

Resource and Constraints
Assessment for Offshore Wind

Characterisation Area Report
Anglesey

15

Characterisation Area Report: 15 - Anglesey

38255-TCE-REP-020 Characterisation Area Report: 15 - Anglesey		
Version	Status	Issue date
1.1	Draft	July 2018
1.2	Draft	November 2018
1.3	Final	September 2019

The information included in this report should be read in conjunction with the *Resource and Constraints Assessment for Offshore Wind: Methodology Report* and the *Summary Stakeholder Feedback Report*. The trigger distance for constraints to be included in the constraints analysis section of this report is 1 nautical mile (NM).

The Crown Estate has undertaken the analysis in this report using the evidence available to it, internal expertise and support from external advisers where appropriate. The analysis does not obviate any potential need for any Habitat Regulations Assessment (HRA) or any project level consideration of the potential impact of development. The analysis does not supersede any statutory policies or marine plans. The analysis, including the data and information contained in this document, presents a point in time assessment with changes likely to both the presence and nature of constraints.

This report is provided for information purposes only and no party may rely on the accuracy, completeness or fitness of its content for any particular purpose. The Crown Estate makes no representation, assurance, undertaking or warranty in respect of the analysis in the report including all data and information contained in it.

Receptor rating	Area rating
Receptor assessed but no interaction noted	Receptor assessed but no interaction noted
Interaction acceptable with best practice/accepted mitigation	The constraint will present the need to implement best practice/accepted mitigation measures to enable acceptable development within the whole area
Interaction acceptable with moderate mitigation	The constraint will present the need to implement moderate mitigation measures to enable acceptable development within the whole area
Interaction acceptable with significant mitigation	The constraint will present the need to implement significant and/or strategic level mitigation measures to enable acceptable development within the whole area
Significant/insurmountable issue that would be challenging to mitigate within the area of influence of a receptor	Significant/insurmountable issue that would be challenging to mitigate for any development within the whole area
No data coverage across the area	No data coverage across the area

Constraints analysis

Note that in addition to The Crown Estate leases/licences within this table, The Crown Estate has also identified key resource areas (KRAs) which may be suitable for the future development of different marine sectors. Information about overlapping KRAs that overlap this characterisation area is described in a latter section of this document.

Exclusions model – Hard constraints			Receptor rating	Area rating
	Present	Commentary		
The Crown Estate agreements	Telecoms cables: there are a few active and inactive cables intersecting the characterisation area.	The cables have been removed from the characterisation area and should be avoided where possible by using best practice/accepted mitigation. However, the number of cables is relatively low and therefore they are not considered to be a significant concern for future offshore wind development. Since cable crossings require cable protection (which may have adverse environmental effects), crossings should be minimised where practicable.	Green	Green
	Holyhead Deep tidal site: adjacent to the eastern boundary of the characterisation area.	The presence of the tidal site is not considered to have any significant impacts on the future development of offshore wind within the area. However, some negotiations may be required with the current rights holder.	Yellow	Green
	West Anglesey Demonstration Zone: adjacent to the eastern boundary of the characterisation area.	The presence of the tidal site is not considered to have any significant impacts on the future development of offshore wind within the area. However, some negotiations may be required with the current rights holder.	Yellow	Green
Other energy infrastructure	None within the trigger distance.	No existing oil and gas infrastructure and no new licences are under development in this area.	Light Green	Light Green
Navigation	There are two traffic separation schemes around the north-west of Anglesey which will interact with the central section of the Anglesey zone.	This constraint may make development in the central part of this area unfeasible. The other two sections should not be impacted.	Red	Yellow
Social	None triggered in the area.		Light Green	Light Green

Restrictions model – Soft constraints			Receptor rating	Area rating
Economic tier				
Navigation	There is an anchorage area within 1.8 km of the area.	This is far enough away so as not to cause a constraint.	Green	Green
	Holyhead Harbour Authority Area is 1.5 km away from the central segment of this area.	There is no direct overlap, although pathways into the harbour should be noted. There is enough scope within the area to avoid interactions.	Yellow	Green
	The Holyhead Harbour disposal area overlaps with the area.	The overlap is minimal and sufficient alternative siting is available in the area for this not to be viewed as a constraint.	Green	Green
	Significant shipping traffic traverses through the central segment of this area.	The central area will probably be unfeasible for development due to impacts on shipping. The other two segments should not present an issue.	Orange	Yellow
Subsurface	None within the trigger distance.		Light Green	Light Green
Fishing	<i>See fisheries commentary below.</i>		N/A	Yellow
Environmental tier				
The assessment of the sensitivity of Marine Protected Areas (MPAs) to pressures caused by offshore wind development and operation is assessed in a separate spreadsheet which will be made available as part of the Round 4 evidence base. Commentary has been noted in the relevant characterisation document where MPAs either overlap or are within 1 NM of the characterisation area and have been assessed as a yellow rating or above. For more information on the methodology for this assessment, please refer to the methodology report.				
Assessments of Annex II species have not been made as part of the characterisation process. Such assessments will need to be undertaken at project level for individual developments within the characterisation area.				
The Wildlife Trusts (TWT) note that Risso's dolphin use the tidal race adjacent to Bardsey Island and that little is known about the wider habitat use of the dolphins. They consider that further research is required to understand wider habitat and area usage by this species in order to assess the potential impacts of offshore wind farm (OWF) development within this characterisation area.				

