Llywodraeth Cymru
Welsh Government

Habitats Regulation Assessment

Welsh National Marine Plan

November 2019

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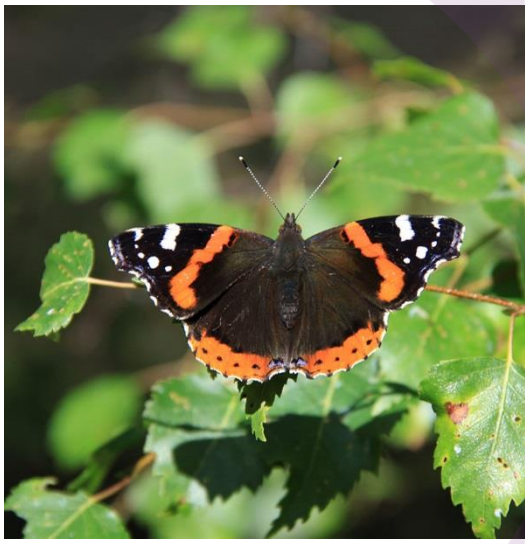

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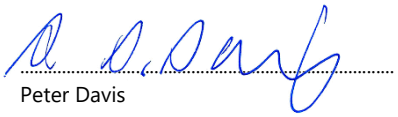

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Document revisions

No.	Details	Date
1	Draft for WG review	June 2019
2	Draft v2	June 2019
3	Final HRA for review	July 2019
4	Final HRA of adopted WNMP	August 2019

Executive summary

The Welsh National Marine Plan

The Welsh National Marine Plan (WNMP) has been prepared by the Welsh Government in accordance with the Marine and Coastal Access Act 2009 (MCAA)[1]. The purpose of marine planning under the MCAA is to help achieve sustainable development in the marine area. Welsh Ministers are the Marine Planning Authority under the MCAA, responsible for creating marine plans for both the inshore region (0-12 nautical miles) and offshore region (beyond 12 nautical miles) of Wales. Plans for both regions will be presented in a single document, the WNMP.

The Welsh Government initially prepared the **Welsh National Marine Plan: Initial Draft**[2], which that was made available for comment between November 2015 and January 2016. This pre-consultation exercise and the responses received, alongside ongoing assessment and appraisal, helped to inform the preparation of the **Draft Welsh National Marine Plan** (Draft WNMP)[3], which was published for formal public consultation over a 16-week period between 7th December 2017 and 29th March 2018. The Draft WNMP was accompanied by a Sustainability Appraisal (SA) and a report[4] summarising the findings of a 'Habitats Regulations Assessment' (HRA), undertaken to meet the requirements of the *Conservation of Habitats and Species Regulations 2017* (the 'Habitats Regulations') and the *Offshore Marine Regulations 2007*.

The Welsh Government subsequently amended the Draft WNMP, taking into account the representations received to the consultation (a summary of consultation responses is available via the Welsh Government's website[5]), the findings of accompanying assessments, ongoing stakeholder engagement and further detailed work in respect of one particular aspect (tidal lagoons). The outcome of this revision process was the **Revised Draft WNMP**, which was the plan intended for adoption. The Revised Draft WNMP was reviewed by Welsh Government and presented for ministerial sign off as the **Final WNMP** (hereafter, 'the WNMP'); this HRA relates to the WNMP as adopted.

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Habitats Regulations Assessment

Regulation 63 of the 'Habitats Regulations' states that if a plan or project "(a) *is likely to have a significant effect on a European site*[6] *or a European offshore marine site*[7] *(either alone or in combination with other plans or projects*); and *(b) is not directly connected with or necessary to the management of the site*" then the plan-making authority must "*…make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before the plan is given effect. The process by which Regulation 63 is met is known as Habitats Regulations Assessment (HRA)[8]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, whether these effects will result in any adverse effects on the site's integrity. Regulation 25 of Offshore Marine Regulations 2007 applies the same provisions to "*…any consent, permission or other authorisation for, a plan or project which…is to be carried out on or in any part of the waters or on or in any part of the seabed or subsoil comprising the offshore marine area, or on or in relation to an offshore marine installation…*".

HRA of the WNMP

Regulation 63 of the Habitats Regulations essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages. However, it is accepted best-practice for the HRAs of strategic plans or policy documents to be run as an iterative process alongside their development and this approach has been followed throughout the development of the WNMP. The broad aim of this process is to avoid as many potential adverse effects upon European sites as possible through the plan evolution. The Welsh Government has therefore engaged with key consultees on the HRA throughout the WNMP development process; this has included consultation on the Draft WNMP and its HRA (see Section 1.1), and the subsequent formation of a 'Working Group' to explore some specific issues arising from the Draft WNMP and HRA (principally in relation to policies associated with tidal lagoon development). This process resulted in the Revised Draft WNMP and subsequently the Final WNMP, which is this subject of this HRA report.

The key components of the WNMP, from an HRA perspective, are as follows:

- **The Plan Objectives**, which state the desired outcomes that the WNMP is seeking to achieve.
- **The General Cross-cutting Policies**: cross-cutting policies that support the delivery of the plan objectives, and which include various protective policies; these policies have no spatial component (beyond applying to the WNMP area).
- **The Sector Policies**: sector-specific policies that will apply to, or inform, decisions related to particular activities e.g. aggregates, dredging, fishing and aquaculture. These policies are broadly categorised as either 'supporting policies' (which encourage the submission of

[6] Strictly, 'European sites' are: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agree the site as a 'Site of Community Importance' (SCI); any classified Special Protection Area (SPA); any candidate SAC (cSAC); and (exceptionally) any other site or area that the Commission believes should be considered as an SAC but which has not been identified by the UK Government. However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') apply; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied as a matter of UK Government policy when considering development proposals that may affect them. "European site" is therefore used in this report in its broadest sense, as an umbrella term for all of the above designated sites (it therefore covers both terrestrial sites and areas that would be defined as 'European Marine Sites' under the Regulations).

[7] 'European offshore marine sites' are defined by Regulation 15 of *The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended); these regulations cover waters over 12 nautical miles from the coast.

[8] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is now more usually termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process; see also Box 1.

proposals for particular activities) or 'safeguarding' policies (which aim to prevent conflicts between activities). The policies do not typically have a clear spatial component, although in some instances (e.g. policies relating to ports) some spatial context can be inferred.

These are the aspects that are most likely to influence or in some way guide future activities in marine areas and hence determine the overall effects of the WNMP with regard to European sites.

However, as noted, the WNMP does not provide any explicit spatial direction, beyond the application of the policies to developments (etc.) in Welsh waters. Whilst some marine areas are likely to be particularly suitable for certain sector activities due to inherent environmental or physiographic conditions, the plan does not identify or link such areas to policy prescriptions. As a result, the plan is geographically neutral and does not explicitly or implicitly identify the nature, scale or location of development that may benefit from the plan policies[9,10]. Therefore, the WNMP does not identify or support specific schemes; nor dictate where certain activities or schemes should or could go; nor preclude activities from taking place in particular areas.

In the absence of specific guidance on the application of Regulation 63 to Marine Plans, the technical assessment of the WNMP is based on case-practice established through the HRAs of other Marine Plans and similar national-level policy documents (such as NPSs), taking into account recent case-law on the treatment of mitigation at the screening stage ('People over Wind').

Screening

The screening broadly employs the following steps and principles, which are consistent with current guidance:

i. Review the plan objectives and policies to identify a reasonable 'zone of environmental influence' for the plan (and hence the effective boundary beyond which 'no effects' would be anticipated), and the potential mechanisms or pathways by which European sites or interest features could be affected.

ii. Identify those WNMP sectors and policies that can be 'screened out' from further consideration; these will principally be:

- policies that cannot have an effect (e.g. general statements of policy; policies that don't promote a change; non-specific protective policies; etc.); or
- policies that reflect or incorporate external plans or programmes that have been subject to HRA (e.g. oil and gas licensing).

iii. Review the plan policies (particularly the 'protective' policies) to ensure that those that are 'screened out' are suitably drafted and that the cross-cutting policies provide appropriate safeguards against the possibility of residual non-specific effects.

iv. Identify those European sites and features that are potentially vulnerable (i.e. both exposed and sensitive) to the 'screened in' policies (i.e. those sites within or near the marine plan area; or mobile interest features that may be dependent on or utilise the marine plan area during

[9] Note, earlier iterations of the WNMP included 'Strategic Resource Areas' (SRAs) which could be interpreted as potentially providing some degree of geographical direction for sector growth or developments. SRAs are not included in the final version of the plan except as a concept that may be explored for certain sectors through supplementary guidance, subject to certain criteria set out in the WNMP. The WNMP does support evidence development to assist with the potential future identification of SRAs and or production of sector specific locational guidance.

[10] There is one principal exception to this: the WNMP includes policies relating to the Ports sector, and so these policies are, in part, implicitly related to the locations of existing ports.

their life-cycle), and those sites that will not or cannot (based on available information) be affected by the plan outcomes.

v. Take 'screened in' policies and European sites to appropriate assessment.

The 'screening' test is treated as a low bar: in general, unless the possibility of significant effects can be simply and self-evidently excluded then an 'appropriate assessment' is completed.

In summary, the following policies were 'screened in':

- All policies that 'support' development proposals (as they make provision for unquantified changes that could affect European sites), except for those policies which reflect or incorporate external plans or programmes subject to HRA, i.e.:
  - 'supporting' policies for 'Energy – Oil and Gas' (O&G_01a) as the leasing / licensing of blocks is subject to HRA through the licensing process and delivered by the UK government, and so the policy simply reflects UK government policy in this area;
  - 'supporting' policies for 'Energy – Low Carbon' (ELC_01 - 03) includes existing lease areas defined by the TCE which have been subject to HRA and so whilst the policy covers these areas, they have not been subject to further appropriate assessment as it has been previously completed. However, ELC policies are screened in for appropriate assessment where they apply to future offshore low carbon proposals that may not be covered by TCE offshore leasing rounds;
  - policy aspects that reflect ongoing authorised activities previously subject to permits or other authorisations and hence HRA (e.g. existing aggregates permissions; existing dredging permissions).
- General policies ENV_01 – ENV_07; although these are 'protective' policies they are taken into the appropriate assessment stage as they will provide a degree of mitigation for the sector policies that should be taken into account at that stage, based on '*People over Wind*', although the policies themselves are 'no significant effect' policies.

All other policies were therefore 'screened out', principally as they do not promote or support developments or environmental changes that could affect European sites. However, it must be recognised that none of the 'supporting' policies, with the possible exception of those related to port development, define a spatial scope for activities below the scale of the WNMP area, and nor do they direct, influence or clarify the precise nature and location of activities that might benefit from policy support. This inevitably presents some constraints for the scope of the 'appropriate assessment' of the WNMP.

With regard to the screening of European sites, most environmental assessments employ source-pathway-receptor models (or similar) to identify potential environmental changes and the risk of consequent effects on ecological receptors. Due to the scope of the WNMP, and the absence of specific schemes (etc.), it is appropriate to adopt a broad approach to the identification of potential sources and pathways, and hence likely effect on European sites and features. As a result, this HRA uses the JNCC's *Marine activities and pressures evidence* database (JNCC 2016) as a basis for the identification of potential effect pathways. This provides:

- a standard UK list of marine activities and their definitions; and
- a list of marine pressures and their definitions (as agreed by the OSPAR Intercessional Correspondence Group on Cumulative Effects).

The screening process for European sites uses the JNCC pressure and applies a set of criteria to identify those sites and interest features that **will not** be affected by the WNMP outcomes (i.e. no significant effects, alone or in combination). Essentially, a suitably precautionary 'zone of environmental influence' (the area within

which environmental changes as a result of the plan may occur) is defined for the activities supported by the WNMP, based on a broad range of existing case studies and examples from delivered projects, where environmental changes are possible as a result of the plan. Interest features are considered to be potentially exposed to the effects of the WNMP if they are within (for habitats) or functionally linked (for mobile species) to this estimated zone of environmental influence.

In summary, the following features (and their corresponding sites) were screened in to the assessment:

Interest feature groups that coincide with, or potentially use or transit the zone of environmental influence

Feature Group	Interest features screened into assessment
Terrestrial habitats within 2km	See **Appendix B** – note, the terrestrial features within the 'zone of environmental influence' are not listed here as (unlike marine habitats) they will not be systematically exposed to the outcomes of the WNMP (i.e. any effects are likely to be secondary or 'in combination' effects associated with specific projects which are not defined at this level).
Subtidal and intertidal habitats	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Large shallow inlets and bays Reefs Submarine structures made by leaking gases Salicornia and other annuals colonizing mud and sand *Spartina* swards (*Spartinion maritimae*) Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Submerged or partially submerged sea caves Plus marine aspects of Ramsar criteria: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge Crit. 8 - important source of food for fishes, spawning ground, nursery and/or migration path
Coastal and supralittoral habitats	Coastal lagoons Annual vegetation of drift lines Perennial vegetation of stony banks Vegetated sea cliffs of the Atlantic and Baltic Coasts Mediterranean and thermo-Atlantic *halophilous* scrubs (*Sarcocornetea fruticosi*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") Fixed coastal dunes with herbaceous vegetation ("grey dunes") Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) Dunes with *Hippopha rhamnoides* Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) Humid dune slacks Coastal dunes with *Juniperus* spp. Petalwort *Petalophyllum ralfsii* Shore dock *Rumex rupestris*
Bats	Lesser horseshoe bat *Rhinolophus hipposideros* Greater horseshoe bat *Rhinolophus ferrumequinum* Barbastelle *Barbastella barbastellus* Bechstein`s bat *Myotis bechsteini*
Marine mammals	Bottlenose dolphin *Tursiops truncatus* Harbour porpoise *Phocoena phocoena* Otter *Lutra lutra* Grey seal *Halichoerus grypus* Common seal *Phoca vitulina*

Feature Group	Interest features screened into assessment
Diadromous fish (plus freshwater pearl mussel)	Atlantic salmon *Salmo salar* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Allis shad *Alosa alosa* Freshwater pearl mussel *Margaritifera margaritifera* Twaite shad *Alosa fallax*
Pelagic seabirds (breeding and wintering)	Northern fulmar *Fulmarus glacialis* Manx shearwater *Puffinus puffinus* European storm-petrel *Hydrobates pelagicus* Leach's storm-petrel *Oceanodroma leucorhoa* Northern gannet *Morus bassanus* Great cormorant *Phalacrocorax carbo* European shag *Phalacrocorax aristotelis* Black (common) scoter *Melanitta nigra* Velvet scoter *Melanitta fusca* Arctic *skua Stercorarius parasiticus* Great *skua Catharacta skua* Mediterranean gull *Larus melanocephalus* Little gull *Larus minutus* Black-headed gull *Larus ridibundus* Mew gull *Larus canus* Lesser black-backed gull *Larus fuscus* Herring gull *Larus argentatus* Great black-backed gull *Larus marinus* Black-legged kittiwake *Rissa tridactyla* Sandwich tern *Sterna sandvicensis* Roseate tern *Sterna dougallii* Common tern *Sterna hirundo* Arctic tern *Sterna paradisaea* Little tern *Sterna albifrons* Common guillemot *Uria aalge* Razorbill *Alca torda* Atlantic puffin *Fratercula arctica* Red-throated diver *Gavia stellata*
Wildfowl and waders (breeding and wintering)	Black-throated diver *Gavia arctica* Great crested grebe *Podiceps cristatus* Slavonian grebe *Podiceps auritus* Great bittern *Botaurus stellaris* Little egret *Egretta garzetta* Mute swan *Cygnus olor* Tundra swan *Cygnus columbianus bewickii* Whooper swan *Cygnus cygnus* Taiga bean goose *Anser fabalis fabalis* Pink-footed goose *Anser brachyrhynchus* Greylag goose *Anser anser* [Iceland/UK/Ireland] Greylag goose *Anser anser* [North-western Scotland] Barnacle goose *Branta leucopsis* [Eastern Greenland/Scotland/Ireland] Common shelduck *Tadorna tadorna* Eurasian wigeon *Anas penelope* Gadwall *Anas strepera* Eurasian teal *Anas crecca* Mallard *Anas platyrhynchos* Northern pintail *Anas acuta* Garganey *Anas querquedula* Northern shoveler *Anas clypeata* Common pochard *Aythya ferina* Tufted duck *Aythya fuligula* Greater scaup *Aythya marila* Common eider *Somateria mollissima* Long-tailed duck *Clangula hyemalis*

Feature Group	Interest features screened into assessment
	Common goldeneye *Bucephala clangula* Red-breasted *merganser Mergus serrator* Goosander *Mergus merganser* Spotted crake *Porzana porzana* Corn crake *Crex crex* Common coot *Fulica atra* Eurasian oystercatcher *Haematopus ostralegus* Pied avocet *Recurvirostra avosetta* Ringed plover *Charadrius hiaticula* Eurasian dotterel *Charadrius morinellus* European golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Northern lapwing *Vanellus vanellus* Red knot *Calidris canutus* Sanderling *Calidris alba* Purple sandpiper *Calidris maritima* Ruff *Philomachus pugnax* Common snipe *Gallinago gallinago* Bar-tailed godwit *Limosa lapponica* Whimbrel *Numenius phaeopus* Eurasian curlew *Numenius arquata* Common redshank *Tringa totanus* Common greenshank *Tringa nebularia* Wood sandpiper *Tringa glareola* Ruddy turnstone *Arenaria interpres* Red-necked phalarope *Phalaropus lobatus* Greater white-fronted goose *Anser albifrons albifrons* Greenland white-fronted goose *Anser albifrons flavirostris* Dunlin *Calidris alpina schinzii* Black-tailed godwit *Limosa limosa limosa* Black-tailed godwit *Limosa limosa islandica* Red knot *Calidris canutus islandica* Dunlin *Calidris alpina alpina* Light-bellied brent goose *Branta bernicla hrota* [Canada/Ireland] Dark-bellied brent goose *Branta bernicla bernicla* **Ramsar criteria**: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity Crit. 5 - regularly supports 20,000 or more waterbirds Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
'Typical species'	All species not identified above which may be associated with specific site habitats.

Appropriate Assessment

The appropriate assessment stage focused on those sectors with policies promoting or supporting development, which have aspects (principally related to future development) not covered by existing HRAs (aggregates, aquaculture, wave and tidal stream, fisheries, ports and shipping, dredging and disposal, subsea cabling and tourism and recreation). Whilst potential impact pathways can be identified for sector activities, the inherent uncertainties over the location, scale, type and timing of future activities means that a plan-level HRA cannot identify specific effects on specific sites or exclude the possibility of significant or significant adverse effects on many European sites solely through the technical analysis of anticipated outcomes and scenarios – the data are too partial to allow reasonable assessment. These uncertainties are inevitable and common in broad, high-level multi-sectoral marine planning where the regime is in its infancy and are best addressed by: policy safeguards within the plan; a requirement for project-level HRA; and regular review of the plan and its effects with regard to European sites to ensure it reflects the best available current knowledge.

However, whilst the WNMP does not explicitly exclude the possibility of adverse effects occurring, there is nothing inherent in the likely scale and nature of the supported activities that would suggest adverse effects are unavoidable at the project level, given the safeguards contained within the WNMP. It is evident from existing projects in the marine environment (including offshore windfarms, aggregates extraction, cable and pipeline laying, aquaculture schemes, marine renewables etc.) that adverse effects are avoidable, and that project-level mitigation and avoidance measures are available, achievable and likely to be effective in preventing adverse effects on European sites from occurring.

Furthermore, the WNMP does not restrict how future schemes might be delivered (other than in a positive way through the General Policies) and so sufficient flexibility is retained within the scope of the policies to ensure that future schemes can be delivered without adverse effects upon European sites.

All future project-level proposals will be subject to project level HRA as part of the consenting procedure, and the general cross-cutting protective policies within the plan will reinforce existing safeguards for European sites. The three-yearly WNMP review process will also provide a mechanism for monitoring and reviewing policy performance; this will be based on accumulated evidence relating to plan application by developers and relevant public authorities through their decision making and, also, identification of plan-related outcomes where possible. Such monitoring therefore ensures that effects that cannot currently be assessed as part of a plan-level HRA can be appropriately identified, reported and fed back into the ongoing marine planning process.

Overall, therefore, it is considered that the measures within the WNMP together with the availability and means of ensuring project-level mitigation will ensure that **there will be no adverse effect on the integrity of any European sites, alone or in combination, as a result of the plan's implementation**.

Contents

1. Introduction

The Welsh Government has prepared the Welsh National Marin Plan (WNMP) to support sustainable development in the marine area. The WNMP is subject to the Conservation of Habitats and Species Regulations 2017 and the Offshore Marine Regulations 2007, requiring assessment of the potential effects of the plan on European sites.

1.1 Overview

A Marine Plan for Wales

1.1.1 The Welsh National Marine Plan (WNMP) has been prepared by the Welsh Government in accordance with the Marine and Coastal Access Act 2009 (MCAA)[11]. The purpose of marine planning under the MCAA is to help achieve sustainable development in the marine area. The Welsh Ministers are the Marine Planning Authority under the MCAA, responsible for creating marine plans for both the inshore region (0-12 nautical miles) and offshore region (beyond 12 nautical miles) of Wales. Plans for both regions are presented in a single document, the WNMP.

1.1.2 Together, the UK Marine Policy Statement[12] (MPS) and marine plans form a new plan-led system for decision making in relation to marine activities. They are intended to provide for greater coherence in policy and a forward-looking, proactive and spatial planning approach to the management of the marine area, its resources, and the activities and interactions that take place within it. The WNMP enables the Welsh Government to plan for, and guide, the management of marine activities in a sustainable way; integrating economic, social and environmental considerations and engaging with communities to help shape the future of the plan area.

Evolution of the WNMP

1.1.3 The WNMP has been prepared by the Welsh Government in accordance with the MCAA and has involved a number of steps covering evidence gathering, policy development, preparation for plan implementation and review, supported throughout by ongoing stakeholder engagement and an iterative process of plan development alongside impact assessment.

1.1.4 The Welsh Government initially prepared the **Welsh National Marine Plan: Initial Draft**[13], which that was made available for comment between November 2015 and January 2016. This pre-consultation exercise and responses received, alongside ongoing assessment and appraisal, helped to inform the preparation of the **Draft Welsh National Marine Plan** (Draft WNMP)[14], which was published for formal public consultation over a 16-week period between 7th December 2017 and 29th March 2018. The Draft WNMP was accompanied by a Sustainability Appraisal (SA) and a

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report[15] summarising the findings of a 'Habitats Regulations Assessment' (HRA), undertaken to meet the requirements of the *Conservation of Habitats and Species Regulations 2017* (the 'Habitats Regulations') and the *Offshore Marine Regulations 2007*.

1.1.5 The Welsh Government subsequently amended the Draft WNMP, taking into account the representations received to the consultation (a summary of consultation responses is available via the Welsh Government's website[16]), the findings of accompanying assessments, ongoing stakeholder engagement and further detailed work in respect of one particular aspect (tidal lagoon policy). The outcome of this revision process was the **Revised Draft WNMP**, which was the plan intended for adoption. The Revised Draft WNMP was reviewed by Welsh Government and provided to the UK Government. Following the completion of any final amendments, it was presented for ministerial sign off as the **Final WNMP** (hereafter, 'the WNMP'); this HRA relates to the WNMP as adopted.

1.2 Habitats Regulations Assessment

1.2.1 Regulation 63 of the 'Habitats Regulations' states that if a plan or project "*(a) is likely to have a significant effect on a European site[17] or a European offshore marine site[18] (either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the plan-making authority must "*…make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before the plan is given effect. The process by which Regulation 63 is met is known as Habitats Regulations Assessment (HRA)[19]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, whether these effects will result in any adverse effects on the site's integrity. Regulation 25 of *Offshore Marine Regulations 2007* applies the same provisions to "*…any consent, permission or other authorisation for, a plan or project which…is to be carried out on or in any part of the waters or on or in any part of the seabed or subsoil comprising the offshore marine area, or on or in relation to an offshore marine installation…*".

1.2.2 Regulation 63 of the Habitats Regulations essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages. However, it is accepted best-practice for the HRAs of strategic plans or policy documents

[15] Welsh Government (2017) *Welsh National Marine Plan - Habitats Regulations Assessment.* Available from https://gov.wales/sites/default/files/consultations/2018-02/habitats-en.pdf

[16] Welsh Government (2018) *Draft Welsh National Marine Plan: Consultation – summary of response*. Available from https://beta.gov.wales/sites/default/files/consultations/2018-07/draft-welsh-national-marine-plan-summary-of-responses.pdf [Accessed September 2018].

[17] Strictly, 'European sites' are: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agree the site as a 'Site of Community Importance' (SCI); any classified Special Protection Area (SPA); any candidate SAC (cSAC); and (exceptionally) any other site or area that the Commission believes should be considered as an SAC but which has not been identified by the UK Government. However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') apply; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied as a matter of UK Government policy when considering development proposals that may affect them. "European site" is therefore used in this report in its broadest sense, as an umbrella term for all of the above designated sites (it therefore covers both terrestrial sites and areas that would be defined as 'European Marine Sites' under the Regulations).

[18] 'European offshore marine sites' are defined by Regulation 15 of *The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended); these regulations cover waters over 12 nautical miles from the coast.

[19] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is now more usually termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process; see also Box 1.

to be run as an iterative process alongside their development and this approach has been followed throughout the development of the WNMP.

1.2.3 The broad aim of this process is to avoid as many potential effects as possible through the plan evolution. The Welsh Government has therefore engaged with key consultees on the HRA throughout the WNMP development process; this has included consultation on the Draft WNMP and its HRA (see Section 1.1), and the subsequent assembly of a 'Tidal Lagoon Policy Technical Working Group' to explore some specific issues arising from the Draft WNMP and HRA.

1.2.4 This process has resulted in the Final WNMP, which is this subject of this HRA report.

1.3 Purpose of this Report

1.3.1 This report enables the Welsh Government to meet its obligations under the Habitats Regulations. It documents the assessment of the **Final WNMP** against the requirements of the Habitats Regulations, summarising the HRA process and its application to the WNMP, and detailing the results of the assessment[20].

1.3.2 The HRA of the WNMP has been undertaken at a strategic level. It does not remove the need for developers or competent authorities to consider the potential effects on European sites of specific future projects, or set any precedent regarding the acceptability of future proposals that may affect European sites. This is because the plan is high-level and strategic and does not identify specific projects that will be progressed or which are encouraged. The HRA may help inform the assessment of subsequent projects, but the screening of any future projects or activities should be completed on their own merit and the HRA of the WNMP does not prejudice such an assessment.

1.3.3 In addition to the HRA, Schedule 6 (10) of the MCAA requires that the Welsh Government carry out an appraisal of sustainability of its proposals for inclusion in the WNMP and to publish a report of the results of the appraisal. The planning authority may only adopt the plan if the SA indicates that it is appropriate to do so. The Sustainability Appraisal (SA) ensures that the likely environmental and socio-economic effects of the WNMP are identified, described and evaluated. In meeting its requirement to undertake an SA of the WNMP, the Welsh Government has determined that the SA, required under the MCAA, should incorporate an assessment in accordance with the requirements of the European Union Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment[21], more commonly known as the Strategic Environmental Assessment (SEA) Directive. The SA for the WNMP is reported separately from this HRA report, although the conclusions of the HRA have informed the SA process.

1.3.4 Note, this report takes into account the consultation responses received on the Draft WNMP and its HRA when completing the assessment of the WNMP against the requirements of the Habitats Regulations, although it should be noted that not all comments will still apply as many of the elements of the Revised Draft WNMP and Final WNMP have been changed.

1.4 Report Structure

1.4.1 The report is structured as follows:

[20] Note, it does not include summaries (etc.) of the HRA of the Draft WNMP, or contrast the content and performance (in HRA terms) of the Revised Draft WNMP or Final WNMP with the Draft WNMP.

[21] Available from http://ec.europa.eu/environment/eia/sea-legalcontext.htm [Accessed March 2019].

- **Section 2** provides a summary of the WNMP.
- **Section 3** provides an overview of the HRA approach and those factors or plan aspects that are relevant to assessment.
- **Section 4** provides a summary of the screening process as applied to the policies of the WNMP. It identifies those policies that should be excluded from further assessment, either because they can have no significant effect or because assessment by the HRA of the WNMP is not appropriate.
- **Section 5** provides a summary of the screening process that has been applied to identify European sites[22] that are potentially exposed and sensitive to the likely outcomes of the WNMP.
- **Section 6** provides more detailed appropriate assessments of the likely effects of those policies and sectors that are not excluded in **Section 5**.
- **Section 7** summarise the review of other plans and projects for potential 'in combination' effects with the policy components of the WNMP.
- **Section 8** provides a summary of the appropriate assessment and the main conclusions.

[22] The HRA considers all European sites (see footnotes 3 and 4) rather than just those considered European Marine Sites due to the potential for offshore activities to affect some onshore habitats or mobile species.

2. The Welsh National Marine Plan

The content, scope and planning approach of the Final WNMP (and its earlier iterations) is critical to the scope and approach used for this HRA. This section provides an overview of the plan and identifies those aspects that will shape the likely outcomes, and hence the scope of this HRA.

2.1 Marine Planning and the UK Marine Policy Statement

2.1.1 Marine plans form part of a new plan-led regulatory system for marine activities introduced in Europe by the Maritime Spatial Planning Directive (EU Directive 89/2014)[23] and in the UK by the MCAA in 2009. The purpose of marine planning under the Maritime Spatial Planning Directive and MCAA is to help achieve sustainable development in the marine area.

2.1.2 The UK MPS is the overarching framework for preparing marine plans and taking decisions affecting the marine environment. It was adopted by all four UK administrations in March 2011. The UK MPS provides the high-level policy context within which UK marine plans are to be developed, implemented, monitored and amended and ensures appropriate consistency in marine planning across the UK marine area. The UK MPS also sets the direction for marine licensing and other relevant authorisation systems.

2.1.3 The UK MPS sets out that the process of marine planning will:

- achieve integration between different objectives;
- recognise that the demand for use of our seas and the resulting pressures on them will continue to increase;
- manage competing demands on the marine area, taking an ecosystem-based approach;
- enable the co-existence of compatible activities wherever possible; and
- integrate with terrestrial planning.

2.1.4 The vision for the marine environment, as set out in Section 2.1 of the UK MPS, is for "*clean, healthy, safe, productive and biologically diverse oceans and seas*". The UK High Level Marine Objectives (HLMOs) published in April 2009 set the broad outcomes for the marine area, and reflect the principles of sustainable development. These objectives are themed as follows:

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

2.1.5 The aim of marine planning is therefore to ensure a sustainable future for the UK's seas through managing and balancing the many activities, resources and assets in the marine environment. In

[23] Available from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0089&from=EN [Accessed January 2017].

this context, marine plans will inform and guide regulation, management, use and protection of the marine plan areas. Section 58 of the MCAA requires that all public authorities taking authorisation or enforcement decisions which may affect the UK marine area (e.g. on an approval, confirmation, consent, licence, permission) must do so in accordance with marine policy documents (marine plans and the UK MPS) unless relevant considerations indicate otherwise[24]. Any other decisions that may affect the area should also have regard to the UK MPS and marine plans. Together, the UK MPS and WNMP (when adopted) form the marine planning documents for Welsh seas.

2.2 The Requirement to Prepare a Welsh National Marine Plan

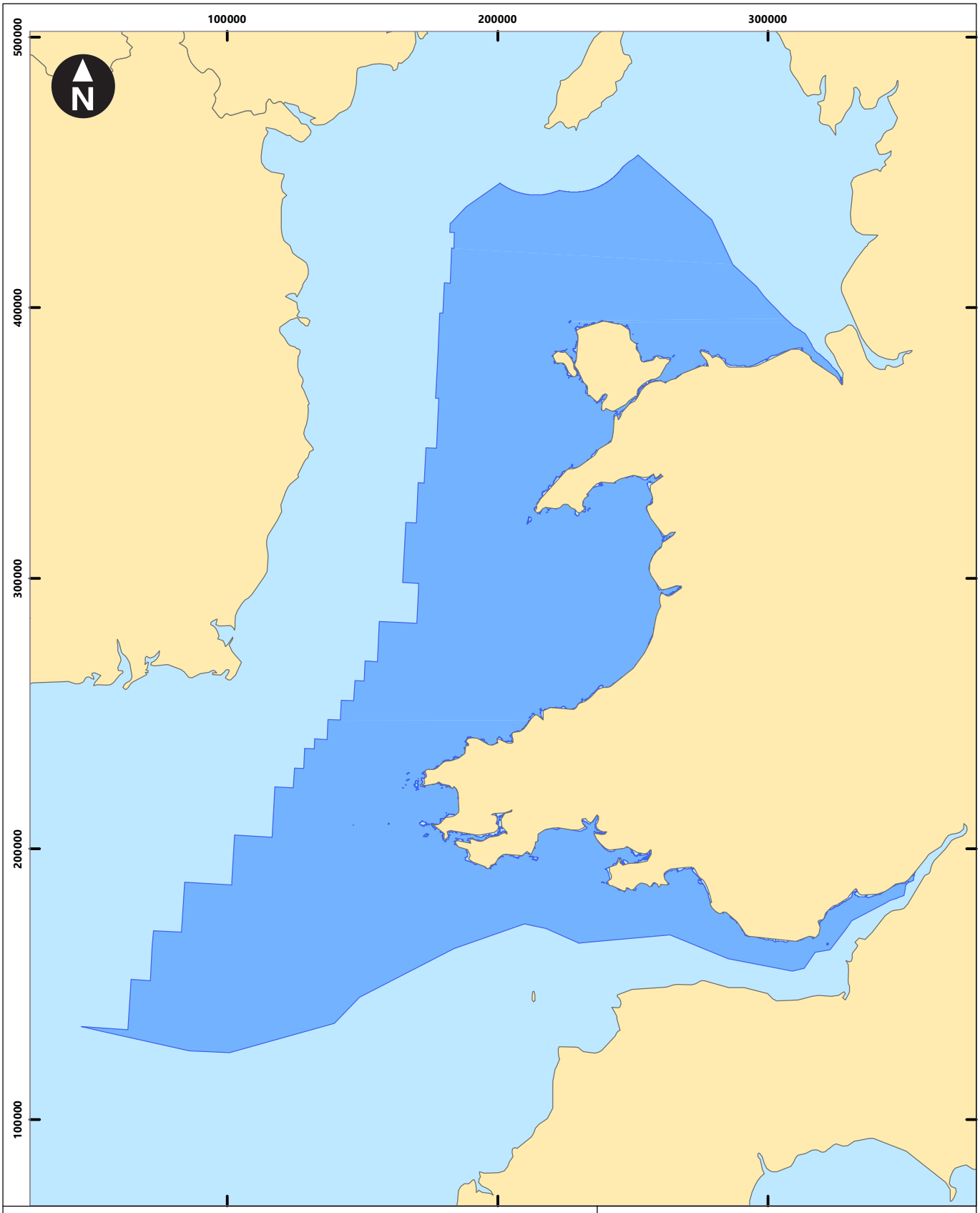
2.2.1 The UK MPS and marine plans form a new plan-led system for marine activities. Section 1.3 of the UK MPS sets out the expectation that, together, the MPS and marine plans will "*provide for greater coherence in policy and a forward-looking, proactive and spatial planning approach to the management of the marine area, its resources, and the activities and interactions that take place within it*."

2.2.2 On adoption of the UK MPS, the MCAA placed a duty on the Welsh Government to ensure that marine plans are prepared for the Welsh marine area. The Welsh Ministers are the relevant Marine Planning Authority (MPA) for the Welsh inshore and offshore regions and responsible for preparing marine plans for these regions. The Welsh marine area is shown in **Figure 2.1**.

2.2.3 The Welsh Government consulted on the approach to marine planning for Wales in February 2011 through the consultation '*Sustainable Development for Welsh seas: Our Approach to Marine Planning in Wales*'[25]. Having considered the responses to this consultation, the Welsh Government confirmed its intention, consistent with the MCAA duty, to put in place a national system of marine planning and to develop a WNMP.

[24] An exception is decisions on applications for development consent for nationally significant infrastructure projects (NSIPs) under the Planning Act 2008 where a decision should also have regard to any relevant marine plan.

[25] Welsh Government (2011) *Sustainable Development for Welsh Seas: Our Approach to Marine Planning in Wales*. Available from http://gov.wales/docs/desh/consultation/110216marineconsultationen.pdf [Accessed January 2017].



Key

WNMP Area

0 50,000 100,000 m

Scale at A4: 1:2,000,000

HRA of the WNMP
Final HRA

Figure 2.1
WNMP Area

August 2019

wood.

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2.3 The Scope of the Welsh National Marine Plan

Purpose

2.3.1 The UK MPS (section 2.2) states that marine plans should "*set out how marine resources can best be managed in order to achieve the plan outcomes, policies and objectives. Marine Plans will provide a clear, spatial and locally-relevant expression of policy, implementation and delivery. They will ensure that different and potentially competing activities are managed in such a way that they contribute to the achievement of sustainable development. A key principle will be to promote compatibility and reduce conflict. Monitoring of implementation will ensure that activities within a marine plan area contribute to the delivery of the MPS, as well as its future revisions*." Article 5 (2) of the Maritime Spatial Planning Directive, meanwhile, sets out that marine spatial plans should "aim to contribute to the sustainable development of energy sectors at sea, of maritime transport, and of the fisheries and aquaculture sectors, and to the preservation, protection and improvement of the environment, including resilience to climate change impacts."

2.3.2 The WNMP is the first marine plan for Wales and represents the start of a process of shaping Wales' future through marine planning to support economic, social and environmental objectives. It will implement the UK MPS at the national level, guiding the sustainable development of Wales' seas by setting out how applicants should shape licence applications and how proposals will be considered by decision makers including, in particular, the consenting authorities. The WNMP has also been developed in the context of the Well-being of Future Generations (Wales) Act 2015 and Environment (Wales) Act 2016.

Geographic scope

2.3.3 The Welsh marine area consists of around 32,000 km^2 of sea, as well as 2,120 km of coastline. The WNMP will cover both the Welsh inshore region (from high water and the landward extent out to 12 nautical miles from shore) and offshore region (beyond 12 nautical miles) in a single document.

Functional scope

2.3.4 The management of activities in Welsh waters is split between devolved functions which are the responsibility of Welsh Ministers, and reserved functions which are retained by UK Government. The Welsh Government has set out that the WNMP includes provision relating to devolved and retained functions and has been adopted with the agreement of the UK Secretary of State for Environment, Food and Rural Affairs.

2.3.5 The balance of retained and devolved functions may change with time.

Duration and review

2.3.6 The WNMP takes a 20-year view whilst recognising that certain activities may need to be planned for beyond this time period and that others are likely to change significantly during the lifetime of the plan.

2.3.7 Monitoring and reporting is a statutory requirement (MCAA s.61) and an important step in the planning process to ensure that the WNMP and its policies are effectively contributing to achieving the plan's objectives. The Welsh Government will review and report at least every three years on the effects of policies in the WNMP and their effectiveness at securing the plan objectives. The planning process is iterative; in accordance with the MCAA, future plans will be developed using experience and understanding gained from previous planning processes.

2.4 The Final Welsh National Marine Plan

2.4.1 The WNMP comprises the following key plan components:

- Vision;
- Plan objectives;
- General cross-cutting policies;
- Sector objectives; and
- Sector policies.

2.4.2 These key plan components are discussed in-turn below.

Vision and Plan Objectives

2.4.3 The WNMP sets out the following vision for the Welsh inshore and offshore marine area over the 20-year view taken by the plan:

"*Welsh seas are clean, healthy, safe, productive and biologically diverse*:

- *Through an ecosystem approach, natural resources are sustainably managed and our seas are healthy and resilient, supporting a sustainable and thriving economy;*
- *Through access to, understanding of and enjoyment of the marine environment and maritime cultural heritage, health and well-being are improving;*
- *Through Blue Growth*[26] *more jobs and wealth are being created and are helping coastal communities become more resilient, prosperous and equitable with a vibrant culture; and*
- *Through the responsible deployment of low carbon technologies, the Welsh marine area is making a strong contribution to energy security and climate change emissions targets*."

2.4.4 The WNMP vision outlined above is underpinned by 13 plan objectives. The plan objectives are a clear statement of desired outcomes that the WNMP is seeking to achieve in order to realise the vision. The objectives are set out in **Table 2.1** under the HLMO themes used in the UK MPS.

Table 2.1 WNMP Plan Objectives

HLMO theme	Objective	
Overarching	1	Support the sustainable development of the Welsh marine area by contributing across Wales' well-being goals, supporting the Sustainable Management of Natural Resources (SMNR) by taking account of the cumulative effects of all uses of the marine environment.
Achieving a sustainable marine economy	2	Contribute to a thriving Welsh economy by encouraging economically productive activities and profitable and sustainable businesses that create long term employment at all skill levels.
	3	Support the opportunity to sustainably develop marine renewable energy resources with the right development in the right place, helping to achieve the UK's energy security and carbon reduction objectives, whilst fully considering other's interests, and ecosystem resilience.

[26] Blue Growth concerns sustainable economic growth in marine and maritime sectors.

HLMO theme	Objective	
	4	Provide space to support existing and future economic activity through managing multiple uses, encouraging the coexistence of compatible activities, the mitigation of conflicts between users and, where possible, by reducing the displacement of existing activities.
	5	Recognise the significant value of coastal tourism and recreation to the Welsh economy and well-being and ensure such activity and potential for future growth are appropriately safeguarded.
Ensuring a strong, healthy and just society	6	Contribute to supporting the development of vibrant, more equitable, culturally and linguistically distinct, cohesive and resilient coastal communities.
	7	Support enjoyment and stewardship of our coasts and seas and their resources by encouraging equitable and safe access to a resilient marine environment, whilst protecting and promoting valuable landscapes, seascapes and historic assets.
	8	Improve understanding and enable action supporting climate change adaptation and mitigation.
Living within environmental limits	9	Support the achievement and maintenance of Good Environmental Status (GES) and Good Ecological Status (GeS).
	10	Protect, conserve, restore and enhance marine biodiversity to halt and reverse its decline including supporting the development and functioning of a well-managed and ecologically coherent network of Marine Protected Areas (MPAs) and resilient populations of representative, rare and vulnerable species
	11	Maintain and enhance the resilience of marine ecosystems and the benefits they provide in order to meet the needs of present and future generations.
Promoting good governance	12	Support proportionate, consistent and integrated decision making through implementing forward-looking policies as part of a plan-led, precautionary, risk-based and adaptive approach to managing Welsh seas.
Using sound science responsibly	13	Develop a shared, accessible marine evidence base to support use of sound evidence and provide a mechanism for the unique characteristics and opportunities of the Welsh Marine Area to be better understood.

General Cross-cutting Policies

2.4.5 The general cross-cutting policies of the WNMP potentially apply to all sectors and activities and support the delivery of the plan objectives, ensuring that socio-economic and environmental considerations are part of the decision-making process. The WNMP contains 25 general cross-cutting policies that are set out by HLMO theme in addition to two general overarching policies. These are listed in **Table 2.2**.

Table 2.2 WNMP General Cross-cutting Policies

HLMO	General Cross-cutting Policies
Overarching planning policy	GEN_01, GEN_02
Achieving a sustainable marine economy	ECON_01, ECON_02
Ensuring a strong, healthy and just society	SOC_01, SOC_02, SOC_03, SOC_04, SOC_05, SOC_06, SOC_07, SOC_08, SOC_09, SOC_10, SOC_11
Living within environmental limits	ENV_01, ENV_02, ENV_03, ENV_04, ENV_05, ENV_06, ENV_07

HLMO	General Cross-cutting Policies
Promoting good governance	GOV_01, GOV_02
Using sound science responsibly	SCI_01

Sector Objectives and Policies

2.4.6 Sector objectives and policies operate alongside the plan objectives and general cross-cutting policies and apply to decisions related to a particular activity. They include supporting policies (to support development of a given sector) and safeguarding policies (to protect a given sector's current or potential future activities from negative impacts from other activities). These objectives and policies are grouped across 11 sectors that operate in Welsh seas. For each sector, objective(s), policies and supporting information are presented.

