The C-SCOPE Marine Plan (Draft)

Contents

List of Figures

List of Tables

Acknowledgements

Interreg IV A 'Two Seas' Programme for part-funding the C-SCOPE Project. Defra, Dorset County Council, Dorset Wildlife Trust, Jurassic Coast Trust, National Trust, Natural England and Weymouth & Portland Borough Council for match-funding.

All DCF members who have contributed to the production of this plan.

All of the local communities who took part in the C-SCOPE road-shows.

Dorset County Council Spatial Planning team for advice and support.
Justin Dix for his work on the seabed habitat maps.

The Belgian Coordination Centre for Integrated Coastal Zone Management for help, support and successful collaboration.

Foreword

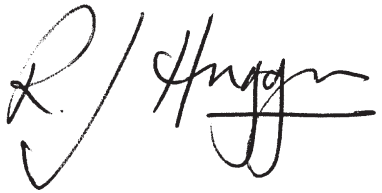
I am very privileged and proud to be the Chairman of the Dorset Coast Forum because the Dorset coast is a very special place in the world, both for those who live and work here and for our large numbers of visitors. The unique beauty and character of the Dorset coast has led to important national and international designations including the Dorset Area of Outstanding Natural Beauty and the Dorset and East Devon Coast World Heritage Site (the Jurassic Coast.)

Although of great beauty and interest, this coast is increasingly active and vibrant in response to the many pressures and opportunities. The long history of coastal activities in Dorset has given rise to a rich cultural heritage and the management of this beauty and heritage has always been a major focus of the Dorset Coast Forum. I recall long and complex debates within the Forum regarding whether a marine plan was required and if so what form it should take. As ever, the Forum decided that an innovative attempt should be made to design a plan that would be based on the best data and information that was available. Recognising the national and international importance of the plan, the Forum decided to take a collaborative approach that would involve local, national and international partners.

The C-SCOPE Project was the perfect vehicle to drive the plan forward. European funding came with the help of Belgian partners who were eager to work with us and regional and national partners stepped forward to support us. We knew that the development of the plan could only be successful if it had the support of stakeholders on the Dorset coast. I'm pleased to report that generous stakeholder support has been provided from the beginning.

So, now the plan has come together and now it is your chance to comment. The plan is, in effect, an experiment. It is non-statutory but we believe important nonetheless because development of the plan has involved so many stakeholders in the future of the Dorset coast. We believe that it will be a pilot in helping to shape national methods and immensely valuable because it has drawn together an enormous amount of information in one place.

The Dorset Coast Forum has again undertaken a complicated and challenging task that will, I believe, deliver a valuable and ground-breaking marine plan. I also believe that it will enrich our enjoyment and understanding of the Dorset coast for many years to come. I endorse the draft plan but also look forward to refining it in the light of your views.



Dr. Bob Huggins MBE, Chairman, Dorset Coast Forum.

The Consultation Process

You are invited to respond to the consultation of the C-SCOPE Marine Spatial Plan by Friday the 9th of March 2012. Please complete the following questions and return via one of the methods below.

Consultation Questions

1. Have we adequately described in Chapter 2 the International and National Policy Context into which the C-SCOPE Marine Plan fits?

Development of the Draft C-SCOPE Marine Plan (Chapter 3)

2. Is the description in Chapter 3 of the purpose and status of the Draft C-SCOPE Marine Plan, and the summary of how it was developed, clear and accurate?

Overview of the C-SCOPE Marine Plan area (Chapter 4)

3. Is the description of the C-SCOPE Marine Plan Area in Chapter 4 comprehensive, clear and accurate?

The C-SCOPE Marine Plan Vision, Objectives and Policies (Chapter 5)

4. The Vision mirrors that set for the Dorset Coast Strategy to ensure consistency – do you agree with this approach?

5. The Objectives take their lead from nationally set objectives for marine planning, adapted to reflect local needs and opportunities – do you agree with this approach?

6. Please make any comments on the policies which appear under each of the objectives, with particular reference to the following questions:

i) Is the policy expressed clearly?
ii) Is the policy likely to contribute to the achievement of sustainable development?
iii) Is the policy reasonable and justified adequately in terms of the evidence presented?

Objective 1
Objective 2
Objective 3
Objective 4
Objective 5
Objective 6
Objective 7
Objective 8

7. Do you agree with the suggested indicators set out in Chapter 6? Do you know of any further monitoring regimes within the C-SCOPE Marine Plan Area, or can you suggest further indicators?

8. Do you have any comments on the C-SCOPE Marine Plan Sustainability Appraisal and Habitats Regulations Screening Assessment?

Format of the final C-SCOPE Marine Plan

9. We envisage much of the content of this consultation document being appended to the final C-SCOPE Marine Plan to ensure that the Plan is as succinct and accessible as possible. Do you agree with this approach? Of the following, which elements do you think should be retained in the final version and which could be retained as appendices? (tick box options)

- Introduction
- What is marine planning?
- The international policy context
- The national policy context
- Marine planning in England
- Purpose and status of the Marine Plan
- Starting points for the C-SCOPE Marine Plan
- Process for producing the C-SCOPE Marine Plan
- Overview of the C-SCOPE Marine Plan area
- Indicators, monitoring and review

Other comments

10. Please make any other comments you have on the Draft C-SCOPE Marine Plan.

How to Respond

- By Email: Download the response form and send your comments to ness.smith@dorsetcc.gov.uk with the subject "Draft C-SCOPE Marine Plan Consultation Response"

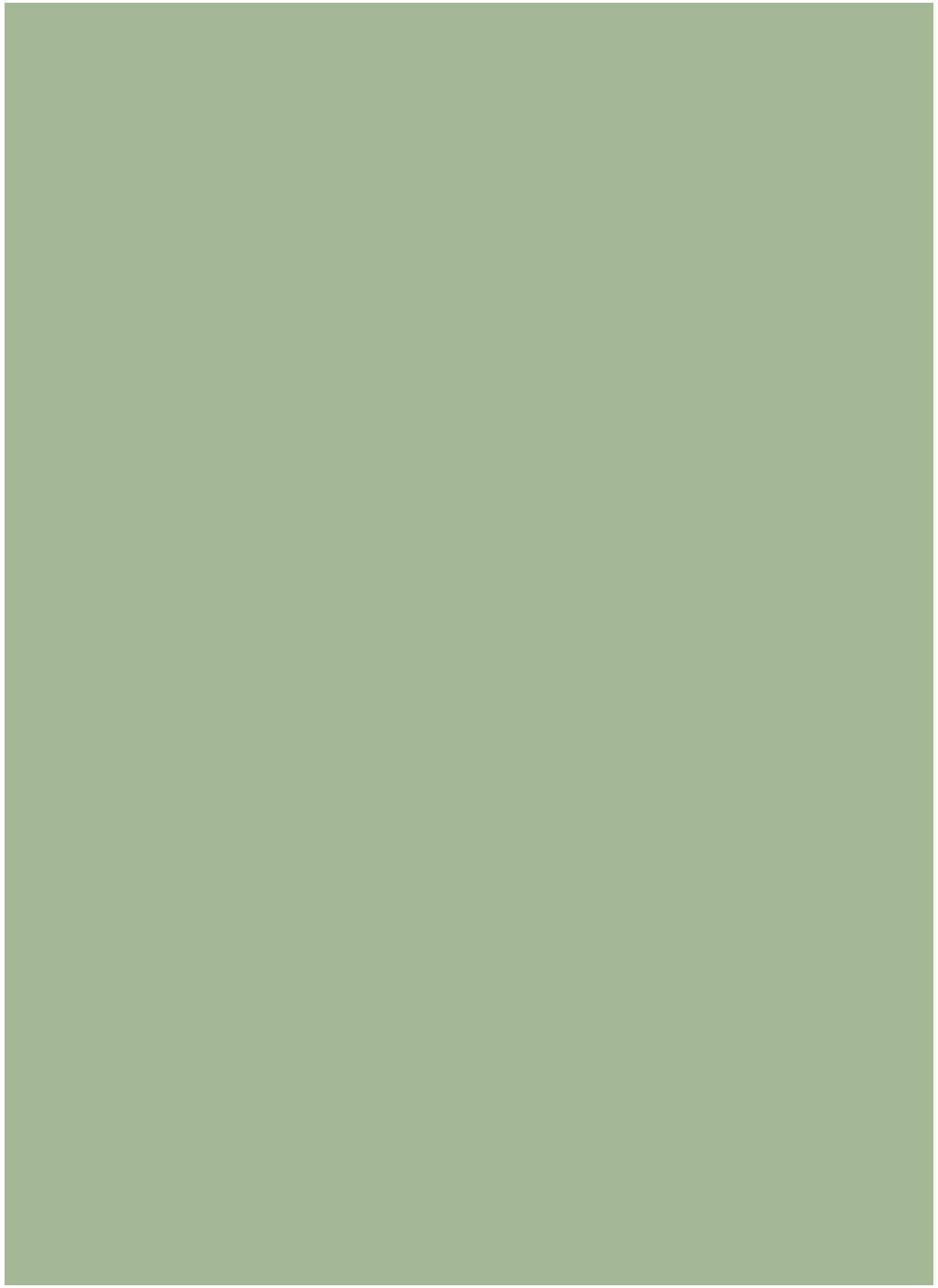
- By Letter: Send your written comments to the address below:
  Draft C-SCOPE Marine Plan Consultation Response
  Dorset Coast Forum
  Environment Directorate
  County Hall
  Colliton Park
  Dorchester
  DT1 1XJ

Chapter 1: Introduction

Combining Sea and Coastal Planning in Europe (C-SCOPE) is a European collaboration between the Dorset Coast Forum (DCF) and The Coordination Centre on Integrated Coastal Zone Management in Belgium, funded by the European Union Interreg IV A 'Two Seas' programme. Its main aim is to achieve a seamless, integrated approach to land and sea planning and management. Both partners focused on three elements which link together to provide a comprehensive plan and information resource to underpin sustainable coastal management:

1. Developing a framework for integrating terrestrial and marine planning;
2. Tools for achieving sustainable coastal economies and environments; and
3. Achieving commitment to Integrated Coastal Zone Management (ICZM) through stakeholder engagement.

The consultation draft Marine Plan seeks to take forward these elements. Additional information on the background, funding and governance of the project can be found at http://www.cscope.eu/en/



Chapter 2: The international and national context for marine planning

2.1 What is marine planning?

Recognition of the economic, social and environmental importance of marine areas has grown significantly in recent decades. This has led to more widespread development of marine planning as a means of addressing risks, seizing opportunities and managing potential conflicts which arise in the marine and coastal environment.

Marine planning is a process which helps to deliver sustainable development and management of resources in the marine environment. Defra define it as *"strategic, forward-looking planning for regulating, managing and protecting the marine environment, including through allocation of space, that addresses the multiple, cumulative, and potentially conflicting uses of the sea."*

Globally, marine planning has taken a variety of forms, from early spatial plans which were designed to create and manage Marine Protected Areas, through multiple-use zoning schemes which have sought to allocate space for differing uses, to more recent attempts to apply an 'ecosystem approach' to the multiple-use of marine environment.

2.2 The international policy context

Marine planning is becoming an important vehicle for delivering a wide range of international policy objectives. Agreements made at the World Summit on Sustainable Development (Johannesburg, 2002) and The Convention on Biological Diversity place requirements for sustainable management of marine ecosystems and good governance of the marine environment on all signatories. At a European level the UK is bound by several important commitments including the OSPAR Convention's Biodiversity Strategy (1992), the EC Biodiversity Strategy (1998), the EU Habitats Directive (Natura 2000 Network) and the Marine Strategy Framework Directive (MFSD, 2008). The MFSD aims to achieve 'good environmental status' of EU marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This aim is transposed into UK law as the Marine Strategy Regulations (2010).

2.3 The national policy context

Nationally, the single most important driver for marine planning has been the Marine and Coastal Access Act (2009). The Act sets out the Government's overarching intentions regarding the social, economic and environmental elements of sustainable development to manage local and regional plans and programmes by covering five principles including planning in the marine area. With respect to planning, the stated aim is: *"To create a strategic marine planning system that will clarify our marine objectives and priorities for the future and direct decision-makers and users towards more efficient, sustainable use and protection of our marine resource".*

Part 3 of The Act legislates for the production of a Marine Policy Statement (MPS), which was published in March 2011. The MPS is expected to lead to more strategic and efficient management of the marine environment and marine resources. It sets out policies in the UK marine area to contribute to the achievement of sustainable development and provide a consistent policy steer for decision makers and users in the marine area. It takes into consideration the priorities of all the UK Administrations and aims to be forward looking (over 20 years and longer where possible). It aims to address European Union (EU) and international obligations and commitments and to explain how UK Administrations are addressing these and taking them forward through domestic policies.

The MPS sits alongside the suite of National Policy Statements (NPSs) which are produced for Nationally Significant Infrastructure Projects (NSIPs) in key sectors under the Planning Act 2008 (including energy, ports, transport, water, wastewater and waste). However, it is the intention of the current Coalition Government to replace the existing framework of Planning Policy Guidance and Planning Policy Statements with a single, overarching National Planning Policy Framework (NPPF). The Draft NPPF was published on 22nd July 2011.

Local planning authorities are tasked to work collaboratively with the Marine Management Organisation in marine areas as well as to take account of marine plans and apply ICZM across land/sea boundaries when managing risk from coastal change. They are also required to identify Coastal Change Management Areas where an area is likely to be affected by physical changes to the coast.

Further reform of terrestrial planning in England will take place as a result of the passage of the Localism Act 2011. The planning and regeneration provisions of the Act abolish Regional Spatial Strategies and the Infrastructure Planning Commission

as well as providing for neighbourhood plans. At the time of writing the provisions of the Act have yet to be implemented, and the Draft NPPF have yet to be finalised, creating significant uncertainty as to how terrestrial planning might interact with national and local marine planning.

2.4 Marine Planning in England

In the UK, the Marine Management Organisation (MMO) is tasked to deliver marine planning. The process is now underway, and in England, the inshore and offshore waters have been split into 11 plan areas (Figure 1), with the aim of delivering two plans every two years. The East Inshore and East Offshore areas were selected as the first areas for marine planning and the process officially began on 1st April 2011. The next two marine plan areas have yet to be selected by the MMO.

With a sustainable development marine plan model, there are close links between planning and licensing, with marine plans governing licensing decisions. As it currently stands, the Marine Policy Statement is the framework for decision making on licensing applications in areas without marine plans.

Figure 1: Marine Plan Areas in England. Source: MMO. © British Crown, NERC and SeaZone Solutions Ltd. All rights reserved. (SZ042010.001)© Crown Copyright and database right 2010. All rights reserved. Ordnance Survey Licence No. 100049981.

Chapter 3: Development of the C-SCOPE Marine Plan

3.1 Purpose and status of the Plan

The C-SCOPE Marine Plan is one of several pilot marine planning projects supported by the MMO. It could be up to eight years before the MMO starts to plan the Southern inshore area and the C-SCOPE Marine Plan is therefore intended to provide non-statutory guidance within the C-SCOPE Marine Plan Area in the meantime.

This plan provides users, managers and regulators of the marine plan area, whether in public, private or voluntary sectors, with direction, policies and advice to ensure that their plans and activities contribute to sustainable development in the area. While the Plan should be taken as a whole, it is also intended to be complementary to existing plans and strategies. It seeks to avoid duplication as far as possible but does, in conjunction with the Coastal Explorer Planning Tool developed in parallel, sign-post users to other relevant plans and strategies.

Additionally there is an aspiration that the C-SCOPE Marine Plan will become a material consideration for local planning and regulatory authorities when making decisions on new applications for development, and eventually be given some statutory recognition through incorporation into Local Development Plans.

3.2 Starting points for the C-SCOPE Marine Plan

3.2.1 Sustainable Development in Marine Planning

The UK Marine Policy Statement takes the achievement of sustainable development as the starting point for marine planning. At its simplest, sustainable development can be defined as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs".* [1]

The Government's strategy for sustainable development recognises the needs of the economy, society and the natural environment, alongside the use of good governance and sound science. The five core principles are laid out in Figure 2, and these are reflected in the High Level Marine Objectives (HCMOs):

- achieving a sustainable marine economy;
- ensuring a strong, healthy and just society;
- living within environmental limits;
- promoting good governance; and
- using sound science responsibly.

The achievement of sustainable development and the HLMOs have therefore been used as the basis for the objectives of the C-SCOPE Marine Plan.

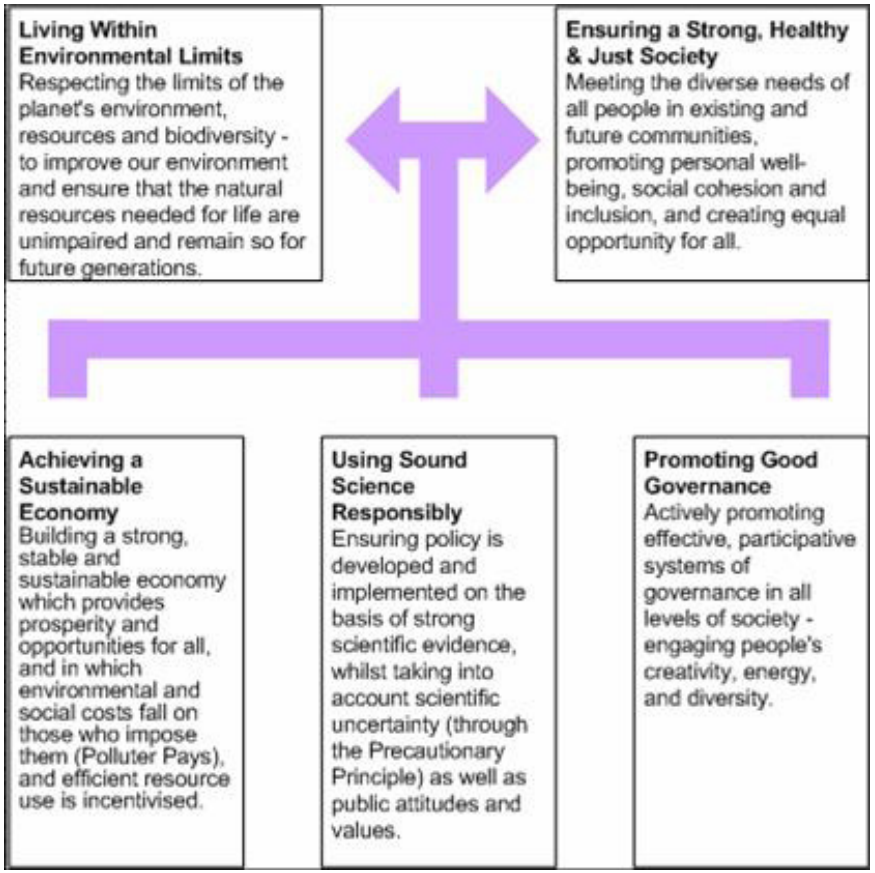


Figure 2: Shared UK Principles of Sustainable Development. Source: Defra

1 Bruntland Commission report 'Our Common Future' (1987)

3.2.2 An 'Ecosystem Approach' to Marine Planning

The Convention on Biological Diversity (CBD) describes an Ecosystem Approach as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way". The Approach adopted by the CBD looks beyond 'natural' ecosystems to include social, cultural and economic factors which are wholly interdependent with biodiversity and ecosystem goods and services. This approach is embedded firmly in UK marine policy: the Marine Strategy Regulations (2010), state that the Strategy *"must apply an ecosystem-based approach to the management of human activities within the marine strategy area"* which it proceeds to define as one "*which ensures that the collective pressure of human activities is kept within the levels compatible with the achievement of good environmental status and does not compromise the capacity of marine ecosystems to respond to human-induced changes"*. The C-SCOPE Marine Plan also adopts this approach.

3.2.3 Stakeholder engagement in Marine Planning

A key principle underpinning the Ecosystem Approach required by the UK Marine Policy Statement is that it should involve all stakeholders and balance local and wider public interests. To do so, requires engagement with *"a broad range of institutions, organisations, groups and individuals that have an interest in, understanding of, or potential influence over, the management of a given ecosystem."* [2]

The existing networks, relationships and trust established by the Dorset Coast Forum (DCF) have been an essential delivery mechanism for stakeholder engagement within the C-SCOPE project. DCF is a strategic coastal partnership established in 1995 to address the long-term, broad-scale issues facing the Dorset coast and its inshore waters. It has over 260 member organisations from the private, voluntary and public sectors. Its membership has wide-ranging expertise, local knowledge and a deep understanding of Dorset's coast and its inshore waters. The Forum has no executive powers, its members have no voting rights and as far as possible it operates on an 'equal partners' basis.

Stakeholder engagement was initially implemented/managed through the C-SCOPE Steering Group (Appendix 1) which was established in early 2008 to help develop the project. The Group has met on a quarterly basis throughout the project, providing strategic advice to the C-SCOPE team. Four Task and Finish Groups (Appendix 1) were set up to help deliver key aspects of the project; DCF members were given an open invitation to join any Group of their choice. Each Group had its own Terms of Reference and Chair. Figure 3 highlights how stakeholders were integral to the project's management and delivery.

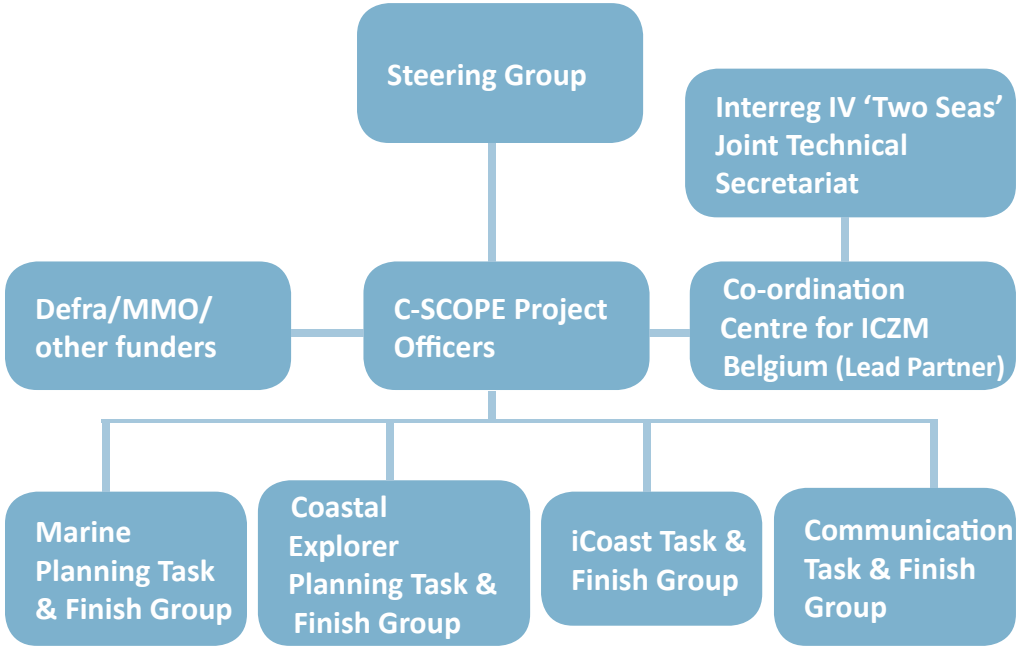


Figure 3: Project structure

The Marine Planning Task & Finish Group met a total of six times (Table 1) over two years and was involved in every stage of marine plan development. Stakeholders from the Group were also engaged on a one-to-one basis where necessary; for instance several meetings were held with Portland Harbour Authority Ltd to ensure integration between its numerous Port plans and strategies and the C-SCOPE Marine Plan.

The Group was not, and could not be, totally representative of all stakeholders, so other means of engagement were also used. An interactions matrix was completed as part of the marine plan evidence base; for this study over fifty stakeholders were interviewed including representatives from major sectors such as shipping, offshore renewables, ports, MoD and fishing. Over 120 DCF members were also involved in a consultation workshop for the Land and Seascape Character Assessment.

2 POSTNOTE Number 377, May 2011. The Ecosystem Approach. Parliamentary Office of Science & Technology.

At a more local level, a series of six community road-shows were held throughout the marine plan area which allowed residents to share their vision for the Dorset coast and express how and where they use the coast; these visions can be found in Appendix 2. A detailed analysis and comparison of stakeholder engagement in Dorset and Belgium will form part of the joint final outputs of the C-SCOPE project.

