

ASSESSMENT AGAINST THE MCZ SELECTION GUIDELINES

Outer Belfast Lough Marine Conservation Zone (MCZ)

Ocean quahog (*Arctica islandica*) on Subtidal sand



Department of
**Agriculture, Environment
and Rural Affairs**

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Summary

The assessment against the Guidance on selection and designation of Marine Conservation Zones (MCZs) in the Northern Ireland Inshore Region (hereafter referred to as the NI Guidance) is a document produced as part of the consultation evidence base, following the OSPAR design principles. This assessment helped to identify Areas of Search (AoS) and determine proposed boundaries and features for protection within them. This process supported the definition of final MCZ boundaries for designation. It also highlights where additional locations or features are required or whether a different size or shape of boundary is needed to develop the Marine Protected Area (MPA) network.

Following the NI Guidance the process includes five stages from the identification of the AoS (Stage 1) to the development of the pMCZs and finally designation as MCZs (Stage 5). Only locations which have passed through all the stages of the assessment are considered for formal designation and inclusion in the MPA network.

This document provides details of the assessment of Outer Belfast Lough MCZ against the selection criteria.

Additional information on Outer Belfast Lough MCZ and the MCZ process includes:

- Guidance on selection and designation of Marine Conservation Zones (MCZs) in the Northern Ireland Inshore Region
- Justification report for selection of proposed Marine Conservation Zone (pMCZ) features
- Guidance on the development of Conservation Objectives and potential Management Options
- Conservation Objectives and potential Management Options for Outer Belfast Lough MCZ
- Data Confidence Assessment for Outer Belfast Lough MCZ

History of development

Outer Belfast Lough MCZ was identified as an AoS for the protection of Ocean quahog (*Arctica islandica*) (OQ) (as a species not as aggregations). The AoS was found to contain dense populations of the long-lived clam OQ (Bangor University, Ridgway *et al.*, 2012) which is an OSPAR Threatened and/or Declining species (OSPAR, 2009).

The habitat Subtidal (sublittoral) sand (SS) was also recommended for inclusion as a broad scale MCZ habitat feature associated with the OQ. The SS habitat is broadly distributed through the AoS with sediments from coarse gravelly sand to stable infralittoral and circalittoral finer sands and patches of gravelly muddy sands. Sea-pen and burrowing megafauna communities were recorded within the AoS but this habitat was considered a Northern Ireland variant as this was found on muddy sand patches within the SS broad scale habitat. As such, it is not included as a feature for designation in its own right, but will be afforded indirect protection within the MCZ.

Recent survey work completed by DOE (June 2015) included underwater video/still images, infaunal grab samples and particle size analysis (PSA) validated the variations of SS sediment in the AoS (from muddy sand to coarser gravelly sand). The presence of multiple burrows with associated megafauna was also recorded in the muddy patches. This survey, combined with data gathered for OQ (Bangor University, Ridgway *et al.*, 2012), supported the initial proposed MCZ boundary.

As a result of the pMCZ public consultation, the Department reviewed all available evidence and amended the proposed boundary reducing the size of the MCZ from 5.76km² to 2.51km². The boundary of Outer Belfast Lough MCZ was drawn to encompass the extent of the OQ records (main feature) and includes a buffer equivalent to four times the depth (~25x4=100m) in accordance with Natural England & JNCC guidance (2010). This enables the MCZ to act as a functional whole, both conserving OQ while representing and maintaining the integrity of all features present. An area of 2.507km² is sufficient to be self-sustaining for SS and the majority of its diversity (Natural England & JNCC, 2010; Hill *et al.*, 2010). The quantitative analysis of VMS data confirmed that the impact of designation on the fishing industry would be low. Within the initial pMCZ the annual average fishing effort was 14.37hrs but this has now been reduced to 7.49hrs following the boundary amendment. This fishing effort is 11% of the total effort within ICES rectangle 38E4 and equates to 2.99hrs/km². The amended boundary was therefore considered appropriated for formal designation.