2.4.7 **Table 2.3** reproduces the 12 objectives and lists the 17 policies for the sectors (albeit that some policies are divided into two parts and the safeguarding policies (SAF_01 and SAF_02) will apply across all the sectors). For each sector, the applicability of the general cross-cutting policies is also shown.

Table 2.3 WNMP Sector Objectives and Policies

Sector	Sector Objectives	Sector Policies	Relevant General Cross-cutting Policies
Defence	To contribute to the defence of the nation by ensuring that Defence and National Security activities are not compromised.	DEF_01	All
	Safeguarding Policy	SAF_01a SAF_01b SAF_02	All
Aggregates	To continue to use marine aggregates resources at a rate and in locations which best meet our current and future needs by ensuring adequate reserves are provided for through long-term licences.	AGG_01a AGG_01b	All
Aquaculture	To facilitate the development of sustainable aquaculture in Welsh waters, including promoting innovative finfish, shellfish and marine algal businesses and associated supply chains.	AQU_01a AQU_01b	All
Dredging and Disposal	To maintain safe and effective navigational access for shipping, fishing and leisure craft and support future growth and increases in port facilities and vessel size whilst promoting the optimal sustainable use of dredged material and ensuring adequate disposal facilities are available.	D&D_01	All

Sector	Sector Objectives	Sector Policies	Relevant General Cross-cutting Policies
Energy – Low Carbon	To contribute significantly to the decarbonisation of our economy and to our prosperity by increasing the amount of marine renewable energy generated, through: • Supporting further commercial deployment of offshore wind technologies at scale over the lifetime of this plan; • Supporting the development and demonstration of wave energy and tidal stream technologies in the short to medium term; • Increasing (where appropriate) the number of wave energy and tidal stream energy generation devices deployed in commercial scale developments over the medium term; • Developing a better understanding of the potential for tidal lagoon power technology; and • Recognising the potential role of the marine environment in new coastal nuclear energy generation facilities. To develop Wales as an exemplar of marine renewable energy technology by developing the essential skill base, infrastructure and technical knowledge to support the development of the industry over the next 20 years.	ELC_01a ELC_01b ELC_02a ELC_02b ELC_03a ELC_03b ELC_04	All
Energy – Oil and Gas	Maximising the sustainable recovery of UK oil and gas in order to provide commercial and domestic consumers with a secure, affordable and resilient supply of energy whilst meeting UK decarbonisation goals.	O&G_01a O&G_01b O&G_02	All
Fisheries	To support and safeguard a sustainable, diversified and profitable fishing sector including promoting sustainable capture fisheries and optimising the economic value of fish caught as a supply of sustainable protein.	FIS_01a FIS_01b	All
Ports and Shipping	To safeguard established shipping routes and support sustainable growth in the shipping and ports sector.	P&S_01a P&S_01b P&S_02	All
Subsea Cabling	To support the optimal distribution of electricity and better global communications through the growth of digital communication networks.	CAB_01	All
Surface Water and Wastewater Treatment and Disposal	To safeguard the capacity to safely and effectively treat and discharge surface water runoff and wastewater.	No sector specific policy, although safeguarding policies (SAF_01 and SAF_02) will apply	All
Tourism and Recreation	To contribute to sustainable development by protecting and promoting access to the coast and improving the quality of the visitor experience thereby increasing Wales' reputation as a world class sustainable marine tourism and recreation destination.	T&R_01a T&R_01b	All

2.5 Summary

2.5.1 The key components of the WNMP, from an HRA perspective, are as follows:

- **The General Cross-cutting Policies**: cross-cutting policies that support the delivery of the plan objectives, and which include various protective policies; these policies have no spatial component (beyond applying to the WNMP area).
- **The Sector Policies**: sector-specific policies that will apply to, or inform, decisions related to particular activities. These policies are broadly categorised as 'supporting policies' (which encourage the submission of proposals for particular activities).

2.5.2 These are the aspects that are most likely to influence or in some way guide future activities in marine areas and hence determine the overall effects of the WNMP with regard to European sites.

2.5.3 The WNMP does not:

- identify or support specific schemes;
- dictate where certain activities or schemes should go; or
- preclude activities or schemes outside those identified in the WNMP, if the proposed activity or scheme is consistent with the policies in the plan.

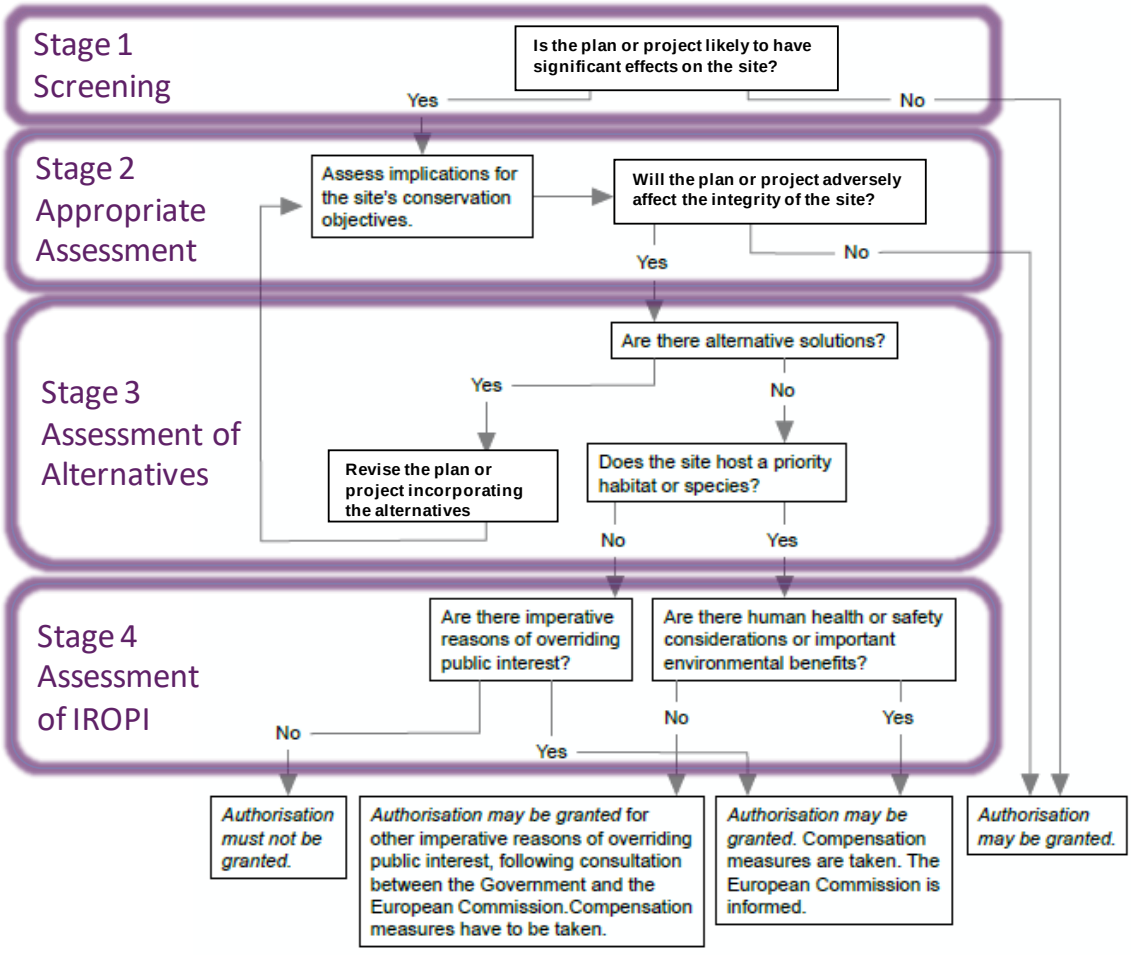
3. HRA of the Welsh National Marine Plan

HRA of strategic policy documents can be complex, often resulting in the identification of theoretical risks that cannot necessarily be qualified or quantified in detail with the information available at the strategy-level, requiring novel policy-based approaches to provide certainty regarding plan effects. This section provides an overview of the HRA approach and those factors or plan aspects that are relevant to this.

3.1 HRA of Strategic Plans

3.1.1 The requirements of Regulation 63 of the Habitats Regulations are usually addressed through a staged process with sequential tests. The current EC guidance[27] suggests a four-stage process for HRA; these stages, and the assessment process, are summarised in **Figure 3.1** below:

Figure 3.1 Summary of HRA process and stages



[27] *Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC 2002).

3.1.2 At the 'screening' stage, the plan should be considered 'likely' to have an effect if the competent authority (in this case, the Welsh Government) is unable, on the basis of objective information, to exclude the possibility that it could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' if it could undermine the site's conservation objectives. The 'screening stage' or 'test of significance' is therefore a relatively low bar, intended as a trigger rather than a threshold test: 'significant effects' can generally be interpreted as any negative effects that are not self-evidently negligible or inconsequential; 'likely' is typically interpreted as a simple question of whether the plan or project concerned is capable of having an effect[28].

3.1.3 If the possibility of 'significant effects' cannot be excluded then 'appropriate assessment' is required. An appropriate assessment provides a robust, objective, scientific basis for determining whether the site integrity will be adversely affected as a result of the plan's implementation. However, what constitutes an 'appropriate' assessment is not defined by the Regulations or the Habitats Directive, and such assessments need not be extremely detailed: they must simply be 'appropriate' to the plan being assessed and the complexity, scale and risk of effects; and sufficient to ensure that there is either no reasonable doubt that adverse effects on site integrity will not occur, or to accurately characterise those effects to adequately inform later stages of the HRA process (if required).

3.1.4 If the competent authority is unable to conclude that there will be no adverse effects on the integrity of a site then it must consider alternative solutions for delivering the objectives of the plan or project (Regulation 64 of the Habitats Regulations); if no alternatives are available, then a case for authorising the plan or project may be made for Imperative Reasons of Overriding Public Interest (IROPI), subject to the identification of suitable compensatory measures. These assessments must necessarily take account of the results of the appropriate assessment stage.

3.1.5 The approach summarised in **Figure 3.1** works well at the project-level where the scheme design is usually established and possible effects on European sites can be assessed (usually quantitatively) using a stepwise process and detailed scheme-specific data. In contrast, the fundamental nature of some strategic plans and policies (including the WNMP) presents several challenges for HRA, particularly when determining those plan aspects that can be meaningfully assessed.

3.2 Approach to HRA

Guidance

3.2.1 There is little specific guidance on the application of Regulation 63 to high-level national plans or policy documents, particularly as many high-level policy documents are often excluded from the HRA process[29].

[28] Case C-258/11: Judgment of the Court (Third Chamber) of 11 April 2013 and Opinion of the Advocate General dated 22nd November 2012. Peter Sweetman and Others v An Bord Pleanála. Reference for a preliminary ruling: Supreme Court - Ireland.

[29] EC guidance on the application of Article 6(3) (*Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC* (EC, 2000) states that "*…a distinction needs to be made with 'plans' which are in the nature of policy statements, i.e. policy documents which show the general political will or intention of a ministry or lower authority. An example might be a general plan for sustainable development across a Member State's territory or a region. It does not seem appropriate to treat these as 'plans' for the purpose of Article 6(3), particularly if any initiatives deriving from such policy statements must pass through the intermediary of a landuse or sectoral plan. However, where the link between the content of such an initiative and likely significant effects on a Natura 2000 site is very clear and direct, Article 6(3) should be applied.*"

3.2.2 Established guidance on plan-level HRA has been used to determine a suitably robust approach, including:

- DTA Publications (2016) *The Habitats Regulation Handbook* [online]. Available at: http://www.dtapublications.co.uk/handbook/. Accessed 02.02.16.
- SNH (2017) Habitats Regulations Appraisal of Plans: Guidance for plan-making bodies in Scotland. Scottish Natural Heritage.

3.2.3 The HRA has also drawn on the approaches used for the HRAs of:

- published and emerging Marine Plans (including the Scottish National Marine Plan (2015)[30], the East Inshore and East Offshore Marine Plans (2014)[31]; the South Marine Plan (2016)[32], and the Marine Plan for Northern Ireland (in preparation)[33]); and
- other high-level policy documents, such as the National Policy Statements (NPS).

HRA as a Process

3.2.4 Regulation 63 of the Habitats Regulations essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages. However, as with Strategic Environmental Assessment (SEA), it is accepted best-practice for the HRAs of strategic plans or policy documents to be run as an iterative process alongside their development.

3.2.5 As such, the *process* of strategic HRA is as much about guiding the development of the plan (and demonstrating that effects on European sites have been considered appropriately) as it is about (ultimately) assessing its effects. This approach has been followed throughout the development of the WNMP.

3.2.6 The broad aim of this process is to avoid as many potential adverse effects as possible through the plan evolution, and so the iterative development of avoidance or mitigation measures is key to the HRA. Avoidance measures are integral to the plan development process, and are essentially minor policy amendments that are identified as part of the iterative plan review process to improve plan performance and / or minimise the risks of 'adverse effect' policies being pursued (for example, dropping a policy or allocation entirely if significant adverse effects appear certain). Mitigation measures are used where specific significant effects are identifiable (and appropriate assessment is undertaken) in order to prevent adverse effects on a site's integrity.

3.2.7 The Welsh Government has engaged with key consultees throughout the WNMP development process and the HRA. This has included consultation on the Draft WNMP and its HRA, and the subsequent assembly of a 'Tidal Lagoon Policy Technical Working Group' to explore some of the issues arising from the Draft WNMP and HRA.

[30] Available at: https://www2.gov.scot/Topics/marine/seamanagement/national

[31] Available at: https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans

[32] Available at: https://www.gov.uk/government/collections/south-marine-plans

[33] Available at: https://www.daera-ni.gov.uk/consultations/consultation-proposed-marine-plan

HRA as a Technical Assessment

Key Issues

3.2.8 As noted, there is little guidance on the on the application of Regulation 63 to high-level national plans or policy documents and so the technical assessment of the WNMP is based on case-practice established through the HRAs of other marine plans and similar national-level policy documents.

3.2.9 The Vision and Objectives of the WNMP (see **Section 2** and **Table 2.1 and 2.3**) are the intended (and so arguably 'likely') outcomes of the WNMP; these outcomes are guided, supported and moderated by the plan policies, individually and collectively as well as wider relevant current legislation, policy and regulatory practice. The WNMP therefore promotes or supports proposals for activities (where they contribute to the plan objectives and comply with the general policies), and provides determination criteria for lower-tier decision-making through the general policies.

3.2.10 The WNMP does not provide any explicit spatial direction, beyond the application of the policies to developments (etc.) in Welsh waters. Whilst some marine areas are likely to be particularly suitable for certain sector activities due to inherent environmental or physiographic factors (e.g. tidal stream technologies currently have requirements for minimum current velocities, although these are likely to change in the future), the plan does not identify or link such areas to policy prescriptions. As a result, the plan is geographically neutral and does not explicitly or implicitly identify the nature, scale or location of development that may benefit from the plan policies[34,35].

3.2.11 The WNMP does not identify or support specific schemes; nor dictate where certain activities or schemes should or could go; nor preclude activities from taking place in particular areas.

3.2.12 This has implications for the HRA of the plan. In particular, whilst potential effect pathways are conceivable at the plan level, there will often be no way of concluding that an effect will not occur (or will not be adverse) solely through an objective technical assessment of an effect scenario (as would be the case with a project-level assessment), given the numerous ways in which a policy could be delivered or met. Attempting to undertake a detailed analysis of how each European site or feature might be affected by a hypothetical sector activity or project is neither feasible or, arguably, meaningful in most instances – the uncertainties over the final outcomes are too great.

3.2.13 Using tidal stream energy as an example: many tidal stream schemes will have the potential to affect mobile interest features (e.g. marine mammals, through collisions with subtidal infrastructure), and so a policy broadly supporting tidal stream energy has a potential effect pathway. However, the actual effects of any schemes that come forward (and which will then be determined in accordance with the policy) will depend on numerous project-specific aspects that cannot be established above the project level; for example, the specific tidal stream technologies that might be deployed at a given location.

3.2.14 The HRA of the WNMP is consequently, and necessarily, a high-level assessment that aims to identify potential effect pathways, exclude them if possible, and manage any residual uncertainty through the WNMP policy framework. It is therefore important to ensure that the WNMP does not

[34] Note, earlier iterations of the WNMP included 'Strategic Resource Areas' (SRAs) which could be interpreted as providing geographical direction for sector growth or developments. [comment as above] SRAs are not included in the revised version of the plan except as a concept that may be explored for certain sectors in future updates of the WNMP, subject to evidence available at that time. The WNMP does support evidence gathering to assist with the future designation of SRAs.

[35] There is one principal exception to this: the WNMP includes policies relating to the Ports sector, and so these policies are, in part, implicitly related to the locations of existing ports.

impose policies or planning constraints that are likely to make the avoidance of adverse effects on European sites unachievable at the project-level.

3.2.15 The HRA recognises safeguards provided by the existing legislative permitting and consenting frameworks, and so the HRA necessarily assumes, as set out in the WNMP, that any developments benefitting from the WNMP will follow and adhere to all relevant consents (etc). including those in relation to a schemes' operation.

Screening

3.2.16 The approach to screening is detailed in **Sections 4** and **5**. In summary, the screening broadly employs the following steps and principles, which are consistent with current guidance:

i. Review the plan objectives and policies to identify a reasonable 'zone of environmental influence' for the plan (and hence the effective boundary beyond which 'no effects' would be anticipated), and the potential mechanisms or pathways by which European sites or interest features could be affected.

ii. Identify those WNMP sectors and policies that can be 'screened out' from further consideration (see also **Section 4**); these will principally be:

- policies that cannot have an effect (e.g. general statements of policy; policies that don't promote a change; non-specific protective policies; etc.); or
- policies that reflect or incorporate external plans or programmes that have been subject to HRA (e.g. oil and gas licensing).

iii. Review the plan policies (particularly the 'protective' policies) to ensure that those that are 'screened out' are suitably drafted and that the cross-cutting policies provide appropriate safeguards against the possibility of residual non-specific effects.

iv. Identify those European sites and features that are potentially vulnerable (i.e. both exposed and sensitive) to the 'screened in' policies (i.e. those sites within or near the marine plan area; or mobile interest features that may be dependent on or utilise the marine plan area during their life-cycle), and those sites that will not or cannot (based on available information) be affected by the plan outcomes.

v. Take 'screened in' policies and European sites to appropriate assessment.

3.2.17 As noted, the 'screening' test is treated as a low bar: in general, unless the possibility of significant effects can be simply and self-evidently excluded then an 'appropriate assessment' is completed.

3.2.18 Data on the European sites, such as site interest features; site locations; conservation objectives; and condition assessments, were collected from the Joint Nature Conservation Committee (JNCC), NRW and Natural England (NE) websites. These data were used to determine the condition, vulnerabilities and sensitivities of the sites and their interest features and determine the approximate locations of the interest features within each site (if reported).

Mitigation and People over Wind

3.2.19 The 'low bar' approach to screening is reinforced by recent case law known as 'People Over Wind'[36], which has altered how avoidance and mitigation measures are accounted for by an HRA. The judgement states that "*…it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects [mitigation] of the plan or project on that site*". This

[36] Case C 323/17 Court of Justice of the European Union: People Over Wind

contrasts with established practice in this area (based on the "Dilly Lane" judgment[37]), where avoidance and mitigation measures incorporated into the plan during its development were typically accounted for at the screening stage.

3.2.20 The broader context of the 'People over Wind' case suggests that the judgement is principally focusing on those instances where specific measures are included in a plan to prevent or mitigate a specific effect that would otherwise be significant. However, there is currently little information on the practical implementation of the 'People over Wind' judgement, particularly for strategy-level HRAs that both guide and assess the subject plan. Many 'recommendations' derived from an iterative policy review process might be interpreted as 'avoidance' or 'mitigation' measures if viewed solely in terms of their implications for European sites, but it is clear that an exhaustive examination of the plan's genesis to see if any aspects might count as 'mitigation' for screening purposes would not be proportionate, or (arguably) consistent with the intent of the Habitats Directive or the 'People over Wind' judgement.

3.2.21 The screening **does not** therefore take account of any specific measures that are included in response to a specific identified effect on a European site, and which are intended to avoid or reduce that effect. However, non-specific policy amendments that have been recommended and adopted during plan-development to improve policy performance, or which would be included irrespective of the presence of any European sites (either as a legal requirement, or as a matter of standard practice), are considered to be an inherent part of the plan being screened.

Appropriate Assessment

3.2.22 The approach to appropriate assessment is detailed in **Section 6**. In summary, the appropriate assessment aims to determine whether any 'screened in' policies will adversely affect any European sites or interest features, taking into account site conservation objectives (where specific sites can be identified), the likely outcomes of the policy, and any mitigation that is either specifically introduced by the plan or which is known to be available, achievable and effective for activities supported by the policy. The approach used will vary according to the policy being considered and the effects anticipated, but necessarily reflects the uncertainties inherent at the plan-level.

3.2.23 Where detailed assessment of effects on specific European sites is not possible (e.g. because the policy has no spatially definable components below the scale of the plan itself, and does not direct, influence or clarify the nature, scale or location of activities) the assessment considers whether HRA can be reasonably deferred 'down the line' to a lower tier in the planning hierarchy. Guidance[38] indicates that this is likely to be acceptable if:

- the higher tier plan appraisal cannot reasonably predict the effects on a European site in a meaningful way; whereas;
- the lower tier plan, which will identify more precisely the nature, scale or location of development, and thus its potential effects, retains enough flexibility within the terms of the higher tier plan over the exact location, scale or nature of the proposal to enable an adverse effect on site integrity to be avoided; and
- HRA of the plan or project at the lower tier is required as a matter of law or Government policy.

3.2.24 When determining whether 'down the line' assessment is acceptable, the appropriate assessment considers:

[37] (*R on the application of Hart DC*) v Secretary of State for Communities and Local Government [2008].)
[38] SNH (2017) *Habitats Regulations Appraisal of Plans: Guidance for plan-making bodies in Scotland*. Scottish Natural Heritage

- the inherent scale of the development(s) potentially receiving support;
- the availability and effectiveness of project-level mitigation measures;
- any incidental or indirect constraints introduced by the policy which may influence how schemes can be delivered and which may inadvertently ensure that significant or significant adverse effects cannot be avoided by lower-tier plans or projects; and
- mitigation measures or policy safeguards within the plan.

In combination effects

3.2.25 The Habitats Regulations requires that the potential effects of a plan on European sites must also be considered 'in combination with other plans or projects'. Consideration of 'in combination' effects is not a separate assessment, but is integral to the screening and appropriate assessment stages and the development of avoidance/ mitigation measures.

3.2.26 Due to the strategic nature of the HRA of the WNMP, the uncertainties associated with any in combination assessment are considerable, and multiply the uncertainties associated with the WNMP. In particular, the WNMP could (in theory) interact with any strategic plan affecting marine areas (or sites supporting species reliant on marine areas). Attempting to identify specific potential effects on marine areas or sites associated with activities that may arise from the WNMP and other plans is therefore not practicable and such an assessment would not provide any meaningful results that would allow specific mitigation to be identified. For example, housing allocations in every local plan could have theoretical 'in combination' effects on water resources and so potentially affect diadromous fish, which could interact with factors affecting the fish in the marine environment. The number and variety of these interactions is obviously huge, and any assessment would be largely generic; how this would translate into policy is not clear, other than equally generic policy statements requiring that 'unacceptable / significant in combination' effects do not occur.

3.2.27 Where specific 'in combination' effects are not identifiable in any meaningful way, the assessment aims to ensure that the WNMP does not include any policy aspects that would obviously constrain the mitigation options available for future activities, or direct activities such that conflict between policies or with other plans is inevitable, or contain policies or objectives that would allow protective measures included in other plans to be over-ridden or ignored.

3.3 Summary

3.3.1 In the absence of specific guidance on the application of Regulation 63 to Marine Plans, the technical assessment of the WNMP is based on case-practice established through the HRAs of other Marine Plans and similar national-level policy documents (such as NPSs), taking into account recent case-law on the treatment of mitigation at the screening stage ('People over Wind').

3.3.2 The screening and appropriate assessment stages reflect the high-level nature of the WNMP and its policies. The WNMP policies are screened for their potential to result in environmental changes that may affect European sites (**Section 4** below); European sites and features are then reviewed to identify those that are potentially exposed and sensitive to those changes (**Section 5**). Appropriate assessments are then undertaken where pathways for significant effects are present (**Section 6**).

4. Welsh National Marine Plan Policy Screening

This section provides a summary of the screening process as applied to the general and sector specific policies of the WNMP. It identifies those policies that should be excluded from further assessment, either because they can have no significant effect or because assessment by the HRA of the WNMP is not appropriate.

4.1 Approach and Screening Criteria

4.1.1 The policies of the WNMP provide:

- general cross-cutting guidance and criteria (the General Policies) applicable to all sectors;
- support for the various Sector Objectives (Sector Policies); and
- cross-cutting 'Safeguarding Policies' that also apply to all sectors.

4.1.2 If the objectives are the intended outcome of the WNMP then the policies that relate to these are the mechanisms by which these objectives are delivered. Assessment of the policies is therefore an important component of the HRA process.

4.1.3 The screening test (as applied to policies) identifies and enables the differentiation of 'no significant effect' policies from policies where effects are uncertain or likely to be significant, so that the latter can be considered in detail through appropriate assessment.

4.1.4 When considering the likely effects of a policy, it is recognised that:

- some policy 'types' cannot result in negative impacts on any European sites (e.g. a general policy safeguarding biodiversity resources); and
- that some policies or plan aspects should not or cannot be assessed by the HRA of the plan within which they sit (even though a theoretical effect pathway exists) as there is no practical way of completing a meaningful assessment (i.e. they are 'screened in' but assessment must be deferred to a lower tier).

4.1.5 Different guidance documents (see **Section 3.2** above) suggest various classification and referencing systems to help identify the types of policy that can be 'screened out', although the general characteristics are summarised in **Table 4.1**.

Table 4.1 Policy 'types' that can typically be screened out

Broad policy type	Notes
General statements of policy / aspiration	The European Commission guidance recognises* that plans or plan components that are general statements of policy or political aspirations cannot have significant effects; for example, general commitments to sustainable development or support for renewable energy (i.e. the policies have no spatially definable components (below the scale of the plan itself) and do not direct, influence or clarify the nature, scale or location of activities).

Broad policy type	Notes
General design / guidance criteria or policies that cannot lead to or trigger development	A general 'criteria based' policy expresses the tests or expectations of the plan-making body when it comes to consider proposals, or relates to design or other qualitative criteria which do not themselves lead to development (e.g. controls on design); however, policies with criteria relating to specific proposals or allocations should not be screened out. With regard to the WNMP, 'safeguarding' policies are considered in this category as although they help provide a framework for the supportive policies to function they do not themselves support or trigger development.
External plans / projects subject to HRA	Plans or projects that are proposed or defined by other plans subject to HRA (e.g. Sectoral Plans such as the Round 3 Offshore Windfarm leasing), which are referred to for completeness, and where the assessed plan does not provide greater clarity on the delivery of the proposals. For example, offshore oil and gas licensing is driven by a separate planning and consenting process, itself subject to HRA, which the WNMP reflects; however, the WNMP does not provide direction, influence or further clarity on the nature and location of these activities.
Environmental protection policies	Policies designed to protect the natural or built environment will not usually have signifcant or adverse effects (although they may often require modification if relied on to provide sufficient safeguards for other policies). Note, protective policies that specifically relate to European sites and which may be relied on to avoid adverse effects cannot themselves have significant or adverse effects but would nevertheless be considered at the appropriate assessment stage to ensure that the measures are suitable.
Policies which could have no conceivable effect	Policies or proposals which cannot affect a European site (no impact pathways and hence no effect; for example, proposals for new cycle path several kilometres from the nearest European site) or which cannot undermine the conservation objectives, either alone or in combination, if impact pathways exist (no significant effect).

* EC, 2000, Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC April 2000 at 4.3.2

4.1.6 The WNMP policies were reviewed with these broad classifications in mind, although it must be noted that it is inappropriate to apply a policy classification tool uncritically to all policies of a certain type; or to consider a policy in isolation, without reference to its broader intent, context or objectives. There will obviously be some occasions when a policy or similar may have potentially significant effects despite it being of a 'type' that would normally be screened out, and many policies (particularly protective policies) can be enhanced to improve their performance in the context of the Habitats Regulations.

4.1.7 As a general rule a policy or sector must have some component that directs, influences or clarifies the nature and location of lower-tier activities in order to be 'assessable' at the plan-level. This can present difficulties for HRA: if this information is absent then, for some policies, it may not be possible to exclude significant effects at the WNMP-level in the planning hierarchy; but there may also be no practical way of completing a meaningful assessment of the effects on specific European sites. In these instances it is generally accepted that such policies should be taken forward to an 'appropriate assessment' stage at which point any plan-level mitigation measures can be considered; if meaningful assessment is still not possible, assessment is then undertaken 'down the line' to a lower tier in the planning hierarchy (e.g. the project level). The key aspect is then ensuring that adverse effects are not an unavoidable outcome of delivering the policy (i.e. that there is sufficient certainty that the policy could be implemented or met by lower-tier plans or projects without adverse effects on a European site).

4.2 Screening of Plan Components

4.2.1 The following sections summarise the screening of the main policy components of the plan (the Plan Vision and Objectives; the overarching General Policies and Safeguarding Policies; and the Sector-specific Policies), based on the policy types noted in **Table 4.1**.

Plan Vision and Objectives

4.2.2 The Plan Vision and Objectives provide the drivers and framework for the WNMP policies, and so it is important that they do not create a scenario whereby associated policies or subsequent developments and activities cannot avoid significant or significant effects on European sites; or set targets or criteria that would be incompatible with the achievement of 'favourable conservation status'.

4.2.3 No aspects of the Plan Vision or Objectives do this: they are essentially general statements of policy and aspirations that do not direct, influence or clarify the nature, scale or location of derived policies or future activities. The Plan Vision and Objectives will therefore have no significant effects, alone or in combination, and are screened out.

General Policies

4.2.4 In summary, all of the general cross-cutting policies in the WNMP (see **Table 4.2**) are considered to be 'no significant effect' policies themselves as they are invariably 'General statements of policy / aspiration', 'General design / guidance criteria or policies that cannot lead to or trigger development' or general 'Environmental protection policies'.

4.2.5 However, following the 'People over Wind' case it is arguably necessary to take account of some of the environmental protection policies at any 'appropriate assessment' stage as they are partially relied on (as cross-cutting policies) to safeguard European sites where sector policies provide general support without any spatial context or definition.

Table 4.2 Summary of 'General Policies' screening

Policy	Screening Summary	Policy Type/Screening Criteria	Examine further (AA)?
GEN_01	Overarching planning policy with presumption in favour of sustainable development; sustainable development is defined in accordance with the Well-being of Future Generations (Wales) Act 2015. No spatial component.	General statements of policy / aspiration.	N
GEN_02	Overarching planning policy; requires that authorities take a proportionate, risk-based approach to decision making.	General statements of policy / aspiration.	N
ECON_01	General statement encouraging proposals for economically sustainable activities. No spatial component. Encourages proposals that contribute to "the sustainable management of natural resources thereby supporting ecosystem resilience".	General statements of policy / aspiration.	N
ECON_02	General statement of policy requiring that proposals demonstrate how they have considered opportunities for coexistence with other compatible sectors. No spatial component.	General guidance criteria that do not define development.	N
SOC_01	General statement of policy that encourages proposals that maintain or enhance access to the marine environment. No spatial component.	General statements of policy / aspiration.	N
SOC_02	Encourages proposals that contribute to the well-being of coastal communities. No spatial component.	General statements of policy / aspiration.	N

Policy	Screening Summary	Policy Type/Screening Criteria	Examine further (AA)?
SOC_03	Requires that proposals demonstrate how they minimise their risk of causing or contributing to marine pollution incidents. Primarily protective policy with no spatial component. Not specific to European sites and so not considered a specific 'mitigation measure' that needs to be considered through AA. Supporting text notes need to consider risks of enhanced access, including environmental risks.	General statements of policy / aspiration / environmental protection policies.	N (although the mitigtaing effect of the policy is considered at the AA stage)
SOC_04	Supports proposals that contribute to the conservation and promotion of Welsh language. No spatial component.	General statements of policy / aspiration.	N
SOC_05	Policy protecting historic assets and settings. No spatial component.	Environmental protection policy.	N
SOC_06	Policy applying the mitigation hierarchy to designated landscapes (National Parks or AoNBs). Implicit spatial component (relates to National Parks and AoNBs which have defined boundaries) but no significant effects possible through this protective policy.	General criteria policy that does not define development / Environmental protection policy.	N
SOC_07	Policy applying the mitigation hierarchy to seascapes. No spatial component.	General criteria policy that does not define development / Environmental protection policy.	N
SOC_08	Proposals should demonstrate how they are resilient to coastal change and flooding over their lifetime. No spatial component.	General criteria policy that does not define development / Environmental protection policy.	N
SOC_09	Policy applying the mitigation hierarchy to coastal change and flooding, although the 'mitigate' component of the hierarchy is not included as in some instances coastal change / flooding is likely to be inevitable or desirable (either as a direct result of climate change, or in association with coastal re-alignment); as a result the policy encourages proposals that align with the relevant Shoreline Management Plans (note, the SMPs have also been subject to HRA). No spatial component.	General criteria policy that does not define development / Environmental protection policy.	Y
SOC_10	Policy applying the mitigation hierarchy to greenhouse gas emissions. No spatial component.	General criteria policy that does not define development / Environmental protection policy.	N
SOC_11	Requires that proposals demonstrate how they have considered / will adapt to climate change. No spatial component.	General criteria policy that does not define development / Environmental protection policy.	N
ENV_01	Policy applying the mitigation hierarchy to proposals affecting marine ecosystems. Encourages proposals that contribute to the protection, restoration and/or enhancement of marine ecosystems. No spatial component.	General criteria policy that does not define development / Environmental protection policy.	N (although the mitigtaing effect of the policy is considered at the AA stage)

Policy	Screening Summary	Policy Type/Screening Criteria	Examine further (AA)?
ENV_02	Policy setting out requirements regards marine protected areas and designated sites that are not part of the MPA network (e.g. terrestrial European sites). Presumption of policy is that proposals will be designed to avoid adverse effects on European sites; activities that cannot demonstrate this would not be able to meet these policy requirements. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
ENV_03	Requires that proposals include biosecurity measures to reduce the risk of introducing and spreading invasive non-native species. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
ENV_04	Requires that proposals demonstrate how they will minimise litter generation / dispersal. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
ENV_05	Policy applying the mitigation hierarchy to noise impacts. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
ENV_06	Policy applying the mitigation hierarchy to air and water quality impacts. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
ENV_07	Policy applying the mitigation hierarchy to impacts on fish species and habitats; directed particularly at supporting habitats for fish and shellfish that are or commercial and (notably, from an HRA perspective) ecological importance. No spatial component.	Environmental protection policy; however, this policy is likely to be relied on as a general 'mitigation' for non-specific effects from other policies, and so is taken into account at any AA stage.	N (although the mitigtaing effect of the policy is considered at the AA stage)
GOV_01	Policy applying the mitigation hierarchy to non-specific cumulative effects. No spatial component.	Environmental protection policy; will ensure that 'in combination' effects are considered in any lower-tier assessments.	N
GOV_02	Policy requiring that determining authorities have regard to compatibility with other plans, including cross-border plans. No spatial component.	General criteria; will also help ensure that 'in combination' effects are considered in any lower-tier assessments.	N
SCI_01	Relevant public authorities should make decisions using sound evidence and a risk-based approach. Where appropriate they should apply the precautionary principle and consider opportunities to apply adaptive management.	General statements of policy / aspiration / Environmental protection policy.	N

Safeguarding Policies

4.2.6 The screening of the 'Safeguarding Policies' is set out in **Table 4.3**. In summary, these policies do not promote or support development, nor preclude development occurring in particular areas in such a way that significant effects on European sites from other policies are rendered more likely. These policies are therefore 'screened out'.

Table 4.3 Summary of 'Safeguarding Policies' screening

Policy	Screening Summary	Policy Type/Screening Criteria	Examine further (AA)?
DEF_01	Overarching safeguarding policy related to defence, requiring the agreement of the MOD for proposals that may affect facilities (etc.) necessary for defence and national security. Policy arguably has an implicit spatial component (reference to 'Danger Areas', 'Exercise Areas' or 'facilities'), although its application is not limited to these areas and, importantly, the policy does not promote or support development nor preclude development from these areas (so risking displacement effects).	General policy criteria that cannot themselves lead to or support development.	N
SAF_01a SAF_01b	Overarching policies intended to safeguard existing activities by requiring that proposals demonstrate their compatibility with these activities; also applies the mitigation hierarchy in this regard. Policy arguably has an implicit spatial component (based around 'existing activities, consented or otherwise) but this cannot be precisely defined by any reasonable method and, importantly, the policy does not promote or support development nor preclude development from these areas.	General policy criteria that cannot themselves lead to or support development.	N
SAF_02	Overarching policy intended to safeguard strategic resources identified by an SRA, requiring that proposals demonstrate their compatibility with the activities intended for the SRA; also applies the mitigation hierarchy in this regard. This policy currently does not have a spatial component as SRAs are not defined in policy at this stage; the policy will apply to any SRAs that may be introduced in the future through a Marine Planning Notice (MPN) (which would be subject to HRA). More generally, the policy does not promote or support development. There may be a theoretical future risk of displacement (if activities are discouraged from occurring in SRAs and consequently have an increased risk of affecting European sites) but the policy does not preclude development from future SRAs and any such displaced activity would still need to meet the other policies within the plan, including those relating to the protection of designated sites.	General policy criteria that cannot themselves lead to or support development.	N

Sector Policies

4.2.7 **Table 4.4** presents the outcome the screening of the sector policies. The policies were reviewed in the context of the objectives for the sector and hence intended outcomes, along with the policy types presented in **Table 4.1**, to identify those where more detailed appropriate assessment at the WNMP level is considered necessary.

Table 4.4 Summary of 'Sector Policies' screening

Aspect / Sector	Policies	Screening summary	Policy Type/ Screening criteria	AA?
Aggregates	AGG_01a AGG_01b	**AGG_01a** provides support for aggregate developments that contribute to the plan objectives and comply with the general policies, including the protective / mitigating policies relating to European sites. The policy is intended to replace the Interim Marine Aggregates Dredging Policy (iMADP, 2004), which applied primarily to extraction in the Bristol Channel. The policies therefore extend the spatial extent of aggregates policy in Wales beyond the iMADP, but does not define a specific spatial component beyond the WNMP area. However, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'. **AGG_01b** simply supports evidence gathering and so cannot significantly affect any European sites.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (AGG_01a, in relation to future activities only, not existing consents)
Aquaculture	AQU_01a AQU_01b	**AQU_01a** provides support for aquaculture developments that contribute to the plan objectives and comply with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy; however, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'. **AQU_01b** simply supports evidence gathering and so cannot significantly affect any European sites.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (AQU_01a)
Defence	DEF_01	See **Table 5.3.**	Safeguarding policy only; does not support (etc.) development.	No
Dredging and Disposal	D&D_01	**D&D_01a** is principally intended to safeguard existing consented operations and provide some surety for operators that these will be maintained. The WNMP does not therefore identify proposed or potential dredging or disposal areas, only areas where operations are currently undertaken. These aspects of the policy can be excluded from further consideration as it is a reflection of the existing consented operations. The policy does provide support for new dredging / disposal activities, contingent on those activities contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites; however, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'.	Significant effects from future activities benefitting from policy cannot be excluded.	Yes (D&D_01a, in relation to future activities only, not existing consents)

Aspect / Sector	Policies	Screening summary	Policy Type/ Screening criteria	AA?
Energy – Low Carbon (Wind)	ELC_01a ELC_01b	**ELC_01a** provides support for wind energy proposals, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy, although there are existing wind lease areas, defined by TCE through its leasing process which have been subject to HRA. Future rounds of seabed leasing by TCE will be subject to strategy-level HRA and will have regard to the provisions of the WNMP policies. This aspect is included based on NRW's comments on the initial draft WNMP (letter dated 17 March 2017) and the application of the WNMP to areas outside the currently leased areas. **ELC_01b** only supports evidence gathering and so cannot significantly affect any European sites.	Partly reflects existing leases but applies more broadly.	Yes (excluding existing TCE leasing)
Energy – Low Carbon (Wave)	ELC_02a ELC_02b	**ELC_02a** provides support for wave energy proposals, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy, although there are existing wave lease areas, defined by TCE through its leasing process which have been subject to HRA. Future rounds of seabed leasing by TCE will be subject to strategy-level HRA and will have regard to the provisions of the WNMP policies. This aspect is included based on NRW's comments on the initial draft WNMP (letter dated 17 March 2017) and the application of the WNMP to areas outside the currently leased areas. **ELC_02b** only supports evidence gathering and so cannot significantly affect any European sites.	Partly reflects existing leases but applies more broadly.	Yes (excluding existing TCE leasing)
Energy – Low Carbon (Tidal stream)	ELC_03a ELC_03b	**ELC_03a** provides support for tidal stream energy proposals, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy, although there are existing tidal stream lease areas, defined by TCE through its leasing process which have been subject to HRA. Future rounds of seabed leasing by TCE will be subject to strategy-level HRA and will have regard to the provisions of the WNMP policies. This aspect is included based on NRW's comments on the initial draft WNMP (letter dated 17 March 2017) and the application of the WNMP to areas outside the currently leased areas. **ELC_03b** only supports evidence gathering and so cannot significantly affect any European sites.	Partly reflects existing leases but applies more broadly.	Yes (excluding existing TCE leasing)
Energy – Low Carbon (Tidal range)	ELC_04	**ELC_04** only supports evidence gathering for tidal lagoon development and so cannot significantly affect any European sites.	Policy cannot lead to development.	No

Aspect / Sector	Policies	Screening summary	Policy Type/ Screening criteria	AA?
Energy – Oil and Gas (including CCS)	O&G_01a O&G_01b O&G_02	**O&G_01a** applies to offshore and inshore areas subject to UK Government national policy, and so reflects UK government policy in this area and the existing leasing process; for oil and gas exploration and production activities, the identification of Resource Areas and the refinement of areas (blocks) for licensing is determined through the OESEA and Seaward Licensing Rounds, which have been subject to strategic HRA through the licensing process[39] (or will be, for future leasing) which concluded no adverse effects[40] and any assessment of the WNMP policies would necessarily reflect this as no further information on specific proposals or likely effects is available[41]. On this basis, this policy is excluded from further assessment. **O&G_01b** reflects Welsh Government policy and does not support the extraction of fossil fuels in intertidal areas and estuaries and coastal inlet waters that fall within the Welsh onshore licence area. Furthermore, the policy does not provide support for extraction of oil and gas outside these areas with land-based elements, and any proposal must be compatible with Welsh Government's decarbonisation approach. These aspects of the policy will not lead to development and can be screened out. **O&G_02** provides support for *carbo*n captured and storage proposals, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy, although where offshore CCS is being explored currently (e.g. the North Sea) it invariably relies on the utilisation of existing offshore oil and gas infrastructure, which is almost entirely absent from the WNMP area at the moment (other than that associated with the Douglas field in Liverpool Bay – the field is outside Welsh waters but a pipeline reaches shore at Point of Ayr on the North Wales coast). The OGA oversees the licensing of carbon storage and the carbon storage public register, BEIS oversees the policy and supports the development of CCS in the UK and OPRED assesses and determines the environmental applications associated with CCS. Therefore, further assessment of this is not possible at this stage, and this aspect is screened out.	Policies which reflect or incorporate external plans or programmes subject to HRA	No

[39] For example: DECC (2015), Offshore Oil & Gas Licensing 28th Seaward Round: Irish Sea and St George's Channel, Habitats Regulations Assessment: Stage 2 - Appropriate Assessment

[40] It should be noted that the HRAs of the license blocks were carried out at a relatively high level but were generally block-specific, with specific impacts on specific sites considered as far as is achievable at that stage. The HRAs invariably concluded 'no adverse effects', largely by deferring some aspects of the assessment to the project level and taking into account the 'mitigation measures' that can be imposed through existing permitting mechanisms on the planning and conduct of activities (i.e. the licences did not include specific exclusions that would guarantee that 'adverse effect' proposals would be refused).