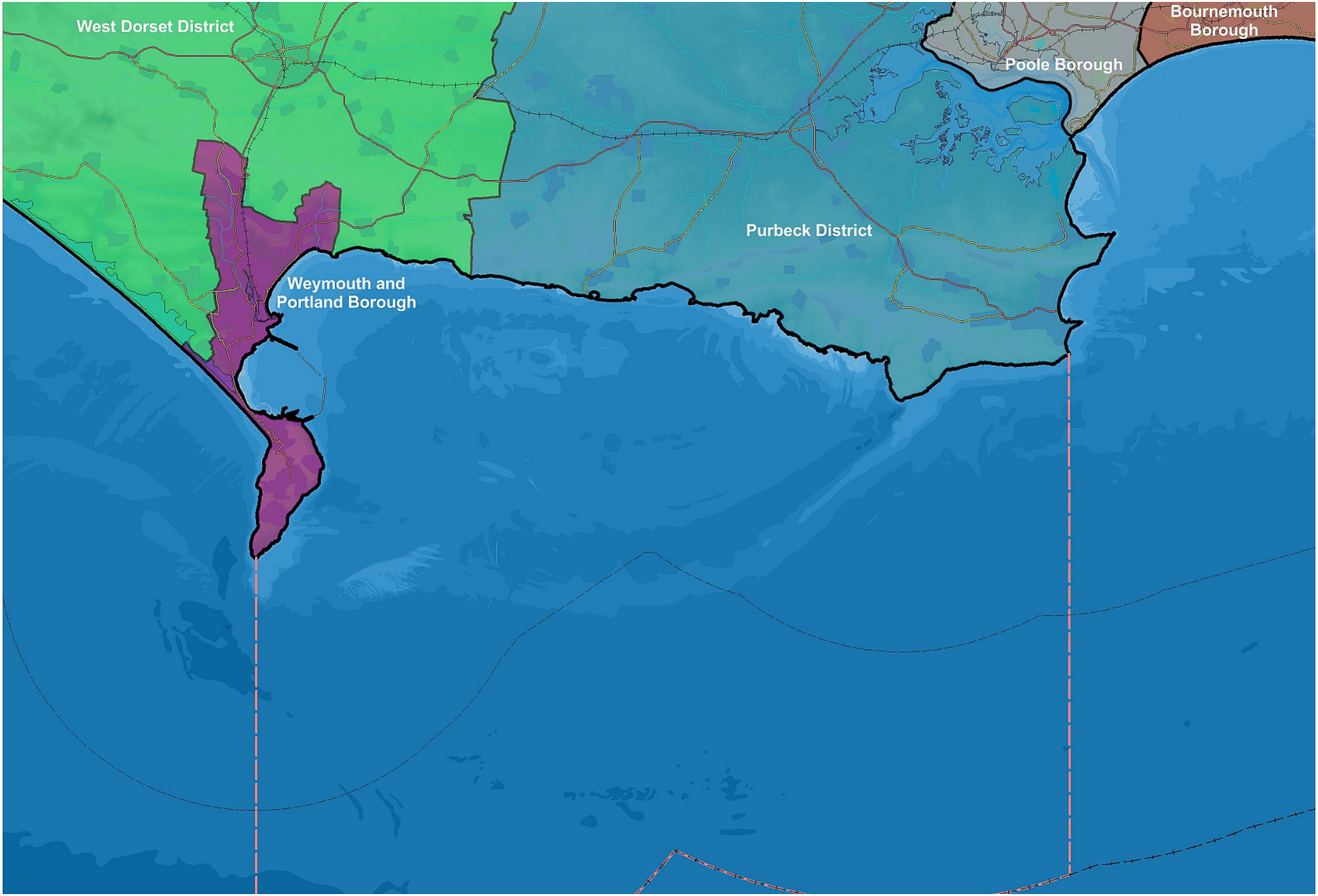
3.2.4 Integration of the C-SCOPE Marine Plan with existing plans

The primary aim of the C-SCOPE project is to achieve a seamless, integrated approach to land and sea planning and management. Within the C-SCOPE Marine Plan area there are many existing plans and policies to which it must have regard:

- **Local Development Frameworks(LDFs)**: (Figure 4, page 14) Weymouth & Portland Borough Council, West Dorset District Council[3] and Purbeck District Council are all producing LDFs, guided by Planning Policy Statement 12: Local Spatial Planning. These are the key terrestrial spatial plans designed to guide development in English local authority areas. Other local authority plans which must be considered include the Bournemouth, Dorset and Poole Minerals and Waste Development Framework and the Bournemouth, Poole and Dorset Local Transport Plan 2011 – 2026. Strategic Flood Risk Assessments conducted by local authorities also have to be taken into account.

3 Weymouth and Portland Borough Council and West Dorset District Council are currently developing a joint Local Development Framework.

Figure 4: Local Authorities Boundaries



- Shoreline Management Plans: the Durlston Head to Rame Head Shoreline Management Plan 2 is an assessment of the risks associated with coastal processes and provides a 'route map' for local authorities to adapt to future coastal change. Although a non-statutory plan, the SMP is a key strategy in managing flooding and coastal erosion and has been adopted by all local authorities within the C-SCOPE Marine Plan area; it is therefore important that policies within the C-SCOPE plan are compatible with it.

- The SW River Basin Management Plan (2009), created under The Water Environment (Water Framework Directive) Regulations (England and Wales) 2003, sets out the environmental objectives for all water bodies out to one nautical mile offshore, presents a programme of measures to achieve these objectives and contains a monitoring programme to assess progress. Strong links between river basin planning and the C-SCOPE Marine Plan are essential to achieve their overlapping objectives.

- Management Plans for protected sites: two further plans play a significant role within the C-SCOPE Marine Plan area and require careful integration into the MSP. The Dorset AONB Management Plan 2009-2014 sets out the Partnership's vision for the AONB, and is a material consideration in the planning process. As it covers a coastal protected landscape with harbour, estuarine and intertidal areas within its boundary, the Plan takes into account the special issues surrounding the land/sea interface. The Dorset and East Devon Coast World Heritage Site Management Plan 2009-2014 sets out proposals for conservation of the geology and geomorphology for which the area was designated, access, education and science as well as identifying ways in which World Heritage Site status can help sustainable development in the wider area. There are important connections with both the SMP2, and the AONB Plan which helps to conserve both the WHS and the wider countryside that surrounds it.

- Dorset Coast Strategy: the Dorset Coast Strategy 2011-2021 (DCS) is a non-statutory document which aims to set out a consensus view on the way in which the members of the Dorset Coast Forum will work together to improve the planning and management of the Dorset Coast and inshore waters. The goals of the Strategy are to:

    - Establish integrated policy;
    - Establish guidelines for more detailed coastal management plans;
    - Identify strategic opportunities for resource development;
    - Engage and develop participation of a wide range of partners;
    - Develop a co-ordinated approach to strategy implementation;
    - Identify solutions for the sustainable coastal development and management;
    - Evaluate success and report results throughout Europe.

As the C-SCOPE marine plan helps to fulfil many of the goals of the Strategy, it shares its vision (page 67).

3.3 Process for producing the C-SCOPE Marine Plan

3.3.1 Project timescales

The project was awarded funding in November 2008 and, following staff recruitment, was officially launched in April 2009. Due originally to complete in March 2012, a project extension was granted by the Joint Technical Secretariat of the Interreg IV A 'Two Seas' programme until June 2012. Key events and milestones of the marine plan are listed below.

Table 1. Key events and milestones

Date	Event/Milestone
November 2008	Funding Awarded
March/April 2009	Staff recruited
April 2009	Project launched
August 2009	First Task & Finish Group meeting; vision scope and early objectives
September 2009	MSP and indicators conference
November 2009	Task & Finish Group meeting; reviewed HLMOs and existing marine plans
February 2010	Task & Finish Group meeting; reviewed draft objectives, workshop to identify current issues, forces for change and opportunities
April 2010	Offshore Renewables Capacity Report
May 2010	Task & Finish Group meeting; discussed structure of marine plan and how objectives could be expressed spatially
September 2010	Land and Seascape Character Assessment Report
October 2010	Task & Finish Group meeting; reviewed first draft policy framework
November 2011	Socio-economic conference
December 2010-February 2011	Community Roadshows
April 2011	Appointed Sustainability Appraisal consultants
May 2011	Task & Finish Group meeting; reviewed evidence base and high level Alternatives for Sustainability Appraisal
August 2011	Sustainability Appraisal Scoping Report
September 2011	Seabed Habitat Maps
October 2011	Sustainability Appraisal Workshop (Task & Finish Group)
December 2011 – March 2012	Draft Marine Plan Consultation
June 2012	End of Project Conference and reports

3.3.2 Compiling the Evidence base

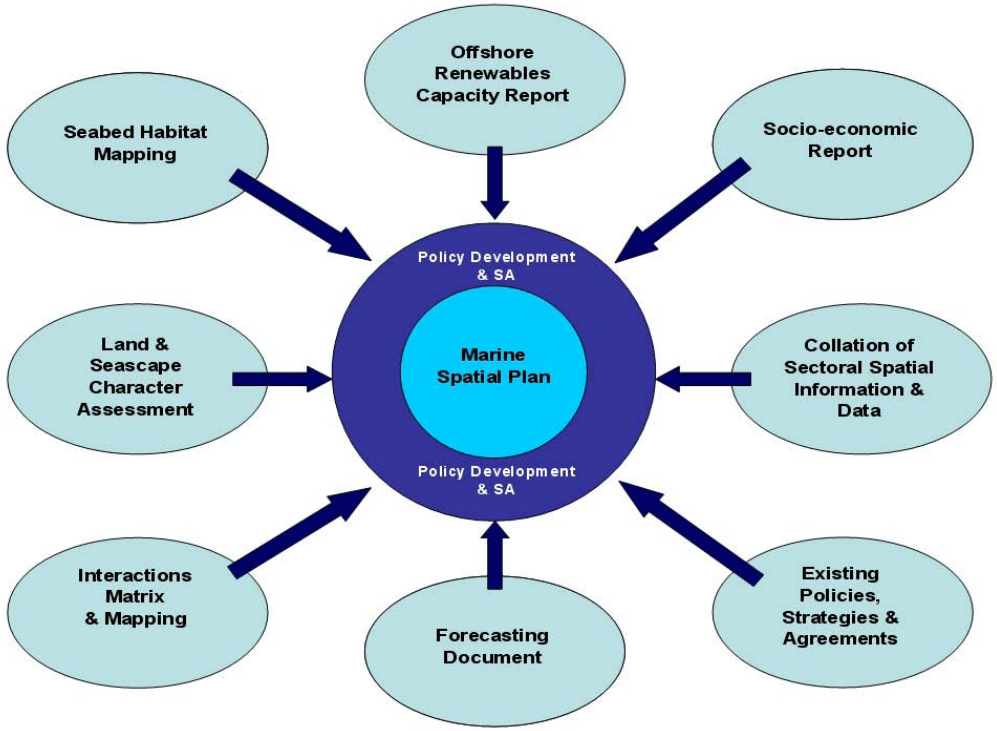


Figure 5: Evidence base schematic

A robust evidence base is an essential foundation for marine planning and a number of studies have either been commissioned, or undertaken by the project team, to inform development of this Plan. Key elements of the evidence base related to:

- Collation of existing datasets: the first stage in evidence gathering involved collecting and collating existing datasets from a wide range of sources. Data were compared to existing national sets and gap analysis conducted. All spatial data are held on a MapInfo Geographic Information System (GIS). A confidence assessment was conducted on data used within the Plan (methods can be found in Appendix 3). Best available data were used. However, data given a low confidence rating were treated with due caution in decision making.

- Existing plans and strategies: Marine Planning does not happen in isolation; to ensure integration with terrestrial planning as well as compliance and/or compatibility with existing marine Plans, Policies and Programmes (PPP) relevant documents were collated and reviewed - details can be found in the Sustainability Appraisal Report.

- Seabed maps: a fundamental piece of work involved the production of detailed seabed and habitat maps. Over 800km2 of multi-beam sonar survey in combination with video drop-down and grab sampling were conducted alongside sedimentary and oceanographic modelling to create a fine-scale seabed habitat map to EUNIS level 3 standards. These maps were used to develop sensitivity maps which will help to inform all future planning decisions, ensuring developments are located in optimum locations and cause minimum damage to the marine environment.

- Offshore Renewable Energy Capacity: the UK Government target to achieve 15% renewable energy use by 2020 was a key driver for the development of a national marine planning system. An Offshore Renewables Capacity Study was undertaken to gain an understanding of those areas within the Dorset marine environment that may be considered suitable for marine renewable energy development from wave, tidal stream and offshore wind technology groups. The study also reviewed current and emerging technologies and land-based infrastructure requirements.

- Land and Seascape Character: Landscape Character Assessment is an established factual and objective technique which is used in a range of terrestrial planning and management situations. New methods, consistent with national guidance, were developed to produce a Landscape and Seascape Character Assessment for Dorset which describes the character of coastal and marine environments, the key forces for change and how these might be managed in the future. The importance of this work was recently recognised in awards granted by the Landscape Institute and the South West Royal Town Planning Institute (RTPI).

- Socio-Economic Characteristics: it is anticipated that marine planning will play an important role in helping to stimulate economic regeneration in coastal towns and to improve the wellbeing of local populations. To identify key issues which need to be addressed, a socio-economic report for the Marine Plan area was conducted. This includes information on population, housing and the local labour market, a profile of marine industries and an Economic Impact Assessment of these industries on the local economy.

- Spatial interactions: It was also essential to understand the complex spatial interactions which take place between sectors in the coastal and marine waters off Dorset. A matrix was used to capture information on the nature, extent and intensity of these interactions as well as their temporal nature. Over fifty face-to-face interviews were recorded, and this narrative is as informative as the interactions themselves. Interactions were later mapped using GIS to highlight areas where competition for space is more intense and identify where there are opportunities to enhance current use.

- Forecasting of future trends: Finally, by its very nature, a marine plan is forward looking. It is important to understand both national and local sectoral trends and possible future developments which will need to be factored in to the marine plan. Climate change is also a major force for change and its potential effects on the marine environment, sectors and communities also need to be considered. A forecasting document has been produced to address these needs.

Supporting documents can be found in the Appendices.

3.3.3 Conducting spatial analysis

In the initial stages of the marine planning process, the project team explored a range of tools to support decision making[4]. Whilst there are a wide range of such tools available, it was felt that few addressed the specific needs of marine planning for sustainable development. Therefore, the project team adapted and developed a range of techniques and tools to enable them to interrogate the data and inform policy.

All data are held on a MapInfo Geographic Information System (GIS) which in itself allows for simple data analysis. To gain a greater understanding of the intensity and location of human activities within the C-SCOPE Marine Plan area, an activity 'heat map' was produced. As might be expected, the results showed a concentration of activity in the coastal zone. However, these activities do not necessarily take place at the same time, or in the same three-dimensional space. Results from the interactions matrix were expressed spatially, and the resulting series of maps revealed that many activities which were apparently competing for space were actually 'neutral' interactions. When considered in combination with forecast a ctivities in the C-SCOPE Marine Plan area, plus existing spatial and temporal management measures (Table 2 below), these findings reinforced the Task and Finish Group's decision that further measures were not necessary in the Marine Plan.

4 Decision support tools considered include Marxan with Zones and Multi-criteria analysis.

Table 2. Existing Spatial Management Measures within the C-SCOPE Marine Plan Area (adapted from the UNESCO Step by Step Guide to Marine Spatial Planning)

Sector	Spatial Management Measures	C-SCOPE Marine Plan Area and Surrounding Waters
Marine Transportation	Mandatory Vessel Traffic Routes	Commercial shipping route into Portland Harbour
	Ship Routes/Fairways	Buoyed fairway into Portland Harbour for marina traffic
	Vessel Traffic Separation Schemes	Channel Separation Scheme to the South of the area
	Areas To Be Avoided (by vessels)	Overwintering Bird areas – The Fleet, Portland Harbour
	Precautionary or Prohibited Areas	Portland Port unauthorised navigation prohibited area
	Particularly Sensitive Sea Areas (PSSAs)	Portland MEHRA High Risk cell
	Ship-to-Ship Transfer Areas	None
	Moving Safety (Buffer) & Security Zones Around LNG Tankers	None
	Pilot Boarding Areas	Portland Harbour and Weymouth Harbour Joint Pilotage Area
	Safety Zones Around Oil Spill Response Operations	Oil spill clean up priority areas, entire coastline
Ports	Safety Zones Around Vessels and Terminals	Portland Port unauthorised navigation prohibited area
	Anchoring & No-Anchoring Grounds or Areas	Portland Harbour safe anchorage area, Anchorages, Refuge Anchorage Weymouth Bay
	Security Zones in Ports and Waterways	Portland Port unauthorised navigation prohibited area
	Offshore Port Zones for Oil or LNG Transfers	None
Fishing	Fishery Closures Areas, including Seasonal Closures	Southern IFCA Byelaws
	No Trawl Areas	MCZ Reference Areas – Not designated yet
	Critical Habitat Designations	None
	Artificial Reef Areas	Wreck to Reef
Offshore Aquaculture	Offshore Areas Designated for Aquaculture	None
Oil & Gas	Oil & Gas Lease or Concession Areas	Multiple throughout the area
	Areas Withdrawn from Leasing	Multiple throughout the area
	Safety Zones Around Offshore Installations	None
Renewable Energy	Wind Farms, Wave Parks, & Tidal Energy Lease or Concession Areas	Crown Estate Round 3, Zone 7 – West of Wight
	Safety Zones Around Wind Farms, Wave Parks, Tidal Facilities	None
Pipelines & Cables	Pipeline Rights-of-Way or Areas	None
	Communications Cable Rights-of-Way	None

Sector	Spatial Management Measures	C-SCOPE Marine Plan Area and Surrounding Waters
	Energy Transmission Cable Rights-of-Way	QinetiQ De-gaussing Cable, and Noise Range, Weymouth Bay
	Cable Lines (not always in Rights-of-Way)	QinetiQ De-gaussing Cable
Sewage	Sewer Lines and Diffusers	Multiple long and short-fall sewer outfalls
Dredging	Dredging Site or Areas	Non active
	Dredged Material Disposal Areas or Sires (Active and Inactive)	Disposal Site, Weymouth Bay
Sand & Gravel Mining	Sand & Gravel (Aggregate) Extraction Areas	None
Military	Military Operations or Exercise/Training Areas (“Hot Zones”)	Multiple throughout area
	Danger, Restricted, or Security Areas	Lulworth Ranges Inner and Outer Danger Areas
	Military Testing Ranges	QinetiQ De-gaussing and Noise Range, Weymouth Bay
	Submarine Operating Areas	Entire Area; although not-often used
	Water Space Management for Submarine Operations	None
	Sonar Operating Zones	None
	Security and Safety Around Naval Ships	Portland Port security for Royal Fleet Auxiliary Ships
	Unexploded Ordinance Areas	None
Receration	Wildlife Viewing Areas	None
	Personal Watercraft Areas	PWC Channel within Portland Harbour and at Bowleaze Cove
	Watersports	Ski boat and sail board approach channels, Weymouth Bay, Recrea-tional management plan, Portland Harbour
	Bathing Areas	Weymouth Bay, Swanage Bay
Marine Protected Areas	MCZ	South Dorset, South of Portland, Chesil Beach and Stennis Ledges, and Broad Bench to Kimmeridge Bay rMCZs – not designated yet
	MCZ Reference Area	South East of Portland Bill and South Dorset Reference Areas – not designated yet
	Special Protection Area Chesil and the Fleet	Chesil & the Fleet
	Special Areas of Conservation	Studland to Portland pSAC - not designated yet
	Voluntary Marine Protected Areas	Purbeck Voluntary Marine Reserve, Kimmeridge
	SSSI	Chesil and the Fleet, Portland Harbour Shore
	Ramsar	Chesil and the Fleet
Nature Conservation	Fish Spawning Areas	Sprat and Sole spawning areas – Weymouth Bay
	Fish Nursery Areas	Whiting , Lemon Sole at Lyme Bay/Fleet, Mackerel entire area

Sector	Spatial Management Measures	C-SCOPE Marine Plan Area and Surrounding Waters
	Marine Mammal Breeding Areas	None
	Marine Mammal Feeding Areas	None
	Marine Mammal Migration Routes Marine Mammal Stopover Areas	None
	Seabird Feeding Areas	The Fleet, Portland Harbour
	Sea Grass Beds	Weymouth Bay, Portland Harbour
	Wetlands	None
History & Culture	Protected Archaeological Areas, e.g., Ship Wrecks	None within Area, nine in the surrounding water
	Submerged Archaeological Sites	Hundreds of wrecks
Research	Scientific Reference Sites	South East of Portland Bill and South Dorset Reference Areas

An analysis of future activities within the area revealed that, in addition to offshore renewables, shellfish mariculture is the most likely development to occur within the timescale of the Marine Plan. Constraints mapping was therefore conducted to identify the most appropriate areas for developers to target and these were incorporated into the policy framework.

Spatial analysis methods can be found in Appendix 4.

3.3.4 Conducting the Sustainability Appraisal and Habitats Regulations Assessment

In developing a marine plan there are inevitably a number of potentially conflicting priorities. Indeed, Government guidance on sustainable development to the MMO recognises that the high level marine objectives are themselves potentially conflicting[5]. Strategic decisions may benefit one sector more than another or policies may emphasise, for example, protecting the environment over development; the Sustainability Appraisal (SA) process helps to ensure that these decisions are fair, transparent and contribute to achieving sustainable development.

Sustainability Appraisal is based on European Directive 2001/42/EC *"on the assessment of the effects of certain plans and programmes on the environment"* (the 'Strategic Environmental Assessment (SEA) Directive'). This is transposed in England by *"The Environmental Assessment of Plans and Programmes Regulations"* (the 'SEA Regulations'). The SEA Directive and Regulations are essentially procedural in nature and provide a level of leeway as to their substantive interpretation. In England, the Government decided to interpret the requirements more broadly, to include wider social and economic aspects; this process is referred to as 'sustainability appraisal'.

While the C-SCOPE Marine Plan is non-statutory and there is no obligation to conduct an SA, it was felt that it could perform a key role in the planning process, ensuring full integration of environmental, social and economic objectives and providing a robust test of the plan-making process with an element of external challenge.

In addition to the SA, a full Habitats Regulation Assessment (HRA) was conducted alongside the development of the Marine Plan to ensure integration of the findings not only with the Plan but with the SA. The Habitats Regulations Screening Assessment, alongside the Sustainability Appraisal, accompanies the Marine Plan for consultation.