Details on the supporting evidence are provided on the Outer Belfast Lough Data confidence assessment.

Glossary of Terms and Acronyms

AoS – Area of Search used to underpin the proposed Marine Conservation Zone

AFBI – Agri-food and Biosciences Institute

Benthic – The ecological region at the lowest level of a body of water such as an ocean or a lake including the sediment surface and some sub-surface layers

Biotope – The region of the habitat associated with a particular ecological community

Circalittoral – The subzone of the rocky sublittoral dominated by animals. No lower limit is defined but species composition changes below about 40m to 80m depth

Conservation objective – A statement of the desired ecological/geological state (quality) of a feature (habitat, species or geological) for which the MCZ is designated

DAERA – [Department of Agriculture, Environment and Rural Affairs](#) (also referred to as the Department in the text)

DOE – Department of the Environment (now lies within DAERA)

EUNIS – The European nature information system, is a habitat classification system used throughout Europe and covers all types of natural and artificial habitats, both aquatic and terrestrial

Infaunal – Aquatic animals such as clams or burrowing worms that live beneath the surface of a sea or lake floor

Infralittoral – Describes the zone from mean low water down to a depth where 1% of light can reach the seabed (JNCC). This zone is dominated by erect algae, typically Kelp species.

JNCC – Joint Nature Conservation Committee

MCZ – Marine Conservation Zone designated under section 13 of the Marine Act (Northern Ireland) 2013 in the Northern Ireland inshore region and in section 116 of the Marine and Coastal Access Act 2009 in the Northern Ireland offshore region adjacent to Northern Ireland

MCZ Feature – Marine Conservation Zone feature(s) that underpins the MCZ designation

MPA – As a generic term Marine Protected Areas are a clearly defined geographical space, recognised, dedicated and managed through legal or other means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. As a specific term it refers to a national designation in Scotland (equivalent to an MCZ)

NIEA – [Northern Ireland Environment Agency](#)

OQ – Ocean quahog

OSPAR – OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Union, cooperate to protect the marine environment of the North-East Atlantic

OSPAR T&D – OSPAR List of Threatened and/or Declining Species and Habitats

PMF – Priority Marine Feature - collective term for those features (habitats, species and geological/geomorphological features) which are considered to be of conservation importance in the Northern Ireland inshore region

pMCZ – Proposed Marine Conservation Zone

pMCZ Feature – Proposed Marine Conservation Zone feature(s)

PSA – Particle size analysis

RIA – Regulatory Impact Assessment

SPBM – Sea pen and burrowing megafauna communities

Spyball – Underwater drop camera operated by crew aboard a vessel used to study submerged habitats and species

SS – Subtidal (sublittoral) sands

SSNI – Sublittoral Survey Northern Ireland

VMS – Vessel Monitoring System

Outer Belfast Lough MCZ – Application of the MCZ selection guidelines

Stage 1 - Identifying the Area of Search			
Summary of assessment	<p>The Outer Belfast Lough AoS (Figure 1) encompassed two pMCZ features: the first one is the species Ocean quahog OQ (<i>Arctica islandica</i>) which is on the OSPAR T&D List.</p> <p>The second pMCZ feature is Subtidal sand SS, which is a broad scale habitat associated with the OQ and is representative of Northern Ireland's seas more generally. This is sand dominated with occasional small patches of gravelly muddy sand with the biotopes <i>Virgularia mirabilis</i> and <i>Ophiura</i> spp with <i>Pecten maximus</i> on circalittoral sandy or shelly mud and Sea-pens and burrowing megafauna in circalittoral fine mud indicating the existence of both muddy sand and sandy mud. Also present is SPBM in muddy sand which is considered a variant of the OSPAR T&D habitat and so is afforded indirect protection within the pMCZ.</p>		
	Guideline met		
Detailed assessment			
Protected features	Guideline 1a Presence of key features	Guideline 1b Presence of features at threat and/or decline	Guideline 1c Presence of ecological resources/geological processes critical to functioning of the ecosystem
<i>Biodiversity</i>			
Ocean quahog (<i>A. islandica</i>) (OQ)	✓	✓ OSPAR T&D <i>Representative feature</i> ¹	
Subtidal (sublittoral) sand (SS) ²	✓	<i>Representative feature</i>	

