

Evidence base for designation of Lizard Point Special Area of Conservation

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References

1. Introduction

1.1 Context

1.1.1 This is the Impact Assessment (IA) for the recommendation that the Lizard Point Special Area of Conservation (SAC) is designated. Natural England is recommending designation of the site to the Department for Food, Environment and Rural Affairs (Defra). The site lies off the southern-most point of England in Cornwall (in the UK's Western English Channel Regional Sea) within 12 nautical miles (nm) of the shore.

1.1.2 The IA informs the government of impacts the site could have on the UK economy¹ and the site's potential environmental and social effects. It should not inform the decision to designate the site (which should be based on the site's Selection Assessment Document). This is because under the European Union's (EU's) Habitats Directive² economic or social impacts should not influence selection of SACs or delineation of their site boundaries. However, information provided on the type and level of activities taking place in and near the site may be used to inform management measures for the site.

1.2 Rationale for government intervention

1.2.1 Government intervention is required to protect marine habitats and species. Though some activities (such as fisheries, marine aggregate extraction and wind farms) are regulated this is not necessarily designed to achieve nature conservation objectives. Consequently marine habitats and species may be at risk of degradation or population decline as a result of human activities now or in the future.

1.2.2 The UK has one of the world's richest marine environments: it includes a diversity of habitats and a huge variety of animals and plants. Many species of seabird occur in internationally important numbers in UK waters. Conservation of marine habitats, plants and animals helps improve the environment (a principle of sustainable development³). It also contributes to the wellbeing of current and future generations.

1.2.3 The UK government is aiming to recover and protect the richness of our marine environment and wildlife through development of a strong, ecologically coherent and well managed network of marine protected areas that is well understood and supported by all sea users by 2012⁴. Establishment of this network plays a key part in delivering the government's vision for the marine environment of clean, safe, healthy, productive and biologically diverse oceans and seas⁵. The network of marine protected areas (MPAs) will include Special Areas of Conservation (SACs) designated under the EC's Habitats Directive and Special

¹ In keeping with guidance provided by the Defra impacts on the other Member States and other countries are not considered in this Impact Assessment.

² Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.

³ HM Government, 2005.

⁴ Defra, 2009.

⁵ Defra, 2002.

Protection Areas (SPAs) designated under the Birds Directive⁶. Further information on the MPA network is provided in Annex 2.

1.3 Intervention objectives and intended effects

1.3.1 The UK (as a Member State of the EU) is required to take measures to maintain or restore favourable conservation status⁷ of natural habitats and species that are considered to be most in need of conservation at a European level and to introduce robust protection for them. Habitats that are in need of conservation (listed in Annex I of the Habitats Directive⁸) are described as those in danger of disappearance within their natural range, or that have a small natural range, or that are outstanding examples of typical characteristics of the biogeographical regions listed in the Directive⁹. The Directive not only aims to conserve these habitats but also their typical species (the approach adopted for typical species in this IA is set out in Annex 9).

1.3.2 Under the Habitats Directive, habitats (and their typical species) in need of conservation are to be protected by a coherent European ecological network of sites (the 'Natura 2000' network¹⁰). The network is being identified by the European Commission from lists of national sites proposed by each Member State. The sites are designated as SACs by the Member State once the Commission adopts them into the Natura 2000 network.

1.3.3 The UK's existing contribution to the European coherent ecological network of sites is insufficient for Annex I reef habitat¹¹. Additional sites are needed both to represent the range of habitat sub-types in the UK and to ensure sufficient proportion of the UK resource of reefs is included within the network. Natural England has identified additional sites that will contribute towards sufficiency. It considers that all of the sites it is recommending in 2010 (plus a small number of other UK sites still under consideration) will be needed to achieve sufficiency (further details on the process for site identification are provided in Annex 2).

1.3.4 Lizard Point possible SAC (pSAC)¹² has been identified by Natural England as one of the best examples of the range and diversity of reef in the UK for protection under the Habitats Directive (based on the habitats' biological quality, geographical location, the proportion of the UK resource of the habitats the site contains, and other factors, for further details see Annex 2).

⁶ Council Directive 2009/147/EC on the conservation of wild birds.

⁷ The conservation status of a habitat is described as favourable when the 'natural range' and area it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long term maintenance exist and are likely to exist for the foreseeable future, and the conservation status of its typical species is favourable'.

⁸ The species are listed in Annex II of the Directive.

⁹ Council Directive 92/43/EEC Article 1(c).

¹⁰ which comprises SPAs as well as SACs.

¹¹ This was endorsed by the outcome of a 'moderation' meeting of the European Commission and Member States for the Atlantic biogeographic region in Galway 24-25 March 2009.

¹² The site is referred to as a 'possible SAC' from public announcement of the site on formal consultation until submission of the site to European Commission.

1.3.5 The Conservation of Habitats and Species Regulations 2010¹³ that implement the Habitats Directive provide significant protection to the habitat and its typical species that an SAC aims to protect. Key features of the protection that is provided are (further details are provided in Annex 3):

- Competent authorities¹⁴ are required to consider whether any plan or project (either alone or in combination with other plans and projects) is likely to have a significant effect¹⁵ on any SACs or SPAs when considering whether to consent it. A plan or project can be consented when it has been ascertained that there will be no significant effect.
- If it finds that a plan or project¹⁶ is likely to have a significant effect, the competent authority is required to undertake an 'Appropriate Assessment' with advice from the appropriate statutory nature conservation adviser(s). Appropriate Assessment assesses the potential impacts of the plan or project on achievement of the conservation objectives of the SAC or SPA and is limited to the implications of the plan or project for the specific habitats or species for which the SAC or SPA is designated. This can increase costs to the developer (as developers are responsible for providing and paying for the information required) and can cause delays though the risk of this is reduced if appropriate consultation¹⁷ is instigated early on. Many types of plan or project are required to undergo comprehensive environmental assessment under existing legislation¹⁸. Under these circumstances Appropriate Assessment under the Conservation of Habitats and Species Regulations and the Offshore Marine Conservation Regulations may not add significantly to assessment costs, since much of the information required for assessment under those Regulations will be available from the wider environmental assessment.
- The competent authority considers the Appropriate Assessment when deciding whether to grant consent. When doing so, it is required to apply the precautionary principle¹⁹ and consequently can only grant consent if it can ascertain that the plan or project will have no adverse effect on the SAC or SPA. This greatly enhances the protection provided for SACs and SPAs compared with some other designations (further details are provided in Annex 3).

¹³ The Conservation of Habitats and Species Regulations 2010 implement the Habitats Directive in English territorial waters within 12 nautical miles (nm) off the coast and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended 2009 and 2010, the Offshore Regulations) implement the Habitats Directive for offshore waters (waters within British fishery limits and any part of the sea bed and sub soil within the UK Continental Shelf Designated Area (within approximately 200 nm off the coast).

¹⁴ A competent authority is a public body or statutory undertaker that grants consents for regulated activities, for example, the Department of Energy and Climate Change (DECC) is the competent authority for wind farm and oil and gas licensing. It is responsible for taking into account the 2010 Conservation of Habitats and Species Regulations and 2007 Offshore Marine Regulations when it considers consenting activities under the regulations within its remit. It is also responsible for applying the Conservation of Habitats and Species Regulations and Offshore Marine Regulations tests (as required) for plans and projects which may affect how the site's conservation objectives are maintained or reached.

¹⁵ A 'significant' effect is one that brings a significant risk of not achieving the designated site's conservation objectives. Assessment of significance in this respect is established on a case by case basis.

¹⁶ That is not directly connected with or necessary to the management of the site.

¹⁷ Consultation of nature conservation bodies, The Crown Estate, regulatory authorities, non-government organisations (NGOs) and other stakeholders.

¹⁸ Environmental Impact Assessment (EIA) of projects and "Strategic Environmental Assessment" (SEA) of plans and programmes.

¹⁹ The precautionary principle and its application in this context are described in Annex 3.

- Derogations may be made under very limited circumstances (discussed in Annex 3).

This greatly enhances the protection provided for SACs and SPAs compared with some other designations (further details are provided in Annex 3).

1.4 Features of conservation interest in the site²⁰

1.4.1 The Lizard Point pSAC comprises coastal upstanding reef and offshore areas of submerged bedrock and boulders of complex geological origin (Figure 1, which can be found along with the other figures at the end of the main body of the Evidence Base, just before the references). These are separated by extensive areas of thin, coarse mobile sediment covering flat sedimentary bedrock to the south and east and flat metamorphic bedrock to the west. The reefs meet the Annex I habitat description of 'reef'. The site covers approximately 13,988 hectares (ha) and comprises about 12,595 hectares (ha) of reef. It comprises three distinct areas: coastal upstanding reef and flat reef and offshore upstanding reef.

1.4.2 The coastal upstanding reef is in depths of 0 to 80m. Where the reef is near the surface, there is a canopy of kelp, often heavily encrusted with the sea mat bryozoan, under which red, green, and brown algae can be found, hosting edible sea urchins.

1.4.3 The flat bedrock reef ranges from being near surface to deeper waters. The tide swept deeper water rock surfaces are inhabited by suspension feeders such as the soft coral 'dead man's fingers', jewel anemones, Devonshire cup corals, and massive rock boring sponges. The less exposed deeper waters are dominated by echinoderms, such as sea urchins, sea cucumbers, and star fish.

1.4.4 The offshore upstanding reefs are at depths down to 80 metres. These are good examples of wave exposed and tide-swept reefs that are at depths where they are dominated by animals rather than plants. In deeper more sheltered waters the reefs are home to hydroids; sponges; bryozoans such as sea chervil; Ross coral; and occasionally the pink sea fan. The pink sea fan is of conservation concern²¹ partly due to its infrequent reproduction and therefore likely slow recovery from damage and loss. Common and spiny star fish, European spiny lobsters, squat lobsters, edible brown crabs, edible sea urchins, cotton spinner sea cucumbers, and cuckoo wrasse are present throughout the reef. In shallower waters the reefs support red algae, anemones, sponges, and corals (such as the Devonshire cup coral).

1.5 The options

1.5.1 Option 1, the preferred option is to designate the SAC. This is assessed relative to a baseline of the situation if the site is not designated (the 'do nothing' option). Other options are not considered here, Natural England is recommending this site as a necessary contribution by the UK to the network of SACs for reefs (based on its biological quality, geographical location, the proportion of the UK

²⁰ For further details see Natural England, 2010.

²¹ It is a species listed in the Wildlife and Countryside Act 1981 and is a priority species under the UK Biodiversity Action Plan.

resource of the habitat the site contains, and other factors). If this site is not designated there is a significant risk that the European Commission (EC) will judge the UK's contribution to the network of SACs for reefs (listed in the Habitats Directive) to be insufficient, which could lead to infraction proceedings²². Known alternatives were considered during the site identification process but not recommended on scientific grounds. Sites of similar quality and overall extent of these habitats were not found and are not currently known to exist. Though the site could be conserved under voluntary agreements or a national designation this would not contribute to fulfilling the requirements of the Habitats Directive.

1.6 Overview of the IA

1.6.1 This IA replaces the IA that was formally consulted on in 2009-10 and has been modified in light of new information and responses to the formal consultation.

1.6.2 It assumes that the site is designated in 2010. Impacts have been assessed in the IA over a time scale of ten years based on the Impact Assessment guidance and toolkit. It is anticipated that costs and benefits of the site will occur for as long as it is designated, but because these are difficult to predict further into the future (for example, due to changes in technology and regulation), a ten year time frame is used for the analysis. Figures used in the calculations have been rounded for presentation in the text and tables in the Evidence Base. Further details of the method used are set out in Annex 4.

1.6.3 The baseline ('do nothing' option) against which the option to designate the site is assessed is set out in Section 2. This describes current and (known) planned human activities in the site and their potential impact on the reef habitats and their typical species. Section 3 assesses the potential costs and benefits of Option 1, designate the site.

1.6.4 The Figures (showing charts) that are referred to in the text can be found at the end of the main body of this evidence base, before the reference list. Annexes provide further detail of the policy and legislative drivers (Annex 2), further information on the regulation and nature of human activities occurring at the site (Annexes 3 and 5), and the combined costs of the recommended suite of Natura 2000 sites on those activities (Annex 8). A summary of abbreviations used in the IA is provided in Annex 1, Annex 6 is a glossary of fishery and ecological terms, Annex 7 describes the method used to estimate the value of landings from fisheries and Annex 9 describes the approach to typical species adopted in the IA.

²² The outcome of the 'moderation' meeting of the EC and Member States for the Atlantic biogeographic region, held in Galway 24-25 March 2009 was that the existing UK network of sites for Annex I reef and sandbank habitat is insufficient and additional sites are required.

2. The Baseline (the 'do nothing' option)

2.1 Human activity at the site

2.1.1 This section describes current and proposed human activities²³ that are expected to occur over the next ten years in the area of the Lizard Point pSAC that may be impacted on by the site. It describes activities that are expected to occur if the site is not designated and includes all those that may be impacted on by designation of the site. Human activities in the terrestrial and marine environment (including developments promoted by Local Development Frameworks and their equivalent) that are not likely to be impacted on by the site are not included in this description or in the analysis for this Impact Assessment. For example, some activities will not be impacted on because they do not have a significant mechanism for interaction with the site's interest features²⁴. All current and proposed activities that may be impacted on by the SAC have been identified as falling under the following sector headings:

- Generation of electricity from renewable sources of energy;
- Cables;
- Commercial fisheries;
- Shipping;
- Recreation;
- National defence;
- Activities that result in land-based sources of pollution.

2.1.2 There are no other significant economic activities that may be impacted on by the designation of the site. Descriptions of these activities are provided in Annex 5 and the regulatory processes that manage their potential impacts on or risks to the environment are described in Annex 3. The size of each sector in the UK is discussed in the analysis of combined impacts in Annex 8.

Vulnerability of interest features in the site to pressures from human activities

2.1.3 An initial assessment of the vulnerability of interest features in the site to pressures from human activities is provided in the table in Appendix A at the end of this document²⁵. In summary, the reef habitats, their communities and typical species have moderate sensitivity to removal, changes in nutrient and organic loading and salinity and selective extraction of species. They have moderate to high sensitivity to abrasion. The inshore upstanding reef has moderate sensitivity to changes in thermal regime and turbidity and the flat reef has moderate sensitivity to toxic contamination.

2.1.4 In the sections that follow, assessment of the potential impacts of human activities on interest features in the site if not designated is informed by the table in Appendix A. This provides the baseline against which the potential impacts of designating the site (Option 1) are assessed later.

²³ Including outstanding consents and permissions and proposed projects.

²⁴ 'Interest features' is used throughout the document to refer to the site's features of conservation interest, which are described in Section 1.4.

²⁵ Natural England, 2009a.

Generation of Electricity from Renewable Sources of Energy

2.1.5 No consented wind farms and no Round 3 zones for potential wind farm development are located within or in the vicinity of the site. Currently, no viable resources²⁶ for generation of electricity from wave energy have been identified within the site (though it should be noted that the ability to generate electricity from lower levels than the current criteria may develop in the future).

Tidal Stream

Extent of activity

2.1.6 It is assumed for the purposes of this analysis that locations within the site may be investigated within the next ten years for demonstrations of one unit or small arrays generation of electricity from tidal stream energy prior to commercial operation. Black & Veatch (2005) ranked the site 42 out of 57 potential tidal stream sites in the UK²⁷, though the Atlas of UK Marine Renewable Energy Resources²⁸ did not identify viable resources in the site²⁹.

Potential environmental impacts if the site is not designated

2.1.7 Generation of electricity using tidal current energy is currently being trialled in the UK and the environmental impacts are not yet fully understood. If the site was not designated, it would be more difficult to secure licence conditions that required micro-siting of activities (such as protection of cables with rock or concrete mattresses) to avoid sensitive areas of reef and thereby avoid or minimise impacts³⁰. Potential impacts are described in Appendix B at the end of this document.

Cables

Extent of activity

2.1.8 As the most southerly point of mainland Britain, Lizard Point provides landfall for a number of electrical and fibre optic telecommunication cables. These are mostly armoured cables that lie on the seabed surface; some are buried beneath the surface for protection as the cable reaches the shore.

2.1.9 Three telecom cables run through a small part of the eastern corner of the site landing ashore east of Lizard Point, outside the pSAC (Figure 2.1). An estimated total length of 6km of these is in the site. Laying of cables that are not replacements or upgrades of existing cables is unlikely³¹. Power cables associated with wet renewables are discussed in the section on renewables.

²⁶ Based on the assessment made by ABPmer (2008). ABPmer (2009a) suggests an annual mean significant wave height of more than 2 metres is required for electricity generation to be viable.

²⁷ They estimated mean spring peak currents at Lizard Point of 1.55 metres per second, which represents 0.1 percent of the total UK tidal stream resource.

²⁸ ABPmer, 2008.

²⁹ The wet renewable energy industry has suggested criteria of a mean spring peak current of at least 2 metres per second to indicate viable tidal stream resources for generating electricity (ABPmer, 2009a).

³⁰ Conditions could potentially be secured on grounds that reefs are Biodiversity Action Plan habitats but this carries less weight than designation as an SAC.

³¹ Due to over-capacity in the current network (ABPmer *et al.*, 2007).

Potential environmental impacts if the site is not designated

2.1.10 Cable routes may coincide with reefs and non-designation could cause damage to the reefs and/or deterioration in their conservation status. Impacts could arise from fixing the cable to the seabed and protective covering of the cable using rock and/or concrete mattresses. If the site is not designated, it would be more difficult to secure licence conditions that prevent cable laying from damaging the reefs (further details of potential impacts are provided in Appendix B at the end of this document).

Commercial fisheries

2.1.11 This section provides an overview of commercial fishing activity in the site, estimates of the scale of activity and its potential impact on the interest features.

Overview of commercial fishing activity

2.1.12 The description below draws on information supplied by the Marine and Fisheries Agency (MFA)³² in response to a request from Natural England, information provided by specialists in Natural England and information in consultation responses.

2.1.13 The pSAC lies completely within the 6nm fisheries limit (Figure 2.2). Only UK vessels operate within this area, the majority of which are under 10 metres in length.

2.1.14 The area is fished by between 40 and 50 under 10 metre seasonal vessels. Around 30 under 10 metre vessels and a small number of over 10 metre vessels also work all year in the area. These vessels use one of the following gear types:

- Pots targeting lobsters and crabs.
- Tangle nets targeting anglerfish, turbot, ray, brill, crawfish, lobster, spider crab and brown crab all year.
- Gill nets targeting pollack, cod, bass, red mullet and sole all year.
- Handlines targeting bass, pollack and mackerel during spring and summer months.

2.1.15 There is currently very little trawling or dredging at the site³³. This is likely to be the result of the rough nature of much of the seabed in the area, including large areas of reef, and the high concentration of static gears that would be likely to become entangled in towed gear. There is potential for increased intensity of effort of static gear in the site and increased scallop dredging activity around the site boundaries as a result of diversification and displacement from Lyme Bay due to the Ministerial Closure, the recent closure of Cardigan Bay SAC, and as a result of designation of the other possible SACs proposed in the South West.

2.1.16 The main ports within the area are Coverack, Cadgwith, Helford, Falmouth, Church Cove, Lizard, Porthleven, Mevagissey, Mullion and Newlyn (see Figure 2.3). Fisheries are an important aspect of tourist attractions in ports in the area and further afield. Tourists enjoy viewing the boats in port and seeing fishers at work in port and

³² The functions of the MFA have since been absorbed by the Marine Management Organisation (MMO).

³³ There may be small amounts of towed fishing by small vessels on the softer sediments between the reefs.

at sea and also purchase fish and seafood from boats, market stalls, shops and restaurants. Fisheries in the site supply the local population with fish and seafood as well as the wider population in the UK and consumers overseas.