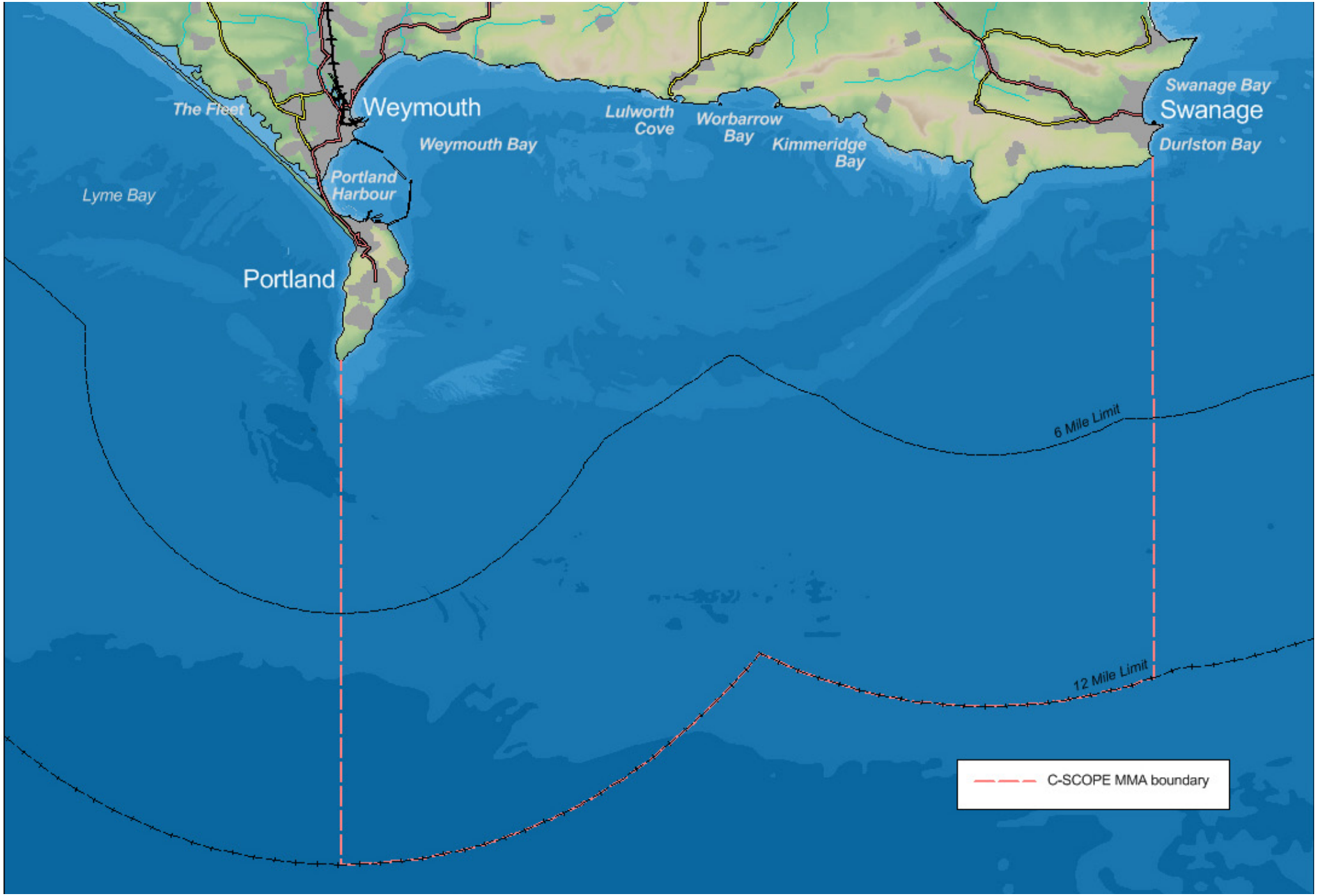
5 Draft statutory guidance to the Marine Management Organisation on its contribution to the achievement of sustainable development. Presented to Parliament pursuant to section 2(6) of the Marine and Coastal Access Act 2009. March 2010.

Chapter 4: An overview of the C-SCOPE Marine Plan Area

4.1 Site description

Covering an area of 953 km2, The C-SCOPE Marine Plan area stretches from Portland Bill in the East to Durlston Head in the West. Its seaward extent is the 12 nautical mile territorial seas limit (Figure 6 below). The Fleet, whilst outside the boundary, has been included in all decision making as it is connected to the waters of Portland Harbour via Smallmouth and the Narrows, through which the tide ebbs and flows. This area was chosen to encompass a variety of coastline types and a wide range of uses, including the urban and industrial areas of Weymouth & Portland. Due to an almost infinite number of ways which it could be delineated, the inland limit has deliberately not been defined.

Figure 6: C-SCOPE Marine Plan Area



4.2 Geology

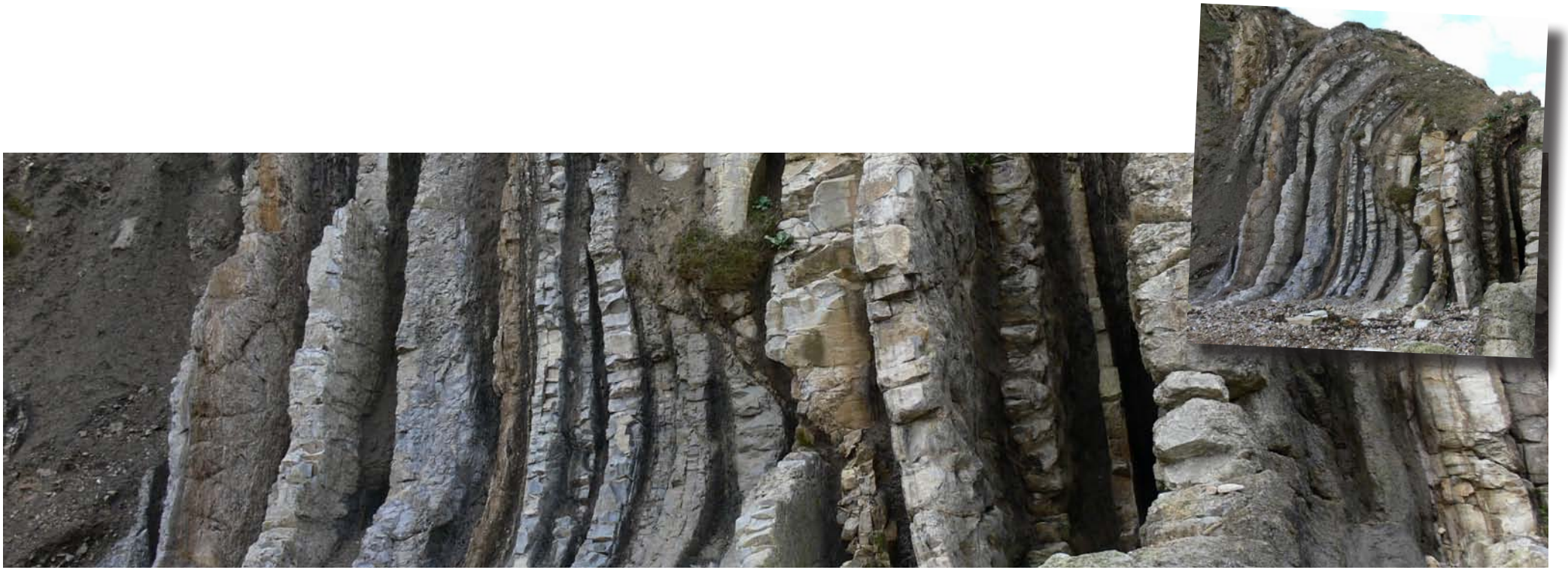
The Dorset coast is renowned for its geology and in December 2001 a 95 mile stretch of east Devon and Dorset coast, including most of the Marine Plan area, was declared a World Heritage Site by UNESCO as *"an outstanding example representing major stages of the Earth's history, including the record of life, significant ongoing geological processes in the development of landforms, and significant geomorphic or physiographic features".*

The area is also world famous for fossils, with new discoveries constantly being uncovered. The sequence of cliffs and bays along Dorset's coast also reveal the complexity of the geological structures, with a considerable range of geomorphological features and processes evident along the coast line, often little impacted by human activity. Numerous examples of landslides, and beach formation and evolution in relation to sea level change are apparent, again making the Dorset coast an extremely important resource.

On the Isle of Portland thin limestone soils support rich flora and fauna – particularly orchids and butterflies. Quarrying of the fine white limestone on Portland continues to this day, and many of London's finest buildings, including St Paul's Cathedral, are built from it.

To the east of Weymouth the coast is made up of a complex sequence of rocks, formed from Upper Jurassic clays, limestones and sandstones, which are twisted by folds and faults. Around Osmington there is a natural seep of oil rising from the seabed, and oil can still be seen seeping onto the sea surface near Bran Point. In 1826, a land slip at White Nothe created the famous 'Burning Cliff' when a chemical reaction caused the organic-rich clays to start smouldering.

Lulworth Cove is a perfect horseshoe bay formed when a river punched a hole in the hard Portland Limestone that formed the cliffs, allowing the sea through to erode the much softer rocks behind. Close by, the Lulworth Crumple is a complex fold, formed by major earth movements in the same period as the Alps were formed, and Durdle Door is a perfect coastal arch of rocks tilted almost vertically.



Kimmeridge Bay contains a thick sequence of Kimmeridge Clay, with harder bands of dolomite and bituminous shales creating a series of rocky ledges running out to sea which provide some of the best access to marine wildlife in the UK. Further East, oil held in the Middle Jurassic Cornbrash Limestone layer, has been extracted on the cliff top since 1959; production is currently 80 barrels per day (12,720 litres). The nearby Wytch Farm Oilfield is the largest onshore field in Western Europe.

The Purbeck section of the coast consists mainly of early Cretaceous limestones alternating with shales and marls. Coastal limestone downland supports internationally important plants and animals and the cliffs are home to large colonies of breeding seabirds. The area has been quarried since Roman times and the qualities of the stone vary from layer to layer, making it suitable for a range of uses; from ornamental columns to hard-wearing paving stones.

Cliff falls and rock falls are common within the Marine Plan Area. The large cracks and fissures mean that the parts of the coastal cliffs are prone to collapse at any point throughout the year. Landslides are also a common occurrence, at various scales, both large and small. The instability of the coast is due to the numerous situations where porous strata, principally the chalk and Upper Greensand, over-lie impermeable clays as well as erosion of the toe of cliffs by the sea.

As shown by the DORIS seabed map (Figure 7), the complex geological features are not limited to the land. For example, a series of limestone ledges up to 15m across can be found in Worbarrow Bay and St Albans ledge, another limestone feature, extends out over 10km offshore. Extensive bedrock terraces occur off Portland Bill, where the coastal cliffs extend underwater and are clearly visible as 20m drop offs.

There is a mixture of seabed sediment forms that are indicative of the hydrodynamic conditions affecting them. Inshore waters around the headlands are exposed to greater current flows and typically have sediments scoured off to expose the underlying bedrock. This most noticeably occurs around Portland Bill and St Albans Head. There is little sediment cover between Portland and Swanage, revealing another dimension of the rock structure; faults, folding, and erosion are all evident. In larger bays tidal currents and exposure to wave influence are greatly reduced and so sediment regimes are indicative of depositional environments and therefore, softer sediments (muds and muddy sands prevail).

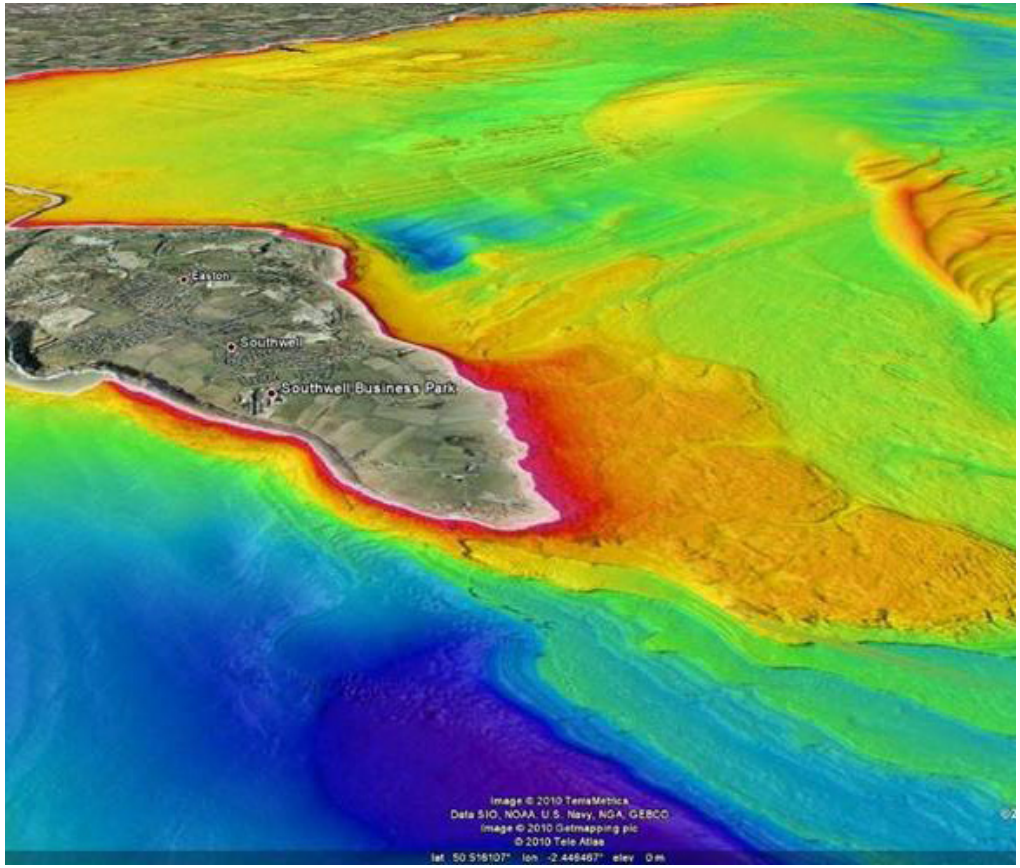
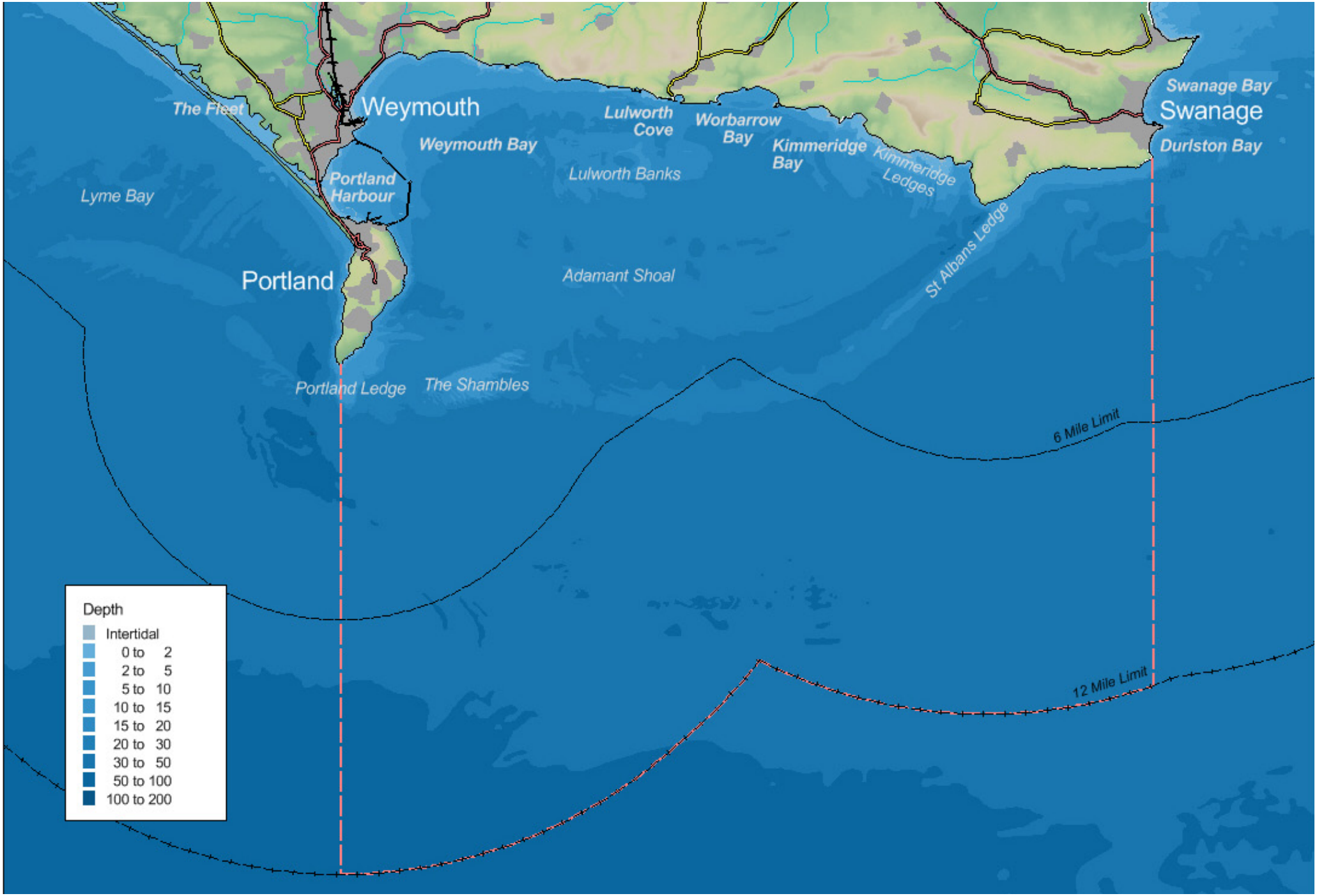


Figure 7: Land topography and DORIS bathymetry

4.3 Oceanography

Figure 8: Marine Plan area Bathymetry



The waters of the Marine Plan Area form part of the English Channel. The majority of the area is less than 50m in depth, with shallow features such as the Shambles and Lulworth Banks, Adamant Shoal and St Alban's Ledges, which are all less than 20m (Figure 8). Surface sea temperatures range from 8°C in winter to 16.5°C in summer (Figure 9).

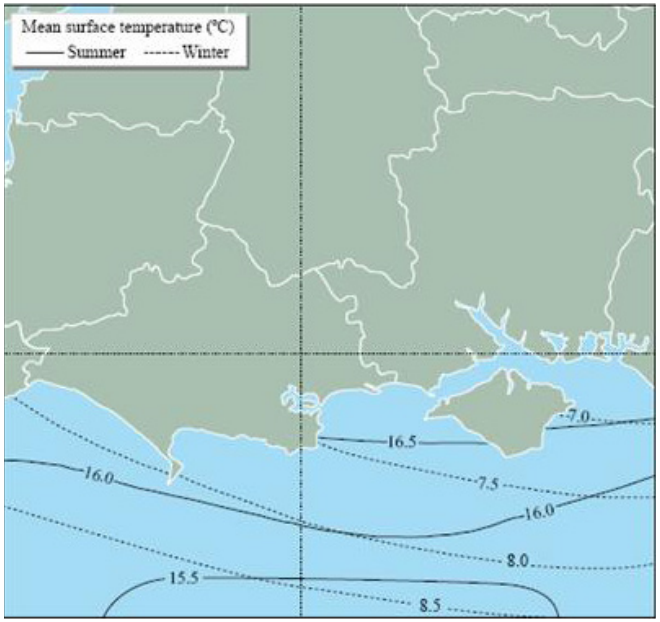


Figure 9: Mean surface water temperature in summer and winter (°C). Source: Lee & Ramster (1981). © Crown copyright.

Most of the Marine Plan area is affected by semi-diurnal tides, which have a range generally less than 2m; east of St Alban's Head there is a double high tide, and in Weymouth Bay and Portland there is a double low tide. The water column consists of well-mixed shelf water. Although lower than in winter, salinity values remain relatively high in summer along the centre of the English Channel due to the movement of Atlantic water towards the North Sea. Salinity values decrease toward the coast in both summer and winter but normally remain above 34.5 g/kg, except locally at river mouths, where there is dilution from freshwater discharge (Figure 10).

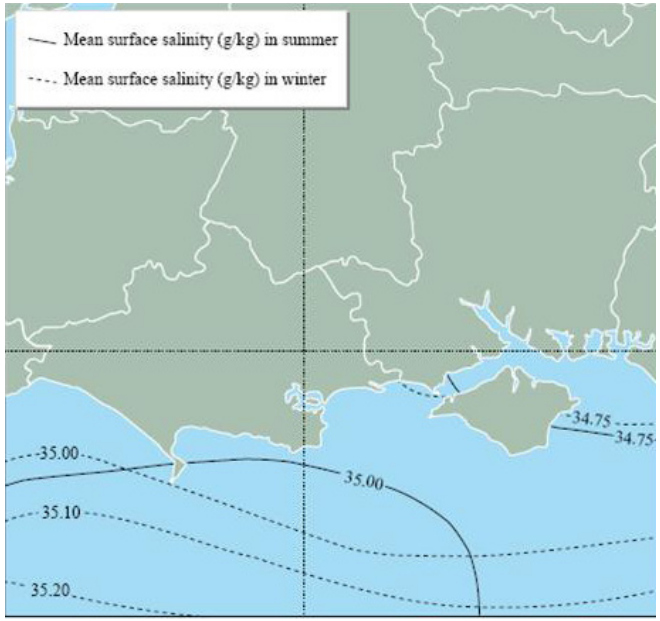


Figure 10: Mean surface salinity of seawater in summer and winter in g/kg of total dissolved salt. Source: Lee & Ramster (1981). © Crown copyright.

There is a strong contrast in exposure to wave energy between east and west sectors. The dominant wave directions are from the south-west and south-south-west (Figure 11), which means the coastline west of White Nothe is relatively protected by Portland and offshore banks and shoals. Maximum extreme wave heights are predicted to occur further east, outside Kimmeridge Bay, which is open to a fetch of over 8,000km (extending to the northern coast of South America) (Figure 12). Waves are transformed as they enter the nearshore zone by offshore bathymetry and this, combined with the presence of inshore reefs and ledges at various locations, sets up complex local wave refraction.

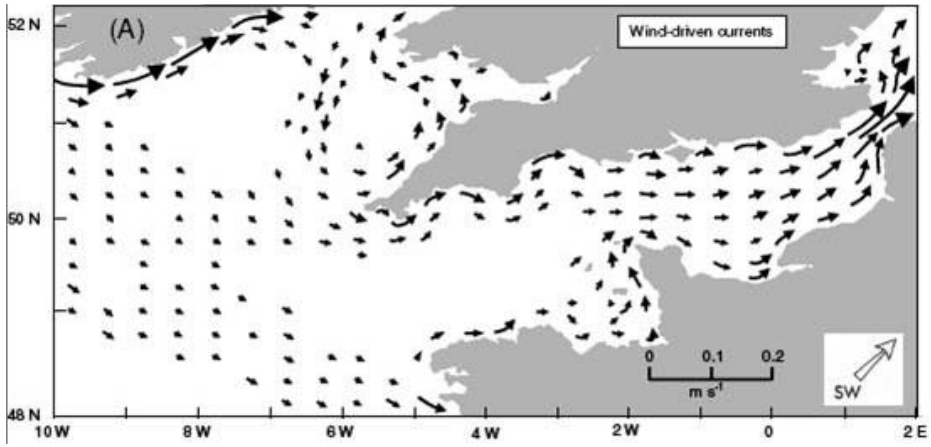


Figure 11: Wind driven currents in the south west. Source: Barne et al 1996.

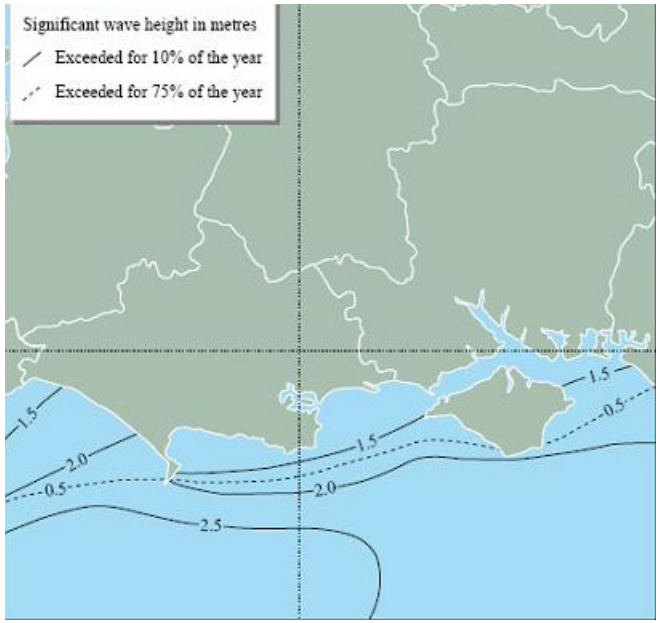


Figure 12: Significant wave height (m) exceeded for 10% and 75% of the year. Source: Lee & Ramster (1981).© Crown copyright.

Tidal range is small; with a maximum of 3m (Figure 13) and currents are relatively weak except at Portland Bill, Durlston and St Alban's Headlands and also where tidal flows are confined by reefs, such as at Ringstead Bay. Current vectors are parallel to the coast and reverse before and after high water. Sediment transport is dominantly wave-induced and net direction of littoral transport is west to east, consistent with the direction of approach of dominant wave fronts. In spite of a large overall input of sediment from cliff and shoreface erosion (200,000m3a-1), much of the material supplied is either clays or other weakly resistant rock that is rapidly abraded by wave action and transported seaward in suspension.