¹ OQ is an OSPAR T&D species (OSPAR, 2009). Whilst not considered by OSPAR to be under threat and/or decline in OSPAR Region III, they are considered to be of conservation interest due to their slow growth and vulnerability to bottom fishing gear (Clements and Loureiro, 2014). They are also defined as a Priority Marine Feature (PMF) in Northern Ireland. Given the conservation importance of this species it is designated as a representative feature.

² Broad scale habitat EUNIS Code A5.2 comprising the predicted biotopes: circalittoral and infralittoral fine sand (SS.SSa.CFiSa – A5.25 and SS.SSa.IFiSa –

SS: Sea-pen and burrowing megafauna communities (SPBM) ³	✓	✓OSPAR T&D ⁴	
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A5.23) and circalittoral and infralittoral muddy sand (SS.SSa.CMuSa – A5.26 and SS.SSa.IMuSa – A5.24) (JNCC, 2008). A5.2 broad scale habitat is in the UK list of Priority Species and Habitats (UK BAP) (JNCC, 2008). Broad scale habitat EUNIS Code A5.2 comprising the predicted biotopes: circalittoral and infralittoral fine sand (SS.SSa.CFiSa – A5.25 and SS.SSa.IFiSa – A5.23) and circalittoral and infralittoral muddy sand (SS.SSa.CMuSa – A5.26 and SS.SSa.IMuSa – A5.24) (JNCC, 2008). A5.2 broad scale habitat is in the UK list of Priority Species and Habitats (UK BAP) (JNCC, 2008).

³ SS component habitat. Biotope – SPBM ([SS.SMu.CFiMu.SpnMeg](#)) – A5.361.

This biotope occurs in the area in fine muddy sand substrata rather than in circalittoral fine mud. (JNCC, 2014; Hughs, 1998).

⁴ OSPAR list of Threatened and/or Declining species and habitats (OSPAR, 2008 a & b).

