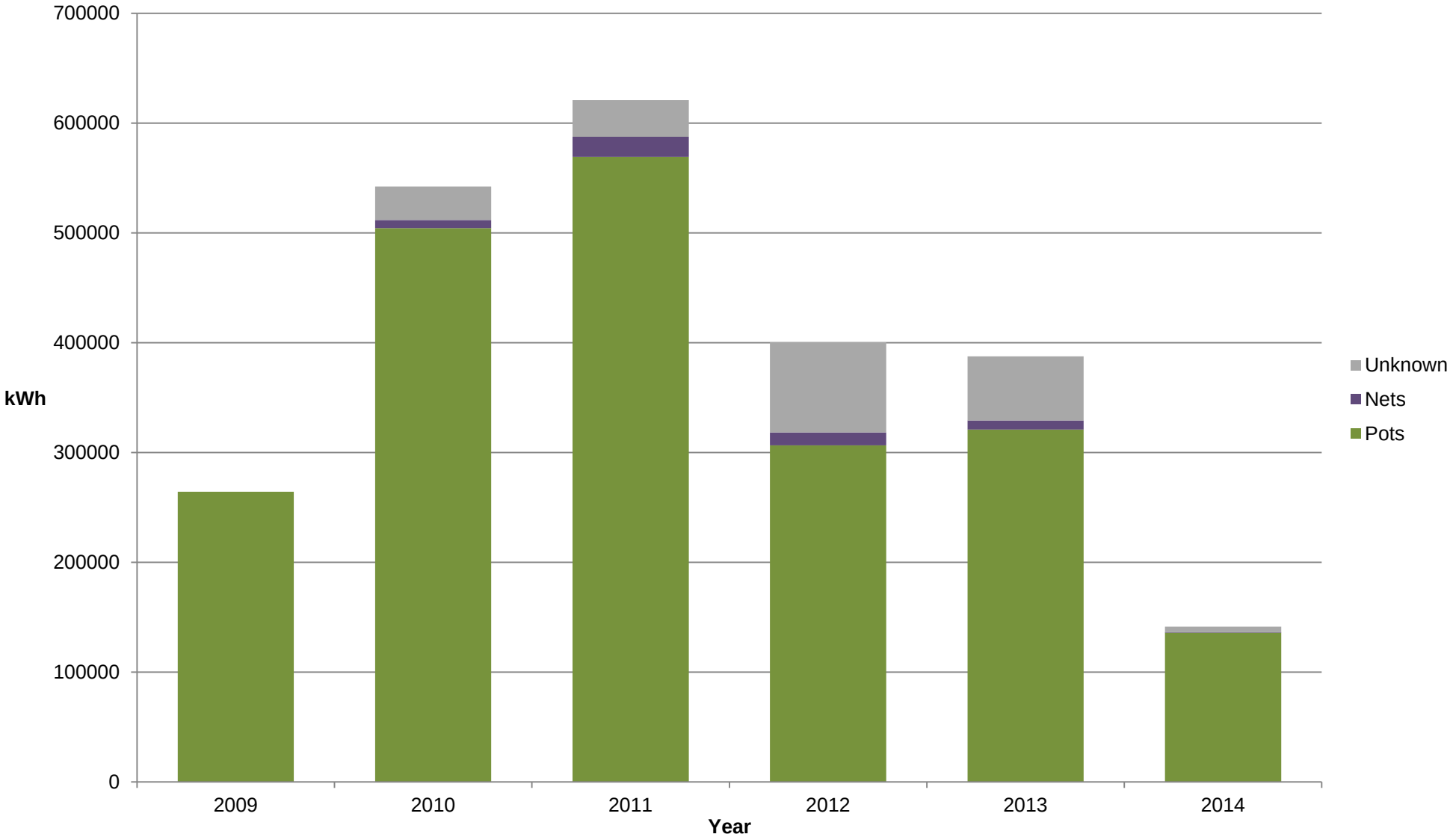


Figure 1: VMS fishing effort Cape Bank 2009-2014

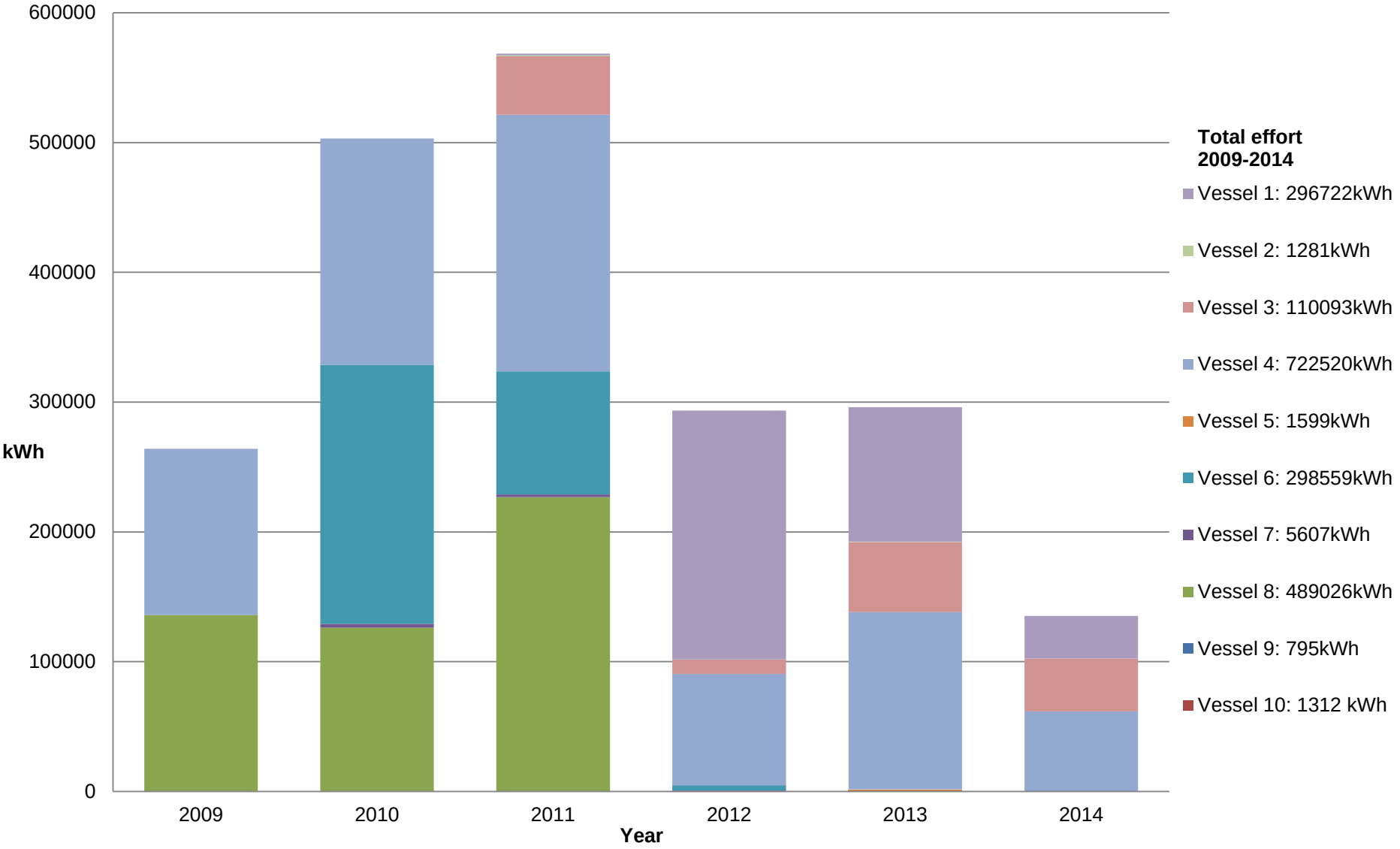


Figure 2: VMS potting effort (kWh) by vessel at Cape Bank

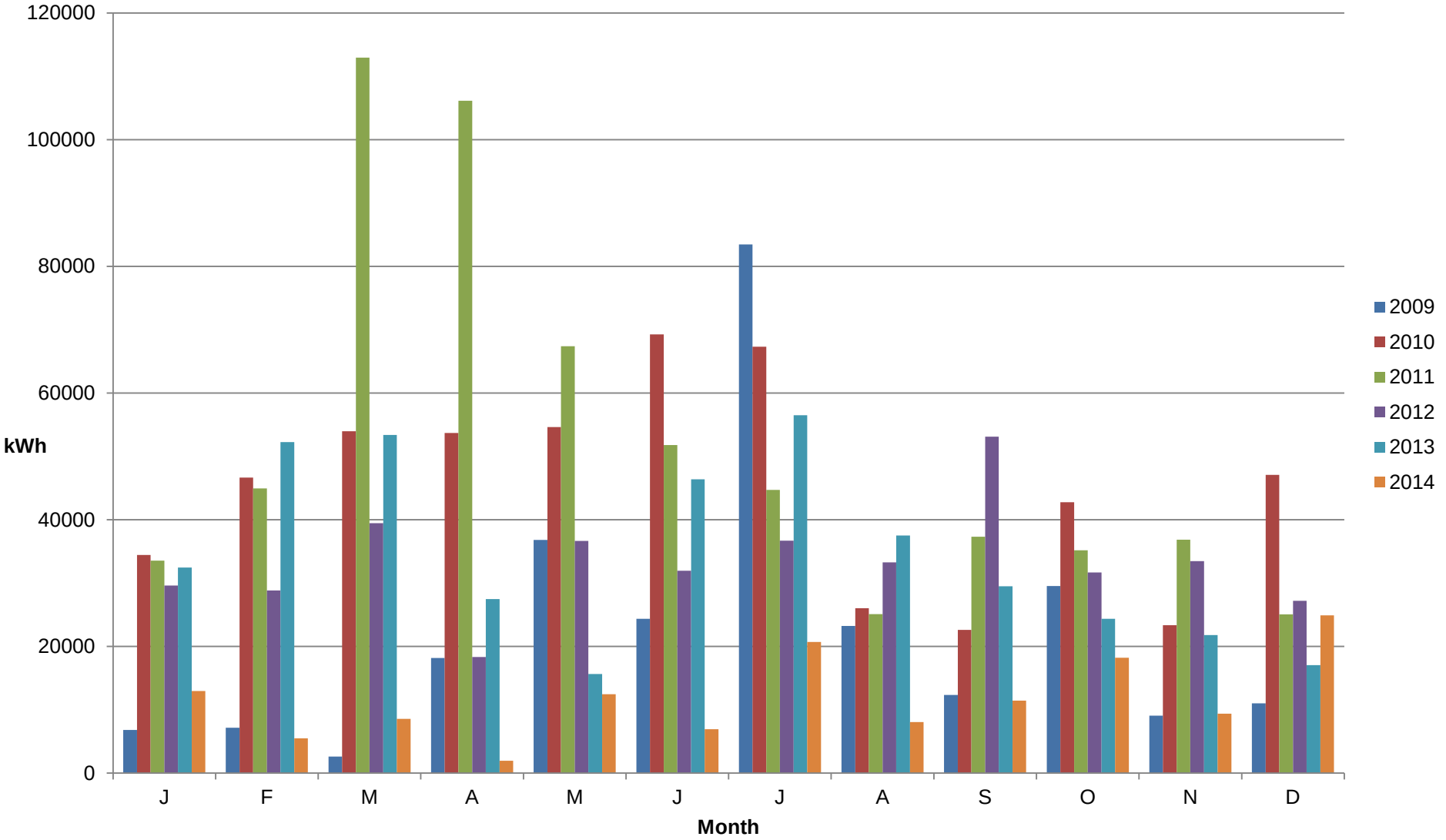


Figure 3: VMS fishing effort (kWh) at Cape Bank seasonal trends

Tables 12 and 13: Landings data from ICES rectangle 29E4

	Species group	Within ICES rectangle							Area based estimate of annual average from within Cape Bank
		2009	2010	2011	2012	2013	Grand Total	Annual average	
Quantity landed (tonnes)	Crustacean	1,295	1,451	1,653	1,751	1,413	7,562	1,512	131.5
	Demersal	709	535	856	1,192	1,010	4,302	860	74.8
	Mollusc	91	91	123	144	382	832	166	14.4
	Pelagic	1,489	1,648	2,590	2,108	2,039	9,873	1,975	171.8
	Total	**3,584**	**3,725**	**5,222**	**5,194**	**4,843**	**22,569**	**4,513**	**508.6**