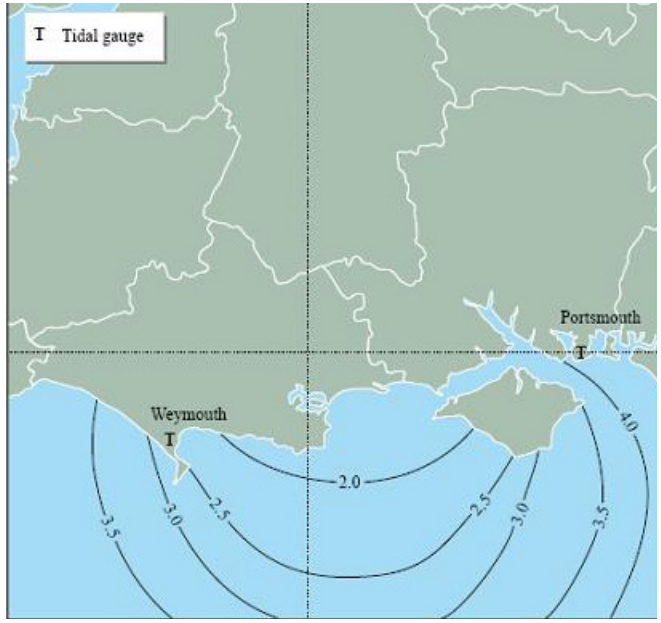


Figure 13: Tidal range (m) at mean spring tides. Source: Lee & Ramster (1981).© Crown copyright.

Littoral drift is also not continuous as it is intercepted by numerous headlands and embayments and this, combined with the presence of deep water in front of some cliffed sections, inhibits long distance longshore transport (Figure 14a and 14b).

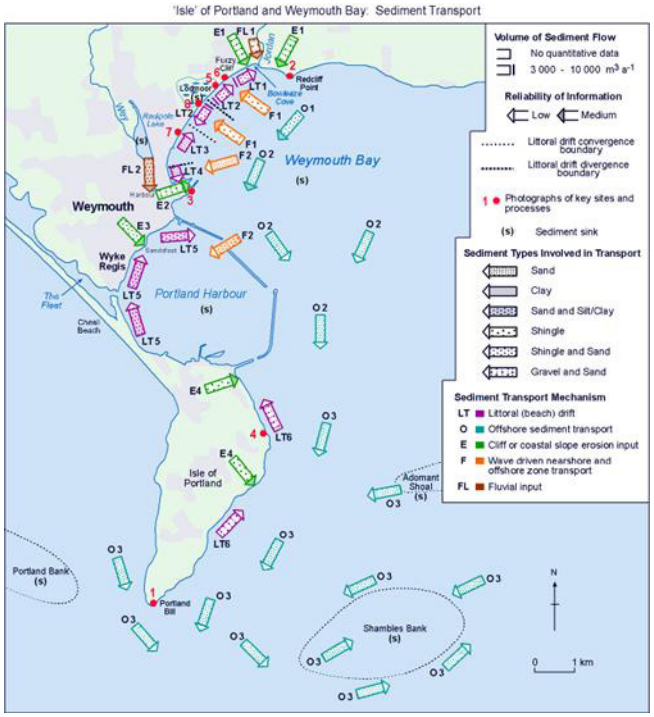


Figure 14a: Isle of Portland and Weymouth Bay sediment transport

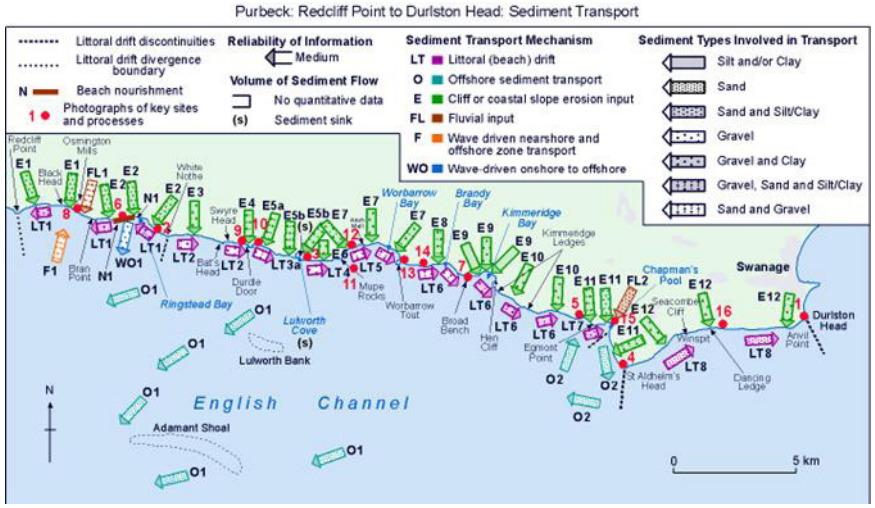


Figure 14b: Purbeck sediment transport

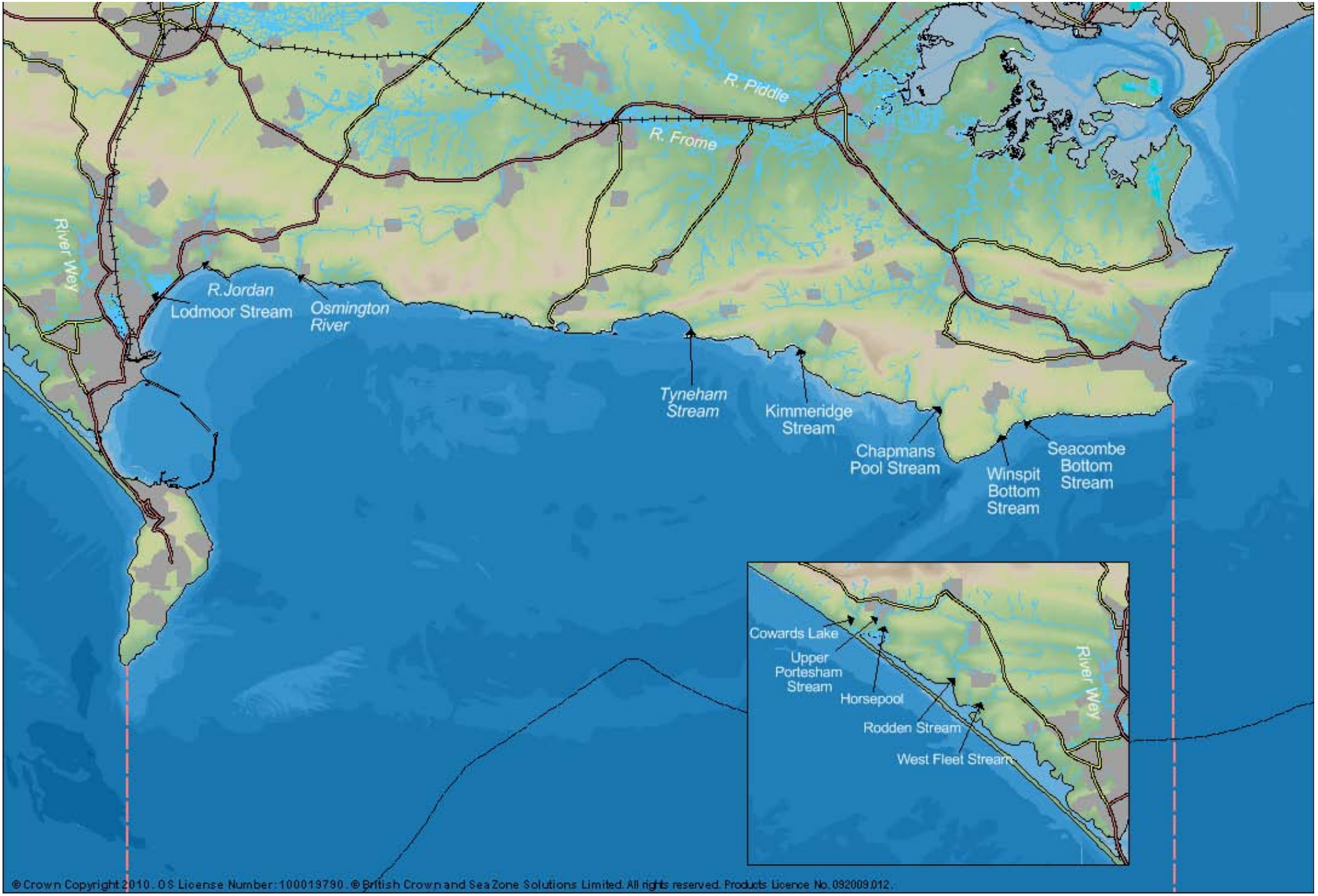
4.4 Hydrology and drainage

Two of the major rivers in Dorset, the Piddle/Trent and Frome, drain the land catchment to the west and north-west, and both flow into Poole Harbour. There is only one significant river which directly flows into the Marine Plan area; this is the River Wey, which flows into Weymouth Bay, passing through the centre of the urban area from the north. The River Jordan drains a small area to the east of Weymouth, flowing into Bowleaze Cove and the Osmington Stream flows across Moigns Down, into Weymouth Bay. Along the Purbeck coast there are many small springs and streams which drain the chalk and limestone ridge (Figure 15).

Twelve rivers and streams within the Marine Plan area are included within the South West River Basin Management Plan; of these Winspit Bottom Stream, Chapman's Pool Stream, Encombe Stream, Tyneham Stream, River Wey and Upper Portesham Stream are all identified as having Good Current Overall Potential, with an Overall Status Objective to be Good by 2015.

Kimmeridge Stream, Osmington Stream, Lodmoor Stream, River Jordan, West Fleet Stream and Rodden Stream are all identified as Moderate Current Overall Potential, with an Overall Status Objective to be Good by 2027.

Figure 15: Hydrology and drainage in Dorset. Source: Water for Life and Livelihoods



4.5 Coastal and marine ecology

The coastline and marine waters within the Marine Plan area support a wealth of wildlife which is of significant international, national and regional importance. Designations within the area include five Sites of Special Scientific Interest (SSSI), three Special Areas of Conservation (SAC) with coastal elements, as well as the Studland to Portland draft inshore SAC (Figure 16). The Marine Plan area also contains many coastal and marine Biodiversity Action Plan priority habitats and species (Figure 17).

A large part of the Marine Plan area coastline consists of high cliffs, varying from grey shales and clays to sheer limestone faces and ledges. Maritime crevice and ledge plant communities occur above the mean high water line and, when in flower, characteristic species such as thrift, rock samphire, sea campion, wild cabbage and rock sea spurry can create splashes of colour on the otherwise sparsely vegetated cliffs. Nationally rare plants associated with these cliff habitats include the Portland sea lavender, early spider orchid and early gentian. The Lulworth skipper butterfly can be found amongst taller grassland vegetation on the cliff edges.

In places such as St Alban's/Aldhelm's Head, Gad Cliff, White Nothe and the East Weares on Portland, where there are undercliffs, areas of scrub have developed with associated characteristic wildlife. These areas provide important staging posts and shelter for many migrant birds.

Birds which breed on the cliffs include fulmar and shag, whilst breeding populations of puffin, guillemot and razorbill are located on the limestone cliffs west of Swanage. Where the cliffs are soft and crumbling, there are valuable niches for a host of specialised invertebrates including mining bees and wasps.

Rocky shores of varying wave exposures and rock types exist along most of the Marine Plan area coastline; a diverse range of habitats including wave-cut platforms, rockpools, fissures, crevices and overhangs provide ideal conditions for a diverse variety of species. There is a contrast between sheltered rocky shores within Portland Harbour and more exposed intertidal ledges and reefs at Kimmeridge and Osmington. East of Chapman's Pool rocky shores are limited to the wave cut platform fringing the limestone cliffs.

Classic Rocky shore zonation is found throughout, although there is a very limited upper shore area due to the unusual double low tides and shoreline profile in this area.

The middle shore is dominated by brown seaweeds with associated limpets, winkles and top shells. Encrusting coralline algae is exposed on the lower shore on extreme low tides or in rock pools. Some areas of softer rock such as at Chapman's Pool are bored by piddocks. A number of rare and scarce
species have been recorded such as the brown seaweeds Padina pavonia and Asperococcus compressus. Several unusual fish are found at Kimmeridge such as Montagu's blenny, the Connemara clingfish and the Cornish sucker.

The main area of intertidal sediment occurs in Portland Harbour, although there is also a long sandy beach at Weymouth. Suspension feeders dominate, and include burrowing anemones, peacock and sandmason worms and up to nineteen species of bivalve mollusc. Small amphipod crustaceans live in the more mobile wave exposed sands of Weymouth Bay. Wading birds such as turnstone can often be seen foraging around the water's edge.

The shallow water, fine mud habitat within Portland Harbour contains many rare species, including the only population of the fragile sea pen in southern Britain. Of particular significance is the saline lagoon sandworm (a protected species under Schedule 5 of the Wildlife & Countryside Act 1981) which is a lagoonal species vulnerable to potential habitat loss.

The 2009 DORIS seabed survey revealed small to medium Sabellaria spinulosa reefs in areas predominantly characterised by mixed sediments throughout the Marine Plan area. Mussel beds associated with strong currents to the south and south east of Portland bill form a substantial feature, and are mainly comprised of mature mussels, although some areas are dominated by juveniles (spat). These beds also stretch into the shallower, infralittoral zone off Portland to depths of approximately 12m. Particularly dense brittlestar beds were found to the south west of Kimmeridge Bay, whilst beds to the south of The Shambles were found among a rich mussel bed. The nationally rare or scarce trumpet anemone was identified in five different locations around Worbarrow and Kimmeridge Ledges in low numbers.
The survey also confirmed existing data on sea grass beds in Weymouth and

Figure 16: Designated coastal and marine sites

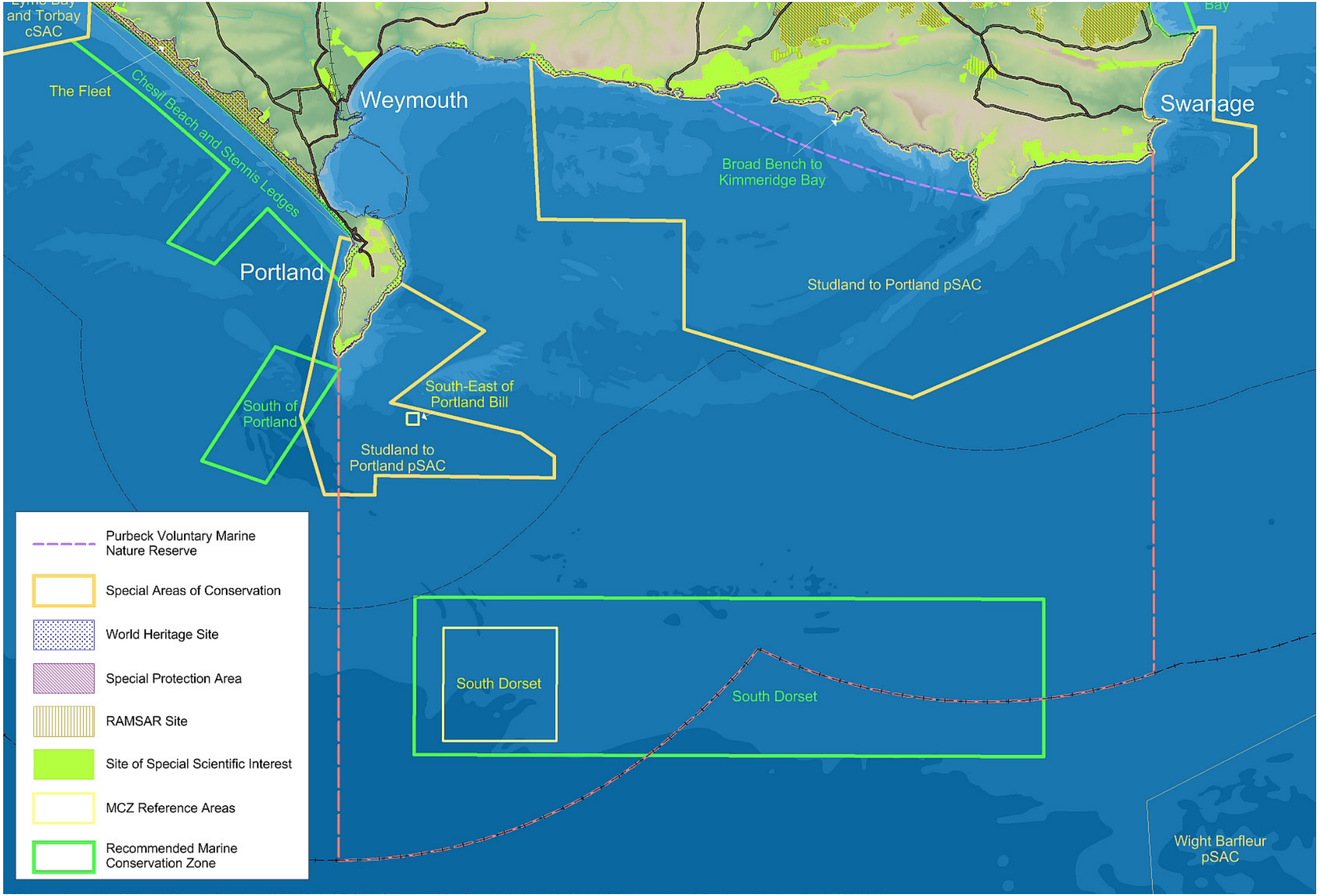
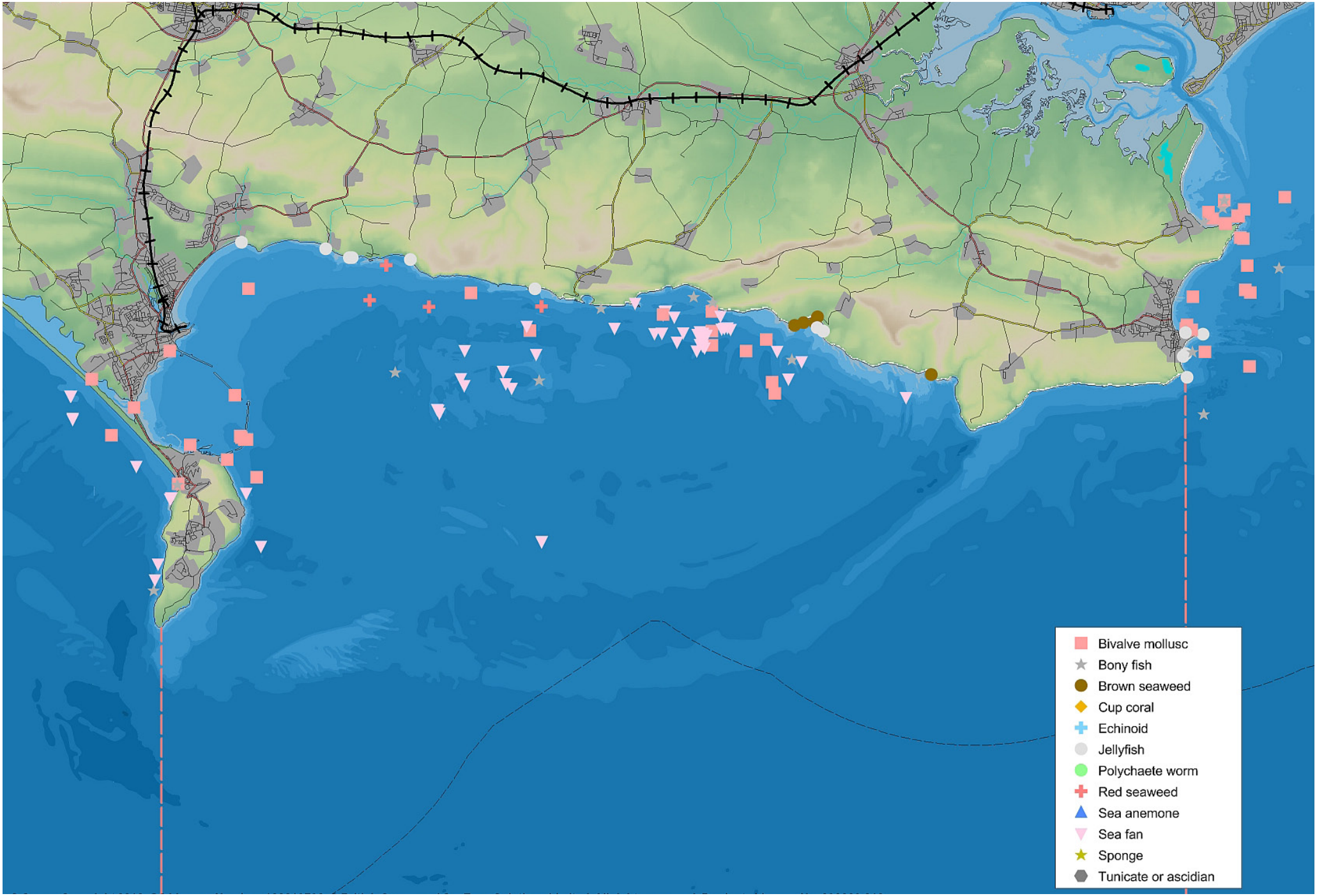


Figure 17: UK Marine Biodiversity Action Plan Species



Worbarrow Bays, as well as Maerl beds to the south-east of Ringstead Bay, south of Worbarrow Bay, Lulworth Cove and Anvil Point. The most easterly populations of pink sea fans in the UK occur within the Marine Plan area, and a large population is known to occur in the Purbeck Marine Wildlife Reserve. However, the species was only found at a few locations during the DORIS survey.

An unusual feature identified by the survey was large mats of Ampelisca sp (tube-dwelling amphipods) throughout the Marine Plan area. Significant amounts of silt surround the tubes, filling the small spaces within the mat, and it is thought that this could support a unique infaunal community. Currently there is no apparent biotope within the EUNIS classification system describing such a habitat, and a new biotope description will most likely be required.

Evidence from the DORIS survey, alongside other studies, has been used to confirm the presence of Annex I reef habitat within the new Studland to Portland draft Special Area of Conservation.

The Marine Plan area consists of transitional waters between Atlantic and Eastern Channel, leading to a diverse mix of species, some of which are close to their limits of distribution. Mobile species include valuable commercial fish species such as plaice, sole, bass, herring and mackerel. Regular sightings of bottlenose dolphin and harbour porpoise occur within the Marine Plan area, whilst seals, marine turtles, basking shark and baleen whales have all been spotted.

4.6 Landscape and seascape

The majority of the county of Dorset is protected under the Area of Outstanding Natural Beauty (AONB) designation, and as such is nationally important. Much of the county's coastline is also designated as Heritage Coast and the Dorset and East Devon World Heritage Site covers the majority of the Marine Plan area (Figure 18). Most of the Marine Plan area's coastline is included in the Dorset AONB, designated in 1959 for its landscape diversity, tranquillity, panoramic views, historic landmarks and an undeveloped rural character. The same section of coastline is also part of the Purbeck Heritage Coast designation, which also extends to the seaward.

Landscapes within the Marine Plan area are a result of interactions between the local topography and geology, farming and forestry practices, plant and animal life, building styles and settlement form, historical and cultural associations. The Dorset

Landscape Character Assessment (LCA) is a detailed assessment of the character of the county, and covers the landward side of the Marine Plan area. In addition there are district-wide LCAs for West Dorset, East Dorset and Purbeck, and an LCA for the Dorset Area of Outstanding Natural Beauty. Commissioned for the C-SCOPE project, the Dorset Land and Seascape Character Assessment provides a seamless link between terrestrial, coastal and marine landscapes and seascapes. It identifies six terrestrial character types, five coastal character types and four marine character types within the Marine Plan area (Figure 19a and b).

The Marine Plan area contains an exceptionally diverse and popular landscape with sharp contrasts within a relatively small area, and also has significant historic interest such as early medieval industrial sites. The spectacular coastline encompasses chalk/shale and vertical limestone cliffs with sheltered bays, bold headlands, caves and sweeping coastal views. For this reason it is assessed as a landscape with a strong character. The urban areas of Weymouth contrast with the distinctive coastal landscape of the mainland to the East and the unique wedge shaped limestone peninsula of Portland to the South. Over the centuries, Dorset's landscapes have inspired poets, authors, scientists and artists, many of whom have left a rich legacy of cultural associations.