Type of designation		Name of designation	Designated features/species	Conservation objectives	Commentary	Receptor rating	Area rating
European marine designations	Special Areas of Conservation (SACs)	Pen Llŷn a'r Sarnau/ Llŷn Peninsula and the Sarnau	Subtidal sandbanks Estuaries Intertidal mudflats and sandflats Lagoons Shallow inlets and bays Reefs Glasswort and other annuals colonising mud and sand Atlantic salt meadows Sea caves Bottlenose dolphin Otter Grey seal	<p>Conservation objectives (set in 2009) were mainly to maintain features, with the requirement to restore some of the habitat areas which had been affected by human activity.</p> <p>For dolphin, seal and otter, conservation objectives include the requirement that their range (within SAC and adjacent to it) should not be constrained.</p>	<p>Most of the features of the site are unlikely to be significantly affected by offshore wind activity unless the site is chosen as a landfall location. Even in this case, it would likely be possible to mitigate the impacts depending on cable-corridor location and cable installation method (although some features such as saltmarsh and reef may be sensitive). It should be noted that The Wildlife Trusts consider that cabling through this site should be avoided, and that impacts to coastal features (especially saltmarsh) could be significant.</p> <p>However, impacts to the grey seal and bottlenose dolphin populations may be harder to avoid, since these species range far offshore and are sensitive to impacts from offshore wind (especially piling noise, although there are other impacts). It may be possible to mitigate impacts with project location/installation methods, but impacts on these features of the SAC may feature heavily in HRA/AA for projects in this area.</p> <p>Consideration should be given to the NRW report on cable sensitivity entitled 'Sensitivity of marine ecology receptors to cabling activities in Wales'.</p> <p>It is noted that the majority of the SAC area has been excluded from the characterisation area, and this may help in managing impacts.</p>	Yellow	Green
		Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh (760 m); Clogwyni Pen Llŷn/ Seacliffs of Llŷn (300 m); Y Twyni o Abermenai i Aberffraw/ Abermenai to Aberffraw Dunes (1 km); Glannau Ynys Gybi/ Holy Island Coast (60 m)					
	Harbour porpoise SAC	North Anglesey Marine	Harbour porpoise	<p>To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters In the context of natural change, this will be achieved by ensuring that:</p> <p>1. Harbour porpoise is a viable component of the site;</p>	<p>This site was fully designated in February 2019. Harbour porpoise could be affected by offshore wind development in the area, mainly through acoustic impacts (disturbance and hearing damage) from pile driving, unexploded ordnance (UXO) clearance and possibly some geotechnical surveys. Disturbance and barrier effects arising from vessel movements and presence of turbines may also occur.</p> <p>The noise disturbance during wind farm construction is likely to be significant if using pile-driving to install the turbine foundations, and there is also a risk from UXO clearance. There will be a need to consider population level effects of disturbance (mainly during construction), and there may be some additional requirements to investigate potential impacts on prey species.</p> <p>The designation of harbour porpoise SACs will undoubtedly have consequences as to how some activities operate, and measures may need to be put in place to reduce disturbance. Implementation of any disturbance management is likely to be challenging given the</p>	Yellow	Yellow