	Gear group	Within ICES rectangle							Area based estimate of annual average from within Cape Bank
		2009	2010	2011	2012	2013	Grand Total	Annual average	
Quantity landed (tonnes)	Demersal nets	1,371	1,458	2,724	2,563	2,255	10,371	2,074	180.4
	Dredges	69	63	102	117	342	693	139	12.1
	Hooks and lines	548	584	600	503	513	2,749	550	47.9
	Miscellaneous gear	2	1	0	0	0	4	1	0.1
	Seine nets	0	3	5	13	15	36	7	0.6
	Surrounding nets	7	0	22	0	108	137	27	2.3
	Pots	1,163	1,369	1,456	1,532	1,216	6,735	1,347	117.2
	Trawls	425	247	312	466	394	1,843	369	32.1
	Total	**3,584**	**3,725**	**5,222**	**5,194**	**4,843**	**22,569**	**4514**	**392.7**

Fishing industry information

Communication with members of the fishing industry indicated that the larger potting vessels work around 14 strings of up to 80 pots a string. These vessels use 'floater' rather than leaded ropes to keep ropes off the seabed. Chains are used on the end of each string rather than anchors.

Potting vessels tend to work around the edge of Cape Bank, rather than in the middle, due to the distribution of crabs and lobsters at the site.

Communication with the fishing industry also indicated that entangling nets are the most common type of net used within Cape Bank.

Footprint

Analysis was undertaken of the total spatial footprint of fishing gear used each year. The total spatial footprint of a particular gear group was then compared to the total area of the feature, producing a ratio (p). A p value of less than 1 means that the total spatial footprint of the gear in a given year was smaller than the total area of the feature. A p value of more than one means that the total spatial footprint of the gear in a given year was greater than the total area of the feature. The spatial footprint analysis used in this assessment is based on report commissioned by Defra's Impact Evidence Group on the feasibility of using a spatial footprint method in appropriate assessments[8] (report reference: MMO1108).

Estimates of the p values for each fishing gear at Cape Bank are displayed in table 13. The assumptions used when calculating footprints are displayed in annex 3.

The range of p values for potting over the years 2009 to 2014 was estimated to be 0.0014 to 0.001. This indicates that if fishing were distributed homogenously throughout the site, each part of reef would interact with potting gear between approximately once every 715 to 1,000 years.

The range of p values for netting over the years 2009 to 2014 was estimated to be 0.0007 to 0.0004. This indicates that if fishing were distributed homogenously throughout the site, each part of reef would interact with netting gear between approximately once every 1,400 to 2,500 years.

It is highly likely to that, certain parts of the site are likely to be subject to more frequent levels of potting or netting. For example communication with the fishing industry indicated that the edges of Cape Bank tend to be potted more intensively than the middle. P values must also be treated with a high degree of caution as they rely on numerous assumptions about size and behaviour of gear, and frequency of use.

Nevertheless the levels calculated for both potting and netting in Cape Bank indicate low levels of interaction with the reef feature, and long time periods for recovery between episodes of interaction.

[8] MARG Ltd in association with Envision Mapping Ltd, 2015

Table 13: Spatial footprint values for pots and nets at Cape Bank

	VMS				**Non-VMS**				**Total (VMS + non-VMS)**		
	Pots		**Nets**		**Pots**		**Nets**		**Pots**	**Nets**	**Total**
Year	Vessel days at sea	p	Vessel days at sea	p	Vessel days at sea	p	Vessel days at sea	p	p	p	p
2009	313	0.0007	46	0.0004	285	0.0006	34	0.0003	0.0013	0.0007	0.002
2010	336	0.0007	20	0.0002	285	0.0006	34	0.0003	0.0013	0.0005	0.0018
2011	350	0.0008	48	0.0004	285	0.0006	34	0.0003	0.0014	0.0007	0.0021
2012	247	0.0005	39	0.0004	285	0.0006	34	0.0003	0.0011	0.0007	0.0018
2013	270	0.0006	39	0.0003	285	0.0006	34	0.0003	0.0012	0.0006	0.0018
2014	186	0.0004	12	0.0001	285	0.0006	34	0.0003	0.0010	0.0004	0.0014

Summary

ICES rectangle 29E4 is an important area for UK vessels for potting and netting and for landings of edible crab in particular. Effort and landings varied throughout the years 2009 to 2014, with effort from potting within Cape Bank peaking in 2010 and 2011, but landings from potting from within whole ICES rectangle peaking in 2012 in terms of quantity and in 2012 and 2013 in terms of value. Landings from netting peaked in 2011 and 2012 but remained high in 2013.

4.2. Abrasion/disturbance of seabed surface substrate

Sensitivity evidence

Potting and netting have generally been considered relatively low impact fishing techniques, especially when compared to trawling and dredging, and therefore have been the focus of less targeted research. This is particularly true for netting.

Much of the information used in this assessment to determine the potential of potting to cause abrasion to the reef in Cape Bank comes from Walmsley *et al* (2015) who undertook an extensive literature review on behalf of the Defra Marine Biodiversity Impact Evidence Group on the physical impacts of potting on a range of UK marine protected area features.

The literature reviewed by Walmsley *et al* (2015) noted that despite several empirical studies there is no direct evidence of negative physical impacts from potting on bedrock reef or associated biotopes/species. The review also highlighted a divergence between sensitivity assessments which tended to be based on expert opinion and suggested that certain reef species were sensitive to potting, and empirical evidence which found very limited evidence of negative impacts as a result of potting.

Walmsely *et al* (2015) do note that there are limitations to all of the empirical studies, and gaps in evidence, particularly around longer term impacts (although see Coleman *et al* 2014 studied ecological changes in fished versus non-fished sites over four years). Nevertheless, the review recommends that potting be generally scoped out of assessments for bedrock reef, unless there are site specific concerns around areas highlighted by some inconclusive empirical results or sensitivity assessments.

In Cape Bank, the presence of vertical rock faces, the level of potting intensity and the presence of potentially sensitive species (slow growing or branching epifauna) are areas of potential concern which are addressed below.

There is very limited information available on the impacts of netting on reef. It is likely that the footrope of nets which operate on or close to the seabed have a comparable impact as the lines used to connect a string of pots.

Nets also have a much larger surface area and have more potential to entangle and consequently remove or damage epifauna. Entanglement and its consequences are considered to be removal of non-target species and discussed under section 4.3.

The available sensitivity assessments (largely based on expert knowledge) report that bedrock reef and associated communities are sensitive to damage from potting and netting, particularly due to the physical interaction between fishing gear (pots, nets and associated ropes and anchors) and sessile epifauna. These sources indicate that at moderate or high levels of activity, restriction or prohibition of potting and or netting is required to further the conservation objectives of this site. However, almost all the available information based directly on empirical evidence report no, or marginal, negative impacts on bedrock reef and associated communities. Although none of the empirical evidence available directly replicates the exact biological or activity conditions which exist at Cape Bank, a broad range of relevant habitats, activity levels and impacts are represented. A summary of the key findings, relevance and limitations for each source is provided in annex 1.

Site specific evidence

Cape Bank reefs are subject to relatively high levels of wave energy. This is likely to mean that the ecological components of the reef are less sensitive (ie to have either higher resilience, higher ability to recover, or both) to physical impacts than those in more sheltered areas. However, Cape Bank also contains vertical rock faces which may be more prone to physical impacts from potting and netting, and branched and slow growing epifauna which may be particularly sensitive to potting and netting.

Fishing effort from static gear (nets, pots and unknown) from VMS vessels (which account for the majority of landings at this site) doubled from 280,000 kWh in 2009 to 550,000 kWh in 2010 and over 600,000 kWh in 2011, before reducing to around 400,000 kWh in both 2012 and 2013 and to under 150,000 kWh in 2014 (figure 1).

Surveys of Cape Bank were conducted 2007[9] and in August and October 2010 (after the majority of the effort in 2010 had taken place (figure 3))[10].The 2007 surveys recorded “no evidence noted of habitat damage attributable to potting/creel fishing or any other anthropogenic activity”.

The 2010 surveys recorded vertical rock faces occurring in several locations throughout the site which were colonised by large numbers of epifauna and Ross corals, and found no evidence of damage as a result of human activity. When the 40 video lines and 1164 photographs taken during the 2010 survey were compared alongside the 20 video lines and 356 photographs taken during the 2007 surveys, there was “no substantial evidence of changes to the biotope composition within the Land’s End & Cape Bank cSAC”[11].

Of the 27 locations surveyed in 2007 and 40 in 2010, nine were surveyed in both 2007 and 2010. Table 14 shows the comparison between these sites from each survey. Although erect sponges, pink sea fan (*Eunicella verrucosa*) and Ross coral (*Pentapora foliacea*) were recorded as being present in 2007 but not in 2010 at one site, the presence of biotopes was largely consistent, and

[9] Birchenough *et al*, 2008
[10] Axelsson & Dewey, 2011
[11] Axelsson & Dewey, 2011

led Natural England to determine that, when considering the repeat survey sites in both the Land's End and Cape Bank portions of the site: "there is no evidence of any anthropogenic impacts and the biological habitats are apparently similar in 2010 to those seen in 2007[12].". Furthermore, due to the difficulties in sampling in the marine environment, it is likely that the biotopes were present in 2010 but missed, rather than any real change[13].

Based on the results of these surveys, Natural England has determined that the reef features were in "excellent condition"[14].

MMO has a high level of confidence in these survey results and the Natural England condition assessment. However it should be noted that the condition monitoring surveys were not designed to specifically assess the impacts of fishing activities on the site features. Furthermore, Natural England's assessment of condition as excellent does not mean that fishing activities at the site could not result in deterioration, particularly in the future.