Much of the seascape of the Marine Plan area consists of shallow waters with strong visual and physical relationships with the coastline. The waters directly off Purbeck are generally quieter, with valuable inshore fisheries and seasonal low levels of sailing and recreational activities, whilst Weymouth Bay and the areas to the south

Figure 18: World Heritage Site and AONB Designation

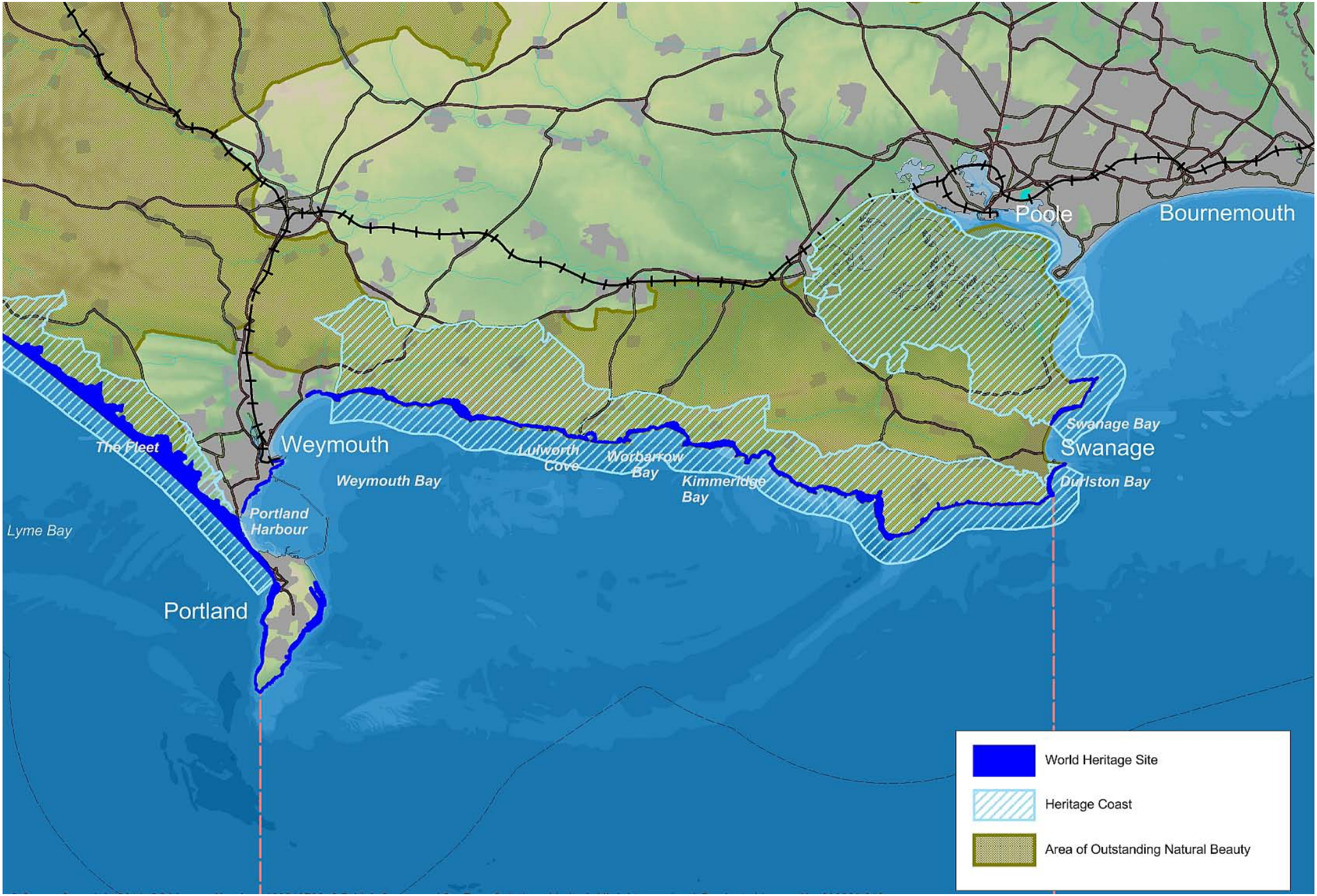


Figure 19a: Seascape Character Areas

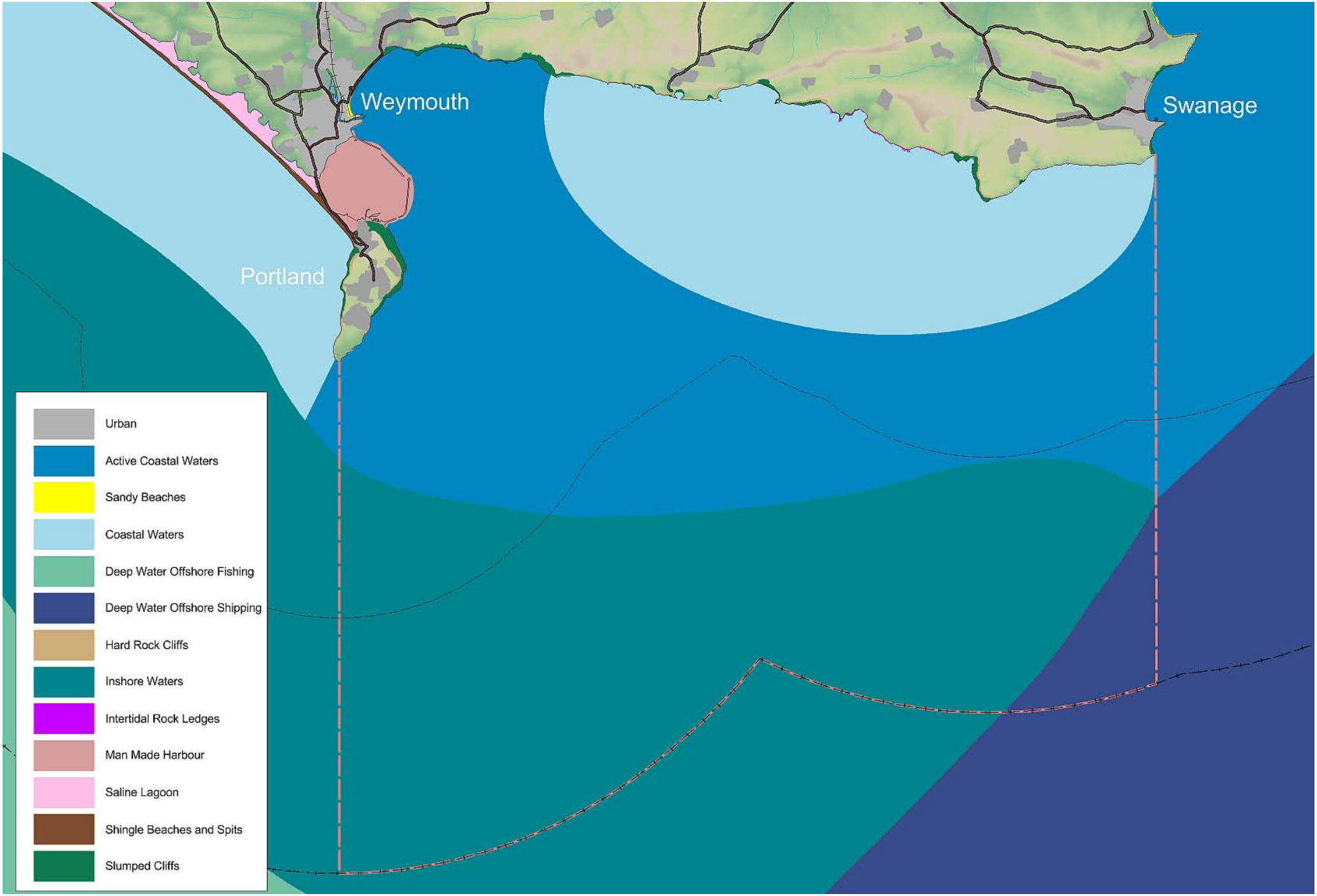


Figure 19b: Seascape Character Areas

and east of Portland Harbour are more active with inshore fisheries, shipping and recreational activities. These shallow waters are underlain by complex superficial sediments over bedrock and have high marine biodiversity value.

Portland Harbour, a large area of deep water enclosed by man-made sea wall, has a high intensity of port and recreational activities and is also valuable for its habitats and biodiversity.

It is an important setting for Portland and Weymouth, and is associated with extensive land based activities and industries. Further offshore, the visual relationship with the coast is less marked. There is a mix of uses, with no single dominant activity, and shipping is typified by north-south movements of cross channel ferries and other vessels moving between harbours and deep water. There are generally strong currents, and complex superficial sediments supporting high biodiversity.

4.7 Cultural heritage

4.7.1 Coastal

The historic environment of the Dorset coast is rich with archaeological remains both on the coast (Figure 20) and offshore, telling the story of more than five thousand years of human activity. Evidence of the historical evolution of the Marine Plan Area's landscape is preserved in a rich archaeological heritage of burial sites, hillforts and ancient patterns of fields, woodlands, hedges, settlements and rights of way. The best preserved sites survive generally in the least intensively used areas of land. Along the Dorset Coast there are some fine, visible archaeological remains including the extensive Neolithic- Bronze Age ceremonial landscape of the Southern Dorset Ridgeway. During World War I and II the Dorset coast was important for the Royal Navy and so was also a target for military action. Portland Harbour was, for many years, and during the two Wars, an important Naval Base. There is significant defence infrastructure and relics along the coast including radar stations, coastal batteries and anti tank blocks and pill boxes.

Ships have visited the coast from as early as prehistoric times. By the mid 14th century trade considerably increased dealing particularly in fish and wine from western France, expanding to fish trade with Newfoundland in the early 17th century. Weymouth and Melcombe were relatively important ports with the towns starting to expand as early as the 12th century. In 1348 the 'Black Death' plague arrived at Melcombe Regis, with a devastating impact on local villages, and many were abandoned at this time. As early as the 18th century, George III took holidays at Weymouth, while he was ill, and the resort has been popular since those times. Portland became more important as a Naval Base from 1845 onwards, with breakwaters being built between 1849 and 1903, which still exist to the present day.

Weymouth Bay 30,000 years ago would have been dry land. Large lagoons at this time may have supported an abundance of game fish, waterfowl, deer and wild cattle, and it would have been an ideal place for early communities to establish s easonal camps; evidence of these early camps may possibly survive on the seabed.

The Isle of Portland itself shows evidence of human presence from the Palaeolithic period onwards. Early sites include Mesolithic shell middens, Bronze Age burials, a defended enclosure from the Iron Age and Roman period and the 13th century St Andrews Church. Portland Castle, on the fringe of Portland Harbour is an impressive Tudor fortress which saw much action in the Civil War. Quarrying has had a profound influence on the Portland landscape and environment. Dating back over 2,000 years, evidence of its long history can be found throughout the Isle.

Inland, the Southern Dorset Ridgeway, much of which has coastal views, encompasses the most extensive Bronze Age cemetery in the country, with a minimum of 428 round barrows in 14 major groups; there are around 500 other round barrows throughout the Ridgeway's landscape. Stone circles also date from this period. The Lulworth region has a rich history with evidence of prehistoric field systems and Iron Age, Romano-British and medieval settlements. East Lulworth village also includes the remains of a medieval deer park. The area between Kimmeridge and Lulworth has been almost entirely closed to the public since 1943 for Ministry of Defence use; Tyneham 'ghost village' is rich in Archaeology, bearing a prehistoric field system; numerous mounds and bowl barrows; a Bronze Age cremation burial; a Romano-British occupation and industrial site; medieval settlement, including the site of a chapel; an Elizabethan house, as well as subsequent occupation until its coercive abandonment in 1943.

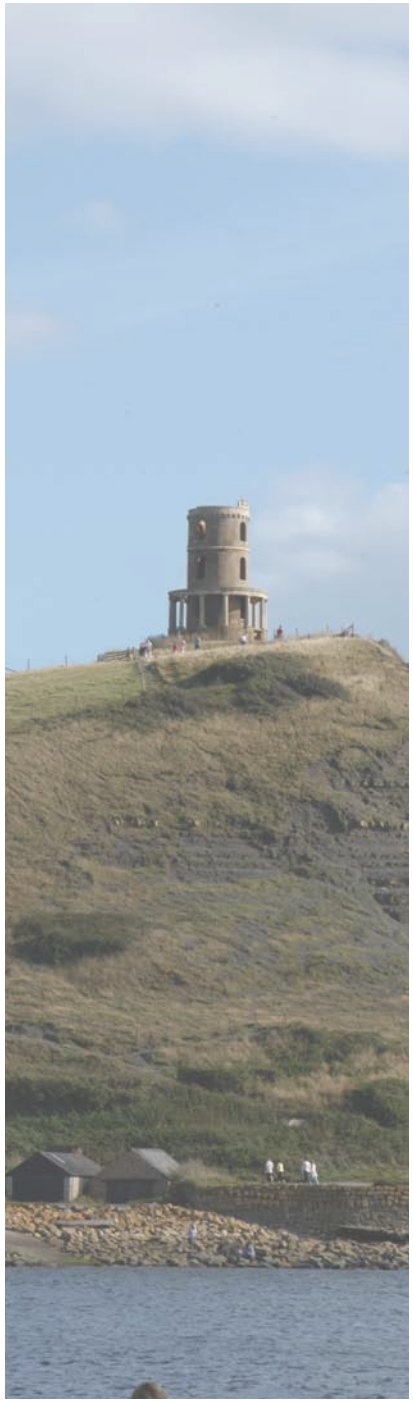
Kimmeridge and its environs have burials and artefacts dating back to the Iron Age and the Romano-British era. There is evidence of use of the extensive natural resources in the area, such as the black shiny Kimmeridge shale which was widely used right through to the late Roman period for manufacture of armlets, finger rings, vessels and even furniture. Also salt, evaporated from seawater, was traded far inland right through the Iron Age.

Figures 20: Designated Heritage Assets

There was a thriving pottery industry in Purbeck during the Roman period, exporting Black Burnished Ware across the Empire. The Romans also exploited Purbeck for building materials, such as Purbeck marble and a white siltstone. The fashion for Purbeck marble endured into medieval times with huge quantities transported for decorative fittings in churches and cathedrals throughout the country.

The Clavell Tower, dating back to 1831, is a good example of how an eroding coastline creates particular issues for historic conservation; in danger of falling into the sea, it recently cost nearly 1million to move it 25metres back from the cliff edge.

Worth Matravers has evidence of prehistoric settlement, including flint-working, Bronze Age pits and Iron-Age/Romano-British burials/barrows. It also has a medieval manor house and other remains of medieval settlement. More recently, Winspit Quarry was used in WWII for naval and air defence.

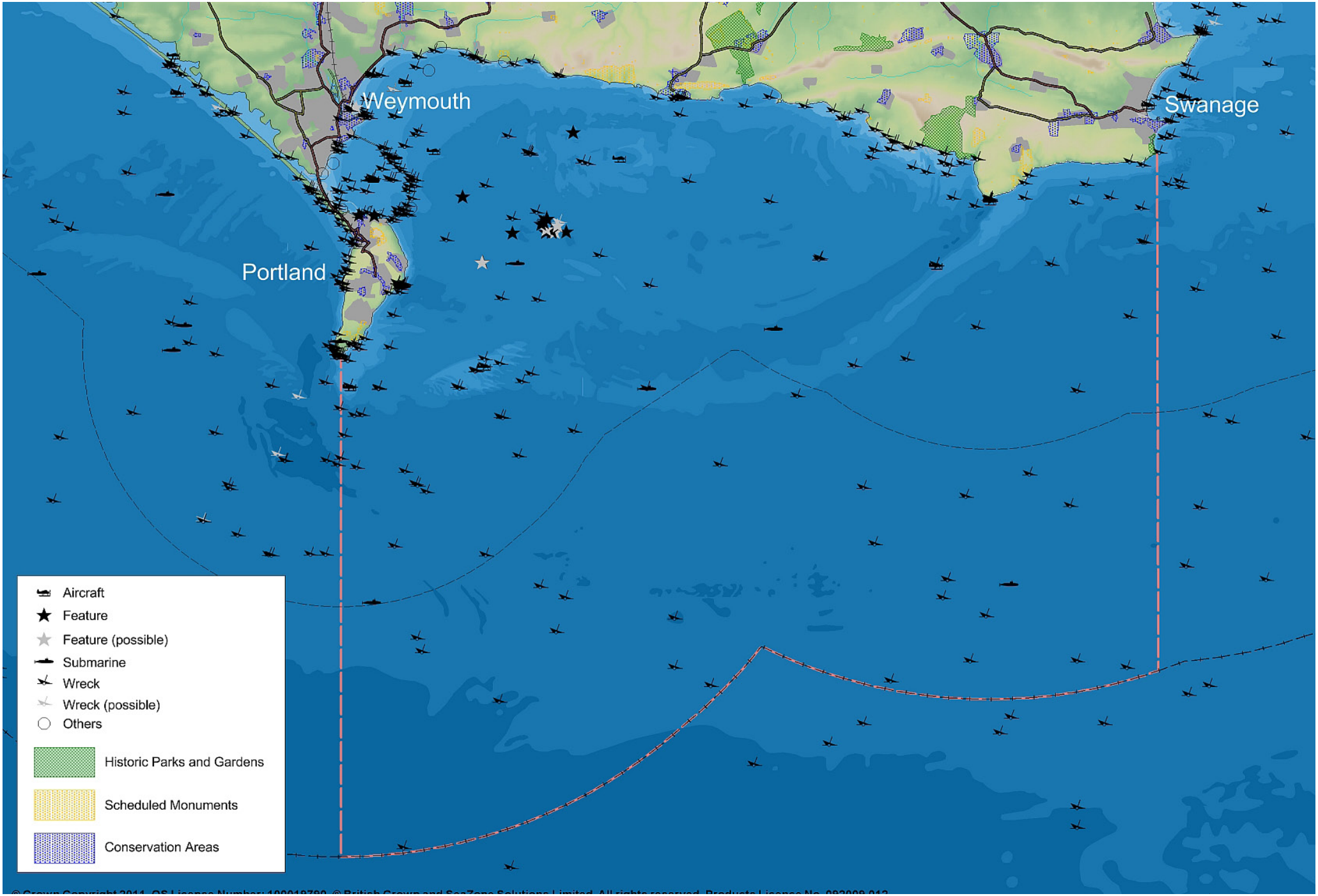


4.7.2 Marine

Dorset waters have played a significant role in maritime history. One of the greatest sea battles of the Middle Ages took place near Swanage, when King Alfred destroyed a Danish fleet of more than 100 vessels in 878. Several Spanish Armada battles took place within the Marine Plan area; in July 1588, a general engagement between the English and Spanish Fleets was fought off Portland Bill, where some of the biggest Spanish warships were rendered ineffective. Many ships have been lost in storms over the centuries, and shipping in The English Channel was a strategic target during both World Wars; consequently the Marine Plan area contains a prolific number of wrecks, including ships, aircraft, submarines and other vehicles (Figure 21). These wrecks are a popular focus for divers, and some inshore wrecks have been adopted by the Nautical Archaeological Society under their 'adopt a wreck' scheme.
Other wrecks of note include:

- Halsewell - A British East Indiaman which was wrecked off the isle of Purbeck on 6th January 1786.
- Earl of Abergavenny - A British East Indiaman which sank in Weymouth Bay on 5th February 1805.
- The Royal Adelaide – a sailing ship which had 67 passengers and crew. It was washed ashore and wrecked on the 25th November 1872, Chesil Beach
- HMS Hood - scuttled in Portland Harbour, 1914.
- SS Kyarra - A twin-screw passenger and cargo liner, built in 1903 which was torpedoed by UB-57 on 26th May, 1918. This is one of the most popular dive sites on the Dorset coast.
- Countess of Erne - A nineteenth century paddle steamer, she ended her days as a coal hulk in Portland harbour, finally sinking on 16th September 1935.
- Black Hawk - A Second World War Liberty Ship which was torpedoed off Portland on 29th December 1944. The stern section sank, but the forward section was towed towards land finally sinking off Worbarrow bay.
- U772 - A German U Boat probably sunk by HMCS Calgary on 30 December 1944, shortly after U772 had torpedoed the Black Hawk.
- MV Aeolian Sky - A 10,715 ton Greek motor vessel which sank following a collision on 3rd November 1979.

Figures 21: Designated Heritage Assets



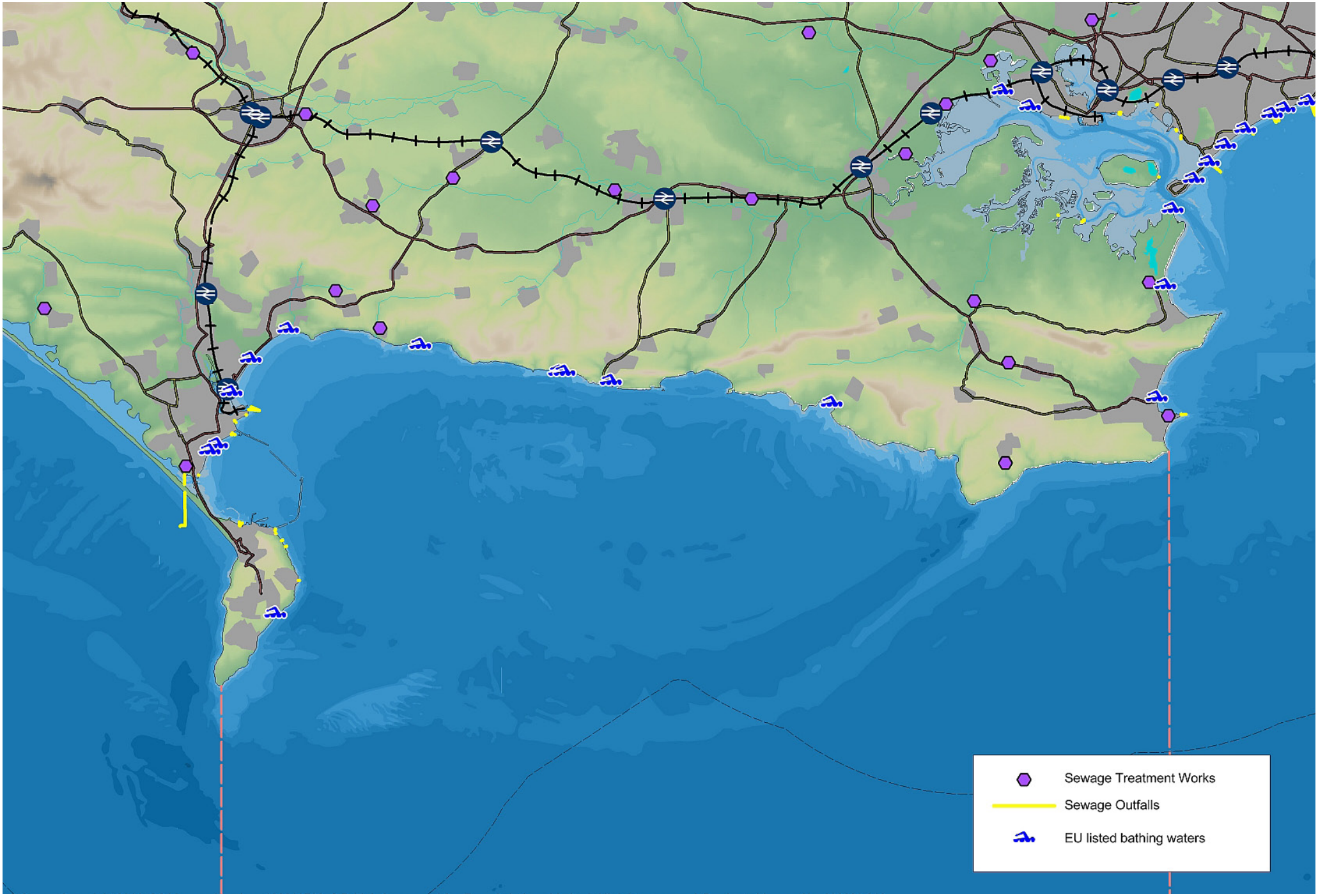
4.7.3 Water quality

Accessible beaches and clean coastal waters are two of the main attractions of the Dorset coast, making water quality an important issue for the local economy. Bathing water quality in the near shore area is measured by the amount of bacteria within water samples. These counts are undertaken by the Environment Agency to monitor whether water quality meets the EC's Bathing Water Directive (Figure 22).