			<p>2. There is no significant disturbance of the species; and</p> <p>3. The condition of supporting habitats and processes, and the availability of prey is maintained.</p> <p>This is similar to the protection afforded to harbour porpoise throughout their range by the European Protected Species (EPS) regulations in the UK. However, the Natura 2000 principles and HRA tests set the bar higher than EPS protection for impacts on the site as the protection is no longer solely considering effects on the population as a whole but making sure that the site is contributing positively to the species' Favourable Conservation Status.</p>	<p>complexity of marine activities, regulatory arrangements and scientific uncertainty surrounding the significance of noise impacts on harbour porpoise. The approach recommended by SNCBs is that developers should ensure that there is sufficient time between the assessment and the start of construction for them to effectively implement mitigation/management, which could include:</p> <ol style="list-style-type: none"> 1. Careful spatial planning and phasing of noisy activities. 2. Use of alternative foundations that do not require pile driving (e.g. suction buckets, gravity bases), noting that these may have other impacts. 3. Use of alternative methods of installation (e.g. vibropiling) to reduce the noise footprint. 4. Use of technology to reduce the sound levels at source or to minimise sound propagation and reduce the noise footprint. <p>Harbour porpoise occur in elevated densities in some parts of the site compared to others during summer and winter. This may make mitigation slightly easier since summer is likely to be the most important construction season.</p> <p>The SNCBs and the Wildlife Trusts have concerns over the potential cumulative impacts on harbour porpoise within this SAC, and note that currently there is no mechanism to ensure that a strategic approach to the management of impacts is taken. They consider that this could be a significant consenting risk for offshore wind development in the North Sea characterisation areas.</p> <p>In parallel to new offshore wind leasing, The Crown Estate has committed to fund a collaborative programme of strategic enabling actions to increase the evidence base and support sustainable and coordinated expansion of offshore wind. Underwater noise and its management, assessment of impacts on sensitive receptors, and approaches to modelling and assessment, are all likely to form a key priority area for further work, and we anticipate collaborating with stakeholders on new work streams under the programme to help address outstanding evidence gaps.</p>		
	West Wales Marine	Harbour porpoise	<p>To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters In the context of natural change, this will be achieved by ensuring that:</p> <ol style="list-style-type: none"> 1. Harbour porpoise is a viable component of the site; 2. There is no significant disturbance of the species; and 3. The condition of supporting habitats and processes, and the availability of prey is maintained. <p>This is similar to the protection afforded to harbour porpoise throughout their range by the European Protected Species</p>	<p>This site was fully designated in February 2019. Harbour porpoise could be affected by offshore wind development in the area, mainly through acoustic impacts (disturbance and hearing damage) from pile driving, unexploded ordnance (UXO) clearance and possibly some geotechnical surveys. Disturbance and barrier effects arising from vessel movements and presence of turbines may also occur.</p> <p>The noise disturbance during wind farm construction is likely to be significant if using pile-driving to install the turbine foundations, and there is also a risk from UXO clearance. There will be a need to consider population level effects of disturbance (mainly during construction), and there may be some additional requirements to investigate potential impacts on prey species.</p> <p>The designation of harbour porpoise SACs will undoubtedly have consequences as to how some activities operate, and measures may need to be put in place to reduce disturbance. Implementation of any disturbance management is likely to be challenging given the complexity of marine activities, regulatory arrangements and scientific uncertainty surrounding the significance of noise impacts on harbour porpoise. The approach recommended by SNCBs is that developers should ensure that there is sufficient time between the assessment and the start of construction for them to effectively implement mitigation/management, which could include:</p> <ol style="list-style-type: none"> 1. Careful spatial planning and phasing of noisy activities. 2. Use of alternative foundations that do not require pile driving (e.g. suction buckets, gravity bases), noting that these may have other impacts. 3. Use of alternative methods of installation (e.g. vibropiling) to reduce the noise footprint. 		

			(EPS) regulations in the UK. However, the Natura 2000 principles and HRA tests set the bar higher than EPS protection for impacts on the site as the protection is no longer solely considering effects on the population as a whole but making sure that the site is contributing positively to the species' Favourable Conservation Status.	<p>4. Use of technology to reduce the sound levels at source or to minimise sound propagation and reduce the noise footprint.</p> <p>Harbour porpoise occur in elevated densities in some parts of the site compared to others during summer and winter. This may make mitigation slightly easier since summer is likely to be the most important construction season.</p> <p>The SNCBs and the Wildlife Trusts have concerns over the potential cumulative impacts on harbour porpoise within this SAC, and note that currently there is no mechanism to ensure that a strategic approach to the management of impacts is taken. They consider that this could be a significant consenting risk for offshore wind development in the North Sea characterisation areas.</p> <p>In parallel to new offshore wind leasing, The Crown Estate has committed to fund a collaborative programme of strategic enabling actions to increase the evidence base and support sustainable and coordinated expansion of offshore wind. Underwater noise and its management, assessment of impacts on sensitive receptors, and approaches to modelling and assessment, are all likely to form a key priority area for further work, and we anticipate collaborating with stakeholders on new work streams under the programme to help address outstanding evidence gaps.</p>		
Sites of Community Importance (SCIs)	None within the trigger distance					
Ramsar	None within the trigger distance					
Special Protection Areas (SPAs)	Glannau Ynys Gybi/ Holy Island Coast (60 m)					
SPA	Anglesey Terns / Morwenoliaid Ynys Môn	Roseate tern (breeding) Common tern (breeding) Arctic tern (breeding) Sandwich tern (breeding)	In 2008 the populations were all assessed as favourable with the exception of roseate tern which was unfavourable. Conservation objectives are to maintain/enhance populations and their supporting habitat.	<p>Tern species forage offshore and are likely to be impacted by offshore wind turbines. Population sizes at this site are significant for Wales and the UK, making the site potentially the second largest sandwich tern colony in the UK. The SPA extends and replaces the Ynys Feurig, Cemlyn Bay and The Skerries SPA and has been designated to support offshore habitats used by terns as well as their breeding areas. The majority of the SPA has been excluded from the characterisation area and consequently, the potential impact on terns is likely to be greatly reduced. Potential impacts from cabling on onshore habitats are likely to be mitigable/avoidable.</p> <p>Royal Society for the Protection of Birds (RSPB) consider that there could be significant cumulative impacts on sandwich tern from this site arising from existing wind farms (Gwynt y Môr), possible extension sites and development within the Anglesey and North Wales characterisation areas. They also note the connectivity of this site with the Dee Estuary SPA.</p>		
SPA	Irish Sea Front	Manx shearwater (breeding)	Avoid significant deterioration of habitats and species and avoid disturbance.	This area supports significant numbers (12,000) of Manx shearwaters which forage in this area from colonies in Northern Ireland, Wales and Devon. Management advice is to avoid mortality, maintain habitats and food sources, and ensure linkages with colonies are maintained. Impacts on Manx shearwater have the potential to be significant in this area. This species is on the RSPB's amber list of Birds of Conservation Concern and was a species with which the (now abandoned) Atlantic Array Wind Farm had significant HRA issues. Manx shearwater populations are a highly mobile species, so development around this designation will present a significant constraint.		