[41] Note, the oil and gas licensing HRAs did not identify any specific 'residual effects' for consideration at the project-level, or in combination with other plans.

Aspect / Sector	Policies	Screening summary	Policy Type/ Screening criteria	AA?
Fisheries	FIS_01a FIS_01b	**FIS_01a** provides support for proposals that support sustainable fishing activities, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy and fishing activities themselves are not covered (fishing itself (etc.) is not a function or a responsibility of marine planning, but a consideration of it); however, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'. **FIS_01b** only supports evidence gathering and so cannot significantly affect any European sites.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (FIS_01a)
Ports and Shipping	P&S_01a P&S_01b P&S_02	**P&S_01a** provides support for proposals for ports, harbours and shipping activities, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. **P&S_02** provides support for maintenance, repair, development and diversification of port and harbour facilities, contingent on the same criteria. **P&S_01a** does not have an explicit spatial component (it arguably relates to proposals for new ports and harbours), although a spatial aspect to **P&S_02** (and perhaps, to some extent, P&S_01a) is implicit since it relates to developments (etc.) associated with existing ports and harbours. As a result, these policies are screened in, with the AA focusing on European sites near to existing ports and harbours, although it should be noted that the policy provides no further information on the scale / type etc. of development that might come forward; and furthermore, ports policy is currently not devolved in Wales except for small fishing and recreation harbours, with the framework for decisions on new port development in the England and Wales provided by the National Policy Statement for Ports (NPS). **P&S_01b** only supports evidence gathering and so cannot significantly affect any European sites.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (P&S_01a, P&S_02)
Subsea Cabling	CAB_01	**CAB_01** provides support for subsea cabling, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy; however, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (CAB_01)
Surface Water and Wastewater Treatment and Disposal	SAF_01a	Surface water and wastewater treatment and disposal facilities are safeguarded by policy **SAF_01a** (see **Table 5.3**), which will not have significant effects on any European sites as it does not support development or otherwise provide a mechanism for European sites to be affected; this aspect is therefore screened out.	Safeguarding policy only; does not support (etc.) development.	No

Aspect / Sector	Policies	Screening summary	Policy Type/ Screening criteria	AA?
Tourism and Recreation	T&R_01a T&R_01b	**T&R_01a** provides support for tourism and recreation proposals, contingent on those proposals contributing to the plan objectives and complying with the general policies, including the protective / mitigating policies relating to European sites. There is no spatial component to the policy; however, the policy nevertheless provides a framework for the delivery of development and activities that have the potential to significantly affect European sites or features, which is not explicitly prevented by the 'General Policies'. **T&R_01b** only supports evidence gathering and so cannot significantly affect any European sites.	Significant effects from activities benefitting from policy cannot be excluded.	Yes (T&R_01a)

Summary

4.2.8 In summary, the following policies are 'screened in'

- All policies that 'support' development proposals (as they make provision for unquantified changes that could affect European sites), except for those policies which reflect or incorporate external plans or programmes subject to HRA, i.e.:
  - 'supporting' policies for 'Energy – Oil and Gas' (O&G_01a) as the leasing / licensing of blocks is subject to HRA through the licensing process and delivered by the UK government, and so the policy simply reflects UK government policy in this area;
  - 'supporting' policies for 'Energy – Low Carbon' (ELC_01 - 03) includes existing lease areas defined by the TCE which have been subject to HRA and so whilst the policy covers these areas, they have not been subject to further appropriate assessment as it has been previously completed. However, ELC policies are screened in for appropriate assessment where they apply to future offshore low carbon proposals that may not be covered by TCE offshore leasing rounds;
  - policy aspects that reflect ongoing authorised activities previously subject to permits or other authorisations and hence HRA (e.g. existing aggregates permissions; existing dredging permissions).
- General policies ENV_01 – ENV_07; although these are 'protective' policies they are taken into the appropriate assessment stage as they will provide a degree of mitigation for the sector policies that should be taken into account at that stage, based on '*People over Wind*', although the policies themselves are 'no significant effect' policies.

4.2.9 All other policies are therefore 'screened out', principally as they do not promote or support developments or environmental changes that could affect European sites.

4.2.10 It must be recognised that none of the 'supporting' policies, with the possible exception of those related to port development, define a spatial scope for activities below the scale of the WNMP area, and nor do they direct, influence or clarify the precise nature and location of activities that might benefit from policy support. This inevitably presents some constraints for the scope of the 'appropriate assessment' of the WNMP.

5. European Sites Screening

This section provides a summary of the screening process that has been applied to the European sites, which identifies the activities, pathways and effects that have been considered in the WNMP screening, in order to identify those European sites to be screened into the assessment.

5.1 Overview of Plan Outcomes and Effect Pathways

5.1.1 The Sector Objectives (see **Table 2.3**) are the intended (and so arguably 'likely') outcomes of the WNMP for those identified sectors; these outcomes are guided, supported and moderated by the policies, individually and collectively. The WNMP therefore promotes or supports proposals for activities and provides planning guidance for lower-tier decision-making. The intended effect of this is therefore the facilitation and delivery of sustainable activities and development within the marine area – for example, aggregate extraction, tidal energy or aquaculture schemes. However, the range of activities that might benefit or result from the WNMP is extensive, and the strategic nature of the WNMP ensures that the assessment of activities and outcomes is necessarily generic.

5.1.2 Most environmental assessments employ source-pathway-receptor models (or similar) to identify potential environmental changes and the risk of consequent effects on ecological receptors. Due to the scope of the WNMP, and the absence of specific schemes (etc.), it is appropriate to adopt a broad approach to the identification of potential sources and pathways, and hence likely effect on European sites and features. This HRA uses the JNCC's *Marine activities and pressures evidence* database (JNCC 2016) as a basis for the identification of potential effect pathways. This provides:

- a standard UK list of marine activities and their definitions; and
- a list of marine pressures and their definitions (as agreed by the OSPAR Intercessional Correspondence Group on Cumulative Effects).

5.1.3 The activities and pressures identified by the JNCC are summarised in **Tables 5.1** and **5.2** below; a summary matrix is provided in **Appendix E**, which shows which pressures may occur as a result of specific activities. The standard activity and pressure definitions (from JNCC) are provided in **Appendix E**.

5.1.4 It should be noted that the WNMP will have limited or no direct influence over many of the activities noted in **Table 5.1**, particularly where they are permitted 'operational' activities outside the remit of a spatial planning policy document (and it's associated HRA). For example, fishing is not a function or a responsibility of marine planning, but a consideration of it; similarly with defence activities, or shipping, or sewage disposal. Unless there is a proposal for a capital scheme or similar, requiring permitting and hence consideration of the WNMP policies, then the WNMP has few mechanisms for influencing these aspects and cannot direct, influence or clarify the nature and location of particular activities through its policies. This is noted in **Table 4.1** and explored in **Section 4.1** (Policy Screening).

Table 5.1 Activities with the potential to affect marine receptors, based on the *Marine activities and pressures evidence* database (JNCC 2016), with the potential for WNMP influence; definitions in Appendix E

Activity	WNMP influence on activities?
Coastal defence & land claim protection (incl. beach replenishment)	Partial
Coastal docks, ports & marinas	Yes
Waste gas emissions	No
Industrial & agricultural liquid discharges	Partial
Sewage disposal	Partial
Waste disposal - munitions (chemical & conventional)	Partial
Power stations - thermal effluent and nuclear discharge	Partial
Fishing – demersal trawling	No
Fishing – dredging	No
Fishing – pelagic trawling	No
Fishing – traps (potting/creeling)	No
Fishing – recreational	No
Fishing – nets (static)	No
Fishing – lines	No
Fishing - seines (encircling)	No
Harvesting - seaweed and other sea-based food (bird eggs, shellfish, etc.)	No
Extraction of genetic resources e.g. bioprospecting & maerl (blue technology)	Partial
Aquaculture - fin-fish	Yes
Aquaculture – shellfish	Yes
Aquaculture – macro-algae	Yes
Extraction – sand and gravel (aggregates)	Yes
Extraction – rock/ mineral (coastal quarrying)	No
Extraction – navigational dredging (capital & maintenance)	Yes
Dredge & spoil disposal	Yes
Extraction – water (abstraction)	Partial
Renewable energy – wind (not including cables)	Yes
Renewable energy – wave (not including cables)	Yes
Renewable energy - tidal (not including cables)	Yes

Activity	WNMP influence on activities?
Marine hydro*carbo*n extraction (not including pipelines)	Partial
Shipping – port operations (mooring, beaching, launching etc.)	Partial
Shipping – general (at sea)	No
Coastal tourist sites (public beaches & resorts)	Partial
Recreational activities (e.g. boating, yachting, diving, etc.)	No
Marine research activities (incl. physical sampling and remote sensing)	Partial
Military activities	No
Submarine cable and pipeline operations	Yes
Gas storage operations (*carbo*n capture & natural gas storage)	Partial
Artificial reefs and other environmental structures	Yes
Cultural & heritage sites/structures (e.g. wrecks, sculptures, foundations etc.)	Yes

Effect Pathways

5.1.5 The pressures noted in **Table 5.2** are grouped according to the broad pressure themes identified in the UK Marine SAC Project (2001) and used in the Regulation 37 advice documents[42] for ease of reference, although these themes have been amended a little to better reflect the range of potential sensitivities and effects associated with the WNMP[43]. These pressures themes are:

- hydrodynamic changes (and hence potential geomorphological effects; e.g. alterations to tidal flows and currents; alterations to wave action);
- toxic contamination (e.g. through intentional, incidental or accidental discharges of contaminants; or mobilisation of contaminated sediments);
- non-toxic contamination and physio-chemical changes (e.g. nutrient enrichment; temperature changes; salinity changes);
- direct physical loss of habitats (e.g. from direct removal or smothering and hence change to another seabed type; land reclamation; etc.);
- direct physical damage of habitats (e.g. from partial removal by aggregate extraction; abrasion; changes in siltation rates; etc.);
- other physical pressures (e.g. litter; noise and vibration; visual disturbance; collisions);
- biological disturbance (e.g. from introduction of microbial pathogens, the introduction of invasive non-native species, or from selective extraction of selected species).

[42] Advice originally provided by SNCBs pursuant to Regulation 33 of *The Conservation (Natural Habitats, &C.) Regulations 1994* and Regulation 35 of the *Conservation of Habitats and Species Regulations 2010* (as amended); now Regulation 37 of the *Conservation of Habitats and Species Regulations 2017*.

[43] It should also be noted that the Regulation 37 advice themes do not precisely match those used in the JNCC's *Marine activities and pressures evidence* matrix (JNCC 2013) although this does not affect the assessment process or outcomes.

5.1.6 The sensitivity of various European features to these pressures is considered later in the report (see **Section 5.3**). The *Marine activities and pressures evidence* database also provides detailed information on the impact pathways and the evidence collected; **note that this is not reproduced in this report due to its size, although it is referenced as appropriate and is freely available online[44].**

Table 5.2 Pressures with the potential to affect marine receptors, based on the *Marine activities and pressures evidence* database (JNCC 2016); full definitions in Appendix E

Regulation 37 theme	JNCC-identified pressures
Hydrodynamic changes	Water flow (tidal current) changes
	Emergence regime changes
	Wave exposure changes
Toxic contamination	Non-synthetic compound contamination (general)
	Non-synthetic compound contamination - Transition elements & organo-metals
	Non-synthetic compound contamination - Hydro*carbo*n & Polycyclic Aromatic Hydro*carbo*n (PAH) Contamination
	Synthetic compound contamination
	Radionuclide contamination
Non-toxic contamination and physio-chemical changes	Temperature changes
	Salinity changes
	Introduction of other substances (solid, liquid or gas)
	De-oxygenation
	Nutrient enrichment
	Organic enrichment
Physical loss	Physical loss (to land or freshwater habitat)
	Physical change (to another seabed type)
Physical damage	Habitat structure changes - removal of substratum (extraction)
	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)
	Penetration and/or disturbance of the substrate below the surface of the seabed- Surface
	Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface
	Changes in suspended solids
	Siltation rate changes
Other physical changes	Litter

[44] Available at: http://jncc.defra.gov.uk/default.aspx?page=7136

Regulation 37 theme	JNCC-identified pressures
	Electromagnetic changes
	Noise and vibration changes
	Introduction of light
	Barrier to species movement
	Death or injury by collision
	Visual disturbance
Biological changes	Genetic modification & translocation of indigenous species
	Introduction or spread of non-indigenous species
	Introduction of microbial pathogens
	Removal of target species
	Removal of non-target species

5.2 Exposure of Sites and Features to WNMP Outcomes

5.2.1 Most European site interest features will be sensitive to one or more of the pressures noted in **Section 5.1**. However, for an interest feature (and hence a European site) to be potentially affected by the outcomes of the WNMP it must be exposed to those outcomes also. The actual exposure of an interest feature to a pressure as the result of an activity will depend on a range of factors, most of which cannot be identified or defined at the strategy level, since they will depend heavily on the precise nature of the specific activities, including any mitigation or avoidance measures that are implemented at that stage.

5.2.2 However, it is possible to determine the potential for features to be exposed to environmental changes that may be associated with activities supported by the WNMP and 'screened in' to the assessment, based on the location of the European sites, the characteristics of the interest features (particularly the behavioural characteristics of mobile species), and the presence (or not) of any functional linkages.

5.2.3 It is not generally appropriate to employ pre-determined screening criteria, but the considered use of suitably precautionary criteria does help rationalise any assessment. This is particularly relevant to the WNMP, due to the scale of the WNMP area and the correspondingly large number of European sites.

5.2.4 Therefore, the screening process for European sites applies a set of criteria to identify sites and interest features that **will not** be affected by the WNMP outcomes (i.e. no significant effects alone or in combination). The activities supported by the 'screened in' policies are initially used to define a suitably precautionary 'zone of environmental influence' (ZoI) (the area in which measurable environmental changes as a result of the WNMP might occur), based on existing impact assessments, case studies and examples from delivered projects.

5.2.5 European sites are then considered to be potentially exposed to the effects of the WNMP (as a whole) if they are within the ZoI, or if their mobile interest features are likely to be functionally-linked to habitats within the ZoI during their life-cycles. Sites with mobile features are 'screened in'

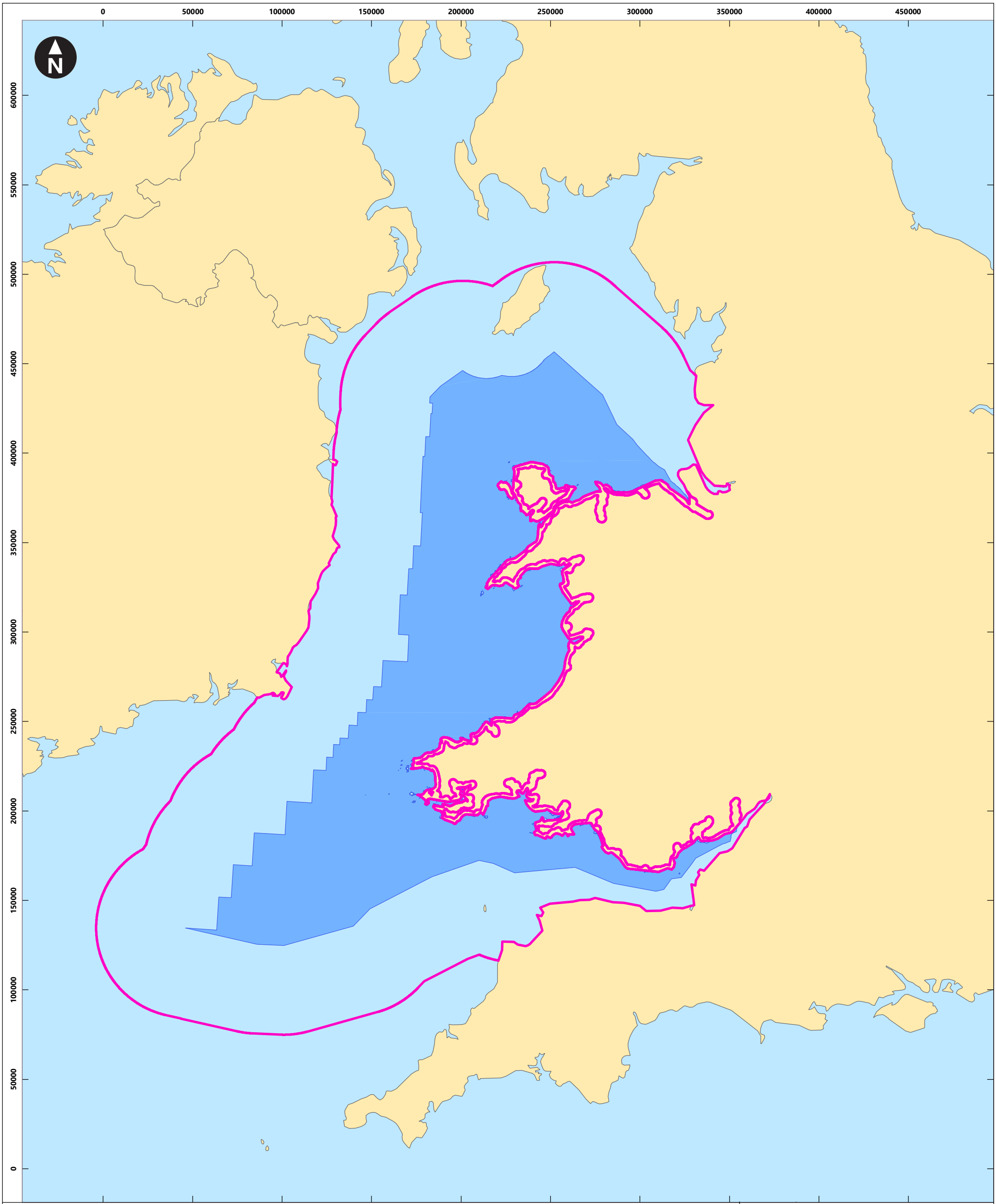
based on generally accepted distance criteria associated with their behaviours (see '**Screening**', below).

Zone of environmental influence

5.2.6 At this stage the ZoI relates to the WNMP as a whole, without distinctions for individual sectors. This is partly to simplify the initial phase of the screening process and partly to ensure that there is no risk of features or sites being excluded inappropriately. The zone of environmental influence has the following components.

- **The WNMP area**. The entirety of the WNMP area is included as (in theory at least) one or more of the activities supported by the plan could occur anywhere within this area. In practice the picture is more nuanced, as most areas will be unsuitable for most activities, but the WNMP contains no over-riding exclusionary policies that would categorically prevent any type of activity in a particular area.
- **A 50km buffer around the WNMP, in marine environments**. The habitat features of designated sites will be sensitive to physio-chemical changes associated with pressures such as the Physical Loss/Gain of Habitat; Physical Damage to Habitat; Toxic Contamination; or Non-Toxic Contamination; and Biological Disturbance. Sites and habitats within the WNMP area are potentially exposed to direct effects (e.g. habitat loss due to construction) as well as indirect effects (e.g. from the dispersal of contaminants); however, effects outside the WNMP area due to activities within it will depend on hydrodynamics (etc.) and more distant areas are less likely to be exposed to effects due to natural attenuation. 50km is considered to be a suitably precautionary zone of environmental influence in the marine environment based on a broad range of existing case studies and consultation responses from Natural Resources Wales (NRW) on earlier drafts of the HRA. For example:
  - Based on evidence from plume studies, sediment mobilised from offshore activities tends to become re-deposited within the distance of one tidal ellipse, which NRW suggest is around 30km in the Severn Estuary and 21km in the Liverpool Bay area; the Anglian Marine Aggregate Regional Environmental Assessment (MAREA) (Emu 2012) suggests a maximum extent for secondary sediment effects as 500m for deposition to the sea bed (smothering) and 0.25km to 4km for fine sediment dispersal.
  - Similarly, modelling and monitoring has demonstrated that various offshore discharges (e.g. waste water) are typically attenuated within a few kilometres of the source, and typically much less.
  - Tidal stream modelling for the Bristol Channel (e.g. Neill 2013) has suggested that sediment dynamics may be influenced up to 50km from the point of energy extraction (although it should be noted that far-field effect distances are likely to be above average in the Bristol Channel).
- **A 2km inland buffer**. Activities supported or managed by the WNMP may affect onshore environments, through a range of direct and indirect mechanisms (e.g. structures affecting sediment dynamics could affect beach recharge and hence the dynamics of associated sand dunes; planned cable-landing points may have no effect on marine receptors but could (in conjunction with onshore planning) affect onshore sites). However, it is considered that the maximum inland range for physical effects that could reasonably be connected to activities supported by the WNMP is 2km, and the plan will have little or no direct influence over associated developments occurring in terrestrial areas away from the coast.

5.2.7 The ZoI is illustrated on **Figure 5.1**.



Key

Zone of Environmental Influence

WNMP Area

0 50,000 100,000 m

Scale at A3: 1:2,000,000

HRA of the WNMP
Final HRA

Figure 5.1
Zone of Environmental Influence

July 2019

wood.

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Screening

Geographical screening

5.2.8 All sites within the ZoI (the WNMP area; a 50km marine buffer; and 2km inland of the Welsh coast) are considered to be potentially exposed to the effects of the WNMP. Sites outside this zone are therefore 'screened out', **except** where they support mobile species that may make use of habitats in the ZoI during their life cycle (see below). The sites within the ZoI are listed in **Appendix A**.

Habitats screening

5.2.9 Application of a geographical screening can throw up anomalies; for example, a river designated for the feature '*Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation*' is likely to be partly within 2km of the WNMP boundary but the feature is self-evidently not exposed to the likely effects due to its location within the site and the consequent absence of impact pathways. The habitat interest features of terrestrial sites within 2km of the WNMP boundary are therefore examined, with features that are evidently located outside the 2km buffer excluded where there is no realistic impact pathway (e.g. environmental or geomorphological process) associated with activities supported by the plan.

5.2.10 Note, the conservation status for natural habitats is defined in Article 1(e) of the Habitats Directive as "*… the sum of influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species*". Typical species are those that are characteristic of the feature, mainly by either making up the basic structure of the habitat, or being deterministic of it in some way; they are not all of the species that make up the habitat in its entirety (JNCC 2002).

5.2.11 The conservation status of habitats is taken as 'favourable' when, inter alia, the conservation status of its typical species is favourable. The habitats screening therefore accounts for 'typical species' as far as is achievable (see 'Feature distributions within the WNMP area', below).

Mobile species screening

5.2.12 The exposure of mobile species, particularly some of the wide-ranging species found in marine environments, is substantially more difficult to determine due to the patchiness of the data. In many instances it is not possible to exclude the possibility that mobile species from a particular site will use or transit the WNMP area. This is a particular issue for migratory waterbirds and seabirds (see below). However, the following principles are applied when determining the potential for mobile species groups to be affected.

Bats

5.2.13 The main UK Annexe II bat species (Lesser horseshoe bat *Rhinolophus hipposideros*; Greater horseshoe bat *Rhinolophus ferrumequinum*; Barbastelle *Barbastella barbastellus*; and Bechstein's bat *Myotis bechsteinii*.) commonly migrate 20 – 30km between summer and winter roost sites. They have been recorded on offshore islands around Wales but are not thought to make significant migrations over open sea (e.g. from UK to Ireland or continental Europe). Mouse-eared bat *Myotis myotis* is thought to be migrate between the UK and mainland Europe, but is considered to be effectively extinct in the UK at the moment (although individuals have been recorded in Sussex) and there is no credible pathway for effects on distant sites supporting this species. Therefore sites designated for these species that are over 20km from the WNMP area are not considered likely to be affected by the outcomes of the WNMP, and are screened out. The sites included in this category are identified in **Appendix B**.

Otters

5.2.14 Otters *Lutra lutra* are an interest feature of 13 SACs in Wales, of which four are coastal or marine. Most of the remaining sites (eight) are river SACs that discharge to the WNMP area; the bulk of the otter population at these sites will be primarily associated with inland areas and so not typically exposed to the direct effects of the WNMP, although individuals associated with these sites may be exposed if using estuarine areas and secondary effects (e.g. through impacts on migratory fish populations hence prey availability) are conceivable but unlike to be significant. Otters that live in freshwater habitats typically have large home ranges (20 – 30km) although the ranges of coastal otters are usually much smaller due to the relative abundance of prey inshore and the need to periodically clean in freshwater to remove salt from their fur. As a result, coastal otters are typically restricted to the inshore areas. Therefore, European sites that are not within 10km of the WNMP area, or directly linked to it, are not considered likely to be affected by the outcomes of the WNMP and so are screened out (i.e. one Welsh site, Cors Caron SAC, and all other sites designated for otters outside Wales).

Marine mammals

5.2.15 IAMMWG (2015) "*Management Units for Cetaceans in UK Waters*" and Evans (2012) "*Recommended Management Units for Marine Mammals in Welsh Waters*" identify Marine Management Units (MMUs) for marine mammals associated with UK and Irish European sites (Bottlenose dolphin *Tursiops truncates*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; and Harbour seal *Phoca vitulina*).

5.2.16 European sites that coincide with these MMUs are assumed to be the 'core sites' for those species' populations and are therefore considered to be potentially exposed to the outcomes of the plan. Mammals from sites beyond this may periodically use or transit the WNMP area but almost certainly not in sufficient numbers for effects on site integrity to be significant. These sites are therefore excluded from explicit assessment; however, it should be noted that any measures considered sufficient to safeguard mammals from the screened in sites will certainly be sufficient to safeguard mammals from more distant sites also.

5.2.17 It should be noted that consultation advice provided by JNCC to the MMO for the HRAs of the English marine plans indicates that European sites designated for marine mammals can be scoped out of the HRA if they lie more than 50km from that Marine Plan Area.

Diadromous fish (plus Freshwater pearl mussel)

5.2.18 The movements of diadromous fish associated with European sites (Atlantic salmon; Sea lamprey; River lamprey; Allis shad; Twaite shad; and (for Ramsar sites) European eel) when away from their natal rivers is not well-established except in broad terms, although Malcolm *et al.* (2010) provide a useful synopsis of the known data for salmon and eels using rivers in Scotland.

5.2.19 The dominant sea currents around the British Isles are the North Atlantic Drift and the Shelf Edge Current (which runs up the west coast of Ireland) and so migration routes or staging areas in the WNMP area are likely to be predominantly used by fish associated with rivers that discharge to the Celtic and Irish Seas (rather than from SACs that are further afield). All European sites designated for Atlantic salmon; Sea lamprey; River lamprey; Allis shad; Twaite shad; and Freshwater pearl mussel (which is dependent on salmon for part of its life-cycle) which discharge into the Irish or Celtic Seas are therefore screened in, since these populations are most likely to be exposed to the likely outcomes of the plan. Sites outside this area (i.e. rivers that discharge from: the north and east coast of Scotland; the south and east coast of England; the west coast of Ireland; and the Atlantic and channel coasts of France) are not explicitly considered in the screening as the exposure of fish populations from these sites to activities in the WNMP area is considered likely to be

sufficiently low to have not significant effect on these populations, based on likely migration patterns. The sites included in this category are identified in **Appendix B**.

Resident and migrant terrestrial birds

5.2.20 SPAs which support exclusively terrestrial species that are unlikely to cross or use the WNMP area are not considered to be exposed to the potential outcomes of the plan. This includes those sites designated for largely sedentary species (e.g. golden eagle) as well as sites designated for terrestrial migratory species where their migration route is unlikely to cross the WNMP area (e.g. nightjar, Dartford warbler). The determination of migration routes and risk is based on the information provided in Wright *et al.* (2012) for the BTO (*Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas*) moderated by an analysis of SPA locations in the UK and Ireland (e.g. all sites designated for nightjar are in the south and east of England). In practice, all terrestrial SPA interest features associated with UK and Irish SPAs that are over 20km from the WNMP area are screened out.

Pelagic seabirds

5.2.21 NRW has indicated that the screening should take account of available studies on seabird seasonal migrations and behaviours, including:

- Thaxter *et al.* (2012) (foraging distances);
- NE (2015) (Biologically Defined Minimum Population Scale (BDMPS)); and
- the BTO GIS model for assessing risks due to offshore windfarms (Wright *et al.* 2012).

5.2.22 Applying screening rules to sites supporting seabirds is difficult due to the complexities of their seasonal migrations and behaviours. In particular, although the WNMP ZoI will be beyond the maximum foraging range of many breeding seabirds associated with particular SPAs, these species will disperse to offshore areas or migrate once breeding has finished, which may involve transit or use of the WNMP area. For example:

- The maximum foraging range of razorbill, based on Thaxter *et al.* (2012) is 95km, which would exclude most Scottish seabird SPAs from consideration including (for example) Mingulay and Berneray SPA; however, the NE (2015) report '*Non-breeding season populations of seabirds in UK waters*' suggests that razorbill from this SPA contribute to the wintering population in the "UK western waters" Biologically Defined Minimum Population Scale (BDMPS), which includes the Irish and Celtic seas (and hence the WNMP area).
- Kittiwake associated with the Flamborough Head and Bempton Cliffs SPA (east coast of England) are very unlikely to use the WNMP area when breeding, but reasonable proportions of the population (20% or more) are thought likely to use the "UK western waters" BDMPS on spring or autumn migration.

5.2.23 Data from the NE (2015) report '*Non-breeding season populations of seabirds in UK waters*' has been used to identify the various BDMPS for European site features that overlap with the WNMP ZoI, with European sites considered potentially exposed to the effects of the plan where more than 1% of a site's population is thought to contribute the wintering population in the relevant BDMPS. In practice, this would exclude 10 species associated with 44 European sites, predominantly from north eastern Scotland and the east coast of England. However, the BDMPS is not necessarily useful for high-level strategic assessments of plans such as the WNMP.

5.2.24 Furthermore, application of the BTO GIS model for assessing the risk of offshore windfarms to migratory birds (Wright *et al.* 2012) suggests that most of these species transit the Irish Sea, although this work does not allow the risk to individual European site populations to be identified;

again, the usefulness of this model for high-level strategic assessments of large areas, such as the WNMP, is uncertain.

5.2.25 As a result, it is difficult to categorically exclude the possibility of effects on the majority of species at most seabird SPAs if these protocols are employed, since most appear likely to use the marine areas within the WNMP ZoI at some stage in their life cycle, be it breeding, wintering or migrating. Therefore all seabird sites in the UK are considered to be potentially exposed to the outcomes of the WNMP, although for most sites and species the potential for significant or adverse effects will be very low.

Wildfowl and waders

5.2.26 Wintering waders and wildfowl can be fairly sedentary once they arrive in their wintering areas, often only moving short distances between roosting and feeding areas. However, longer-distance movements of individuals and flocks between sites are common, typically in association with changing weather conditions, which may involve transit or use of the WNMP area. The risk of wildfowl and waders crossing the WNMP area has been assessed using the information provided in Wright *et al.* (2015) for the BTO (*Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas*), based on advice from NRW; this theoretically allows species that may be exposed to the outcomes of the plan to be identified. However, it should be noted that whilst this allows some species with restricted migrations (and hence some sites) to be objectively excluded[45], for most species and sites this is not possible, and the application of the BTO model to the WNMP assessment scenario arguably has limited value (in theory, all European sites in the UK and Ireland supporting wintering bird species that could migrate across the WNMP area would be considered potentially exposed (see **Appendix D**))[46]. The assessment therefore focuses on those European sites which are within the WNMP ZoI as (i) wintering birds from other sites are most likely to be exposed the effects of the plan if they use these sites; (ii) additional effects on more distant sites would not be expected; and (iii) it is considered that any policy-based measures employed to avoid or mitigate effects on features from sites within the study area will also safeguard the same or similar features associated with more distant European sites.

5.3 Effect Pathways and Feature Sensitivities

5.3.1 The initial screening provides a long list of sites and features that are potentially exposed to the likely outcomes of the WNMP (see **Appendices A – D**). In order to rationalise the screening it is appropriate to sort interest features into groups with similar characteristics, behaviours and sensitivities. The principal habitat and species groups used are as follows:

- Terrestrial habitats within 2km of WNMP area (excl. supralittoral habitats).
- Subtidal and intertidal habitats.
- Coastal and supralittoral habitats.

[45] For example, the Dark-bellied brent goose spends the winter in southern and south-eastern parts of Britain.

[46] It is recognised that the logical extension of this approach is that the breeding SPAs of wintering species must also be considered theoretically exposed to the effects of the plan; this would arguably require that SPAs in (for example) Scandinavia or the Baltic be considered also where they use UK sites in the winter. This linkage would be extremely difficult to explore in any meaningful way, and it must therefore be assumed that if the plan can avoid significant or significant adverse effects on interest features when using UK SPAs and habitats, then this will also ensure that there are no effects (as a result of the plan) on more distant, breeding SPAs. This is an appropriate mechanism for dealing with effect scenarios that are imaginable but unlikely.

- Bats.
- Marine mammals (including otters).
- Diadromous fish (plus freshwater pearl mussel).
- Pelagic seabirds (breeding and wintering).
- Wildfowl and waders (breeding and wintering).

5.3.2 In addition, the potential for 'typical species' to be affected is considered. This is obviously a hugely diverse category and the subdivision of this into specific groups or taxa is not practicable at this level in the plan or assessment hierarchy. It is therefore important that 'typical species' are appropriately considered in any 'down-the-line' HRAs.

5.3.3 The interest features that coincide with, or potentially use or transit the ZoI are listed in **Table 5.3**. The sensitivity of these feature groups to the pressures identified in **Table 5.2** is then summarised in **Table 5.4**. Note that **Table 5.4** focuses on the pressures occurring in the marine environment and so terrestrial habitats within 2km of the WNMP area are not explicitly considered in this table as effects are only likely to be secondary or in combination effects from the onshore component of any prospective development (which the WNMP ultimately has limited influence over).

5.3.4 The potential for these feature groups to be affected by the general and sector policies of the WNMP is considered in the **Section 4**.

Table 5.3 Interest feature groups that coincide with, or potentially use or transit the zone of environmental influence

Feature Group	Interest features screened into assessment
Terrestrial habitats within 2km	See Appendix A – note, the terrestrial features within the ZoI are not listed here as (unlike marine habitats) they will not be systematically exposed to the outcomes of the WNMP (i.e. any effects are likely to be secondary or 'in combination' effects associated with specific projects which are not defined at this level).
Subtidal and intertidal habitats	• Sandbanks which are slightly covered by sea water all the time • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Reefs • Submarine structures made by leaking gases • Salicornia and other annuals colonizing mud and sand • *Spartina* swards (*Spartinion maritimae*) • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Submerged or partially submerged sea caves Plus marine aspects of Ramsar criteria: • Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities • Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge • Crit. 8 - important source of food for fishes, spawning ground, nursery and/or migration path

Feature Group	Interest features screened into assessment
Coastal and supralittoral habitats	• Coastal lagoons • Annual vegetation of drift lines • Perennial vegetation of stony banks • Vegetated sea cliffs of the Atlantic and Baltic Coasts • Mediterranean and thermo-Atlantic *halophilous* scrubs (*Sarcocornetea fruticosi*) • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") • Fixed coastal dunes with herbaceous vegetation ("grey dunes") • Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) • Dunes with *Hippopha rhamnoides* • Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) • Humid dune slacks • Coastal dunes with *Juniperus* spp. • Petalwort *Petalophyllum ralfsii* • Shore dock *Rumex rupestris*
Bats	• Lesser horseshoe bat *Rhinolophus hipposideros* • Greater horseshoe bat *Rhinolophus ferrumequinum* • Barbastelle *Barbastella barbastellus* • Bechstein`s bat *Myotis bechsteini*
Marine mammals	• Bottlenose dolphin *Tursiops truncatus* • Harbour porpoise *Phocoena* phocoena • Otter *Lutra* lutra • Grey seal *Halichoerus grypus* • Common seal *Phoca vitulina*
Diadromous fish (plus freshwater pearl mussel)	• Atlantic salmon *Salmo salar* • Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis* • Allis shad *Alosa* alosa • Freshwater pearl mussel *Margaritifera* margaritifera • Twaite shad *Alosa fallax*
Pelagic seabirds (breeding and wintering)	• Northern fulmar *Fulmarus glacialis* • Manx shearwater *Puffinus* puffinus • European storm-petrel *Hydrobates pelagicus* • Leach's storm-petrel *Oceanodroma leucorhoa* • Northern gannet *Morus bassanus* • Great cormorant *Phalacrocorax carbo* • European shag *Phalacrocorax aristotelis* • Black (common) scoter *Melanitta nigra* • Velvet scoter *Melanitta fusca* • Arctic *skua Stercorarius parasiticus* • Great *skua Catharacta skua* • Mediterranean gull *Larus melanocephalus* • Little gull *Larus minutus* • Black-headed gull *Larus ridibundus* • Mew gull *Larus canus* • Lesser black-backed gull *Larus fuscus* • Herring gull *Larus argentatus* • Great black-backed gull *Larus marinus* • Black-legged kittiwake *Rissa tridactyla* • Sandwich tern *Sterna sandvicensis* • Roseate tern *Sterna dougallii* • Common tern *Sterna hirundo* • Arctic tern *Sterna paradisaea* • Little tern *Sterna albifrons* • Common guillemot *Uria aalge* • Razorbill *Alca torda* • Atlantic puffin *Fratercula arctica* • Red-throated diver *Gavia stellata*

Feature Group	Interest features screened into assessment
Wildfowl and waders (breeding and wintering)	• Black-throated diver *Gavia arctica* • Great crested grebe *Podiceps cristatus* • Slavonian grebe *Podiceps auritus* • Great bittern *Botaurus stellaris* • Little egret *Egretta garzetta* • Mute swan *Cygnus olor* • Tundra swan *Cygnus columbianus bewickii* • Whooper swan *Cygnus* cygnus • Taiga bean goose *Anser fabalis fabalis* • Pink-footed goose *Anser brachyrhynchus* • Greylag goose *Anser* anser [Iceland/UK/Ireland] • Greylag goose *Anser* anser [North-western Scotland] • Barnacle goose *Branta leucopsis* [Eastern Greenland/Scotland/Ireland] • Common shelduck *Tadorna* tadorna • Eurasian wigeon *Anas penelope* • Gadwall *Anas strepera* • Eurasian teal *Anas crecca* • Mallard *Anas platyrhynchos* • Northern pintail *Anas acuta* • Garganey *Anas querquedula* • Northern shoveler *Anas clypeata* • Common pochard *Aythya ferina* • Tufted duck *Aythya fuligula* • Greater scaup *Aythya marila* • Common eider *Somateria mollissima* • Long-tailed duck Clangula *hyemalis* • Common goldeneye *Bucephala clangula* • Red-breasted *merganser Mergus serrator* • Goosander *Mergus merganser* • Spotted crake *Porzana* porzana • Corn crake *Crex* crex • Common coot *Fulica atra* • Eurasian oystercatcher *Haematopus ostralegus* • Pied avocet *Recurvirostra avosetta* • Ringed plover *Charadrius hiaticula* • Eurasian dotterel *Charadrius morinellus* • European golden plover *Pluvialis apricaria* • Grey plover *Pluvialis squatarola* • Northern lapwing *Vanellus* vanellus • Red knot *Calidris canutus* • Sanderling *Calidris alba* • Purple sandpiper *Calidris maritima* • Ruff *Philomachus pugnax* • Common snipe *Gallinago* gallinago • Bar-tailed godwit *Limosa lapponica* • Whimbrel *Numenius phaeopus* • Eurasian curlew *Numenius arquata* • Common redshank *Tringa totanus* • Common greenshank *Tringa nebularia* • Wood sandpiper *Tringa glareola* • Ruddy turnstone Arenaria *interpres* • Red-necked phalarope *Phalaropus lobatus* • Greater white-fronted goose *Anser albifrons albifrons* • Greenland white-fronted goose *Anser albifrons flavirostris* • Dunlin *Calidris alpina schinzii* • Black-tailed godwit *Limosa* limosa limosa • Black-tailed godwit *Limosa* limosa *islandica* • Red knot *Calidris canutus islandica* • Dunlin *Calidris alpina alpina* • Light-bellied brent goose *Branta bernicla hrota* [Canada/Ireland] • Dark-bellied brent goose *Branta bernicla bernicla*

Feature Group	Interest features screened into assessment
	Ramsar criteria: • Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity • Crit. 5 - regularly supports 20,000 or more waterbirds • Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
'Typical species'	• All species not identified above which may be associated with specific site habitats.

Table 5.4 Sensitivity of interest feature groups to pressures occurring in the marine environment (Y – directly sensitive; S – sensitive to consequent or secondary effects; note, does not include terrestrial features)

Pressure	Marine and Intertidal Habitats	Supralittoral habitats	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes – local	Y	Y		Y	Y	S	S	Y
Emergence regime changes – local	Y	Y			S	Y	Y	Y
Wave exposure changes – local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination – overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Transition elements & organo-metals	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydro*carbo*n & PAH contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Radionuclide contamination	Y	Y		Y	Y	Y	Y	Y
Temperature changes – local	Y	Y		Y	S	S	S	Y
Salinity changes - local*	Y	Y		Y	S	S	S	Y
Introduction of other substances (solid, liquid or gas)	Y	Y		Y	Y	S	S	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Physical loss (to land or freshwater habitat)	Y			Y	S	S	S	Y
Physical change (to another seabed type)	Y			Y	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			Y	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Overall abrasion	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y							Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			Y	S	Y	S	Y
Litter	Y	Y		Y	Y	Y	Y	Y
Electromagnetic changes				Y	Y		S	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Genetic modification & translocation of indigenous species	Y			Y				Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y
Removal of target species				Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y

5.4 Summary

5.4.1 The initial screening has identified 84 European sites within the 'Zone of Environmental Influence' of the plan, and a further 288 sites with mobile species that may be functionally linked to habitats (etc.) within the ZoI, or which are likely to transit this area in sufficient numbers that significant effects on the populations associated with the European sites cannot be excluded based on the information available.

5.4.2 The screening of the sites and features has taken into account the screening of the policies (see **Section 4**); however, it is clear that the high-level and general nature of the policies does not allow for specific effects on specific sites or features to be robustly identified and assessed, and so sites and features that are potentially exposed to the outcomes of the WNMP cannot necessarily be 'screened out' from further consideration. **Section 6** therefore examines the potential effect-pathways for each 'screened in' WNMP sector through an 'appropriate assessment', taking into account mitigation measures incorporated into the plan (and/or otherwise available at the project level) which are intended to ensure that adverse effects do not occur.

6. Appropriate Assessment of Sector Policies

This section examines the potential effect-pathways for each 'screened in' WNMP sector through an 'appropriate assessment', taking into account mitigation measures incorporated into the plan (or otherwise available at the project level) which are intended to ensure that adverse effects do not occur.

6.1 Approach

6.1.1 The appropriate assessment aims to determine whether any 'screened in' policies will adversely affect any specific European sites or interest features. This takes into account:

- the intended and likely outcomes of the policy;
- the exposure of any European sites or interest features that are sensitive to these outcomes, where this can be determined;
- the European site conservation objectives, and the extent to which the policies might undermine site integrity or prevent these objectives being met; and
- any mitigation that is either specifically introduced by the plan or which is known to be available, achievable and effective for activities supported by the policy.

6.1.2 The approach used will vary according to the policy being considered and the effects anticipated, but necessarily reflects the uncertainties inherent at the plan-level. In particular, where detailed assessment of effects on specific European sites is not possible (e.g. because the policy has no spatially definable components below the scale of the plan itself, and does not direct, influence or clarify the nature, scale or location of activities) the assessment considers whether HRA can be reasonably deferred 'down the line' to a lower tier in the planning hierarchy.

6.1.3 When determining whether 'down the line' assessment is acceptable, the appropriate assessment considers:

- the inherent scale and nature of the development(s) potentially receiving support;
- the availability and effectiveness of project-level mitigation measures;
- any incidental or indirect constraints introduced by the policy which may influence how schemes can be delivered and which may inadvertently ensure that significant or significant adverse effects cannot be avoided by lower-tier plans or projects; and
- mitigation measures or policy safeguards within the plan.

6.1.4 The potential for the screened in policies to operate 'in combination' is also considered, as far as achievable.

6.2 Additional Feature Distribution Data

6.2.1 The broad screening criteria noted in **Section 5.2** above have been used to identify those European sites with features that may be exposed to the likely outcomes of the WNMP. For those sites screened in, and proportionate to the additional level of assessment needed for AA, additional

consideration of the distribution of features within the ZoI has been made as some features may be more or less exposed to particular activities or outcomes.