Estimated value of landings

2.1.17 In the absence of audited statistics on fisheries that are specific to the site, a description of landings is provided here for fisheries in the ICES rectangles³⁴ that contain the site (28E4 and 29E4, as shown in Figure 2.2). The description uses data from the Fishing Activity Database (FAD) and is summarised in tables in Appendix C. Note that fisheries within the site may differ from those in each rectangle as a whole because the site only covers a proportion of the rectangles (Figure 2.2), distribution of fishing activity is not uniform throughout the rectangles³⁵ and not all fisheries landings are captured in the FAD. Potting for crustaceans accounted for 32 percent of the value of landings by UK vessels from ICES rectangles 28EF and 29E4 over 2005-8 and trawling with bottom contact accounted for 30 percent (Table C.1). Over this period, edible crab accounted for the largest proportion of the value of landings from the rectangles recorded in the FAD (22 percent) followed by scallops (12 percent) and sole (10 percent) (Table C.2). Vessels over 15 metres landed 43 percent of the total value of landings and vessels 10 metres and under landed a third (Table C.3). Over 2005-8, landings from the rectangles were a significant proportion of the total value of landings for vessels potting for crustaceans within the rectangles and vessels 10 metres and under netting within the rectangles (Table C.4). However, many sections of the fleet fishing in the rectangles also got a significant proportion of their value of landings from elsewhere; vessels dredging got the majority of their landings outside the two rectangles.

2.1.18 Estimates based on FAD data indicate that the average annual value of landings from the pSAC from 2004 to 2007 for all UK vessels with Vessel Monitoring Systems (VMS)³⁶ was £0.010m. This has been estimated for the area within the pSAC boundary and is based on analysis provided by ABPmer (2009b) and use of a more refined technique than that used in the consultation IAs (the data and method used are described in Annex 7). For all UK vessels without VMS³⁷, estimates based on FAD data indicate average annual value of landings of £0.0004m from the site (based on the unlikely but necessary assumption that their value of landings is evenly distributed across the ICES rectangles that contains the site³⁸). Combined these provide a rough estimate based on FAD data of average total value of landings from the site of £0.010m per year. Further details are provided in Annex 7). This is subject to considerable uncertainty and is likely to be an underestimate for reasons set out in Annex 7 and because Cornwall Sea Fisheries Committee (SFC) has

³⁴ Fisheries data in the Fisheries Activity Database is referenced to the rectangles that were introduced by the International Council for the Exploration of the Seas (ICES) to standardise the division of sea areas for use in statistical analysis. Each ICES statistical rectangle is '30 min latitude and 1° longitude in size (approximately 30 nautical miles square depending on its location) and has a unique identifier, such as 34F1 (Source: MFA, 2009).

³⁵ For example, the inshore area may be associated with smaller rather than larger vessels.

³⁶ In the analysis undertaken by ABPmer (2009b) vessels with VMS were defined as vessels greater than 15 metres in length for landings in 2005-7 and greater than 18 metres for landings in 2004.

³⁷ Vessels 15 metres or under for landings in 2005-7 and vessels 18 metres or under for landings in 2004.

³⁸ Distribution of value of landings is not assumed to be the same as for VMS vessels as vessels with VMS are expected to have different fishing patterns to smaller vessels without VMS.

indicated that about £250,000 of shellfish was landed at Cadgwith port alone in 2006³⁹.

Potential environmental impacts if the site is not designated

2.1.19 The impacts of fisheries on interest features over the next ten years if the site is not designated are difficult to predict. This is because of the paucity of information on the likely intensity of fishing over this period and the level of information available on the existing impact of fisheries in the site. If the SAC is not designated, fisheries will not be managed in light of their impact on the interest features in the site. If fishing intensity remains the same (which will not necessarily be the case), fisheries that may be currently detrimentally affecting the condition of interest features in the site may continue to do so. Fisheries that are not impacting on the interest features of the site may continue not to, but changes in fishing effort and intensity (for example as a result of changes in technology, displacement and diversification) could result in some of these fisheries having an impact in future. Potential impacts of specific gear types are described in Appendix B at the end of this document.

2.1.20 High intensity of fishing activity in the site could have effects on the ecosystem that are additional to removal of target species. Removal of particular species (such as predatory species) from a marine food web can also have knock on effects on inter-dependent species. For example, if stocks of target species (such as cod, monkfish, plaice, sole, rays, pollack, spurdog, ling, and lobster) are over-exploited then the composition of the species associated with the reef could alter. As some of these species are top predators, their removal (and the consequent reduction in predation pressure) could cause a shift in size in the reef-associated animals. It could lead to greater dominance of smaller mid-water fish and large molluscs and crustaceans such as crabs and alter the overall balance of the ecosystem. The potential impacts of selectively extracting a particular species is complex and little understood at present

Shipping

Scale of activity

2.1.21 A lot of shipping passes through the area, ranging from small coastal freighters to larger crude oil or bulk carriers and container ships. The majority of shipping passes well offshore.⁴⁰

2.1.22 There is no existing or planned dredging of channels within or in the vicinity of the site. There is a small fishing port, Mullion Cove, to the north west of Lizard Point (Figure 2.3), but no major commercial ports in the site. Further development of harbours for commercial use in the site is unlikely due to the exposed nature of the coast and remoteness from land-based freight transport. There are no dredge disposal sites in the pSAC.

2.1.23 SeaZone Hydrospatial data⁴¹ (the source suggested by the Maritime and Coastguard Agency for anchoring areas outside port limits) indicates that there are at least five shipping anchorages within the site (Figure 2.3). It is also recognised

³⁹ Estimate based on shellfish landings returns from the Cornwall SFC's Permit Byelaw database

⁴⁰ Safetec, 2000.

⁴¹ The last known update to the data layer that was used occurred on 04/01/2008.

that smaller vessels (for example local fishing boats) may anchor within the site boundary although to what extent is unknown.

Potential environmental impacts if the site is not designated

2.1.24 Under the current level of operations, the risk is low that non-designation will result in an increase in impacts on interest features in the site from ships passing through the site. Shipping could potentially affect the reefs through abrasion and collision of vessels with each other and/or the reefs but impacts from day to day operations are unlikely. Ships and local boats could cause significant impacts from inappropriate anchoring on sensitive interest features within the site. Further details of potential impacts are provided in Appendix B at the end of this document.

Recreation

2.1.25 Locations to the east and west of Lizard Point are popular with recreational divers and are likely to be dived on a regular basis but the Point itself is unlikely to be visited too often by divers due to strong tidal streams. Boat trips for viewing wild life currently takes place from Falmouth mostly to see basking sharks (there is a known hot spot for their activity on the eastern side of the Lizard) and cetaceans.

2.1.26 In addition to the small fishing port, Mullion Cove, (Figure 2.3) there is a slipway (Figure 2.4) and a number of small craft facilities, marine rescue stations and anchorages (Figure 2.3) along the coast. There are a few managed areas for mooring and anchoring although vessels may anchor informally throughout the site. Further development of slipways and harbours for recreational use is unlikely to occur at the site due to the remote nature of much of the coastline. A few cruising routes for sailing boats pass through the site (Figure 2.5).

2.1.27 Lizard Point is a popular site for recreational angling from the shore. There is potentially some recreational potting and netting associated with smaller settlements on the coast, but the level of this is unlikely to be significant. Intermittently, there is some recreational spear fishing around Lizard Point.

Potential environmental impacts if the site is not designated

2.1.28 Recreational fishing could potentially have a significant impact on the reefs in the site and/or their typical species (details of potential impacts are provided in Appendix B at the end of this document). Further information is required to assess the risk of this impact if the site was not designated.

2.1.29 Anchoring by vessels used for recreation could potentially impact on interest features in the site. At the current level of activity, the risk is low that impacts of other recreational activities on interest features would increase if the site was not designated (for further details see Appendix B).

National defence

Extent of activity

2.1.30 The majority of the site overlaps with a naval training and trials area. Aircraft fly over the site. The nearest MoD site is Royal Naval Air Station Predannack which is 0.5 km away.

Activities that result in land-based sources of pollution

Extent

2.1.31 Toxic and non-toxic pollutants enter the sea from direct point source discharges of effluents or diffuse sources (such as agricultural run-off via rivers). Discharges can be both continuous and intermittent, but the high dilution that any land-based discharge is likely to receive would reduce the risk of these to features in the site. Run off of pollutants from the adjacent land is likely to be lower than for some of the other marine pSACs in the South West because most of the land adjacent to Lizard Point is National Nature Reserve or owned by the National Trust. No significant point source inputs of pollution into the site were identified for this analysis. Any point source discharges are currently controlled through licensing by the Environment Agency.

2.1.32 Assessments made under the Water Framework Directive (WFD)⁴² indicate that relevant coastal waters in and adjacent to the pSAC boundary are at moderate ecological status, but water quality is reported to be of good quality.

Potential environmental impacts if the site is not designated

2.1.33 Pollution from the land could potentially lead to changes in water quality at sea and in turn impact on the resident biology (see Appendix B at the end of this document). However, the WFD will be addressing freshwater and coastal water quality issues and discharges will be controlled under this to meet objectives specified in this Directive.

Benefits of the interest features

2.1.34 In their current condition a range of benefits are obtained from the reefs and their typical species in the site. If the reefs became degraded or the populations of typical species became depleted as a consequence of not designating the site this could potentially diminish the benefits. Benefits of fisheries and recreation have already been described. Other benefits include:

- **Research and Education:**
 - The area currently is not well studied.
 - Limited information on the environment and wildlife is provided for visitors in a number of locations such as Lizard National Nature Reserve and National Trust land holdings which collectively cover most of the coastal land adjacent to the site (which the South West coastal path passes through).

⁴² Environment Agency (2009).

- **Cultural Value:**

- As an island nation, local fishing communities are an important factor in defining an area's character, history and cultural heritage. Currently and in the past the fishing industry and its supporting industries often play a significant role in many small port communities and the surrounding area, contributing towards their cultures and community identities. Family traditions in commercial fishing and the supporting small-scale industries have been passed down over a number of generations and fishers have built up many decades of local knowledge of fishing within their area.
- There are three protected wrecks⁴³ in the site: Schiedam (a post medieval (1684) cargo vessel designated for its historical significance), Royal Anne (a post medieval (1721) 5th rate oared frigate built at Woolwich, designated for its historical significance) and Rill Cove (post Medieval (early 17th Century) remains of an unidentified vessel sunk after 1605, designated for its archaeological significance). There are also a number of other wrecks (Figure 2.4, some of which are listed in Appendix D). Though they are generally avoided by fishing vessels, there is some evidence of fishing activity inadvertently damaging wrecks⁴⁴.

- **Option and Non-use Value:** People gain from having the option to benefit in future from habitats and species in the site even if they do not currently benefit from them. People also benefit from the knowledge that there are good examples of reef habitat in the site.

2.2 Summary of condition of features in the baseline

2.2.1 In summary, vessels anchoring have potential to significantly impact on areas of sensitive reef habitat. Additional information is needed to assess the impact of commercial and recreational fisheries on the reefs and their typical species. Laying of cables could potentially impact on the reefs. Deployment of devices to demonstrate generation of electricity using tidal stream energy could potentially impact of sensitive areas of reef; further information is required to better understand the impacts of these developments. At their current level of activity, there is a low risk that shipping in passage, recreation (other than fisheries and anchoring of vessels), and land-based sources of pollution will have impacts on the interest features in the site that increase over the next ten years.

2.2.2 The situation summarised above is reflected in the conservation objectives for management of Lizard Point pSAC, which are to **maintain** the environmental quality and processes of the reefs and to maintain the extent, physical structure, diversity, community structure and typical species of inshore and offshore upstanding reefs⁴⁵. This implies that, in general, current activities, plans and projects have not been identified as causing significant damage to the interest features either because no such damage is occurring or because there is insufficient information on the actual

⁴³ All designated under the Protection of Wrecks Act, 1973. This affords the site with statutory protection from unauthorised access and it is a criminal offence for anyone to do any of the following other than under the authority of a licence: tamper with, damage or remove any part of the wreck, carry out diving or salvage operations or deposit anything that obliterates, obstructs or damages the wreck without first obtaining a licence.

⁴⁴ Kingsley, 2009.

⁴⁵ Natural England, 2009a.

effects of activities on the condition of the feature.

2.2.3 New activities and changes to current activities are likely to be proposed at Lizard Point. These activities could potentially have adverse impacts on the interest features. If the site is not designated, it will be difficult to influence the consenting of plans and projects through, for example, the introduction of effective mitigation measures. The Conservation of Habitats and Species Regulations and the Offshore Marine Conservation Regulations will not apply as a matter of law to plans or projects that may significantly affect site integrity. For nationally significant infrastructure projects, regulatory authorities would still be required to consult the statutory nature conservation advisers about potentially damaging effects on interest features in the site but less weight would be placed on the assessment of impacts on interest features and securing appropriate mitigation. Also, developers would not be required to demonstrate no adverse effect in the same way (see Annex 3).

2.2.4 Not designating the recommended suite of marine Natura 2000 sites will reduce the likelihood that government will meet its aims for the marine environment. The government would fail to deliver its responsibilities under the EU Birds and Habitats Directives (to maintain or restore Annex I habitats and the populations of Annex I and regularly occurring migratory species).

2.2.5 The recommended suite of sites will form an important component of the UK's MPA network which will make a significant contribution towards maintaining and restoring resilience of the marine ecosystem. A key component of the network will be missing if the sites are not designated. This will increase the risk that the marine ecosystem will undergo irreversible change as a result of natural perturbations and human activities particularly in the face of climate change.

3. Costs and benefits of Option 1: Designate the site

3.1 Approach adopted to assess impacts

3.1.1 This section describes key features of the approach that has been used to estimate the impacts of the policy option (designate the SAC). It is followed by the hypothetical management measures that are used for this analysis, estimates of the costs and benefits and a summary of these.

3.1.2 The costs and benefits of the SAC will result from the management measures that are applied to the site. These are not yet known; the process of developing and implementing management measures follows designation of the site. Competent authorities will be required to assess the impacts on interest features in the site of any activity they consent and to review outstanding consents and permissions with a view to achieving the site's conservation objectives (as discussed in Annex 3). Activities that do not result in pressures to which the interest features are sensitive may continue at their current levels of spatial and temporal intensity. The intended outcome of the management measures is to prevent further degradation and help deliver restoration of the interest features in the site where damage to them has occurred.

3.1.3 To estimate the costs of the management measures scenarios have been used for the IA that describe a range of plausible hypothetical management measures (discussed further below).

3.1.4 In future, if new information suggests that the condition of the interest features in the sites has deteriorated, or is unfavourable, then restoration will be required; it is likely that more significant restrictions on activities would be needed to achieve this. As the likelihood of these circumstances arising is at present unpredictable, the implications of a 'restore' conservation objective are not analysed further in this IA.

3.1.5 This section estimates the potential costs and benefits designating the site compared with the baseline (the 'do nothing' option). These are subject to significant uncertainty because:

- there is uncertainty about what fishing activity occurs in the site;
- there is a high degree of uncertainty about the effects of activities on the interest features;
- it is not yet known what management measures will be developed and implemented for the site;
- it is difficult to know how the management measures will impact on operators, how operators will respond, the economic costs of the impacts and what the wider effects will be;
- it is difficult to predict how the condition of the interest features and wider marine environment will change with designation of the SAC; and
- there is limited evidence on the benefits that will arise.

Hypothetical management measures

3.1.6 The potential hypothetical management measures for the SAC developed for the purposes of this analysis are presented below in Table 3.1. Development of these was informed by:

- the sensitivity of interest features (including typical species⁴⁶) in the site to pressures from human activities (Appendix A),
- current and proposed levels of activities in the site (Section 2),
- the potential environmental impacts of those activities if the site was not designated (Appendix B, summarised in Section 2),
- and sector specialists in Natural England who drew on their knowledge of licence conditions for plans and projects.

3.1.7 Because the measures that will apply to the site are not known, a range of plausible hypothetical measures is used for the analysis, described by a minimum and maximum scenario. It is assumed that the true costs of the final management measures that are developed for the site will fall within the range. The management measures that are implemented will be determined by the relevant authorities⁴⁷ (as described in Annex 3) and may differ from those used for this analysis.

3.1.8 The minimum scenario involves the smallest change in activities that may plausibly be needed compared with the baseline and therefore presents the minimum potential effect on activities. It assumes that all activities, plans and projects are deemed to have no likely significant effect on interest features in the site with the exception of dredging and trawling with bottom contact which are assumed to impact on the reef.

3.1.9 The maximum scenario is at the other end of the scale: it involves the maximum change in activities that plausibly may be needed. It assumes that activities, plans and projects that could potentially impact on interest features in the site are deemed to have a likely significant effect. Consequently Appropriate Assessment is required for plans and projects and therefore costs for competent authorities are likely to increase (discussed under other costs to the public sector at the end of Section 3.2). The management measures used for this scenario are precautionary to avoid under-estimation of costs. They are used to estimate an upper limit for plausible costs (not the worst case scenario).

3.1.10 The two scenarios are used to reflect the range of management measures that may be required. The benefits are therefore assumed to be the same for both.

3.1.11 The management measures used for the analysis are generic in that they could apply to any site that is being designated for reefs with conservation objectives of 'maintain'. However, they are specified only for activities that are currently known to occur or are expected to occur at a significant level in the site.

⁴⁶ See Annex 9 for the approach adopted in the IA for typical species.

⁴⁷ Relevant authorities are statutory bodies with powers or functions that have or that could have an impact on the marine area within or adjacent to a marine SAC or SPA, for example, local authorities, harbour authorities and sea fisheries committees. They have powers to establish a management scheme for marine SACs and SPAs and have a general duty under the Conservation of Habitats and Species Regulations and Offshore Marine Regulations to exercise their functions so as to further the conservation of marine SACs and SPAs. Some competent authorities are also relevant authorities.

| Table 3.1 Summary of the “minimum” and “maximum” management scenarios employed in the analysis for Lizard Point SAC | |
|---|---|
| <p>“Minimum” scenario: <i>assumes that aside from the specified exception that all activities, plans and projects have no likely significant effect on interest features in the site.</i></p> | <p>“Maximum” scenario: <i>assumes that the activities, plans and projects listed below are deemed to have a likely significant effect on interest features in the site. Consequently Appropriate Assessment is required for plans and projects.</i></p> |
| <u>Outstanding consents & permissions & existing fisheries:</u> | |
| <p>Fisheries (further details are provided in Section Error! Reference source not found.): Reference source not found.):</p> <ul style="list-style-type: none"> ▪ Closure to all dredging and trawling with bottom contact. <p>Sectors other than fisheries: No change</p> | <p>Fisheries (further details are provided in Section Error! Reference source not found.): Reference source not found.): as for minimum scenario plus:</p> <ul style="list-style-type: none"> ▪ Ban on landings of berried lobsters. ▪ Minimum and maximum landing size for crustaceans. ▪ Limits on effort for specified gear types. <p>Recreational angling: If angling is found to significantly impact on interest features in the site, controls may be required.</p> <p>All sectors: Higher likelihood of prohibition of anchoring over sensitive interest features except in emergency circumstances.</p> |
| <u>New plans or projects:</u> | |
| <p>No change</p> | <ul style="list-style-type: none"> ▪ Businesses may face delays to consents if Appropriate Assessment is required and increased cost of additional survey. ▪ It is likely that more projects would not pass the hurdle of no ‘adverse effect’ and so would not be consented. ▪ Businesses may make adjustments to projects proposed relative to the baseline to ensure no significant effects. ▪ Businesses are also likely to invest more in proposal assessment. <p>Cables and generation of electricity from tidal energy:</p> <ul style="list-style-type: none"> ▪ Siting of devices and cables to avoid sensitive interest features. This would be considered in the design of new projects that are proposed for the site. ▪ Increased costs for surveys to inform the baseline and siting of devices and cables to avoid sensitive interest features. ▪ Increased costs for post-construction surveys to assess impacts on interest features. ▪ Possible increase in operating costs to avoid impacts on sensitive interest features. |

3.1.12 The sections that follow estimate the economic cost of the impact of the SAC on each sector of human activity in the site in turn, followed by the costs of managing the SAC. The impact of designating the site on existing activities, outstanding consents and permissions (which will be subject to Review of Consents) and

proposed projects that are expected to occur over the next ten years (though it is possible that these may not be funded or consented) is assessed. The assessments that follow do not pre-judge Review of Consents, environmental Impact Assessments or Appropriate Assessments (AAs) (discussed in Annex 3) for individual plans and projects and have been developed drawing on past experience. If Appropriate Assessment is required this could delay consent, but the risk of this is reduced if appropriate consultation⁴⁸ is instigated early on. Costs are assessed for known outstanding consents and permissions and known existing fisheries.