Marine Conservation Zones (MCZs)	None within the trigger distance					
Sites of Special Scientific Interest (SSSIs)	Cappas Lwyd (1.3 km); Coed Cwmgwared (1 km); Coed Eiernion (1.8 km); Gallt y Bwlch (500 m); Glannau Ynys Gybi: Holy Island Coast (60 m); Gwydir Bay (300 m); Morfa Dinlle (1.6 km); Newborough Warren to Ynys Llanddwyn (750 m); Porth Dinllaen i Borth Pistyll (200 m); Porth Tywyn i Borth Wen (1.6 km); Yr Eifl (700 m).					
SSSI	Carreg Y Llam (200m)	Seabird breeding sites: guillemot, razorbill and kittiwake in large numbers, fulmar, shag, cormorant and herring gull in smaller numbers		The site is an important breeding area for seabirds in North Wales and birds from this site have the potential to be affected by the presence of turbines offshore. The site is not protected as part of a SPA, and is very close to the area of interest (within 300 m). Impacts may be mitigable through the location of projects and/or turbine design.		
Spawning and nursery grounds		There are few overlaps of high-intensity nursery and spawning grounds in the area (maximum is four). There are most overlapping species to the north of the area.		This data does not show this area to be of significant sensitivity, so it should be viewed as having minimal constraints.		
Social tier						
Royal Yachting Association (RYA) Automatic Identification System (AIS) intensity		There is a significant amount of recreational sailing activity around the Anglesey coast.		The shape of the characterisation area means that this interaction is minimal.		
Marinas		Holyhead Marina is 1.8 km from the area.		This impact should be easily mitigable with appropriate siting within the area.		
Bathing beaches		There are significant numbers of bathing beaches all around the Anglesey coast. There are three within 1.5 km of the area.		The area extends very close to shore. However, the impact on these beaches should be mitigable with appropriate siting of development.		
Visibility from sensitive receptors		See visual analysis below.				

Review layers

Visibility from landscape designations and from the coast

The bands of significant visual impact are taken from the OSEA3¹ environmental report. It should be noted that these bands were challenged through the statutory stakeholder engagement by the SNCBs so further analysis and engagement should be conducted to understand the visual constraint in potential development areas more fully.

The visibility from landscape designations analysis has been conducted using designations which include protections for landscapes and settings namely: National Parks, Areas of Outstanding Natural Beauty (AONBs), Heritage Coasts and World Heritage sites. For more information on these, please consult the methodology report. The analysis draws on visibility from these designations but not the sensitivity of them to offshore wind developments. Proposals should draw on the relevant management plans or local policies to fully understand the level of constraint that exists in the vicinity of these landscape designations. As such, more analysis is required to fully understand the potential constraint.

	Band of significant visual impact	% of overlap with the characterisation area	Commentary	Area rating
Medium sensitivity receptors	0-13 km (3.6 MW turbines)	48%	A significant proportion of this area is near the coast. However, 25% of the area is more than 30 km from the coast.	
	13-20 km (4-8 MW turbines)	23%		
	20-30 km (10-15 MW turbines)	14%		
High sensitivity receptors	0-30 km	85%		

Visibility of sea surface from landscape designations		Receptor rating	Area rating
The southern section of the area is visible from: <ul style="list-style-type: none"> Holyhead Mountain, Aberffraw Bay and Llŷn Heritage Coasts Llŷn Peninsula and Anglesey AONBs. 	Visibility from sensitive receptors will present a potentially large constraint to the south segment of the characterisation area in particular. Feedback from statutory stakeholders including the National Trust has also highlighted that this area is very sensitive to visual pressures due to the number of designations and their setting. Specifically, anything to the west of Great Orme has been noted as sensitive to potential development. Impacts on both landscape and seascape should be taken into consideration, from both offshore arrays and cabling/grid connection aspects of the project. There is a high potential for significant impact.		