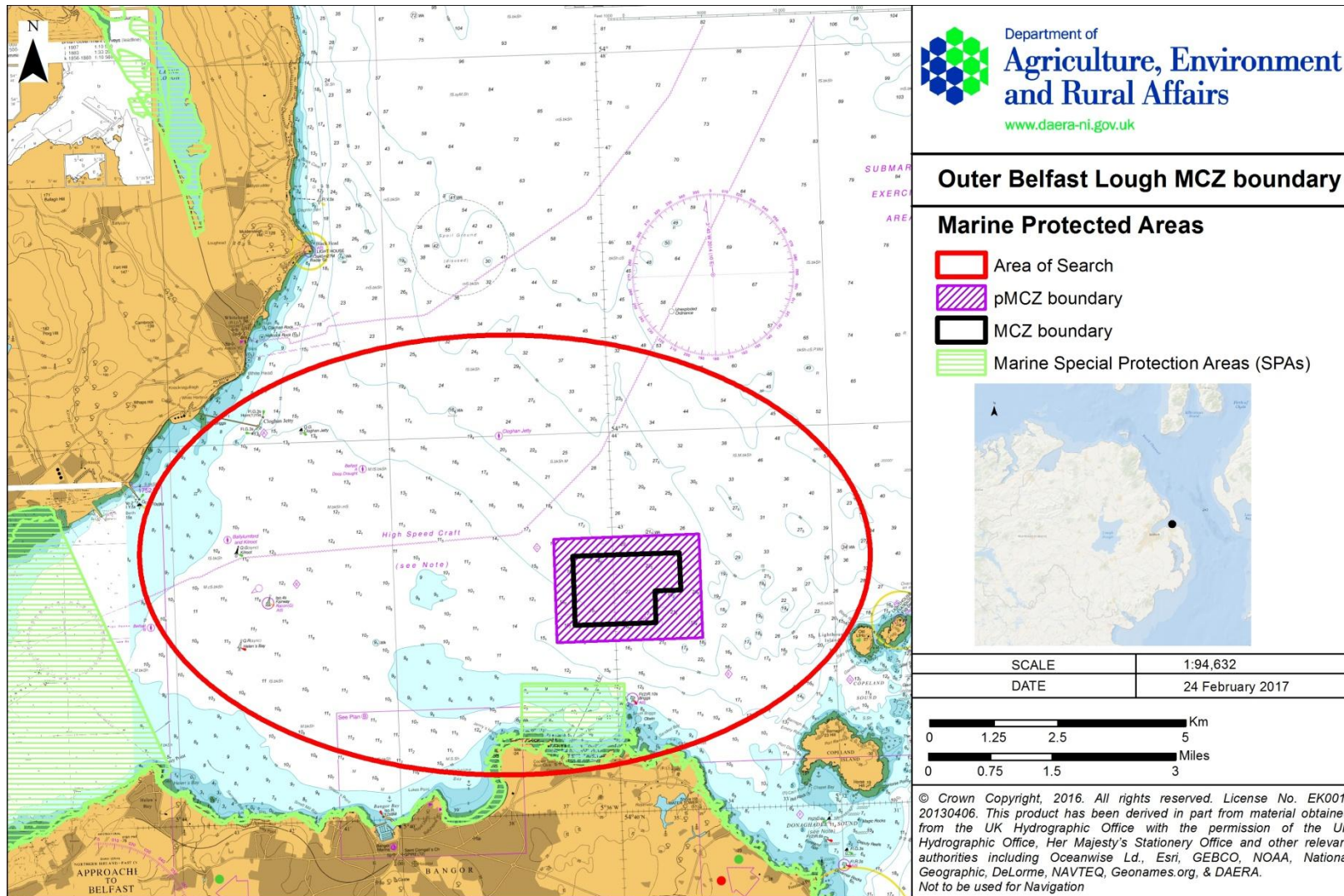


Figure 1 Location of Area of Search, initial proposed (p) boundary and designated boundary of Outer Belfast Lough MCZ