3.1.13 An overview of the generic costs that could be incurred is provided in Annexes 3 and 4. The combined and strategic impact on each sector of the suite of proposed marine Natura 2000 sites is considered in Annex 8.

3.2 Costs

Generation of electricity from tidal energy

3.2.1 It is difficult to predict the impacts of designating the Lizard Point SAC on developments to generate electricity from tidal stream energy at the site as there is great uncertainty over locations and scale of future developments, types of devices that may be deployed and tested, numbers of devices in a location and grid connections. Impacts only on future projects are considered as there are no existing developments or outstanding consents within the site. For the purposes of the analysis, it is assumed that there will be one new development in the site over the next ten years.

3.2.2 To reflect uncertainty, it is assumed in the minimum scenario that the SAC has no impact on developments to generate electricity from tidal energy. In the maximum scenario, it is assumed that additional survey costs may be incurred to provide required baseline information on interest features and to inform siting of devices and cable routes to avoid sensitive interest features in the site. These costs would arise for example, if sufficient information was not collected in initial surveys. To avoid under-estimation of the costs it is assumed here that the cost of any additional surveys that are required is equivalent to the cost of an entire benthic and geophysical survey. These additional costs could arise on four occasions: the baseline survey prior to construction and the monitoring surveys conducted (under Food and Environment Protection Act licence conditions) each year for three years post-construction. As the scale of the development is not known and this is likely to significantly influence survey costs for the devices, the additional survey costs for the devices are not estimated here. Based on the location of the tidal stream resources (which are confined to a small area), it is estimated here that 3km of export cable would be required for a development. It is assumed that the cable would need to be 20 percent longer to avoid sensitive interest features in the site⁴⁹. As a result of the SAC additional costs may also be incurred in operating the devices to avoid impacts on sensitive interest features (for example, through using different mountings, anchoring or foundations). The costs of this are unknown.

⁴⁸ Consultation of nature conservation bodies, The Crown Estate, regulatory authorities, non-government organisations and other stakeholders.

⁴⁹ Based on the opinion of experts in ABPmer and etfec.

3.2.3 The economic costs of impacts of the SAC on generation of electricity using tidal stream energy is estimated to have a present value⁵⁰ in the range of zero to £0.290m plus unknown potentially significant costs over the 10 year assessment period. Details of the calculations are provided in Table 3.2 below.

| Table 3.2 Estimated economic costs of impacts of the SAC on generation of electricity from tidal stream energy | | |
|---|---|---|
| <i>"Minimum" scenario:</i> | <i>Assumptions*</i> | <i>Costs</i> |
| <u>Outstanding consents:</u> No change. | NA | £0 |
| <i>"Maximum" scenario:</i> | | |
| <u>Future projects:</u> | | |
| <ul style="list-style-type: none"> ▪ Additional cost for survey to inform baseline and inform siting to avoid sensitive interest features. Plus additional cost for monitoring to assess impact on interest features each year for 3 years following cable laying. | <p>For power export cable, additional cost for the baseline survey and for each of the post-cable laying surveys estimated based on the cost of undertaking an additional benthic monitoring survey (£600 per km) and geophysical survey (£3,893 per km). Assume cost is incurred on four occasions (for the baseline survey and each of the three post-laying surveys). Assume 20 percent extra cable required to divert around sensitive interest features**. Assume 3km of power export cable passes through the site plus 20%, a total of 3.6km. Cost = 4,493 x 3.6 x 4.</p> <p>Number and extent of devices unknown, therefore survey costs unknown.</p> | <p>For cable: £0.065m one off.</p> <p>For devices: unknown, potentially significant cost.</p> |
| <ul style="list-style-type: none"> ▪ Siting cables and devices to avoid sensitive interest features | <p>For 3 km of power export cable, if 20 percent extra is required to avoid sensitive interest features, 0.6km of extra cable is required. Unit cost is £465,300 per km for purchase and installation of new power cable. Cost = 465,300 x 0.6.</p> | <p>£0.279m one off.</p> <p>For devices: unknown, potentially significant cost.</p> |
| <ul style="list-style-type: none"> ▪ Possible restrictions on operating the devices to avoid impacts on sensitive interest features | <p>The cost and need for restrictions for example on mountings, anchoring and foundations are unknown</p> | <p>Unknown cost. (Total of above = £0.344m plus unknown)</p> |
| <p>* Source of benthic and geophysical survey costs: industry (confidential) (in comparison, ABPmer et al. (2007) estimate cost of geophysical survey as £3,000 per km and additional benthic survey £300 per km). Source of cost of purchasing and installing cable Scottish Power Renewables consultation response (note that cost estimated by ABPmer et al. (2007) is £465,000 per km). Source of cost of purchasing and installing cable ABPmer et al., 2007. Cost of geophysical survey estimated as midpoint of the range of £1,285 to £6,500 per km. One-off costs could occur at any time, so are assumed to arise in 2015.</p> <p>** Assumption made based on the opinion of experts in ABPmer and etfec.</p> | | |

⁵⁰ This is the total value of all the costs over the 10 year assessment period (2010 – 2019) adjusted for the timing of their incidence because as a whole, society prefers to defer costs to future generations (and to receive goods and services sooner rather than later). This adjustment is achieved through discounting (using a discount rate of 3.5%).

Cables

3.2.4 To reflect uncertainty, it is assumed in the minimum scenario that the SAC has no impact on activities concerning telecommunication cables.

| Table 3.3 Estimated economic costs of impacts of the SAC on telecom cables | | |
|--|--|---|
| <i>"Minimum" scenario:</i> | <i>Assumptions*</i> | <i>Costs</i> |
| <u>Outstanding consents:</u> No change. | NA | £0 |
| <i>"Maximum" scenario:</i> | | |
| <u>Future projects:</u> | | |
| <ul style="list-style-type: none"> ▪ Additional cost for survey to inform baseline and inform siting to avoid sensitive interest features. Plus additional cost for monitoring to assess impact on interest features each year for 3 years post cable laying. ▪ Routes of replacement cables avoid sensitive interest features | <p>Additional cost for baseline survey and each of the post-cable laying surveys estimated as cost of undertaking an additional benthic monitoring survey (£600 per km) and geophysical survey (£3,893 per km). Assume cost is incurred on four occasions (for the baseline survey and each of the three post-laying surveys). Assume 20% extra cable required to divert around sensitive interest features**. 6km of cable replaced over next ten years plus 20%, a total of 7.2km of cable. Cost = £4,493 x 7.2 x 4.</p> <p>For 6 km of cable, if 20% extra is required to avoid sensitive interest features, 1.2km of additional cable is required. Unit cost is £20,000 per km for purchase and installation of new telecom cable. Cost = £20,000 x 1.2.</p> | <p>£0.129m one off.</p> <p>£0.024m one off (Total of the above = £0.153m)</p> |
| <p>* Source of benthic and geophysical survey costs: industry (confidential) (in comparison, ABPmer et al. (2007) estimate cost of geophysical survey as £3,000 per km and additional benthic survey £300 per km). Source of cost of purchasing and installing cable ABPmer et al., 2007. Cost of geophysical survey estimated as midpoint of the range of £1,285 to £6,500 per km. One-off costs could occur at any time, so are assumed to arise in 2015.</p> <p>** Assumption made based on the opinion of experts in ABPmer and etfec.</p> | | |

3.2.5 In the maximum scenario it is assumed that all cables that pass through the site will need to be replaced within the next ten years⁵¹. It is assumed that additional survey costs for cable replacement may be incurred to provide required baseline information on interest features, to inform routing of the replacement cables to avoid sensitive interest features in the site and to assess impact on the interest features. These costs would arise for example, if sufficient information was not collected in initial surveys. To avoid under-estimation of the costs it is assumed here that the cost of any additional surveys that are required is equivalent to the cost of an entire benthic and geophysical survey. These additional costs could arise on four occasions: the baseline survey prior to construction and the monitoring surveys conducted (under Food and Environment Protection Act licence conditions) each year for three years following cable laying. It is estimated that 20% additional length of replacement cables could be required to avoid sensitive interest features in the site⁵².

⁵¹ This assumption is made to avoid under-estimation of costs on the basis that the stock of cables in the UK is relatively old (other than cables for wind farms).

⁵² Based on the opinion of experts in ABPmer and etfec.

3.2.6 The economic cost of the impacts of the SAC on telecom cables is estimated to have a present value in the range of zero to £0.129m over the 10 year assessment period (Table 3.3).

Commercial fisheries

3.2.7 The impact of the site on the contribution that fisheries make to the UK economy is estimated here in terms of the impact on gross value added (GVA) for the sector⁵³ plus costs arising from impacts on proposed mussel farm developments. Ideally this would be estimated as the change in GVA that arises from the impacts of the site on costs and revenue for fishers arising from changes in fishing patterns, steaming time, species targeted, landings, gear types used, and also from vessels leaving the fleet. Displacement of fishing effort is likely to result in impacts on fishers operating outside as well as within the site. Regrettably such detailed analysis was not feasible. Instead the impact on GVA is estimated based on:

- the proportion of the value of landings in the site (by the UK fleet) that could be affected by the hypothetical management measures⁵⁴. For the purpose of the analysis, largely arbitrary hypothetical estimates have been provided of the level of restriction provided (and the value of landings affected) by the management measures. These have been crudely informed by the outcome of previous implementation of similar management measures and are precautionary to avoid under-estimation of the costs. The value of landings affected by a measure is estimated based on contribution to value of landings made by the gear type (or landings of species) that the measures aims to restrict. The contribution is calculated using FAD statistics for landings by gear type (Table C.1) and by species (Table C.2) for the ICES rectangles that contain most of the site. These are very rough estimates as the site only occupies part of the rectangles and fishing is not uniform throughout the rectangles.
- the value of landings in the site (by the UK fleet), presented in Section 2. As discussed in Annex 7 these are rough estimates, not least because as fishing by non-VMS vessels is not distributed evenly throughout the rectangles and the value of shellfish landings by vessels under 10 metres may not be fully reflected in the data.
- estimates of GVA as a proportion of earnings from fisheries for the vessels in the UK fleet.

Finally, potential social impacts are considered.

3.2.8 The assessment assumes the measures apply to the whole site. In practice, where management measures are needed they may be applied only to interest

⁵³ GVA measures the contribution to the economy of each individual producer, industry or sector by estimating the value of output (goods or services) less the value of inputs used in that output's production process (Source: Office for National Statistics, <http://www.statistics.gov.uk/cci/nugget.asp?ID=254>). The source that is used here (Anderson & Guillen, 2009) estimates GVA for the UK fleet in terms of the sum of remuneration of labour (crew) and capital (owner), calculated as income minus all expenses (fuel, repairs, variable and fixed costs) except crew cost.

⁵⁴ As set out in Section 3.1 a range of hypothetical management measures has been used here to so that the potential impacts of the designation can be assessed. This is because the management measures for the site are not yet known; they will be developed by the relevant authorities and may differ from those set out here. The involvement of local fisheries stakeholders in the design of any new management measure for new Natura2000 sites will help ensure compliance and reduce enforcement costs.

features for which they are required but the feasibility of doing this depends on enforcement considerations. The cost of the measures estimated here may therefore be overestimated. However, if enforcement capacity is not refined enough to discriminate implementation of measures required only in small areas of the site, those measures may need to be implemented in other areas of the site (where they are not necessary).

3.2.9 The analysis assumes that new management measures are not applied if the necessary controls are already in place. An overview of existing relevant byelaws that apply to the site is provided in Appendix E at the end of this document. If the government decides that national and local management measures are required to protect stocks of brown crab and lobster (which it is currently considering), many (if not all) of the measures suggested below to manage brown crab and lobster fisheries may not be necessary (though additional measures may still need to be sought between 6 and 12 nm where appropriate).

Value of landings affected in the minimum scenario

3.2.10 The following hypothetical management measure is used for the purposes of the analysis to estimate the impact on fisheries in the minimum scenario:

Measure 1: *Closure of the site to all towed demersal gear⁵⁵ (including: rock-hopper, otter, beam and scallop/shellfish dredging and trawling). This aims to prevent damage to Annex I sea-floor habitats for which the site is designated and stationary species*

3.2.11 The value of landings from trawling with bottom contact as a proportion of total landings within the two rectangles that contain the site (from Table C.1) is multiplied by the value of landings in the site (Section 2.1) to estimate the level of landings potentially affected by this measure: approximately £0.003m per year. The same approach is used for dredging and to estimate the value of landings affected for each measure); it is estimated that approximately £0.001m per year of landings from dredging could potentially be affected. This is subject to considerable uncertainty and may be an underestimate for reasons set out in Section 2.1 and Annex 7.

Value of landings affected in the maximum scenario

3.2.12 The following hypothetical management measures (plus measure 1 above) are used for the purposes of the analysis to estimate the impact on fisheries in the maximum scenario:

Measure 2: *Ban landings of berried lobster. This aims to ensure that reproductive capacity of lobsters is maximised. It aims to protect typical species of the site.*

3.2.13 As landing of berried lobster are already banned in the site under existing byelaws (Appendix E) this measure has no impact compared with the baseline (and is not required in addition to the byelaw).

⁵⁵ Demersal gear targets species that live on or near the seabed, such as plaice and sole.

Measure 3: *Cap on the number of pots deployed; reduction by 50 percent⁵⁶. This aims to reduce the number of crustaceans taken from the site. It aims to protect typical species of the site.*

3.2.14 A cap reducing the number of pots by 50 percent is assumed to reduce the value of landings from pots by 50 percent and so could potentially affect landings of £0.002m per year.

Measure 4: *Cap on landings from all gear with any bottom contact excluding towed demersal gear and potting; landings reduced by 50 percent. This measure (along with Measure 1) aims to prevent damage to Annex I sea-floor habitats for which the site is designated and stationary species.*

3.2.15 It is assumed that the cap on landings would not exceed 50 percent, reducing landings from netting and lines with bottom contact by a similar amount. This measure is estimated to affect approximately £0.001m of landings per year.

Measure 5: *Cap on mortality consequent of all gear types without bottom contact to reduce mortality (targeting mortality avoids discarding by-catch); effort reduced by 50 percent. This measure aims to manage potential impacts on the biomass of typical species at the site.*

3.2.16 The cap could be up to 50 percent of current landings for all without bottom contact, affecting 50 percent of the value of landings for these gears. This could affect approximately £0.001m of landings per year.

Measure 6: *Increase minimum landing size and introduce maximum landing size for crustaceans. The minimum landing size aims to help crustaceans reach maturity and breed and the maximum landing size aims to enable presence of larger crustaceans in the site and therefore protect typical species of the site.*

3.2.17 Crustaceans may have a functional role in an ecosystem to the extent that they determine the community of plants and animals. An example of this is the predation of sea urchins by lobsters; where lobster populations are reduced, sea urchins proliferate and kelp can be overgrazed⁵⁷. Evidence from North Eastern Sea Fisheries Committee suggests that where landings of lobsters are high, as is the case in this site, there is a low abundance of lobsters that are bigger than the minimum landing size⁵⁸. As the largest lobsters and crabs, at an individual level, can make the greatest contribution to the function of the ecosystem, these size classes should be represented within a healthy community.

⁵⁶ This is a hypothetical scenario used for the purposes of the Impact Assessment. A more likely management scenario would be a cap on existing potting and netting levels. This scenario would be based on the assumption that if management of the site required reduction in mobile gear activity, a cap on potting and netting levels might be required to limit the impacts of fishers who were trawling/dredging and have diversified to potting (as greater levels of static gear activity could increase impacts on the site's interest features). Such a cap would be accompanied by appropriate monitoring of typical species to adequately ascertain the true impact of these activities upon them.

⁵⁷ Breen & Mann, 1976.

⁵⁸ Bannister, 1999.

3.2.18 There is already a minimum landing size for crustaceans in the site. The maximum landing size would probably be variable and it is not currently known what size could be appropriate. It is estimated for the purposes of this analysis that at maximum it might affect 25 percent of the value of landings of crustaceans, approximately £0.001m per year.

Application of all measures:

| Table 3.4 Estimated value of landings by UK vessels affected by application of the hypothetical management measures (assuming average value of landings from the site of £10k)* | | | | | |
|--|---|---|--|--|--|
| <i>Category of gear type</i> | <i>Landings for each gear type as a percentage of value of landings by UK vessels (a)**</i> | <i>Management measures that affect landings</i> | <i>Percentage of value of landings by UK vessels affected by application of all measures</i> | | <i>Value of landings affected (£m per year) ****</i> |
| | | | <i>Landings by that gear type (b)</i> | <i>Landings by all vessels fishing in the site (a x b)</i> | |
| Minimum scenario: | | | | | |
| Trawling with bottom contact | 30% | 1 | 100% | 30% | 0.003 |
| Dredging | 12% | 1 | 100% | 12% | 0.001 |
| Total | | | | 43% | 0.004 |
| Maximum scenario: | | | | | |
| Trawling with bottom contact | 30% | 1 | 100% | 30% | 0.003 |
| Dredging | 12% | 1 | 100% | 12% | 0.001 |
| Trawling with no bottom contact | 0% | 5 | 50% | 0% | 0 |
| Netting with bottom contact | 9% | 4 | 50% | 5% | 0 |
| Netting with no bottom contact | 11% | 5 | 50% | 5% | 0.001 |
| Lines with bottom contact | 5% | 4 | 50% | 3% | 0 |
| Lines with no bottom contact | 0% | 5 | 50% | 0% | 0 |
| Pots (Crustacean) | 32% | 2, 3 & 6 | 50% | 16% | 0.002 |
| Other pots | 0% | - | 0% | 0% | 0 |
| Other | 0% | - | 0% | 0% | 0 |
| Total for all gear types | | | | 71% | 0.007 |

* For details see Section 2.1. Note that figures in this table are rounded so may not add up to the total.

** For vessels fishing in the ICES rectangles that contain the site (Average for 2005-8. Source: Fishing Activity Database, data supplied by the Marine and Fisheries Agency (MFA, the functions of which have since been absorbed by the MMO). For details see Table C.1).

*** Calculated as a x b x £10,407.

3.2.19 The impact of applying all of the hypothetical management measures is not the sum of the impacts of the individual measures estimated above because some of the measures overlap. It is assumed that if the control that is sought by one measure (for example restrictions on potting under measure 6) is being achieved by another measure (such as the restriction on potting sought under measure 3), the control is not increased further. However, for controls that are not duplicated (for

example, controls for different fisheries) the effects of all measures are assumed to be additive. For each gear type, the impact of combined application of all of the measures in the maximum scenario is set out in Table 3.4. This indicates the measures that restrict each gear type and estimates the percentage of the total value of landings by that gear type that would be affected and the value of landings by that gear type (and by all gear types) that would be affected.

3.2.20 The sum of the percentage of value of landings affected by each gear type in Table 3.4 gives the total percentage affected in the minimum and maximum scenarios: 43 percent and 71 percent respectively. It is estimated based on FAD data that approximately £0.004m per year of landings could be affected in the minimum scenario and £0.007m in the maximum scenario if the hypothetical management measures were all implemented. Note that this is subject to considerable uncertainty and may be an underestimate for reasons set out in Section 2.1 and Annex 7.

Impact on the fishing sector

3.2.21 Fishing businesses would adapt to any additional management measures in different ways and it is difficult to predict whether and to what extent the above estimates of landings potentially affected would translate into a net reduction in income to the fishing sector. This section considers the potential for businesses to adapt and estimates the direct impact of the measures on the fishing sector. Further details on the potential impacts are provided in Appendix G at the end of this document.

3.2.22 It is assumed here that the hypothetical management measures used for the analysis may reduce the contribution that fisheries in the area make to the UK economy to some extent. In the absence of more detailed information on the impacts that would arise it is assumed that the entire value of landings affected is lost and not replaced. Consequently the impact on the economy is the loss in GVA from these landings. Landings from outside the site for vessels that fish in the site are not assumed to be lost as well as it is assumed that other fishing businesses would make these landings.

3.2.23 The average GVA for the UK national fleet is estimated to have been 40% of total fleet earnings for 2005-7 inclusive⁵⁹. A figure for the national fleet is used here because of the high margin of error involved in the estimates that are being used⁶⁰. Using this, Table 3.5 estimates the cost of the impact of the site on fisheries based on the impact on GVA.