Designated sites are sampled 20 times from 15th May to 30th, and at present compliance with the Directive requires that in order for bathing water to comply, 95% of these samples must have less than 10,000 total coliform bacteria and no more than 2,000 faecal coliforms per 100ml. However the revised Bathing Water Directive which comes into force in 2015 requires more stringent parameters, including a change from a pass/fail approach to classification based on four classes: poor/sufficient/good/excellent. The South West River Basin Management Plan (SWRBMP) makes delivering compliance with the revised directive a high priority.

Beach waters can be influenced by extended periods of heavy rainfall during the summer, which leads to pollution caused by surface water runoff from farmland and urban areas, and the more frequent operation of combined sewer overflows (CSOs), into streams and rivers, estuaries and the sea. Bathing water quality can therefore vary considerably from year to year, and season to season.

Figure 22: Current outfalls and sewage treatments, bathing waters



4.8 Current activities

4.8.1 Commercial fishing

Commercial fishing has always played an important role in the Dorset economy and way of life. Most of the inshore fleet are multi-purpose vessels which can use several methods of fishing to take advantage of seasonal fisheries. Fishers target a mix of species depending on the season, using whichever method and location best suits the prevailing conditions and enable them to earn a reasonable wage.

As of 1st September 2010, the numbers of registered and licensed fishing vessels within the Marine Plan area were:

Home Port/Harbour	10 metres and under overall length	Over 10 metres overall length
Weymouth	53	5
Portland	25	1
Kimmeridge	1	0
Lulworth Cove	3	1
Swanage*	10	1
Poole*	88	5

Table 3. Registered and Licensed Fishing Vessels within the C-SCOPE Marine Plan Area (2010)

Approximately 90% of boats registered within the Marine Plan area are skipper-owned, and because of this it is difficult to estimate the number of people dependent on fishing within the area. Most of these boats are, with one or two exceptions, day boats, leaving in the morning to return and land their catch later that day; they are generally home-based but may also travel between local ports.

Since April 2011, inshore vessels are controlled by the Southern Inshore Fisheries and Conservation Authority (formerly the Southern Sea Fisheries Committee (SSFC). The Southern Inshore Fisheries and Conservation Authority (SIFCA) manages sea fisheries from the high water mark out to 6 nautical miles, and all fishing vessels operating within the district must be registered with them. Under district byelaws, vessels must be less than 12m; although a few skippers have 'grandfather rights' which exempt vessels over the permitted size prior to the introduction of the byelaw to continue until ownership of the vessel changes. Inshore Fisheries and Conservation Authorities have a remit not only for sustainable management of inshore fisheries, but also to support the conservation objectives of designated sites, such as SSSIs and Ramsar sites and Marine Conservation Zones within the IFCA district.

The fishing fleet is dominated by static gear operators, and a large number use pots to target crabs and lobsters along the rocky inshore ledges. The potting fleet is increasing, and is mainly operated by full time fishermen. Vessels sometimes stake and operate within boundaries, with a degree of local cooperation and respect of each other's boundaries. Boats set between 400 and 1,000 pots each, in fleets of 20-100 pots from a couple of metres from the shoreline, sometimes out to 30 miles offshore. It is currently estimated that there are 6000 crab and lobster pots around the Weymouth and Portland areas alone. Portland Harbour is also potted for prawns and whelks, caught in purpose-built pots, are targeted for the rapidly growing Far-east market. Cuttlefish are also targeted by potters at certain times of the year.

Bass are an important demersal target species, and provide income for many part time and casual fishermen in the warmer months. Fishermen use gill and trammel nets, but there has been a trend to switch from netting to rod and lining which usually takes place at dusk and dawn. This particularly applies to smaller vessels operating out of Weymouth which fish the Portland Race and the Shambles.

Bass are taken further offshore by visiting pair trawlers, which often land their catch in France, and these trawlers also take herring, mackerel and sprat during the colder months. Other fin-fish which are targeted in smaller quantities by the local fleet include bottom dwelling flatfish, such as sole, rays and plaice as well as demersal and pelagic species such as cod, pollack and mackerel.

Scallop dredging, by a small number of boats, mainly occurs to the west of the Marine Plan area in Lyme Bay, but commercial divers gather scallops from the rough grounds on Lulworth Bank during the summer months.

Weymouth is the main landings port within the Marine Plan area, and in 2009 a total catch of 1,952 tonnes worth £2,153,000 was recorded. Shellfish were the dominant catch, primarily made up of mussels, crab, whelks and scallops. Bass dominated the demersal catch and the only other major landings were skates and rays. The only pelagic species landed in 2009 was mackerel. Landings into Weymouth have been decreasing since 2005, although the value of those landings has remained relatively stable (Figure 23 a). Over the same period, landings into Poole have steadily increased and are now greater than Weymouth (Figure 23b).

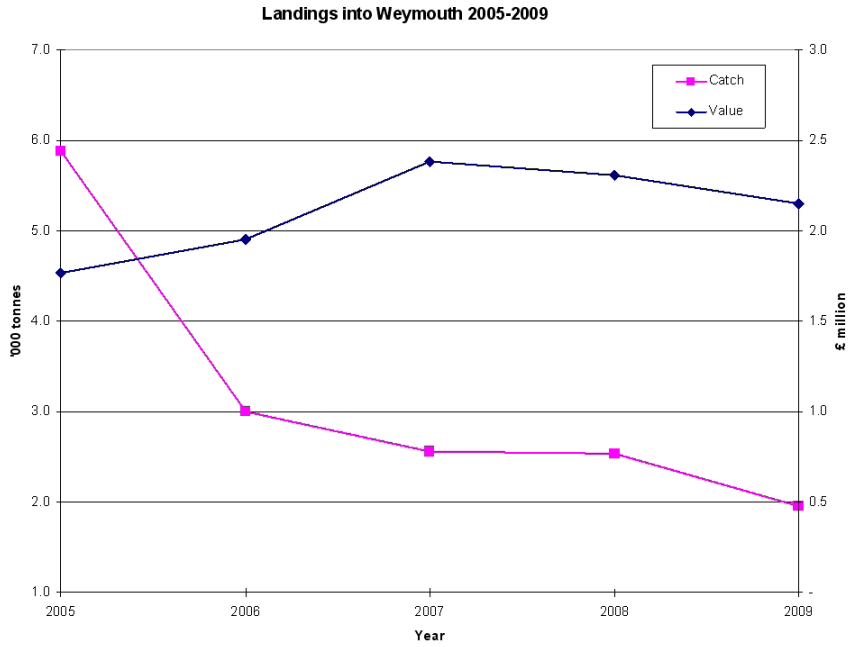


Figure 23a: Landings and Catch Value of Fisheries into Weymouth (2009)

Figure 23b: Landings and Catch Value of Fisheries into Poole (2009)

4.8.2. Aquaculture

There is a small aquaculture industry within the Marine Plan area, which is currently limited to shellfish. Three areas - Portland Harbour East, Portland Harbour West and the Shambles Bank – are designated shellfish waters, under the EC Shellfish Waters Directive (Figure 24), and it is the responsibility of the Environment Agency to monitor a variety of parameters including pH, salinity, suspended solids and a variety of heavy metals. Harvesting areas are classified as:

- Category A: Can be sold direct with no treatment
- Category B: Must be cleaned or relayed until they meet standards in category A
- Category C: Must be relayed for at least 2 months followed by specific treatment to achieve category A or heat treated by an approved method.
- If an area falls below a Category C, harvesting is prohibited.

There is one mussel farm located within Portland Harbour (Figure 24), which is managed by Lyme Bay Fisheries and is located on the middle breakwater of the Harbour. The site is on lease to the consortium from Portland Port Ltd until 2013. The farm also rents the breakwater and the Vernon building. Plans exist to install a purification plant and to purchase a new crane to enable larger lines to be lifted. Mussel spat is collected from the end of Portland Bill and the farm currently holds fourteen ropes with one hundred drop down lines, producing 800 kilos of mussels a week.

A several order, Portland Harbour Fishery (Variation) order 1999, covered most of the south western side of the harbour, but this expired in 2009 and has not been renewed. The deep water off Portland Bill is also an important natural source of seed Mussels; some are taken from the area and stored in Portland Harbour to meet winter demand, but the majority are re-laid on subtidal ground lays in Poole Harbour for fattening, which accounts for 90% of the Mussel production from Poole Harbour. Although there is currently no finfish aquaculture in the area, advances in technology and husbandry mean that future developments of cod, bass, turbot and even salmon farms are a possibility.

4.8.3 Recreation and tourism

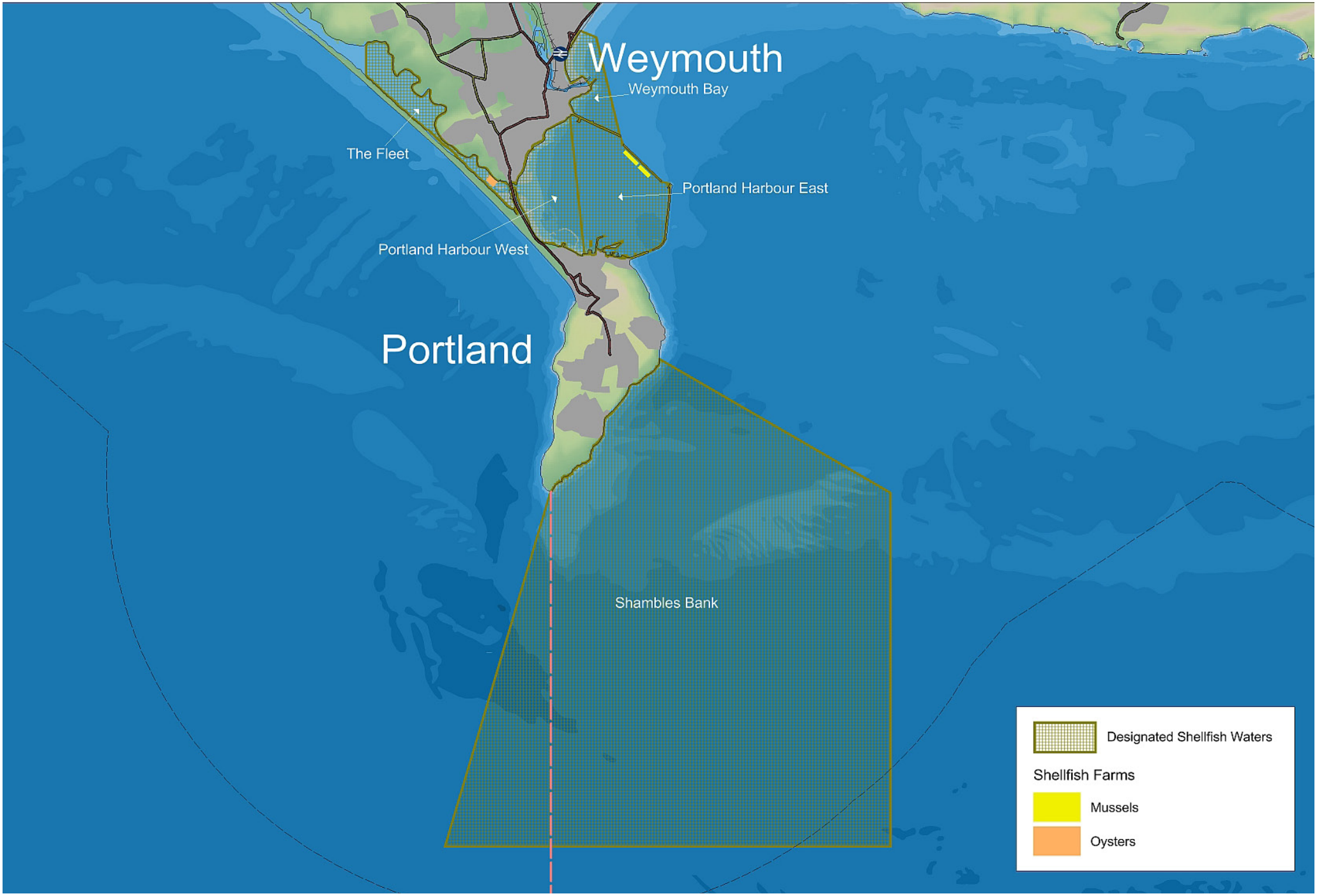
Tourism is one of Dorset's predominant industries, and the coast is arguably Dorset's most important single tourism asset. As well as traditional beach holidays, walking, angling, scuba diving, sailing and other watersports are all popular attractions. In 2008, the total visitor related spend in Dorset was £1.5 billion. Employment in the sector equates to 13% of total employment in the county, with related employment standing at 41,034 in 2008.

Weymouth's main attraction is its clean, family-friendly, sandy beaches. Weymouth Central consistently has the highest standards of water quality. There is a range of accommodation, but the emphasis is on affordable family hotels, B&Bs and self-catering properties. Just over half of all day visits are specifically to the coast, which equates to a total spend of £32 million in 2008. 16% of employment in Weymouth is supported by tourism. However, like many coastal towns, tourism at Weymouth is seasonal and often leads to low-paid and part-time employment.

Holiday parks represent a large proportion of the accommodation stock in rural Dorset. In some cases these can be visually intrusive, and at present many local holiday park owners are undertaking environmental improvements - such as planting trees and improving the appearance of their sites. Some of these parks are located in areas which are vulnerable to coastal flooding.

The coast is one of the most popular attractions in Purbeck; renowned for its spectacular geomorphological features, quaint villages, and dramatic walks on the Dorset Coast Path. The stretch of coast between Lulworth and Portland is the first area to be put forward by Natural England towards an England Coast Path. Features such as Lulworth Cove, Stair Hole and Durdle Door attract up to 750,000 visitors a year and the pebble beaches in this area are popular for beach activities, rock-pooling, bathing and water sports. In 2008 the district attracted 744,000 day visits

Figure 24: Mariculture sites



to the coast, equating to a total spend of £29 million. Swanage accounts for much of this spend but, whilst being outside the Marine Plan area, it acts as a gateway for exploring the rest of the Purbeck coast.

The area also attracts large numbers of educational groups of all ages; it is a classic field studies site, and many groups stay for up to a week in centres in Swanage, Weymouth and west Dorset.

4.8.4 Scuba diving

The Dorset coast is visited by scuba divers from all over the country, with a wealth of wrecks and scenic reef dives to explore. Weymouth & Portland is one of the most popular diving locations in the UK. There are currently ten commercial hard boats and RHIBs offering a mixture of shuttle and charter trips, five diving schools and four slipways serving over 35,000 diver days per year. Dive clubs also take advantage of the slipways to launch their own RHIBs, which can cause congestion during the summer months.

It is estimated that £260,000 is spent on diving in the Weymouth & Portland with additional spend on accommodation, food, parking and equipment of approximately £360,000 a year. Swanage has three shuttle boats and one charter boat which offer diving within the Marine Plan area, and most of the charter boats from Poole also head for the area. Shore diving is also popular, with several easily accessible sites, including Kimmeridge Bay.

Most boats offer 'two-tank' dives; the first is usually at slack water on a wreck, onto which the skipper will drop a shot-line when they arrive at the site. Most boats do not anchor; idling close to the shot line. Second dives often involve a drift dive, with the skipper following surface marker buoys; many divers will opportunistically collect crab, lobster, scallops and flat-fish. Shuttles, where the boat returns to harbour in between dives, are becoming increasingly popular, and this has led to increased boat traffic within the Marine Plan area.

Popular dive sites include the MV Aeolian Sky, Countess of Erne, HMS A3, Lulworth Banks and Anvil Point Lighthouse (Figure 25). The Kyarra, whilst just outside the Marine Plan area, is one of the most visited wrecks in the country.

4.8.5 Wreck to reef project

Weymouth and Portland Wreck to Reef is a non-profit community group which aims to sink a ship as an artificial reef off Ringstead Bay (Figure 25). Drawing on the experiences and the resulting benefits of previous man made artificial reefs, notably in Plymouth, it is believed that this project will help redress the economic down-turn within the local diving industry. Within the area of seabed leased from the Crown Estate, there will also be lobster restocking reefs and artificial reef balls.

4.8.6 Shore and sea angling

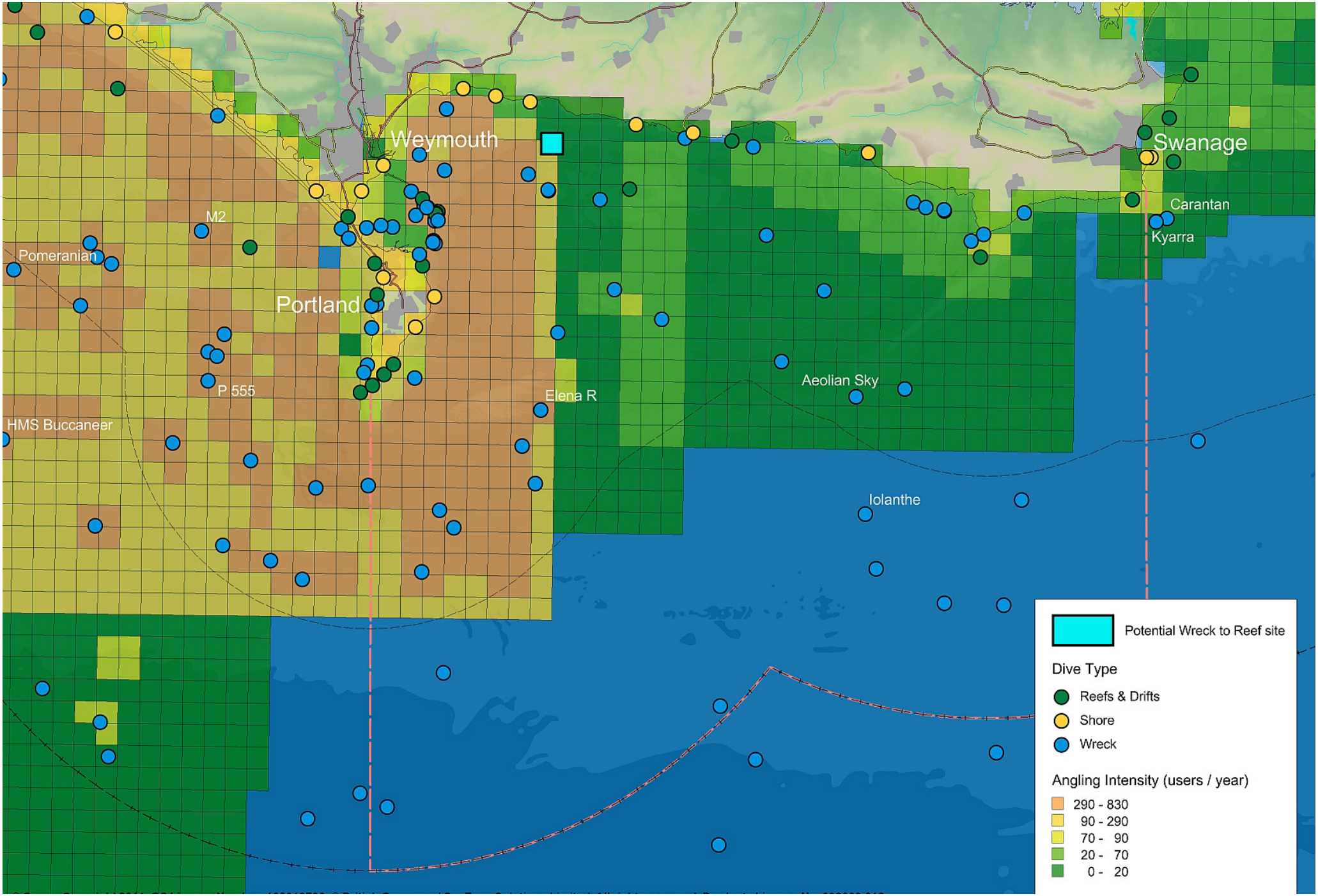
Angling is widespread in Dorset, from both shore and boat (Figure 25). There are 4 tackle shops in Weymouth & Portland and another in Swanage, as well as three sea angling clubs which hold regular shore and boat competitions. Shore anglers can be found all year round and local knowledge is essential to catch target species; 'marks' are often closely guarded by regulars, but there are at least 30 well known marks within the Marine Plan area. Although just outside the Marine Plan area, Chesil Beach is a regarded as an international shore angling site, and is busy all year round. Target species depend on location and time of year, but bass, mullet, flounders, cod, mackerel, garfish, scad, pollack, wrasse and pouting can all be caught from shore; and modern generation beach-casting rods allow anglers to cast well over a 90 metres to target species as the small-eyed ray.

In the 70s many skippers of licensed fishing boats realised it was more lucrative to take out parties of anglers wreck fishing, and inshore wrecks were soon fished out. Skippers began to invest in faster boats and go longer distances to find the better fishing; which led to a more specialist angling fleet. Many dive skippers also offer angling from their boats, so it is hard to gauge the exact number operating at any one time; however there are at least 18 charter boats operating from Weymouth & Portland and, although neither Swanage nor Poole are within the Marine Plan area, a further 23 boats enter the area from these towns.

Most boats offer both reef and wreck fishing. Wreck fishing is conducted either whilst drifting in the current, or at anchor once the tide has slackened sufficiently; the main target species at slack water are usually conger eels and ling, although cod, pouting, anglerfish and turbot are also caught. The Weymouth harbour fleet will often head out to the Shambles Bank where plaice, turbot and brill are targeted ,along with pollack and blonde rays at the Kidney Bank.

The Portland Race is an area of fast moving turbulent water which attracts bass; the most turbulent water in the front of the race often produces the bigger fish, and boats drift at speeds sometimes in excess of 5 or 6 knots to catch them. When the drift has dropped below 2 knots the bass will usually stop biting, and skippers will head to the Shambles and Kidney Banks.

Figure 25: Diving and angling recreation



4.8.7 Sailing

Yachting has been a feature of the Dorset coast for over two hundred years. The main centres are at Poole Harbour, and Weymouth & Portland (Figure 26) but there is also significant activity around Swanage. Thanks to a combination of clean winds, sheltered waters and weak tides, Weymouth Bay and Portland Harbour are widely recognised as some of the best small-boat sailing waters in the UK. Heavily used RYA yacht cruising routes run parallel to the shore, and there are several less heavily used routes passing through the Marine Plan area.

In more recent years there has been a renaissance of sailing in the Weymouth & Portland area with the development of the Weymouth and Portland National Sailing Academy (WPNSA) on the site of the old naval establishment of HMS Osprey. Since opening, WPNSA has created demand in service and marine industries worth in the region of £10m, and it is predicted that it will be adding something in the region of £6m each year to the local economy. This figure could be even higher, since the Academy has been selected to host the sailing events for the 2012 London Olympic and Paralympic Games.

Weymouth also provides the shortest crossing to France west of Folkestone, which makes it a popular berthing location. Weymouth Inner Harbour has two marinas that are managed by the Weymouth Harbour Master providing over 450 permanent berths for vessels 6-12 metres in length. Weymouth Marina, which sits just beyond the town's lifting bridge, offers over 300 fully serviced berths. Portland Marina opened in April 2009 and will be part of the venue for the 2012 Games. It currently offers 300 fully serviced berths, but this will double to 600 in its second phase of development in time for the Games. The development also includes 15 new business/retail units and five large commercial units.

4.8.8 Other watersports

The last ten years has seen an increase in both established and new watersports within the Marine Plan area. Portland Harbour provides a safe environment for many types of watersport; with windsurfing and kitesurfing being particularly popular. Certain byelaws apply, and permits are required for most watersports, including waterskiing, wakeboarding, windsurfing, kitesurfing and personal water craft (jet skis). Within the inner harbour, PWCs must keep to a designated channel/fairway. These activities are also subject to the General Directions or the Local Notices to Mariners (Figure 27). There is a similar permit scheme within the limits of Weymouth Harbour Authority. Weymouth and Portland Borough Council operates a zoned watersport area within Weymouth Bay, which separates activities away from bathing areas; this includes a PWC channel at Bowleaze Cove (Figure 28). There are several training schools that cater for windsurfers, powerboating, waterskiing and kitesurfing in the area.