Ornithology outside of Special Protection Areas (SPAs) for high-risk species

Joint Nature Conservation Committee (JNCC), Natural England and Royal Society for the Protection of Birds (RSPB) advise that there are a number of information sources which should be taken into consideration in the assessment of potential impacts from offshore wind development in this characterisation area. These are:

- Site Information Centres on the JNCC website (<http://jncc.defra.gov.uk/page-6895>) which provide up-to-date information on protected areas, their features and status.
- Marine Ecosystems Research Programme (MERP) seabird distribution maps (https://marine-ecosystems.org.uk/Research_outcomes/Top_predators)
- Future of the Atlantic Marine Environment (FAME) and Seabird Tracking and Research (STAR) tracking data from the RSPB (<https://rspb.maps.arcgis.com/apps/Cascade/index.html?appid=d6c3aa1ec7184a2895a01cebf451c7b3>)
- Wakefield, E., Owen, E., Baer, J., Carroll, M., Daunt, F., Dodd, S., Green, J., Guilford, T., Mavor, R., Miller, P., Newell, M., Newton, S., Robertson, G., Shoji, A., Soanes, L., Votier, S., Wanless, S. & Bolton, M. (2017) Breeding density, fine-scale tracking, and large-scale modeling reveal the regional distribution of four seabird species. *Ecological Applications* <https://doi.org/10.1002/eap.1591>
- Cleasby, I.R., Owen, E., Wilson, L.J., Bolton, M. (2018) Combining habitat modelling and hotspot analysis to reveal the location of high density seabird areas across the UK: Technical Report. RSPB Research Report no. 63
- Kober, K., Webb, A., Win, I., Lewis, M., O'Brien, S., Wilson, L.J., Reid, J.B. (2010) An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs. JNCC Report 431 (and the distribution maps therein) (<http://jncc.defra.gov.uk/page-5622>)

¹ BEIS (2016), OSEA3 Environmental Report. Crown copyright 2016, p 291. URN 16D/033.

- Sansom, A., Wilson, L.J., Caldow, R.W.G. & Bolton, M. 2018. Comparing marine distributions maps for seabirds during the breeding season derived from different survey and analysis methods. PLOS ONE <https://doi.org/10.1371/journal.pone.0201797>
- Bradbury, G., Trinder, M., Furness, B., Banks, A.N., Caldow, R.W.G. & Hume, D. 2014. Mapping Seabird Sensitivity to Offshore Wind Farms. PLoS ONE 9(9): e106366. doi:10.1371/journal.pone.0106366
- Thaxter, C.B., Ross-Smith, V., Bouten, W., Clark, N., Conway, G., Rehfishch, M. & Burton, N. (2015) Seabird–wind farm interactions during the breeding season vary within and between years: A case study of lesser black-backed gull *Larus fuscus* in the UK. *Biological Conservation* 186: 347-358

Species	Site	Commentary on coverage	Area rating
Gannet	Grassholm SPA	<p>The gannet's mean maximum seaward foraging range extends 229 km from the source colony at Grassholm SPA. This range overlaps six other characterisation areas in addition to encompassing the Anglesey characterisation area, which lies in the north of the foraging radius. Cumulative collision risk effects should be considered if development is taken forward in more than one of these characterisation areas. Given the limited existing offshore wind development in the Grassholm foraging range, cumulative impacts will most likely focus on the cumulative effects of new development in the characterisation areas.</p> <p>Summer density of gannet tends to be more concentrated around the Grassholm SPA; gannet density in the Anglesey area is relatively low. However, locating any development towards the north of the characterisation area, where gannet density is generally relatively low, would help to minimise any impacts on the Grassholm SPA colony.</p>	
Lesser black-backed gull	Ribble and Alt Estuaries SPA	<p>The lesser black-backed gull's mean maximum seaward foraging range extends 141 km from the Ribble and Alt Estuaries SPA, encompassing most of the Anglesey characterisation area. Two other characterisation areas lie within this foraging range, as well as a high level of existing offshore wind development; cumulative collision risk effects are therefore likely to be a key consent consideration for any development in this characterisation area.</p> <p>Summer density of the lesser black-backed gull is concentrated closer to shore around the SPA colony, and in the central part of the Liverpool Bay area. Lesser black-backed gull density is relatively low in the northern and southern parts of Anglesey characterisation area, with some patches of slightly increased density in the central part of the area. Locating any development in the north or south of the characterisation area would help to minimise any impacts on this SPA colony.</p> <p>RSPB advise the use of the British Trust of Ornithology tracking data for lesser black-backed gull from colonies in the north-west of England to assist with impact assessments.</p>	
Lesser black-backed gull	Morecambe Bay and Duddon Estuary SPA	<p>The lesser black-backed gull's mean maximum seaward foraging range extends 141 km from the Morecambe Bay and Duddon Estuary SPA, encompassing most of the Anglesey characterisation area. Two other characterisation areas lie within this foraging range, as well as a high level of existing offshore wind development; cumulative collision risk effects are therefore likely to be a key consent consideration for any development in this characterisation area.</p> <p>Summer density of the lesser black-backed gull is concentrated closer to shore around the SPA colony, and in the central part of the Liverpool Bay area. Lesser black-backed gull density is relatively low in the northern and southern parts of Anglesey characterisation area, with some patches of slightly increased density in the central part of the area. Locating any development in the north or south of the characterisation area would help to minimise any impacts on this SPA colony.</p>	