3.2.24 The economic costs of impacts of the SAC on fisheries are roughly estimated to have a present value in the range of £0.015m to 0.026m over the 10 year assessment period (for details see Table 3.5). There may be additional costs relating to impacts on landings and on the fishing industry not captured in the data used for the analysis. Once the fisheries management measures that will be adopted for the site are known, advice will be sought from Sea Fisheries Committees (SFCs) /

⁵⁹ Source: EC Annual Economic Report on the European Fishing Fleet (Anderson & Guillen (2009).

⁶⁰ Estimates of GVA as a percentage of earnings can be estimated for a number (but not all) segments of the UK fleet using data from Curtis *et al.* (2010).

Inshore Fisheries Conservation Authorities (IFCAs)⁶¹ and the Marine Management Organisation (MMO) on the estimated loss of GVA that will arise from the impact on fisheries and potential social impacts⁶². This will result in a better informed assessment than it has been possible to provide here.

| Table 3.5 Estimated economic costs of impacts of the SAC on fisheries | | |
|---|--|--------------------------------------|
| <i>“Minimum” scenario:</i> | <i>Assumptions</i> | <i>Costs</i> |
| <u>Existing activities</u> <ul style="list-style-type: none"> ▪ Closure to dredging and trawling with bottom contact | Assumptions set out in text above. Loss of GVA is estimated as 40% of the value of landings affected (£0.004m per year) plus impacts on fisheries’ contribution to the economy that are not included in the estimate. | £0.002m per year plus unknown costs. |
| <i>“Maximum” scenario:</i> | | |
| <u>Existing activities</u> <ul style="list-style-type: none"> ▪ Impacts from a collection of management measures. | Assumptions set out in text above. Loss of GVA is estimated as 40% of the value of landings affected (£0.007m per year). plus impacts on fisheries’ contribution to the economy that are not included in the estimate. | £0.003m per year plus unknown costs. |

Potential social impacts and impacts on the local and regional economy

3.2.25 In both the minimum and maximum scenarios the estimated reduction in income to fishing businesses could potentially result in negative social impacts and impacts on the local and regional economy. For example, there could be a potential reduction in demand for services such as fish processing, packaging, storage and transport, as well as a reduction in the demand for supplemental services such as vessel and gear maintenance. Some ports could be affected by reduction in landings and a decrease in income from fisheries. Ports that could be affected are listed in Section 2.1.

3.2.26 Fisheries stakeholders have indicated⁶³ that if the measures used for the maximum scenario in the IA (such as a 50 percent reduction in pots) were applied it would make many of the boats operating in the site financially unviable. It would be difficult for them fish more distant grounds because of the increased fuel costs and because they need to return to shore each day as many of the vessels are cove boats and it could have implications for crew safety. The impact on fishing businesses would reduce the size of the fleet that fishes the site and would result in loss of jobs. This would have knock on effects on associated businesses such as fish merchants, diesel suppliers, fish markets and harbours both locally and more widely in the region.

⁶¹ Sea Fisheries Committees will be replaced with Inshore Fisheries and Conservation Authorities (IFCAs) in April 2011. The limits of the jurisdiction for IFCAs have not yet been decided.

⁶² This could potentially be informed by research funded by Defra, due to be completed in May 2010, that will provide more detailed information on fishing effort by under 15 metre vessels within 6nm.

⁶³ In consultation responses and discussions with Natural England.

Shipping

3.2.27 No additional measures for vessels passing through the site are likely to be required for the current level of shipping movements and vessel sizes⁶⁴. Restrictions may need to be introduced to ships anchoring within the site (these would not apply in emergency circumstances) if anchoring is demonstrated to be impacting on the interest features. If anchoring sites are changed this may bring the vessels closer to or further away from the coast depending on where the present anchoring areas are situated. This could impact on steaming times.

Recreation

3.2.28 Hypothetical management measures for recreational sea angling are not suggested here because of insufficient information on its impact on interest features in the site. If angling was found to be significantly impacting on interest features in the site by impacting on the populations of typical species, controls such as bag limits that restrict the number and size of fish extracted might need to be introduced. If they were required, these measures could lead to a reduction in sea angling activity at the site. However, there is so much uncertainty about whether they would be required and the net impact that they would have on angling in the area that this is not assessed.

3.2.29 As discussed for shipping, if anchoring by recreational vessels is found to be impacting on interest features in the site, restrictions on anchoring may need to be introduced (these would not apply in emergency circumstances). Additional management measures for other recreational activities are unlikely to be necessary due to the fairly low level and low impacts of these on the interest features.

National defence

3.2.30 As for shipping, no additional measures are likely to be required to manage naval vessels transiting through the site given the current level of vessel movements and vessel sizes. If anchoring by naval vessels is found to significantly impact on the reefs and their typical species, restrictions may be required (these would not apply in emergency circumstances).

Activities that result in land-based sources of pollution

3.2.31 The Environment Agency's ongoing Review of Consents that may have a likely significant effect on existing SACs and SPAs⁶⁵ will need to include consents that may affect Lizard Point SAC. The results of this review could lead to further costs to industry to address any impacts from discharges (which could include capital costs associated with improved effluent treatment and increases in operational costs⁶⁶). It is unlikely that action on discharges will be required to protect interest features in the site. Current coastal water quality as reported in the Environment Agency River Basin Management Plans should be sufficient to support conservation objectives for the features designated in the site.

⁶⁴ Designation of this site is not likely to significantly impact on a ships right of innocent passage and freedom of navigation in seas around the UK. Equipment carried and used by ships for the safe navigation (such as echo sounders) would not be affected by the site designation.

⁶⁵ Mostly inland or extending to estuaries and some coastal waters including the nearby Fal and Helford SAC).

⁶⁶ For example, in its consultation response South West Water indicated that additional treatment (nutrient stripping) at five Sewage Treatment Works in the South West would cost approximately £25m.

Costs of managing the SAC

3.2.32 For the purposes of this analysis it is assumed that a management group (comprising representatives from relevant authorities) will be established for the site⁶⁷. Once the site is designated, the management group would be responsible for establishing operations that may cause deterioration to interest features in the site (based on advice from the statutory nature conservation advisers) and evaluating current use against the conservation objectives. From this it would develop an action plan with targets for management of the site then implement this through agreements, working practices and byelaws, for example. It would also establish and carry out a monitoring plan for periodic assessment and review of the site (which will consider requirements for base line data, compliance monitoring and condition monitoring) in consultation with the statutory nature conservation advisers.

3.2.33 The management group would probably meet twice a year and its members would also provide advice during the year on management measures that might be needed, surveillance, the annual review, plans and projects and report any damaging activities. It should⁶⁸ also meet periodically to consult with representatives from the advisory groups and interest groups. Full public consultation should be undertaken on any proposals for managing the site and wide publicity should be given at appropriate stages⁶⁹. It is assumed for the purposes of the analysis that an advisory group (of representatives of other stakeholders including local interests, user groups and conservation groups) would also be formed (though again, this is not required).

3.2.34 The organisations involved will incur costs from the contributions that they make to the management group and advisory group. Based on inputs made for the Wash and North Norfolk Coast SAC it is estimated that input to the management group costs the member organisations (from the public sector) in the region of £47,000 per year⁷⁰. The costs are estimated to be treble this for the first year after the site is designated whilst the management scheme for the site is developed and the advisory group established, and double in the second year whilst development of the management scheme continues. The cost to stakeholder groups of participating in the advisory group is estimated at around £13,500 per year⁷¹. Though this is an annual cost that will be incurred by the private sector it is not an administrative cost⁷² as defined by the government's Simplification Programme. The total cost of inputs to

⁶⁷ The Conservation of Habitats and Species Regulations imply (but do not require) that the relevant authorities should work together, ideally within a management group, to develop a suitable management scheme for an SAC. The level of human activity in the site is likely to determine whether a group is formed.

⁶⁸ Based on the guidance in DETR and the Welsh Office (1998).

⁶⁹ The management schemes for existing English marine Natura 2000 sites were developed with participation of user groups and extensive consultation. Many of these sites are located in estuaries or on the coast and have strong links with adjacent terrestrial protected sites (such as the New Forest SPA and Solent and Southampton Water SPA).

⁷⁰ Input to the management group for each of the relevant authorities (of which there could be about twenty) is estimated here to cost about £2,000 per year (in staff time and travel costs), a total cost of £40,000 per year. The cost to the lead authority of hosting the group is estimated at about £7,000 per year (in staff time for participating in the group, arranging meetings, taking minutes amongst other things).

⁷¹ Input to the advisory group for each of the stakeholder groups (of which there could be about fifteen) is estimated here to cost about £900 per year (in staff time and travel costs), a total cost of £40,000 per year.

⁷² Under the Simplification Programme, administrative costs arise from regulatory obligations for the private sector to provide information and data to the public sector (Better Regulation Executive, 2005).

the management and advisory group are estimated at £60,500 per year plus in the first year, an additional £94,000 for the management group and in the second year an additional £47,000 for the management group and £13,500 for the advisory group (for developing the management scheme)⁷³.

3.2.35 Further input of staff resource to managing the site is also likely to be required. For the purposes of the analysis it is assumed that this staff resource is provided by Natural England, though this will not necessarily be the case. It is estimated that in the first two years the equivalent of half of the time of a full time member of staff in Natural England will be helping establish and organise the work of the site's management group and advisory group and helping develop the site's management scheme and conservation objectives. It is estimated that thereafter, the equivalent of a quarter of the time of a full time member of staff in Natural England will be making input to management of the SAC. These costs are estimated for the IA pro rata based on a full cost of employing a full time member of staff of approximately £31,000 per year.

3.2.36 Competent authorities will be responsible for 'compliance' monitoring in the site, to check that no unconsented activities, plans or projects are taking place and activities that do occur are undertaken in accordance with the management scheme to avoid damage to interest features. The costs of enforcing fisheries management measures will be largely affected by the measures that are developed for the site and so are currently subject to considerable uncertainty. The MFA⁷⁴ has provided the following rough estimates of the additional annual costs that may be incurred to effectively enforce additional fisheries management measures that are required for the site: one day of Royal Navy surveillance time (cost £8,850 per day), 5 days of joint patrols by the MMO and SFCs/IFCAs (estimated here at a cost £900 per day, though this is likely to be an under-estimate⁷⁵), 2 hours air surveillance (cost £2,114 per hour) and perhaps 1 prosecution case (cost £10,375 per case) might be necessary to enforce fisheries management measures effectively⁷⁶. This is estimated to cost approximately £0.028m per year and is assumed to start in 2010. It is assumed that administration of records and other activities is carried out as part of existing duties. The requirement for patrols could decrease if VMS technology is fitted on more fishing vessels (though this uptake will incur set up and running costs for fishers and increase VMS monitoring costs). In the unlikely event that management of the site requires new regulations for migratory fish (specifically salmon, sea trout, eel, lamprey and smelt) in tidal waters and to 6nm, this would result in costs for the Environment Agency⁷⁷. Due to the low likelihood, these costs are not estimated here.

⁷³ Estimates based on experience with the Wash and North Norfolk Coast SAC.

⁷⁴ J. Hatchman, personal communication, 15/07/09. The functions of the MFA have since been absorbed by the MMO.

⁷⁵ Consultation responses from SFCs indicated that patrol costs were under-estimated for other SACs that Natural England is recommending. Estimates of patrol costs are likely to differ between sites and SFCs (according to vessel running costs for example).

⁷⁶ This is based on costings provided by the Marine Fisheries Agency (personal communication, 15/07/09).

⁷⁷ Costs would arise from amending or implementing new regulations (byelaws or net limitations), the additional assessments required for any new projects or plans affecting the site, additional compliance monitoring and additional fish population studies.

3.2.37 Natural England will face survey costs to assess the condition of interest features in the site. These are provisionally estimated (subject to considerable uncertainty) as initial costs of £60,000 for a survey in the first three years, and £60,000 for a survey in the following six years. In addition, further survey or research may be required by relevant authorities (perhaps including conservation advisors) in order to inform any appropriate changes or additions to existing fisheries management measures.

3.2.38 The present value of the total quantified costs arising from managing the SAC, monitoring and enforcement (summarised in Table 3.6) is estimated at £1.106m.

| Table 3.6 Summary of costs of managing, enforcing and monitoring the site in both the minimum and maximum scenario | |
|---|--|
| | <i>Cost</i> |
| Managing the SAC | Total over 10 years (not discounted): £0.853m comprising: <ul style="list-style-type: none"> ▪ £0.047m per year for the management group and £0.014m per year for the advisory group (total of £0.061m per year). ▪ Plus additional £0.094m for the management group in the first year (2010/11) to develop the management scheme and establish the advisory group ▪ Plus an additional £0.047m for the management group and an additional £0.014m for the advisory group in the second year (2011/12) to develop the management scheme (total of £0.061m). ▪ £0.016m per year staff for other staff input to site management for the first two years and £0.008m per year thereafter (equivalent to half the time of a full time member of staff for the first two years and a quarter thereafter). |
| Enforcing fisheries management measures | £0.028m per year |
| Surveys to assess condition of interest features | Total over 10 years (not discounted): £0.120m comprising: <ul style="list-style-type: none"> ▪ £0.060m for surveys in the first 3 years (assumed to occur in 2010). ▪ £0.060m in the following 6 years (assumed to occur in 2015). |

Other costs to the public sector

3.2.39 The following costs to the public sector (which cannot be quantified) will also be incurred as a result of the SAC:

- Informing users of the marine environment about the sites and any management measures that are required for the sites. This will include addition of the sites to charts by the UK Hydrographic Office and communication through Notice to Mariners.
- Review by competent authorities (with advice from statutory nature conservation advisers) of outstanding permissions and consents and other existing activities that may have impacts on the designated site.
- Lead competent authorities will need to undertake Appropriate Assessment when necessary for new plans or projects that are likely to have a significant effect⁷⁸ on the SAC. The statutory nature conservation advisers advise when Appropriate Assessment is required (as described in Section 1.3 and Annex 3). It may

⁷⁸ A 'significant' effect is one that brings a significant risk of not achieving the designated site's conservation objectives. Assessment of significance in this respect is established on a case by case basis.

involve significant work for the competent authority and the appropriate statutory nature conservation adviser(s).

Administrative costs

3.2.40 This IA has not identified any administrative costs (as defined under the government's Simplification Programme⁷⁹) that will arise from designation of the site.

3.3 Benefits of designating the site

3.3.1 The benefits of designating the site are considered below in terms of the conservation of habitats and species and the economic benefits.

Conservation of habitats and species

3.3.2 The Habitats Directive aims to promote the maintenance of biodiversity through conservation of natural habitats, wild animals and plants in Member States. SACs protect types of habitat and species that have been identified as in danger of disappearance, having a small natural range, or that are outstanding examples of typical habitats or species. The aim of designating an SAC is neither predominantly nor specifically to deliver economic benefits⁸⁰. The Directive and the legislation implementing it demonstrate that society in the UK and in the EU seek to conserve habitats and species; this could reflect a range of values such as social, political, moral as well as economic. The Marine Strategy Framework Directive and UK Marine and Coastal Access Act (2009) indicate that they seek to conserve marine habitats and species. Consultation responses provided evidence that the conservation of marine habitats and species is important to people in the UK. The Directives and legislation recognise that the natural environment has intrinsic value⁸¹ (which means that it has value 'in itself' or 'for its own sake', independent of other things, including people) and seek to maintain or improve the environment's status. However, because intrinsic value is neither known nor knowable to people it cannot be used to inform this assessment.

3.3.3 Designation of the sites will reduce the risk that the environmental quality and processes of reef habitats in the sites will diminish over time and the risk that the extent, physical structure, diversity, community structure and typical species of the habitats will diminish. If the site is not designated there is a risk that new human activities and changes to existing activities could have an adverse effect on the habitats and species (as described in Section 2.2). It will also be difficult to influence the consenting of activities through, for example, the introduction of effective mitigation measures. Current activities have not been identified as causing significant damage to the interest features. This is either because no damage is occurring or because there is insufficient information on the effects. However, it is unknown whether and to what extent, any adverse impact on the habitats and species will arise in future.

⁷⁹ Better Regulation Executive, 2005.

⁸⁰ Neither economic benefits that are traded nor economic benefits that are not traded.

⁸¹ As is explained in Defra (2007) "While it is recognised that the natural environment has intrinsic value i.e. is valuable in its own right, such non-anthropocentric value is, by definition, beyond any human knowledge".

Economic benefits

3.3.4 The site will conserve about 12,595 ha of reef habitat. A brief description of species in the site is provided in Section 1.4⁸². In addition to being a desirable outcome to society in itself, conservation of habitats and species in the site will also provide economic benefits. These are discussed here from an ecosystem services perspective (as described in Annex 4). The benefits of the site compared with the baseline of not designating the site are assessed qualitatively (summarised in Table 3.7). It has not been possible to quantify or value the benefits because the impacts cannot be readily quantified (and there is considerable uncertainty about the impacts) and most of the services are not traded (described in further detail in Annex 4).

Fish, shellfish and other crustaceans for human consumption

3.3.5 Extraction of fish and shellfish that are both targeted by fisheries and caught as bycatch may be affected by designation, with the potential for both positive and negative effects. On the one hand, if additional fisheries management measures are required they could reduce the amount of demersal fish, crustaceans and scallops caught from the site. These controls would contribute to sustainable management of fish stocks at the site and as a result, the abundance of fish may increase⁸³. On the other hand, controls could cause fishing effort to be displaced to other areas outside of the site, increasing pressure on the stocks in these areas.

3.3.6 The control of commercial fishing on the site may extend the longevity of shellfish such as lobsters, and there may be greater numbers of larger individuals that can produce more young. This could contribute to a potentially larger population of fish in the future.

3.3.7 With a reduction in demersal fishing, there should be a concurrent reduction in habitat damage. The use of heavy bottom gear (for example commercial otter and beam trawls) causes significant damage by removing/damaging long-lived and slow-growing animals and plants that characterise reef communities. This can lead to a long-term change in community structure towards short-lived and fast-growing organisms such as polychaetes and small crustaceans. Although these species are good food for fish they do not provide the habitat complexity important for settlement and growth of a wide range of species, including ones of commercial significance such as scallops.

3.3.8 More specifically, research has shown that the erect, sedentary species associated with reefs provide a surface for settlement of juvenile scallops as well as other species and provide crucial nursery and feeding areas for fish. If activities that damage these plants and animals cease following designation of the site this is likely to benefit fish and shellfish populations, particularly scallops.

3.3.9 Positive impacts on fish, shellfish and crustacean stocks will benefit human consumption only if landings of fish, shellfish and crustaceans for consumption (from within or outside the site) are improved as a result of designating the site. This benefit will not be realised if fisheries management measures required for the site

⁸² And in further detail in Natural England (2010).

⁸³ Examples of benefits to fisheries of marine protected areas are provided in Natural England (2009b).

prevent improvements (in composition, quality, and/or quantity) in landings within and/or outside the site.

Recreation

3.3.10 If fish populations increase or the size of fish increase as a result of controls on some commercial fishing activities in the site, anglers fishing in the area could potentially benefit from an improved sea angling experience. There is potential for increased sea angling from the shore around Lizard Point and other coastal access points around the site. However, these benefits may not be realised if it transpires that additional controls on angling are required.

3.3.11 There is also potential for designation to lead to an improved experienced for divers. Existing levels of dive activity could increase if this leads to Lizard Point having a reputation as a rich dive site, particularly attracting divers who go out from Falmouth and currently aim for the Manacles.

3.3.12 If designation of the site increases numbers of charismatic species in the site, this could increase the amount of wildlife viewing in the site and numbers of tourists.

Research and education

3.3.13 Designation of the site could acts as a stimulus for provision of education on the reef, particularly associated with the Combined University of Cornwall at Falmouth (which has a new cutting edge Marine Natural History Photography course) and the Falmouth Marine School. The National Maritime Museum at Falmouth also offers potential opportunities for educating the public and raising their awareness about marine protected areas, reefs and their typical species. This would build on Natural England's ongoing communication with the public about the pSAC, the marine environment and its conservation. Examples include Natural England's work with the media and drop-in meetings that it held during the formal consultation.