These surveys do however represent the best direct ecological information available for Cape Bank, and while they cannot definitively rule out negative impacts from fishing activities, the absence of any evidence of physical damage, despite coinciding with high levels in fishing effort in 2010, strongly indicates that fishing activities have resulted in minimal, if any, short term damage to the reef feature, including those biotopes identified as the most potentially sensitive.

Furthermore, this is consistent with available empirical evidence where no negative impacts to bedrock reef constituent species or communities was reported (see annex 1).

It is possible that fishing at this site is causing long term sub-lethal impacts, which will result in an adverse effect on the site over time. However, potting and netting are long standing activities at this site. It is likely that long term sub-lethal impacts from surface abrasion would result in damaged individuals (for example pink sea fans or Ross coral), but these were not observed in either the 2007 or 2010 surveys, indicating that there were no negative long term impacts taking place.

This is consistent with Coleman *et al* (2013) who reported that there were no differences in ecological change from 2004 to 2007 between areas subject to a newly introduced no-take-zone and areas outside of the no-take-zone. Although the levels of potting in the fished areas were not recorded, work by Devon and Severn Inshore Fisheries and Conservation Authority [15] in 2008 indicates that potting did occur in these areas.

The long term impacts of fishing are likely to be dependent on the level of fishing activity. Fishing effort from VMS vessels using pots or nets in Cape Bank fell to around 400,000 kWh in 2012 and 2013, and under 150,000 kWh in 2014.

[12] Axelsson & Dewey, 2011
[13] Natural England, *pers coms*, 2015
[14] Natural England, 2012
[15] Clark 2008

The spatial footprint ratios estimated for potting at Cape Bank over the years 2009 to 2014 were estimated to be 0.0014 to 0.001. This indicates that if fishing were distributed homogenously throughout the site, each part of reef would interact with potting gear between approximately once every 715 to 1,000 years.

For netting at Cape Bank estimates ranged from 0.0007 to 0.0004, indicating that (assuming homogeneous distribution of effort across the site) each part of the site will interact with a net once every 1,400 to 2,500 years. It is unlikely that fishing effort is homogeneously distributed across the site, however even with concentrations of effort in certain areas this indicates an extremely low level of impact.

As a result of the balance of empirical evidence strongly suggesting that static gears have very limited impacts on reef communities, the falling trend in fishing effort at Cape Bank and the low estimates of spatial footprint, we determine that abrasion from potting and netting is not having an adverse effect on Cape Bank.

Table 14: Biotopes present at repeat survey sites[16]

Survey location	Biotopes present 2007	Biotopes present 2010	Change
1	• Brittlestars overlying coralline crusts, *Parasmittina trispinosa* and *Caryophyllia smithii* on wave-exposed circalittoral rock • *Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock	• Brittlestars overlying coralline crusts, *P.trispinosa* and *C.smithii* on wave-exposed circalittoral rock • *C.smithii*, sponges and crustose communities on wave-exposed circalittoral rock • *Corynactis viridis* and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock	+ *C.viridis* and a mixed turf of crisiids, *Bugula*, *Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock
2	• Bryozoan turf and erect sponges on tide-swept circalittoral rock • Eunicella verrucosa and Pentapora foliacea on wave-exposed circalittoral rock • *Mediomastus fragilis, Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel	• Bryozoan turf and erect sponges on tide-swept circalittoral rock • *E.verrucosa* and *P.foliacea* on wave-exposed circalittoral rock • *M.fragilis*, *Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel	None
3	• *M.fragilis*, *Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel • Bryozoan turf and erect sponges on tide-swept circalittoral rock • Brittlestar bed on bryozoan and hydroid turf • *E.verrucosa* and *Pentapora foliacea* on wave-exposed circalittoral rock	• *M.fragilis*, *Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel	- Bryozoan turf and erect sponges on tide-swept circalittoral rock - Brittlestar bed on bryozoan and hydroid turf - *E.verrucosa* and *P.foliacea* on wave-exposed circalittoral rock
4	• *C.viridis* and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock • *M.fragilis*, *Lumbrineris spp*. and venerid	• *C.viridis* and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock • *M.fragilis*, *Lumbrineris spp*. and venerid bivalves	- *C.smithii*, sponges and crustose communities on wave-exposed circalittoral rock

[16] Axelsson & Dewey, 2011

	bivalves in circalittoral coarse sand or gravel • Bryozoan turf and erect sponges on tide-swept circalittoral rock • Sparse sponges, *Nemertesia spp*. and *Alcyonidium diaphanum* on circalittoral mixed substrata • Brittlestar bed on bryozoan and hydroid turf • *Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock	in circalittoral coarse sand or gravel • Bryozoan turf and erect sponges on tide-swept circalittoral rock • Sparse sponges, *Nemertesia spp*. and *A.diaphanum* on circalittoral mixed substrata • Brittlestar bed on bryozoan and hydroid turf	- *Alcyonidium diaphanum* on circalittoral mixed substrata - *Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock
5	• Bryozoan turf and erect sponges on tide-swept circalittoral rock • *C.viridis* and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock • *M.fragilis*, *Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel • Circalittoral coarse sediment	• Bryozoan turf and erect sponges on tide-swept circalittoral rock • *C.viridis* and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock • *M.fragilis*, *Lumbrineris spp*. and venerid bivalves in circalittoral coarse sand or gravel • *C.smithii*, sponges and crustose communities on wave-exposed circalittoral rock	+ *C.smithii*, sponges and crustose communities on wave-exposed circalittoral rock

Table 15: Abrasion assessment

Pressure	Interest feature	Favourable condition target	Activity	Compatible with the conservation objectives?
Abrasion/ disturbance of the substrate on the surface of the seabed	Reef (Circalittoral rock/ Infralittoral rock)	Maintain the presence and spatial distribution of reef communities.	Anchored nets	Y
			Traps	Y
		Maintain the species composition of component communities.	Anchored nets	Y
			Traps	Y
		Maintain the natural rate of sediment deposition.	Anchored nets	Y
			Traps	Y

4.3. Removal of target and non-target species

Edible crab and European lobster

The main target species for pots and nets at Cape Bank are edible crab and European lobster.

Some evidence shows that inter-specific competition may be the limiting factor for edible crab, rather than removal from fishing, as there is evidence that both species have not increased in abundance following drastic reductions in fishing[17].

The most recent stock assessments (based on 2013 data) undertaken by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) reported that:

“The status of the stock of female edible crab in the Celtic Sea is approaching the level associated with maximum sustainable yield. Exploitation levels are moderate for females and likely to be sustainable but above the target maximum sustainable yield level. The status of the stock has not changed since the last assessment in 2012.”[18]

and

“The status of the stock of lobster in the Southwest area is moderate; spawning biomass levels are between the minimum reference point limit and the level associated with maximum sustainable yield but is decreasing, particularly for females. The exploitation level is between maximum sustainable yield target level and the maximum reference point limit for both sexes and has been

[17] Hoskin *et al*, 2011
[18] Edible crab (*Cancer pagurus*) Cefas Stock Status Report 2014.

increasing since 2010. The status of the stock has not changed since the last assessment in 2012."[19]

The minimum reference point is the point at which fisheries operating beyond this level are considered to carry higher risk to the production of further generations. Exploitation (fishing) below this level indicates that the population is sustainable, although will not provide maximum long term fisheries yields.

The Cefas stock assessments are based on a large spatial scale, and do not necessarily indicate the status of local populations at a smaller area, such as Cape Bank. However lobster and particularly edible crab are mobile species with relatively large scale larval dispersal, meaning that local populations within a region are to some degree linked.

Given the stability of the populations at the regional level, and the decrease in potting and netting effort and landings in the most recent years analysed, we have determined that removal of target species is not resulting in an adverse effect on Cape Bank.

Entanglement of branching epifauna

As well as the potential for pots and nets to cause abrasion to reef epifauna, a potential exists for nets to become entangled with branching epifauna which may damage, kill or remove individuals. Evidence of this potential impact is very limited, however there is some evidence of entanglement of the large and branched pink sea fan (*Eunicella verrucosa*) in fishing nets and longlines from Lyme Bay (Doyle 2005, Wood 2003, 2008).

The photographic and video surveys undertaken by Axelsson and Dewey (2011) did not definitively record the presence of pink sea fan at Cape Bank[20]. The authors note on page 46 that "this taxon may be present but increased survey coverage would be required to assess this further", however, pink sea fans were encountered on contemporaneous surveys using similar methods at the Land's End portion of the site and the Lizard Special Area of Conservation. The potential for entanglement of pink sea fans at Cape Bank is considered in this assessment on a precautionary basis following advice from Natural England[21].

It was not been possible to locate any evidence for entanglement of static gear with other branching epifauna. However it is possible that the branching epifauna encountered by Axelsson and Dewey at Cape Bank, in particular (*Alcyonium glomeratum*) which can grow up to 30 cm (Pizzolla 2008), but tends to be smaller and is less branched that pink sea fan, could become entangled and damaged, killed or removed.

[19] Lobster (*Homarus gammarus*) Cefas Stock Status Report 2014.
[20] The final report (Axelsson and Dewey 2011) notes the presence of pink sea fan at four locations at Cape Bank. However the underlying video data report shows that no pink sea fans were encountered. The explanation may be that the pink sea fan records are based on recordings of the biotope "*Eunicella verrucosa* and *Pentapora foliacea* on wave-exposed circalittoral rock" (CR.HCR.XFa.ByErSp.Eun), which the authors note was recorded in the absence of pink sea fan under certain circumstances (p.42).
[21] Natural England interim advice August 2016 [ref to be included]

However, Axelsson and Dewey note on page 78 that “no evidence of habitat damage as a result of any type of fishing activity or any other anthropogenic activity”. Furthermore the spatial footprint ratio estimated for netting at Cape Bank ranged from 0.0007 to 0.0004, indicating that (assuming homogeneous distribution of effort across the site) each part of the site will interact with a net once every 1,400 to 2,500 years. It is unlikely that fishing effort is homogeneously distributed across the site, however even with concentrations of effort in certain areas this indicates an extremely low level of impact.

Therefore, provided that the levels or nature of netting activity do not depart from recently observed levels, we have determined that entanglement is not having an adverse effect at Cape Bank.

Table 16: Removal of target/non-target species assessment

Pressure	Interest feature	Favourable condition target	Activity	Compatible with the conservation objectives?
Removal of non-target species	Reef (Circalittoral rock/ Infralittoral rock)	Maintain the presence and spatial distribution of reef communities.	Anchored nets	Y
			Traps	Y
		Maintain the species composition of component communities.	Anchored nets	Y
			Traps	Y

4.4. In-combination assessment

The effects of activities considered to be compatible with the conservation objectives of the site when considered alone were also assessed in-combination with other relevant activities taking place including:

- fishing activity/pressure combinations which were excluded in Part A of this assessment but which could have an effect on the feature (see table 17);
- fishing activities with interactions at the site identified as green in the Matrix;
- plans and projects.

There were no gear/feature interactions identified as green in the matrix at Cape Bank. To determine which plans and project should be included in this part of the assessment, a distance of 5 km was considered to be suitable to capture any potential source receptor pathways which could impact the site in combination with effects of the fishing activities assessed. A 5 km^2 buffer was therefore applied to the site boundary and any activities including other fishing activities, marine works licensed by MMO and recreational activities within this area were identified and are detailed in table 18.