6.2.2 Distribution evidence for many interest features is patchy, even within European site boundaries, and so the information below is used primarily to guide the assessment of the policies and provide a framework for identifying features or sites that are more likely to be vulnerable affected by the plan outcomes

Habitats

6.2.3 The habitat interest features will coincide with the sites themselves. The Regulation 37 advice for some sites contains information on the approximate distribution of some habitat interest features within the sites, which can potentially be used to identify those features that are more (or less) exposed to an activity in a particular area. However, this exercise is more appropriate for project-scale HRAs, where the specific parameters of a scheme are known and hence the potential for features to be affected can be more reliably judged.

Typical species

6.2.4 NRW Regulation 37 advice for marine sites defines the 'typical species' as "*species that are, from time to time, associated with a specified habitat within the site; i.e. all species that contribute to the biodiversity of the specified habitat within the site*"[47]. It is important to note that this refers to "*…the specified habitat*" rather than the biodiversity of the site as a whole: in general 'typical species' are taken as those that are a representative or intrinsic component of the designated habitat feature; or which are otherwise important to its maintenance and ecological functioning; or which are perhaps dependent on the particular characteristics of that habitat. It is not usually taken to mean 'any species that may use the site' or similar.

6.2.5 However, there are no definitive lists of 'typical species' for particular sites or habitats. Whilst the Regulation 37 advice documents provide some guidance on the 'typical species' associated with the various habitat features, this is not intended to be exhaustive and in practice the complexity of most marine habitats and ecological interactions means that a very wide range of species and species groups might be considered 'typical'[48] under the above definition (indeed, few marine taxa could be excluded).

6.2.6 The information available on 'typical species' is therefore highly variable, and it is difficult to provide substantive information on the distributions of typical species that might be useful for assessments undertaken at the plan- or policy-level. Many species are mobile for all or part of their life-cycle[49] and so (as with mobile species features) potential effect pathways are not limited to the geographical extent of the site; however, the species will be directly associated or co-located with the habitat features of the site in question at some point and so the sites themselves are likely to be the key areas for the vast majority of typical species; NRW have advised that for HRA purposes,

[47] E.g. CCW (2009) *Cardigan Bay European Marine Site: Advice Provided by the Countryside Council For Wales in Fulfilment of Regulation 33 of the Conservation (Natural Habitats, &C.) Regulations 1994*.

[48] So, for example, basking sharks are frequently recorded within Cardigan Bay SAC but might not necessarily be considered as a 'typical species' of the habitat features (Reefs, Submerged or partially submerged sea caves, Sandbanks which are slightly covered by seawater all the time); however, these features (or the associated geomorphology) are likely to be factors influencing feeding opportunities in the area, so there may be some functional association that would warrant consideration in any HRA.

[49] For example, many benthic invertebrate species have planktonic juvenile stages and are likely to be at least partly dependant on recruitment from outside the site.

typical species only need to be considered within the boundaries of their home European site and do not need to be considered when outside of their home sites.

Bats

6.2.7 There are 11 European sites with bats as a feature within 20km of the ZoI. As noted, UK bat species have been recorded on offshore islands around Wales but significant excursions over open sea are not thought to occur. Any risk to bats would generally come from developments in coastal and close inshore areas. The main exception to this may be around the Severn Estuary and (to a lesser extent) the Bristol Channel, where bat sites are present on both the English and Welsh sides of the estuary and the open water distance is less than 20km. Bats have been recorded crossing the estuary and so it is perhaps more likely that bats may be encountered several kilometres from the coast in these areas, particularly during migration periods.

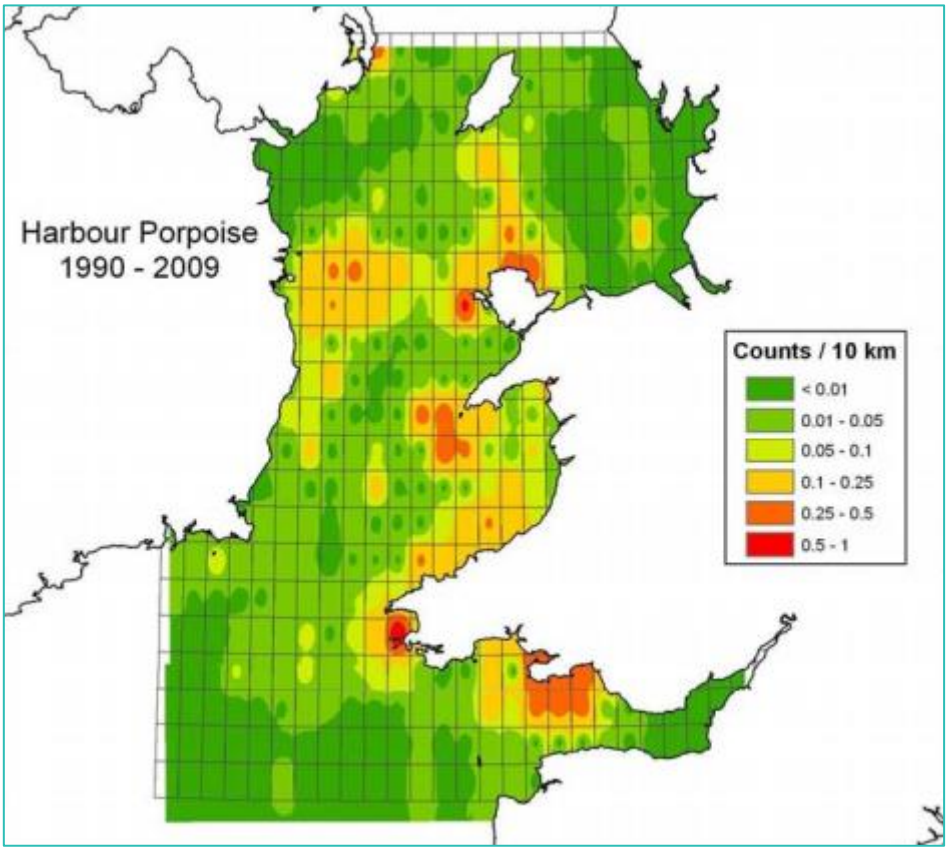
Marine mammals

Harbour porpoise

6.2.8 Harbour porpoise is the commonest and most widespread cetacean species in Welsh waters. Harbour porpoise utilise the entire continental shelf waters and not just coastal areas, although 'hotspots' of activity have been identified off North and West Anglesey; the southwest coast of the Lleyn Peninsula; southern Cardigan Bay; and in the Bristol Channel (these areas are broadly coincident with recently designated marine SACs). The species is known to use tidal conditions for foraging and often occurs in areas of high tidal energy around headlands and channels.

6.2.9 The *Atlas of the Marine Mammals of Wales* (Baines & Evans 2012) provides a useful analysis of the temporal and spatial distribution and relative abundance of marine mammal species in the Irish and Celtic seas, based on a range of survey datasets and studies. The variability the source data and recording techniques ensures that there are some analysis constraints, and the mapping should be used cautiously; however, the study notes that maps show consistency across time periods, giving "*some confidence at least at a gross level*" (Baines & Evans 2012). The inverse distance weighted (IDW) interpolated distribution map for harbour porpoise is provided below (**Figure 6.1**).

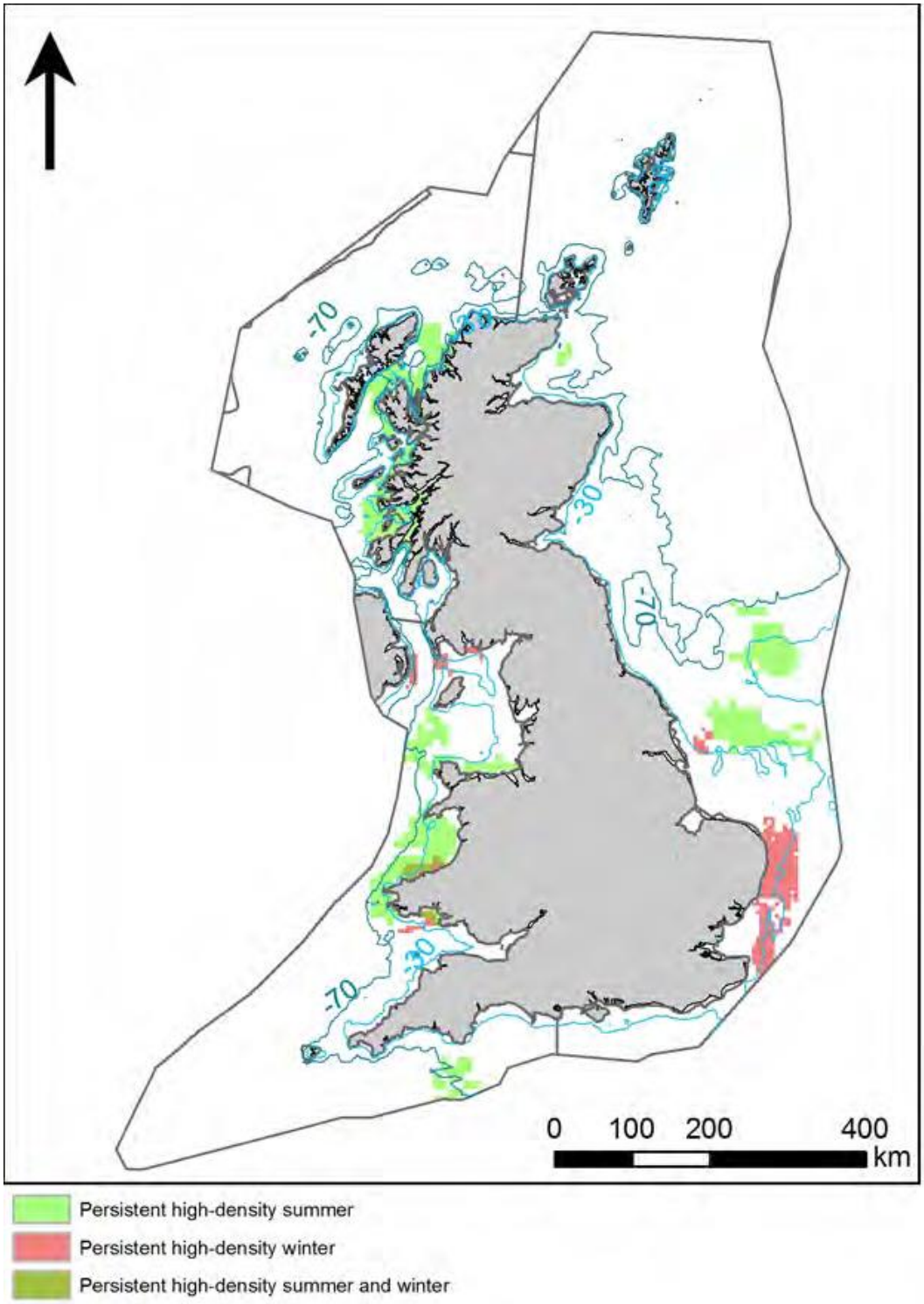
Figure 6.1 IDW interpolated map of harbour porpoise distribution (*from Baines & Evans 2012*)



6.2.10 More recent modelling has been completed by Heinänen and Skov (2015). This used the Joint Cetacean Protocol (JCP)[50] data to build a distribution model of porpoise density based on their relationships with environmental parameters, such seabed type and the presence of upwelling, fronts and eddies, and was the primary evidence base for the harbour porpoise SACs around the WNMP area (North Anglesey Marine / Gogledd Môn Forol SAC; West Wales Marine / Gorllewin Cymru Forol SAC; Bristol Channel Approaches / Dynesfeydd Môr Hafren possible SAC; and North Channel SAC). **Figure 6.2** (from Heinänen and Skov (2015)) shows the persistent high-density areas of harbour porpoise around the UK coast. These data are used when considering the potential effects of the WNMP.

[50] http://jncc.defra.gov.uk/page-5657

Figure 6.2 Persistent high-density areas of harbour porpoise with survey effort from three or more years (from Heinänen and Skov (2015))



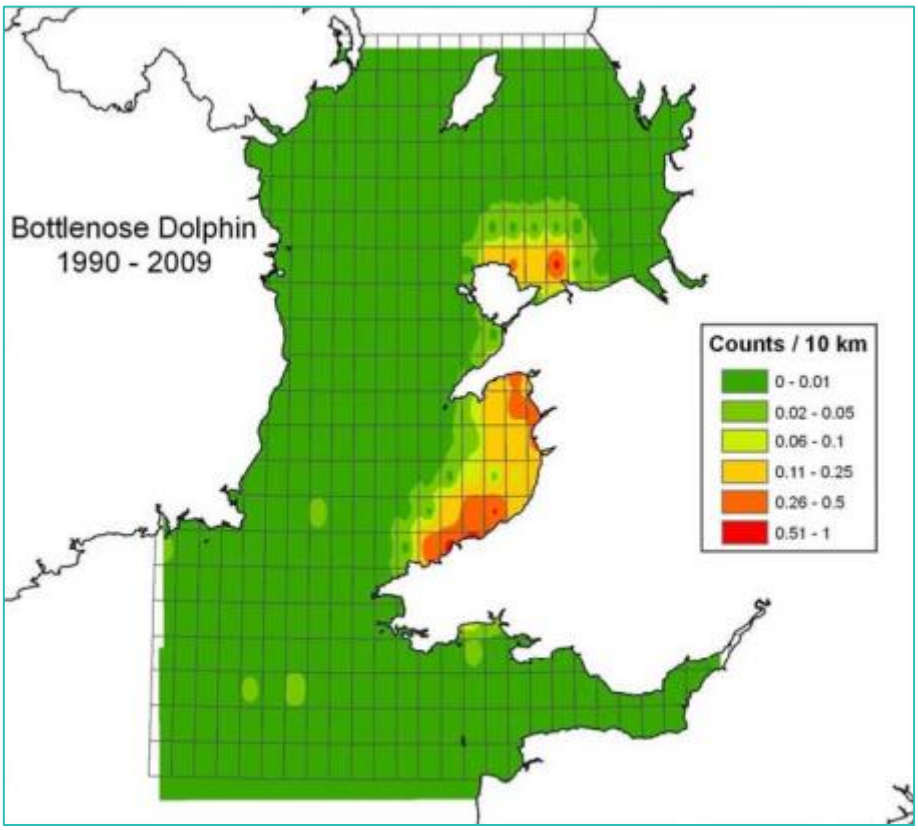
Bottlenose dolphin

6.2.11 Bottlenose dolphins have a predominantly inshore distribution, particularly around Cardigan Bay which is particularly attractive for the species, possibly due to the shallow benthic areas. However, it is evident (Feingold & Evans 2014) that some individuals range more extensively along the coast and in the Irish Sea, although the main sighting areas for this species are from inshore areas around

southern Cardigan Bay into Tremadog Bay in the north. It also occurs frequently off the north coast, particularly north and east of Anglesey, and low densities have been recorded in offshore areas around St. George' Channel. The species may form small groups in the summer, centred on Cardigan Bay, before dispersing more widely in winter.

6.2.12 The inverse distance weighted (IDW) interpolated distribution map (Baines & Evans 2012) for bottlenose dolphin is provided below (**Figure 6.3**).

Figure 6.3 IDW interpolated map of bottlenose dolphin distribution (*from Baines & Evans 2012*)



Grey seal

6.2.13 Grey seals are widely distributed around Wales (although in low densities compared to Scottish populations, for example), typically using secluded or inaccessible areas of the coast for breeding particularly in Pembrokeshire, southern Ceredigion, the Lleyn and Anglesey. These areas are also used outside the breeding season for moulting, feeding and haul-out sites, along with other areas around the coast (e.g. offshore sandbanks, such as the West Hoyle Sandbank in the Dee Estuary).

6.2.14 Westcott & Stringell (2004) identify several haul-out sites in North Wales that appear particularly important (Ynys Dulas, Ynys Seiriol/Puffin Island, the West Hoyle Sandbank and Ynys Enlli/Bardsey Island in winter; and West Hoyle Sandbank, Ynys Enlli/Bardsey Island, the Tudwals and Ynysoedd y Moelrhoniaid/The Skerries in the summer). The principal sites in south Wales are around Ramsey and Skomer. However, a substantial proportion of the population use secluded and isolated sites, and any areas with undisturbed rocky island shores or sea cave sites near tidal races are likely to be used.

6.2.15 Furthermore, only limited information is available on movements away from haul-out sites. Grey seals are generalist feeders and forage predominantly on the sea bed at depths of up to 100m, although they are probably capable of feeding at all the depths found across the UK continental

shelf (SCOS, 2016). SCOS (2015) notes that "*tracking of individual seals has shown that most foraging probably occurs within 100km of a haul-out site although they can feed up to several hundred kilometres offshore*". The species is present year-round within the Irish Sea and is known to regularly travel between southeast Ireland and southwest Wales (Lidgard *et al.*, 2000). Analysis of grey seal movements indicate that they have homogeneous usage near-shore, transit between haul-out sites in large-scale interconnected networks and spend 15% of their time far-offshore (Russell and McConnell, 2014).

Common seal

6.2.16 Baines & Evans (2012) provide no information on common seal distributions; this species is not thought to breed in Wales and the nearest sites designated for common seal are in Northern Ireland and Ireland. The species will use the Irish Sea periodically but significant agglomerations are not thought to occur in the region.

Diadromous fish (plus Freshwater pearl mussel)

6.2.17 As noted, the movements of diadromous fish associated with European sites (Atlantic salmon; Sea lamprey; River lamprey; Allis shad; Twaite shad; and (for Ramsar sites) European eel) when away from their natal rivers is not well-established except in broad terms. In broad summary:

- Sea lamprey migrate from the sea to the lower reaches of rivers in April and May to spawn; the adults do not feed in freshwater and die after spawning. The larval form remain in rivers for around 5 years before metamorphosing to the adult form and migrating to the sea, usually in the autumn (although the timing varies between rivers). Relatively little is known about the precise habitats occupied by adult sea lampreys, although estuaries are likely to be used during migration and development (although the species appears to be more marine than the river lamprey).
- River lamprey are behaviourally similar to Sea lamprey, although the main upstream migration period is during the winter. However, the species appears to make greater use of estuaries than sea lamprey, growing to maturity in these areas. River lamprey are also a feature of the River Wye SAC.
- Twaite and Allis shad gather in estuaries in early summer (April and May) before moving upstream to spawn from mid-May to mid-July. Suitable estuarine habitat is likely to be very important for shad, both for passage of adults and as a nursery ground for juveniles, although the precise distribution of these species within the estuary and marine environment is uncertain.
- Atlantic salmon migrate from the sea to their natal river in the late summer / autumn to breed, with juvenile fish migrating seaward in the spring. After a period of one to six years spent in freshwater the young salmon undergo physiological and behavioural changes to become smolts and migrate downstream to the sea. The smolts spend time in estuaries to acclimatise to the salinity of the sea water and to a change of diet before migrating to coastal waters, and then to the Norwegian Sea or North Atlantic. *Salmo*n live in the sea for between one and four years, mostly near the surface or in midwater.
- European eels are catadromous (spawn in the sea before migrating to freshwater). They are thought to spawn in the western Atlantic, after which the eel leptocephali (at this stage transparent and leaf-like) gradually migrate eastwards on the Gulf Stream. As they reach European waters (after 1 – 3 years) they transform into glass eels before migrating upstream between February and May, with a peak in June. They reach sexual maturity over 10 – 15 years before migrating back to their spawning grounds.

6.2.18 It is therefore difficult to identify particular areas within the WNMP ZoI that may be especially important or well-used by these species, other than estuarine areas which are known to be used by all species for a proportion of their life-cycle.

Pelagic seabirds

6.2.19 As noted in **Section 5.2**, determining distribution information (and hence potential exposure to plan outcomes) for seabirds is difficult due to the complexities of their seasonal migrations and behaviours; whilst it may be possible to exclude the possibility of some species from some European sites being affected during breeding on the basis of Thaxter *et al.* (2012), this cannot necessarily be extended to the same species / sites for the winter period, if the BDMPS assessments are employed as per NRW advice.

6.2.20 The BDMPS report (NE 2015) probably provides the most robust general synopsis of seabird distributions and seasonal movements around the UK and their relationship to SPA breeding populations, and the data in NE (2015) are not repeated here. The BDMPS data will be useful for the assessment of potential effects at the project level; as noted, for the HRA of the WNMP, European sites considered potentially exposed to the effects of the plan where more than 1% of a site's population is thought to contribute the wintering population in the relevant BDMPS, but more detailed information on distribution and hence exposure to the outcomes of the sector policies is not available.

Wintering waders and wildfowl

6.2.21 As noted, wintering waders and wildfowl can be fairly sedentary, typically moving relatively short distances between roosting and feeding areas unless undertaking longer-distance movements in response to changing weather conditions. As a result, the largest concentrations of wintering wildfowl and waders will be associated with the European sites themselves, and with any non-designated functionally linked areas (e.g. nearby fields which are used for roosting or foraging at high tide). Activities are therefore more likely to result in significant effects if they are in close proximity to these areas.

6.3 Mitigation and avoidance measures

6.3.1 Mitigation and avoidance measures are accounted for at the Appropriate Assessment stage, in accordance with the 'People Over Wind' judgement. As noted, there is currently little information on the practical implementation of the 'People over Wind' judgement for strategy-level HRAs, and it is obviously arguable that many aspects of the plan are simply examples of 'policy best practice' that will incidentally moderate or prevent effects on European sites occurring, without that being the principal intent. However, it is also arguable that if a general protective policy is relied on to moderate or prevent undefined or unidentifiable effects associated with other policies occurring, then the effectiveness of those policies needs to be examined through AA.

6.3.2 In addition, due to the nature of the WNMP policies it is likely that specific effects on specific sites or features (and hence specific mitigation) will not be identifiable at the plan-level, and so the appropriate assessment of the plan will need to rely to some extent on the availability of effective project-level mitigation to have confidence that adverse effects can be avoided at the project stage.

Plan-level measures

6.3.3 The WNMP includes several cross-cutting policies that will help moderate the effects of the plan on European sites and features. In general these are not explicitly preventative (i.e. 'proposals must

not…' etc.) but rather create implicit compliance criteria by requiring that proposals demonstrate how they meet the mitigation hierarchy in relation to particular environmental aspects, impacts or effects.

Table 6.1 WNMP policies with protective or 'mitigating' effects that are taken into account at the appropriate assessment stage

Policy	Summary	Mitigating / Moderating Effect
SOC_03	Requires that proposals demonstrate how they minimise their risk of causing or contributing to marine pollution incidents.	Policy requires that proposals explicitly consider their inherent risks of causing or contributing pollution incidents, and demonstrate how these risks will be minimised, so reducing the overall risk of marine pollution incidents in the marine plan area.
SOC_09	Requires that proposals demonstrate how they avoid significant adverse impacts on coastal processes, with proposals encouraged which align with the relevant Shoreline Management Plans (note, the SMPs have also been subject to HRA).	Aims to ensure that proposed activities will not have significant adverse impacts on coastal processes; this will help ensure that the geomorphological processes and mechanisms shaping the coast and potentially affecting the condition of some European sites will be considered in determination; there is no 'mitigation' provision, so arguably a proposal that has significant adverse impacts on coastal processes will not be consistent with this policy.
ENV_01	Explicitly applies the mitigation hierarchy to proposals affecting marine ecosystems.	Aims to ensure that proposed activities will not have significant adverse impacts on marine ecosystems; provides safeguards at the ecosystem level to complement the site-specific provisions of ENV_02.
ENV_02	Requires that proposals demonstrate how they avoid adverse effects on MPAs and other protected sites.	Presumption of policy is that proposals will be designed to avoid adverse effects on European sites; activities that cannot demonstrate this would not be able to meet these policy requirements although the policy supporting text reflects the current legislative provisions of the Habitats Regulations.
ENV_03	Requires that proposals include biosecurity measures to reduce the risk of introducing and spreading invasive non-native species (INNS).	Policy requires that proposals explicitly consider their inherent risks of introducing or spreading INNS, and demonstrate how these risks will be minimised, so reducing the overall risk of INNS in the marine plan area.
ENV_04	Requires that proposals demonstrate how they will minimise litter generation / dispersal.	Policy requires that proposals explicitly consider their inherent risks of introducing or spreading litter, and demonstrate how these risks will be minimised, so reducing the overall risk of litter affecting the marine plan area.
ENV_05	Policy applying the mitigation hierarchy to noise impacts.	Policy requires that proposals explicitly consider the effects of anthropogenic noise on the marine environment; policy is not specific to the noise associated with the proposal and the supporting text makes it clear that marine plan authorities will take a strategic overview and assess the potential cumulative effects of noise and vibration across sensitive receptors in the marine area.
ENV_06	Policy applying the mitigation hierarchy to air and water quality impacts.	Policy requires that proposals explicitly consider their impacts on air and water quality through the mitigation hierarchy; seeks compliance and consistency with existing legislation and standards.
ENV_07	Policy applying the mitigation hierarchy to impacts on fish species and habitats.	Policy is directed particularly at supporting habitats for fish and shellfish that are of commercial and notably, from an HRA perspective, ecological importance. Policy contributes to ecosystem resilience by providing ecosystem-level protective measures for a range of fish species, and so wider benefits for ecological resilience for any coincident species (e.g. benthic organisms, seabirds, marine mammals) supported by these feeding, breeding (including spawning & nursery) and migration areas or habitats.

6.3.4 These policies are key to the achievement of 'Good Environmental Status' (GES) and the Sustainable Management of Natural Resources (SMNR). **Table 5** of the WMNP summarises how the policies within the plan support / contribute to the 11 'descriptors' used in the UK Marine Strategy to represent the key aspects of GES and hence also SMNR in a Welsh policy context. Collectively, the policies will therefore minimise the risk of adverse effects on European sites as a result of the plan although they do not categorically exclude the possibility of 'adverse effect' schemes being brought forward (which is consistent with the provisions of the Habitats Regulations); it is therefore important to understand whether adverse effects are inherently avoidable with good project planning despite this.

Project-level measures

Project planning and survey

6.3.5 Project planning and pre-development surveys are critical for the robust implementation of the mitigation hierarchy.

6.3.6 Pre-development surveys and investigations ensure that the risks for a given location or activity are fully understood, allowing potential effects to be avoided through design process. Where potential effects cannot be avoided through design, robust survey data will allow the identification of measures (such as equipment use protocols) that can be implemented to minimise the risk or magnitude of any effects. Where effects cannot be avoided or reduced, the data will allow appropriate restoration or reinstatement measures to be identified.

6.3.7 In practice, flexibility over the choice of location for a development is likely to be the primary mechanism for avoiding adverse effects on site integrity; pre-development surveys and investigations are critical to this.

Construction and decommissioning

6.3.8 Most construction activities have the potential to adversely affect European sites or interest features through the mechanisms and pressures identified in **Table 5.2**.

6.3.9 The majority of potential effects associated with construction or decommissioning activities will not generally be sector-specific, and so **Table 6.2** summarises the mitigation measures that are typically known to be available, achievable and effective for the pressures and effect pathways identified in the Marine *activities and pressures evidence* database (JNCC 2016) that may arise as a result of construction activities. **Table 6.2** focuses on mitigation for those effects that are typically the incidental result of construction activities rather than sector operations or where the pressure or effect is the intended consequence of the construction activity. It assumes that all legislative requirements and normal best-practice are adhered to. In all instances, avoiding effects by locating of development appropriately will be the primary mitigation mechanism for avoiding adverse effects.

Table 6.2 Mitigation and avoidance measures available for typical pressures that may be associated with construction activities

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Water flow (tidal current) changes - local	• Most likely to be associated with large temporary structures (e.g. caissons, rigs, cranes, breakwaters); • Short-term local changes in water flow may often be an unavoidable consequence of the construction method required for a particular activity (indeed, it may be the intent in some instances).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physiographic and biological effects might be moderated by timing activities to avoid particular tidal phases.
Emergence regime changes - local	• As for water flow (above)	• As for water flow (above)
Wave exposure changes - local	• As for water flow (above)	• As for water flow (above)
Non-synthetic compound contamination - overall	• Introduction as a direct consequence of the activity (e.g. oil / gas seeps during exploration / tapping). • Incidental introduction of non-synthetic contaminants (e.g. heavy metals, organo-metallic compounds such as tributyl tin, or hydro*carbo*ns) from operation of ships and or plant. • Disturbance / mobilisation of contaminants bound in sediments etc.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods. • Normal best-practice pollution-prevention measures. • Implement risk-identification and construction management plans including minimum requirements for inspections and biofouling measures, surveillance etc. • Specify newer fleet / plant with lower emissions etc.
Non-synthetic compound contamination - Transition elements & organo-metals	• As for Non-synthetic compound contamination - overall (above)	• As for Non-synthetic compound contamination - overall (above)
Non-synthetic compound contamination - Hydro*carbo*n & PAH contamination	• As for Non-synthetic compound contamination - overall (above)	• As for Non-synthetic compound contamination - overall (above)
Synthetic compound contamination	• Incidental introduction or intentional use of synthetic compounds including pesticides and antifoulants that may be required during construction.	• As for Non-synthetic compound contamination - overall (above)

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Radionuclide contamination	• Generally unlikely to be an issue during construction except in a few specific circumstances where disturbance / mobilisation of historic contaminants present in sediments etc. may be an issue.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result.
Temperature changes - local	• Generally less likely during construction than operation of schemes with water discharges, although may be a short-term issue locally for some schemes e.g. if tidal flows are disrupted by plant so reducing mixing, or where shipping is locally concentrated. • Possible local effects due to power cables if required during construction.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods.
Salinity changes - local*	• Freshwater or hyposaline discharges (e.g. due to dewatering of coastal excavations) may reduce salinity locally. • Hypersaline discharges less likely (most usually associated with operation of desalination plants). • Temporary localised changes may occur if marine areas are temporarily impounded (e.g. temporary lagoons etc). • May be exacerbated by short-term changes in tidal flows due to construction.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Locate discharges etc to maximise mixing and avoid sensitive habitats.
Introduction of other substances (solid, liquid or gas)	• Other substances may be introduced to the marine environment intentionally or incidentally through a range of mechanisms depending on construction requirements, for example: ▶ dewatering from excavations or impoundments; ▶ disposal of dredged etc. material; ▶ dust deposition from coastal works; ▶ emissions from shipping or plant; ▶ material import and use (e.g. for rock armouring or temporary impoundments; ▶ discharges of process water; ▶ drilling muds.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods. • Normal best-practice pollution-prevention measures.

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
De-oxygenation	• Typically associated with nutrient or organic enrichment (see below), temperature changes, and pollution incidents. • Stagnation of water masses due to impoundment / impedance of flows • Release of ballast water, which may be intentionally de-oxygenated to minimise risk of INNS transfer.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods. • Normal best-practice pollution-prevention measures.
Nutrient enrichment	• Substantial nutrient enrichment would not typically be expected as a systematic consequence of construction (any enrichment due to construction would usually be short-term and localised, associated with a particular aspect of construction e.g. installation of temporary waste water treatment facilities for large schemes). • Nitrogen is usually the limiting nutrient in marine ecosystems. • During construction additional nutrients may be derived from (for example): ▶ emissions from shipping / plant ▶ disturbance / mobilisation of nutrients bound in sediments etc. ▶ discharges from shipping / wastewater treatment for larger / long-term construction schemes. ▶ discharges etc from terrestrial environments due to ancillary on-shore works.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods. • Normal best-practice pollution-prevention measures. • Specify newer fleet / plant with lower emissions etc. • Treatment of discharges.
Organic enrichment	• More typically associated with operational activities (e.g. sewage discharges, aquaculture, run-off) rather than construction. • Discharges of sewage etc. possible from shipping or larger construction rigs etc. • Black *carbon* from incomplete combustion of fossil fuels possible through operation of shipping and plant.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Normal best-practice measures for shipping and plant including controls over idling, maintenance schedules, discharges and operational periods. • Normal best-practice pollution-prevention measures. • Specify newer fleet / plant with lower emissions etc. • Treatment of discharges.
Physical loss (to land or freshwater habitat)	• Most likely to be associated with large temporary structures (e.g. caissons, impoundments) where the loss (temporary or permanent) is probably intentional.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Planning for restoration of temporarily affected habitats by sediment / substrate seeding and safeguarding of adjacent habitats to encourage re-colonisation.

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Physical change (to another seabed type)	• Likely to be an intentional component of the construction in most instances. • May be associated with dredging and material removal, disposal or deposition of dredgings, or introduction of new materials into the water column (e.g. rock armouring, concrete, etc).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols. • Exclusion zones. • Planning for restoration of temporarily affected habitats by sediment / substrate seeding and safeguarding of adjacent habitats to encourage re-colonisation.
Habitat structure changes - removal of substratum (extraction)	• Likely to be an intentional component of the construction in most instances associated with dredging and material removal.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols. • Exclusion zones. • Planning for restoration of temporarily affected habitats by sediment / substrate seeding and safeguarding of adjacent habitats to encourage re-colonisation.
Penetration and/or disturbance of the substrate below the surface of the seabed- Overall abrasion	• Penetration or disturbance of the seabed is likely to be an intentional component of the construction in most instances. • Incidental damage e.g. from anchoring • Compression of sediments may occur from plant (e.g. jack-up barges).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols. • Exclusion zones.
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	• As for 'Penetration and/or disturbance of the substrate below the surface of the seabed', above.	• As for 'Penetration and/or disturbance of the substrate below the surface of the seabed', above.
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	• As for 'Penetration and/or disturbance of the substrate below the surface of the seabed', above.	• As for 'Penetration and/or disturbance of the substrate below the surface of the seabed', above.
Changes in suspended solids	• Principally associated during construction with activities that disturb sediment and mobilise it into the water column (e.g. dredging, disposal, trenching, materials import and deposition, shipping movements and wash, discharges, increased scour around structures, etc.) so likely at some point for virtually all construction schemes.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Limit activity periods (seasonally, diurnally, total duration) to minimise suspended solid concentrations and release periods. • Physio-chemical and biological effects might be moderated by timing activities to avoid particular tidal phases when high local concentrations might result. • Best-practice measures to minimise generation of suspended solids (e.g. selection of appropriate plant, zoning and phasing, exclusion zones, etc.) • Active sediment control measures such as silt curtains or use of flocculants (where appropriate).

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Siltation rate changes	• Alteration of natural rates of siltation. • Increased siltation may be intentional (e.g. dredging disposal) or incidental due to increased mobilisation of sediments locally during construction (see 'Changes in suspended solids', above). • Structures in the water column may increase or decrease sedimentation locally depending on consequent hydrodynamic changes. • Decreases in sedimentation may also occur where sediment inputs to a system are impeded or altered by construction.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Changes in siltation rates might be moderated by timing activities to avoid particular tidal phases. • Best-practice measures to minimise generation of suspended solids (e.g. selection of appropriate plant, zoning and phasing, exclusion zones, etc.) • Active sediment control measures such as silt curtains or use of flocculants (where appropriate).
Litter	• Any manufactured or processed solid material from anthropogenic activities that is discarded, disposed or abandoned (excluding legitimate disposal) in the marine environment. • Potentially an issue for all types of construction.	• Principally managed through codes of construction practice / contractor requirements, method statements etc. designed to manage behaviours (individually and collectively).
Electromagnetic changes	• Likely to be localised and temporary during construction as a result of plant operation or powered cabling required for plant / telecommunications etc.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Limit activity periods (seasonally, diurnally, total duration) or employ pre-initiation surveys to minimise exposure of sensitive species. • Shielding (etc.) by temporary burial.
Underwater noise changes	• Most construction activity has the potential to generate underwater noise (excavation, vessel movements, etc.) but the most significant sources of noise are typically associated with heavy construction operations, particularly piling	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols. • Use of bespoke equipment (e.g. hammer modifications, sleeving or muffling, vibro-piling or gravity-based piling) to reduce noise levels). • Limit usage (seasonally, diurnally, total duration) or employ pre-initiation surveys to minimise exposure of sensitive species. • Concurrent monitoring during noisy activities • Identify stand-off zones from sensitive features. • Follow established protocols e.g. the JNCC (2010) *Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise*. • Acoustic deterrents. • Protocols for equipment use such as soft start etc.

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Introduction of light	• Floodlighting etc. used on above surface plant and equipment to facilitate working or navigation. • Underwater lighting to facilitate specific construction activities	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols. • Limit usage (seasonally, diurnally, total duration) or employ pre-initiation surveys to minimise exposure of sensitive species. • Design lighting to avoid spillage and so minimise exposure of sensitive species
Barrier to species movement	• Structures used during construction (e.g. caissons, impoundments, breakwaters, etc.) may present physical barriers to species movements in some scenarios. • Other pressures (e.g. noise, visual disturbance, light, EMF) may also create barrier effects for sensitive species.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Limit activity periods (seasonally, diurnally, total duration) or employ pre-initiation surveys to minimise exposure of sensitive species.
Death or injury by collision	• Vessel movements or larger construction plant (e.g. cranes, rigs) presenting a collision risk for birds and marine mammals. • Pumps presenting a risk of entrainment for smaller mobile species including fish. • Some entrainment may be unavoidable (e.g. of some benthic species during suction dredging).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Limit activity periods (seasonally, diurnally, total duration) or employ monitoring to minimise risk to sensitive species if present in the construction area. • Increase the visibility of equipment and plant. • Acoustic deterrents. • Proximity sensors to engage automatic shut-down of equipment with moving parts. • Use of bespoke equipment (e.g. 'fish-friendly' pumps). • Protocols for equipment use such as soft start etc.
Visual disturbance	• Direct disturbance of sensitive features (principally birds and seals, cetaceans to a lesser extent) through construction activities, e.g. increased vessel, vehicle or personnel movements.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Limit activity periods (seasonally, diurnally, total duration) or employ monitoring to minimise risk to sensitive species if present in the construction area.
Genetic modification & translocation of indigenous species	• Not generally a pressure associated with construction but translocation of species may occur incidentally during vessel movements and operation (e.g. through ballast tanks).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols.

Pressure / Mechanism	Potential pathways in construction / decommissioning	Typical measures to avoid / moderate effects on receptors
Introduction or spread of non-indigenous species	• Introduction potentially a risk for works that require specialist plant and equipment or materials from outside the marine biogeographic area, or from areas with high INNS loading. • Spread possible where works are required in areas with a high INNS load.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Adherence to legislation and international conventions (e.g. International Maritime Organisation (2004) International Convention for the Control and Management of Ship' Ballast Water and Sediments (BWM)). • Implement risk-identification and biosecurity management plans including minimum requirements for inspections and biofouling measures, surveillance etc. • Avoid import of materials through re-use on site.
Introduction of microbial pathogens	• Untreated or insufficiently treated effluent discharges, run-off from terrestrial sources or vessels. • Ballast water releases.	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design. • Adherence to legislation and international conventions (e.g. International Maritime Organisation (2004) International Convention for the Control and Management of Ship' Ballast Water and Sediments (BWM)). • Implement risk-identification and biosecurity management plans including minimum requirements for inspections and biofouling measures, surveillance etc.
Removal of target species	• Pressure unlikely to be particularly significant for construction (generally associated with fishing) although some schemes may require activities targeting particular species (e.g. removal of biofouling).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols.
Removal of non-target species	• Pressure unlikely to be particularly significant for construction (generally associated with fishing).	• Pre-development surveys and investigations to ensure risks for a given location / activity are fully understood, with effects avoided through design and equipment use protocols.

Operation

6.3.10 Mitigation and avoidance measures that may be available during the operational stage of sector activities are generally sector-specific, and so are considered within the following sector assessments. However, many of the measures identified in **Table 6.2** will be equally applicable to operational activities. The assessments assume that all legislative and permitting (etc.) requirements governing specific operational activities will be met.

6.4 Appropriate Assessment – Aggregates

Screening summary

6.4.1 Policy AGG_01a provides the supporting framework for future aggregate proposals as follows:

AGG_01 a: Proposals for new aggregate extraction will be supported, within any tonnage limits, where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.4.2 It should be noted that the aggregates policies will replace the provisions of the 2004 Interim Marine Aggregates Dredging Policy (iMADP), which was published in response to a series of lease applications in the Severn Estuary and Bristol Channel area. This was produced due to the absence, at that time, of a statutory licensing regime and included annual and area caps on extraction tonnages. It applied to the Severn Estuary and Bristol Channel area only; the WNMP will extend aggregates policy beyond the Bristol Channel region to the whole of the Wales marine area. Many of the controls introduced by iMADP are now covered by the marine licensing process (under MaCAA, 2009). It is important to note that the HRA can only assess the WNMP and the likelihood of its outcomes affecting European sites; it cannot and should not assess the 'revocation' of the iMADP or try to compare the relative merits of the WNMP and iMADP.

6.4.3 As with other supporting policies, the intended or likely outcome of the policy is maintenance of existing aggregate activities and perhaps an increase in the number of aggregates proposals within Welsh waters, with delivery of those that can be shown to comply with the general policies within the WNMP. The policy itself does not have an explicit spatial component nor support extraction in particular areas; nor does it propose quanta for extraction.

6.4.4 However, the supporting text reflects aspects of the current provisions of iMADP in allowing (subject to sustainability criteria and the undertaking of necessary assessment through the decision-making processes) not more than 800,000 tonnes (exclusive of licensed roll-over tonnage) of annual licensed aggregate extraction from Welsh waters in the Severn Estuary. This is consistent with the existing iMADP provisions and is understood to be sustainable based on HRAs (etc.) of existing licences for the Severn Estuary, and so this spatial aspect of the policy is not considered further as it reflects existing provisions subject to HRA.

6.4.5 Aggregates extraction schemes, whilst well understood, have the potential to affect the interest features of European sites and therefore a policy promoting these activities could result in significant effects if not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

Appropriate Assessment

Potential Effect Pathways

6.4.6 The likely or intended outcome of the aggregates policy is the ongoing provision of extraction opportunities and hence schemes to meet market demand. The scale or type of extraction supported by the policy is not defined, nor are specific schemes or locations identified.

6.4.7 Having said that, aggregate extraction is a well-established industry with much available literature on best practice and mitigation approaches (etc.)[51] and generally a clear appreciation of the likely effects and recovery times. Some substantial aggregates extraction studies have been produced (for example, the *Anglian Marine Aggregate Regional Environmental Assessment* (MAREA) Emu (2012)) and whilst this level of detail is not necessarily achievable for the WNMP, or appropriate for the assessment of the WNMP proposals, it provides a clear basis for assessing the potential outcomes of the WNMP policies and the need for any additional safeguards.

6.4.8 Emu (2012) and Newell & Woodcock (2013) provides a useful summary of the primary and secondary effects most likely as a result of aggregate extraction. These include:

- Direct damage or loss of habitats through dredging.
- Increased turbidity and generation of sediment plumes from the overflow and screening processes (usually within 4km).
- Toxic contamination; this may include toxic contaminants associated directly with marine activities (e.g. oils etc.) but is more likely to involve the release of contaminants in sediments through excavation.
- Hydrodynamic changes: aggregates schemes alter the sea bed morphology and are known to result in hydrodynamic changes such as alteration of wave patterns and tidal flows, with consequential effects on sediment transport.
- Effects on mobile species: aggregates schemes can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:
  - changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
  - underwater noise and vibration due to turbine operation, particularly for fish and marine mammals;
  - collisions with vessels and structures, particularly for marine mammals;
  - introduction of lighting (although generally not likely to be substantial);
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.4.9 The sensitivity of the interest feature groups to the potential pressures associated with aggregates schemes are summarised in **Table 6.3**. Note that only the pressures that JNCC (2016) identify as being associated with aggregates extraction are included in **Table 6.3.**

[51] For example, The Crown Estate / Minerals Planning Association (2017) *Good Practice Guidance: Extraction by Dredging of Aggregates from England's Seabed*. TCE / BMPA, London; The Crown Estate / Minerals Planning Association (2013) *Marine aggregate dredging and the coastline: a guidance note: Best practice guidance for assessment, evaluation and monitoring of the possible effects of marine aggregate extraction on the coast – a Coastal Impact Study*. TCE / BMPA, London

Table 6.3 Sensitivity of the interest feature groups to the potential pressures associated with **aggregates** schemes *(note, pressures are not included if they are not associated with aggregates activities (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects*)

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes – local	Y	Y		Y	Y	S	S	Y
Wave exposure changes – local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination – overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Transition elements & organo-metals	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydro*carbon* & PAH Contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Radionuclide contamination	Y	Y		Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y					Y	Y	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y					Y	Y	Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Underwater noise changes				Y	Y	Y	S	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y

European site / feature exposure

6.4.10 The supporting text of the policy refers to Welsh Waters in the Severn Estuary although this is a reflection of the existing provisions agreed under IMADP. The Severn Estuary is considered to be sensitive to aggregate extraction as there is no known significant modern source of sand-sized sediment to replenish that which is extracted, although sandbanks in the Inner Bristol Channel may be a source of sediment for the Severn Estuary under certain conditions. Over time, extraction may have an impact on the extent and morphology of the sand-bank features.