3.3.14 There are also opportunities to increase provision of information describing and explaining the marine environment in the surrounding area which has an extremely high visitor footfall from the tourism industry. 'The Most Southerly Café' on Lizard Point could offer opportunities to provide visitors with information on the reefs, their typical species and the role of marine protected areas.

Cultural heritage

3.3.15 If protection of the reefs from damage caused by certain kinds of mobile fishing gear is required this may protect maritime heritage from some inadvertent damage. The benefits of this would probably be minimal as fishing vessels normally attempt to avoid wrecks.

Option values

3.3.16 People will gain from having the option to benefit in future from conservation of interest features in the site, even if they do not currently plan to benefit from them (option value). This arises because if the site is not protected now there may not be good examples still available to conserve in future. Also, people will gain from the

knowledge that the reefs and their typical species are conserved in case future information reveals that these provide important benefits that we are not currently aware of (quasi-option value).

Non-use values

3.3.17 People will gain satisfaction from knowing that good examples of reef habitat and their typical species are being conserved. The greatest benefits of designating the site are likely to be the satisfaction that people gain from knowing that a good example of reef habitat and its typical species is being conserved. Most of the people who benefit from knowing the site is being conserved are unlikely to use it or get tangible benefits from it. This is known as the existence value of conserving the site. Some people will also gain satisfaction from knowing that the reefs are being conserved for others in the current generation (altruistic value), and for future generations (bequest value). Lizard Point is generally considered an iconic site and protection of its waters could be seen as a high profile commitment to marine conservation.

3.3.18 There is reliable evidence that the general population in the UK has significant positive combined⁸⁴ use and non-use values associated with conserving the marine environment. McVittie and Moran (2008) found that households in the UK were willing to pay a total of between £0.48 – 1.17 billion per year for a UK network of marine protected areas⁸⁵. Based on households' willingness to pay, Beaumont et al (2006) estimate the non-use value of maintaining sea mammals in the UK marine environment at £0.5-1.1 billion per year to the UK population. In a recent survey⁸⁶ 80 percent of the adult population in England stated that a healthy marine environment was important to them.

Summary of economic benefits

3.3.19 The level and value of the ecosystem services under the baseline scenario (if the site is not designated) and for the scenario where the site is designated (option 1) are summarised in Table 3.7. The value of these benefits is described followed by an assessment of the potential for designation of the site to increase the level of service provision. This has been assessed subjectively based on a combination of the scale of any increase in service provision (assessed on a subjective scale of the level of benefits that could be delivered by a marine protected area in the UK) and the number of beneficiaries. The final column indicates the level of confidence in the assessments. In summary, designation of the site will provide a low to moderate level of benefits. The beneficiaries include the relatively low number of direct and indirect users of the sites and all members of the society. The economic benefits are estimated to arise mainly through increased provision of the following ecosystem services: fisheries, recreational angling, wildlife watching, research, education and through non-use and option values.

⁸⁴ Even if people do not currently use the marine environment, it is likely that their responses to surveys will be influenced by motives to maintain the option for future use so will include a component of use value.

⁸⁵ These findings of this study cannot be used to indicate willingness to pay for groups of sites or individual sites within this network. They apply only to an entire network of sites in UK (not just English) waters that will conserve numerous interest features.

⁸⁶ Undertaken in July 2009 with 898 individuals as part of Natural England's Monitor of Engagement with Natural Environment (MENE) omnibus survey.

Other benefits

3.3.20 Designation of the proposed suite of marine Natura 2000 sites may aid marine spatial planning and more strategic consideration of available resources by sectors that use the marine environment. These sectors will be able to undertake future plans and applications for their operations (for example applications for licenses) with the better knowledge of the nature conservation significance of different parts of the marine environment and of the added costs for making an application within or adjacent to a Natura 2000 site boundary as opposed to outside it.

3.4 Summary of Costs and Benefits

3.4.1 On the pages that follow, Table 3.8 summarises the potential costs and benefits of the site identified in Sections 3.2 and 3.3 and Table 3.9 summarises the total quantified costs. In the analysis, minimum and maximum scenarios have been used to present the range of management measures that may be required for the site given that these are currently unknown; they are not alternatives. As has been indicated in the IA, the estimates made are subject to considerable uncertainty. Costs and benefits are likely to occur beyond the ten year time frame for the analysis but these are subject to even greater uncertainty.

3.4.2 The aim of designating the site is to contribute to maintaining biodiversity through conserving natural habitats and species; the legislation indicates that this is an outcome that is sought by society (not necessarily for economic reasons). Though the aim is not specifically to deliver economic benefits, designation of the site will deliver benefits through improved delivery of some ecosystem services and the satisfaction people gain from knowing the site is being conserved. It has not been feasible to quantify these benefits though they are estimated qualitatively.

3.4.3 Details of calculation of the total present value and the time profile of the total costs (not discounted) are provided in Appendix H at the end of this document. The impact tests are presented in Appendix I.

| Table 3.7 Estimated economic benefits of Lizard Point SAC | | | | | |
|--|--|---|--|---|--|
| Ecosystem service | Relevance and value of service in the site | Level of service provision in baseline | Level of service provision if the site is designated | Increment in service provision if the site is designated | Level of confidence |
| <i>Fish, shellfish and other crustaceans for human consumption</i> | High relevance, low to moderate value. There are habitats for several commercially significant fish and shellfish species in the site. | Moderate, could decrease. Continued demersal fishing could (but may not necessarily) impact on the reef habitat. | Moderate, could decrease. Protection of the reef habitat may maintain or increase populations of some commercially significant species. Migration in/out of the site will impact on the benefit to some fisheries. Service provision could be restricted by additional controls on fisheries. Displacement of fishing effort may result in negative impacts off site. | Low to moderate increase in value to a low number of beneficiaries (consumers of fish and shell fish from the site). Any increase in landings may be offset to some extent by the impacts of displacement of fishing effort to areas outside the site. | Low to moderate. The net impact on the service is difficult to predict. |
| <i>Recreation</i> | High relevance, moderate value. Site is popular for recreational angling and is used for wildlife watching. It is used little for diving because of strong tidal streams. | Moderate, could decrease. Angling and wildlife watching are associated with biodiversity and size of populations in the site, which may decline without designation. | Moderate. Protection of the reef habitat is likely to maintain or could increase diversity of species and size of certain populations, which could maintain or improve recreational experiences and could attract more recreational users. | Low to moderate increase in value for a relatively small number of anglers, divers and wildlife watchers. Although the site is popular, substitute sites could replace some of the lost recreational value if this site not designated. | Low to moderate. Difficult to predict impact on recreation due to scope for substitution. |
| <i>Research and Education</i> | Low relevance and value. Some opportunity for educational initiatives and potential benefit to marine science research. | Low, could decrease. Possible degradation could reduce the scope for using the site for research and education. | Low to moderate. Designation will prevent possible degradation of the research and educational resource. It could also stimulate increased research and educational use. | Low to moderate increase in value that the whole of society could potentially benefit from in the long term. | Moderate. |
| <i>Cultural Heritage</i> | Moderate to high relevance and value. There are some submerged wrecks in the site. | Moderate, could decrease. Demersal gear can inadvertently damage wrecks. | Moderate. Protection from demersal gear will help protect wrecks, but benefits of this will be low | Low increase in value for the whole of society. | High (in mapping of wrecks). |

Continued overleaf

| Ecosystem service | Relevance and value of service in the site | Level of service provision in baseline | Level of service provision if the site is designated | Increment in service provision if the site is designated | Level of confidence |
|---|---|--|---|--|-------------------------|
| <i>Non-use and option values of natural environment</i> | Moderate relevance and value. Evidence public has preferences for a healthy marine environment and conservation of habitats and species. | Moderate, could decrease. Possible degradation could impact on the habitats and species but may not have an adverse effect on non-use and option values | Moderate. Designation will prevent degradation of habitats and populations of species in the site. | Low to moderate increase in value for all members of society who gain from knowing that a good example of reef habitat is being conserved. | Moderate. |
| Total value of changes in ecosystem services | | | | Low to moderate increase in value. Beneficiaries include the low number of direct and indirect users of the site and all members of the society | Moderate to High |

| Table 3.8 Summary of costs and benefits for Option 1: Designate the site | | | |
|---|---|--|---|
| Sector | Minimum Scenario Costs | Maximum Scenario Costs | Benefits |
| <i>Generation of electricity from tidal stream energy</i> | £0 | £0.065m additional baseline and post-cable-laying survey costs for power export cable; £0.279m one-off cost of longer cable to avoid sensitive interest features. Unknown potentially significant one-off costs of: <ul style="list-style-type: none"> ▪ additional baseline and post-construction survey costs for devices; ▪ siting devices to avoid sensitive interest features in the site; ▪ restrictions on operating the devices. | <p>Conservation of habitats (12,600 ha of reef) and species.</p> <p>Low to moderate increases in value of ecosystem services, benefiting the low number of direct and indirect users of the site and all of society.</p> <p>Also benefits outside the site.</p> |
| <i>Telecom cables</i> | £0 | £0.129m one-off additional baseline and post-cable laying survey costs; £0.024m one-off cost of longer cables on replacement to avoid sensitive interest features. | |
| <i>Commercial fisheries</i> | £0.002m per year loss in gross value added plus unknown as for maximum scenario | £0.003m per year loss in gross value added. Also: <ul style="list-style-type: none"> ▪ loss of gross value added not captured in estimate; ▪ social impact and impact on local and regional economy of effect on fishing industry. | |
| <i>Shipping</i> | £0 | Unknown costs of potential restrictions on anchoring (except in emergency). | |
| <i>Recreation</i> | £0 | Unknown costs of controls on recreational fisheries if required. | |
| <i>All sectors</i> | | Also: <ul style="list-style-type: none"> ▪ higher likelihood new developments are not permitted; ▪ costs from delay of consents if Appropriate Assessment is required; ▪ higher likelihood that anchoring is prohibited in areas with sensitive interest features (except in emergency circumstances); ▪ cumulative costs of suite of Natura 2000 sites. | |
| <i>Managing the SAC</i> | Participation in the management group (by public sector bodies) and advisory group (by private sector bodies) for the site: £0.061m per year plus £0.094m in 2010/11 and £0.061 in 2011/12. £0.016m per year staff input from Natural England to site management for first 2 years, £0.008m per year thereafter. Enforcement: £0.028m per year. Surveys (cost to public sector): £0.060m in 2010, £0.060m in 2015. | | |
| <i>Other costs to public sector</i> | <ul style="list-style-type: none"> ▪ Cost of informing users of the site about the sites and any management measures that are required; ▪ cost of incorporating the sites onto nautical charts and into relevant publications; ▪ other costs to competent and relevant authorities. | | |

| Table 3.9 Summary of quantified costs (£m) for Option 1: designate the site | | | |
|--|-------------------------|-------------------------|------------------|
| | <i>Minimum scenario</i> | <i>Maximum scenario</i> | <i>Midpoint*</i> |
| <i>Total one-off</i> | 0.306 | 0.803 | 0.554 |
| <i>Average Annual Costs</i> | 0.096 | 0.098 | 0.097 |
| <i>Total (PV)</i> | 1.122 | 1.551 | 1.336 |

Risk of Unintended Consequences

3.4.4 The main risks of unintended consequences are assessed to be the following:

- If longer export cables are required for developments to generate electricity from tidal stream energy (to avoid sensitive habitats), these will have higher inspection and maintenance costs, will be at greater risk of incurring damage and have higher transmission losses in exporting electricity back to shore. These impacts have not been included in the assessment of costs in the IA.
- Project financiers may preferentially seek to develop projects at other locations.
- In practice, some of the fishing businesses that are affected by fisheries management measures for the site may continue to fish but operate in alternative grounds and / or switch to using different gear⁸⁷. This could impact on other fishers and other users of the marine environment. Displacement of fishing activity may also put greater pressure on stocks outside of the sites and could result in overfishing or increased overfishing in some cases.
- If enforcement efforts at sea are not successful due to uncontrollable circumstances, the conservation objectives for the site may not be achieved.
- The proposed designation could affect sources of income to the UK Treasury and The Crown Estate. If developments do not take place within the site but take place elsewhere in the UK this may not have a significant impact on revenues to the Treasury (for example from electricity generation) or royalties to The Crown Estate. If, however, exploitation of resources is constrained as a whole in the longer term then it could impact on income to the UK Treasury and The Crown Estate. However, it is assumed that this would not occur within the period for this assessment.
- If the suite of pSACs Natural England is recommending is not put forward to the EC as candidate SACs or eventually designated there is a high risk of infraction from the EC and legal challenge from non-governmental organisations. This was indicated at a 'moderation' meeting of the EC and Member States⁸⁸. The costs of infraction can be significant for a Member State. They involve the potential legal costs of dealing with the situation and a potential fine from the EC.

⁸⁷ As discussed in Appendix G. This is an alternative scenario to that used for calculation of costs in the IA, which assumes that the entire value of landings that would be affected is lost.

⁸⁸ for the Atlantic biogeographic region, held in Galway 24-25 March 2009.

4. Figures

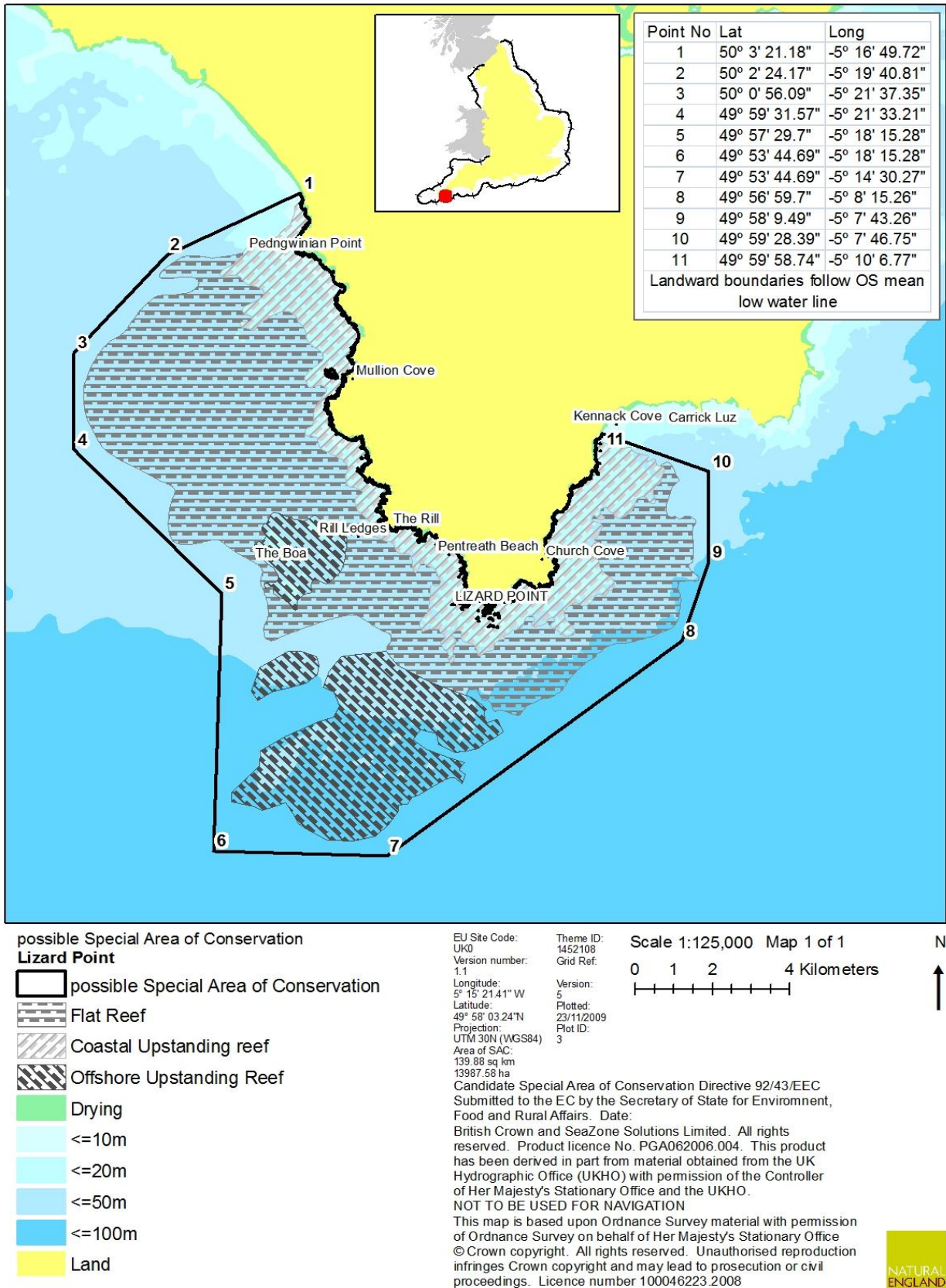


Figure 1 Chart showing Lizard Point pSAC

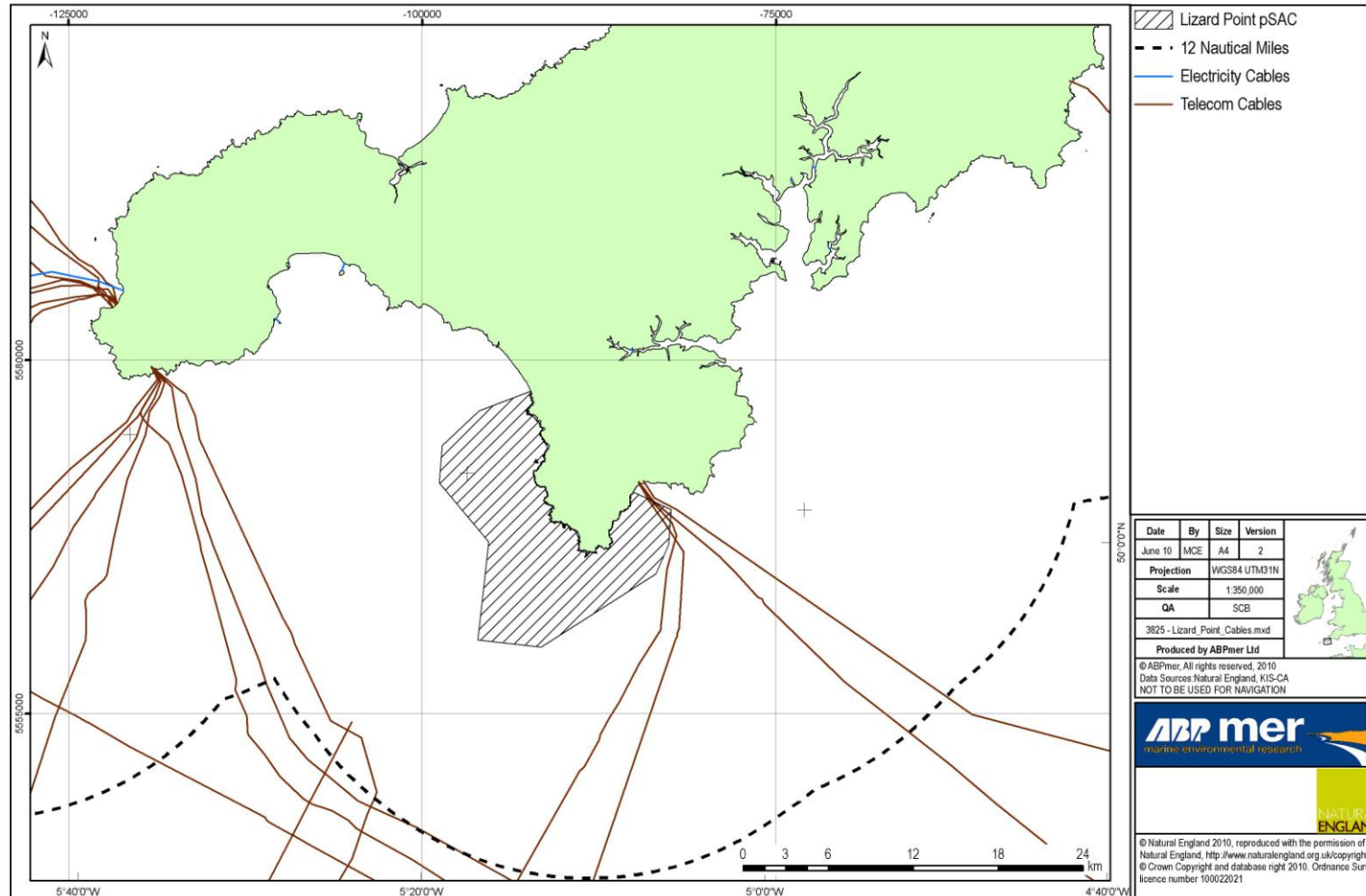


Figure 2.1 Chart showing telecom and electricity cables in the area of Lizard Point pSAC