There tends to be less motorised watersports off the Purbeck Coast, with the emphasis on more 'tranquil' sports. Kimmeridge Bay is highly popular for both surfers and wind-surfers. It is acknowledged as one of the best surfing spots on the south coast, and when the wind is from the NW, N or NE, surfers flock to the Bay and it can get quite crowded. Kayaking is also popular, with launches mainly from Swanage, Kimmeridge Bay and Lulworth Cove; many companies offer kayaking and camping tours of the area. Coasteering has seen a rapid increase in popularity, and the cliffs and caves of Purbeck have proved to be a major draw for companies offering this activity.

4.8.9 Harbours and ports

Weymouth Harbour and Portland Port both feature prominently within the Marine Plan area. As well as being important commercial hubs, they also offer popular recreational facilities, house important historic structures and are of great ecological value.

4.8.10 Weymouth Harbour

Weymouth Harbour (Figure 28) is owned and managed by Weymouth and Portland Borough Council, which has been the Statutory Harbour Authority since 1861. The Harbour has no tidal restrictions and provides shelter from the predominantly south westerly winds, allowing for safe and easy access at all states of the tide. Pilotage within the Harbour's jurisdiction is compulsory for all vessels over 50m in length, and it can accommodate ships with a maximum length of 130m and a maximum draft of 5.2m on its commercial berths. Diesel fuel is available within the Harbour.

Figure 26: Yachting and sailing areas

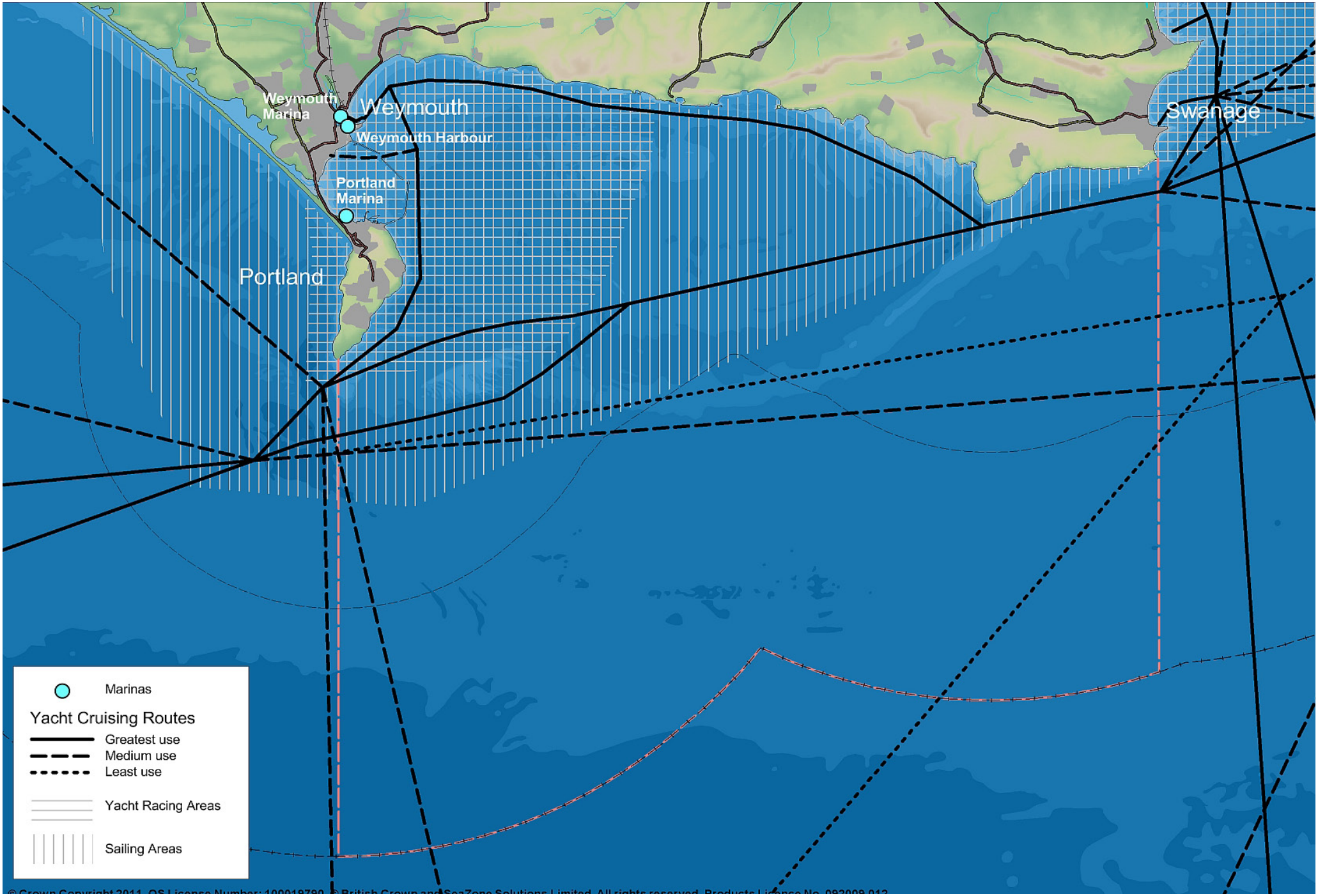


Figure 27: Weymouth beach management plan

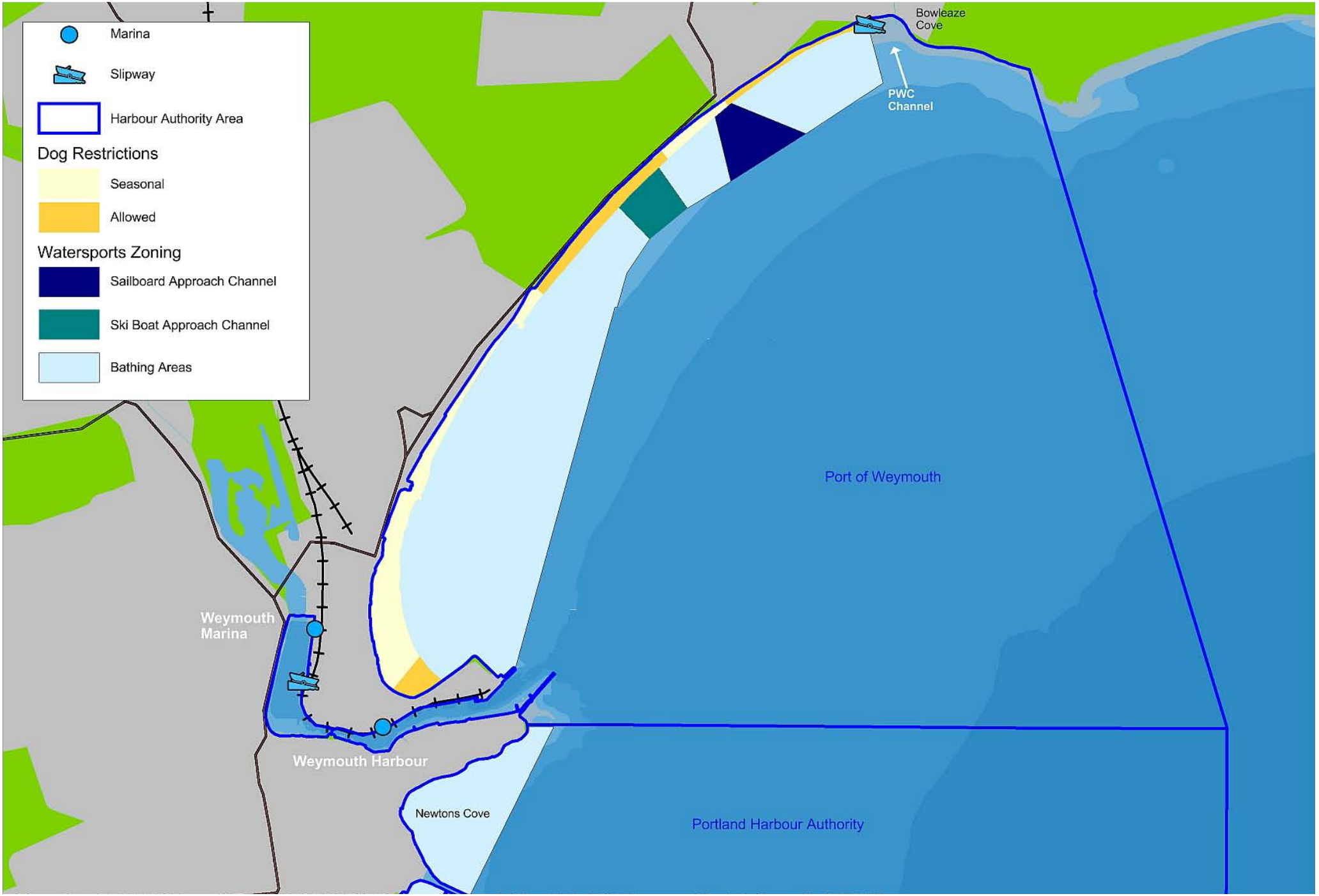
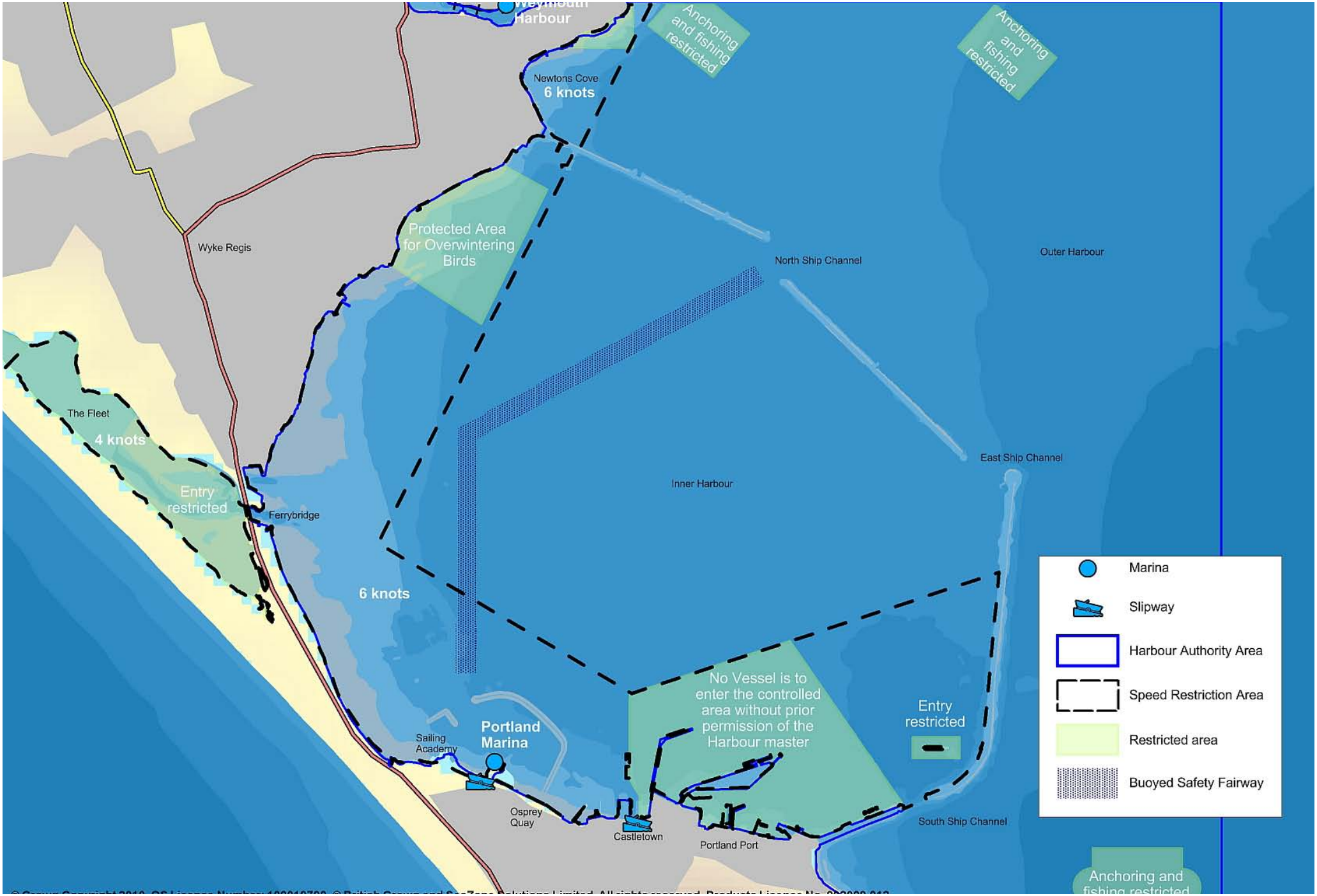


Figure 28: Portland Harbour recreational management plan



Facilities for handling bulk, utilised commodities and containerised goods are available; current uses include imports of bulk animal feeds and fertilisers and exports of aggregates and pre-slung /palletised case cargo. Temporary storage facilities are available prior to shipment, but space is limited. In addition to passenger transport, the Condor Ferries also offer a year round light freight fast ferry service between Weymouth, Channel Islands and St. Malo providing a vital supply link for all kinds of fresh and frozen produce.

Weymouth is a licensed port for the discharge of bulk fish and has a designated fish landing quay to comply with EEC Fish Landing Directive. This area must be used for landing of fish and shellfish for human consumption only. There are currently 57 fishing vessels registered to Weymouth Harbour, and in 2008 109,000 tonnes demersal fish worth £556,000 and 2,422,000 shellfish worth £1,742,000 were landed.

The Harbour also offers extensive berthing for yachts and other pleasure craft, and it has seen an increase in the size of visiting vessels over the last few years. Currently the majority of visiting vessels are 11-13m in length. There are numerous byelaws and a zoning scheme which control recreational activities within the Harbour's jurisdiction.

4.8.11 Portland Harbour

Portland Harbour has been a strategic military location since the time of King Henry VIII in the 16th Century. Construction of the modern harbour began in 1849 when the Royal Navy created a breakwater to the south of the anchorage, made of blocks from local quarries on the Isle of Portland. This was completed in 1872 and provides protection from south-easterly winds. The Harbour continued to serve as an important naval base until 1995.

Following closure of the navy base, its assets were purchased by Langham Industries Ltd in 1996, bringing about the creation a new deep-water commercial Port. Portland Harbour Authority Ltd became the statutory Harbour Authority for Portland Harbour and its surrounds following the adoption of the Portland Harbour Revision Order (HRO) on 1st January 1998. Within the HRO, provision is made for Portland Harbour Authority Limited to make byelaws as considered necessary for the management and regulation of the harbour and harbour premises. Pilotage is compulsory within the Port's jurisdiction for any vessel over 50 metres, and any vessel over 20 metres carrying dangerous cargoes or more than 12 passengers. The Port is also HM Customs inventory linked, offering Phase II clearance.

Portland Port sits within the second largest man made harbour in the world, 22 miles north of the westerly shipping lanes and on the main maritime trade routes allowing fast, safe access 24 hours a day. Depths are up to 20 metres in the outer harbour and 15 metres in the inner harbour, although vessel size is limited by the charted depth at the breakwater entrance of 13.8 metres. The Port has the capacity to handle all types of cargo from unit load/containers, general cargo and bulk through to project cargos, heavy lifts and most categories of hazardous goods. A new development in 2009 provided 8,400m2 (approx. 2 acres) of cargo handling hard standing with an adjacent cargo shed, suitable for Ro-Ro and General Cargo operations. Seventeen designated anchorages, bunkering, ship repair and maintenance, vessel replenishment and diving services are all available, and there are numerous berths, piers and jetties serving diverse traffic including cruise ships, cable ships and general cargo vessels. The Port also maintains strong links with the navy, particularly the Royal Fleet Auxiliary.

There are 25 companies based within the Port's estate. These include: Shipbuilders and engineers Manor Marine, Global Marine Systems, the world's largest independent provider of marine cable installation and maintenance, bunkering providers Aegean Oil, and underwater maintenance providers, UMC International. In 2008 planning permission was granted for Portland Gas to develop a gas storage facility on the site of former navy buildings at Upper Osprey. Fourteen caverns, capable of storing up to 1000 million cubic metres of gas, will be formed by dissolving rock salt 2,400 metres under Portland. Three pipelines, one gas and two brine, will be built including a nine-kilometre section across Weymouth Bay. Drilling to construct the first cavern is expected to start in 2011, and once complete the facility is anticipated to provide 25 permanent jobs.

Portland Harbour Authority Ltd were recently awarded the Portland Harbour (Improvements) Order 2010 which allows for major expansion of the commercial port area and includes provisions for additional operational land, improvements to the passenger terminal, berths and yard areas, and a floating dry dock. The West of Wight offshore wind site will also provide significant opportunities for the Port to offer both construction and service facilities.

4.8.12 Shipping

Oil Tankers and Cargo Vessels

Dorset sits on the 350 miles long English Channel, which is one of the busiest shipping lanes in the world; AIS data shows approximately 400 vessels traversing the channel on a typical day. The Traffic Separation Scheme in operation means that southbound vessels pass along the English coast, to the south of the Marine Plan area. While some ships call into a Dorset port, many don't; only 20-30 will berth at Poole, Portland or Weymouth.

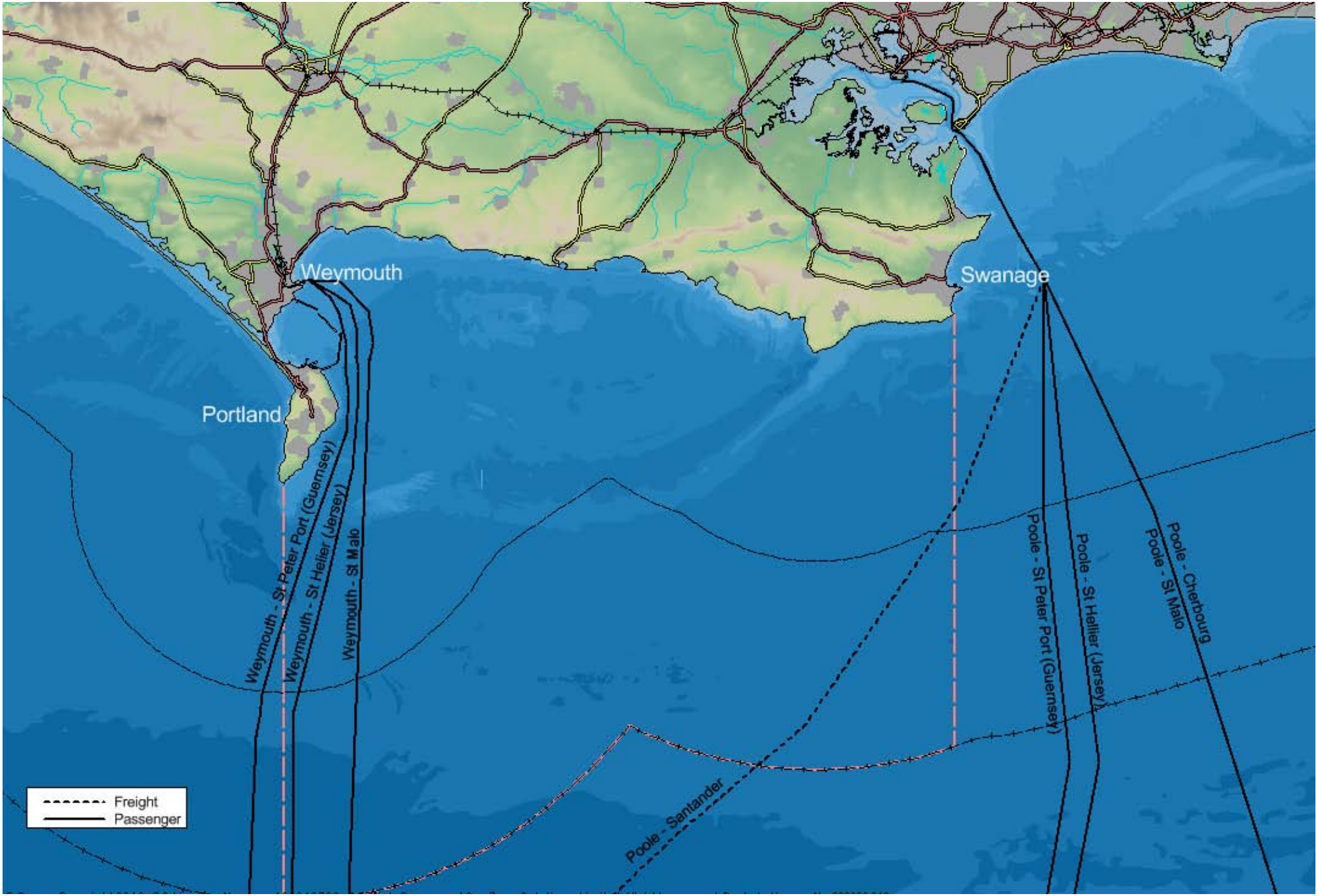
However, passing shipping have the potential to create impacts within the Marine Plan area, particularly pollution; litter thrown overboard and oil resulting from dumping of fuel washings, do come ashore on Dorset's beaches. Emergency plans are in place to deal with collisions or wrecks taking account of both casualties and possible pollution from fuel, oil or hazardous cargoes. Incidents such as the g rounding of the MSC Napoli near Branscombe in 2007 are always a possibility. Storms can force shipping to shelter within the Marine Plan area, and there is a bad weather refuge anchorage area within Weymouth Bay, offering shelter from the prevailing south-westerly winds. This anchorage area is likely to be moved slightly to the east once pipelines for Portland Gas are constructed. Bunkering is available within Portland Harbour.

Passenger Ferries and Cruise Ships

Condor Ferries operate out of Weymouth with routes to the Guernsey, Jersey and St Malo (Figure 29). The ferry terminal is in the heart of the town, next to the Pavilion, and traffic can occasionally be a problem in the summer months. The company operates a conventional all-weather ferry designed to carry 300 passengers and 100 cars, as well as high-speed catamarans which carry 741 passengers and 175 cars. With a service speed of 38 knots, the catamarans take just two hours to get to Guernsey; routes travel north-south and run close to the western boundary of the Marine Plan area. In 2008/2009, ferries from Weymouth carried a total of 182,710 passengers and 55,409 vehicles.

Portland Harbour currently receives approximately 5-8 cruise ships per annum, with capacities ranging from 50 to 500 berths. Ships use the Harbour as a base for excursions, as well as turnaround, and it has a dedicated cruise passenger terminal which was refurbished in 2005. Portland Harbour Authority Ltd is aiming to increase business to fifty turnaround cruises per year, which could contribute approximately £5-7.5 million per annum to the local economy. Weymouth has very occasional visits by medium-sized cruise ships.

Figure 29: Ferry routes



Marine and Maritime Industries play an important role in Dorset's economy; 2685 marine businesses in the South West generate a turnover of over £1.3 billion per year employing some 32,000 people, with 18% of these businesses in Dorset. Businesses range from boat building and marine equipment manufacture to marine research and international communications. The county also attracts a large number of recreational watercraft, which requires overnight moorings, chandlery and repair services.

There are a number of associations representing marine and maritime industry in Dorset. The largest is British Marine Federation Wessex (a regional group affiliated to the BMF), with a current membership of around 90 companies. The Dorset Marine Network works to promote the diverse range of marine businesses in the county. Within the Marine Plan area, activity is clustered in Weymouth and Portland. Weymouth and Portland Borough Council are working with marine sector stakeholder groups to establish the area as a centre of international marine and leisure excellence. They aim to attract additional marine businesses, increase the contribution of the marine sector to the local economy and the number of people employed by marine related businesses.

Redevelopment of the former HMS Osprey site has given significant opportunities to replace the estimated 4500 defence jobs that were lost on Portland. The site will provide up to 55,000 square metres of development land. A significant part of the site is for employment and marine leisure use. Current occupiers include Sunseeker, who hope to create up to 1050 jobs in super-yacht design and manufacture, dive equipment manufacturers O'Three, Portland Marina and the Maritime and Coastguard Agency.

Portland Harbour Authority Ltd provides extensive commercial port facilities with deep water access, and hosts a growing number of tenants from the marine industry. These cover sectors including submarine cabling, commercial diving, underwater services, marine engineering and boat building.