6.4.11 However, in terms of the environmental impact of extraction in the Severn Estuary and Inner Bristol Channel, the current licences have all been through due regulatory process including Environmental Impact Assessment and Habitats Regulations Assessment, and recent work for the Welsh Government[52] indicates that activities are currently being managed within environmental limits in relation to habitats and species. Each of the licences also includes a comprehensive programme of monitoring to manage any residual risk of morphological change (and subsequent impacts on features), which includes topographic and bathymetric surveys across the whole bank system, undertaken jointly by the operators. It should also be noted that the intention of the WNMP is to encourage the exploitation of resources away from the Severn Estuary, and in the inner Bristol Channel instead.

6.4.12 Policy AGG_01 therefore has no explicit or implicit spatial direction and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functionally-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes.

Mitigation

Plan level

6.4.13 The principal mitigating measures introduced at the plan level are set out in **Section 6.3.**

Scheme level

6.4.14 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**, although these phases are not typically substantial for aggregate extraction schemes.

6.4.15 With regard to operation, offshore aggregates extraction is a common activity around the UK coast and there is a substantial body of established good-practice mitigation and avoidance measures that are known to be effective in most scenarios. Indeed, the Severn Estuary is one location in Welsh waters where designated features are currently dredged directly, and so a reasonably body of practice and evidence exists regarding the sustainability of these activities in a Welsh context.

6.4.16 Most of the established mitigation and avoidance measures currently employed are set out in "*Good Practice Guidance Extraction by Dredging of Aggregates from England's Seabed*" (TCE / MPA / MMO 2017)[53], although it should be noted that this is not exhaustive and bespoke operational

[52] HR Wallingford (2016) Review of Aggregate Dredging off the Welsh Coast. Report for Cefas, Ref. DDM7582-RT001-RT05-00. Available at http://gov.wales/docs/drah/publications/161024-fisheries-review-of-aggregate-dredging-off-welsh-coast-oct-2016-en.pdf.
[53] Available at: https://www.bmapa.org/documents/BMAPA_TCE_Good_Practice_Guidance_04.2017.pdf

measures will often be required for specific locations or activities. Established mitigation and avoidance measures would typically include a range of active operational management approaches, for example:

- Exclusion zones around high-value habitats within an application area, to safeguard sensitive features and facilitate re-colonisation of worked areas.
- Temporal restrictions on activities, either diurnally (e.g. associated with at particular stages of the tide) or seasonally (e.g. to minimise effects on migratory fish).
- Selection of appropriate dredging plant and techniques, including dredger navigation routes.
- Sediment and plume management measures, including screening controls.
- Active zoning and management of activities, to minimise dredge areas and ensure appropriate phasing of works.
- Modification of the dredging depth to limit changes to hydrodynamics and sediment transport patterns.
- Partial retention of aggregate resource and capping to allow natural re-colonisation by marine species after dredging has ceased.

6.4.17 Furthermore, most aggregates licences are time-limited with clear monitoring requirements, to ensure that effects which were no predicted at the time of application can be identified and rectified.

6.4.18 This suggests that many of the potential operational effects associated with aggregate extraction activities can be largely avoided or substantially reduced with appropriate project-planning and best-practice management measures.

Policy Review and assessment summary

6.4.19 The intent of Policy AGG_01 is the support of aggregate schemes, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of aggregates schemes, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.4.20 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, although it is clear from existing aggregate schemes in the Severn estuary that measures are available and adverse effects are not an inevitable outcome (even within or close to European site boundaries). In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- All aggregates applications will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.
- The WNMP requires five yearly review of monitoring results for aggregate licences.

6.4.21 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate.

However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing aggregates schemes in UK waters strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- All schemes benefiting from this policy would require project-level HRA as part of the normal consenting process.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.4.22 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.5 Appropriate Assessment – Aquaculture

Screening summary

6.5.1 The Aquaculture Sector Objective is "*To facilitate the development of sustainable aquaculture in Welsh waters, including promoting innovative finfish, shellfish and marine algal businesses and associated supply chains*". 'Sustainable' is defined in accordance with the 'Sustainable Development' principles and *The Well-being of Future Generations (Wales) Act 2015*. Policy GEN_01 provides a 'presumption in favour' of sustainable development.

6.5.2 Policy AQU_01a provides the supporting framework for future aquaculture proposals as follows:

AQU_01 a: Proposals for new aquaculture developments will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.5.3 As with other supporting policies, the intended or likely outcome of the policy is an increase in the number of aquaculture proposals within Welsh waters, where they are shown to be sustainable. However, the policy does not have a spatial component and the supporting text does not limit support to particular areas or aquaculture areas (e.g. inshore only). Furthermore, the policy does not identify any proposed quantum for future aquaculture development.

6.5.4 Aquaculture schemes have the potential to affect the interest features of European sites, in particular in intertidal areas, and therefore a policy promoting these could result in significant effects if proposals are not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

Appropriate Assessment

Potential effect pathways

6.5.5 There are essentially four main types of aquaculture that are likely to be commercially viable around Wales:

- Seabed or bottom culture: this typically involves the collection of wild shellfish spat, usually by dredging areas of seabed (some of which may be prepared for this purpose), and the relocation of these to seabed grow-out sites in areas of shallow, nutrient-rich water. The shellfish are subsequently harvested when they reach commercial size, again usually by dredging.
- Off-bottom culture (trestle or rope): these methods are less extensive than bottom culture and involve the growing of shellfish on trestles (usually oysters) or rope lines suspended in the water column (usually mussels), which are then harvested.
- Cages: this typically involves the cultivation of finfish species (e.g. salmon) in cages or pens, which are floating or fixed in the sea.
- On-land systems: where tanks and infrastructure are largely on land, with seawater abstracted and discharged to the sea.

6.5.6 In broad summary, the principal environmental aspects and effect pathways are likely to be as follows.

Construction

6.5.7 All interest features potentially associated with the ZoI (see Appendix A) will be potentially vulnerable (i.e. sensitive and potentially exposed) to one or more of the pressures that are typically associated with construction schemes in the marine environment (e.g. direct damage to, or loss of, habitats; indirect damage to, or loss of, habitats due to secondary effects; toxic contamination; barrier effects and disturbance, displacement or mortality of mobile species etc; see **Section 5.3**). The construction requirements for most aquaculture installations will be localised and small-scale only, and whilst scale is not always a predictor of the significance of any effects it is usually strongly correlated; in most instances, therefore, aquaculture schemes will have only limited potential for significant or significant adverse effects on European sites as a result of construction activities, and principally on sites in relatively close proximity to the construction location.

Operation

6.5.8 Operational effects will depend on the scale and type of development proposed, and the technologies that are used at the point of delivery. Evidence from existing aquaculture installations (many of which are in European sites) indicates that effects as a result of operation are typically local to the installation only (e.g. substantial secondary effects on distant habitats due to hydrodynamic changes do not occur). Effects as a result of the following pressures are therefore most likely:

- **Hydrodynamic changes**: structures or beds associated with aquaculture can alter local hydrodynamics (e.g. by slowing tidal currents around them) resulting in increased siltation locally. More wide-ranging changes are possible, depending on the size of any structures but are generally unlikely based on evidence from existing schemes.
- **Physical loss / changes**: Physical loss or damage to habitats may occur directly, as a result of structure installation, or as a secondary effect of (for example) hydrodynamic changes causing increased sedimentation. Operational activities (e.g. collection of spat or harvesting by

dredging; management of substrates) can result in the removal associated habitats and species, or lead to damage through sediment mobilisation and smothering. Moorings (etc.) can result in abrasion damage, depending on scales.

- **Toxic contamination**: toxic contamination may occur as the result of spillages (etc.) during operations, or (particularly for finfish) the introduction of non-synthetic and synthetic compounds (e.g. feed pellets; parasite treatments; etc.). Toxic contaminants in sediments that may be released through dredging.
- **Non-toxic contamination and physio-chemical changes**: Local physio-chemical changes may occur in conjunction with the hydrodynamic changes, as tidal currents and fluxes are altered; fish farming in particular generates large amounts of organic waste products which may affect surrounding habitats and can result in reduced dissolved oxygen levels locally.
- **Biological changes**: there are a number of potential mechanisms for biological effects as a result of aquaculture, including:
  - the introduction or transfer of pathogens or parasites from cultured to wild populations;
  - the direct introduction of non-native species for commercial exploitation;
  - the introduction of new bare surfaces which may allow non-native species to colonise an area more easily, in the absence of competition from established native species (assuming spread is limited to some extent by existing regime and absence of new substrates);
  - translocation or introduction of indigenous species to new areas resulting in genetic shifts in populations (e.g. through fish escapes and interbreeding);
  - alterations in predator or prey behaviours in response to aquaculture installations, bringing them into conflict with operations.

6.5.9 Significant direct disturbance, displacement, mortality and barrier effects on mobile species would not generally be expected due to the scale of most operations, although changes may occur through changes in habitat or prey distributions due to the physical and physio-chemical changes noted above; or the introduction of new structures creating new habitat (particularly for fish, which often aggregate around structures, but conceivably for birds which may use structures for perching and nesting). It is also possible for some species, particularly diving birds, to become entangled in ropes and tethers associated with aquaculture facilities.

6.5.10 The sensitivity of the interest feature groups to the potential pressures associated with aquaculture schemes are summarised in **Tables 6.4 – 6.6**, based on the JNCC impact categories.

Table 6.4 Sensitivity of the interest feature groups to the potential pressures associated with **fin-fish aquaculture** schemes *(note, pressures are not included if they are not associated with aquaculture activities (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure (in relation to fin-fish aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y			S	S	S	S	Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y

Pressure (in relation to fin-fish aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Litter	Y	Y		Y	Y	Y	Y	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Genetic modification & translocation of indigenous species	Y			Y				Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens	Y			Y	Y	Y	Y	Y
Removal of target species				Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y

Table 6.5 Sensitivity of the interest feature groups to the potential pressures associated with **shellfish aquaculture** schemes *(note, pressures are not included if they are not associated with aquaculture activities (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure (in relation to shellfish aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Emergence regime changes - local	Y	Y			S	Y	Y	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y							Y
Changes in suspended solids	Y			Y	S	S	Y	Y

Pressure (in relation to shellfish aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Siltation rate changes	Y			S	S	Y	S	Y
Litter	Y	Y		Y	Y	Y	Y	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Genetic modification & translocation of indigenous species	Y			Y				Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y
Removal of target species				Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y

Table 6.6 Sensitivity of the interest feature groups to the potential pressures associated with **macroalgae aquaculture** schemes *(note, pressures are not included if they are not associated with aquaculture activities (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure (in relation to macroalgae aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y							Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y

Pressure (in relation to macroalgae aquaculture)	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Visual disturbance				Y	Y	Y	Y	Y
Genetic modification & translocation of indigenous species	Y			Y				Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y
Removal of target species				Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y

European site / feature exposure

6.5.11 Policy AQU_01 has no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functionally-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see **Appendices A - D**) are potentially vulnerable to the policy outcomes.

Mitigation

Plan level

6.5.12 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.5.13 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**; these are likely to be fully effective for the vast majority of aquaculture schemes.

6.5.14 A number of established operational mitigation and avoidance measures are available at the scheme-level and are known to be effective. These are set out in the EC guidance document "*Guidance on Aquaculture and Natura 2000: Sustainable aquaculture activities in the context of the Natura 2000 Network*"[54], which notes that "*It needs to be stressed that by properly implementing relevant EU and national legislation (including licensing and control) most of the potential pressures and impacts from aquaculture are prevented or minimised. In addition, the aquaculture operators are voluntarily making significant efforts to apply good management practices (e.g. codes of conduct, monitoring, certification)*". This suggests that many of the potential operational effects associated with aquaculture (hydrodynamic changes, physical changes, toxic and non-toxic contamination, and biological changes) can be almost entirely avoided or substantially reduced with appropriate siting of infrastructure and best-practice farm management measures.

Policy Review and assessment summary

6.5.15 The intent of Policy AQU_01 is the support of aquaculture schemes, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of aquaculture schemes, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.5.16 Furthermore, the consenting process for any aquaculture scheme is set out in the supporting text, which notes the licensing role associated with the granting of any Several Order (SO), which would require HRA at the project level as part of any SOs.

6.5.17 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, although it is clear from existing aquaculture schemes around Wales that measures are available and adverse effects are not an inevitable outcome (even within European site boundaries).

[54] Available at: https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/guidance-aquaculture-natura2000.pdf

In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- All SOs will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.5.18 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing aquaculture schemes and EC guidance strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- All schemes benefiting from this policy would require project-level HRA.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.5.19 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.6 Energy – Low Carbon (Wind)

Screening summary

6.6.1 The Energy – Low Carbon Sector objectives are:

- "*To contribute significantly to the decarbonisation of our economy and to our prosperity by increasing the amount of marine renewable energy generated, through:*
  - *Supporting further commercial deployment of offshore wind technologies at scale over the lifetime of this plan;*
  - *Supporting the development and demonstration of wave energy and tidal stream technologies in the short to medium term;*
  - *Increasing (where appropriate) the number of wave energy and tidal stream energy generation devices deployed in commercial scale developments over the medium term;*
  - *Developing a better understanding of the potential for tidal lagoon power technology; and*

- *Recognising the potential role of the marine environment in new coastal nuclear energy generation facilities.*

- *To develop Wales as an exemplar of marine renewable energy technology by developing the essential skill base, infrastructure and technical knowledge to support the development of the industry over the next 20 years."*

6.6.2 Policies ELC_01, ELC_02 and ELC_03 provide the supporting policy framework for wind, wave and tidal stream proposals respectively. ELC_04 provides support for further investigations into tidal range opportunities. As noted (see Section 4.2.5), ELC_04 is 'screened out' as it cannot lead to development.

6.6.3 Potential effects associated with the wave and tidal stream policies (ELC_02 and ELC_03) are considered in **Section 6.7**.

6.6.4 Policies ELC_01 provides the supporting policy framework for wind energy proposals:

ELC_01a: Proposals for offshore wind energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

Proposals for wind >350MW will be considered by UK Government in accordance with relevant national policy. In determining an NSIP for a wind proposal, the decision maker will have regard to this plan. Any determination in relation to energy developments of any scale will be taken in accordance with this plan alongside any other relevant considerations.

6.6.5 As with other supporting policies, the intended or likely outcome of the policy is the provision of an appropriate level of support for offshore wind proposals.

6.6.6 Existing wind lease areas have been subject to HRA (e.g. Entec 2009); whilst the policy covers these, these areas are not subject to the appropriate assessment process for the WNMP as this has been previously completed and the WNMP is reflecting an external plan in this instance. The WNMP therefore applies to future offshore wind schemes more generally, and so the policy does not have an explicit spatial component nor support or direct installations to particular areas although it is most likely that they will be within areas defined by TCE as part of its leasing processes, a new round of which (Round 4) is underway (the leasing rounds are subject to HRA).

6.6.7 Offshore wind schemes have the potential to affect the interest features of European sites and therefore policies promoting these could result in significant effects if not appropriately located and designed.

Appropriate Assessment

Potential effect pathways

6.6.8 The likely or intended outcome of Policies ELC_01 is an increase in the number of offshore wind proposals; and, as a consequence, the implementation of those schemes.

6.6.9 Offshore wind is a growth sector but nevertheless fairly mature, and most of the effect pathways are relatively well understood. Future offshore arrays will have similar effect pathways to those currently in operation, related to the installation of large structures in the water column (although the foundation and hence construction requirements vary, depending on the depth of water, turbine parameters and substrates); cable installation (note, the potential effects of subsea cabling are considered in **Section 6.12**); the operation of the turbines themselves; and increases in vessel

movements and activities associated with device maintenance. It should be noted, however, that the next generation of offshore turbines are likely to include floating devices deployed in deeper water, which are tethered to the seafloor; these may introduce additional risk factors (e.g. cetacean or diving seabird collisions with cable tethers) although it is unlikely that these risks will be so novel as to obviate mitigation measures that are currently considered effective.

6.6.10 Most currently installed offshore wind farms are over 10km from the coast, with the average distance to shore for wind farms with grid connections in 2017 being 41km (Wind Europe 2018). Consequently it is generally unlikely that terrestrial habitats will be exposed to effects, except through secondary mechanisms (e.g. cable landfall and grid connection locations) that are only likely to occur in very rare project-specific scenarios rather than systematically as a result of turbine installation. However, the scale or type of scheme supported by the policy is not defined or restricted, nor are specific schemes or locations identified.

Construction and Decommissioning

6.6.11 All interest features, with the exception of terrestrial habitats, will be potentially vulnerable (i.e. sensitive and potentially exposed, depending on the mitigation or avoidance measures that can be employed) to one or more of the pressures that are generated by large-scale construction schemes in the marine environment. These would typically include:

- direct damage to, or loss of, habitats through dredging and structure / cable installation, abrasion etc.;
- indirect damage to, or loss of, habitats due to changes in coastal processes (e.g. erosion, deposition, sediment regimes and littoral drift patterns);
- toxic contamination; this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; etc.) or contaminants in sediments that may be liberated through excavation (e.g. oils and other organic contaminants);
- barrier effects and disturbance, displacement or mortality of mobile species (through the above mechanisms, plus noise and vibration, visual and physical intrusion, collisions with structures, lighting, etc.);
- introduction of INNS.

Operation

6.6.12 Operational effects will depend on the scale and type of development proposed, and the technologies that are used at the point of delivery. However, effects as a result of the following pressures are most likely:

- Hydrodynamic changes: turbine foundations have the potential to result in local hydrodynamic changes (e.g. resulting in scour around structures, or increased sedimentation) and conceivably more wide-ranging changes if structures or arrays are of sufficient scale for sediment dynamics and coastal processes to be altered.
- Physical loss / changes: the hydrodynamic changes may result in the physical loss of some habitats, or localised changes.
- Toxic contamination: from maintenance vessels and operations.
- Pressures on mobile species: schemes deploying large structures can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:

- changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
- underwater noise and vibration due to operation, particularly for fish and marine mammals;
- electromagnetic changes associated with the generation and transfer of electricity, particularly for fish (some marine mammals may also be sensitive in certain situations, although this is thought to be less notable);
- collisions with moving structures or entanglement with tethers, particularly for marine mammals and birds (bats are likely to be less exposed to collision risk for offshore turbines due the typical distance from the coast of offshore wind farms);
- the introduction of new structures creating new habitat or reef effects (particularly for fish, which often aggregate around structures, but conceivably for birds and other features).

- Biological changes, particularly through:
  - the introduction of non-native invasive species;
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.6.13 The sensitivity of the interest feature groups to the potential pressures associated with offshore wind schemes is summarised in **Table 6.7**.

Table 6.7 Sensitivity of the interest feature groups to the potential pressures associated with **offshore wind** schemes *(note, pressures are not included if they are not associated with offshore wind schemes; sensitivities to **subsea cables** are set out in Table 6.12 (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Temperature changes - local	Y	Y		Y	S	S	S	Y
Salinity changes - local	Y	Y		Y	S	S	S	Y
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Emergence regime changes - local	Y	Y			S	Y	Y	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Transition elements & organo-metals	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydrocarbon & PAH Contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Radionuclide contamination	Y	Y		Y	Y	Y	Y	Y
Introduction of other substances (solid, liquid or gas)	Y	Y		Y	Y	S	S	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y							Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Litter	Y	Y		Y	Y	Y	Y	Y
Electromagnetic changes				Y	Y		S	Y
Underwater noise changes				Y	Y	Y	S	
Introduction of light			Y	Y	Y	Y	Y	
Barrier to species movement				Y	Y	Y	Y	

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Death or injury by collision			Y	Y	Y	Y	Y	
Visual disturbance				Y	Y	Y	Y	
Genetic modification & translocation of indigenous species	Y			Y				Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y

European site / feature exposure

6.6.14 Policy ELC_01 has no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes.

6.6.15 However, it should be noted that the nature of offshore wind will ensure that terrestrial habitats will not typically be exposed to effects, except through secondary mechanisms (e.g. cable landfall and grid connection locations) that are only likely to occur in very rare project-specific scenarios rather than systematically as a result of turbine installation. In contrast seabirds and wildfowl are likely to be more exposed to effects than they are for many other activities in the marine environment.

Mitigation

6.6.16 Offshore wind is a relatively mature sector and so a reasonably substantial body of best-practice mitigation and avoidance measures has been established. Potential effects are likely to be strongly dependent on the location of the development, and so the planning and survey phase is critical to the avoidance of adverse effects; however, it is not considered necessary to include specific exclusions in policy (e.g. within or near SPAs) as evidence from constructed schemes suggests that effects can be avoided even for wind farms in close proximity to protected sites.

Plan level

6.6.17 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.6.18 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**; these are likely to be fully effective for the vast majority of marine construction schemes, and have been reliably employed during the construction of several major offshore wind farms around the UK coast.

6.6.19 With regard to operational mitigation, the appropriate siting of devices through a detailed project planning and investigation process is likely to be the principal method by which adverse operational effects on habitats and species are avoided; however the risks posed by particular operational effect pathways may be reduced further by additional scheme-specific measures; for example:

- underwater collision risk may be reduced by increasing the visibility of subsurface structures or using acoustic deterrents;
- residual collision risk for birds can be reduced through a number of design and operational measures, including:
  - increasing blade height above the sea surface (evidence suggests that most seabird species fly within 20m of the sea surface for more than 90% of their flight time, although there are some exceptions (e.g. gulls and gannets) (Jongbloed 2016);
  - minimising turbine lighting, or avoiding red or white lighting that may disorientate or attract some bird species (Poot *et al.* 2008);

- operational minimisation measures, such as increased cut-in speeds or curtailment based on appropriate variables (e.g. seasonality, weather patterns, migration periods, numbers of vulnerable species nearby, when high-risk species are present, etc.).

- electromagnetic fields (EMF) may be reduced by appropriate screening or burial or cables;
- noise and vibration effects can be minimised through device design or restrictions on operational periods.

Policy review and assessment summary

6.6.20 The intent of Policy ELC_01a is the support of wave and tidal stream proposals, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of schemes, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.6.21 As a result, the likelihood of specific effects occurring on specific sites or features that are potentially exposed cannot be determined, and will depend entirely on the nature of the schemes that come forward under the WNMP policies.

6.6.22 Having said that, there is a substantial and growing body of evidence regarding the effects of offshore wind farms on sensitive receptors, including European site interest features, and HRAs for several large offshore schemes have demonstrated that adverse effects can be avoided at the project level, even in areas close to or within European sites.

6.6.23 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, although there is evidence from existing schemes that measures are available and adverse effects are not an unavoidable outcome. In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- All schemes will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.6.24 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing schemes suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective, although the importance of scheme location (and hence the need for comprehensive environmental studies) is clear.

- All schemes benefiting from this policy would require project-level HRA.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.6.25 Therefore, the policy will not result in adverse effects that cannot be avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.7 Energy – Low Carbon (Wave and Tidal Stream)

Screening summary

6.7.1 The Energy – Low Carbon Sector objectives are:

- *"To contribute significantly to the decarbonisation of our economy and to our prosperity by increasing the amount of marine renewable energy generated, through:*
  - *Supporting further commercial deployment of offshore wind technologies at scale over the lifetime of this plan;*
  - *Supporting the development and demonstration of wave energy and tidal stream technologies in the short to medium term;*
  - *Increasing (where appropriate) the number of wave energy and tidal stream energy generation devices deployed in commercial scale developments over the medium term;*
  - *Developing a better understanding of the potential for tidal lagoon power technology; and*
  - *Recognising the potential role of the marine environment in new coastal nuclear energy generation facilities.*
- *To develop Wales as an exemplar of marine renewable energy technology by developing the essential skill base, infrastructure and technical knowledge to support the development of the industry over the next 20 years."*

6.7.2 Policies ELC_02a and ELC_03a are effectively the same, providing support for wave and tidal stream proposals:

ELC_02a: Proposals for wave energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

ELC_03a: Proposals for tidal stream energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.7.3 As with other supporting policies, the intended or likely outcome of the policy is the provision of an appropriate level of support for wave and tidal stream proposals.

6.7.4 The policy supporting text notes the existing test and demonstration zones for wave (off south Pembrokeshire) and tidal stream (off west Anglesey), which have been subject to HRA (ABPMer 2014); whilst the policy covers these, these areas are not subject to the appropriate assessment process for the WNMP as this has been previously completed and the WNMP is reflecting an external plan in this instance. The WNMP therefore applies to wave and tidal schemes more

generally, and so the policy does not have an explicit spatial component nor support or direct installations to particular areas.

6.7.5 Wave and tidal stream schemes have the potential to affect the interest features of European sites and therefore policies promoting these could result in significant effects if not appropriately designed. Furthermore, the novel nature of some technologies increases the likelihood that as yet undefined or undeveloped mitigation measures will be required. On this basis, significant effects cannot necessarily be excluded.

Appropriate Assessment

Potential effect pathways

6.7.6 The likely or intended outcome of Policies ELC_02a and ELC_03a is an increase in the number of wave and tidal stream proposals; and, as a consequence, the implementation of those schemes. The scale or type of scheme supported by the policy is not defined or restricted, nor are specific schemes or locations identified (although it is almost certain that they will be within areas defined by TCE as part of its leasing processes).

6.7.7 It should be noted that wave and tidal stream are novel technologies and the range of potential devices (and hence effects) is large. The range of uncertainties over impacts is therefore equally large. Work undertaken by the Natural Environment Research Council (NERC) for TCE (TCE, 2014) identifies a number of recommended research areas and priority research projects to help fill known gaps in the understanding of the likely effects of tidal energy schemes, but the complexity of any interactions typically means that identification of effects is possible at the project-level only. Furthermore, there are few operational commercial-scale schemes to provide examples of best-practice or mitigation measures. Nevertheless, monitoring of operational devices is expected to provide a robust evidence base in the near future.

6.7.8 The most common tidal stream technologies are broadly similar to submerged wind turbines, although other technologies such as tidal kites (where a kite 'flies' within a tidal stream, increasing stream velocities over an attached turbine) or enclosed turbines with concentrators have good potential in certain conditions. These technologies are typically installed where currents are magnified by topographical features, such as headlands, inlets and straits, or subsurface channels, although wider areas of lower tidal stream power are likely to become exploitable as technologies mature.

6.7.9 Wave energy devices are equally varied, and include floating or semi-fixed devices that effectively 'ride' the wave surface, submerged oscillators that are pushed by the wave surge, and large fixed structures that force waves (or air) through turbines.

6.7.10 The range of technologies means that the range of potential effect mechanisms is large, and the technological immaturity within the sector ensures that there is limited empirical data on these mechanisms, particularly if devices are deployed at scale. However, commercially viable schemes are likely to be large scale, involving the installation of relatively large structures in the water column and on the seabed that will have large moving parts; the associated installation of subsea cables (note, the potential effects of subsea cabling are considered in **Section 6.11**); and increases in vessel movements and activities associated with device maintenance. In broad summary, the principal aspects and pathways are likely to be as follows.

Construction and Decommissioning

6.7.11 All interest features noted above will be potentially vulnerable (i.e. sensitive and potentially exposed, depending on the mitigation or avoidance measures that can be employed) to one or more of the pressures that are generated by large-scale construction schemes in the marine environment. These would typically include:

- direct damage to, or loss of, habitats through dredging and structure / cable installation, abrasion etc.;
- indirect damage to, or loss of, habitats due to changes in coastal processes (e.g. erosion, deposition, sediment regimes and littoral drift patterns);
- toxic contamination; this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; etc.) or contaminants in sediments that may be liberated through excavation (e.g. oils and other organic contaminants);
- barrier effects and disturbance, displacement or mortality of mobile species (through the above mechanisms, plus noise and vibration, visual and physical intrusion, collisions with structures, lighting, etc.);
- introduction of INNS.

Operation

6.7.12 Operational effects will depend on the scale and type of development proposed, and the technologies that are used at the point of delivery. However, effects as a result of the following pressures are most likely:

- Hydrodynamic changes: tidal schemes have the potential to result in local hydrodynamic changes (e.g. resulting in scour around structures, or increased sedimentation) and conceivably more wide-ranging changes if structures or arrays are of sufficient scale for sediment dynamics and coastal processes to be altered. Neill & Crouch (2011) note that "*relatively small changes to the residual flow field caused by exploitation of the tidal stream resource could have a significant influence on the residual sediment transport pathways*", and Neill (2013) has suggested that far-field effects as a result of changes to sediment dynamics might extend up to 50km from the point of energy extraction based on models of the Bristol Channel.
- Physical loss / changes: the hydrodynamic changes may result in the physical loss of some habitats, or localised changes.
- Toxic contamination: from maintenance vessels and operations.
- Pressures on mobile species: schemes deploying large structures can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:
  - changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
  - underwater noise and vibration due to operation, particularly for fish and marine mammals;
  - electromagnetic changes associated with the generation and transfer of electricity, particularly for fish (some marine mammals may also be sensitive in certain situations, although this is thought to be less notable);
  - collisions with moving structures or entanglement, particularly for marine mammals;

- the introduction of new structures creating new habitat or reef effects (particularly for fish, which often aggregate around structures, but conceivably for birds and other features).

- Biological changes, particularly through:
  - the introduction of non-native invasive species;
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.7.13 The sensitivity of the interest feature groups to the potential pressures associated with wave and tidal stream schemes is summarised in **Table 6.8**.

Table 6.8 Sensitivity of the interest feature groups to the potential pressures associated with **wave or tidal stream** schemes *(note, pressures are not included if they are not associated with wave or tidal stream schemes; sensitivities to **subsea cables** are set out in Table 6.12 (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Emergence regime changes - local	Y	Y			S	Y	Y	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydro*carbo*n & PAH Contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Temperature changes - local	Y	Y		Y	S	S	S	Y
Salinity changes - local*	Y	Y		Y	S	S	S	Y
De-oxygenation	Y			Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y			S	S	S	S	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y			S	S	S	S	Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Electromagnetic changes				Y	Y		S	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision				Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Emergence regime changes - local	Y	Y			S	Y	Y	Y

European site / feature exposure

6.7.14 Policies ELC_02 and ELC_03 have no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes.

6.7.15 Due to the novel nature of the technologies there is some uncertainty over the likely exposure and responses of some interest features, and in practice this is likely to be very project- and device-specific.

6.7.16 The nature of most tidal stream demonstration schemes to date suggests that some feature groups are more likely to be systematically exposed to potentially adverse effects that cannot necessarily be avoided through siting alone, due to their potential to interact with the devices; specifically, marine mammals, diadramous fish and some deeper diving pelagic seabirds. In summary:

- Marine mammals: The factors that ensure areas are hydrodynamically suitable for tidal stream schemes also may make these areas attractive to some species for foraging; in particular, harbour porpoise are known to use tidal conditions for foraging and often occur in areas of high tidal energy around headlands and channels, and seal species commonly forage in these areas also. However, there is some evidence that exposure to certain risks associated with these schemes (e.g. collision) may be reduced by behavioural responses (e.g. some harbour seals have been found to avoid tidal turbine sound (Hastie *et al.* (2017)) which may (over the longer-term) lead to adaptive resilience to the pressures.
- Pelagic seabirds: Some pelagic seabirds also take advantage of tidal currents and upwellings when foraging, and deeper-diving species may be vulnerable to interaction with tidal stream devices, particularly if they act as fish-aggregation devices. Furness *et al.* (2012) identify "*…black guillemot, razorbill, European shag, common guillemot, great cormorant, divers and Atlantic puffin as the species most vulnerable to adverse effects from tidal turbines…*"[55] although the same authors note that "*there is a very strong consensus in the published literature that these wet renewables technologies are unlikely to represent as great a hazard to seabirds as posed by offshore wind farms*". A number of tidal stream schemes have been installed in or near offshore SPAs (particularly in Scotland) following HRAs that concluded that no adverse effects would occur.
- Diadramous fish: Tidal stream studies have indicated that there is a risk of direct effects on diadromous fish (principally collisions) although they may be susceptible to a range of other effects (e.g. displacement due to altered hydrodynamics, noise, or electromagnetic fields from cable connections; or from reef / aggregation effects).

6.7.17 There are far fewer wave schemes from which to base any assessment of potential exposure, although these are likely to be large devices that present some degree of collision risk (etc.), together with additional exposure mechanisms. In particular, far-field effects on sediment dynamics might extend up to 50km from the point of energy extraction (Neill, 2013) and so

[55] Note that Manx shearwaters have also been recorded diving over 30m deep (Shoji *et al.* 2016).

estuarine sites and their dependent species may also be exposed to this mechanism despite the likely separation distance to offshore wave devices.

6.7.18 However, it should be noted that most of these mobile species are wide-ranging and so wave or tidal schemes are unlikely to occupy a substantial proportion of their available habitat (although obviously some areas may be disproportionately important for some species).

6.7.19 For example, HRAs of specific wave and tidal stream developments have attempted to estimate the proportions of the regional marine mammal populations associated with the MMUs that may be affected by a given scheme. The general conclusion of these assessments, for harbour porpoise and bottlenose dolphin, is that these are wide-ranging species that are likely to have sufficient alternative foraging resources available to not impact the population; that the effects of specific schemes on marine mammals is likely to be relatively local; and that species commonly travel and forage alone or in small groups, and so impacts are not likely to affect large proportions of their regional populations at any one time (e.g. Tidal Ventures 2015; Minesto 2016).

Mitigation

6.7.20 There are several test and demonstration schemes in place around the UK, and many of the mitigation and avoidance measures used for other large marine schemes (e.g. wind turbines) are transferable to wave and tidal stream technologies. The HRAs of tidal stream developments consented in Wales have concluded that there would be no adverse effects on European site integrity, with suitable mitigation being found to allow deployment despite them being sited in environmentally sensitive areas.

6.7.21 In practice, the potential effects (and hence mitigation requirements) are likely to be strongly dependent on the technologies or devices deployed at a given location. As technologies mature a body of best-practice mitigation and avoidance measures is being established, but it is likely that the appropriate application of adaptive management will provide the most reliable mechanism for ensuring that adverse effects do not occur as a result of wave or tidal stream schemes.

Plan level

6.7.22 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.7.23 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**; these are likely to be fully effective for the vast majority of marine construction schemes, including for wave and tidal schemes.

6.7.24 With regard to operational mitigation, the appropriate siting of devices through a detailed project planning and investigation process is likely to be the principal method by which adverse operational effects on habitats and species are avoided; however the risks posed by particular operational effect pathways may be reduced further by additional scheme-specific measures; for example:

- adaptive management whereby monitoring gauges the effectiveness of operational regimes and mitigation measures, which are then altered as necessary;
- collision risk may be reduced by increasing the visibility of devices, using acoustic deterrents, using proximity sensors to engage automatic shut-down, or restrictions on operational periods (e.g. seasonally);

- electromagnetic fields (EMF) may be reduced by appropriate screening or burial or cables;
- noise and vibration effects can be minimised through device design or restrictions on operational periods.

Policy review and assessment summary

6.7.25 The intent of Policies ELC_02 and ELC_03 is the support of wave and tidal stream proposals, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of schemes, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.7.26 As a result, the likelihood of specific effects occurring on specific sites or features that are potentially exposed cannot be determined, and will depend entirely on the nature of the schemes that come forward under the WNMP policies.

6.7.27 However, this is clearly a sector where (a) data is lacking, particularly for large-scale schemes and (b) effects will be highly dependent on the technologies employed. It is also evident that development location will be a significant factor in determining whether adverse effects are likely, in particular:

- the factors that ensure areas are hydrodynamically suitable for tidal stream schemes also may make these areas attractive to some species for foraging; and
- far-field effects on hydrodynamics and hence habitats may be possible some distance from the point of energy extraction.

6.7.28 Having said that, there is little evidence of adverse effects from existing tidal stream schemes, and HRAs for commercial and test schemes have largely demonstrated or concluded that adverse effects can be avoided at the project level, even in areas close to European sites (for example, the Torr Head Tidal Energy Array (Tidal Ventures 2015). Similarly, whilst wave schemes at the moment are limited to a few demonstrators the evidence suggests that adverse effects as a result of deployment at scale are avoidable.

6.7.29 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, although there is evidence from existing schemes and some analogous large-scale marine developments that measures are available and adverse effects are not an inevitable outcome. In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- All schemes will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.7.30 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in

the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing schemes suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective, although the importance of scheme location (and hence the need for comprehensive environmental studies) is clear.
- All schemes benefiting from this policy would require project-level HRA.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.7.31 Therefore, the policy will not result in adverse effects that cannot be avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.8 Fisheries

Screening summary

6.8.1 The Fisheries Sector Objective is "*To support and safeguard a sustainable, diversified and profitable fishing sector including promoting sustainable capture fisheries and optimising the economic value of fish caught as a supply of sustainable protein*". 'Sustainable' is defined in accordance with the 'Sustainable Development' principles and *The Well-being of Future Generations (Wales) Act 2015*. Policy GEN_01 provides a 'presumption in favour' of sustainable development.

6.8.2 Policy FIS_01a provides the supporting framework for future aquaculture proposals as follows:

FIS_01 a: Proposals that support and enhance sustainable fishing activities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.8.3 It is important to note that the policy does not cover fishing activities themselves: fishing activity (etc.) is not a function or a responsibility of marine planning, but a consideration of it. The policy therefore relates to proposals that might support fishing activities, particularly those that provide opportunities for sustainable diversification and delivering added value as commercial fish stocks are frequently fully exploited with little opportunity for sustainable expansion.

6.8.4 In this context, therefore, the WNMP recognises that there is little or no scope for expanding fishing and so the focus of the policy is on enhancing the profitability of the established activity. The intended or likely outcome of the policy is an increase in the number of proposals that support economic growth and efficiency of the fisheries sector within Welsh waters (without expansion of fishing activity itself), and ideally delivery of those that can be shown to be sustainable. However, the types of proposals that might be covered by the policy are not defined, and the policy does not have a spatial component.

6.8.5 Whilst the types of schemes that might come forward are not defined, development in or near the marine environment have the potential to affect the interest features of European sites and therefore a policy promoting these could result in significant effects if proposals are not

appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

Appropriate Assessment

Potential effect pathways

6.8.6 The types of development that might benefit from this policy are likely to be fairly varied, in contrast to other sectors (e.g. aggregates or aquaculture); as a result, it is not possible to identify specific effect pathways that are likely to be particularly relevant to the policy.

6.8.7 The pressures noted in **Tables 4.2 and 5.4** and used in the Regulation 37 advice documents cannot therefore be excluded during the construction, operation or decommissioning of any schemes that benefit from the policy, i.e.

- Hydrodynamic changes (and hence potential geomorphological effects; e.g. alterations to tidal flows and currents; alterations to wave action).
- Toxic contamination (e.g. through intentional, incidental or accidental discharges of contaminants; or mobilisation of contaminated sediments).
- Non-toxic contamination and physio-chemical changes (e.g. nutrient enrichment; temperature changes; salinity changes).
- Direct physical loss of habitats (e.g. from direct removal or smothering and hence change to another seabed type; land reclamation; etc.).
- Direct physical damage of habitats (e.g. from partial removal by aggregate extraction; abrasion; changes in siltation rates; etc.).
- Other physical pressures (e.g. litter; noise and vibration; visual disturbance; collisions).
- Biological Disturbance (e.g. from introduction of microbial pathogens, the introduction of invasive non-native species, or from selective extraction of selected species).

European site / feature exposure

6.8.8 Policy FIS_01a has no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes. However, it is self-evident that the vast majority of schemes benefitting from this policy will be relatively localised and small-scale, and so adverse effects would generally be very unlikely unless there are direct effects on a European site.

Mitigation

Plan level

6.8.9 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.8.10 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**; these are likely to be fully effective for the vast majority of schemes that benefit from this policy.

6.8.11 Operational mitigation and avoidance measures cannot be easily identified without any information on the operation of the schemes, although it is very unlikely that the established measures identified for other sectors will not also be effective for any schemes benefitting from policy FIS_01a.

Policy Review and assessment summary

6.8.12 The intent of Policy FIS_01a is the support of schemes that in turn support the fisheries sector, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of any development, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.8.13 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, particularly as the policy provides no indication of the type of schemes that might benefit from the policy. However, it is clear from development (generally) around Wales that measures are available and adverse effects are not an inevitable outcome. In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- Developments with the potential to affect European sites will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.8.14 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing developments in the marine environment strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- Schemes benefiting from this policy would require project-level HRA.

- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.8.15 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.9 Ports and Shipping

Screening summary

6.9.1 The Ports and Shipping Sector Objective is "*To safeguard established shipping routes and support sustainable development in the shipping and ports sector*". 'Sustainable' is defined in accordance with the 'Sustainable Development' principles and *The Well-being of Future Generations (Wales) Act 2015*. Policy GEN_01 provides a 'presumption in favour' of sustainable development.

6.9.2 Policies P&S_01 and P&S_02 provide the supporting framework for future aquaculture proposals as follows:

P&S_01: Proposals for ports, harbours and shipping activities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

P&S_02: Proposals that provide for the maintenance, repair, development and diversification of port and harbour facilities will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.9.3 The supporting text sets out the intent of the policy, which is to help maintain and develop "*port, harbour and marina facilities in order to accommodate current and projected future increases in demand from the freight, bulk commodity, passenger and leisure markets, both in and out of the UK (including navigation access)*". As with other supporting policies, therefore, the intended or likely outcome of the policy is support for ongoing port activities and proposals for port development within Welsh waters, and ideally delivery of those developments that can be shown to be sustainable.

6.9.4 Development schemes in or near the marine environment have the potential to affect the interest features of European sites and therefore a policy promoting these could result in significant effects if proposals are not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

6.9.5 Unlike other policies within the WNMP there is an implicit spatial component as the policy relates to "*port, harbour and marina facilities*" in Wales. Welsh Government have identified 54 commercial ports and harbours in Wales[56], although a definitive list of marinas, jetties and private non-commercial harbours (to which the policy would arguably also apply) has not been identified to date. In addition, the operational boundaries of existing ports, or their landholdings, have not been provided to Welsh Government. The scale and type of development that might be supported by the policy is not specified.

[56] Available at: http://lle.gov.wales/apps/marineportal/#lat=52.5313&lon=-2.8894&z=8&layers=184

6.9.6 Note that whilst the policy includes reference to the current shipping lanes these are 'screened out' as they are determined and regulated outside the control of the WNMP.

Appropriate Assessment

Potential effect pathways

6.9.7 The policies are intended to support port-associated development, should proposals be brought forward, although specific schemes or even types of scheme are not identified. The potential range of developments that might benefit from the sector policies is therefore large and many (including most land-based developments) will not be directly subject to the provisions of the WNMP. Port development schemes can obviously result in a range of complex and interdependent pathways by which European sites or features could potentially be affected. In broad summary, however, the principal aspects and pathways are likely to be as follows.

Construction

6.9.8 Most interest features will be potentially vulnerable (i.e. sensitive and potentially exposed, depending on the mitigation or avoidance measures that can be employed) to one or more of the pressures that are generated by large and small-scale construction schemes in the marine environment. These would typically include:

- direct damage to, or loss of, habitats through dredging and structure installation;
- indirect damage to, or loss of, habitats due to changes to coastal processes (e.g. erosion, deposition, sediment regimes and littoral drift patterns);
- toxic contamination; this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; etc.) or contaminants in sediments that may be liberated through excavation (e.g. oils and other organic contaminants);
- non-toxic pollution and physio-chemical changes;
- barrier effects and disturbance, displacement or mortality of mobile species (through the above mechanisms, plus noise and vibration, visual and intrusion physical intrusion, collisions with structures, lighting, etc.);
- introduction of INNS.