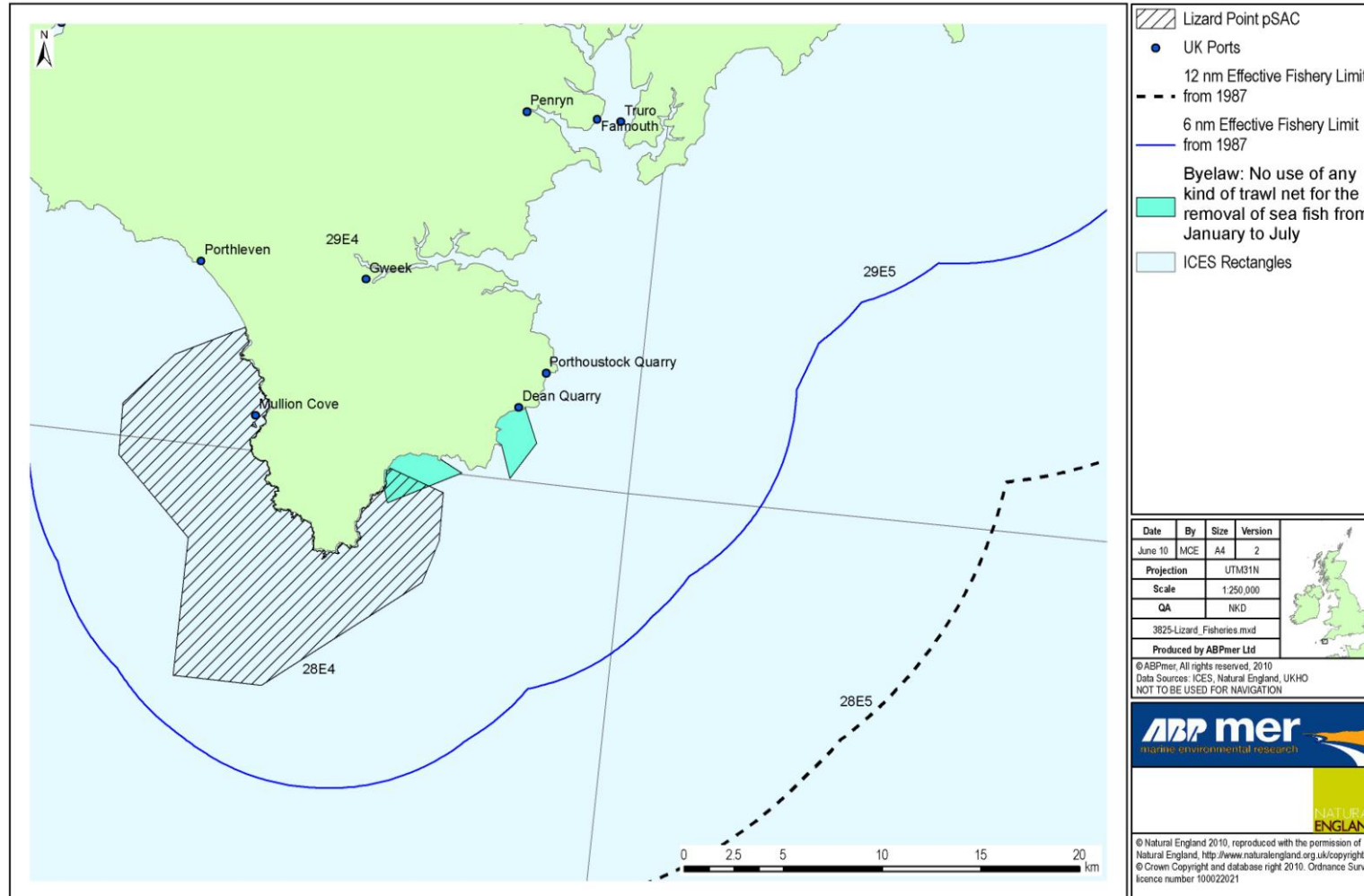


Figure 2.2 Chart showing ICES rectangles that contain the pSAC (28E4 & 29E4), ports and effective fisheries limits from 1987

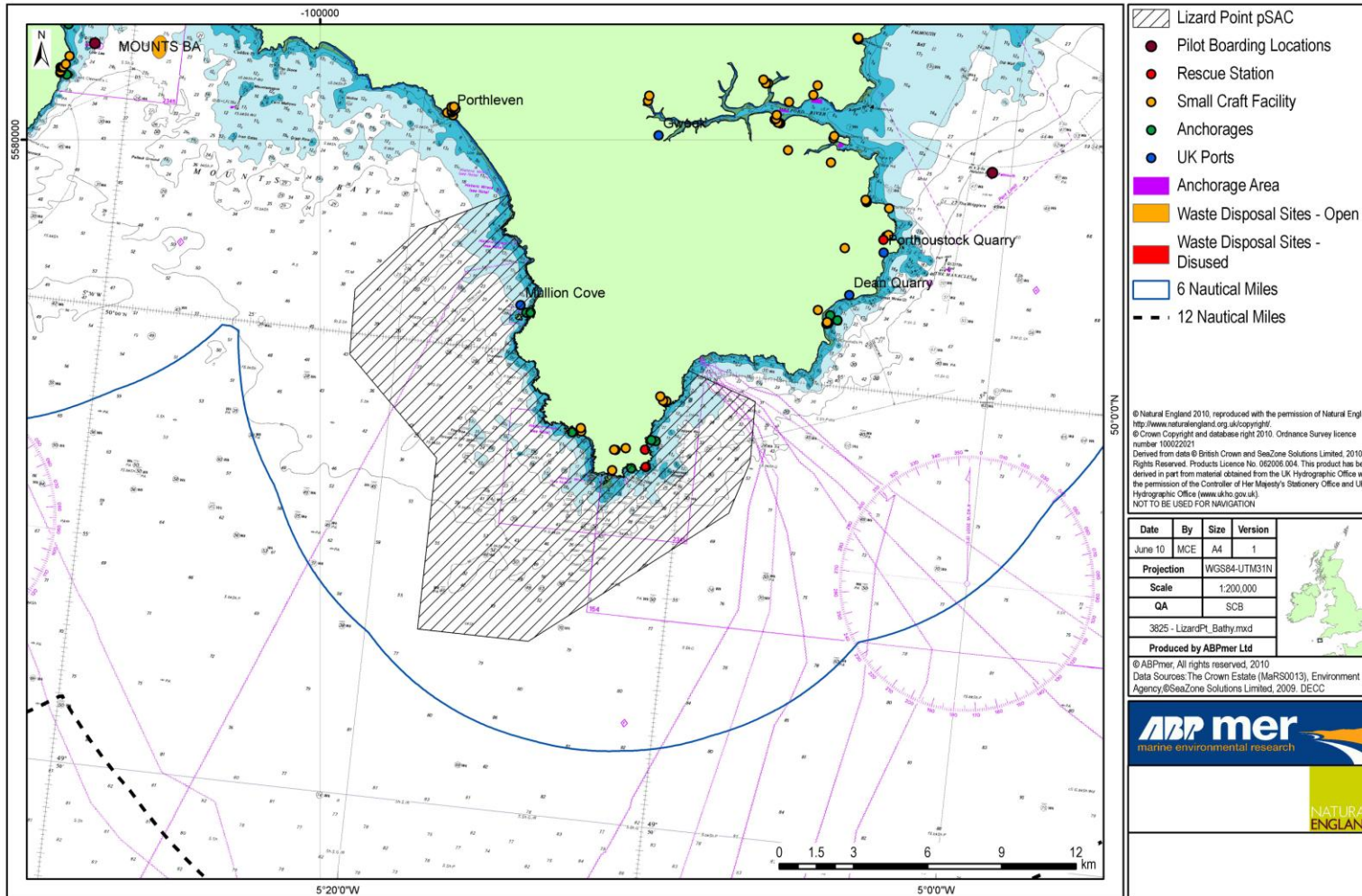


Figure 2.3 Chart showing information concerning shipping in the area of the Lizard Point pSAC

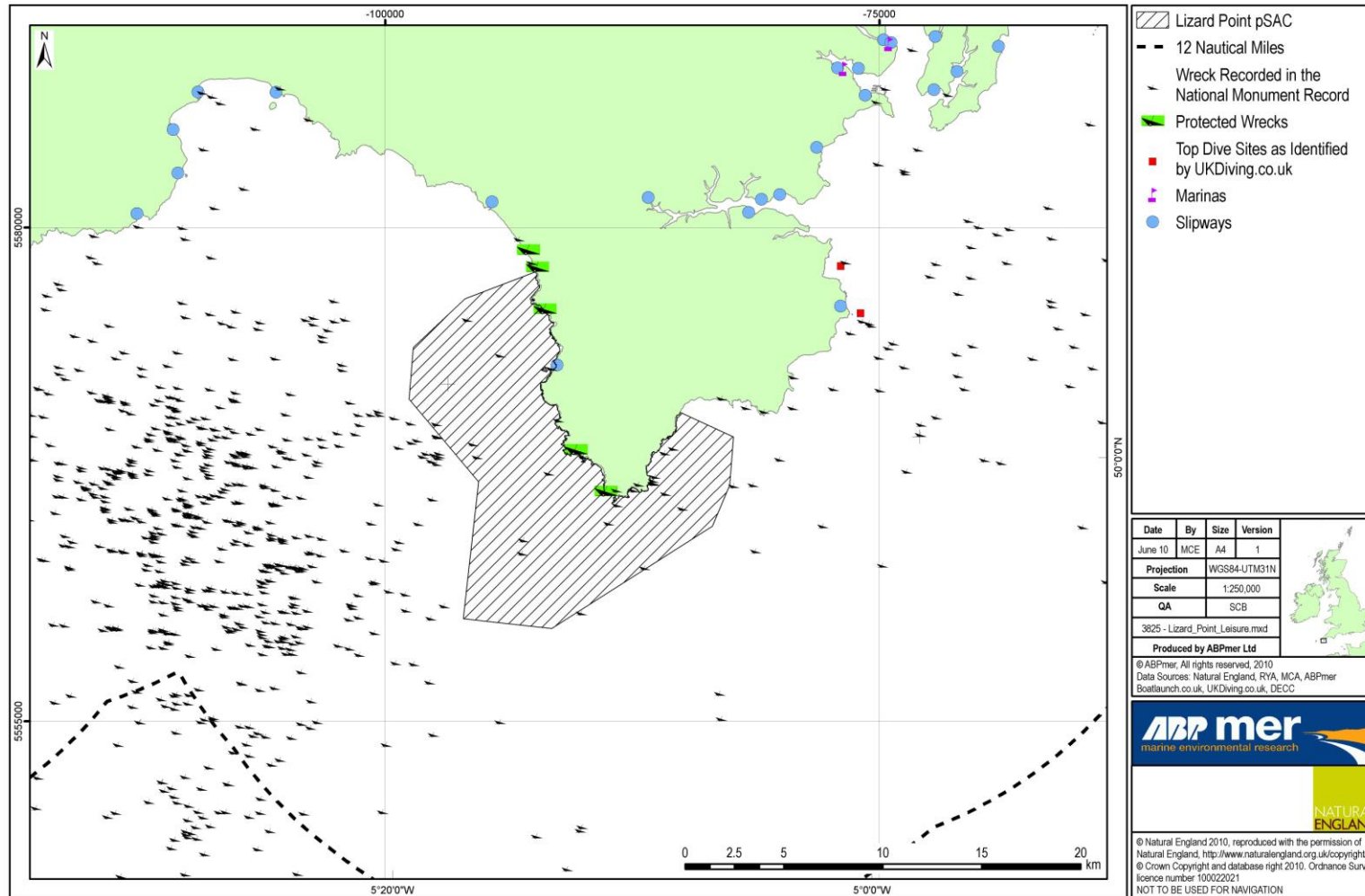


Figure 2.4 Chart showing recreational resources in the area of the Lizard Point pSAC

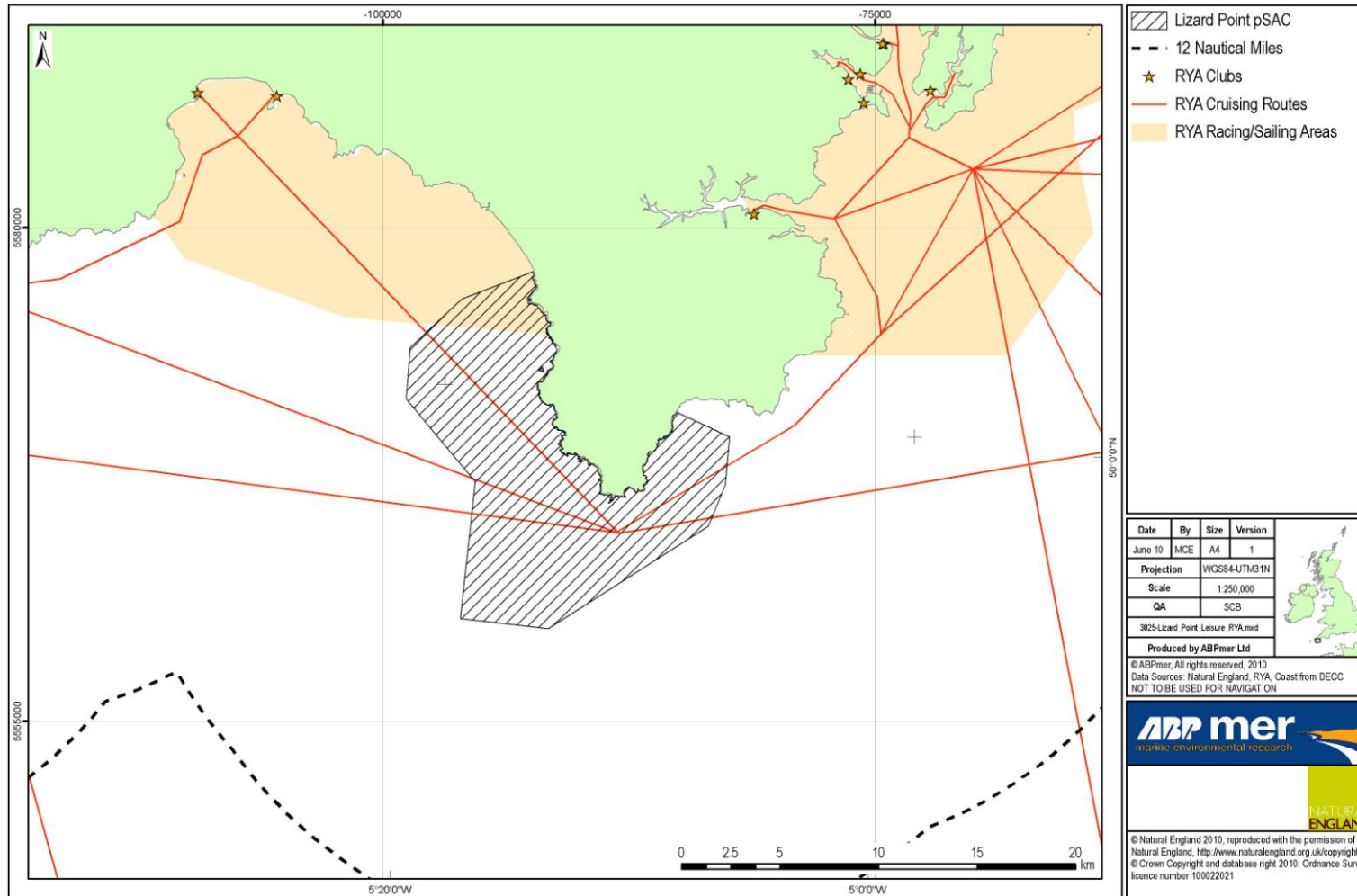


Figure 2.5 Chart showing recreational boating activity in the area of the Lizard Point pSAC

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APPENDICES

A. Vulnerability of interest features in the site

The table below summarises initial assessment of the vulnerability of interest features in the site to pressures from human activities. This is reproduced here from the Draft Conservation Objectives and Advice on Operations for the site⁸⁹. These were provided as supplementary information in the public consultation and will be revised following designation of the site. The information on operations that may cause deterioration of the site's interest features is based on the statutory nature conservation adviser's knowledge of current activities and patterns of use at the site. This is likely to be refined during development of the management scheme for the site and through discussion with the relevant and competent authorities. In contrast, the information on sensitivity of the interest features is relatively stable and will only change as a result of an improvement in scientific knowledge⁹⁰.

Vulnerability of the site's interest features to human activities is determined by the features' sensitivity to the specified impacts and the potential exposure to those impacts. Only if an interest feature is both sensitive and exposed to a human activity is it considered vulnerable. The scores of relative sensitivity, exposure and vulnerability have been derived using best available scientific information and expert judgement.

⁸⁹ Natural England, 2009a.

⁹⁰ For further details see Natural England (2009a).

Table A.1: The relative vulnerability of interest features and sub-features of the Lizard Point pSAC to operations
Key:

| Sensitivity | | Exposure | | Vulnerability | |
|-------------|-----|----------|-----|-----------------|--|
| None | - | None | - | None detectable | |
| Low | • | Low | + | Low | |
| Moderate | •• | Medium | ++ | Moderate | |
| High | ••• | High | +++ | High | |

| Operations which may cause deterioration or disturbance | Annex I Reefs | | | | | | | | |
|--|--------------------------|----------|---------------|-------------------------|----------|---------------|-------------|----------|---------------|
| | Offshore Upstanding Reef | | | Inshore Upstanding Reef | | | Flat reef | | |
| | Sensitivity | Exposure | Vulnerability | Sensitivity | Exposure | Vulnerability | Sensitivity | Exposure | Vulnerability |
| Physical loss | | | | | | | | | |
| Removal (e.g. harvesting, coastal development) | •• | - | - | •• | - | | •• | - | - |
| Smothering (e.g. by artificial structures, disposal of dredge spoil) | • | + | Low | • | + | | • | + | Low |
| Physical damage | | | | | | | | | |
| Siltation (e.g. run-off, channel dredging, outfalls) | • | + | Low | • | + | | • | + | Low |
| Abrasion (e.g. boating, anchoring, trampling) | •• | ++ | Moderate | •• | ++ | Moderate | ••• | ++ | High |
| Selective extraction (e.g. aggregate dredging) | - | - | - | - | - | - | - | - | - |
| Non-physical disturbance | | | | | | | | | |
| Noise (e.g. boat activity) | - | + | - | - | + | - | - | + | - |
| Visual (e.g. recreational activity) | - | + | - | - | + | - | - | + | - |

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| Operations which may cause deterioration or disturbance | Annex I Reefs | | | | | | | | |
|---|--------------------------|----------|---------------|--------------------------|----------|---------------|--------------------------|----------|---------------|
| | Offshore Upstanding Reef | | | Inshore Upstanding Reef | | | Flat reef | | |
| | Sensitivity | Exposure | Vulnerability | Sensitivity | Exposure | Vulnerability | Sensitivity | Exposure | Vulnerability |
| Toxic contamination | | | | | | | | | |
| Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs) | • | ++ | Low | • | ++ | | •• | ++ | Moderate |
| Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons) | • | ++ | Low | • | ++ | Low | •• | ++ | Moderate |
| Introduction of radionuclides | Insufficient information | - | - | Insufficient information | - | | Insufficient information | - | - |
| Non-toxic contamination | | | | | | | | | |
| Changes in nutrient loading (e.g. agricultural run-off, outfalls) | •• | + | Low | •• | + | Low | •• | + | Low |
| Changes in organic loading (e.g. mariculture, outfalls) | •• | + | Low | •• | + | Low | •• | + | Low |
| Changes in thermal regime (e.g. power stations) | • | - | Low | •• | - | Low | • | - | Low |
| Changes in turbidity (e.g. run-off, dredging) | • | + | Low | •• | + | Low | • | + | Low |
| Changes in salinity (e.g. water abstraction, outfalls) | •• | - | | •• | + | Low | •• | - | |
| Biological disturbance | | | | | | | | | |
| Introduction of microbial pathogens | Insufficient information | + | - | • | + | Low | Insufficient information | + | - |
| Introduction of non-native species and translocation | Insufficient information | + | - | • | + | Low | Insufficient information | + | - |
| Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing) | •• | ++ | Moderate | •• | +++ | High | •• | +++ | High |

B. Potential impacts on interest features in the baseline

The following sections provide detailed information on the potential impacts of human activities on reefs in the site and their typical species in the baseline (if the site is not designated). A general description of regulation of human activities to manage impacts on the marine environment is provided in Annex 3, along with further detail for some of the sectors listed below.