No additional pressures from relevant activities were identified which could, in combination with potential pressures from fishing, result in a negative impact to the site. Therefore the MMO concludes that fishing activities, in-combination with other known activities, are not adversely affecting the reef feature at Cape Bank.

Table 17: Non-significant interactions to be considered in in-combination assessment

Potential pressures	**Traps**	**Anchored nets**		
	Pots/creels	Gill nets	Trammel nets	Entangling nets
Deoxygenation	Possible interaction – in-combination effects are considered in section 4.4			
Hydrocarbon & PAH contamination	Possible interaction – in-combination effects are considered in section 4.4			
Introduction/spread of non-indigenous species	No interaction – ballast water not used by fishing vessels at this site			
Litter	Possible interaction – in-combination effects are considered in section 4.4			
Organic enrichment	Possible interaction – in-combination effects are considered in section 4.4			
Penetration, abrasion or disturbance of seabed sub-surface substrate	Possible interaction – in-combination effects are considered in section 4.4			
Synthetic compound contamination	Possible interaction – in-combination effects are considered in section 4.4			
Transition elements & organo-metal contamination				

Table 18: Activities considered in combination with fishing activities included in this assessment.

Relevant activity	Description	Potential Pressure
Amber interaction activities considered to have insignificant impacts alone in part A of this assessment	Pots/creels, gill nets, trammel nets, entangling nets	Deoxygenation
		Hydrocarbon & PAH contamination
		Litter
		Organic enrichment
		Penetration, abrasion or disturbance of seabed sub-surface substrate
		Synthetic compound contamination
		Transition elements & organo-metal contamination
Commercial fishing with green interaction	There are no fishing activities for which interaction with bedrock reef is categorised as green in the Matrix	None
Wave Hub study site[22]	Construction completed in 2010. Operation of site is ongoing including four underwater power converter units connected to a termination and distribution unit and 25 km of sub-sea cables.	No risks to designated features.

5. Assessment result

5.1. Fishing alone

The activities and pressures identified as likely to cause a significant effect at Cape Bank are physical abrasion from potting and netting on branching and slow growing epifauna and removal of target (edible crab and European lobster) or non-target (pink sea fan) species also from potting and netting.

The evidence considered includes a range of empirical and expert judgement based evidence on the sensitivity of reef epifauna, a comparison of condition surveys of the site before and after a period of relatively high levels of activity, regional stock assessments for edible crab and European lobster and the estimated spatial footprint of potting and netting gear.

Consequently we conclude that, within the scope of the assessment as outlined in section 2.1, fishing activities are not, alone, having an adverse effect on the integrity of Cape Bank in light of the site's conservation objectives.

[22] Wave Hub Environmental Impact Statement: www.wavehub.co.uk/downloads/EIA/Wave_Hub_Environmental_Statement_2006.pdf

5.2. In combination

No additional pressures from relevant activities were identified which could, in-combination with potential pressures from fishing, result in a negative impact to the site. Therefore MMO concludes that the fishing activities assessed, in-combination with other known activities, are not causing an adverse effect to the integrity of the site.

6. Proposed Management

As no adverse effect is occurring, no management is required at this stage.

7. Review of this assessment

The MMO has concluded that within the scope of the assessment as outlined in section 2.1, the activities assessed are not causing an adverse effect on the integrity of the site.

MMO will review this assessment every 2 years, or earlier if significant new information is received. Such information could include:

- updated conservation advice;
- updated advice on the condition of the feature;
- significant increase in activity levels.

To coordinate the collection and analysis of information regarding activity levels, and to ensure that any required management is implemented in a timely manner, a monitoring and control plan will be implemented for this site. This plan will be developed in line with to the MMO Monitoring and Control Plan framework.

Monitoring of activity levels will occur through a combination of surface surveillance and ongoing monitoring of VMS and landings data. Should activity levels increase significantly or in a manner that could affect the site features, this will trigger further investigation into the level and distribution of the activity, including consultation with Natural England regarding current site condition. Any subsequent evidence gathered would be used to assess the need for further management measures.

Possible management measures include an MMO emergency byelaw, which can be implemented immediately for up to 12 months, or a (non-emergency) MMO byelaw which would be subject to public consultation before implementation.

An overview of the monitoring and control process is illustrated in Annex 4.

8. Conclusion

With having regard to best available evidence and through consultation with relevant advisors, the MMO conclude that the activities assessed are, alone and in-combination, compatible with the conservation objectives of this marine protected area.

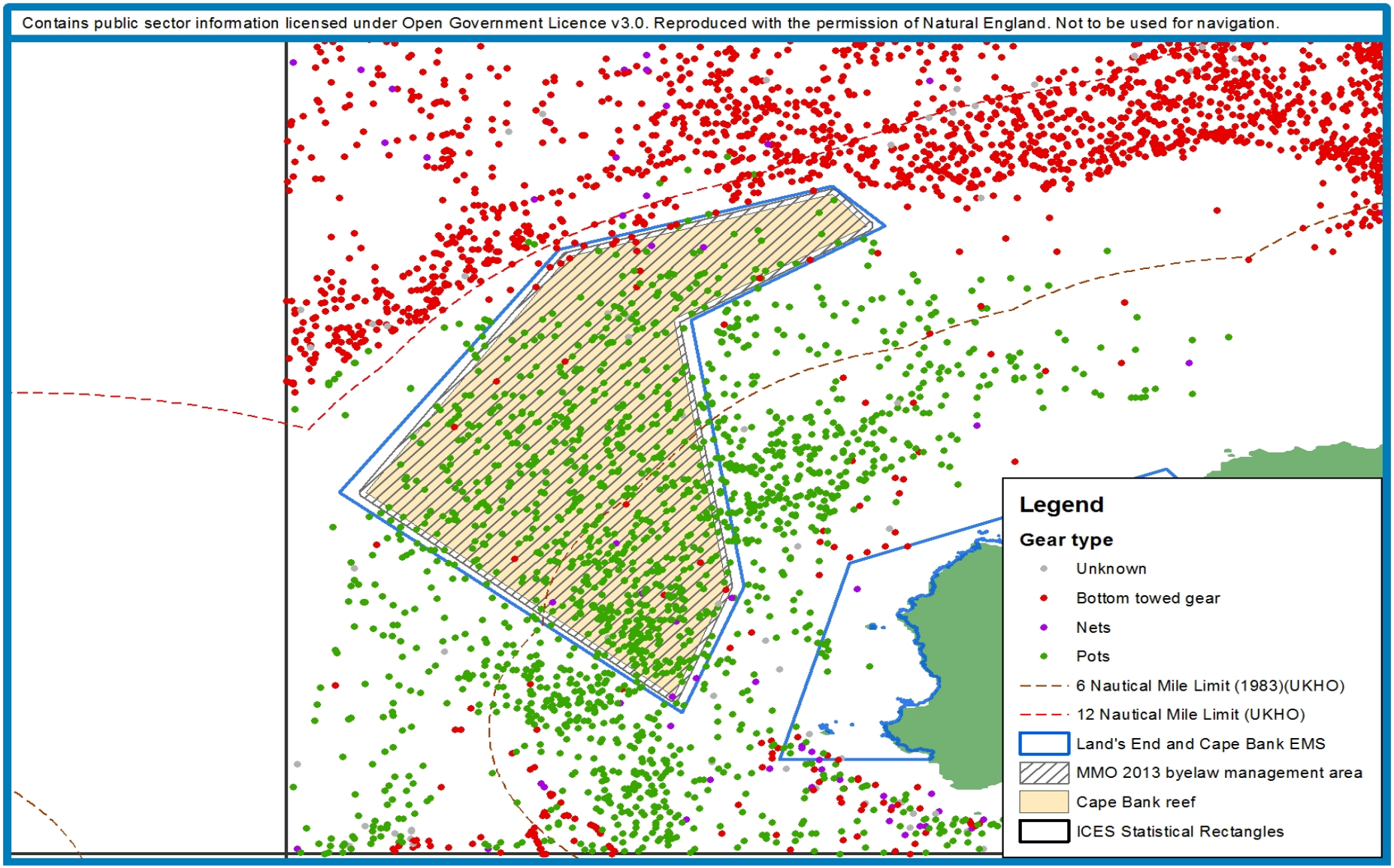
Annex 1. Summary of literature used to assess abrasion from potting

Reference	Main findings	Interpretation/Limitations
Coleman *et al* (2013)	Over four years of sampling at sites around Lundy Island, both within the newly established Lundy no-take-zone, and in sites left open to commercial fishing, no important changes were found in assemblages of sessile epifauna as a result of potting. All species studied were found to be generally insensitive to commercial shellfish potting.	Indicates that levels of potting do not affect sessile epifauna over a relatively long-term study. Impacts over a longer term are still possible. Levels of potting in the potted sites were not quantified, although continued activity was evidenced.
Eno *et al* (2001)	Quantitative studies were also conducted in west Wales and south Devon comparing the abundance of species selected on the basis of having the highest potential for sensitivity for potting. No detrimental effects on species abundance were found after one month's active potting. Pink sea fans (*Eunicella verrucosa*) and sea pens were frequently observed bending under the weight of pots before returning to an upright position. Three out of the five species studied increased significantly in abundance in the experimental (potted) plots, but not in the control (unpotted) sites. Some evidence of detachment of ascidians and sponges and damage to large individual Ross coral colonies during an experimental study of potting, however there was no direct evidence that this was related to potting activities.	Indicated that reef communities in general and branching epifauna specifically are relatively resistant to short term interaction with potting gear. Impacts over a longer term are still possible.
Eno *et al* (2013)	Sensitivity assessment based on expert judgement and available literature, determined that vertical rock and associated species were highly sensitive to damage from high levels potting, netting and lining, and to moderate levels of potting. Slow growing branching species and rock with erect branching species were also considered to be highly sensitive to damage from netting and lining and moderately sensitive to high and medium levels of potting. Rock with low-lying fast growing faunal turf was determined as having	Sensitivity assessment which relies on expert judgement rather than empirical evidence.