Operation

6.9.9 The operational effects of port development will depend entirely on the scale and type of development proposed, and the technologies that are used at the point of delivery; however, effects as a result of the following pressures are most likely:

- Hydrodynamic changes: marine structures can alter tidal and hence emergence regimes, the tidal currents, and wave exposure.
- Physio-chemical changes: physio-chemical changes would be expected in conjunction with the hydrodynamic changes, as tidal currents and fluxes are altered; the extent would depend on the scale of the scheme, but may result in pressures such as localised changes in salinity or temperature, or accumulation of nutrients where dispersal is limited.

- Physical loss / changes: the hydrodynamic changes are likely to result in the physical loss of some habitats and maintenance dredging is a likely operational requirement due to increased siltation within and around any structure.
- Toxic contamination: from maintenance vessels and operations.
- Air quality changes: associated with variations in port capacity and vessel type.
- Pressures on mobile species: schemes can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:
  - changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
  - underwater noise and vibration, particularly for fish and marine mammals;
  - electromagnetic changes (e.g. associated with the generation and transfer of electricity), particularly for fish (some marine mammals may also be sensitive in certain situations, although this is thought to be less notable);
  - collisions with structures or vessels, particularly for marine mammals;
  - temporary or permanent barrier effects, particularly for marine mammals and fish;
  - the introduction of new structures creating new habitat (particularly for fish, which often aggregate around structures, but conceivably for birds and other features);
  - introduction of lighting;
- Biological changes, particularly through:
  - the introduction of non-native invasive species;
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.9.10 There may also be a range of indirect and incidental effects; for example, construction of harbours or sea walls may increase opportunities for recreational fishing or provide aquaculture opportunities. Furthermore there may be 'in combination' effects with the Dredging and Disposal policy as the two aspects (port development and dredging) are to some extent interconnected. The sensitivity of the interest feature groups to the potential pressures associated with port schemes are summarised in **Table 6.8**, although the range of potential activities that might be supported by the ports policies is such that the pressure tables from most sectors could potentially be applied.

Table 6.9 Sensitivity of the interest feature groups to the potential pressures associated with **ports** schemes *(note, pressures are not included if they are not associated with port activities (see Appendix F for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Temperature changes - local	Y	Y		Y	S	S	S	Y
Salinity changes - local*	Y	Y		Y	S	S	S	Y
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Emergence regime changes - local	Y	Y			S	Y	Y	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Transition elements & organo-metals	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydro*carbo*n & PAH Contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Radionuclide contamination	Y	Y		Y	Y	Y	Y	Y
Introduction of other substances (solid, liquid or gas)	Y	Y		Y	Y	S	S	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y			Y	Y	Y	Y	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Y			Y	Y	Y	Y	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y			Y	Y	Y	Y	Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Litter	Y	Y		Y	Y	Y	Y	Y
Electromagnetic changes				Y	Y		S	Y
Underwater noise changes				Y	Y	Y	S	Y
Introduction of light			Y	Y	Y	Y	Y	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Genetic modification & translocation of indigenous species	Y			Y				Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y
Removal of target species				Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y

European site / feature exposure

6.9.11 Unlike other policies within the WNMP there is an implicit spatial component as the policy relates to "*port, harbour and marina facilities*" in Wales. The Welsh Government has identified 54 commercial ports and harbours in Wales[57], which vary significantly in scale. Seven of these are categorised by the UK Government as 'major ports' (Holyhead, Fishguard, Milford Haven, Swansea, Port Talbot, Cardiff and Newport), with some others (e.g. Mostyn) being considered 'minor ports'. The vast majority of these facilities are small-scale local harbours and jetties.

6.9.12 However, the spatial definition remains partial and the policy does not necessarily allow for the exposure of European sites to be determined as:

- a definitive list of marinas, jetties and private non-commercial harbours (to which the policy would arguably also apply) has not been identified by Welsh Government to date (although they will often be co-located with other ports and harbours); and, critically
- the scale and type of development that might be supported by the policy in any given location is not specified.

6.9.13 Comments from NRW on earlier versions of the WNMP and its HRA suggested that the spatial component of the ports policies required more detailed examination with "*information…provided on sites or features potentially affected… in particular in relation to overlapping or adjacent European sites and features*".

6.9.14 As the scale and type of development is not defined it is not simple to produce a refined ZoI for port development (particularly as development in ports is likely to have a range of secondary, consequent and in combination effects e.g. increased vehicle or vessel movements away from the port as a consequence of changes in its facilities). However, developments within ports and harbours, if treated in isolation, are generally unlikely to result in potentially important environmental changes over ~5km from the source due to the inherent characteristics of the ports themselves, unless the proposed developments involve substantial new structures in the marine environment that could affect far-field hydrodynamic processes (note, this does not mean that mobile features from more distant sites would not be exposed to any potentially significant environmental changes).

6.9.15 **Table 6.10** therefore identifies all European sites within 5km (2km for terrestrial sites) of a port or harbour identified by the Welsh Government. These sites are most likely to be exposed to significant effects (and hence potentially adverse effects) as a result of development within the ports and harbours – although significant effects for sites not on this list cannot be categorically excluded without information on the proposed developments that might come forward, which is not specified by the policy.

6.9.16 European sites that appear to partially overlap with each port, or which are in very close proximity (i.e. less than 200m) are identified with an asterisk; note however that a definitive list of sites within close proximity cannot be generated as the ownership and operational boundaries of the ports have not been made available to Welsh Government.

[57] Available at: http://lle.gov.wales/apps/marineportal/#lat=52.5313&lon=-2.8894&z=8&layers=184

Table 6.10 European sites within 5km of a port or harbour identified by the Welsh Government, to which Policies P&S_01 and P&S_02 might be applied.

Port / Harbour	European sites within 5km (sites in **bold** coincide with or are within approximately 200m of port)
Connah's Quay	**The Dee Estuary SPA** Deeside and Buckley Newt Sites SAC River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC **Dee Estuary/ Aber Dyfrdwy SAC** **The Dee Estuary Ramsar**
Greenfield Dock	**The Dee Estuary SPA** **Dee Estuary/ Aber Dyfrdwy SAC** **The Dee Estuary Ramsar**
Mostyn	**The Dee Estuary SPA** **Dee Estuary/ Aber Dyfrdwy SAC** **The Dee Estuary Ramsar**
Rhyl	Liverpool Bay / Bae Lerpwl SPA
Llanddulas	**Liverpool Bay / Bae Lerpwl SPA**
Rhos-on-Sea	**Liverpool Bay / Bae Lerpwl SPA** Coedwigoedd Penrhyn Creuddyn/ Creuddyn Peninsula Woods SAC Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Conwy	Liverpool Bay / Bae Lerpwl SPA Coedwigoedd Penrhyn Creuddyn/ Creuddyn Peninsula Woods SAC Great Orme`s Head/ Pen y Gogarth SAC Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Port Penrhyn	**Traeth Lafan/ Lavan Sands, Conway Bay SPA** **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**
Bangor	**Traeth Lafan/ Lavan Sands, Conway Bay SPA** **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**
Beaumaris	Liverpool Bay / Bae Lerpwl SPA **Traeth Lafan/ Lavan Sands, Conway Bay SPA** **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**
Amlwch	Liverpool Bay / Bae Lerpwl SPA **Anglesey Terns / Morwenoliaid Ynys Môn SPA** **North Anglesey Marine / Gogledd Môn Forol SAC**
Cemaes Bay	**Anglesey Terns / Morwenoliaid Ynys Môn SPA** Bae Cemlyn/ Cemlyn Bay SAC **North Anglesey Marine / Gogledd Môn Forol SAC**
Holyhead	**Anglesey Terns / Morwenoliaid Ynys Môn SPA** Glannau Ynys Gybi/ Holy Island Coast SPA Glannau Ynys Gybi/ Holy Island Coast SAC **North Anglesey Marine / Gogledd Môn Forol SAC**
Tal-y-Foel	Afon Gwyrfai a Llyn Cwellyn SAC Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh SAC Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes SAC
Moel-y-Don	**Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**

Port / Harbour	European sites within 5km (sites in **bold** coincide with or are within approximately 200m of port)
Menai Bridge	Traeth Lafan/ Lavan Sands, Conway Bay SPA **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**
Port Dinorwic	**Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC**
Caernarfon	Afon Gwyrfai a Llyn Cwellyn SAC Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh SAC **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC** Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes SAC
Belan	**Afon Gwyrfai a Llyn Cwellyn SAC** Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh SAC Glynllifon SAC **Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC** **Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes SAC**
Trefor	Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC
Nefyn	Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC Corsydd Llyn/ Lleyn Fens SAC West Wales Marine / Gorllewin Cymru Forol SAC Corsydd Môn a Llyn / Anglesey and Llyn Fens SAC
Porth Dinllaen	**Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC** **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** Corsydd Llyn/ Lleyn Fens SAC West Wales Marine / Gorllewin Cymru Forol SAC Corsydd Môn a Llyn/ Anglesey and Llyn Fens Ramsar
Aberdaron	**Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA** **Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC** **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** **West Wales Marine / Gorllewin Cymru Forol SAC**
Abersoch	Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** West Wales Marine / Gorllewin Cymru Forol SAC
Pwllheli	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC Corsydd Llyn/ Lleyn Fens SAC Corsydd Môn a Llyn/ Anglesey and Llyn Fens Ramsar
Borth-Y-Gest	Northern Cardigan Bay / Gogledd Bae Ceredigion SPA Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC Morfa Harlech a Morfa Dyffryn SAC
Porthmadog	Northern Cardigan Bay / Gogledd Bae Ceredigion SPA Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** Morfa Harlech a Morfa Dyffryn SAC
Pensarn	Northern Cardigan Bay / Gogledd Bae Ceredigion SPA Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** Morfa Harlech a Morfa Dyffryn SAC

Port / Harbour	European sites within 5km (sites in **bold** coincide with or are within approximately 200m of port)
Barmouth	Northern Cardigan Bay / Gogledd Bae Ceredigion SPA **Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC** **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** Cadair Idris SAC
Aberdyfi	Northern Cardigan Bay / Gogledd Bae Ceredigion SPA **Dyfi Estuary / Aber Dyfi SPA** Cors Fochno SAC **Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC** West Wales Marine / Gorllewin Cymru Forol SAC **Cors Fochno and Dyfi Ramsar**
Aberystwyth	**Northern Cardigan Bay / Gogledd Bae Ceredigion SPA** Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Aberaeron	**Cardigan Bay/ Bae Ceredigion SAC** **West Wales Marine / Gorllewin Cymru Forol SAC**
New Quay	**Cardigan Bay/ Bae Ceredigion SAC** **West Wales Marine / Gorllewin Cymru Forol SAC**
Lower Fishguard (Cwm)	**West Wales Marine / Gorllewin Cymru Forol SAC**
Fishguard	St David`s / Ty Ddewi SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Abercastle	St David`s / Ty Ddewi SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Porthgain	Pembrokeshire Marine/ Sir Benfro Forol SAC North West Pembrokeshire Commons/ Comins Gogledd Orllewin Sir Benfro SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Porthclais	**Ramsey and St David`s Peninsula Coast SPA** **St David`s / Ty Ddewi SAC** **Pembrokeshire Marine/ Sir Benfro Forol SAC** North West Pembrokeshire Commons/ Comins Gogledd Orllewin Sir Benfro SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Solva	**Ramsey and St David`s Peninsula Coast SPA** **St David`s / Ty Ddewi SAC** **Pembrokeshire Marine/ Sir Benfro Forol SAC** North West Pembrokeshire Commons/ Comins Gogledd Orllewin Sir Benfro SAC **West Wales Marine / Gorllewin Cymru Forol SAC**
Martin's Haven	**Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA** **Pembrokeshire Marine/ Sir Benfro Forol SAC** **West Wales Marine / Gorllewin Cymru Forol SAC**
Milford Haven	**Pembrokeshire Marine/ Sir Benfro Forol SAC** Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC
Pembroke	**Pembrokeshire Marine/ Sir Benfro Forol SAC** Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC

Port / Harbour	European sites within 5km (sites in **bold** coincide with or are within approximately 200m of port)
Stackpole Quay	Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA **Castlemartin Coast SPA** **Pembrokeshire Marine/ Sir Benfro Forol SAC** **Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC** Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC
Tenby	Bae Caerfyrddin/ Carmarthen Bay SPA **Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC** Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC **Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC**
Saundersfoot	Bae Caerfyrddin/ Carmarthen Bay SPA Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC
Burry Port	**Bae Caerfyrddin/ Carmarthen Bay SPA** Burry Inlet SPA **Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC** Carmarthen Bay Dunes/ Twyni Bae Caerfyrddin SAC **Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC** Burry Inlet Ramsar
Swansea	Crymlyn Bog/ Cors Crymlyn SAC Crymlyn Bog Ramsar
Briton Ferry (Neath)	Crymlyn Bog/ Cors Crymlyn SAC Crymlyn Bog Ramsar
Port Talbot	Kenfig/ Cynffig SAC
Porthcawl	Kenfig/ Cynffig SAC
Barry	Severn Estuary SPA Severn Estuary Ramsar
Penarth	**Severn Estuary SPA** **Severn Estuary/ Môr Hafren SAC** **Severn Estuary Ramsar**
Cardiff	**Severn Estuary SPA** **Severn Estuary/ Môr Hafren SAC** **Severn Estuary Ramsar**
Newport	**Severn Estuary SPA** **Severn Estuary/ Môr Hafren SAC** **River Usk/ Afon Wysg SAC** **Severn Estuary Ramsar**

Mitigation

6.9.17 The policies do not specify developments that they might support or benefit, and so the range of developments that might come forward is very broad. Potential effects are likely to be strongly dependent on the type of development.

6.9.18 However, it should be recognised that developments within and associated with ports have been taking place before and since European sites began to be designated, and many of the mitigation

and avoidance measures used for other marine activities (e.g. dredging) will be transferable port development activities also (for example, the recently completed Holyhead Port expansion took place immediately adjacent to the North Anglesey Marine SAC and the Anglesey Terns SPA).

Plan level

6.9.19 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.9.20 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in **Table 6.2**; these are likely to be fully effective for the vast majority of marine construction schemes, including all but the most substantial schemes associated with port development and operation.

6.9.21 Operational mitigation and avoidance measures cannot be easily identified without any information on the scale or type of schemes that might come forward, although it is very unlikely that the established measures identified for other sectors will not also be effective for any schemes benefitting from policies P&S_01 and P&S_02.

Policy Review and assessment summary

6.9.22 The intent of Policies P&S_01 and P&S_02 is the support of schemes that in turn support the ports and shipping sector, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies).

6.9.23 However, the policies provide no further information on the type of schemes that are likely to come forward under the policies, or potentially benefit from them, and so whilst European sites and features that may be particularly vulnerable to developments located in existing ports can be identified, it is not possible to identify and meaningfully assess specific impact pathways on specific features due to the absence of information on what the developments benefitting from the policy might entail.

6.9.24 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, particularly as the policies provide no indication of the type of schemes that might benefit from them. However, it is clear from development (generally) around Wales, and specifically in association with ports, that mitigation measures are usually available and adverse effects are not an inevitable or unavoidable outcome of development in or near ports.

6.9.25 In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- Developments with the potential to affect European sites will be subject to project level HRA as part of the consenting procedures.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.9.26 The strategic and non-specific nature of the policies (at least in terms of the developments that might come forward) ensures that meaningful assessment of their effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, nature and (to some extent) location of proposals cannot be determined at this stage,

it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing developments associated with ports strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- Schemes benefiting from these policies would require project-level HRA.
- The WNMP review process will ensure that these policies can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.9.27 Therefore, the policies will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.10 Dredging and Disposal

Screening summary

6.10.1 The Dredging and Disposal Sector Objective is "*To maintain safe and effective navigational access for shipping, fishing and leisure craft and support future increases in port facilities and vessel size whilst promoting the optimal sustainable use of dredged materials and ensuring adequate disposal facilities are available*"

6.10.2 Policy D&D_01 provides the supporting framework for this objective and dredging and disposal proposals as follows:

Proposals that maintain navigable channels and long term access to open at-sea disposal sites for appropriate material will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.10.3 Unlike many other policies, the intended or likely outcome of policy D&D_01 is not an increase in the number of dredging and disposal proposals within Welsh waters: the policy supporting text is explicit that that dredging and disposal is considered to be an ongoing function essential to maintaining safe and efficient navigational access to ports, harbours and some marinas, likely to continue at current levels (or increase to a relatively small extent) with little requirement for major expansion.

6.10.4 Whilst the policy covers consented activities to some extent these aspects are screened out of the HRA (as it reflects existing provisions subject to HRA) and the policy itself does not have an explicit spatial component nor support dredging in particular areas in relation to new activities or developments; however there is some overlap with the ports policy as it is arguable that most dredging activity will be associated with existing facilities.

6.10.5 Dredging and disposal schemes, whilst well understood, have the potential to affect the interest features of European sites and therefore a policy supporting these activities could result in

significant effects if not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

6.10.6 Note that ongoing dredging and disposal activities and permissions are screened out of further assessment as they have previously been subject to assessments against the Habitats Regulations.

Appropriate Assessment

Potential Effect Pathways

6.10.7 The likely or intended outcome of the dredging and disposal policy is essentially the status quo, perhaps with some minor expansion in facilities should this be required due to port expansion. The scale or type of activity supported by the policy is not defined, nor are specific schemes or locations identified.

6.10.8 Having said that, dredging and disposal activities (like aggregate extraction) are well-established with much available literature on best practice and mitigation approaches (etc.)[58] and generally a clear appreciation of the likely effects and recovery times.

6.10.9 Indeed, the effects of dredging and disposal activities on marine receptors will be very similar to those identified for aggregates extractions, including:

- Direct damage or loss of habitats through dredging or smothering.
- Increased turbidity and generation of sediment plumes.
- Toxic contamination; this may include toxic contaminants associated directly with marine activities (e.g. oils etc.) but is more likely to involve the release of contaminants in sediments through excavation.
- Hydrodynamic changes: aggregates schemes alter the sea bed morphology and are known to result in hydrodynamic changes such as alteration of wave patterns and tidal flows, with consequential effects on sediment transport.
- Effects on mobile species: aggregates schemes can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:
  - changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
  - underwater noise and vibration due to turbine operation, particularly for fish and marine mammals;
  - collisions with vessels and structures, particularly for marine mammals;
  - introduction of lighting (although generally not likely to be substantial);
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.10.10 The sensitivity of the interest feature groups to the potential pressures associated with dredging and disposal activities are summarised in **Table 6.10**. Note that only the pressures that JNCC (2016) identify as being associated with dredging and disposal are included in **Table 6.10.**

[58] For example, ABP Research (1999). *Good practice guidelines for ports and harbours operating within or near UK European marine sites*. English Nature, UK Marine SACs Project

Table 6.11 Sensitivity of the interest feature groups to the potential pressures associated with **dredging and disposal** schemes *(note, pressures are not included if they are not associated with these activities (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes – local	Y	Y		Y	Y	S	S	Y
Wave exposure changes – local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination – overall	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Transition elements & organo-metals	Y	Y		Y	Y	Y	Y	Y
Non-synthetic compound contamination - Hydro*carbo*n & PAH Contamination	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Radionuclide contamination	Y	Y		Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y			S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y			S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y					Y	Y	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y					Y	Y	Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Underwater noise changes				Y	Y	Y	S	Y
Barrier to species movement				Y	Y	Y	Y	Y
Death or injury by collision			Y	Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y
De-oxygenation	Y			Y	S	S	S	Y
Nutrient enrichment	Y	Y		Y	S	S	S	Y

European site / feature exposure

6.10.11 Policy D&D_01 has no explicit spatial direction and so specific European sites or features that will be vulnerable to the policy outcomes cannot necessarily be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see **Appendices A - D**) are potentially vulnerable to the policy outcomes.

6.10.12 However, whilst existing dredging and disposal activities are screened out it is arguable that there is an implicit spatial component as new dredging activity is most likely to be associated with existing ports and harbours. As noted, Welsh Government has identified 54 commercial ports and harbours in Wales[59] (see **Section 6.8**), although a definitive list of marinas, jetties and private non-commercial harbours has not been identified by Welsh Government to date.

6.10.13 **Table 6.10** (in the 'Ports' section, above) identifies all European sites within 5km (2km for terrestrial sites) of a port or harbour identified by the Welsh Government. European sites that appear to partially overlap with each port, or which are in very close proximity (i.e. less than 200m) are identified in **Table 6.10** in bold; note however that a definitive list of sites within close proximity cannot be generated as the ownership and operational boundaries of the ports have not been made available to Welsh Government. The marine sites in **Table 6.10** are most likely to be exposed to significant effects (and hence potentially adverse effects) as a result of dredging associated with the ports and harbours; however, there is virtually no chance of terrestrial sites being significantly affected by dredging activities unless mobile species are exposed.

Mitigation

Plan level

6.10.14 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.10.15 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in Table 6.2, although these phases are not typically substantial for these activities.

6.10.16 Dredging and disposal are common activities around the UK coast and there is a substantial body of established good-practice mitigation and avoidance measures that are known to be effective in most scenarios (e.g. ABP Research (1999); OSPAR (2004)). Much of the established mitigation and avoidance currently employed is similar to that used in the aggregates industry (see Section 6.4.2). This suggests that many of the potential operational effects associated with aggregate extraction activities can be largely avoided or substantially reduced with appropriate project-planning and best-practice management measures.

[59] Available at: http://lle.gov.wales/apps/marineportal/#lat=52.5313&lon=-2.8894&z=8&layers=184

Policy Review and assessment summary

6.10.17 As noted, the likely or intended outcome of the dredging and disposal policy is essentially the status quo, perhaps with some minor expansion in facilities should this be required due to port expansion. The scale or type of activity supported by the policy is not defined, nor are specific schemes or locations identified. The support for future activities provided by the policy is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of schemes, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.10.18 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, although it is clear from existing dredging and disposal activities that measures are available and adverse effects are not an inevitable outcome (even within or close to European site boundaries). In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- All new dredging and disposal applications will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.10.19 The strategic and essentially non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing dredging and disposal schemes in UK waters strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most future schemes.
- All schemes benefiting from this policy would require project-level HRA as part of the normal consenting process.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.10.20 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.11 Subsea Cabling

Screening summary

6.11.1 The Subsea Cabling Sector Objective is "*To support the optimal distribution of electricity and better global communications through the growth of digital communication networks.*" Policy CAB_01 provides the supporting framework for future tourism and recreation proposals as follows:

CAB_01: Proposals that facilitate the growth of digital communications networks and/or the optimal distribution of electricity will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.11.2 As with other supporting policies, the intended or likely outcome of the policy is the provision of an appropriate level of support for subsea cabling schemes. However, the policy itself does not have an explicit spatial component nor support or direct cable installation to particular areas. Developments in or near the marine environment have the potential to affect the interest features of European sites and therefore a policy promoting these could result in significant effects if proposals are not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

Appropriate Assessment

Potential effect pathways

6.11.3 Subsea cabling is a well-established industry with a generally a clear appreciation of the potential effect pathways. The "*Subsea Cable Interactions with the Marine Environment: Expert review and Recommendations Report*" (NIRAS 2015)[60] provides detailed information on the potential primary and secondary effects that may occur as a result of cable schemes.

6.11.4 Cables are typically installed by trenching or horizontal directional drill (HDD) in the landfall / intertidal areas, since access for these construction methods is usually available. In subtidal areas the cable may be laid on the surface of the seabed, but more typically they are covered to minimise the risk of damage by other sea-users; a range of techniques are employed for this depending on the substrate and the risks to the cable, but common methods would include:

- covering surface-laid cables with rock armouring;
- installing cables in trenches cut by water jets or ploughs (in softer sediments), or mechanical excavators in harder substrates;
- installing cables in artificial structures (e.g. tubing or pre-cast trenching).

6.11.5 Cables may then require periodic inspection or maintenance during their lifespan.

6.11.6 It should be noted that cable routing can be quite constrained by the landfall opportunities, and the location of a cable in the marine environment will often depend on the accessibility and location of onshore connections to terrestrial networks.

[60] Available at: https://renewables-grid.eu/fileadmin/user_upload/Files_RGI/RGI_Publications/RGI_Subsea_cables_report.pdf

Construction and Decommissioning

6.11.7 All interest features potentially associated with the ZoI (see **Appendix A**) will be potentially vulnerable (i.e. sensitive and potentially exposed) to one or more of the pressures that are typically associated with construction schemes in the marine environment, for example:

- Direct damage or loss of habitats through installation.
- Increased turbidity and generation of sediment plumes from trench excavation.
- Toxic contamination; this may include toxic contaminants associated directly with marine activities (e.g. oils etc.) but is more likely to involve the release of contaminants in sediments through excavation.
- Effects on mobile species: marine construction schemes can result in disturbance, displacement, mortality and barrier effects through a variety of mechanisms, including:
  - changes in habitat or prey distributions due to the physical and physio-chemical changes noted above;
  - underwater noise and vibration, particularly for fish and marine mammals;
  - collisions with vessels and structures, particularly for marine mammals;
  - introduction of lighting (although generally not likely to be substantial);
  - changes in foraging success / predation risk as a result of effects on prey distributions.

6.11.8 The construction requirements for most cable installations will be relatively localised and whilst scale is not always a predictor of the significance of any effects it is usually strongly correlated; in most instances, therefore, the installation of cable schemes will have only limited potential for significant or significant adverse effects on European sites as a result of construction activities, and principally on sites in relatively close proximity to the construction location. Compared to other offshore activities, seabed disturbance resulting from subsea cable activities are typically temporary with the seabed usually returning to its original state relatively quickly.

Operation

6.11.9 Operational effects are typically more limited for subsea cabling than other sectors as invasive maintenance operations are typically limited if the cables are undisturbed which is most often the case; the principal effect pathways are as follows:

- Electromagnetic fields (EMF): Some species are known to be sensitive to EMFs which can alter behaviour and, in theory, have displacement or barrier effects. Studies to date have largely focused on elasmobranchs and lampreys that have specialized electroreceptors (NIRAS 2015) although other fish species and some mammals may also have some degree of sensitivity. There is currently limited information on the biological effects of EMFs but any effects appear to be relatively minor and significant negative impacts on species populations have not been found to date (NIRAS 2015). However, it is clear that this is a potential effect pathway that may become more notable (particularly cumulatively) in the future as cable installations increase.
- Thermal radiation: Some cables can increase water and substrate temperatures, although there are limited data on the biological effects of this and it is accepted that any effects will be very local to the cable only (i.e. a few centimetres).

- Maintenance works: invasive maintenance works to repair or replace sections of cable can have similar effects to the initial installation (e.g. direct damage to, or loss of, habitats; indirect damage to, or loss of, habitats due to secondary effects; toxic contamination; barrier effects and disturbance due to noise, displacement or mortality of mobile species from vessels; etc.).
- Hydrodynamic changes: seabed surface structures can alter local hydrodynamics (e.g. by slowing tidal currents around them) resulting in increased siltation locally.
- Habitat creation: seabed surface structures can provide new bare surfaces which may allow non-native species to colonise an area more easily.

6.11.10 The sensitivity of the interest feature groups to the potential pressures associated with subsea cabling schemes are summarised in **Table 6.12**. Note that only the pressures that JNCC (2016) identify as being associated with subsea cables are included in **Table 6.12.**

Table 6.12 Sensitivity of the interest feature groups to the potential pressures associated with **subsea cable** schemes *(note, pressures are not included if they are not associated with subsea cable operations (see Appendix E for justification); Y – directly sensitive; S – sensitive to consequent or secondary effects)*

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Water flow (tidal current) changes - local	Y	Y		Y	Y	S	S	Y
Wave exposure changes - local	Y	Y		Y	S	Y	Y	Y
Non-synthetic compound contamination - overall	Y	Y		Y	Y	Y	Y	Y
Synthetic compound contamination	Y	Y		Y	Y	Y	Y	Y
Temperature changes - local	Y	Y		Y	S	S	S	Y
Organic enrichment	Y	Y		Y	S	S	S	Y
Physical loss (to land or freshwater habitat)	Y			S	S	S	S	Y
Physical change (to another seabed type)	Y	Y		S	S	S	S	Y
Habitat structure changes - removal of substratum (extraction)	Y	Y		S	S	S	S	Y
Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Y							Y
Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Y							Y
Changes in suspended solids	Y			Y	S	S	Y	Y
Siltation rate changes	Y			S	S	Y	S	Y
Litter	Y	Y		Y	Y	Y	Y	Y

Pressure	Marine and Intertidal Habitats	Supralittoral habitats and plants	Bats	Diadromous fish	Marine mammals	Wildfowl and waders	Pelagic seabirds	Typical species
Electromagnetic changes				Y	Y		S	Y
Underwater noise changes				Y	Y	Y	S	Y
Death or injury by collision				Y	Y	Y	Y	Y
Visual disturbance				Y	Y	Y	Y	Y
Introduction or spread of non-indigenous species	Y	Y		Y	S	Y	Y	Y
Introduction of microbial pathogens				Y	Y	Y	Y	Y
Removal of non-target species				Y	Y	Y	Y	Y

European site / feature exposure

6.11.11 Policy CAB_01 has no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes. However, it is self-evident that the vast majority of schemes benefitting from this policy will have effects that are relatively localised and small-scale, and so adverse effects would generally be unlikely unless there are direct effects on a European site.

Mitigation

Plan level

6.11.12 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.11.13 Subsea cabling activities have typically relied on the project planning process to avoid or minimise potential effects on sensitive sites and features, although in some instances the opportunities for re-routing can be limited due to on- and off-shore constraints (e.g. connection locations).

6.11.14 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in Table 6.2; these are likely to be fully effective for the vast majority of schemes that benefit from this policy.

6.11.15 There are fewer options for mitigating the possible operational effects where these are an inherent part of the cable function (e.g. generation of EMFs or thermal radiation) although these can be reduced through measures such as burial if potentially adverse effects are identified; however, these can only be identified on a scheme-by-scheme basis.

Policy Review and assessment summary

6.11.16 The intent of Policy CAB_01 is the support of cabling schemes required for development within other sectors, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of any development, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.11.17 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, particularly as the policy provides no indication of the location or type of schemes that might benefit from the policy. However, it is clear from the extensive existing cable networks that measures are available and adverse effects are not an inevitable or unavoidable outcome of cable installation. In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- Developments with the potential to affect European sites will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic

studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.11.18 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing developments in the marine environment strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- Schemes benefiting from this policy would require project-level HRA.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available.

6.11.19 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

6.12 Tourism and Recreation

Screening summary

6.12.1 The Tourism and Recreation Sector Objective is "*To contribute to sustainable development by protecting and promoting access to the coast and improving the quality of the visitor experience thereby increasing Wales' reputation as a world class sustainable marine tourism and recreation destination*". 'Sustainable' is defined in accordance with the 'Sustainable Development' principles and *The Well-being of Future Generations (Wales) Act 2015*. Policy GEN_01 provides a 'presumption in favour' of sustainable development.

6.12.2 Policy T&R_01a provides the supporting framework for future tourism and recreation proposals as follows:

T&R_01a: Proposals that demonstrate a positive contribution to tourism and recreation opportunities and policy objectives (for the sector) around the Welsh coast will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding policies of this plan and any other relevant considerations.

6.12.3 It is important to note that the policy does not necessarily cover tourism and recreational activities themselves, except where some form of permitting is required; it is mainly aimed at developments that will support the sector. As with other supporting policies, the intended or likely outcome of the policy is an increase in the number of proposals that support the sustainable development of tourism and recreation opportunities. However, the types of proposals that might be covered by the policy are not defined, and the policy does not have a spatial component.

6.12.4 Whilst the types of schemes that might come forward are not defined, developments in or near the marine environment have the potential to affect the interest features of European sites and

therefore a policy promoting these could result in significant effects if proposals are not appropriately designed. On this basis, significant effects on sites and features within the ZoI, or which are functionally linked to it, cannot necessarily be excluded.

Appropriate Assessment

Potential effect pathways

6.12.5 The types of development that might benefit from this policy are likely to be fairly varied, in contrast to other sectors (e.g. aggregates or aquaculture); as a result, it is not possible to identify specific effect pathways that are likely to be particularly relevant to the policy.

6.12.6 The pressures noted in **Tables 4.2 and 5.4** and used in the Regulation 37 advice documents cannot therefore be excluded during the construction, operation or decommissioning of any schemes that benefit from the policy, i.e.

- Hydrodynamic changes (and hence potential geomorphological effects; e.g. alterations to tidal flows and currents; alterations to wave action).
- Toxic contamination (e.g. through intentional, incidental or accidental discharges of contaminants; or mobilisation of contaminated sediments).
- Non-toxic contamination and physio-chemical changes (e.g. nutrient enrichment; temperature changes; salinity changes).
- Direct physical loss of habitats (e.g. from direct removal or smothering and hence change to another seabed type; land reclamation; etc.).
- Direct physical damage of habitats (e.g. from partial removal by aggregate extraction; abrasion; changes in siltation rates; etc.).
- Other physical pressures (e.g. litter; noise and vibration; visual disturbance; collisions).
- Biological Disturbance (e.g. from introduction of microbial pathogens, the introduction of invasive non-native species, or from selective extraction of selected species).

European site / feature exposure

6.12.7 Policy T&R_01a has no spatial component and so specific European sites or features that will be vulnerable to the policy outcomes cannot be identified (beyond noting that all sites and features that are within the ZoI, or which are likely to be functional-linked to habitats within the ZoI, are potentially exposed to the ultimate outcomes of the policy depending on the precise nature of any schemes (etc.) that may come forward). As a result, all of the European sites and features identified in the screening process (see Appendices A - D) are potentially vulnerable to the policy outcomes. However, it is self-evident that the vast majority of schemes benefitting from this policy will be relatively localised and small-scale, and so adverse effects would generally be very unlikely unless there are direct effects on a European site.

Mitigation

Plan level

6.12.8 The principal mitigating measures introduced at the plan level are set out in **Section 6.3**.

Scheme level

6.12.9 Typical avoidance and reduction measures available at the construction and decommissioning stages are set out in Table 6.2; these are likely to be fully effective for the vast majority of schemes that benefit from this policy.

6.12.10 Operational mitigation and avoidance measures cannot be easily identified without any information on the operation of the schemes, although it is very unlikely that the established measures identified for other sectors will not also be effective for any schemes benefitting from policy T&R_01a.

Policy Review and assessment summary

6.12.11 The intent of Policy T&R_01a is the support of schemes that in turn support the tourism sector, although this support is conditional and contingent on the performance of schemes against the other policies in the plan (including the protective cross-cutting General Policies). The policy does not constrain the delivery of future schemes such that adverse effects cannot obviously be avoided through appropriate siting of any development, and the policy does not propose a quantum of development or growth that might increase the possibility of adverse effects occurring.

6.12.12 Specific mitigation measures for future schemes cannot be determined or outlined at the plan-level, particularly as the policy provides no indication of the type of schemes that might benefit from the policy. However, it is clear from development (generally) around Wales that measures are available and adverse effects are not an inevitable outcome. In terms of plan-level mitigation, it should be recognised that various controls and safeguards are woven through the cross-cutting policies; in addition:

- Developments with the potential to affect European sites will be subject to project level HRA as part of the consenting procedure.
- The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed.

6.12.13 The strategic and non-spatial nature of the policy ensures that meaningful assessment of its effects on individual European sites is not possible, and thus assessment 'down the line' is appropriate. However, whilst the precise scale, location and nature of proposals cannot be determined at this stage, it is considered that the policy (when taken together with the protective General Policies in the WNMP) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, for the following reasons:

- The policy does not identify or promote specific development proposals or an overall quantum of development, nor restrict how future schemes might be delivered. As a result, sufficient flexibility is retained within the scope of the policy to ensure that proposals can be delivered without adverse effects.
- Evidence from existing developments in the marine environment strongly suggests that project-level mitigation and avoidance measures are available, achievable and likely to be effective for most schemes.
- Schemes benefiting from this policy would require project-level HRA.
- The WNMP review process will ensure that the policy can be modified to reflect the best evidence available, including the possibility of the future designation of SRAs based on high-quality evidence and monitoring.

6.12.14 Therefore, the policy will not result in adverse effects that cannot be reliably avoided at the scheme level using measures that are known to be available, achievable and likely to be effective.

7. 'In Combination' Effects

The Habitats Regulations requires that the potential effects of a plan on European sites must also be considered 'in combination with other plans or projects'. Consideration of 'in combination' effects is not a separate assessment, but is integral to the screening and appropriate assessment stages and the development of avoidance/ mitigation measures.

7.1 Overview

7.1.1 As noted, due to the strategic nature of the WNMP, the uncertainties associated with any in combination assessment are considerable. It is therefore important to ensure that the WNMP does not include any measures that would obviously constrain the mitigation options available for future activities, or direct activities such that conflict with other plans is inevitable, or contain policies or objectives that would allow protective measures included in other plans to over-ridden.

7.1.2 The following sections summarise the review of other plans and projects for potential 'in combination' effects with the policy components of the WNMP.

7.2 General cross-cutting policies

7.2.1 All of the general cross-cutting policies in the WNMP (see **Table 4.2**) are considered to be 'no significant effect' policies as they are invariably 'General statements of policy / aspiration', 'General design / guidance criteria or policies that cannot lead to or trigger development' or 'Environmental protection policies'. It is considered that these policies will not have any significant effects 'in combination' with other plans (etc.) for the same reasons. Where there are potential interactions, the WNMP defers to existing plans (for example, Policy SOC_09 explicitly encourages proposals that "*…align with the relevant Shoreline Management Plan*").

7.2.2 It should be noted that some of the general cross-cutting policies will provide plan-level safeguards and mitigation for 'in combination' effects. In particular, Policy GOV_01 specifically requires that "*Proposals should demonstrate that they have assessed potential cumulative effects*".

7.3 Inter-sector 'in combination' effects

7.3.1 All of the sector policies have the potential to result in 'in combination' effects as a result of their implementation.

7.3.2 For some policies the linkages arguably have an inherent geographical coincidence – for example, most new dredging activity will be located near existing port facilities, with port development being the driver for the dredging – but for the vast majority no such links can be made.

7.3.3 However, the absence of any information on the location, scale, timing and (for some sectors) type of development that might benefit from a policy ensures that specific 'in combination' effects cannot be identified. Even for ports and dredging, the policies provide no indication of the scale or requirements of any development that might come forward, and it is equally likely that port development and dredging activities will occur independently.

7.3.4 As with the individual policies, therefore, it is not possible to undertake a meaningful assessment of the potential for the policies to have significant or significant adverse effects on specific European

sites and features 'in combination', and so assessment 'down the line' is appropriate. However, whilst the risk of 'in combination' effects as a result of proposals supported by the plan cannot be categorically excluded, the plan (including the protective General Policies) is sufficiently caveated and flexible to ensure that adverse effects are not an unavoidable or inevitable outcome of its implementation, particularly as the requirement to consider cumulative or in combination effects is woven into the safeguarding and protective policies.

7.4 Other sector-specific plans and HRAs

7.4.1 **Table 7.1** summarises the strategic planning measures that are in place for the specific sectors identified by the WNMP. It also notes where HRA has been undertaken for these plans, and the broad conclusions of these documents; generally, this was 'no adverse effects', but the assessments invariably considered the requirement for project-level HRA and hence the deferral of some assessment 'down-the-line'.

7.4.2 In many cases, there is no specific strategy or plan shaping sector activities, with HRAs therefore undertaken on individual schemes at the consenting stage. It is not possible to examine all of the existing consents and permissions potentially affecting the WNMP area to determine possible residual effects that may operate with the sector policies.

Table 7.1 Sector-specific plans

Sector	Existing Strategies and HRAs
Aggregates	Strategic planning in the aggregates sector principally occurs when the Crown Estate conducts tender rounds to offer interested parties the opportunity to bid for rights to prospect the seabed in some or all regions under mineral management. A plan-level HRA was undertaken by The Crown Estate for aggregate option areas in 2015 (not available on line). The aggregates policies are intended to replace the Interim Marine Aggregates Dredging Policy (iMADP, 2004), which applied primarily to extraction in the Bristol Channel, although this was not subject to HRA. Regulation of aggregate extraction is devolved to the Welsh Ministers for the inshore plan region. The management of aggregate dredging is undertaken under a marine licence which NRW Permitting Service issue on behalf of the Welsh Ministers, and HRAs are therefore undertaken at the licensing stage.
Aquaculture	There are no aquaculture-specific strategic plans; individual proposals are subject to HRA as part of the SO process. However, the commercial fisheries sector is considered as a plan or project under the Habitats Regulations, and Defra has consequently altered its approach to the management of fisheries in European Marine Sites (essentially by using a high-level risk-based assessment approach that prevents use of certain gear in an EMS without specific assessment (Defra 2013)).
Defence	Defence is not subject to a strategic plan, with HRA addressed at the project / consent level rather than as part of strategic planning document.
Dredging and Disposal	Dredging and disposal activities are not subject to a strategic plan, with HRA issues addressed at the project / consent level rather than as part of strategic planning document.
Energy – Low Carbon	Wind lease areas have been identified by TCE with plan level HRA undertaken (e.g. Entec 2009). These concluded no adverse effects with deferred assessment for projects. With regard to wave and tidal, the Crown Estate has agreed seabed rights for new wave and tidal demonstration zones and new wave and tidal current sites, which have been subject to HRA (ABPMer 2014); this also concluded 'no adverse effects' with deferred assessment for projects. Future leasing will be subject to HRA also. Tidal lagoons are not subject to a strategic plan, with HRA issues addressed at the project / consent level rather than as part of strategic planning document.

Sector	Existing Strategies and HRAs
Energy – Oil and Gas (including CCS)	Some aspects of oil and gas have been examined at the strategy level through the block licensing process[61], which concluded no adverse effects. The HRAs of the license blocks were carried out at a relatively high level but were generally block-specific, with specific impacts on specific sites considered as far as achievable at that stage. The HRAs invariably concluded 'no adverse effects', largely by deferring some aspects of the assessment to the project level and taking into account the 'mitigation measures' that can be imposed through existing permitting mechanisms on the planning and conduct of activities (i.e. the licences did not include specific exclusions that would guarantee that 'adverse effect' proposals would be refused). The HRAs did not identify any specific 'residual effects' for consideration at the project-level, or in combination with other plans. There are no CCS schemes and any proposals would likely be addressed on a project-by-project basis rather than through a strategic plan (particularly as the siting is likely to be dependent on existing oil and gas infrastructure).
Fisheries	The commercial fisheries sector is not considered as a plan or project under the Habitats Regulations. Defra has consequently altered its approach to the management of fisheries in European Marine Sites, essentially by using a high-level risk-based assessment approach that prevents use of certain gear in an EMS without specific assessments (Defra 2013); this is not a strategic resource assessment however.
Subsea Cabling	Subsea cabling is not subject to a strategic plan itself but will obviously be a component of various other sector strategies or programmes (e.g. Offshore Wind Licensing) as well as individual projects in other sectors.
Surface Water and Wastewater Treatment and Disposal	Wastewater operators are currently producing catchment-scale drainage strategies to improve the management of wastewater and demonstrate how a water and sewerage company intends to deliver its statutory functions over the long term within a particular area in a sustainable and economic manner. It is unclear whether these will be subject to HRA, although it would seem likely. At the moment, however, Surface Water and Wastewater Treatment and Disposal is managed through individual consents and legislative requirements, which are subject to HRA.
Tourism and Recreation	The Welsh government "Partnership for Growth: The Welsh Government Strategy for Tourism 2013 – 2020' (Welsh Government (2013)) sets out broad principles for tourism growth but this is not a planning document and not subject to HRA; individual projects will be subject to HRA as required.
Ports and Shipping	The National Policy Statement for Ports (which has been subject to HRA[62]) provides a framework for port development and whilst taking a strategic view on the national need for port infrastructure is not explicit on the schemes required; it requires HRA for DCO proposals as part of the policy. There is no strategic plan for port development across Wales although ports may produce Port Masterplans which outline future development proposals; these may be subject to HRA but more typically HRA is addressed at the project / consent level rather than as part of strategic planning document.