Ministry of Defence (MoD) activity

	Issues when using 250 m tip heights	Issues when using 350 m tip heights	Receptor rating
Air traffic control (ATC)	Royal Air Force (RAF) Valley Primary Surveillance Radar (PSR) concerns. RAF Valley Precision Approach Radar (PAR) concerns over a small part to the east of the Anglesey area. There are currently no mitigation solutions to alleviate PAR impacts.	RAF Valley PSR concerns. RAF Valley PAR concerns over a small part to the east of the Anglesey area. There are currently no mitigation solutions to alleviate PAR impacts.	
Air defence radar (ADR)	No ADR concerns.	Aberporth Range PSR concerns with turbines in the southern part of the Anglesey area. No ADR concerns.	

Threat radar	No threat radar concerns.	No threat radar concerns.	
Low flying	No low flying concerns, however, there will be a lighting requirement.	No low flying concerns, however, there will be a lighting requirement.	
Ranges, danger and exercise areas	<p>The southern D201B Aberporth range in the southern section of the area. As well as impacting the radar, turbines in this area will impact on the range's activities. Aberporth is a test and evaluation range where missile-firing takes place, so turbines within the range would be incompatible with the range's activities.</p> <p>UXO should be taken into account and consideration should be given to the cable route. The MoD would need to review routes to ensure highly surveyed routes are not obstructed by cables or turbines. Routing cables through the Aberporth Danger Area would be a concern.</p>	<p>The southern D201B Aberporth range in the southern section of the area. As well as impacting the radar, turbines in this area will impact on the range's activities. Aberporth is a test and evaluation range where missile-firing takes place, so turbines within the range would be incompatible with the range's activities.</p> <p>UXO should be taken into account and consideration should be given to the cable route. The MoD would need to review routes to ensure highly surveyed routes are not obstructed by cables or turbines. Routing cables through the Aberporth Danger Area would be a concern.</p>	
Area commentary			Area rating
ATC radars and Aberporth Danger Area concerns. Engagement should be undertaken to ensure that siting of development takes account of operations at the Aberporth Danger Area.			
There will be a lighting requirement and consideration of UXO as per standard industry practice.			

Fishing activity

Gear type	Location and comments	
Static gear	<ul style="list-style-type: none"> There is some netting and potting close to shore. There are mussel beds against the Welsh coast. 	
Mobile gear	<ul style="list-style-type: none"> There is a scallop fishery throughout this area. The Welsh Government requires all vessels that fish for scallops inside Welsh waters to have Succorfish iVMS units on board. This data is available from Natural Resources Wales on request. The fleet is made up of local and visiting vessels but they are all under 12 m due to permitting rules. 	
Area commentary		Area rating
This area hosts a strong fishery but there is opportunity for proposals to be brought forward around this activity which is supported by good data on fishing effort in the area.		

Marine plans

Please note there is one marine plan area in Wales, encompassing Welsh inshore and offshore waters. The Welsh Government is responsible for preparing a Marine Plan for Wales. The Welsh National Marine Plan was consulted on, between December 2017 and March 2018. Welsh Government have been working with stakeholders to address issues raised through the consultation and it is now being finalised. The Welsh Government are aiming for adoption of the plan in Autumn 2019, subject to seeking approval of the plan from the UK Government. The analysis below is based on the published draft Welsh National Marine Plan.

Welsh National Marine Plan (Draft)	Spatially explicit policies	Issues	Area rating
Aggregates	<p>AGG4: proposals potentially affecting strategic resource areas for aggregate extraction should demonstrate how they, in order of preference:</p> <p>a) avoid adverse impacts on future potential aggregate extraction in those areas;</p>	There is no overlap of the characterisation area with the aggregate strategic resource area identified in the draft Welsh National Marine Plan.	