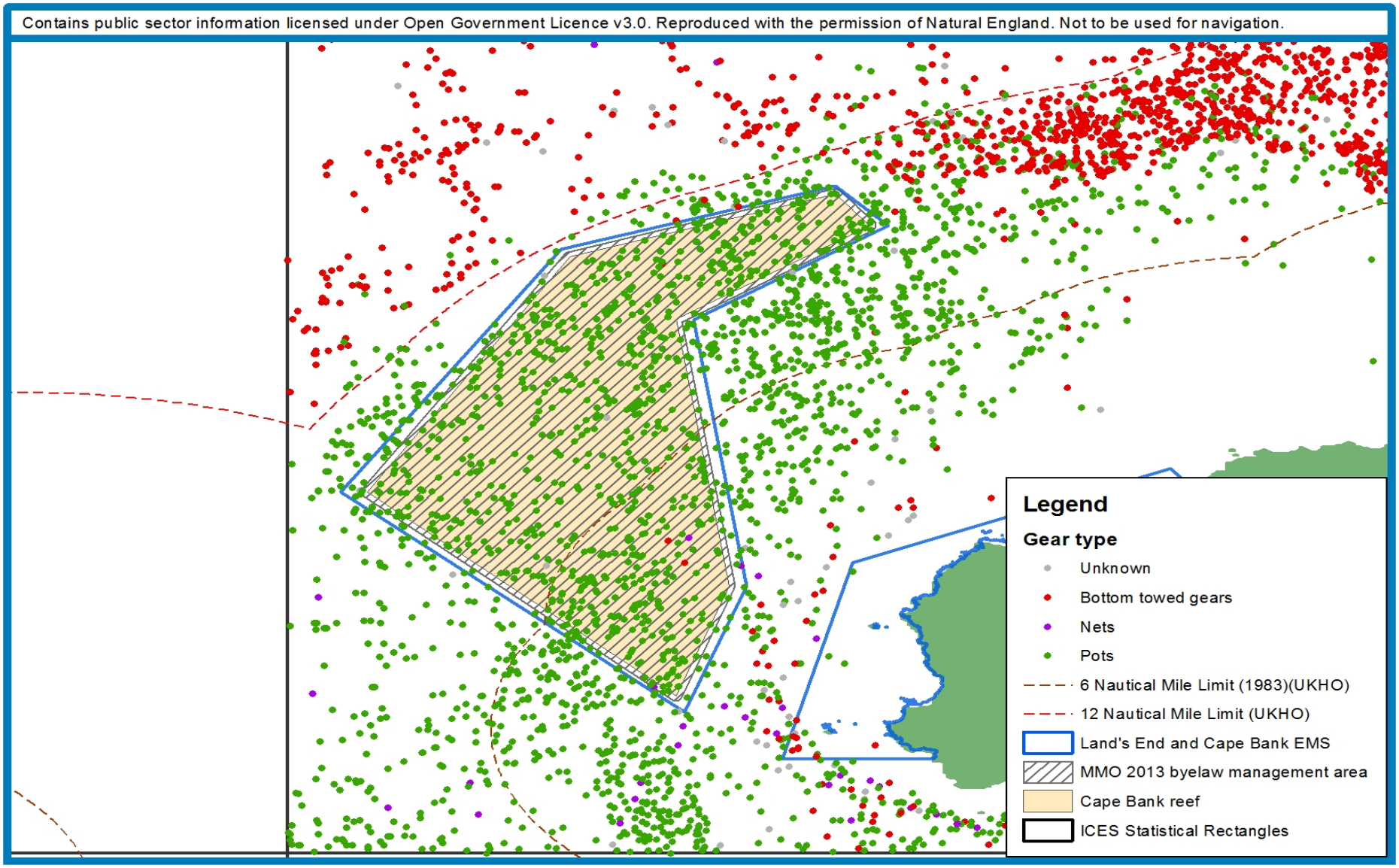
	moderate sensitivity to damage from all static gears and moderate levels of netting or long lining, but low or no sensitivity to all other levels of static gears.	
Fowler (1989)	Sensitivity assessment determined that the Ross coral (*P. foliacea*) is particularly vulnerable to pots being laid on or dragged over the seabed.	Sensitivity assessment which relies on expert judgement rather than empirical evidence.
Hall *et al* (2013)	Sensitivity assessment determined that subtidal rocky habitats and their associated communities were extremely sensitive to high levels of anchoring associated with the use of nets and lines, and were sensitive to heavy levels of potting, in particular vertical faces.	Sensitivity assessment which relies on expert judgement rather than empirical evidence.
Hartnoll (1998)	Sensitivity assessment noted that short term studies indicated limited impact from potting on circalittoral faunal turf biotopes.	Sensitivity assessment which relies on expert judgement rather than empirical evidence. Hartnoll notes that longer term studies are needed to verify the assessment.
Haynes *et al* (2014)	No significant relationship between potting density and species abundance across several sites around Skomer Island.	Analysis of the data for testing and validation proved inconclusive due to the limited availability of suitable environmental and pressure data.
Fitzsimmons (cited as *pers comm* in Walmsley *et al* 2015)	No significant difference in a faunal-algal crust community between sites exposed to extremely high levels of potting (orders of magnitude greater than normal potting effort) and control sites (which were subject to normal levels of potting).	Faunal-algal crust communities are present at Cape Bank but are not the most sensitive biotopes at the site.
JNCC and NE (2011)	Sensitivity assessment advised that the impacts of weights and anchors associated with static gear, and hauling of gear, can damage some species within fragile sponge and anthozoan communities on subtidal rocky habitats, but that other species appear to be resilient to individual fishing operations. Concluded that the sensitivity of these species to low intensity potting is	Sensitivity assessment which relies on expert judgement rather than empirical evidence.

	considered low.	
Roberts *et al* (2010)	Sensitivity assessment determined that “while the potential for damage [to reefs from static gear] is lower per unit deployment compared to towed gear, there is a risk of cumulative damage to sensitive species if use is intensive. Damage could be caused during the setting of pots or nets and their associated ground lines and anchors, and by their movement over the bottom during rough weather and during recovery.”	Sensitivity assessment which relies on expert judgement rather than empirical evidence.
Stephenson *et al* (2015)	Fishing effort was not correlated to specified biodiversity aspects of a faunal-algal crust habitat over four years.	Faunal-algal crust communities are present at Cape Bank but are not the most sensitive biotopes at the site.
Tilin *et al* (2010)	Sensitivity assessment classified ‘fragile sponge and anthozoan communities on subtidal rocky habitats’ as having a high sensitivity to surface abrasion.	Sensitivity assessment which relies on expert judgement rather than empirical evidence. Confidence rating for the classification was rated as low.

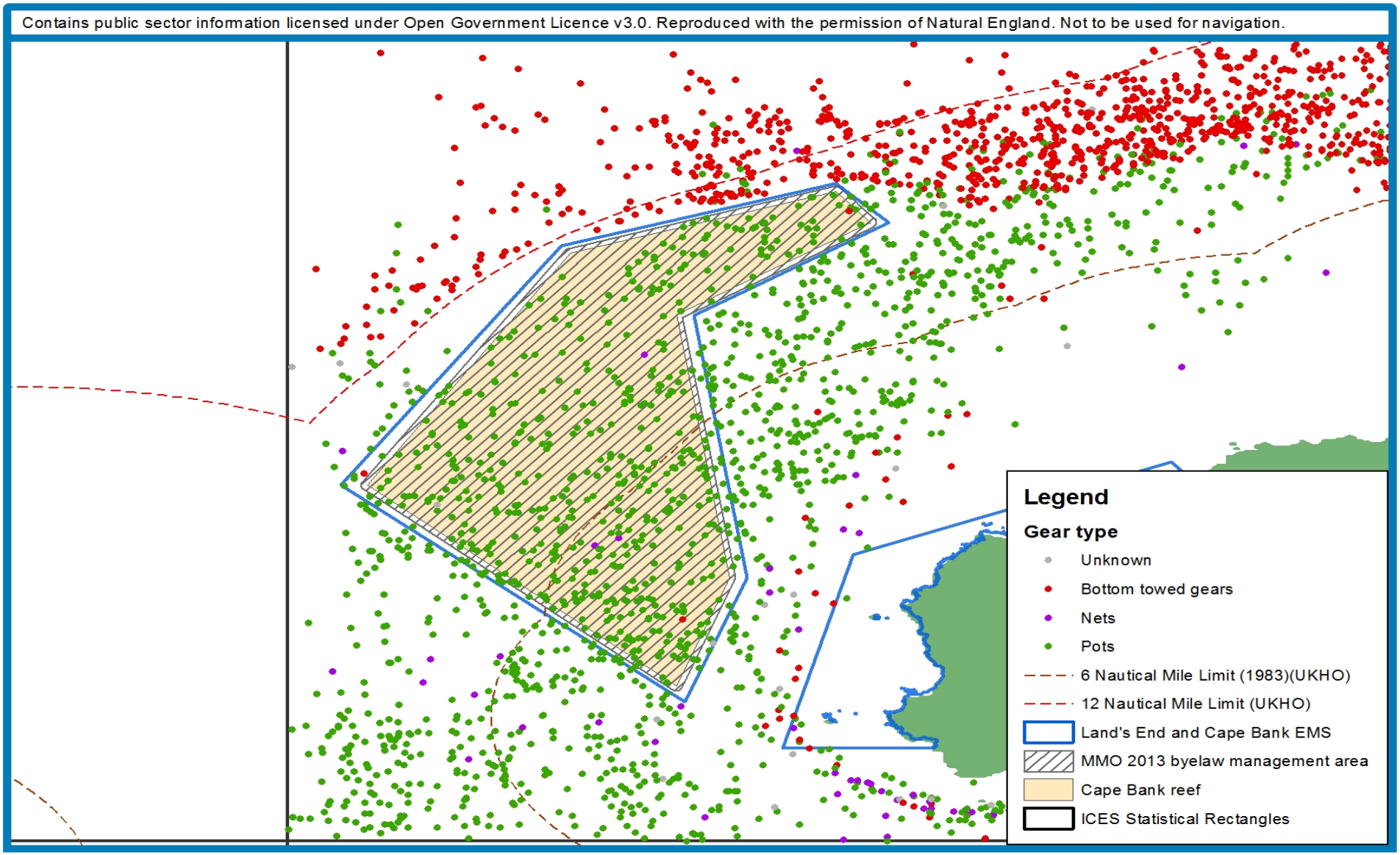
Annex 2a. Fishing activity data: UK VMS 2009