Generation of electricity from tidal stream energy

Regulation of environmental impacts is described in the renewables section in Annex 3. Some of the ecological impacts of tidal turbines are reasonably well understood⁹¹. Tidal devices are usually fixed to the seabed using piles or, less commonly, gravity bases. Installation of devices and the power export cable could potentially damage the reefs. Cables that are surface laid (rather than buried) may abrade the seabed. Where it is not possible to bury cables using ploughing or jetting techniques, it may be necessary to leave cables on the seabed in which case there could be a requirement to protect them from damage by installing materials such as deposition of rock or concrete mattresses. Installation of the devices may also require seabed levelling for the construction jack-up rig and anchoring components. There may also be a requirement for disposal of construction material.

If the site was not designated, it would be more difficult to secure licence conditions that required micro-siting of such activities to avoid sensitive areas of reef and thereby avoid or minimise impacts⁹². The operation of tidal turbines generally involves movement of blades that then generate power at the turbine. The blades may impact on reef features through hydrodynamic effects as they tend to redistribute tidal flow locally and reduce energy both upstream and downstream of the device. They may also present a navigational hazard for fish and marine mammals. Power cables produce electromagnetic fields (EMF) that may impact on electromagnetically-sensitive organisms such as skates and rays.

Technology is being trialled in Strangford Lough, Orkney, the Humber, North Devon coast and there are proposals for testing some tidal stream devices off the Welsh coast which will create a better information base on which to assess possible impacts and to refine the technology.

Cables

Regulation of environmental impacts is described in the cables section in Annex 3. Cable routes may coincide with reefs and if the site was not designated, it would be more difficult to secure licence conditions that prevent cable laying from damaging the reefs.

Cables are generally buried where possible using specialised trenching equipment to ensure protection from the environment and other anthropogenic activities such as beam trawling and dredging that may damage the cable. Where this is not possible, where the seabed is hard or in some places where the submarine cable meets land,

⁹¹ ABPmer, 2009a.

⁹² Conditions could potentially be secured on grounds that reefs are Biodiversity Action Plan habitats but this carries less weight than designation as an SAC.

the cable is usually fixed to the seabed and may be protected by covering with rock and/or mattresses (made out of concrete) which greatly increases the footprint of seabed impact. Burying the cable at the landfall could affect inter-tidal habitats and habitats on land.

Cables that are surface laid and unfixed or unprotected may abrade the seabed. Anchoring of the vessel during the cable laying process could also potentially impact on the reefs. Given the relatively small diameter of cables, the loss of habitat and impact on biological communities in the 'footprint' of the cable can be localised and the effect is usually short term though the impact is greater on sensitive and fragile communities. Following placement cables can become coated with marine life.

Power cables produce electromagnetic fields (EMF) that may impact on electromagnetically-sensitive organisms such as skates and rays. New telecom cables and those that do not require an electric current have negligible EMF in absolute terms, but older telecom cables and those that could contain electric current could have potential to have EMF but this is likely to be less significant than for power cables.

Commercial fisheries The approach to regulating environmental impacts is described in the fisheries section in Annex 3. The potential environmental impacts of the main types of gear used in the site are discussed below. Though dredging and bottom trawling do not currently take place in the site, description of their environmental impacts is provided below as explanation for the potential range of management measures that are used in the analysis of Option 1.

Scallop dredging

Scallop dredging has been shown to have significant impacts on seabed habitats, including where it coincides with stable low-lying reefs. The dredges scrape over the seabed surface, removing or damaging upstanding species such as corals and sponges, which results in a reduction in species biodiversity and abundance. Over time, scallop dredging can also break down some types of reef structure to create a homogenous seabed. This results in a reduction in habitat complexity which further contributes to lower biodiversity (in addition to the loss of species directly damaged or killed by the passage of the dredge) as some animals and plants are unable to recolonise the altered habitats. Recovery of some species affected by scallop dredging may be slow.

In this area dredging is unlikely to take place over areas of upstanding reef, due to the risk of fishing gear becoming stuck. However, areas of lower lying reef around the site edges may be subject to dredging, and dredging could potentially occur on the area of flat bedrock reef.

Bottom trawling

Bottom trawling is acknowledged to have a potentially high impact on seabed habitats and associated plants and animals. The extent to which the seabed and associated plants and animals are affected depends on the type of fishing gear used, the substrate and its physical characteristics. Bottom trawling disturbs the seabed, reducing species abundance and number and impacting on reef structure through

abrasion and sedimentation. Bottom trawling impacts on animals largely through abrasion. It can damage or kill a range of species which causes a reduction in diversity. Some types of bottom trawling, may also result in a significant bycatch of non-target species.

Otter trawls may have a (comparatively) reduced impact on the seabed compared with beam trawls as they have a reduced 'footprint' of contact with the seabed, though the 'otter' boards and foot ropes potentially damage erect animal life such as sponges. Like beam trawling, most demersal otter trawling takes place over flat seabed, primarily on sediments, and is unlikely to take place over much of the reef area. The use of rockhopper gear potentially allows reef fringe areas to be targeted and is likely to cause greater damage to reef plants and animals.

Gill and tangle netting

Drifts nets are usually set to avoid contact with seabed, so they would impact on the reefs only through incorrectly set gear or lost nets that snag on the seabed. However, the fisheries could potentially impact on species typical of reefs. Gill and tangle nets can be set to touch the seabed, so they can potentially impact on the reef if the net snags upstanding species such as branching sponges and sea fans. Such impacts may frequently be insignificant.

There is additional potential risk from lost nets which snag on the seabed but continue fishing and entangle marine life; this is known as ghost fishing.

Potting

Potting has the potential to damage some of the species living on reefs through abrasion (although impacts in many cases may be limited). It could potentially significantly reduce the numbers of species typical of reefs, such as crabs and lobsters.

Long Lines

Line-fishing does not affect reefs directly. There may be some direct or indirect impacts (as the result of lost gear entangling some species) or effects on typical species through the extraction of target species.

Shipping

Shipping could potentially affect the reefs in the site through abrasion and collision of vessels with each other and/or the reefs but impacts from ships passing through the site are unlikely.

Risk of pollution

The risk of oil pollution from ships at this site remains. If an oil spill occurs there is a likelihood that this high energy area will help to break up and disperse the oil slick. However, if the slick moves over the reef or towards the coastline, there may be a call to use dispersants to stop the slick from impacting the coastline or possibly favoured fishing areas. The use of dispersants will break a large slick into smaller slicks and will also distribute the oil particles into the water column from the water

surface. Generally, oil spills have the greatest impacts on the plants and animals near shore and shallow environments such as reef and rocky areas. Before dispersants are used Natural England would be asked for an opinion on their use and it would consider the impacts of dispersants on the reef and its associated plants and animals before agreeing to use dispersants.

There is also always a risk that toxic and non toxic contamination and nutrient and organic enrichment of sediment and the water column may occur due to accidental spillage of cargo or the release of sewage and rubbish by shipping, or very rarely the purposeful release of “tank washings” from vessels. However, MARPOL contains substantial quantities of internationally agreed design and operational requirements for ships which have been instrumental as a preventative instrument for reducing marine pollution. MARPOL also provides for implementation of controls to address marine pollution incidents. Oil spill response plans exist for all local authorities in adjacent areas and well developed emergency plans are in place for major incidents.

Anchoring

If ships anchor over reefs the potential impacts include;

- Direct damage to the reef from an anchor dropping onto the reef;
- Abrasion from the anchor and anchor chain on the reef itself;
- A circular area of damage to the reef and its associated communities (plants and animals) due to the ship revolving around the anchor as a result of wind, waves, tide and current action.

Recovery time is not known for areas of reef.

Anchoring could break off sections of the reef and dislodge plants and animals from the reef. Recovery time is not known for areas of reef.

Non-native invasive species

Through ballast water discharge, shipping may be a key vector for the introduction and dispersal of non-native invasive species which could potentially cause disturbance to species living in the site. There are many non-native invasive species found along the coast within the area. Once the International Maritime Organisation’s Ballast Water Management Convention enters into force the risk of non-native invasive species from shipping is likely to be reduced.

The risk is low that non-designation will result in an increase in impacts from shipping operations on features in the site (under the current level of operations).

Recreation

Anchoring could potentially cause physical damage to the reefs and fuel spills or discharges could potentially lead to toxic or non-toxic contamination of the sediment or water column. As for the preceding section, the risks of these causing significant impacts on interest features if the site was not designated are thought to be low at current levels of activity.

Recreational fishing could potentially have a significant impact on the populations of fish, shell fish and other crustaceans that are typical of the reefs. Further information is required to assess the risk of this impact if the site was not designated.

Recreational angling could potentially impact on the site through lost gear entangling seabed animals such as pink sea fans and erect sponges. This is unlikely to impact at the site level, although some individual areas of the site could be detrimentally affected. Spear fishing could potentially damage the site through abrasion and the removal of animals but the level of activity and potential impact are thought to be low.

Activities that result in land-based sources of pollution

Discharges of pollution from the land could potentially impact on interest features in the site by causing changes in physico-chemical conditions of the overlying water, such as changes in temperature, turbidity, salinity, and increases in nutrient and organic matter. However, the high dilution that any land-based discharge is likely to receive would reduce the risk of these having an impact.

C. Fisheries in the ICES rectangles that contain the site

The tables below present statistics for 2005-8 calculated using FAD data kindly supplied by the MFA⁹³. These statistics are for fisheries in the entire rectangles that contain the site and are not estimates of fisheries for only the area within the site.

Based on FAD data, Table C.1 indicates average annual landings from the rectangles for each gear type for both the UK fleet and foreign vessels. Table C.2 indicates average annual landings according to species and Table C.3 presents landings according to vessel length category (both for the UK fleet). Table C.4 indicates the significance (in terms of value of landings) of landings from the rectangles that contain the site for UK vessels that fished within those rectangles. It presents the percentage of landings that vessels fishing in the rectangles obtained from the rectangles, and the percentage they obtained elsewhere.

| Table C.1 Average annual landings by gear type in the ICES rectangles (28E4 and 29E4) that contain the site (2005-2008) | | | | |
|--|---|------------------------------------|--|------------------------------------|
| <i>Category of gear type</i> | <i>UK Vessels</i> | | | <i>Foreign vessels</i> |
| | <i>Live weight landed (tonnes p.a.)</i> | <i>Value of landings (£k p.a.)</i> | <i>Percentage of value of landings by UK vessels</i> | <i>Value of landings (£k p.a.)</i> |
| Trawling with bottom contact | 1,022 | 2,837 | 30% | 429 |
| Dredging | 771 | 1,137 | 12% | 172 |
| Trawling with no bottom contact | 121 | 46 | 0.5% | |
| Netting with bottom contact | 479 | 839 | 9% | 8 |
| Netting with no bottom contact | 1,137 | 991 | 11% | |
| Lines with bottom contact | 404 | 499 | 5% | |
| Lines with no bottom contact | 0.1 | 0.3 | 0% | |
| Pots (Crustacean) | 1,525 | 2,959 | 32% | 48 |
| Other pots | 0.1 | 0.2 | 0% | |
| Other | 0 | 0 | 0% | |
| Total for all gear types | 5,460 | 9,307 | 100% | 657 |

Note that most figures in this table are rounded to the nearest integer so may not add up to the total.

Source: Fishing Activity Database, data supplied by the MFA.

⁹³ The functions of the MFA have since been absorbed by the MMO.

| Table C.2 Average annual UK fleet landings by species in the ICES rectangles (28E4 and 29E4) that contain the site (2005-2008) | | | |
|---|--|------------------------------------|--|
| <i>Species</i> | <i>Live weight of landings (tonnes p.a.)</i> | <i>Value of landings (£k p.a.)</i> | <i>Percentage of value of landings by UK fleet</i> |
| Bass | 26 | 195 | 2% |
| Brill | 20 | 128 | 1% |
| Edible crab | 1,296 | 2,024 | 22% |
| Haddock | 122 | 133 | 1% |
| John Dory | 25 | 168 | 2% |
| Lemon Sole | 86 | 275 | 3% |
| Lobsters | 80 | 840 | 9% |
| Mackerel | 360 | 323 | 3% |
| Megrim | 51 | 164 | 2% |
| Monk Fish & Angler Fish | 295 | 740 | 8% |
| Pilchards | 770 | 289 | 3% |
| Pollack | 290 | 452 | 5% |
| Scallops | 762 | 1,107 | 12% |
| Skates & Rays | 97 | 119 | 1% |
| Sole | 109 | 900 | 10% |
| Spider Crabs | 325 | 326 | 4% |
| Squid | 28 | 139 | 1% |
| Turbot | 18 | 154 | 2% |
| Other | 699 | 829 | 9% |
| Total | 5,460 | 9,307 | 100% |

Note that figures in this table are rounded to the nearest integer so may not add up to the total.
Source: Fishing Activity Database, data supplied by the MFA.

| Table C.3 Average percentage of UK vessel landings by vessel length in the ICES rectangles (28E4 and 29E4) that contain the site (2005-2008) | |
|---|--|
| <i>Category of Vessel Length</i> | <i>Percentage of Value of Landings</i> |
| 10 metres and under | 34% |
| 10.01 to 15 metres | 23% |
| Over 15 metres | 43% |
| Total | 100% |

Note that figures in this table are rounded to the nearest integer so may not add up to the total
Source: Fishing Activity Database, data supplied by the MFA.

| Table C.4 | | Average contribution that landings from ICES rectangles 28E4 and 29E4 made to total value of landings of UK vessels that fish in the rectangles (2005-2008) | |
|---------------------------------|---------------------------|--|----------------|
| <i>Category of gear type</i> | Category of Vessel Length | Percentage of landings for UK vessels fishing in ICES rectangles 28E4 & 29E4 | |
| | | From ICES rectangles 28E4 & 29E4 | From elsewhere |
| Trawling with bottom contact | 10 m* and under | 44% | 56% |
| | 10.01 to 15 m | 25% | 75% |
| | Over 15 m | 10% | 90% |
| Dredging | 10 m and under | 22% | 78% |
| | 10.01 to 15 m | 15% | 85% |
| | Over 15 m | 11% | 89% |
| Trawling with no bottom contact | 10 m and under | 100% | 0% |
| | 10.01 to 15 m | 0% | 100% |
| | Over 15 m | 1% | 99% |
| Netting with bottom contact | 10 m and under | 54% | 46% |
| | 10.01 to 15 m | 50% | 50% |
| | Over 15 m | 12% | 88% |
| Netting with no bottom contact | 10 m and under | 70% | 30% |
| | 10.01 to 15 m | 51% | 49% |
| | Over 15 m | 8% | 92% |
| Lines with bottom contact | 10 m and under | 89% | 11% |
| | 10.01 to 15 m | 86% | 14% |
| | Over 15 m | 2% | 98% |
| Lines with no bottom contact | 10 m and under | 26% | 74% |
| | 10.01 to 15 m | 0% | 100% |
| Pots (Crustacean) | 10 m and under | 71% | 29% |
| | 10.01 to 15 m | 69% | 31% |
| | Over 15 m | 68% | 32% |
| Other pots | 10 m and under | 1% | 99% |
| | 10.01 to 15 m | 0% | 100% |
| | Over 15 m | 0% | 100% |
| Other | 10 m and under | 0% | 100% |
| Total | | 19% | 81% |

Source: Fishing Activity Database, data supplied by the MFA.

* Throughout this table 'm' is used to refer to metres.

D. Wrecks in the site

The following wrecks in the site have been identified by ABPmer using data from the National Monument Record. These are in addition to the Schiedam, Royal Anne Galley and Rill Cove Wreck, which are designated under the Protection of Wrecks Act (1973). Note that the data used were subject to some positional inaccuracies so the list below should be viewed as indicative.

| NAME | DESCRIPTION |
|-------------|--|
| IBIS | 1918 wreck of English cargo vessel |
| HEIDRUN | Possible remains of 1915 wreck of Norwegian cargo vessel |
| OSPRA | POSSIBLE REMAINS OF DANISH BRIGANTINE, 1832 |
| HANSY | PROBABLE REMAINS OF SWEDISH CARGO VESSEL, 1911 |
| ACTIVE | REMAINS OF BRITISH CARGO VESSEL, 1881 |
| MABEL BAIRD | REMAINS OF BRITISH STEAMSHIP, 1917 |
| CZAR | REMAINS OF ENGLISH CARGO VESSEL, 1859 |
| DENISE | REMAINS OF FRENCH CARGO VESSEL, 1918 |
| LE VIEUX | |
| TIGRE | REMAINS OF FRENCH TRAWLER, 1935 |
| MOSEL | REMAINS OF GERMAN BARQUE, 1882 |
| STROMBOLI | REMAINS OF SCOTTISH CARGO VESSEL, 1878 |
| BELLUCIA | REMAINS OF SCOTTISH CARGO VESSEL, 1917 |
| CLAN | |
| MALCOLM | REMAINS OF SCOTTISH CARGO VESSEL, 1935 |
| ARAB | REMAINS OF STEAMSHIP, 1888 |
| ROBERT | REMAINS OF STEAMSHIP, 1888 |
| ILSTON | REMAINS OF WELSH CARGO VESSEL, 1917 |

E. Relevant existing fisheries byelaws

The site lies within the South West Mackerel Box, a fishery management measure that prevents mid-water trawling targeting mackerel around the South West peninsular of Britain. In the site (which lies entirely within 6 nm) fisheries are controlled by the Cornwall Sea Fisheries Committee (SFC) which puts in place byelaws to control fishing activity either through seasonal closures, permanent closures, or restrictions on the type of fishing activity that can take place. The following byelaws are relevant to the control that may be required to protect interest features in the site:

| Overview of Cornwall SFC bye-laws that may overlap with the hypothetical management measures |
|--|
| No removal of any berried lobster (<i>Homarus gammarus</i>) or berried crawfish (<i>Palinurus elephas</i>). |
| Size restrictions for removal from the fishery for conger eel, hake, grey mullet, red mullet, red seabream, black seabream, witch flounder, dab, lemon sole, flounder, megrim, brill and turbot. |
| No vessel greater than 16.46m in length to be used for shellfish fishing. |
| No towed net allowed that exceeds 18.28m overall length or 221 kW engine power for use in fishing for any sea fish. |
| No removal of any v-notched or mutilated lobster (<i>Homarus gammarus</i>). |
| Dredges must be fitted with a spring loaded tooth bar and certain size restrictions apply for mouth width, ring and mesh size. The total number of dredges towed by any one vessel should not exceed 12. |
| No removal of any part of an scallop (<i>Pecten maximus</i>) which is detached from its shell. |
| No removal of any edible Crab (<i>Cancer pagarus</i>) under a certain size. |
| No use of any purse seine, ring net, or similar net, for taking sea fish by encircling. Exemption for use if cast and hauled from the shore or if the boat is under a certain size. |
| No removal of crawfish (<i>Palinurus elephas</i>) under a certain size. |
| No use of any kind of trawl net for the removal of sea fish in specific areas of Lizard Point (illustrated in Figure 2.2) from January to July. |

Source: Cornwall Sea Fisheries Committee (<http://www.cornwall.gov.uk/default.aspx?page=7072>)

F. Fisheries landings affected by each management measure

| Table E Estimated value of landings by UK vessels affected by each of the hypothetical management measures when applied alone (not in combination) (assuming average value of landings from the site of £10k)* | | | | | |
|---|--|---|---|---|--|
| <i>Hypothetical management measure</i> | <i>Category of gear type or species affected</i> | <i>Percentage of value of landings accounted for by the gear type category or species** (a)</i> | <i>Percentage of value of landings that the measure affects</i> | | <i>Value of landings affected (£m p.a.)***</i> |
| | | | <i>for the category of gear type or species (b)</i> | <i>for all UK vessels fishing in the site (a x b)</i> | |
| 1 | Trawling with bottom contact | 30% | 100% | 30% | 0.004 |
| | Dredging | 12% | 100% | 12% | |
| | Total | | | 43% | |
| 2 | Lobster landings | 9% | - | - | - |
| 3 | Pots (Crustacean) | 32% | 50% | 16% | 0.002 |
| 4 | Netting with bottom contact | 9% | 50% | 5% | 0.001 |
| | Lines with bottom contact | 5% | 50% | 3% | |
| | Total | | | 7% | |
| 5 | Trawling with no bottom contact | 0% | 50% | 0% | 0.001 |
| | Netting with no bottom contact | 11% | 50% | 5% | |
| | Lines with no bottom contact | 0% | 50% | 0% | |
| | Total | | | 6% | |
| 6 | Pots (Crustaceans) | 32% | 25% | 8% | 0.001 |

* For details see Section 2.1. Note that figures in this table are rounded so may not add up to the total.