	<ul style="list-style-type: none"> b) minimise impacts where they cannot be avoided; c) mitigate impacts where they cannot be minimised; and, d) should present the case for proceeding where (a-c) are not possible. 		
Aquaculture	<p>AQU3: proposals potentially affecting strategic resource areas for aquaculture should demonstrate how they, in order of preference:</p> <ul style="list-style-type: none"> a) avoid adverse impacts on future potential aquaculture activity in those areas; b) minimise impacts where they cannot be avoided; c) mitigate impacts where they cannot be minimised; and d) should present the case for proceeding where (a-c) are not possible. 	<p>The characterisation area overlaps with some of the seabed strategic resource area and water column strategic resource area for aquaculture identified in the draft Welsh National Marine Plan. However, the overlap is relatively small and is not considered to be a significant concern for future offshore wind development, although negotiation with the aquaculture sector would be required.</p>	
Ports and shipping	<p>PS3: proposals potentially affecting strategic resource area for:</p> <ul style="list-style-type: none"> a) established commercial navigation routes; b) pilot boarding areas and commercial anchorages; or c) existing port, harbour and marina activities and their potential for future expansion. <p>Including where a consent or authorisation has been granted or formally applied for, should not be authorised except where compatibility with the existing, authorised or proposed activity can be satisfactorily demonstrated or there are exceptional circumstances.</p> <p>Compatibility should be achieved, in order of preference, through:</p> <ul style="list-style-type: none"> a) avoiding adverse impacts on those activities; b) minimising impacts where they cannot be avoided; and/or, c) mitigating impacts where they cannot be minimised. <p>If adequate compatibility cannot be achieved, proposals should present the case for proceeding.</p>	<p>There is some overlap of the central part of the characterisation area with the strategic resource area for shipping as identified in the draft Welsh National Marine Plan. Any new offshore wind development would need to account for navigation routes when locating the project area.</p>	
Tidal range energy	<p>ELC04: proposals potentially affecting strategic resource areas for renewable energy (including those within the UK Offshore Energy SEA process) should demonstrate how, in order of preference, they:</p>	<p>There is no overlap of the characterisation area with the tidal range energy strategic resource area identified in the draft Welsh National Marine Plan.</p>	
Tidal stream energy	<ul style="list-style-type: none"> a) avoid adverse impacts on future potential renewable energy activities in those areas; b) minimise impacts where they cannot be avoided; and/or c) mitigate impacts where they cannot be minimised; and, d) should present the case for proceeding where (a-c) are not possible. 	<p>There is some overlap of the central part of the characterisation area with the tidal stream energy strategic resource area identified in the draft Welsh National Marine Plan. Any new offshore wind development would need to consider impacts to the tidal stream industry and negotiation with the sector would be required.</p>	
Wave energy		<p>There is no overlap of the characterisation area with the wave energy strategic resource area identified in the draft Welsh National Marine Plan.</p>	

The Crown Estate key resource areas (KRAs) for other sectors

KRA category	Where	Commentary	Receptor rating	Area rating
Cables	Intersects the two southern segments of the area.	This KRA is significant in size and does not give a strong enough signal to be a significant constraint on development in this area.	Green	Green
Carbon Capture Storage (CCS) stores	No interaction.		Light Green	Light Green
CCS infrastructure	No interaction.		Light Green	Light Green
Minerals	No interaction.		Light Green	Light Green
Pipelines	No interaction.		Light Green	Light Green
Sandscaping	Slight coverage on the southern side of the area.	This KRA is significant in size and does not give a strong enough signal to be a significant constraint on development in this area.	Green	Green
Tidal range	No interaction.		Light Green	Light Green
Tidal stream	Significant overlap around Anglesey.	There is some interest in this tidal stream resource with several projects under development. There is significant opportunity elsewhere in the area.	Yellow	Green
Wave	No interaction.		Light Green	Light Green

National Air Traffic Services (NATs) radar overlap

% Overlap with Primary Surveillance Radar (PSR) assessment buffer (200 m turbines)	Commentary	Area rating
0%	No overlap, not an issue.	Light Green

Water Framework Directive (WFD)

Water bodies triggered	Water body details					
	Type	Is it heavily modified?	Overall status	Ecological status	Chemical status	Target date to achieve good status
Caernarfon Bay – south	Coastal	No	Moderate	Moderate	Good	2021
Caernarfon Bay – north	Coastal	No	Good	Good	Good	2015

% of the area covered	Spatial overlap with the area	Commentary	Area rating
4%	There is a small amount of intersection around Caernarfon Bay.	This area intersects only unmodified water bodies which are in good to moderate overall condition. The overlap with the characterisation area is minimal and should not present a significant constraint.	