The West Isle of Wight wind farm zone provides a great opportunity for marine industry in Dorset. In the south-west as a whole, it is estimated offshore wind will require investment in excess of £5 billion and has the potential to create thousands of onshore and offshore jobs. Portland Harbour offers great potential as both a construction and service port. Marine and other businesses should also be able to capitalise upon the increased leisure craft and watersports usage that will occur in the area before and after the sailing events for the 2012 London Olympic Games. Pressure on waterside land is seen as one of the greatest constraints on growth of the marine and maritime sector. A shortage of land and pressure for prime and low cost waterside sites is leading to increased competition with other developments in the coastal zone and rising commercial land values. Available sites can be lost to residential development. It was hoped that the former DERA/QinetiQ site at Bincleaves would be retained as employment land for marine tourism and recreation but permission has been granted for a mixed use development. There are also strong national concerns within the BMF about the implications of environmental designations along the coastline for daily operation and future development of the marine industries.

Transport Infrastructure

There are no motorways within Dorset and road infrastructure is generally poor throughout the county (Figure 30). The A358 road is described within Draft Regional Spatial Strategy (RSS) as a 'Regionally Significant Road Route' and a 'primary artery for long distance intra-regional freight and passenger traffic' linking Weymouth and Portland with the national road network. The road is also important for journeys to work and public transport. For a number of years congestion has been a problem in the largely residential environment, which has led to airborne traffic pollution, in the form of Nitrous Oxides, as well as encouraging 'rat-running' on minor roads through the protected landscape of the Dorset AONB.

The £87.4 million Weymouth Relief Road is intended to address these issues and assist in realising the economic potential of the Weymouth/Portland/Dorchester area. Improving access to Weymouth is also recognised as an important objective that will assist in the future development of Portland port. Within Weymouth there have been extensive road works to improve access in time for the 2012 Olympic Sailing events.

Weymouth benefits from a regular half-hour train service to London Waterloo via Dorchester, where trains to Bath and Bristol can also be accessed. The main London Waterloo line also serves many of the inland Purbeck towns such as Wool and Wareham.

The A353 serves as a link between Weymouth and Purbeck, meeting the A352 at Warmwell. Congestion is also a major problem on both these roads, particularly in the summer months when tourism is at its peak. There is no coast road in Purbeck and access to the small coastal villages found in this area is via narrow roads which run perpendicular to and terminate at the coast. Regular urban and rural bus services are available throughout the Marine Plan Area.

Figure 30: Existing terrestrial infrastructure

Military

There is a long history of military use of Dorset's coast. The most significant site has been the naval base at Portland, which was established in the 1840s but closed in 1995. HMS Osprey, the Navy's helicopter base at Portland also closed in 1999. These closures had significant effects on the local economy within the Marine Plan area. There is still however a strong military presence (Figure 31); important ranges and training schools at Lulworth and Poole, The Royal Fleet Auxiliary regularly berths at Portland Port and defence research industries retain some testing ranges and facilities. The Royal Armoured Corps Gunnery School, Lulworth provides live firing and tactical training for the Army. The ranges have been a feature of the coast since World War I; they cover more than 2,830 hectares of land east of Lulworth, and a defined sea danger area of around 30,000 hectares. About 70,000 high explosive shells are fired each year. In the late 90s the MoD signed a new 100-year lease on the facilities. Safety requirements mean that public access is severely restricted, but the Range Walks and beaches are open during the main school holiday periods and all but six weekends of the year. Access is also permitted during Christmas, Easter, the month of August and all Public Holidays. When the Range walks are closed a 12-mile detour along roads is necessary.

The limited public access and reduced agricultural activity within the ranges has had some benefits for wildlife. It has also restricted access to important geological sites such as the Fossil Forest at Lulworth. The sea danger areas also restrict recreational boating and fishing for much of the time outside the main holidays.

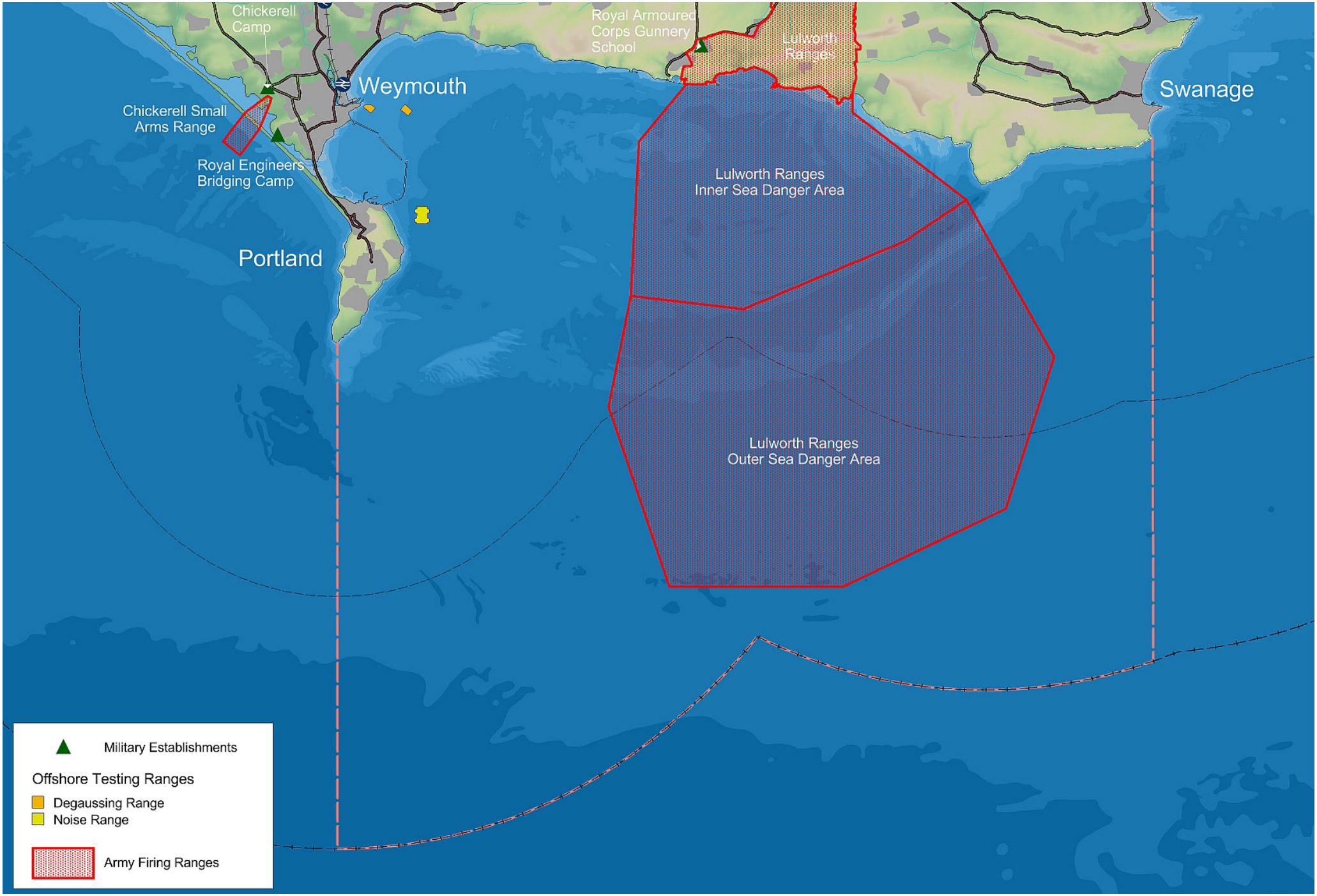
Based at Poole, The Landing Craft Wing, Royal Marines is the centre for all landing and raiding craft training for the Royal Marines, and a critical part of the Forces' amphibious capability. The wing use 7.4 metre, fast Rigid Raiders and Landing Craft of 13.5 and 27.4 metres. Most of their activity takes place within Poole Harbour, although Studland Bay, Lulworth Cove, Worbarrow Bay and Portland Harbour are used for training.

The Wyke Regis Training Area is used mainly by the Army, although public use of climbing facilities and adventure training has increased over the last few years. Two sites are located on the northern side of the Fleet including a small arms range that extends across Chesil Beach and out to sea. The range is typically used for 150 days per year and sentries are posted when it is live, to police the footpaths and offshore area. There is also a bridging camp on the shoreline of the Fleet.

Offshore there are several designated naval exercise areas although this has substantially decreased since the closure of the Portland naval base and relocation of the Navy's sea training unit. Surface use by warships is now much reduced and takes place mainly off Devon and Cornwall. Submarine exercises are now also extremely rare off the Dorset Coast and the navy suggest that these can be discounted as an activity.

QinetiQ, with close links to the MoD, is a leading international provider of technology-based services and solutions to the defence, security and related markets. It has several operations within the Marine Plan area, including a number of ranges for noise measurement and testing torpedo technology. It also has a permanent and temporary vessel degaussing (demagnetisation) station within the limits of Portland Harbour. Portland Harbour Authority Ltd actively promotes the use of the harbour for military activity including Special Forces and Royal Navy training.

Figure 31: Military activities within the Marine Plan area



Agriculture

Agriculture is a significant land use along the Dorset coast covering over 80% of the land area. Farming types reflect the wide range of soils, hydrology and topography. Stock farming is dominant in the wetter, steeper and more marginal areas and dairy and arable dominate on the more freely draining soils that are more easily cultivated. Agriculture has traditionally been an important source of local employment. In 2006, 897 (2.6% of total workforce) people were employed in agriculture and horticulture within Purbeck, and 58 (0.1% of total workforce) in Weymouth & Portland.

However, the industry continues to lose employment with a reduction in labour intensive dairy giving way to arable or beef. Livestock numbers have steadily decreased over the past twenty years, and there has been a reduction in the number of medium sized farms (20-100ha), with a corresponding increase in numbers in both larger farms (over 100ha) and smallholdings. As farm incomes have dropped over recent years, many smaller farms have become economically unviable. Some farmers have diversified into retail enterprises and non agricultural-based activities such as tourism and leisure.

Within Purbeck District, agriculture is the main land use, with just 4% given up to urban development. Farming is mainly mixed in the vale and on the limestone plateau. On steeper slopes and along the coast pasture is predominant. Most of the land is owned by a small number of large private estates, but a large proportion of this is managed under generational tenancies. The Corfe Valley is mainly under pasture, enclosed within hedgerows with dense belts of hedgerow trees. Further east, there is mixed farmland, with mainly arable pasture around Smedmore.

Towards Weymouth most of the land is in mixed agricultural use, with arable cultivation mainly on the ridges and flatter valley sides. On the steeper slopes, especially around Osmington, there is mainly pasture with more substantial hedges and hedgerow trees. Grassland is also present on the steepest valley sides, in places with patches of gorse scrub, and on the coast.

Climate change is likely to affect farming practices in the future, with potential change to crops more suited to drier and warmer conditions, such as vines and sunflowers. In addition changing patterns of rainfall could result in increased soil erosion.

Agricultural runoff contributes to diffuse pollution in the Marine Plan area coastal waters; management policies are set out in the South West River Basin District River Basin Management Plan, which was published in December 2009. There are also initiatives such as the Catchment Sensitive Farming Delivery Initiative – CSFDI, which encourages land managers to ensure that diffuse emissions of pollutants into rivers, groundwater and other aquatic habitats is maintained at acceptable levels.

Aggregates

Marine sand and gravel aggregates are becoming increasingly important for concrete production, road construction, and building as well as for beach replenishment and coastal defences, and today approximately 21 per cent of the sand and gravel used in England and Wales is supplied by the marine aggregate industry. No licensed extraction areas for marine aggregates exist within the Marine Plan area. However, there is a large area to the south east of Poole in Poole Bay which produced 72,551 tonnes in 2009. Generally, the South West and Dorset areas are a low priority for extraction due to the absence of any market demand. There are resources present, but it is unlikely that these will be commercially viable in the short term. The exception of this could be the increased need for coastal protection; however, given the policy move towards working with natural processes and reducing the need for coastal defence, this seems unlikely in the short to medium term.

4.8.13 Energy

Oil and Gas

Oil is an important economic resource within Dorset, and its distribution is based on the underlying geological resource. Oil is held in the Middle Jurassic Cornbrash Limestone layer in Kimmeridge, and has been extracted on the cliff top since 1959; production is currently 65 barrels per day. There is no offshore gas or oil fields in production or under development within the Marine Plan area, but there are several blocks licensed in Poole Bay and inland, including under Poole Harbour (Figure 32). Operated by BP, the nearby Wytch Farm Oilfield is the largest onshore field in western Europe, and both oil and natural gas are extracted. There have been a number of exploratory wells, now plugged and abandoned, in and around the Marine Plan area with significant deposits of oil known to exist.

Offshore Renewables

At present there are no offshore renewable energy sites within the Marine Plan area. At the beginning of 2010, The Crown Estate awarded Eneco the lease to develop Zone 7 (West of Wight) of the Round 3 offshore wind sites. The total zone area equates to 723.7km2, but only 197km2 of this will be developed (Figure 33). At its closest turbines will be sited 8.2 miles from Peveril Point, Swanage and its Northern most boundary will be located 10.2 miles from Bournemouth and 8.4 miles South West of the Needles. The type (and therefore height) of turbines will be determined following further research and consultation and this in turn will dictate the number of turbines within the development. Eneco currently state there will be approximately 180-300 turbines spaced 1.5km apart with a total power capacity of 0.9GW, powering between 615,000 and 820,000 homes.

Construction is currently expected to commence in 2016, and to be completed in 2018. The network connection will be at the Mannington sub-station, and the onshore cable route is proposed to follow the road network as much as possible however there are a number of obstacles that would need to be crossed.

Neither The South West Regional Development Agency (SWRDA) Offshore Renewables Resource Assessment and Development Technical Report (2010), nor The Offshore Valuation Group Report (2010) identified further practical fixed offshore wind resource (what is available after consideration of external physical constraints) in Dorset waters. The Dorset Offshore Renewable Energy Capacity Study identified two Potential Development Areas, but this study imposed fewer hard constraints and listed development considerations (i.e. parameters that may influence the complexity of development within these areas but do not restrict it out right). Both areas lie within 12nm of the coast.

The study also identified the potential for tidal stream development off the coast of Portland Bill. This area is not considered one of the UK's best tidal resource locations due to relatively shallow water depths, which may be insufficient to allow the installation of high capacity devices, and inconsistent tidal flows - where flow reversals of up to 35% have been recorded. Further areas around St Albans ledge may also be suitable in the future should technology progress to enable commercialisation in slightly lower resource areas.

As would be expected, given the County's location in the English Channel, no suitable wave resource exists within Dorset's waters, although there is potential for ¼ scale test devices.

Figure 32: Oil and gas licensing

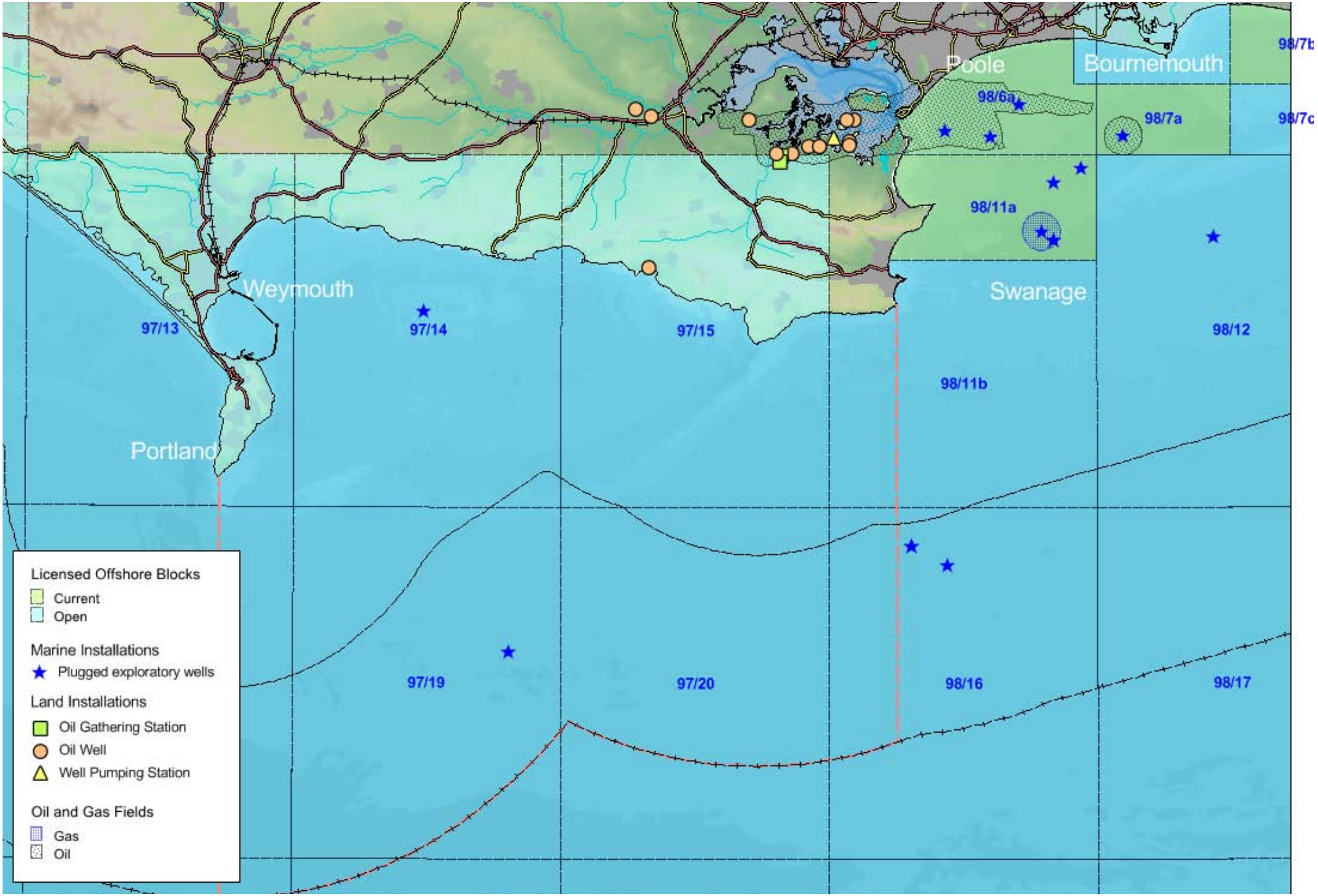
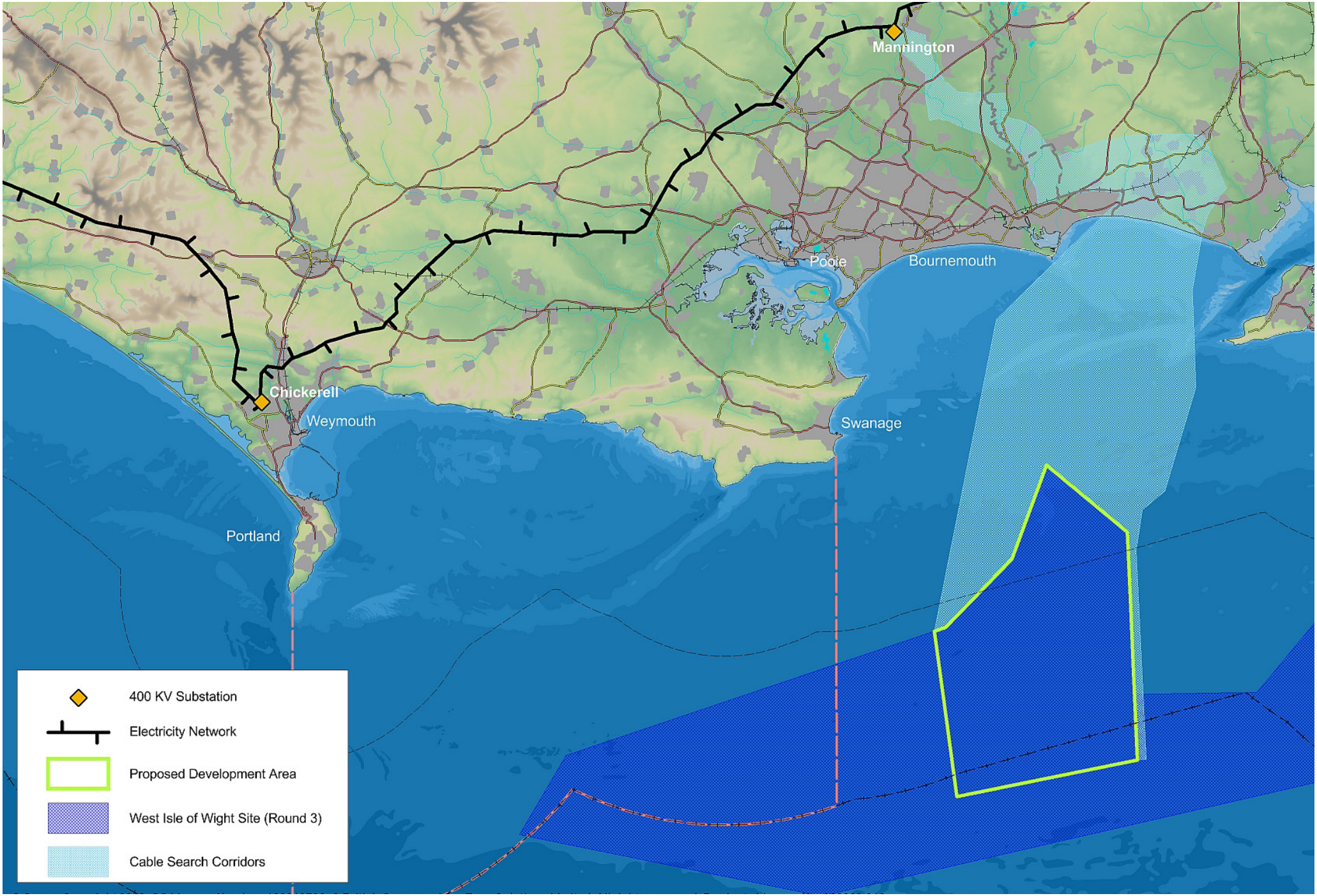


Figure 33: West of Wight zone and area to be developed



Climate Change

The UK climate has varied greatly over time due to natural causes, but human activities, and in particular the emission of greenhouse gases from agriculture, industry and waste disposal, are now believed to be causing changes to the climate including an accelerated warming trend. Scientific evidence suggests that this could influence a great many physical, chemical, biological and human activities.

According to the United Kingdom Climate Projections 2009 (UKCP09), by 2050 Dorset will experience hotter summers with an increase in average summer temperature of between 1.3 - 4.6 °C on the current average summer temperature. Total annual rainfall is unlikely to change, however, the patterns of rainfall could shift with a decrease in summer rainfall, and a rise in winter.

Sea levels in the English Channel have risen by 10cm since 1900, and they are now rising at an accelerating rate; around the South West coast they are expected to rise by 18 - 26cm by 2050, rising to 30 - 44cm by the 2080s. Coastal storm surge modelling is not conclusive, but even if the pattern of coastal storms does not change drastically, the extreme high-water levels they generate coupled with this increase in absolute sea levels means that the overall risk of increased damage and loss on the Dorset coast will increase.

Within and around the Marine Plan area there are a number of locations that have been identified as being particularly vulnerable to storms over the next 100 years and subsequently flooding and/or accelerated erosion; the Portland causeway, Weymouth (lower town centre and the Park District) and Poole Town are the most notable. Coastal flooding issues are being addressed through the Shoreline Management Plans which, in addition to traditional engineering solutions, also use natural processes as a response to sea level rise.

UKCP09 projections for the period 2070 -2098 also suggest that the seasonal mean Sea Surface Temperatures (SST) for English Channel waters will be warmer by up to 4°C in summer and 2°C in winter. These waters are likely to have a slightly lower salinity than today. There is also a chance that major oceanic currents and wave patterns could be altered in the future.

These physical changes could have important consequences, both positive and negative, for the distribution of plankton, fish larvae and fisheries stocks which in turn will affect fishing activity. With rising sea levels and increased coastal erosion intertidal areas, which are often rich in invertebrate sediment communities, may be squeezed with consequences for over-wintering wildfowl and waders.