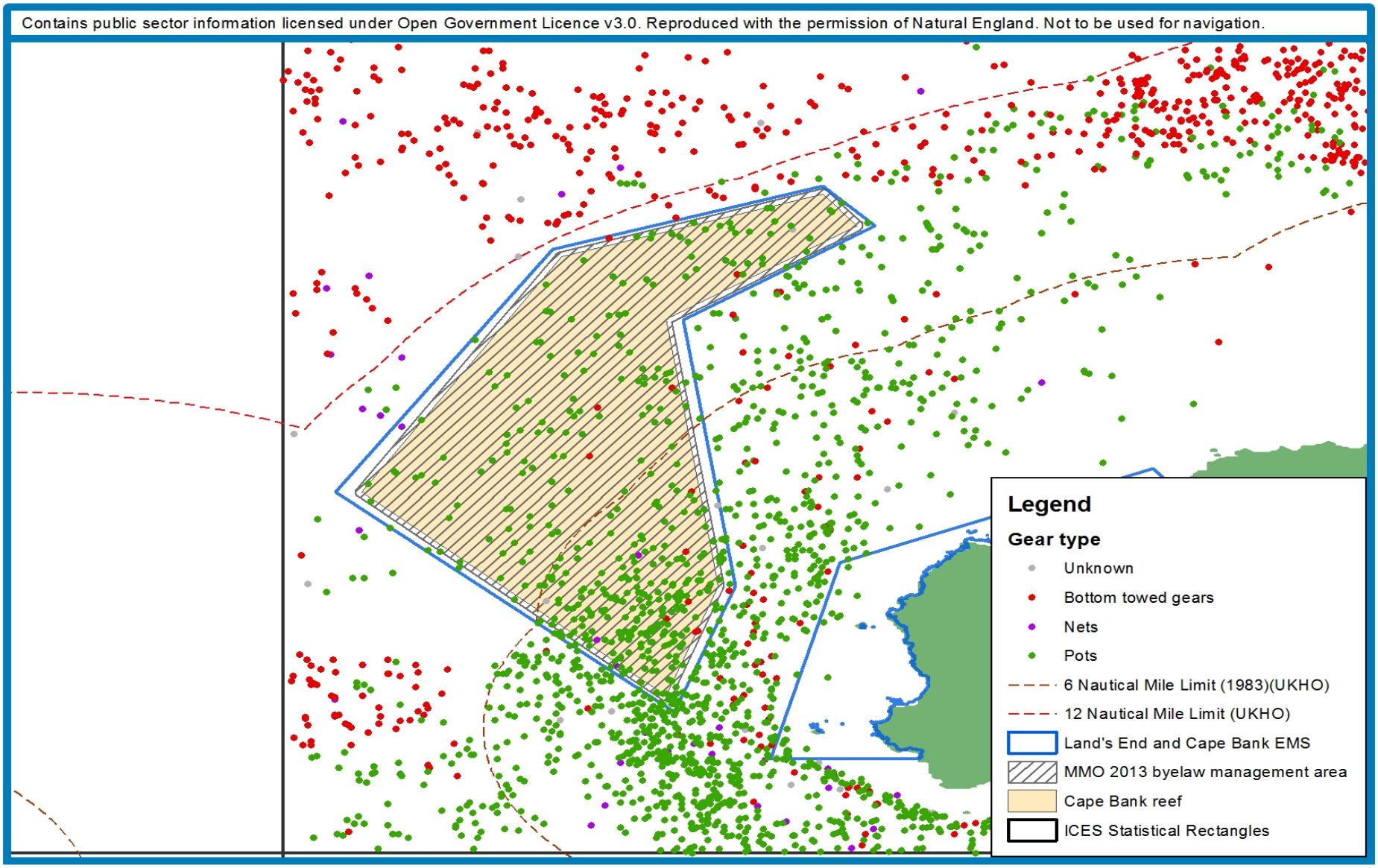
Annex 2b. Fishing activity data: UK VMS 2010



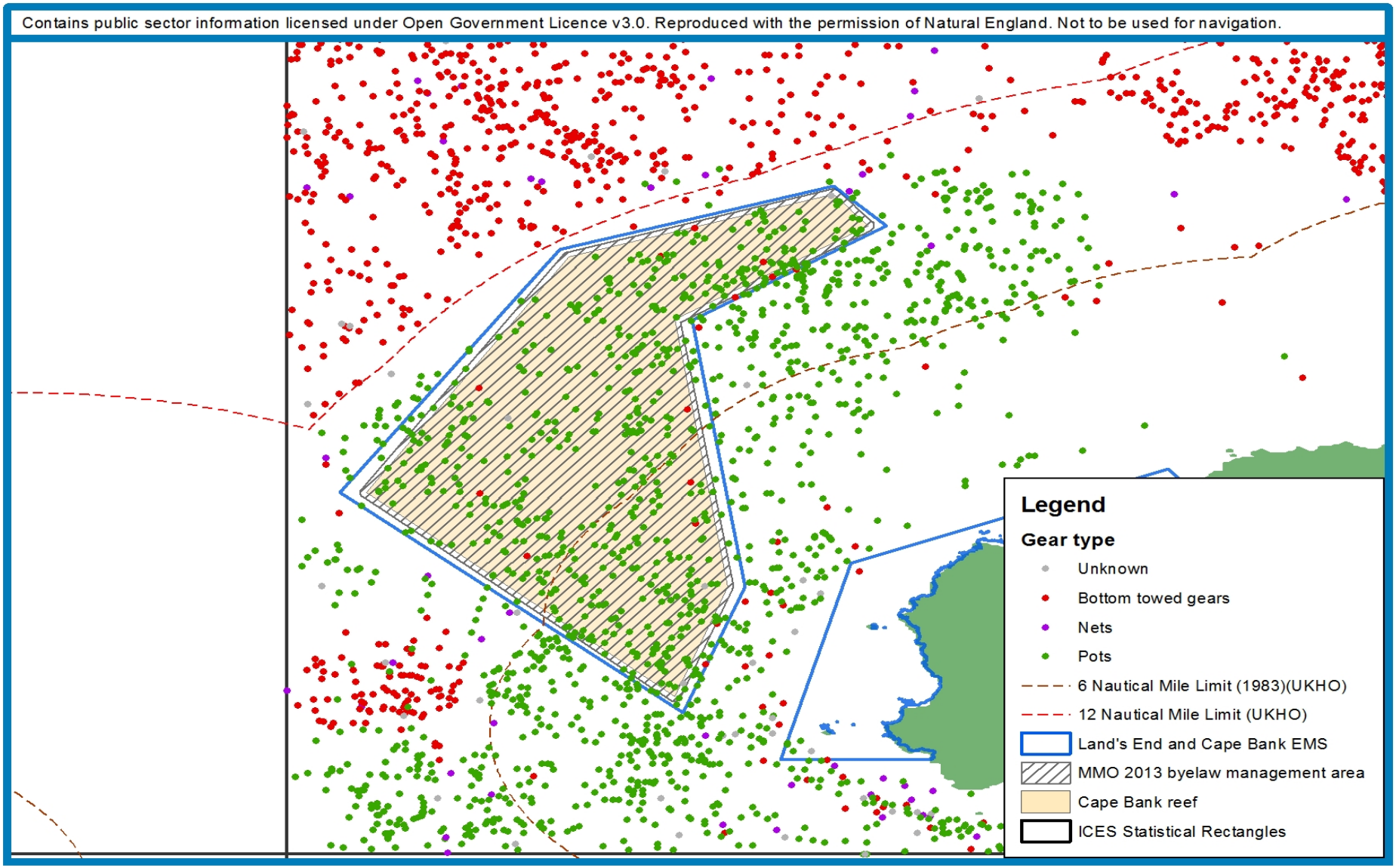
Annex 2c. Fishing activity data: UK VMS 2011



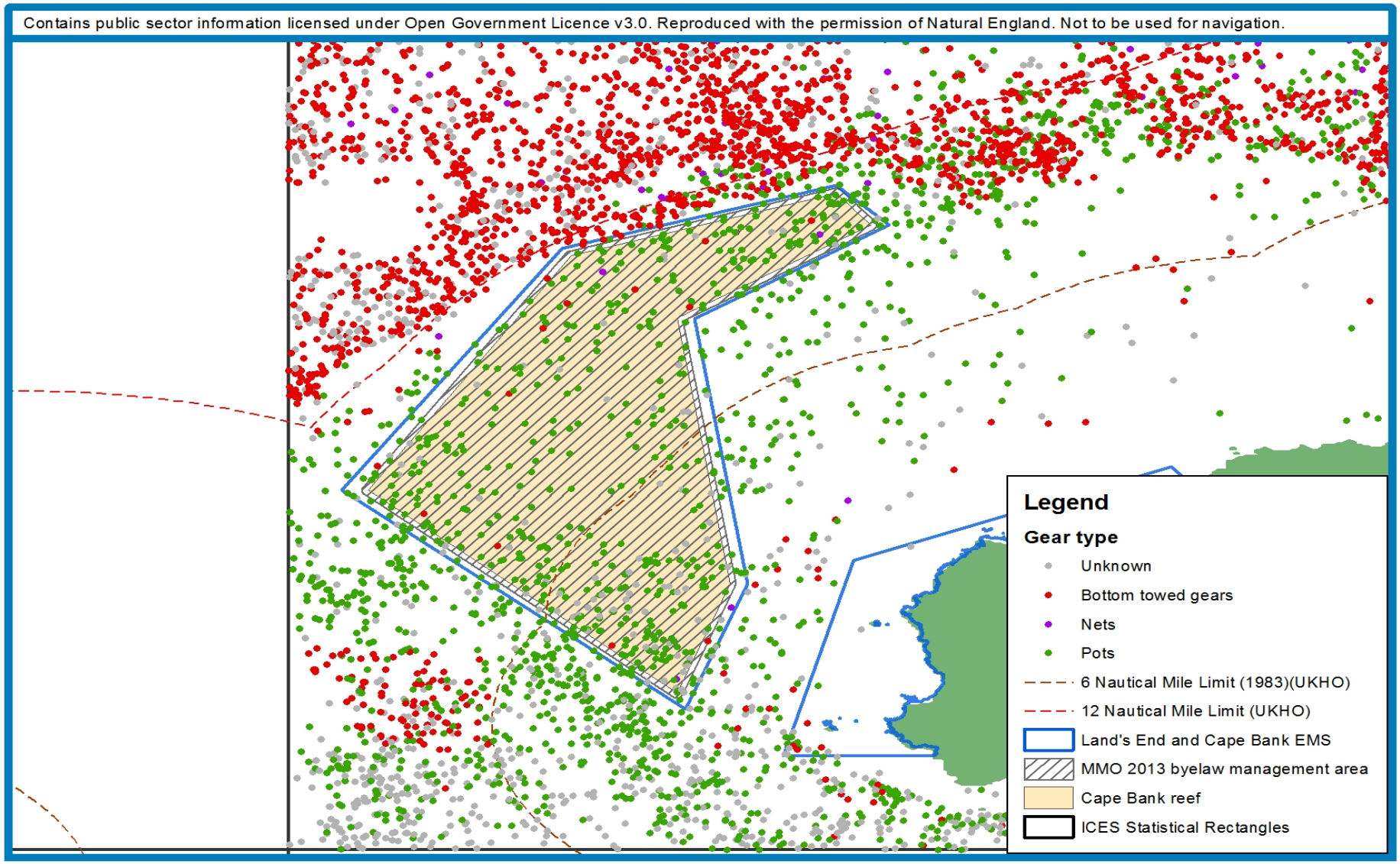
Annex 2d. Fishing activity data: UK VMS 2012