Marine Cultural Heritage

Heritage asset type	Where	Commentary on sensitivity from offshore wind development	Receptor rating
Maritime archaeology and wrecks	Potential throughout characterisation area, with the greatest concentration of known wrecks located close to Holyhead and the west coast of Anglesey. Numerous wrecks associated with the shipping routes from Dublin that traverse the characterisation area.	<p>There is potential for maritime archaeological material from the Palaeolithic to the present day to be present and affected by OWF development in the Anglesey characterisation area. The area contains a number of wrecks and obstructions, with a concentration of known wrecks located close to Holyhead and the west coast. The waters around Anglesey contain a number of wrecks, owing to the dangers of navigating the coastal topography and notoriously treacherous sea conditions.</p> <p>The concentration of known wreck losses recedes to the west within the characterisation area. The area played a significant role in 20th Century military conflict, with important shipping and supply routes passing the island en-route to the Atlantic from Liverpool, Ireland and the west coast of Scotland. The characterisation area contains the remains of HMS H5, a British H-Class submarine in operation in the Irish Sea during the First World War, which was sunk in 1918 to the south west of Anglesey. The vessel is designated as a controlled site under the Protection of Military Remains Act (1986). In addition to military and trade vessels, early forms of watercraft are likely to have been utilised to traverse the coastal waters of the characterisation area in the late Palaeolithic and early Mesolithic periods. The island was also known to be a significant location during the Roman period, so the remains of boats and vessels from this period may also be present in the adjacent waters of the characterisation area.</p> <p>Established procedures exist to ensure that any historic wrecks, known and unknown, and associated remains, are identified as part of any proposed OWF development and its impacts are mitigated and minimised.</p>	
Aviation archaeology	Potential for the recovery of aviation archaeological remains throughout the characterisation area.	<p>The Anglesey characterisation area has significant potential for the recovery of crashed aircraft and material from airborne military conflict in the First and Second World Wars. The skies above the channel saw substantial airborne conflict, with aircraft involved in protecting merchant shipping and passenger vessels in the Irish sea and to the north west of England.</p> <p>The area is located on important routes between the Atlantic, Wales and Ireland, and to ports and other important strategic locations and targets located on the north-west coast of England (Liverpool), and Scotland. An RAF base was constructed on Anglesey at RAF Valley in 1941, and the island forces played a significant role in the monitoring of German U-Boat activity during this time. Few known aircraft wrecks have been identified in the area due to the difficulty of identifying these sites on the seabed. However, the historic records attest to the high number of losses in the area, indicating the potential for aircraft wrecks. If present, any remains may be identified or impacted upon by wind farm development.</p> <p>While existing standard mitigation measures may be utilised for specific projects in the area, further site-specific mitigation may be required, including excavation and recovery of significant remains that are encountered and where impacts are unavoidable. However, it should be noted that this is an extreme example and would only be undertaken following significant discussion with advisors and in rare cases where preservation <i>in situ</i> was not a feasible option.</p>	
Submerged prehistoric landscapes	Potential across the characterisation area, with enhanced potential in parts of the characterisation area close to the coast and geomorphological features such as palaeochannels.	<p>During periods of lower sea level caused by three major glaciations (the Anglian, Wolstonian and Devensian), the Anglesey characterisation area would have been covered by the Welsh Ice Cap, so there is limited potential for the recovery of prehistoric archaeological material from these periods. There is some potential for the survival of sediments and secondary context artefactual material in areas where glacial activity has not eroded earlier sedimentary deposits. There is potential for the recovery of material associated with the late Upper Palaeolithic and Mesolithic periods in the Anglesey characterisation area.</p> <p>Following the retreat of the Devensian ice sheet, much of the area would have provided an accessible and attractive habitat due to the geomorphological features that may have been utilised by humans during the Mesolithic period. Significant deposits and possible finds may therefore be anticipated in association with the early Mesolithic channel systems and other geomorphological features that were present and exposed prior to marine transgression. The island of Anglesey contains a number of known prehistoric monuments, and there is known to have been a human presence in the Mesolithic, as is evidenced by the recovery of Mesolithic flints finds from coastal locations such as Trywn Du and Porth Ruffydd on the west coast. There is the potential for remains from this period to be present and impacted by OWF development in the characterisation area.</p>	

	Established procedures exist to ensure that any submerged prehistoric landscapes, associated geographical and geomorphological features, and associated deposits, features and finds are identified as part of any proposed OWF development and impacts are mitigated and minimised.	
Area commentary		Area rating
	There are a range of known heritage assets and potential for the recovery of further remains across the characterisation area, with particular potential for the recovery of significant historic wrecks associated with trade and military functions, aviation archaeological remains, and prehistoric archaeological remains from the late Palaeolithic and Mesolithic in locations closer to the coast (i.e. the south of the characterisation area). The application of standard mitigation measures on a strategic and project-specific basis will minimise the risk to underwater cultural heritage in this area.	

Glossary of acronyms and abbreviations

AA	Appropriate Assessment
ADR	Air Defence Radar
AONB	Area of Outstanding Natural Beauty
ATC	Air Traffic Control
CCS	Carbon Capture Storage
cSAC	Candidate Special Area of Conservation
EPS	European Protected Species
FAME	Future of the Atlantic Marine Environment
HRA	Habitat Regulations Assessment
JNCC	Joint Nature Conservation Committee
km	Kilometre
KRA	Key Resource Area
m	Metre
MCZ	Marine Conservation Zone
MERP	Marine Ecosystems Research Programme
MoD	Ministry of Defence
MPA	Marine Protected Area
MW	Mega watt
NATS	National Air Traffic Services
NM	Nautical Mile
OESEA3	Offshore Energy Strategic Environmental Assessment 3
OFTO	Offshore Transmission Owners
OWF	Offshore Wind Farm
PAR	Precision Approach Radar
PSR	Primary Surveillance Radar
Ramsar	Ramsar Convention on wetlands of international importance especially as waterfowl habitat, also known as the 'Convention on Wetlands'.
RAF	Royal Air Force
RSPB	Royal Society for the Protection of Birds
RYA AIS	Royal Yachting Association (RYA) Automatic Identification System (AIS)
SAC	Special Area of Conservation
SCI	Site of Community Importance
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STAR	Seabird Tracking and Research
Succorfish	Under 12m vessel tracking equipment
TWT	The Wildlife Trusts
UXO	Unexploded Ordnance
WFD	Water Framework Directive