7.5 Marine Plans

7.5.1 In combination effects are possible with the other marine plans, principally where the plans' zones of influence overlap geographically[63] or if mobile species are affected by separate activities taking place at different points in their range or life-cycle[64]. Significant in combination effects are most likely to be possible with the neighbouring marine plans, and these have been reviewed accordingly (see **Table 7.2**); the range of some mobile species ensures that far-field effects are conceivable (if unlikely, given the plan safeguards).

[61] For example: DECC (2015) *Offshore Oil & Gas Licensing 28th Seaward Round: Irish Sea and St George's Channel, Habitats Regulations Assessment: Stage 2 - Appropriate Assessment*

[62] https://webarchive.nationalarchives.gov.uk/20110203173326/http://www.dft.gov.uk/consultations/closed/portsnps/appropriateassessment.pdf

[63] i.e. a 100km zone around the plan boundary (assuming the ZoIs of all plans is assumed to be 50km).

[64] For example, activities affecting breeding seabirds at the colony and then when wintering elsewhere.

7.5.2 In summary, the different development timetables for the marine plans means that they cannot all be reviewed in detail to inform the assessment. However, the WNMP includes mitigating provisions within it that will minimise the risk of 'in combination' effects, notably:

- the need for activities (etc.) to consider the overall coherence of the marine protected area network;
- the requirement for proposals to assess potential cumulative effects (GOV_01);
- the requirement to have regard to any relevant policies in other land-use and marine plans (GOV_02);
- the requirements for project level HRA; and
- the three-yearly review process, which will allow for potential 'in combination' effects to be identified and mitigated with the benefit of new data.

7.5.3 These provisions (or similar) are also included in the drafts of the neighbouring plans that are currently available (see **Table 7.2**).

Table 7.2 Marine Plans

Plan	Status	Interaction with WNMP
Marine Plan for Northern Ireland	In preparation – draft policies and HRA available	The Marine Plan for Northern Ireland is currently in preparation and as subject to public consultation in 2018. The policies cover similar sectors to the WNMP and have no explicit spatial component, but do generally provide a presumption in favour of activities contingent on there being 'no unacceptable adverse impact' and the application of the mitigation hierarchy. The HRA of the emerging plan concluded that all of the policies should be 'screened out' since there was no spatial component and specific European sites could not be assessed.
North West Marine Plan	In preparation – draft policies available	Draft sector policies are available for the Iteration 3 of the emerging North West Marine Plan. These policies have been reviewed for possible interactions with the WNMP, although SRAs (or similar) are not currently available. In summary, most policies relating to economic sectors are 'safeguarding' policies (e.g. ensuring that activities do not take place in existing areas designated for dredging disposal) that do not themselves advocate activities; there are some supporting policies that typically require the application of the mitigation hierarchy, although the spatial aspect of these is not currently available. There are a number of protective policies that are likely to ensure that adverse effects do not occur as a result of the plan.
South West Marine Plan	In preparation – draft policies available	As for the North West Marine Plan
Integrated Marine Plan for Ireland	Adopted	"Harnessing Our Ocean Wealth" sets out the Irish Government's high-level strategy for putting in place appropriate marine policy and governance; however, the document is not a spatial plan and so potential 'in combination' effects cannot be identified or assessed.
Isle of Man Marine Plan	In preparation – no policy information available	The Isle of Man Marine Plan is currently in preparation and so potential in combination effects cannot be identified.

7.6 Other Plans

7.6.1 There are a number of other strategic plans that could interact with the WNMP. These are primarily terrestrial sector plans and so 'in combination' effects are most likely on the coast and within inshore areas where zones of influence of the plans (or specific associated activities) potentially

overlap. The key plans considered for potential in combination effects with the WNMP are summarised in **Table 7.3**, although it should be noted that this list is unlikely cover all 'in combination' eventualities and scheme-specific assessments will be required at the project level.

7.6.2 In summary, specific 'in combination' effects cannot be readily identified at the plan-level due to the absence of detail on the location (etc) of projects likely to come forward under the WNMP and (in most cases) under the other plans identified. As a result, the interactions between the WNMP-supported activities and activities promoted or supported by other plans can only be reasonably characterised at the project level.

7.6.3 It is also worth noting that the HRAs of some plans (e.g. the Shoreline Management Plans) have been unable to conclude 'no adverse effects' and have been adopted for IROPI; it is arguable that this also means that it is not possible to be certain that there will be no in combination effects where the ZoIs of these plans overlap.

7.6.4 Most sector plans, programmes and licensing activities have, however, been subject to HRA and most of these will have complementary policy protections which should help ensure that the risk of adverse effects at the project-level is limited. It is difficult to be certain that the outcomes of the WNMP will have no adverse effects in combination; however, as noted, the WNMP includes mitigating provisions within it that will minimise the risk of 'in combination' effects, notably:

- the need for activities (etc.) to consider the overall coherence of the marine protected area network;
- the requirement for proposals to assess potential cumulative effects (GOV_01);
- the requirements for project level HRA; and
- and the three-yearly review process, which will allow for potential 'in combination' effects to be identified and mitigated with the benefit of new data.

Table 7.3 Other plans with the potential for 'in combination' effects with WNMP and supported activities

Other Plans and Programmes	Interaction with WNMP
Wales Spatial Plan (2008)	The Wales Spatial Plan provides the framework for future collaborative action between the Welsh Assembly Government and its partners to achieve sustainable economic growth across the whole of Wales. The Plan emphasises the need for coordinated action at national, regional and local levels. The Plan should assist with the comprehensive management of the environment so that it contributes to sustainable development, and is reflected in the development of the marine plan. Specific in combination effects cannot be identified. Note, the WSP will be replaced in the near future by the National Development Framework (NDF).
Local Development Plans / Core Strategies (Various)	Allocations and policies within local development plans, depending on location, may affect European sites. Activities arising from local development plans could affect European sites through disturbance during construction, adverse effects from encroachment on habitats or species displacement, or indirect effects such as alterations to drainage, increased surface water run-off and diffuse / point source pollution, or increased visitor pressure. Welsh Government has reviewed all relevant plans including LDPs and English local plans for marine components although in detailed assessment of potential future in combination effects can only be undertaken at the project level.

Other Plans and Programmes	Interaction with WNMP
Shoreline Management Plans (SMPs): • SMP 18 Hartland Point to Anchor Head (North Devon & Somerset) Lead: North Devon District Council (2010) • SMP 19 Anchor Head to Lavernock Point (Severn Estuary) Lead: Monmouthshire Council (2017) • SMP 20 Lavernock Point to St Ann's Head (South Wales) Lead: Carmarthenshire Council (2012) • SMP 21 St Ann's Head to Great Ormes Head (West of Wales) Lead: Pembrokeshire Council (2012) • SMP 22 Great Ormes Head to Scotland (2011)	Shoreline Management Plans provide a large-scale assessment of the risks associated with coastal evolution and present a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. They generally set policy prescriptions for sections of coast, typically Hold the Line (HTL); Maintain or Upgrade; Advance the Line (ATL); Managed Realignment (MR); No Active Intervention (NAI); or Generic Mitigation. Some of the SMPs will have adverse effects on some European sites, principally where a HTL approach is required resulting in coastal squeeze. The WNMP complements / defers to the SMPs (Policy SOC_09 explicitly encourages proposals that "*…align with the relevant Shoreline Management Plan*) and so 'additional' in combination effects would not be expected.
River Basin Management Plans (RBMPs): • Severn river basin district RBMP (2015) • Western Wales RBMP (2015) • Dee RBMP (2015) • South West RBMP (2015) • North West RBMP (2015)	Under the EU Water Framework Directive (WFD) a management plan is required for each River Basin District (RBD). The purpose of this management plan is to protect and improve the water environment for the wider benefits to people and wildlife. In order to achieve this, the plan includes a summary of the Programme of Measures needed to achieve the objectives of the WFD together with the predicted environmental outcomes over the plan period (six years). Whilst the locations of the measures are broadly defined in the RBMP (the water bodies are identified, but the specific project locations are not), the specific activities that are likely to take place are not always known and the HRAs of the RBMPs generally defer assessment to the project level. Effects with the WNMP are possible, but can only be determined at a lower tier.
Catchment Flood Management Plans (CFMPs): • Bristol Avon CFMP (2011) • Severn Tidal Tributaries CFMP (2009) • River Severn CFMP (2009) • Wye and Usk CFMP (2010) • Taff and Ely CFMP (2010) • Ogmore to Tawe CFMP (2010) • Loughor to Taf CFMP (2010) • Pembrokeshire and Ceredigion Rivers CFMP (2010) • North West Wales CFMP (2010) • Conwy and Clwyd CFMP (2010) • River Dee CFMP (2010)	Catchment flood management plans (CFMPs) are primarily concerned with inland flooding from rivers, groundwater, surface water and tidal flooding (SMPs deal with flooding from the sea) and so potential in combination effects are likely to be geographically limited. The CFMPs essentially provide broad policy prescriptions for managing flooding in difference catchments or reaches but do not identify specific schemes. As a result, it is not possible to identify or assess any in combination effects with the CFMPs. Effects with the WNMP are possible, but can only be determined at a lower tier or project level.
Flood Risk Management Plans (FRMPs): • Western Wales River Basin District FRMP (2015) • Severn River Basin District FRMP (2015) • Dee River Basin District CFMP (2015)	The FRMPs plan and prioritise actions depending upon the Community at Risk register and also encourage more joined up planning and management of the water environment (alongside RBMPs). The FRMPs essentially identify measures proposed to help manage the risk of flooding to a community, which are fairly broad and not scheme-specific (for example, "design and construction of flood risk asset improvements"). As a result, it is not possible to identify or assess any in combination effects with the FRMPs. Effects with the WNMP are possible, but can only be determined at a lower tier or project level.
Regional Waste Plans: • North Wales Region (2003) • South East Wales Region (2003) • South Wales Region (2003)	The regional waste plans are revised every three years and contain various policies and proposals for waste management; they are intended to assist which assists local authorities to allocate sites in their Local Development Plans for new waste management facilities. Systematic in combination effects are therefore unlikely; specific proposals would be addressed at the LDP stage with effects on European sites considered then.

Other Plans and Programmes	Interaction with WNMP
Water Resources Management Plans: • Welsh Water (2014, 2019) • Severn Trent Water (2014, 2019) • United Utilities (2014, 2019) • Bristol Water (2014, 2019) • Wessex Water (2014, 2019)	Water companies in England and Wales are required to produce a Water Resources Management Plan that sets out how they aim to maintain water supplies over a 25-year period. The current Water Resources Management Plans were published in 2014, and are in the process of being revised (Welsh Water has had direction to publish its 2019 WRMP). The current WNMPs do not have any adverse effects on European sites. The revised plans explicitly account for any reductions in abstraction that are required to safeguard European sites and for the growth predicted by LPAs. However, the schemes advocated by the WRMP may interact with the WNMP (for example, a possible source of 'new water' is an aquifer beneath the Severn Estuary).

7.7 Projects

7.7.1 With regard to projects, it is not possible to produce a definitive list of existing (minor) planning applications in or near the WNMP area and in reality the timescales for delivery of these means that generating a list at this stage would be of little value. It is likely that most current developments will be completed by the time that the WNMP is adopted and activities associated with this come forward. It is possible that there will be 'in combination' scheme-specific construction effects associated with future planning applications, although this can only be assessed nearer the time of construction.

7.7.2 The exception to this is Nationally Significant Infrastructure Projects (NSIPs), and known large-scale projects. NSIPs currently identified on the Planning Inspectorate (PINS) website have been reviewed for their potential to interact with the WNMP or future activities associated with this (see **Table 7.4**), along with known large-scale marine projects. However, a detailed assessment of possible 'in combination' effects between the NSIPs and future activities associated with the WNMP cannot be completed at the plan level, and therefore 'down the line' assessment will need to be relied on. As before, the mitigating provisions within the WNMP (requirement to protect the coherence of the marine protected area network; requirement for project-level HRA; the requirement for proposals to assess potential cumulative effects (GOV_01); and the three-yearly review process) will minimise the risk of 'in combination' effects).

Table 7.4 Current NSIPs and known large-scale projects with the potential to operate in combination with the marine plan or future activities

Project	Status	Summary	Interaction with WNMP
Morlais tidal stream	TBC	Infrastructure scheme intended to enable tidal stream developers to deploy tidal devices on a commercial scale across a 35km^2 area of seabed off north-west Anglesey. Intended initially facilitate a tidal stream demonstration zone, with future expansion dependent on developer applications. EIA currently being prepared with intention of having a consent decision in the second half of 2020.	EIA not yet submitted; scoping report identifies 31 European sites for consideration in the assessment process, although most are unlikely to be significantly affected by the proposals. The WNMP is likely to be adopted prior to the granting of consent (so in combination effects with WNMP unlikely as the scheme will need to meet the WNMP provisions).

Project	Status	Summary	Interaction with WNMP
Minesto Deep Green Holyhead Deep – 80MW	TBC	Proposed extension of Holyhead Deep tidal kite array to increase capacity of 80MW; site intended to be developed in three phases as part of a deploy-and-monitor approach. Minesto has submitted a scoping report to UK consenting authorities Marine Management Organisation (MMO) and Natural Resources Wales (NRW), asking for their scoping opinion for development of an 80 MW site in Holyhead Deep.	HRA for the demonstrator concluded no adverse effects on sites within the WNMP ZoI, including the sites within the proposed tidal stream SRA (Anglesey Terns / Morwenoliaid Ynys Môn SPA; Bae Cemlyn/ Cemlyn Bay SAC; North Anglesey Marine / Gogledd Môn Forol cSAC; Ynys Feurig, Cemlyn Bay and The Skerries SPA). Residual effects with future projects supported by the WNMP possible but cannot be assessed at the strategy level. The 80MW scheme would be covered by WNMP provisions so in combination effects with WNMP unlikely.
Internal Power Generation Enhancement for Port Talbot Steelworks	Decided	Potential effects on terrestrial sites within 2km of WNMP area, principally through air quality changes, notably Kenfig SAC.	HRA concluded no significant effects for Kenfig; residual in combination effects with WNMP unlikely.
Tidal Lagoon Swansea Bay	DCO decided; marine licence awaiting determination.	Potentially substantial changes to marine habitats around Swansea bay during construction and operation; impacts on mobile species; etc.	HRA of scheme concluded no adverse effects. The HRA of the Marine Licence application is currently being considered (principal issues relate to impacts on diadramous fish). Residual effects from this in combination with other projects will need to be considered at the project level; possibility of lagoon accounted for in WNMP. Would be covered by WNMP provisions so in combination effects with WNMP unlikely.
South Hook Combined Heat & Power Station	Decided	Potential effects to sites within the WNMP ZoI through surface and process waste water impacting on features within the Pembrokeshire Marine SAC; aerial emissions from the project impacting on sensitive SAC and SPA features in the vicinity of the project; impacts on greater horseshoe bats foraging, commuting and roosting from disturbance.	HRA concluded no adverse effects on the integrity of the Cleddau Rivers Special Area of Conservation; Limestone Coast of South and West Wales Special Area of Conservation; Pembrokeshire Bat Sites and Bosherston Lakes Special Area of Conservation; Pembrokeshire Marine Special Area of Conservation; Castlemartin Coast Special Protection Area through airborne emissions or aqueous discharges in view of this mitigation and the protection secured by the Environmental Permitting regime. Residual effects from this in combination with other projects will need to be considered at the project level.
Hinkley Point C New Nuclear Power Station	Decided	New nuclear power station in Somerset; significant construction / operational effects likely; zone of environmental influence will overlap with ZoI of WNMP area; HRA completed.	HRA concluded no adverse effects on any European sites. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
North Wales Connection	Withdrawn	Grid connection on Anglesey, involving Menai Straight crossing; construction / operational effects on sites possible.	Menai crossing would be covered by WNMP provisions so in combination effects with WNMP unlikely. Proposal has been indefinitely withdrawn due to the delay on the Wylfa Newydd scheme.

Project	Status	Summary	Interaction with WNMP
Wylfa Newydd Nuclear Power Station	Recommendation	New nuclear power station on Anglesey; significant construction / operational effects likely on habitats etc in the WNMP area; HRA ongoing but concluded that adverse effects on the Anglesey Terns SPA could not be excluded.	New nuclear power station requiring construction in the WNMP area and abstractions / discharges. Would be in accordance with the New Nuclear NPS rather than the WNMP, which would require assessment of in combination effects at that time. The project is currently on hold.
Tidal Lagoon Newport	Pre-Application	Tidal lagoon within Severn Estuary SAC / SPA / Ramsar approximately 1km from the River Usk; the furthest offshore extent is up to 8km from the foreshore towards the centre of the Severn Estuary. Significant construction and operational effects likely.	Would be covered by WNMP provisions so in combination effects with WNMP unlikely.
Tidal Lagoon Cardiff	Pre-Application	Tidal lagoon within Severn Estuary SAC / SPA / Ramsar between Cardiff Bay and the Usk; the furthest offshore extent is up to 8km from the foreshore towards the centre of the Severn Estuary. Significant construction and operational effects likely.	Would be covered by WNMP provisions so in combination effects with WNMP unlikely.
NuGens Moorside Project in West Cumbria	Pre-Application	New nuclear power station in Cumbria; significant construction / operational effects likely; zone of environmental influence likely to overlap with ZoI of WNMP area; HRA ongoing.	New nuclear power station requiring construction outside the WNMP area and abstractions / discharges. Would be in accordance with the New Nuclear NPS, which would require assessment of in combination effects at that time. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
North West Coast Connections Project - N Grid	Pre-Application	New grid connection involving crossing of Morcambe Bay; zone of environmental influence likely to overlap marginally with ZoI of WNMP area; HRA ongoing.	Would be outside the direct influence of the WNMP so in combination effects possible depending on projects that come forward (principally on mobile species that may use both areas). Would be covered by NPS, which requires project level HRA. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
Oldbury New Nuclear Power Station	Pre-Application	New nuclear power station in Gloucestershire, likely to affect Severn Estuary. Significant construction / operational effects likely; zone of environmental influence will overlap with WNMP area; project parameters not certain.	Would be outside the direct influence of the WNMP so in combination effects possible depending on projects that come forward (principally on mobile species that may use both areas). Would be covered by NPS, which requires project level HRA. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.

Project	Status	Summary	Interaction with WNMP
Avon Power Station 950 MW output	Pre-Application	New gas power station in Gloucestershire, likely to affect Severn Estuary. Significant construction / operational effects likely; zone of environmental influence will overlap with WNMP area; project parameters not certain.	Would be outside the direct influence of the WNMP so in combination effects possible depending on projects that come forward (principally on mobile species that may use both areas). Would be covered by NPS, which requires project level HRA. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
The West Somerset Tidal Lagoon	Pre-Application	Tidal lagoon on north Somerset coast; Significant construction / operational effects likely; zone of environmental influence will overlap with WNMP area; project parameters not certain.	Would be outside the direct influence of the WNMP so in combination effects possible depending on projects that come forward (principally on mobile species that may use both areas). WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
Seabank 3 CCGT	Pre-Application	New Combined Cycle Gas Turbine (CCGT) power station immediately adjacent to the existing Seabank Power Station; within 400m of Severn Estuary. Significant construction / operational effects likely; zone of environmental influence will overlap with WNMP area; project parameters not certain. HRA ongoing.	Would be outside the direct influence of the WNMP so in combination effects possible depending on projects that come forward (principally on mobile species that may use both areas). Would be covered by NPS, which requires project level HRA. WNMP requires projects to comply with Habitats Regulations, including in combination assessment, so mechanism for avoiding effects in place; in combination effects with projects supported by the WNMP possible but cannot be assessed at the strategy level.
Tidal Energy Ltd, Deltastream Demonstration Array, St David's Head, Pembrokeshire.	Pre-application	Proposed array of tidal stream devices, although Tidal Energy Ltd. is in administration and no further information on the scheme is available. The proposal has interactions with the Severn Estuary and may share receptors linked to far field effects.	Tidal Energy Ltd. is in administration and no further information on the scheme is available, although it would fall within the existing lease areas if progressed.

7.8 Other activities

7.8.1 In addition to other plans or projects, some ongoing activities (most notably fishing and recreational activities) do not require permissions and hence HRA. Defra has published guidance requiring that commercial fishing operations be managed in accordance with Article 6 of the Habitats Directive[65], although future project-level HRA of schemes arising from the WNMP may need to take these aspects into account.

[65] Available at: https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery

7.9 Summary

7.9.1 The Habitats Regulations requires that the potential effects of a plan on European sites must also be considered 'in combination with other plans or projects'. Whilst 'within plan' in combination effects can be considered as part of the general assessment, the wide range of external plans and programmes, and their varied approaches to HRA, ensures that attempting to define and assess specific effects at a strategic scale is not practicable to any meaningful extent. This aspect is complicated further by the fact that many activities (for example fishing) are not subject to the HRA process.

7.9.2 The review of plans and projects for 'in combination' effects was necessarily high level due to the strategic nature of the marine plan and the uncertainties inherent within it. 'In combination' effects will therefore need to be revisited and addressed in a more comprehensive manner at the project-level when more detailed information is available. However, the WNMP includes appropriate plan-level mitigating provisions within it that will minimise the risk of 'in combination' effects as a result of activities within the WNMP area.

8. Conclusion of Screening and Appropriate Assessment

8.1 Overview

8.1.1 The WNMP is a high-level policy-led plan for guiding marine decision making over the next 20 years. Due to its wide geographic scale, high-level and long-term outlook there are inevitably a large number of uncertainties inherent within it. In particular, whilst it is a spatial planning document, the extent to which it determines or controls where activities may take place is variable, and limited.

8.1.2 With regard to HRA, the spatial nature of the plan means that potential effects on specific European sites are easy to envisage (due to the known 'sensitivities' of the interest features), but much harder to accurately identify, quantify and assess (due to the strategic nature of the plan and the absence of detailed information on any activities). The strategic nature of the WNMP is therefore reflected in the HRA of the WNMP, which is necessarily a strategic assessment.

8.1.3 It is important that the WNMP does not impose policies or planning constraints that are likely to make the avoidance of adverse effects unachievable at the project-level, if projects remain in accordance with the plan. It is therefore necessary, within the limitations established, for the HRA to identify potential pathways for effects to occur, and to ensure that the policies do no create a framework that ensures those effects are likely or unavoidable.

8.2 Screening

8.2.1 The screening assessment had two principal components:

- A screening of European sites to identify those sites and features that will not be affected by the outcomes of the WNMP (alone or in combination) and those with features that are vulnerable (i.e. exposed and sensitive) to the potential outcomes of the WNMP; and
- A screening of the WNMP policies to determine those which:
  - cannot result in negative impacts on any European sites (e.g. a policy advocating the protection of European sites); and
  - should not or cannot be assessed by the HRA of the WNMP (even though a theoretical effect pathway exists) as there is no practical way of completing a meaningful assessment (i.e. they are 'screened in' but assessment must be deferred to a lower tier in the planning hierarchy).

8.2.2 The screening of the European sites was based on the anticipated physical 'zone of environmental influence' of the WNMP (50km beyond the WNMP boundary in marine areas, and 2km inland). Essentially, all European sites within the ZoI were considered to be potentially exposed to the outcomes of the WNMP, along with sites supporting mobile species that may be dependent on habitats (etc) within the ZoI or which could otherwise be affected by activities within the WNMP area. This effectively included:

- all European sites associated with the MMUs for marine mammals using the ZoI;
- all bat sites within 20km;

- all European sites designated for diadromous fish that discharge into the Irish or Celtic Seas;
- all UK and Irish seabird SPAs (principally due to uncertainties over the use of the Irish Sea in winter, since many sites / species could be excluded during the breeding season based on Thaxter *et al.* (2012) foraging distances);
- European sites in the UK and Ireland supporting wintering wildfowl and waders birds that could migrate across the WNMP area, based on Wright *et al.* (2015).

8.2.3 With regard to the screening of the WNMP policies:

- All of the general cross-cutting policies in the WNMP (see **Table 2.2**) are considered to be 'no significant effect' policies as they are invariably 'General statements of policy / aspiration', 'General design / guidance criteria or policies that cannot lead to or trigger development' or 'Environmental protection policies'; these have been screened out from further assessment (although note that the mitigating aspects of the 'Environmental protection policies' are considered at the appropriate assessment stage, for consistency with 'People over Wind').
- Many of the sector policies reflect or incorporate external plans or programmes that have been subject to HRA (e.g. oil and gas licensing).
- The sector policies were not screened out (as they could support development) and were subject to additional assessment to determine whether they are likely to result in adverse effects.

8.3 Appropriate Assessment

8.3.1 The appropriate assessment stage focused on those sectors with policies promoting or supporting development, which are not covered by existing sectoral HRAs. Whilst potential impact pathways can be identified for sector activities, the inherent uncertainties over the location, scale, type and timing of future activities ensure that a plan-level HRA cannot identify or quantify specific effects on specific sites or exclude the possibility of significant or significant adverse effects on many European sites solely through the technical analysis of anticipated outcomes and scenarios – the data are too partial to allow meaningful assessment. These uncertainties are inevitable in broad multi-sectoral marine planning where the regime is in its infancy and are best addressed by policy safeguards within the plan; a requirement for project-level HRA; and regular review of the plan to ensure it reflects the best available current knowledge (i.e. an adaptive management approach).

8.3.2 However, whilst the WNMP does not explicitly exclude the possibility of adverse effects occurring, there is nothing inherent in the scale of the supported activities that would make adverse effects unavoidable at the project level, given the safeguards contained within the WNMP. It is evident from existing projects in the marine environment (including offshore windfarms, aggregates extraction, cable and pipeline laying, aquaculture schemes, marine renewables etc.) that adverse effects are avoidable, and that project-level mitigation and avoidance measures are available, achievable and likely to be effective in preventing adverse effects on European sites from occurring.

8.3.3 Furthermore, the WNMP does not restrict how future schemes might be delivered and so sufficient flexibility is retained within the scope of the policies to ensure that future schemes can be delivered without adverse effects.

8.3.4 All proposals will be subject to project level HRA as part of the consenting procedure, and the general cross-cutting protective policies within the plan will provide safeguards for European sites. The three-yearly WNMP review process will also provide a mechanism for monitoring and reviewing policy performance; this will be based on accumulated evidence from future project- and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-

level HRA can be appropriately captured and addressed in future revisions of the policies or the identification of SRAs.

8.3.5 Overall, whilst the plan-level HRA necessarily defers some assessment to project-level HRA, it is considered that the measures within the WNMP will ensure that there will be no unavoidable adverse effects on the integrity of any European sites, alone or in combination, as a result of the plan's implementation.

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Appendix A
UK European Sites and European Marine sites within the Geographical Zone of Environmental Influence

Table A1 lists those UK European sites that are partly or fully within the zone of environmental influence for the WNMP (i.e. the WNMP area plus 50km offshore and 2km inland). The table also indicates those interest features that are not located in the zone of environmental influence (typically terrestrial features associated with larger sites) and mobile features that are not thought to be functionally dependent on habitats in the zone of environmental influence.

Table A1 European sites and features within or functionally linked to the zone of environmental influence

Site and Interest Feature	Within ZoI?
Afon Eden - Cors Goch Trawsfynydd SAC	
Active raised bogs	N
Freshwater pearl mussel Margaritifera margaritifera	Y
Atlantic salmon Salmo salar	Y
Otter Lutra lutra	N
Floating water-plantain Luronium natans	N
Afon Gwyrfai a Llyn Cwellyn SAC	
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	N
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Atlantic salmon Salmo salar	Y
Otter Lutra lutra	N
Floating water-plantain Luronium natans	N
Afon Teifi/ River Teifi SAC	
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	N
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Atlantic salmon Salmo salar	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
Floating water-plantain Luronium natans	N
Afon Tywi/ River Tywi SAC	
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Allis shad Alosa alosa	Y
Twaite shad Alosa fallax	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
Afonydd Cleddau/ Cleddau Rivers SAC	
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N

Site and Interest Feature	Within ZoI?
Active raised bogs	N
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Y
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
Bae Cemlyn/ Cemlyn Bay SAC	
Coastal lagoons	Y
Perennial vegetation of stony banks	Y
Braunton Burrows SAC	
Mudflats and sandflats not covered by seawater at low tide	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Petalwort Petalophyllum ralfsii	Y
Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC	
Harbour porpoise Phocoena phocoena	Y
Cardigan Bay/ Bae Ceredigion SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Reefs	Y
Submerged or partially submerged sea caves	Y
Sea lamprey Petromyzon marinus	Y
River lamprey Lampetra fluviatilis	Y
Bottlenose dolphin Tursiops truncatus	Y
Grey seal Halichoerus grypus	Y
Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Large shallow inlets and bays	Y
Salicornia and other annuals colonizing mud and sand	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Sea lamprey Petromyzon marinus	Y
River lamprey Lampetra fluviatilis	Y
Allis shad Alosa alosa	Y
Twaite shad Alosa fallax	Y
Otter Lutra lutra	Y
Carmarthen Bay Dunes/ Twyni Bae Caerfyrddin SAC	
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Narrow-mouthed whorl snail Vertigo angustior	Y
Petalwort Petalophyllum ralfsii	Y
Fen orchid Liparis loeselii	Y
Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y

Site and Interest Feature	Within ZoI?
Coed Cwm Einion SAC	
Tilio-Acerion forests of slopes, screes and ravines	Y
Coedwigoedd Penrhyn Creuddyn/ Creuddyn Peninsula Woods SAC	
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Y
Tilio-Acerion forests of slopes, screes and ravines	Y
Taxus baccata woods of the British Isles	Y
Coedydd Aber SAC	
Old sessile oak woods with Ilex and Blechnum in the British Isles	Y
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Y
Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC	
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Northern Atlantic wet heaths with Erica tetralix	N
European dry heaths	N
Tilio-Acerion forests of slopes, screes and ravines	Y
Old sessile oak woods with Ilex and Blechnum in the British Isles	Y
Bog woodland	N
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	N
Lesser horseshoe bat Rhinolophus hipposideros	Y
Cors Fochno SAC	
Active raised bogs	Y
Degraded raised bogs still capable of natural regeneration	Y
Depressions on peat substrates of the Rhynchosporion	Y
Corsydd Llyn/ Lleyn Fens SAC	
Calcareous fens with Cladium mariscus and species of the Caricion davallianae	Y
Alkaline fens	Y
Geyer`s whorl snail Vertigo geyeri	N
Desmoulin`s whorl snail Vertigo moulinsiana	N
Corsydd Môn/ Anglesey Fens SAC	
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Y
Northern Atlantic wet heaths with Erica tetralix	N
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	Y
Calcareous fens with Cladium mariscus and species of the Caricion davallianae	Y
Alkaline fens	Y
Geyer`s whorl snail Vertigo geyeri	N
Southern damselfly Coenagrion mercuriale	N
Marsh fritillary butterfly Euphydryas (Eurodryas, Hypodryas) aurinia	Y
Crymlyn Bog/ Cors Crymlyn SAC	
Transition mires and quaking bogs	Y
Calcareous fens with Cladium mariscus and species of the Caricion davallianae	Y
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Y
Dee Estuary/ Aber Dyfrdwy SAC	
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Annual vegetation of drift lines	Y
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
Salicornia and other annuals colonizing mud and sand	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y

Site and Interest Feature	Within ZoI?
Humid dune slacks	Y
Sea lamprey Petromyzon marinus	Y
River lamprey Lampetra fluviatilis	Y
Petalwort Petalophyllum ralfsii	Y
Deeside and Buckley Newt Sites SAC	
Old sessile oak woods with Ilex and Blechnum in the British Isles	Y
Great crested newt Triturus cristatus	Y
Dunraven Bay SAC	
Shore dock Rumex rupestris	Y
Eryri/ Snowdonia SAC	
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	N
Northern Atlantic wet heaths with Erica tetralix	Y
European dry heaths	Y
Alpine and Boreal heaths	N
Siliceous alpine and boreal grasslands	N
Alpine and subalpine calcareous grasslands	N
Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	N
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	N
Blanket bogs (* if active bog)	Y
Depressions on peat substrates of the Rhynchosporion	N
Petrifying springs with tufa formation (Cratoneurion)	N
Alkaline fens	N
Alpine pioneer formations of the Caricion bicoloris-atrofuscae	N
Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	N
Calcareous rocky slopes with chasmophytic vegetation	N
Siliceous rocky slopes with chasmophytic vegetation	N
Old sessile oak woods with Ilex and Blechnum in the British Isles	N
Slender green feather-moss Drepanocladus (Hamatocaulis) vernicosus	N
Floating water-plantain Luronium natans	N
Exmoor Heaths SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
Northern Atlantic wet heaths with Erica tetralix	N
European dry heaths	Y
Blanket bogs (* if active bog)	N
Alkaline fens	N
Old sessile oak woods with Ilex and Blechnum in the British Isles	N
Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh SAC	
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Salicornia and other annuals colonizing mud and sand	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Glannau Ynys Gybi/ Holy Island Coast SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
Northern Atlantic wet heaths with Erica tetralix	Y
European dry heaths	Y
Glan-traeth SAC	
Great crested newt Triturus cristatus	Y
Glynllifon SAC	
Lesser horseshoe bat Rhinolophus hipposideros	Y
Gower Ash Woods/ Coedydd Ynn Gwyr SAC	

Site and Interest Feature	Within ZoI?
Tilio-Acerion forests of slopes, screes and ravines	Y
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Y
Gower Commons/ Tiroedd Comin Gwyr SAC	
Northern Atlantic wet heaths with Erica tetralix	Y
European dry heaths	Y
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	Y
Southern damselfly Coenagrion mercuriale	Y
Marsh fritillary butterfly Euphydryas (Eurodryas, Hypodryas) aurinia	Y
Great Orme`s Head/ Pen y Gogarth SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
European dry heaths	Y
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Y
Kenfig/ Cynffig SAC	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Y
Petalwort Petalophyllum ralfsii	Y
Fen orchid Liparis loeselii	Y
Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
European dry heaths	Y
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Y
Caves not open to the public	Y
Submerged or partially submerged sea caves	Y
Greater horseshoe bat Rhinolophus ferrumequinum	Y
Petalwort Petalophyllum ralfsii	Y
Early gentian Gentianella anglica	Y
Llyn Dinam SAC	
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Y
Lundy SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Reefs	Y
Submerged or partially submerged sea caves	Y
Grey seal Halichoerus grypus	Y
Mendip Limestone Grasslands SAC	
European dry heaths	N
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Y
Caves not open to the public	N
Tilio-Acerion forests of slopes, screes and ravines	N
Greater horseshoe bat Rhinolophus ferrumequinum	N
Morecambe Bay SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Coastal lagoons	N
Large shallow inlets and bays	Y
Reefs	Y

Site and Interest Feature	Within ZoI?
Perennial vegetation of stony banks	N
Salicornia and other annuals colonizing mud and sand	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
Atlantic decalcified fixed dunes (Calluno-Ulicetea)	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Great crested newt Triturus cristatus	N
Morfa Harlech a Morfa Dyffryn SAC	
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Petalwort Petalophyllum ralfsii	Y
Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC	
Calaminarian grasslands of the Violetalia calaminariae	N
Lesser horseshoe bat Rhinolophus hipposideros	Y
North Anglesey Marine / Gogledd Môn Forol SAC	
Harbour porpoise Phocoena phocoena	Y
North Channel SAC	
Harbour porpoise Phocoena phocoena	Y
North West Pembrokeshire Commons/ Comins Gogledd Orllewin Sir Benfro SAC	
Northern Atlantic wet heaths with Erica tetralix	Y
European dry heaths	Y
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	Y
Transition mires and quaking bogs	Y
Floating water-plantain Luronium natans	N
Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC	
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	N
Lesser horseshoe bat Rhinolophus hipposideros	Y
Greater horseshoe bat Rhinolophus ferrumequinum	Y
Otter Lutra lutra	Y
Pembrokeshire Marine/ Sir Benfro Forol SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Coastal lagoons	Y
Large shallow inlets and bays	Y
Reefs	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Submerged or partially submerged sea caves	Y
Sea lamprey Petromyzon marinus	Y
River lamprey Lampetra fluviatilis	Y
Allis shad Alosa alosa	Y
Twaite shad Alosa fallax	Y
Otter Lutra lutra	Y
Grey seal Halichoerus grypus	Y
Shore dock Rumex rupestris	Y

Site and Interest Feature	Within ZoI?
Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Coastal lagoons	Y
Large shallow inlets and bays	Y
Reefs	Y
Salicornia and other annuals colonizing mud and sand	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Submerged or partially submerged sea caves	Y
Bottlenose dolphin Tursiops truncatus	Y
Otter Lutra lutra	Y
Grey seal Halichoerus grypus	Y
Pisces Reef Complex SAC	
Reefs	Y
River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC	
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Atlantic salmon Salmo salar	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
Floating water-plantain Luronium natans	N
River Usk/ Afon Wysg SAC	
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Allis shad Alosa alosa	Y
Twaite shad Alosa fallax	Y
Atlantic salmon Salmo salar	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
River Wye/ Afon Gwy SAC	
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	N
Transition mires and quaking bogs	N
White-clawed (or Atlantic stream) crayfish Austropotamobius pallipes	N
Sea lamprey Petromyzon marinus	Y
Brook lamprey Lampetra planeri	N
River lamprey Lampetra fluviatilis	Y
Allis shad Alosa alosa	Y
Twaite shad Alosa fallax	Y
Atlantic salmon Salmo salar	Y
Bullhead Cottus gobio	N
Otter Lutra lutra	N
Sefton Coast SAC	
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y

Site and Interest Feature	Within ZoI?
Atlantic decalcified fixed dunes (Calluno-Ulicetea)	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Great crested newt Triturus cristatus	N
Petalwort Petalophyllum ralfsii	N
Severn Estuary/ Môr Hafren SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Estuaries	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Reefs	Y
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Y
Sea lamprey Petromyzon marinus	Y
River lamprey Lampetra fluviatilis	Y
Twaite shad Alosa fallax	Y
Shell Flat and Lune Deep SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Reefs	Y
St David`s / Ty Ddewi SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
European dry heaths	Y
Floating water-plantain Luronium natans	Y
Tintagel-Marsland-Clovelly Coast SAC	
Vegetated sea cliffs of the Atlantic and Baltic Coasts	Y
European dry heaths	N
Old sessile oak woods with Ilex and Blechnum in the British Isles	N
West Wales Marine / Gorllewin Cymru Forol SAC	
Harbour porpoise Phocoena phocoena	Y
Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC	
Sandbanks which are slightly covered by sea water all the time	Y
Mudflats and sandflats not covered by seawater at low tide	Y
Large shallow inlets and bays	Y
Reefs	Y
Submerged or partially submerged sea caves	Y
Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes SAC	
Embryonic shifting dunes	Y
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	Y
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Y
Dunes with Salix repens ssp. argentea (Salicion arenariae)	Y
Humid dune slacks	Y
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Y
Petalwort Petalophyllum ralfsii	Y
Shore dock Rumex rupestris	Y
Croker Carbonate Slabs SCI	
Submarine structures made by leaking gases	Y
Anglesey Terns / Morwenoliaid Ynys Môn SPA	
Sandwich tern Sterna sandvicensis	Y
Roseate tern Sterna dougallii	Y
Common tern Sterna hirundo	Y
Arctic tern Sterna paradisaea	Y
Bae Caerfyrddin/ Carmarthen Bay SPA	

Site and Interest Feature	Within ZoI?
Black (common) scoter Melanitta nigra	Y
Burry Inlet SPA	
Common shelduck Tadorna tadorna	Y
Eurasian wigeon Anas penelope	Y
Eurasian teal Anas crecca	Y
Northern pintail Anas acuta	Y
Northern shoveler Anas clypeata	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Grey plover Pluvialis squatarola	Y
Red knot Calidris canutus	Y
Eurasian curlew Numenius arquata	Y
Common redshank Tringa totanus	Y
Ruddy turnstone Arenaria interpres	Y
Dunlin Calidris alpina alpina	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Castlemartin Coast SPA	
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Dyfi Estuary / Aber Dyfi SPA	
Greenland white-fronted goose Anser albifrons flavirostris	Y
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA	
Manx shearwater Puffinus puffinus	Y
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Glannau Ynys Gybi/ Holy Island Coast SPA	
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Grassholm SPA	
Northern gannet Morus bassanus	Y
Irish Sea Front SPA	
Manx shearwater Puffinus puffinus	Y
Liverpool Bay / Bae Lerpwl SPA	
Red-throated diver Gavia stellata	Y
Black (common) scoter Melanitta nigra	Y
Little gull Larus minutus	Y
Common tern Sterna hirundo	Y
Little tern Sterna albifrons	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Mersey Estuary SPA	
Great crested grebe Podiceps cristatus	Y
Common shelduck Tadorna tadorna	Y
Eurasian wigeon Anas penelope	Y
Eurasian teal Anas crecca	Y
Northern pintail Anas acuta	Y
Ringed plover Charadrius hiaticula	Y
European golden plover Pluvialis apricaria	Y
Grey plover Pluvialis squatarola	Y
Northern lapwing Vanellus vanellus	Y
Eurasian curlew Numenius arquata	Y

Site and Interest Feature	Within ZoI?
Common redshank Tringa totanus	Y
Common redshank Tringa totanus	Y
Black-tailed godwit Limosa limosa islandica	Y
Dunlin Calidris alpina alpina	Y
Mersey Narrows and North Wirral Foreshore SPA	
Great cormorant Phalacrocorax carbo	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Grey plover Pluvialis squatarola	Y
Sanderling Calidris alba	Y
Bar-tailed godwit Limosa lapponica	Y
Common redshank Tringa totanus	Y
Little gull Larus minutus	Y
Common tern Sterna hirundo	Y
Common tern Sterna hirundo	Y
red knot Calidris canutus islandica	Y
Dunlin Calidris alpina alpina	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Morecambe Bay and Duddon Estuary SPA	
Little egret Egretta garzetta	Y
Whooper swan Cygnus cygnus	Y
Pink-footed goose Anser brachyrhynchus	Y
Common shelduck Tadorna tadorna	Y
Northern pintail Anas acuta	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Ringed plover Charadrius hiaticula	Y
European golden plover Pluvialis apricaria	Y
Grey plover Pluvialis squatarola	Y
Red knot Calidris canutus	Y
Sanderling Calidris alba	Y
Ruff Philomachus pugnax	Y
Bar-tailed godwit Limosa lapponica	Y
Eurasian curlew Numenius arquata	Y
Common redshank Tringa totanus	Y
Ruddy turnstone Arenaria interpres	Y
Mediterranean gull Larus melanocephalus	Y
Lesser black-backed gull Larus fuscus	Y
Lesser black-backed gull Larus fuscus	Y
Herring gull Larus argentatus	Y
Sandwich tern Sterna sandvicensis	Y
Common tern Sterna hirundo	Y
Little tern Sterna albifrons	Y
Black-tailed godwit Limosa limosa islandica	Y
Dunlin Calidris alpina alpina	Y
Seabird assemblage	Y
Seabird assemblage	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA	
Red-billed chough Pyrrhocorax pyrrhocorax	Y

Site and Interest Feature	Within ZoI?
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Northern Cardigan Bay / Gogledd Bae Ceredigion SPA	
Red-throated diver Gavia stellata	Y
Ramsey and St David`s Peninsula Coast SPA	
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Ribble and Alt Estuaries SPA	
Great cormorant Phalacrocorax carbo	Y
Tundra swan Cygnus columbianus bewickii	Y
Whooper swan Cygnus cygnus	Y
Pink-footed goose Anser brachyrhynchus	Y
Common shelduck Tadorna tadorna	Y
Eurasian wigeon Anas penelope	Y
Eurasian teal Anas crecca	Y
Northern pintail Anas acuta	Y
Greater scaup Aythya marila	Y
Black (common) scoter Melanitta nigra	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Ringed plover Charadrius hiaticula	Y
European golden plover Pluvialis apricaria	Y
Grey plover Pluvialis squatarola	Y
Northern lapwing Vanellus vanellus	Y
Red knot Calidris canutus	Y
Sanderling Calidris alba	Y
Sanderling Calidris alba	Y
Ruff Philomachus pugnax	Y
Bar-tailed godwit Limosa lapponica	Y
Whimbrel Numenius phaeopus	Y
Eurasian curlew Numenius arquata	Y
Common redshank Tringa totanus	Y
Common redshank Tringa totanus	Y
Black-headed gull Larus ridibundus	Y
Lesser black-backed gull Larus fuscus	Y
Common tern Sterna hirundo	Y
Black-tailed godwit Limosa limosa islandica	Y
Dunlin Calidris alpina alpina	Y
Seabird assemblage	Y
Seabird assemblage	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Severn Estuary SPA	
Tundra swan Cygnus columbianus bewickii	Y
Common shelduck Tadorna tadorna	Y
Gadwall Anas strepera	Y
Common redshank Tringa totanus	Y
Greater white-fronted goose Anser albifrons albifrons	Y
Dunlin Calidris alpina alpina	Y
Waterbird assemblage	Y
Waterfowl assemblage	Y
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	
Manx shearwater Puffinus puffinus	Y