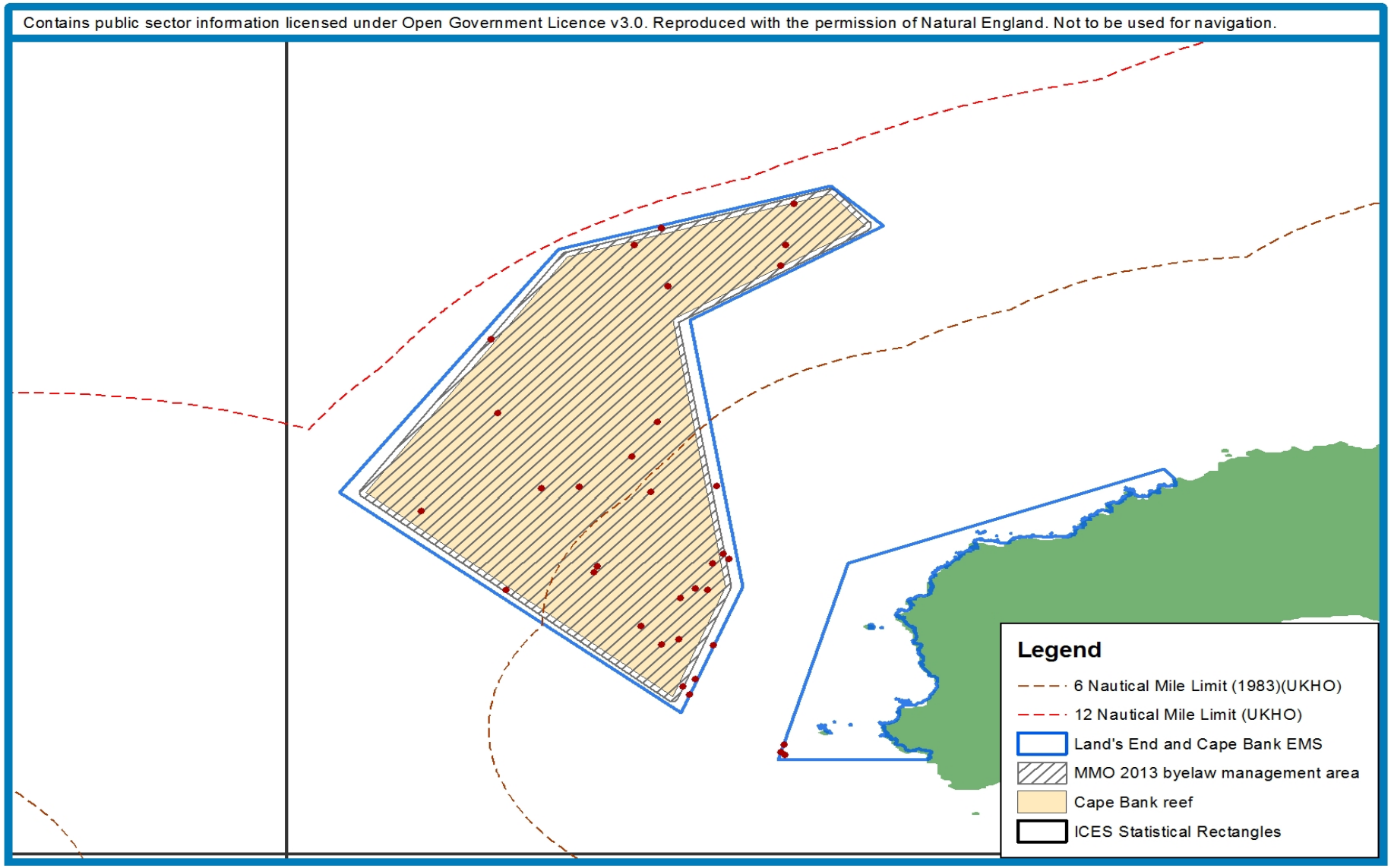
Annex 2e. Fishing activity data: UK VMS 2013



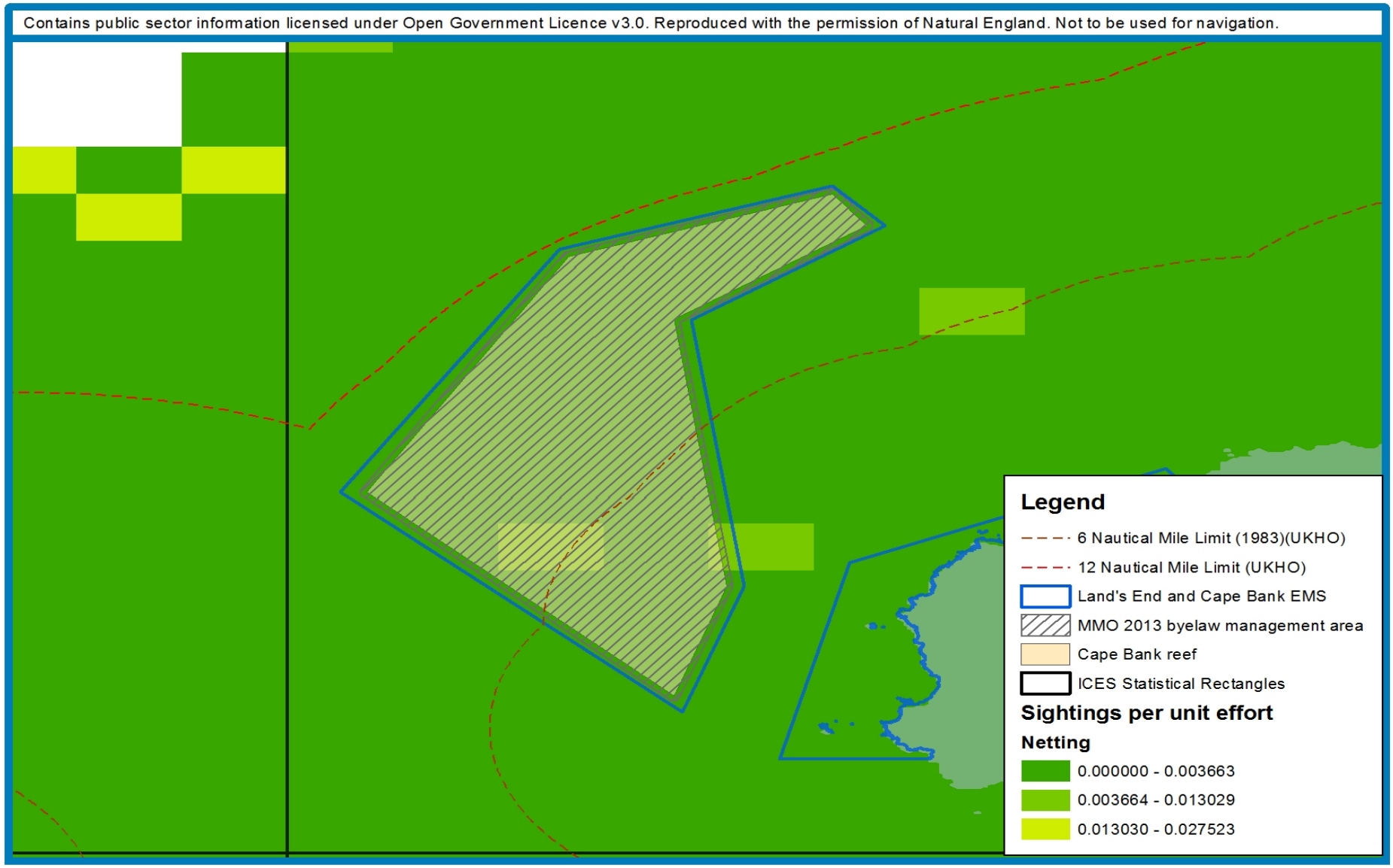
Annex 2f. Fishing activity data: UK VMS 2014



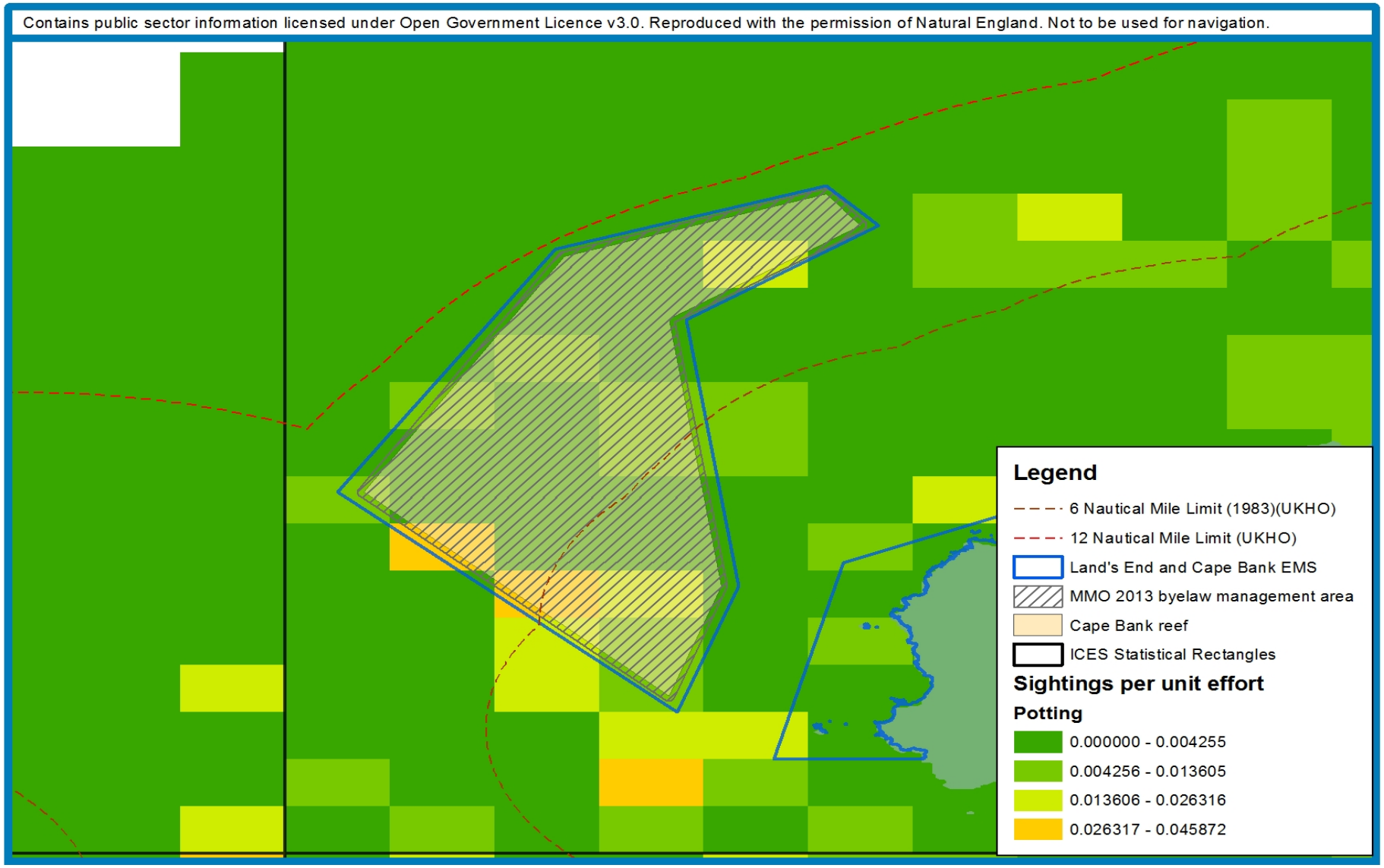
Annex 2g. Fishing activity data: Non-UK VMS 2009-2013 (potting and netting only)



Annex 2h. Fishing activity data: Netting sightings per unit effort 2010-2012



Annex 2i. Fishing activity data: Potting sightings per unit effort 2010-2012



Annex 3: Assumptions used to calculate spatial footprint (p) values

Pots

Size of pot: based on GAEL Force Lobster/Crab creel (609.6mm x 406.4mm)

Number of vessels and days spent fishing: derived from VMS/landings records.

Number of pots used by vessels: derived from local fisherman.