** For vessels fishing in the ICES rectangles that contain the site (Average for 2005-8. Source: Fishing Activity Database, data supplied by the MFA. For details see Table C.1).

*** Calculated as $a \times b \times £10,407$.

G. Impact of maximum scenario on the fishing sector

If the hypothetical management measures used for this analysis were applied, fishing businesses might adapt. However, their capacity to adapt will be subject to constraints, which are considered below.

Vessels could potentially be changed from towed gear methods to fixed gear methods to avoid the impact of management measures. However, this can involve considerable cost⁹⁴. It may not be feasible to switch gear and vessels that do not have the necessary licence consents cannot be adapted. Therefore some vessels would need to displace their effort to alternative grounds to retain levels of effort. Whether fishers were able to do so would depend on a number of considerations:

- availability of suitable grounds.
- whether boats have capacity to reach alternative grounds; which could have implications for vessel safety. Smaller vessels may not have the capacity to go further out from the shore or to deeper grounds. Weather is the biggest constraint to small inshore vessels.
- There may also be other seasonal constraints to moving to alternative areas.

For businesses that respond by fishing alternative grounds this could have implications for costs and profitability. If the grounds were further afield this would increase fuel and labour costs, a higher proportion of time would be spent steaming rather than fishing and so profitability could be reduced. Alternative grounds might also be less productive, reducing profitability of days spent fishing. Vessels based at ports that are tidal or that are launched from the beach may have restricted access to grounds further away from their home port. If access to the vessel's berth is subject to tidal restrictions this will limit the amount of time the vessel can stay out at sea.

The MFA⁹⁵ has provided the following information on the potential capacity for fishing businesses in the area to adapt to new management measures that may be required for the SAC. There is limited opportunity for vessels currently fishing in the site to fish elsewhere for the following reasons:

- All the species targeted are caught over or on rocky seabed which is not present in the area surrounding the site.
- Because of their size, fishing by the small 'cove' boats (which are much of the fleet fishing the site) is heavily limited by weather conditions which can be very dynamic on this exposed headland.
- There is little opportunity to use static gear in the area immediately outside the SAC as it is heavily worked by French and UK trawlers and UK scallopers.
- Vessels that could fish elsewhere would not be able to do so viably.

In some cases, particularly where moving to an alternative ground would be unprofitable, individual fishers may stop fishing. Depending on the type and main target species of the vessel leaving the industry, this may not alter the income from

⁹⁴ For example from the purchase of fixed gear haulers, changes and removal of deck machinery and alterations to stowage for gear.

⁹⁵ The functions of the MFA have since been absorbed by the MMO.

the commercial fishing fleet in the area. Should a vessel that is part of the under 10 metre fleet or that is classed as being 'non-sector' leave the industry, the quota that it would have landed will be taken up by other vessels remaining in the industry, as these types of vessel do not own the quota⁹⁶. Should a 'sector' vessel⁹⁷ leave the industry then there is a possibility that the value of its landings would be lost to the area. Should a vessel fishing for shellfish such as crab and lobster (which are not subject to European quota restrictions) leave the industry, the MMO would determine whether its licence could be transferred to another vessel. The shellfish licensing scheme restricts the number of vessels allowed to land these species. In the event that other businesses do not meet the shortfall of landings that arise from a vessel leaving the industry (as a result of designating the site), the contribution to the economy from the vessels landings from both within and outside the site are lost.

⁹⁶ Vessels that are part of the under 10 metre fleet or are classed as being 'non-sector' have quota allocated to them by the MMO on a monthly basis.

⁹⁷ Sector vessels are generally over 10 metres in length and have their quota managed by a producer organisation; the quota can be individually owned by the vessel.

H. Spreadsheet calculating total present value

The tables below shows the quantified costs identified for each sector in Section 3.2. The costs that are not quantified are listed in Section 3.2 and are not repeated here.

The left half of the table identifies the one-off and annual costs for each of the minimum and maximum scenarios. Administrative costs (as defined by the government's Simplification Programme⁹⁸) and policy costs are presented separately and the timing of the costs is specified. These costs are summed at the bottom of the left half of the table to give the total one-off costs and the total annual costs for each sector in current prices. The total of these costs for all the sectors is shown in the summary sheets of the IA and in the summary table in Section 3.4 of the IA.

In the right half of the table, the discount factor (for a discount rate of 3.5%⁹⁹) in the top row is used to calculate the present value¹⁰⁰ of each of the costs for each of the 10 years (2010 – 2019) of the analysis. The right half of the table presents the present values of all of the costs for all of the years and the total present value of the administrative and policy costs. The present value of a cost in year 1 is the cost discounted by 3.5% (calculated by multiplying it by $(1 - 1/(1+3.5\%))$ or by 99.6% as shown in the tope row of the right hand side of the table). The discount factor builds up year on year, so the present value of the cost in year 2 is the cost multiplied by the discount factor from year 1 (99.6%) discounted by 3.5% (again multiplied by $(1 - 1/(1+3.5\%))$), giving a discount factor of 93.4%.

The present values of the costs are used to calculate the following:

- The present value for the total costs of each item (the first column in the tables in the right). These are the present value figures reported for each sector in Section 3.2.
- The present value of the total costs for all sectors shown in the summary sheets of the IA.

⁹⁸ Better Regulation Executive, 2005.

⁹⁹ As specified in H.M. Treasury (2007).

¹⁰⁰ This is the total value of all the costs over the 10 year assessment period (2010 – 2019) discounted at a rate of 3.5% to reflect society's preference to defer costs to future generations (and to receive goods and services sooner rather than later).

The present value and time profile of the total costs shown in the summary sheets of the IA.

| Renewables - Tidal | | | | | | | Discount Factor | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | | |
|--------------------|--|---------------|---------|------------------|---------|-----------------|------------------|---------------|-----------------------|-------|-------|-------|-------|-------|--------|-------|-------|------|------|
| Description | | One-off Cost | | Annual Cost | | | Year of Analysis | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average | Cost £k | Present Value of Cost | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| MINIMUM | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | <i>Admin</i> | - | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 0 | | 0 | | - | <i>Policy</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Both</i> | 0 | | 0 | | - | <i>Both</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| MAXIMUM | Additional cost for baseline survey and post cable-laying survey | Policy | 64.69 | 2015 | | | - | | 54.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 54.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Longer cable route | Policy | 279.2 | 2015 | | | - | | 235.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 235.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | <i>Admin</i> | - | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 343.9 | | 0 | | - | <i>Policy</i> | 289.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 289.53 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Both</i> | 343.9 | | 0 | | - | <i>Both</i> | 289.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 289.53 | 0.00 | 0.00 | 0.00 | 0.00 |

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| Cables | | | | | | | Discount Factor | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | | |
|---|-----------|---------------|---------|------------------|---------|-----------------|------------------|---------------|-----------------------|-------|-------|-------|-------|--------|--------|-------|-------|------|------|
| Description | | One-off Cost | | Annual Cost | | | Year of Analysis | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average | Cost £k | Present Value of Cost | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| MINIMUM | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | <i>Admin</i> | 0 | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 0 | | 0 | | - | <i>Policy</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Both</i> | 0 | | 0 | | - | <i>Both</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAXIMUM | | | | | | | | 108.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 108.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Additional costs for baseline survey and post cable laying survey | | Policy | 129.4 | 2015 | | | - | | 108.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 108.94 | 0.00 | 0.00 | 0.00 | 0.00 |
| Longer cable routes | | Policy | 24 | 2015 | | | - | | 20.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | <i>Admin</i> | 0 | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 153.384 | | 0 | | - | <i>Policy</i> | 129.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 129.15 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Both</i> | 153.384 | | 0 | | - | <i>Both</i> | 129.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 129.15 | 0.00 | 0.00 | 0.00 | 0.00 |

| Fisheries | | | | | | | Discount Factor | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | | |
|---|-----------|---------------|---------|------------------|---------|-----------------|------------------|---------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
| Description | | One-off Cost | | Annual Cost | | | Year of Analysis | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average | Cost £k | Present Value of Cost | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| MINIMUM | | | | | | | | 15.47 | 1.80 | 1.74 | 1.68 | 1.62 | 1.57 | 1.51 | 1.46 | 1.41 | 1.37 | 1.32 | |
| Loss of GVA from impact on fisheries landings | | Policy | | | 1.798 | 2010 | 1.80 | | 15.47 | 1.80 | 1.74 | 1.68 | 1.62 | 1.57 | 1.51 | 1.46 | 1.41 | 1.37 | 1.32 |
| Total | | <i>Admin</i> | 0 | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 0 | | 1.798 | | 1.80 | <i>Policy</i> | 15.47 | 1.80 | 1.74 | 1.68 | 1.62 | 1.57 | 1.51 | 1.46 | 1.41 | 1.37 | 1.32 |
| | | <i>Both</i> | 0 | | 1.798 | | 1.80 | <i>Both</i> | 15.47 | 1.80 | 1.74 | 1.68 | 1.62 | 1.57 | 1.51 | 1.46 | 1.41 | 1.37 | 1.32 |
| MAXIMUM | | | | | | | | 25.86 | 3.00 | 2.90 | 2.80 | 2.71 | 2.62 | 2.53 | 2.44 | 2.36 | 2.28 | 2.20 | |
| Loss of GVA from impact on fisheries landings | | Policy | | | 3.004 | 2010 | 3.00 | | 25.86 | 3.00 | 2.90 | 2.80 | 2.71 | 2.62 | 2.53 | 2.44 | 2.36 | 2.28 | 2.20 |
| Total | | <i>Admin</i> | 0 | | 0 | | - | <i>Admin</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | <i>Policy</i> | 0 | | 3.004 | | 3.00 | <i>Policy</i> | 25.86 | 3.00 | 2.90 | 2.80 | 2.71 | 2.62 | 2.53 | 2.44 | 2.36 | 2.28 | 2.20 |
| | | <i>Both</i> | 0 | | 3.004 | | 3.00 | <i>Both</i> | 25.86 | 3.00 | 2.90 | 2.80 | 2.71 | 2.62 | 2.53 | 2.44 | 2.36 | 2.28 | 2.20 |

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| Managing the SAC | | | | | | | Discount Factor | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | |
|------------------|------------------------------|--------------|--------------|------------------|-------------|-----------------|------------------|-----------------------|--------|--------|-------|-------|-------|--------|-------|-------|-------|-------|
| Description | | | | | | | Year of Analysis | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| Scenario | Cost Item | Type | One-off Cost | | Annual Cost | | Cost £k | Present Value of Cost | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| | | | Cost £k | Year Experienced | Cost £k | Year Commencing | | | | | | | | | | | | |
| MINIMUM | Management & advisory groups | Policy | 94 | 2010 | 60.5 | 2010 | 60.50 | 614.77 | 154.50 | 58.45 | 56.48 | 54.57 | 52.72 | 50.94 | 49.22 | 47.55 | 45.94 | 44.39 |
| | Management & advisory groups | Policy | 60.5 | 2011 | | | | 58.45 | 0.00 | 58.45 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | 15.5 | 2010 | | | | 15.50 | 15.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | 15.5 | 2011 | | | | 14.98 | 0.00 | 14.98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | | | 7.75 | 2012 | 6.20 | 51.47 | 0.00 | 0.00 | 7.23 | 6.99 | 6.75 | 6.53 | 6.30 | 6.09 | 5.89 | 5.69 |
| | Enforcement | Policy | | | 27.95 | 2010 | 27.95 | 240.61 | 27.95 | 27.01 | 26.09 | 25.21 | 24.36 | 23.54 | 22.74 | 21.97 | 21.23 | 20.51 |
| | Survey | Policy | 60 | 2010 | | | | 60.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Survey | Policy | 60 | 2015 | | | | 50.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 50.52 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total | Admin | | 0 | | 0 | - | Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Policy | | 305.5 | | 96.2 | 94.65 | Policy | 1106.30 | 257.95 | 158.89 | 89.81 | 86.77 | 83.84 | 131.52 | 78.26 | 75.61 | 73.06 | 70.59 |
| | Both | | 305.5 | | 96.2 | 94.65 | Both | 1106.30 | 257.95 | 158.89 | 89.81 | 86.77 | 83.84 | 131.52 | 78.26 | 75.61 | 73.06 | 70.59 |
| MAXIMUM | Management & advisory groups | Policy | 94 | 2010 | 60.5 | 2010 | 60.50 | 614.77 | 154.50 | 58.45 | 56.48 | 54.57 | 52.72 | 50.94 | 49.22 | 47.55 | 45.94 | 44.39 |
| | Management & advisory groups | Policy | 60.5 | 2011 | | | | 58.45 | 0.00 | 58.45 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | 15.5 | 2010 | | | | 15.50 | 15.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | 15.5 | 2011 | | | | 14.98 | 0.00 | 14.98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Staff input to management | Policy | | | 7.75 | 2012 | 6.20 | 51.47 | 0.00 | 0.00 | 7.23 | 6.99 | 6.75 | 6.53 | 6.30 | 6.09 | 5.89 | 5.69 |
| | Enforcement | Policy | | | 27.95 | 2010 | 27.95 | 240.61 | 27.95 | 27.01 | 26.09 | 25.21 | 24.36 | 23.54 | 22.74 | 21.97 | 21.23 | 20.51 |
| | Survey | Policy | 60 | 2010 | | | | 60.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Survey | Policy | 60 | 2015 | | | | 50.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 50.52 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total | Admin | | 0 | | 0 | - | Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Policy | | 305.5 | | 96.2 | 94.65 | Policy | 1106.30 | 257.95 | 158.89 | 89.81 | 86.77 | 83.84 | 131.52 | 78.26 | 75.61 | 73.06 | 70.59 |
| | Both | | 305.5 | | 96.2 | 94.65 | Both | 1106.30 | 257.95 | 158.89 | 89.81 | 86.77 | 83.84 | 131.52 | 78.26 | 75.61 | 73.06 | 70.59 |

Time profile of total costs (not discounted, £m, Y = Year)

| | Y0 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|
| Transition costs | 0.17 | 0.08 | - | - | - | 0.56 | - | - | - | - |
| Annual recurring cost | 0.09 | 0.09 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Total annual costs | 0.26 | 0.17 | 0.10 | 0.10 | 0.10 | 0.66 | 0.10 | 0.10 | 0.10 | 0.10 |

I. Impact Tests

Consideration has been given within the main body of the assessment to relevant and identifiable environmental impacts and effects on sustainable development. The further specific tests specified by the IA guidance are considered here.

Competition Assessment

Designation of the SAC is not expected to have a significant impact on competition. Assessment of the impact, shown in the table below (in the format specified in the Office of Fair Trading Guideline (2007)), is restricted to the impacts of designating Lizard Point SAC. The table presents the impact of the hypothetical management measures for the maximum scenario as this scenario would involve larger potential effects on competition than the minimum scenario. In addition to these effects, the cumulative impacts of marine conservation under EU legislation, through designation of Natura 2000 sites in the marine environment, could have more significant effects on competition in some sectors.

| Table I.1 Competition assessment for hypothetical management measures for the maximum scenario for Lizard Point SAC | | | |
|--|---|---------------|-----------------------------|
| <i>Would the proposal:</i> | <i>Wet renewables</i> | <i>Cables</i> | <i>Commercial fisheries</i> |
| <i>1. Directly limit the number or range of suppliers?</i> | Fishing: Possible local impact, no effect at UK and England Level. Tidal Energy: May limit cable connections to research and development opportunities, but sufficient better tidal stream resources in rest of UK that no significant effect likely. Cables: No. | | |
| <i>2. Indirectly limit the number or range of suppliers?</i> | No. | | |
| <i>3. Limit the ability of suppliers to compete?</i> | Fishing: Possible local impact, no effect at UK and England Level. Cables and Tidal Energy: No. | | |
| <i>4. Reduce suppliers' incentives to compete vigorously?</i> | No. | | |

Small Firms Impact Test

Small and Medium Enterprises (SMEs) are considered for these purposes to be those with fewer than 250 employees. The industries potentially affected by the designation with a significant number of SMEs are fishing and any recreational activity.

In the fishing industry it is likely that the fishing vessels that may be impacted on by any additional management measures would be owned by SMEs. The number of fishing vessels affected would depend on the actual management measures implemented. Under the maximum scenario, the profitability of some small fishing businesses could potentially be affected. For example, their adaptation to the management measures for the site may increase costs, reduce value of landings or both.

Down-stream and up-stream effects in other sectors could also impact on SMEs, but impacted activities are likely to be displaced, at least partly to other locations in the UK economy, limiting the overall impact on SMEs in the UK. For example, there are a number of SMEs which are directly and indirectly connected to the fishing sector, which could potentially be impacted on by designation. These include, the retail trade (fish mongers, markets) fish processing plants, ship builders and diesel suppliers. If coves are closed as a result of the impact of management measures for the site on fishers this could impact locally on SMEs in the tourist industry.

Impacts on deployment of devices to generate electricity from waves or tidal current could impact on SMEs that are involved in the development and/or manufacture of technology. On a local scale, increased costs of trialling or deploying a device within a designated site, will increase costs to the SME that is deploying the devices. It could impact on the financial viability of projects deterring developers and investors. This in turn may have knock on negative impacts on local businesses that could be involved in the supply of services. The availability of suitable alternative sites may be limited on a regional and local level¹⁰¹. However, other SMEs may benefit financially from additional survey requirements for new devices and cables as this work is often carried out by or subcontracted to SMEs.

Greenhouse Gas Assessment

The impact of designating the site on greenhouse gas (GHG) emissions is unknown but not expected to be significant. If fishing vessels have to travel longer distances to access alternative fishing grounds this would increase emissions depending on vessel size and whether they already operate over a variety of fishing grounds. If anchoring restrictions are implemented they will have the potential to increase or decrease GHG emissions depending on if the anchorages are moved inshore or offshore from their current location.

Another potential impact arises if any increase in operations and therefore emissions is required at sewage treatment works for nutrient removal. However, this can be offset by using renewable sources of energy and more sustainable technologies at the nutrient source. If development to generate electricity from tidal current energy is significantly restricted, this could affect achievement of the UK's commitment to reducing GHG emissions. However it should be noted that there are alternative locations for generating electricity from renewable sources of energy and other means to reduce GHG emissions.

Health and well being

Well being of UK society is expected to benefit through the satisfaction people gain from the knowledge that habitats and species in the site are being conserved.

Human rights

The designation will have the effects set out in section 1.3 and may have the effects, or some of them, set out in section 3.2. The effect of designating the site on Human Rights has been considered and it is thought that this designation, balancing the

¹⁰¹ This is because there are a number of constraints on the selection of suitable sites for generation of electricity from waves and tidal currents.

public and the private interests, justifies any interference with property rights that it may have under Protocol 1 Article 1 of the European Convention on Human Rights and is compatible with the Convention rights.

Rural proofing

Some of the economic costs identified in relation to fisheries may occur in remote coastal communities in predominantly rural areas of the UK. Due to the less diversified nature of their local economies, the impacts may be relatively more important as a proportion of economic activity in these locations.

Other Impact Tests

The effect of designating the site on statutory equality duties and the justice system has been considered and it is not thought to have an impact. Consequently these impact tests are not examined further here.