Site and Interest Feature	Within ZoI?
European storm-petrel Hydrobates pelagicus	Y
Lesser black-backed gull Larus fuscus	Y
Atlantic puffin Fratercula arctica	Y
Short-eared owl Asio flammeus	Y
Red-billed chough Pyrrhocorax pyrrhocorax	Y
Seabird assemblage	Y
The Dee Estuary SPA	
Common shelduck Tadorna tadorna	Y
Eurasian teal Anas crecca	Y
Northern pintail Anas acuta	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Grey plover Pluvialis squatarola	Y
Red knot Calidris canutus	Y
Bar-tailed godwit Limosa lapponica	Y
Eurasian curlew Numenius arquata	Y
Common redshank Tringa totanus	Y
Common redshank Tringa totanus	Y
Sandwich tern Sterna sandvicensis	Y
Common tern Sterna hirundo	Y
Little tern Sterna albifrons	Y
Black-tailed godwit Limosa limosa islandica	Y
Dunlin Calidris alpina alpina	Y
Waterbird assemblage	Y
Traeth Lafan/ Lavan Sands, Conway Bay SPA	
Great crested grebe Podiceps cristatus	Y
Red-breasted merganser Mergus serrator	Y
Eurasian oystercatcher Haematopus ostralegus	Y
Eurasian curlew Numenius arquata	Y
Common redshank Tringa totanus	Y
Ynys Seiriol / Puffin Island SPA	
Great cormorant Phalacrocorax carbo	Y
Burry Inlet Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Cors Fochno and Dyfi Ramsar	
Crit. 1 - sites containing representative, rare or unique wetland types	Y
Corsydd Môn a Llyn/ Anglesey and Llyn Fens Ramsar	
Crit. 1 - sites containing representative, rare or unique wetland types	Y
Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity	Y
Crymlyn Bog Ramsar	
Crit. 1 - sites containing representative, rare or unique wetland types	Y
Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities	Y
Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity	Y
Mersey Estuary Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Mersey Narrows and North Wirral Foreshore Ramsar	
Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge	Y
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y

Site and Interest Feature	Within ZoI?
Ribble and Alt Estuaries Ramsar	
Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities	Y
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Severn Estuary Ramsar	
Crit. 1 - sites containing representative, rare or unique wetland types	Y
Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity	Y
Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge	Y
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Crit. 8 - important source of food for fishes, spawning ground, nursery and/or migration path	Y
The Dee Estuary Ramsar	
Crit. 1 - sites containing representative, rare or unique wetland types	Y
Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities	Y
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y

Appendix B
SACs (etc.) with Potentially Exposed Mobile Species

The following table summarises those SACs and associated designations (pSAC, cSAC, SCI; plus corresponding Ramsar sites / features) that are designated for mobile species that are potentially exposed and sensitive to the outcomes of the plan. **Note, only those interest features of each that are considered to be potentially exposed and sensitive are listed**. In summary these sites are:

- sites designated for bats within 20km of the zone of influence;
- sites designated for diadromous fish within the Irish and Celtic seas, or which discharge to this area;
- sites supporting marine mammals that are within 50km of the relevant Marine Management Units;
- UK sites designated for otters within the zone of influence

Site Ref	SAC Site Name	SAC Mobile Interest Features Screened In
UK0030384	The Maidens SAC	Grey seal *Halichoerus grypus*
UK0030383	Skerries and Causeway SAC	Harbour porpoise *Phocoena phocoena*
UK0030227	North Pembrokeshire Woodlands/ Coedydd Gogledd Sir Benfro SAC	Barbastelle *Barbastella barbastellus*
UK0030203	Mendip Limestone Grasslands SAC	Greater horseshoe bat *Rhinolophus ferrumequinum*
UK0030161	Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC	Lesser horseshoe bat *Rhinolophus hipposideros*
UK0030148	Exmoor and Quantock Oakwoods SAC	Barbastelle *Barbastella barbastellus*; Bechstein`s bat *Myotis bechsteini*
UK0030131	Dee Estuary/ Aber Dyfrdwy SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*
UK0030052	North Somerset and Mendip Bats SAC	Lesser horseshoe bat *Rhinolophus hipposideros*; Greater horseshoe bat *Rhinolophus ferrumequinum*
UK0020020	Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Otter *Lutra lutra*
UK0016618	Strangford Lough SAC	Common seal *Phoca vitulina*
UK0016612	Murlough SAC	Common seal *Phoca vitulina*
UK0014794	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC	Lesser horseshoe bat *Rhinolophus hipposideros*; Greater horseshoe bat *Rhinolophus ferrumequinum*
UK0014793	Pembrokeshire Bat Sites and Bosherston Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC	Lesser horseshoe bat *Rhinolophus hipposideros*; Greater horseshoe bat *Rhinolophus ferrumequinum*
UK0014789	Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC	Lesser horseshoe bat *Rhinolophus hipposideros*
UK0014787	Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC	Greater horseshoe bat *Rhinolophus ferrumequinum*
UK0013694	Isles of Scilly Complex SAC	Grey seal *Halichoerus grypus*
UK0013117	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin *Tursiops truncatus*; Otter *Lutra lutra*; Grey seal *Halichoerus grypus*
UK0013116	Pembrokeshire Marine/ Sir Benfro Forol SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Otter *Lutra lutra*; Grey seal *Halichoerus grypus*

Site Ref	SAC Site Name	SAC Mobile Interest Features Screened In
UK0013114	Lundy SAC	Grey seal *Halichoerus grypus*
UK0013030	Severn Estuary/ Môr Hafren SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Twaite shad *Alosa fallax*
UK0013025	Solway Firth SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*
UK0013007	River Usk/ Afon Wysg SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*
UK0012727	Wye Valley Woodlands/ Coetiroedd Dyffryn Gwy SAC	Lesser horseshoe bat *Rhinolophus hipposideros*
UK0012712	Cardigan Bay/ Bae Ceredigion SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Bottlenose dolphin *Tursiops truncatus*; Grey seal *Halichoerus grypus*
UK0012670	Afon Teifi/ River Teifi SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*
UK0012661	Glynllifon SAC	Lesser horseshoe bat *Rhinolophus hipposideros*
UK0012642	River Wye/ Afon Gwy SAC	Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*
UK0030398	North Anglesey Marine / Gogledd Môn Forol cSAC	Harbour porpoise *Phocoena phocoena*
UK0030397	West Wales Marine / Gorllewin Cymru Forol cSAC	Harbour porpoise *Phocoena phocoena*
UK0030396	Bristol Channel Approaches / Dynesfeydd Môr Hafren possible cSAC	Harbour porpoise *Phocoena phocoena*
UK0030399	North Channel cSAC	Harbour porpoise *Phocoena phocoena*
IE0002172	BLASKET ISLANDS SAC	Harbour porpoise *Phocoena phocoena*
IE0002170	BLACKWATER RIVER (CORK/WATERFORD) SAC	Freshwater pearl mussel *Margaritifera margaritifera*; Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*
IE0002162	RIVER BARROW AND RIVER NORE SAC	Freshwater pearl mussel *Margaritifera margaritifera*; Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*
IE0002158	KENMARE RIVER SAC	Common seal *Phoca vitulina*
IE0000781	SLANEY RIVER VALLEY SAC	Freshwater pearl mussel *Margaritifera margaritifera*; Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; Allis shad *Alosa alosa*; Twaite shad *Alosa fallax*; Atlantic salmon *Salmo salar*; Otter *Lutra lutra*; Common seal *Phoca vitulina*
IE0000707	SALTEE ISLANDS SAC	Grey seal *Halichoerus grypus*
IE0000204	LAMBAY ISLAND SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
IE0000101	ROARINGWATER BAY AND ISLANDS SAC	Harbour porpoise *Phocoena phocoena*; Otter *Lutra lutra*; Grey seal *Halichoerus grypus*
IE0000090	GLENGARRIFF HARBOUR AND WOODLAND SAC	Common seal *Phoca vitulina*
FR5302008	ROCHES DE PENMARCH SAC	Harbour porpoise *Phocoena phocoena*
FR5302007	CHAUSSÉE DE SEIN SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5302006	CÔTES DE CROZON SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300066	BAIE DE SAINT-BRIEUC - EST SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300052	COTE DE CANCALE A PARAME SAC	Bottlenose dolphin *Tursiops truncatus*
FR5300049	DUNES ET COTES DE TREVIGNON SAC	Harbour porpoise *Phocoena phocoena*
FR5300046	RADE DE BREST, ESTUAIRE DE L'AULNE SAC	Common seal *Phoca vitulina*
FR5300023	ARCHIPEL DES GLENAN SAC	Harbour porpoise *Phocoena phocoena*

Site Ref	SAC Site Name	SAC Mobile Interest Features Screened In
FR5300020	CAP SIZUN SAC	Bottlenose dolphin *Tursiops truncatus*; Grey seal *Halichoerus grypus*
FR5300019	PRESQU'ILE DE CROZON SAC	Grey seal *Halichoerus grypus*
FR5300018	OUESSANT-MOLENE SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300017	ABERS - CÔTES DES LEGENDES SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300015	BAIE DE MORLAIX SAC	Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300011	CAP D'ERQUY-CAP FREHEL SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*
FR5300010	TREGOR GOËLO SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR5300009	COTE DE GRANIT ROSE-SEPT-ILES SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*
FR3102005	BAIE DE CANCHE ET COULOIR DES TROIS ESTUAIRES SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR3102003	RECIFS GRIS-NEZ BLANC-NEZ SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR3102002	BANCS DES FLANDRES SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR3100482	DUNES DE L'AUTHIE ET MOLLIERES DE BERCK SAC	Common seal *Phoca vitulina*
FR3100474	DUNES DE LA PLAINE MARITIME FLAMANDE SAC	Common seal *Phoca vitulina*
FR2502021	BAIE DE SEINE ORIENTALE SAC	Bottlenose dolphin *Tursiops truncatus*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2502020	BAIE DE SEINE OCCIDENTALE SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2502019	ANSE DE VAUVILLE SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2502018	BANC ET RÉCIFS DE SURTAINVILLE SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2500088	MARAIS DU COTENTIN ET DU BESSIN - BAIE DES VEYS SAC	Common seal *Phoca vitulina*
FR2500084	RÉCIFS ET LANDES DE LA HAGUE SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2500080	LITTORAL OUEST DU COTENTIN DE BREHAL A PIROU SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2500079	CHAUSEY SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2500077	BAIE DU MONT SAINT-MICHEL SAC	Bottlenose dolphin *Tursiops truncatus*; Harbour porpoise *Phocoena phocoena*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2300139	LITTORAL CAUCHOIS SAC	Bottlenose dolphin *Tursiops truncatus*; Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*
FR2300121	ESTUAIRE DE LA SEINE SAC	Grey seal *Halichoerus grypus*; Common seal *Phoca vitulina*

Appendix C
Additional Seabird Sites

Table C1 identifies those interest features from UK, Irish or French seabird sites that may use the ZoI, based on established foraging ranges over water (e.g. Thaxter *et al.* 2012) and (for UK sites) where more than 1% of a site's population is thought to contribute the wintering population in the relevant BDMPS based on data from NE (2015). Note, the table does not include sites or features that will not be exposed, based on the above criteria, or sites located within the ZoI (see Appendix A).

Site and Feature	BDMPS>1%	Foraging
Ailsa Craig SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Herring gull Larus argentatus	Y	
Lesser black-backed gull Larus fuscus	Y	
Northern gannet Morus bassanus	Y	Y
Auskerry SPA		
Arctic tern Sterna paradisaea	Y	
Bowland Fells SPA		
Lesser black-backed gull Larus fuscus	Y	Y
Breydon Water SPA		
Common tern Sterna hirundo	Y	
Buchan Ness to Collieston Coast SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Northern fulmar Fulmarus glacialis	Y	
Caithness and Sutherland Peatlands SPA		
Red-throated diver Gavia stellata	Y	
Calf of Eday SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Canna and Sanday SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Herring gull Larus argentatus	Y	
Cape Wrath SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Carlingford Lough SPA		
Common tern Sterna hirundo	Y	
Sandwich tern Sterna sandvicensis	Y	
Copeland Islands SPA		
Manx shearwater Puffinus puffinus	Y	Y
Copinsay SPA		

Site and Feature	BDMPS>1%	Foraging
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Coquet Island SPA		
Common tern Sterna hirundo	Y	
Cromarty Firth SPA		
Common tern Sterna hirundo	Y	
Dungeness, Romney Marsh and Rye Bay SPA		
Common tern Sterna hirundo	Y	
East Caithness Cliffs SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Fair Isle SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Northern gannet Morus bassanus	Y	
Razorbill Alca torda	Y	
Farne Islands SPA		
Common tern Sterna hirundo	Y	
Fetlar SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Flamborough and Filey Coast SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Northern gannet Morus bassanus	Y	
Razorbill Alca torda	Y	
Flannan Isles SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Forth Islands SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common tern Sterna hirundo	Y	
Northern gannet Morus bassanus	Y	
Razorbill Alca torda	Y	
Foula SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Atlantic puffin Fratercula arctica	Y	

Site and Feature	BDMPS>1%	Foraging
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Red-throated diver Gavia stellata	Y	
Foulness (Mid-Essex Coast Phase 5) SPA		
Common tern Sterna hirundo	Y	
Fowlsheugh SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Glas Eileanan SPA		
Common tern Sterna hirundo	Y	
Handa SPA		
Arctic skua Stercorarius parasiticus	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Hermaness, Saxa Vord and Valla Field SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Northern gannet Morus bassanus	Y	
Red-throated diver Gavia stellata	Y	
Hoy SPA		
Arctic skua Stercorarius parasiticus	Y	
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Red-throated diver Gavia stellata	Y	
Imperial Dock Lock, Leith SPA		
Common tern Sterna hirundo	Y	
Inner Moray Firth SPA		
Common tern Sterna hirundo	Y	
Isles of Scilly SPA		
Lesser black-backed gull Larus fuscus	Y	
Larne Lough SPA		
Common tern Sterna hirundo	Y	
Roseate tern Sterna dougallii	Y	
Sandwich tern Sterna sandvicensis	Y	
Lewis Peatlands SPA		
Red-throated diver Gavia stellata	Y	
Lough Neagh and Lough Beg SPA		

Site and Feature	BDMPS>1%	Foraging
Common tern Sterna hirundo	Y	
Marwick Head SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Mingulay and Berneray SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	Y
Razorbill Alca torda	Y	
Mointeach Scadabhaigh SPA		
Red-throated diver Gavia stellata	Y	
Monach Islands SPA		
Little tern Sterna albifrons	Y	
Mousa SPA		
Arctic tern Sterna paradisaea	Y	
North Caithness Cliffs SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
North Colonsay and Western Cliffs SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
North Norfolk Coast SPA		
Common tern Sterna hirundo	Y	
North Rona and Sula Sgeir SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Northern gannet Morus bassanus	Y	
Razorbill Alca torda	Y	
Northumberland Marine SPA		
Atlantic puffin Fratercula arctica	Y	
Common guillemot Uria aalge	Y	
Noss SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Northern fulmar Fulmarus glacialis	Y	
Northern gannet Morus bassanus	Y	
Orkney Mainland Moors SPA		
Red-throated diver Gavia stellata	Y	
Otterswick and Graveland SPA		
Red-throated diver Gavia stellata	Y	
Outer Ards SPA		
Arctic tern Sterna paradisaea	Y	Y

Site and Feature	BDMPS>1%	Foraging
Papa Stour SPA		
Arctic tern Sterna paradisaea	Y	
Papa Westray (North Hill and Holm) SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Pentland Firth Islands SPA		
Arctic tern Sterna paradisaea	Y	
Poole Harbour SPA		
Common tern Sterna hirundo	Y	
Rathlin Island SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Razorbill Alca torda	Y	
Ronas Hill - North Roe and Tingon SPA		
Great skua Catharacta skua	Y	
Red-throated diver Gavia stellata	Y	
Rousay SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Rum SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Manx shearwater Puffinus puffinus	Y	
Red-throated diver Gavia stellata	Y	
Sheep Island SPA		
Great cormorant Phalacrocorax carbo	Y	
Shiant Isles SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Solent and Southampton Water SPA		
Common tern Sterna hirundo	Y	
South Uist Machair and Lochs SPA		
Little tern Sterna albifrons	Y	
St Abb's Head to Fast Castle SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Razorbill Alca torda	Y	
St Kilda SPA		
Atlantic puffin Fratercula arctica	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Great skua Catharacta skua	Y	
Manx shearwater Puffinus puffinus	Y	
Northern fulmar Fulmarus glacialis	Y	
Northern gannet Morus bassanus	Y	
Razorbill Alca torda	Y	

Site and Feature	BDMPS>1%	Foraging
Strangford Lough SPA		
Arctic tern Sterna paradisaea	Y	
Common tern Sterna hirundo	Y	
Sandwich tern Sterna sandvicensis	Y	
Sule Skerry and Sule Stack SPA		
Atlantic puffin Fratercula arctica	Y	
Common guillemot Uria aalge	Y	
Northern gannet Morus bassanus	Y	
Sumburgh Head SPA		
Arctic tern Sterna paradisaea	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Troup, Pennan and Lion's Heads SPA		
Black-legged kittiwake Rissa tridactyla	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
West Westray SPA		
Arctic skua Stercorarius parasiticus	Y	
Arctic tern Sterna paradisaea	Y	
Black-legged kittiwake Rissa tridactyla	Y	
Common guillemot Uria aalge	Y	
Northern fulmar Fulmarus glacialis	Y	
Razorbill Alca torda	Y	
Ythan Estuary, Sands of Forvie and Meikle Loch SPA		
Common tern Sterna hirundo	Y	
Beara Peninsula SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Galley Head to Duneen Point SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Helvick Head to Ballyquin SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Horn Head to Fanad Head SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Howth Head Coast SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Inishtrahull SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Ireland's Eye SPA		
Atlantic puffin Fratercula arctica	NS	Y
Northern fulmar Fulmarus glacialis	NS	Y
Lambay Island SPA		
Atlantic puffin Fratercula arctica	NS	Y
Lesser black-backed gull Larus fuscus	NS	Y
Manx shearwater Puffinus puffinus	NS	Y
Northern fulmar Fulmarus glacialis	NS	Y
Old Head of Kinsale SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Poulaphouca Reservoir SPA		
Lesser black-backed gull Larus fuscus	NS	Y

Site and Feature	BDMPS>1%	Foraging
Saltee Islands SPA		
Lesser black-backed gull Larus fuscus	NS	Y
Manx shearwater Puffinus puffinus	NS	Y
Northern fulmar Fulmarus glacialis	NS	Y
Sheep's Head to Toe Head SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Skerries Islands SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Tacumshin Lake SPA		
Lesser black-backed gull Larus fuscus	NS	Y
The Bull and The Cow Rocks SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Tory Island SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Wicklow Head SPA		
Northern fulmar Fulmarus glacialis	NS	Y
Camaret ZPS		
Northern fulmar Fulmarus glacialis	NS	Y
Cap Sizun ZPS		
Northern fulmar Fulmarus glacialis	NS	Y
Cote de Granit Rose-Sept Iles ZPS		
Manx shearwater Puffinus puffinus	NS	Y
Northern fulmar Fulmarus glacialis	NS	Y
Ouessant-Molene ZPS		
Manx shearwater Puffinus puffinus	NS	Y
Northern fulmar Fulmarus glacialis	NS	Y

Appendix D
Wildfowl and Wintering Bird Sites

Table D1 summarises those SPAs outside the ZoI with migratory wildfowl and waders that may be exposed to the outcomes of the plan when on migration (i.e. essentially those sites with species likely to transit the Irish Sea during spring or autumn from non-UK sites and areas, based on Wright *et al.* (2012) and Wernham *et al.* (2002)). The list excludes all wintering sites in Northern Ireland, Scotland and Northern England (north of Morcambe Bay) on this basis. For the listed sites, guidance on likelihood of a species being exposed to significant adverse effects as a result of the WNMP is provided, based on the predominant migration routes for those species based on Wright *et al.* (2012) and Wernham *et al.* (2002) (essentially, features associated with sites in the south and east of England which arrive from the east and north-east are unlikely to be exposed to environmental changes that could result in significant adverse effects). Note, UK sites supporting breeding wildfowl and waders (r) that may utilise or cross the ZoI on migration are also included although any effects on these sites are likely to be weak.

Table D1 Wildfowl and waders that may cross ZoI

Site	Exposed?
Abberton Reservoir SPA	
Common coot Fulica atra	N
Common goldeneye Bucephala clangula	N
Common pochard Aythya ferina	N
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Great crested grebe Podiceps cristatus	N
Mute swan Cygnus olor	N
Northern shoveler Anas clypeata	N
Tufted duck Aythya fuligula	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Alde-Ore Estuary SPA	
Common redshank Tringa totanus	Y
Pied avocet Recurvirostra avosetta	N
Ruff Philomachus pugnax	N
Arun Valley SPA	
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Avon Valley SPA	
Gadwall Anas strepera	Y
Tundra swan Cygnus columbianus bewickii	N
Benfleet and Southend Marshes SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Grey plover Pluvialis squatarola	N
Red knot Calidris canutus	N
Ringed plover Charadrius hiaticula	Y

Site	Exposed?
Waterbird assemblage	N
Waterfowl assemblage	N
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common pochard Aythya ferina (r)	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Ringed plover Charadrius hiaticula	Y
Ringed plover Charadrius hiaticula (r)	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Breydon Water SPA	
European golden plover Pluvialis apricaria	Y
Northern lapwing Vanellus vanellus	N
Pied avocet Recurvirostra avosetta	N
Ruff Philomachus pugnax	N
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Broadland SPA	
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Great bittern Botaurus stellaris (r)	Y
Hen harrier Circus cyaneus	N
Northern shoveler Anas clypeata	N
Ruff Philomachus pugnax	N
Tundra swan Cygnus columbianus bewickii	N
Whooper swan Cygnus cygnus	Y
Caithness and Sutherland Peatlands SPA	
European golden plover Pluvialis apricaria (r)	Y
Short-eared owl Asio flammeus (r)	Y
Chesil Beach and The Fleet SPA	
Eurasian wigeon Anas penelope	N
Chew Valley Lake SPA	
Northern shoveler Anas clypeata	N
Chichester and Langstone Harbours SPA	
Bar-tailed godwit Limosa lapponica	N
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian curlew Numenius arquata	N
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Grey plover Pluvialis squatarola	N
Northern pintail Anas acuta	Y
Northern shoveler Anas clypeata	N
Red-breasted merganser Mergus serrator	Y

Site	Exposed?
Ringed plover Charadrius hiaticula	Y
Ruddy turnstone Arenaria interpres	Y
Sanderling Calidris alba	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Colne Estuary (Mid-Essex Coast Phase 2) SPA	
Common pochard Aythya ferina (r)	Y
Common redshank Tringa totanus	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Hen harrier Circus cyaneus	N
Ringed plover Charadrius hiaticula (r)	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Craig yr Aderyn (Bird`s Rock) SPA	
Red-billed chough Pyrrhocorax pyrrhocorax	N
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Waterbird assemblage	N
Waterfowl assemblage	N
Deben Estuary SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Pied avocet Recurvirostra avosetta	N
Dengie (Mid-Essex Coast Phase 1) SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Red knot Calidris canutus	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Dungeness, Romney Marsh and Rye Bay SPA	
Aquatic warbler Acrocephalus paludicola	N
European golden plover Pluvialis apricaria	Y
Great bittern Botaurus stellaris	N
Hen harrier Circus cyaneus	N
Northern shoveler Anas clypeata	N
Ruff Philomachus pugnax	N
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Exe Estuary SPA	
Black-tailed godwit Limosa limosa islandica	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian oystercatcher Haematopus ostralegus	Y
Grey plover Pluvialis squatarola	N
Pied avocet Recurvirostra avosetta	N
Slavonian grebe Podiceps auritus	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Falmouth Bay to St Austell Bay SPA	

Site	Exposed?
Black-throated diver Gavia arctica	Y
Great northern diver Gavia immer	Y
Slavonian grebe Podiceps auritus	Y
Forest of Clunie SPA	
Short-eared owl Asio flammeus (r)	Y
Foulness (Mid-Essex Coast Phase 5) SPA	
Bar-tailed godwit Limosa lapponica	N
Common redshank Tringa totanus	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Eurasian oystercatcher Haematopus ostralegus	Y
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Pied avocet Recurvirostra avosetta	N
Red knot Calidris canutus	Y
Ringed plover Charadrius hiaticula (r)	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Gibraltar Point SPA	
Bar-tailed godwit Limosa lapponica	N
Grey plover Pluvialis squatarola	N
Sanderling Calidris alba	N
Greater Wash SPA	
Black (common) scoter Melanitta nigra	Y
Little gull Larus minutus	N
Red-throated diver Gavia stellata	Y
Hamford Water SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Eurasian teal Anas crecca	Y
Grey plover Pluvialis squatarola	N
Pied avocet Recurvirostra avosetta	N
Ringed plover Charadrius hiaticula	Y
Hornsea Mere SPA	
Gadwall Anas strepera	N
Mute swan Cygnus olor (r)	Y
Humber Estuary SPA	
Bar-tailed godwit Limosa lapponica	N
Black-tailed godwit Limosa limosa islandica	Y
Black-tailed godwit Limosa limosa islandica	Y
Common goldeneye Bucephala clangula	N
Common greenshank Tringa nebularia	N
Common pochard Aythya ferina	N
Common redshank Tringa totanus	Y
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Dunlin Calidris alpina alpina	N

Site	Exposed?
Eurasian curlew Numenius arquata	N
Eurasian oystercatcher Haematopus ostralegus	N
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
European golden plover Pluvialis apricaria	Y
Great bittern Botaurus stellaris	N
Great bittern Botaurus stellaris (r)	Y
Greater scaup Aythya marila	Y
Grey plover Pluvialis squatarola	N
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Mallard Anas platyrhynchos	N
Northern lapwing Vanellus vanellus	N
Pied avocet Recurvirostra avosetta	N
Red knot Calidris canutus	Y
Red knot Calidris canutus	Y
Ringed plover Charadrius hiaticula	Y
Ringed plover Charadrius hiaticula	Y
Ruddy turnstone Arenaria interpres	Y
Ruff Philomachus pugnax	N
Sanderling Calidris alba	Y
Sanderling Calidris alba	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Whimbrel Numenius phaeopus	Y
Lee Valley SPA	
Gadwall Anas strepera	N
Great bittern Botaurus stellaris	N
Northern shoveler Anas clypeata	N
Leighton Moss SPA	
Great bittern Botaurus stellaris (r)	Y
Lewis Peatlands SPA	
European golden plover Pluvialis apricaria (r)	Y
Lower Derwent Valley SPA	
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
European golden plover Pluvialis apricaria	Y
Northern shoveler Anas clypeata (r)	Y
Ruff Philomachus pugnax	N
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Marazion Marsh SPA	
Aquatic warbler Acrocephalus paludicola	N
Great bittern Botaurus stellaris	N
Martin Mere SPA	
Eurasian wigeon Anas penelope	N
Northern pintail Anas acuta	N
Pink-footed goose Anser brachyrhynchus	Y
Tundra swan Cygnus columbianus bewickii	N

Site	Exposed?
Waterbird assemblage	N
Waterfowl assemblage	N
Whooper swan Cygnus cygnus	Y
Medway Estuary and Marshes SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common greenshank Tringa nebularia	N
Common pochard Aythya ferina	N
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian curlew Numenius arquata	N
Eurasian oystercatcher Haematopus ostralegus	Y
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Great cormorant Phalacrocorax carbo	N
Great crested grebe Podiceps cristatus	N
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Mallard Anas platyrhynchos	N
Merlin Falco columbarius	N
Northern pintail Anas acuta	Y
Northern shoveler Anas clypeata	N
Pied avocet Recurvirostra avosetta	N
Red knot Calidris canutus	Y
Red-throated diver Gavia stellata	Y
Ringed plover Charadrius hiaticula	Y
Ruddy turnstone Arenaria interpres	Y
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Minsmere-Walberswick SPA	
Eurasian teal Anas crecca (r)	Y
Gadwall Anas strepera	N
Gadwall Anas strepera (r)	Y
Great bittern Botaurus stellaris (r)	Y
Greater white-fronted goose Anser albifrons albifrons	N
Hen harrier Circus cyaneus	N
Northern shoveler Anas clypeata	N
Northern shoveler Anas clypeata (r)	Y
Muirkirk and North Lowther Uplands SPA	
European golden plover Pluvialis apricaria (r)	Y
Short-eared owl Asio flammeus (r)	Y
Nene Washes SPA	
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Gadwall Anas strepera (r)	Y
Northern pintail Anas acuta	Y
Northern shoveler Anas clypeata	N

Site	Exposed?
Northern shoveler Anas clypeata (r)	Y
Tundra swan Cygnus columbianus bewickii	N
New Forest SPA	
Hen harrier Circus cyaneus	N
North Norfolk Coast SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Eurasian wigeon Anas penelope	N
Great bittern Botaurus stellaris (r)	Y
Pied avocet Recurvirostra avosetta	N
Pink-footed goose Anser brachyrhynchus	Y
Red knot Calidris canutus	Y
Waterbird assemblage	N
Waterfowl assemblage	N
North Pennine Moors SPA	
European golden plover Pluvialis apricaria (r)	Y
North Uist Machair and Islands SPA	
Ringed plover Charadrius hiaticula (r)	Y
North York Moors SPA	
European golden plover Pluvialis apricaria (r)	Y
Northumbria Coast SPA	
Purple sandpiper Calidris maritima	N
Ruddy turnstone Arenaria interpres	N
Orkney Mainland Moors SPA	
Short-eared owl Asio flammeus (r)	Y
Ouse Washes SPA	
Common coot Fulica atra	N
Common pochard Aythya ferina	N
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Gadwall Anas strepera (r)	Y
Great cormorant Phalacrocorax carbo	N
Hen harrier Circus cyaneus	N
Mallard Anas platyrhynchos (r)	Y
Mute swan Cygnus olor	N
Northern pintail Anas acuta	Y
Northern shoveler Anas clypeata	N
Northern shoveler Anas clypeata (r)	Y
Ruff Philomachus pugnax	N
Tufted duck Aythya fuligula	Y
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Waterfowl assemblage	N
Whooper swan Cygnus cygnus	Y
Outer Thames Estuary SPA	
Red-throated diver Gavia stellata	N
Pagham Harbour SPA	
Dark-bellied brent goose Branta bernicla bernicla	N
Ruff Philomachus pugnax	N
Papa Stour SPA	

Site	Exposed?
Ringed plover Charadrius hiaticula (r)	Y
Peak District Moors (South Pennine Moors Phase 1) SPA	
European golden plover Pluvialis apricaria (r)	Y
Short-eared owl Asio flammeus (r)	Y
Pettigoe Plateau SPA	
European golden plover Pluvialis apricaria (r)	Y
Poole Harbour SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common shelduck Tadorna tadorna	N
Little egret Egretta garzetta	N
NULL Platalea leucorodia leucorodia	N
Pied avocet Recurvirostra avosetta	N
Waterbird assemblage	N
Waterfowl assemblage	N
Portsmouth Harbour SPA	
Black-tailed godwit Limosa limosa islandica	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Red-breasted merganser Mergus serrator	Y
Rutland Water SPA	
Common coot Fulica atra	N
Common goldeneye Bucephala clangula	N
Eurasian teal Anas crecca	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Goosander Mergus merganser	N
Great crested grebe Podiceps cristatus	N
Mute swan Cygnus olor	N
Northern shoveler Anas clypeata	N
Tufted duck Aythya fuligula	Y
Waterbird assemblage	N
Waterfowl assemblage	N
Salisbury Plain SPA	
Hen harrier Circus cyaneus	N
Sléibhtean agus Cladach Thiriodh (Tiree Wetlands and Coast) SPA	
Ringed plover Charadrius hiaticula (r)	Y
Solent and Southampton Water SPA	
Black-tailed godwit Limosa limosa islandica	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Eurasian teal Anas crecca	Y
Ringed plover Charadrius hiaticula	Y
Waterbird assemblage	N
Somerset Levels and Moors SPA	
Eurasian teal Anas crecca	Y
European golden plover Pluvialis apricaria	Y
Northern lapwing Vanellus vanellus	N
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
South Pennine Moors Phase 2 SPA	
European golden plover Pluvialis apricaria (r)	Y

Site	Exposed?
Short-eared owl Asio flammeus (r)	Y
South Uist Machair and Lochs SPA	
Ringed plover Charadrius hiaticula (r)	Y
South West London Waterbodies SPA	
Gadwall Anas strepera	N
Northern shoveler Anas clypeata	N
Stodmarsh SPA	
Common pochard Aythya ferina	N
Common snipe Gallinago gallinago	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Gadwall Anas strepera (r)	Y
Great bittern Botaurus stellaris	N
Greater white-fronted goose Anser albifrons albifrons	N
Hen harrier Circus cyaneus	N
Mallard Anas platyrhynchos	N
Northern lapwing Vanellus vanellus	N
Northern shoveler Anas clypeata	N
Tufted duck Aythya fuligula	Y
Water rail Rallus aquaticus	N
Stour and Orwell Estuaries SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common goldeneye Bucephala clangula	N
Common redshank Tringa totanus	Y
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian curlew Numenius arquata	N
Eurasian wigeon Anas penelope	N
European golden plover Pluvialis apricaria	Y
Gadwall Anas strepera	N
Great cormorant Phalacrocorax carbo	N
Great crested grebe Podiceps cristatus	N
Greater scaup Aythya marila	Y
Grey plover Pluvialis squatarola	N
Mute swan Cygnus olor	N
Northern lapwing Vanellus vanellus	N
Northern pintail Anas acuta	Y
Red knot Calidris canutus	Y
Ringed plover Charadrius hiaticula	Y
Ringed plover Charadrius hiaticula	Y
Ruddy turnstone Arenaria interpres	Y
Waterbird assemblage	N
Tamar Estuaries Complex SPA	
Little egret Egretta garzetta	N
Pied avocet Recurvirostra avosetta	N
Thames Estuary and Marshes SPA	
Black-tailed godwit Limosa limosa islandica	Y
Common redshank Tringa totanus	Y

Site	Exposed?
Dunlin Calidris alpina alpina	N
Grey plover Pluvialis squatarola	N
Hen harrier Circus cyaneus	N
Pied avocet Recurvirostra avosetta	N
Red knot Calidris canutus	Y
Ringed plover Charadrius hiaticula	Y
Waterbird assemblage	N
Thanet Coast and Sandwich Bay SPA	
European golden plover Pluvialis apricaria	Y
Ruddy turnstone Arenaria interpres	Y
The Swale SPA	
Common redshank Tringa totanus	Y
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian curlew Numenius arquata	N
Eurasian oystercatcher Haematopus ostralegus	Y
Eurasian teal Anas crecca	Y
Gadwall Anas strepera	N
Grey plover Pluvialis squatarola	N
Ringed plover Charadrius hiaticula	Y
Waterbird assemblage	N
The Wash SPA	
Bar-tailed godwit Limosa lapponica	N
Black (common) scoter Melanitta nigra	Y
Black-tailed godwit Limosa limosa islandica	Y
Common goldeneye Bucephala clangula	N
Common redshank Tringa totanus	Y
Common shelduck Tadorna tadorna	N
Dark-bellied brent goose Branta bernicla bernicla	N
Dunlin Calidris alpina alpina	N
Eurasian curlew Numenius arquata	N
Eurasian oystercatcher Haematopus ostralegus	Y
Eurasian wigeon Anas penelope	N
Gadwall Anas strepera	N
Grey plover Pluvialis squatarola	N
Northern pintail Anas acuta	Y
Pink-footed goose Anser brachyrhynchus	Y
Red knot Calidris canutus	Y
Ruddy turnstone Arenaria interpres	Y
Sanderling Calidris alba	Y
Tundra swan Cygnus columbianus bewickii	N
Waterbird assemblage	N
Upper Nene Valley Gravel Pits SPA	
Common coot Fulica atra	N
Common pochard Aythya ferina	N
Eurasian wigeon Anas penelope	N
European golden plover Pluvialis apricaria	Y
Gadwall Anas strepera	N
Great bittern Botaurus stellaris	N
Great cormorant Phalacrocorax carbo	N

Site	Exposed?
Great crested grebe Podiceps cristatus	N
Mallard Anas platyrhynchos	N
Northern lapwing Vanellus vanellus	N
Northern shoveler Anas clypeata	N
Tufted duck Aythya fuligula	Y
Waterbird assemblage	N
Walmore Common SPA	
Tundra swan Cygnus columbianus bewickii	N
Abberton Reservoir Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Avon Valley Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Benfleet and Southend Marshes Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Blackwater Estuary (Mid-Essex Coast Phase 4) Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Breydon Water Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Broadland Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Chichester and Langstone Harbours Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Colne Estuary (Mid-Essex Coast Phase 2) Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Dengie (Mid-Essex Coast Phase 1) Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Exe Estuary Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Foulness (Mid-Essex Coast Phase 5) Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Hamford Water Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Humber Estuary Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Lower Derwent Valley Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Martin Mere Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y

Site	Exposed?
Medway Estuary and Marshes Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Nene Washes Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
North Norfolk Coast Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
North Uist Machair and Islands Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Ouse Washes Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Poole Harbour Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Portsmouth Harbour Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Rutland Water Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Solent and Southampton Water Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Somerset Levels and Moors Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Stour and Orwell Estuaries Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Thames Estuary and Marshes Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Thanet Coast and Sandwich Bay Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
The Swale Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
The Wash Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Upper Lough Erne Ramsar	
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Upper Nene Valley Gravel Pits Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y
Upper Solway Flats and Marshes Ramsar	
Crit. 5 - regularly supports 20,000 or more waterbirds	Y
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds	Y

Appendix E
JNCC-defined Activities and Pressures

This appendix provides a copy of the JNCC's Marine activities and pressures evidence matrix (JNCC 2016); the standard UK list of marine activities and their definitions; and the list of marine pressures and their definitions (as agreed by the OSPAR Intercessional Correspondence Group on Cumulative Effects).

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Activity	Temperature changes - local	Salinity changes - local*	Water flow (tidal current) changes - local	Emergence regime changes - local	Wave exposure changes - local	Non-synthetic compound contamination - overall	Non-synthetic compound contamination - Transition elements & organo-metals	Non-synthetic compound contamination - Hydrocarbon & PAH Contamination	Synthetic compound contamination	Radionuclide contamination*	Introduction of other substances (solid, liquid or gas)	De-oxygenation	Nutrient enrichment	Organic enrichment	Physical loss (to land or freshwater habitat)	Physical change (to another seabed type)	Habitat structure changes - removal of substratum (extraction)	Penetration and/or disturbance of the substrate below the surface of the seabed- (Overall abrasion)	Penetration and/or disturbance of the substrate below the surface of the seabed- Surface	Penetration and/or disturbance of the substrate below the surface of the seabed- Subsurface	Changes in suspended solids	Siltation rate changes	Litter	Electromagnetic changes	Noise and vibration changes	Introduction of light	Barrier to species movement	Death or injury by collision	Visual disturbance	Genetic modification & translocation of indigenous species	Introduction or spread of non-indigenous species	Introduction of microbial pathogens	Removal of target species	Removal of non-target species
Coastal defence & land claim protection (incl. beach replenishment)	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y		Y	Y	Y	Y		Y	Y	Y			Y		Y		Y					Y
Coastal docks, ports & marinas	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y	Y	Y	Y	Y		Y	Y		
Waste gas emissions						Y	Y	Y	Y	Y											Y	Y												
Industrial & agricultural liquid discharges	Y	Y	Y			Y	Y	Y	Y	Y		Y	Y	Y		Y					Y	Y	Y									Y		
Sewage disposal	Y	Y	Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y					Y	Y	Y								Y	Y		
Waste disposal - munitions (chemical & conventional)						Y	Y	Y	Y	Y						Y		Y			Y	Y						Y	Y		Y			
Power stations - thermal effluent and nuclear discharge	Y	Y	Y			Y	Y	Y	Y	Y		Y	Y		Y	Y	Y	Y			Y	Y	Y		Y			Y	Y		Y	Y		
Fishing – demersal trawling						Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y		Y	Y	Y	Y
Fishing – dredging						Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y		Y	Y	Y	Y
Fishing – pelagic trawling						Y			Y				Y	Y									Y		Y			Y	Y		Y	Y	Y	Y
Fishing – traps (potting/creeling)														Y		Y			Y	Y			Y		Y		Y	Y	Y		Y		Y	Y
Fishing – recreational																			Y	Y			Y		Y		Y	Y	Y		Y		Y	Y
Fishing – nets (static)			Y						Y					Y				Y	Y				Y		Y		Y	Y	Y		Y		Y	Y
Fishing - lines							P	P		P	P	P						Y	Y				Y			P		Y	Y		Y		Y	Y
Fishing - seines (encircling)							P	P		P	P	P						Y	Y				Y			P		Y	Y		Y		Y	Y
Harvesting - seaweed and other sea-based food (bird eggs, shellfish, etc.)			Y	Y	Y				Y			Y	Y		Y	Y	Y	Y	Y	Y	Y	Y			Y		Y		Y		Y		Y	Y
Extraction of genetic resources e.g. bioprospecting & maerl (blue technology)			Y									Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y		Y		Y			Y	Y	Y
Aquaculture - fin-fish			Y		Y	Y			Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Aquaculture - shellfish			Y	Y	Y	Y			Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Aquaculture – macro-algae			Y		Y	Y			Y			Y	Y	Y	Y	Y		Y		Y	Y	Y			Y	Y			Y	Y	Y	Y	Y	Y
Extraction – sand and gravel (aggregates)			Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y		Y	Y	Y		Y			Y
Extraction – rock/ mineral (coastal quarrying)		Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y		Y		Y						
Extraction – navigational dredging (capital & maintenance)		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y		Y	Y	Y		Y			Y
Dredge & spoil disposal			Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y			Y	Y			Y			Y	Y		Y			
Extraction – water (abstraction)	Y	Y	Y	Y	Y	Y			Y			Y	Y	Y		Y	Y					Y			Y			Y						Y
Renewable energy – wind (not including cables)			Y		Y	Y	Y	Y	Y						Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y			
Renewable energy – wave (not including cables)			Y	Y	Y	Y		Y	Y			Y			Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y			
Renewable energy - tidal (not including cables)	Y	Y	Y	Y	Y	Y		Y	Y			Y			Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y			
Marine hydrocarbon extraction (not including pipelines)			Y			Y	Y	Y	Y	Y		Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y			
Shipping – port operations (mooring, beaching, launching etc.)			Y	Y		Y	Y	Y	Y				Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y		
Shipping – general (at sea)			Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y		
Coastal tourist sites (public beaches & resorts)			Y	Y		Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y		Y	Y	Y	Y
Recreational activities (e.g. boating, yachting, diving, etc.)			Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y
Marine research activities (incl. physical sampling and remote sensing)					Y	Y	Y	Y	Y	Y			Y		Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y
Military activities				Y	Y	Y	Y	Y	Y	Y					Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y		Y	Y		
Submarine cable and pipeline operations	Y		Y		Y	Y			Y					Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y			Y	Y		Y	Y		Y
Gas storage operations (carbon capture & natural gas storage)		Y				Y	P	P	Y						Y	Y		Y			Y	Y	Y		Y			Y						
Artificial reefs and other environmental structures			Y	Y	Y	Y	Y	Y	Y			Y	Y		Y	Y		Y	Y		Y	Y			Y				Y		Y			
Cultural & heritage sites/structures (e.g. wrecks, sculptures, foundations etc.)						Y	Y	Y	Y		P	Y	Y	P	P	Y	Y	Y	P	P	Y	Y	P	P	Y	P	Y	P	Y	P				

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