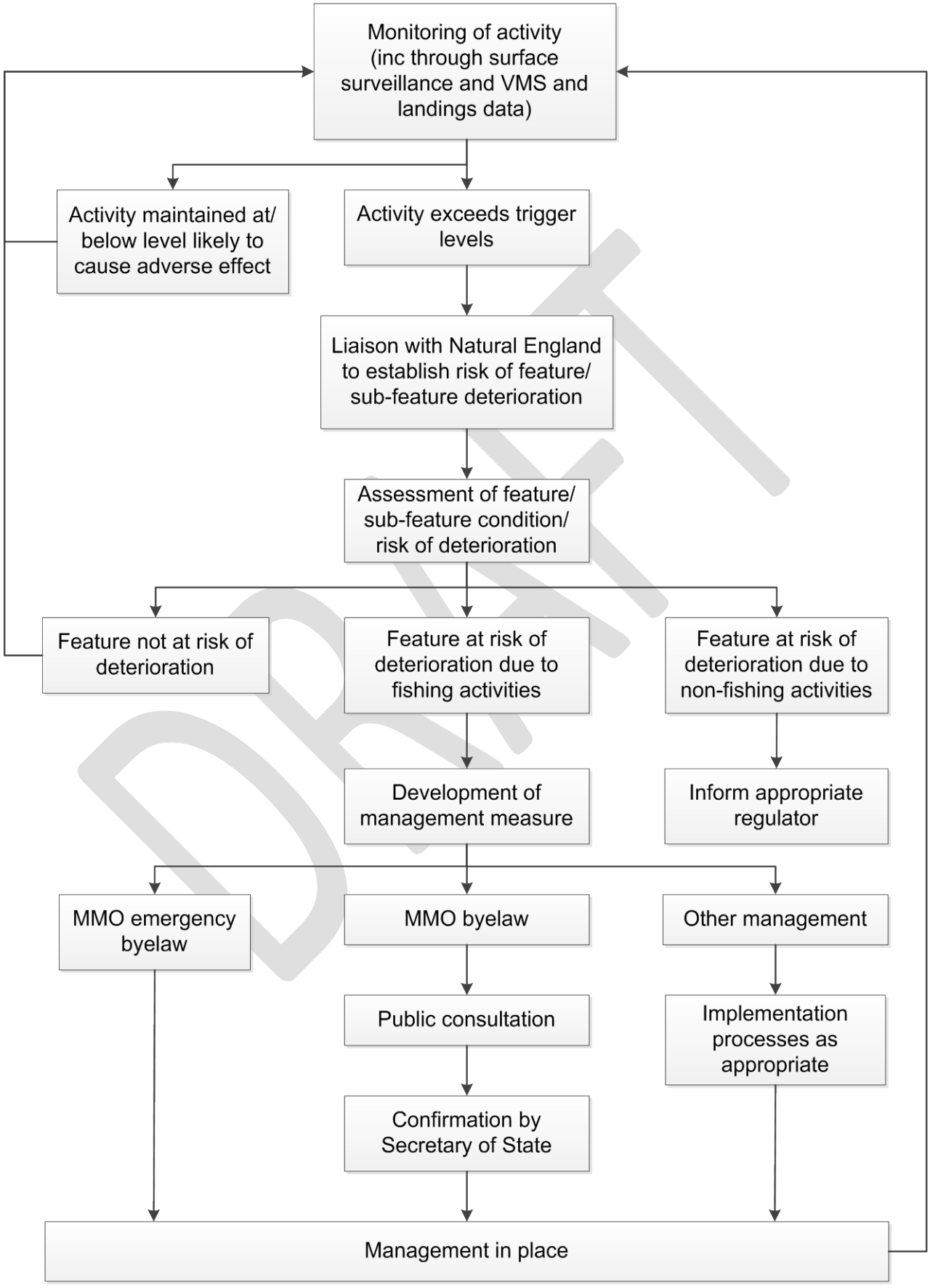
Nets (gill nets/trammel nets)

Gear information: taken from report on a workshop on the physical effects of fishing activities on the Dogger Bank

Number of vessels and days at sea: derived from VMS/landings records.

Number of nets hauled per day: supplied by IFCA.

Annex 4: Monitoring and Control Process



Annex 5: References

Axelsson M, Dewey S, (2011) Lizard Point cSAC and Land's End & Cape Bank cSAC baseline surveys 2010, Drop-down camera (stills photography and video) and Remotely Operated Vehicle (ROV) surveys. Natural England report.

Birchenough SNR, Coggan RA, Limpenny DS, Barrio-Frojan C, James JWC, Tyler-Walters H, Kirby SJ, Boyd SE, (2008) Acquisition of survey data and preparation of Site Briefing Statements for Draft Marine Special Areas of Conservation within the 0-12 Nautical Mile Zone. Cefas Report.

Chiappone M, Dienes H, Swanson DW, Miller SL (2005) Impacts of lost fishing gear on coral reef sessile invertebrates in the Florida Keys National Marine Park. Biological Conservation, 121: 221-230.

Clark S (2008) Lundy Island Potting Effort Survey. Devon Sea Fisheries Committee Research Report 200803.

Coleman RA, Hoskin MG, von Carlshausen E, Davis CM (2013) Using a no-take zone to assess the impacts of fishing: Sessile epifauna appear insensitive to environmental disturbances from commercial potting. Journal of Experimental Marine Biology and Ecology, 440: 100-107.

Doyle J (2005) Pink Sea Fan Survey Report, Cornwall. Cornwall Wildlife Trust. Available online: www.seasearch.org.uk/downloads/Pink%20Seafan%20Survey%20Report%20Cornwall%202005.pdf

Eno NC, Frid DLJ, Hall K, Ramsay K, Sharp RAM, Brazier DP, Hearn S, Dernie KM, Robinson KA, Paramore OAL, Robinson LA (2013). Assessing the sensitivity of habitats to fishing: from seabed maps to sensitivity maps. Journal of Fish Biology, doi:10.1111/jfb.12132, available online at wileyonlinelibrary.com.

Eno NC, MacDonald, DS, Amos SC, (1996) A Study of the effects of fish (crustacea/mollusc) traps on benthic habitats and species. Final Report to the European Commission. Study Contract No 94/076

Eno NC, MacDonald DS, Kinnear JAM, Amos SC, Chapman CJ, Clark RA, Bunker FStPD and Munro C (2001) Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science, 58: 11-2.

Fowler S (1989) Nature Conservation implication of damage to the seabed by commercial fishing operations. Nature Conservancy Council Report No.79, pp 1-33.

Griffin J, De La Haye K, Hawkins S, Thompson R, Jenkins S (2008) Predator diversity and ecosytem functioning: density modifies the effect of resource partitioning. Ecology, 89: 298–305.

Hall K, Paramor OAL, Robinson LA, Winrow-Giffin A, Frid CLJ, Eno NC, Dernie KM, Sharp RAM, Wyn GC, Ramsay GC (2008) Mapping the sensitivity of benthic habitats to fishing in Welsh waters – development of a protocol; CCW (Policy Research) Report No: 8/12. 85pp.

Hartnoll RG (1998) Circalittoral faunal turf biotopes: An overview of dynamics and sensitivity characteristics for conservation management of marine SACs. Scottish Association of Marine Sciences (UK Marine SAC Project), Oban, Scotland.

Haynes T, Bell J, Saunders G, Irving R, Williams J, Bell G (2014) Marine Strategy Framework Directive Shallow Sublittoral Rock Indicators for Fragile Sponge and Anthozoan Assemblages Part 1: Developing Proposals for Potential Indicators. JNCC Report No. 524, Nature Bureau and Environment Systems Ltd. for JNCC, JNCC Peterborough.

Hoskin MG, Coleman RA, von Carlshausen E, and Davis CM (2011) Variable population responses by large decapod crustaceans to the establishment of a temperate marine no-take zone. Canadian Journal of Fisheries and Aquatic Sciences, 68: 185–200.

JNCC and NE, (2011) Advice from the Joint Nature Conservation Committee and Natural England with regard to fisheries impacts on Marine Conservation Zone habitat features.

Lake NCH, Jones FMB, Paul JD (1987) Crab predation on the scallop (*Pecten maximus*) and its implication for scallop cultivation. Journal of the Marine Biological Association of the UK, 67: 55–64.

Mascaró M, Seed R (2001) Foraging behaviour of juvenile *Carcinus maenas* and *Cancer pagurus* Marine Biology, 139: 1135–1145.

MARG Ltd in association with Envision Mapping Ltd (2015) Feasibility study on applying a spatial footprint approach to quantifying fishing pressure. Report prepared for Defra's Marine Biodiversity Impact Evidence Group. Reference: MMO1108.

Natural England (2012) Land's End & Cape Bank candidate Special Area of Conservation Formal advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010. Available online: http://publications.naturalengland.org.uk/publication/3261179

Natural England (2012a) Marine Conservation Zone Project Stakmap Commercial Fishing under 15m vessels www.naturalengland.org.uk/publications/data/default.aspx

Pizzolla PF, (2008) *Alcyonium glomeratum* Red sea fingers. In Tyler-Walters H and Hiscock K (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available from: http://www.marlin.ac.uk/species/detail/1503

Stephenson F, Fitzsimmons C, Polunin NVC, Mill AC, Scott CL (2015) Assessing Long-Term Benthic Impacts Of Potting In Northumberland. Report to Natural England.

Silva ACF, Boaventura DM, Thompson RC, and Hawkins SJ (2014) Spatial and temporal patterns of subtidal and intertidal crabs excursions. Journal of Sea Research, 85: 343–348.

Silva ACF, Hawkins SJ, Boaventura DM, Thompson RC (2008) Predation by small mobile aquatic predators regulates populations of the intertidal limpet *Patella vulgata*. Journal of Experimental Marine Biology and Ecology, 367: 259–265.

Tillin HM, Hull SC, Tyler-Walters H (2010) Development of a sensitivity Matrix (pressures-MCZ/MPA features). Report to the Department of Environment, Food and Rural Affairs from ABPMer, Southampton and the Marine Life Information Network (MarLIN) Plymouth:Marine Biological Association of the UK. Defra Contract No. MB12 Task 3A, Report No. 22.

Vanstaen K, Breen P (2014) Understanding the distribution and trends in inshore fishing activities and the link to coastal communities. Cefas report for Defra. Report reference: MB0117. Available online: http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=1&ProjectID=18126

Walmsley SF, Bowles A, Eno NC, West N (2015) Evidence for Management of Potting Impacts on Designated Features. Report prepared for Defra's Marine Biodiversity Impact Evidence Group by ABP Marine Environmental Research Ltd, Eno Consulting and Centre for Environment, Fisheries and Aquaculture Science. Reference: MMO1086

Wood C (2003) Pink sea fan survey 2001/2. A report for the Marine Conservation Society. Available online: www.seasearch.org.uk/downloads/MCS%20Pink%20Sea%20Fan%20Survey%202001-2002.pdf

Wood C (2008) Seasearch pink sea fan surveys 2004/6. Available online: www.seasearch.org.uk/downloads/seafan2004-2006.pdf

Wootton E, Clegg T, Woo J, Woolmer A (2015) Ecosystem niche review for species caught by commercial potting. Report to Natural England from Salacia-Marine.