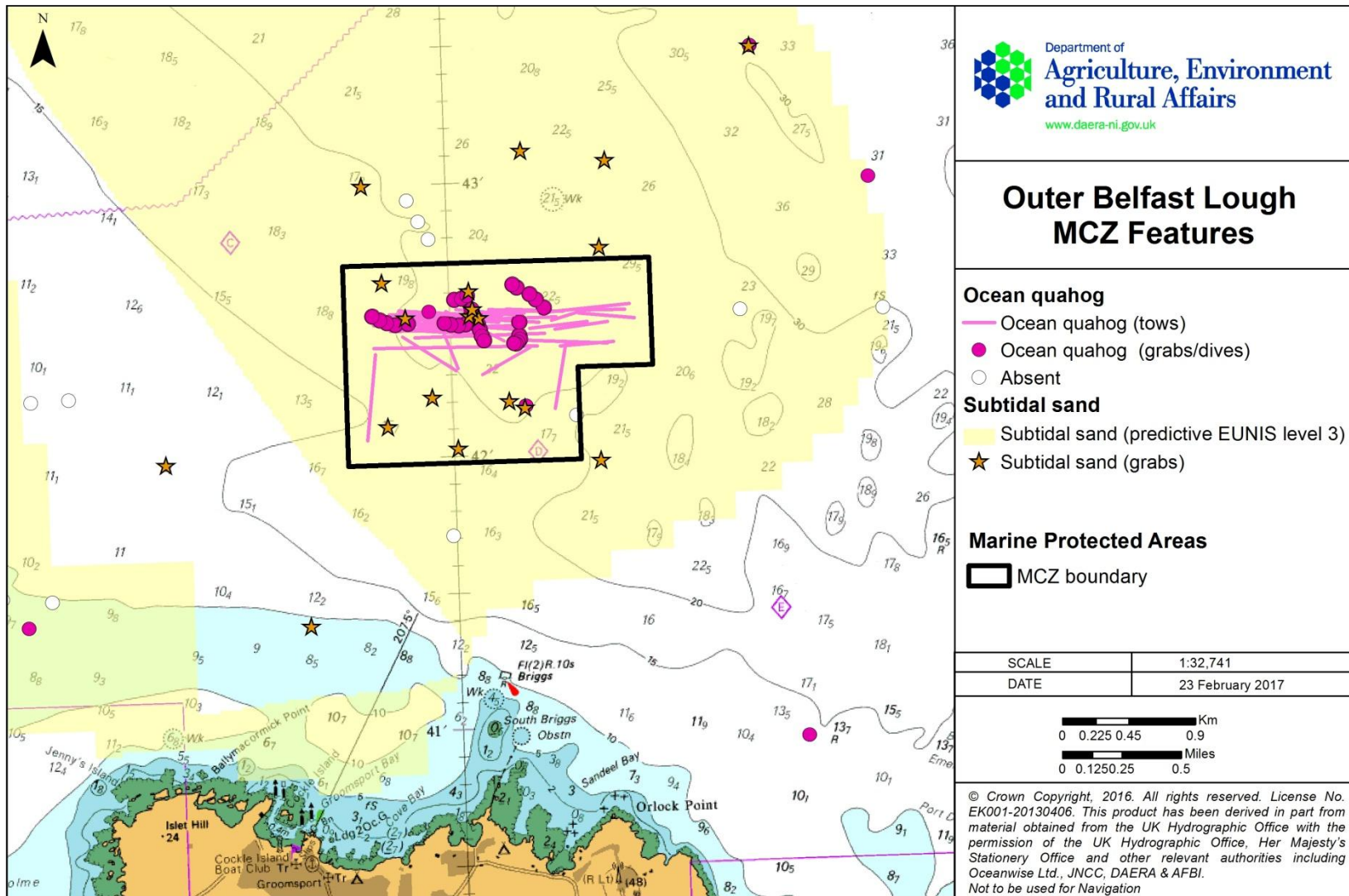


Figure 2 Distribution of the features in Outer Belfast Lough MCZ

Stage 2 - Prioritise the Area of Search based on quality of MCZ features contained	
Summary of assessment	<p>Outer Belfast Lough AoS was selected for two spatially and functionally linked features, SS and OQ. SS habitats (along with SPBM communities) are naturally diverse biotopes. This muddy/gravelly sand seabed is inhabited by a dense and undisturbed population of OQ (Witbaard and Bergman, 2003; JNCC, 2008; Sabatini & Pizzolla, 2008) and this represents the most populated area for OQ in the Irish Sea and the second most dense population in UK waters (De Wilde <i>et al.</i>, 1986; Ridgway <i>et al.</i>, 2012). Belfast Lough is impacted by human activity with a rapidly growing commercial sector and booming leisure activities (the Lough is a major shipping port). The pMCZ features are vulnerable to a range of pressures (such as dredging/trawling or anchoring by large ships) and are therefore considered to be at moderate risk of future significant damage. Evidence of dredging/trawling and anchoring is clearly visible in the southwest area of the AoS. As such, the pMCZ features are considered to be in unfavourable condition.</p>
	Five of the six Stage 2 Guidelines have been met (2a-2e)
Detailed assessment	
Guideline 2a - The Area of Search contains a combination of features especially those that are functionally linked	
<p>Outer Belfast Lough was selected as an AoS for two pMCZ features. The SS sediments are closely associated and grade into one another across the AoS (from fine sands/muddy sands to coarser gravelly sands). OQ occurs in this seabed habitat buried in muddy or fine sand sediments (Witbaard and Bergman 2003; JNCC, 2008; Sabatini & Pizzolla, 2008; Natural England & JNCC, 2010). Sea-pen (<i>V. mirabilis</i>) and burrowing megafauna communities are also present in the area as a biotope component of the habitat SS, most likely due to the high percentage of mud in the fine sediments, rich organic content and suitability for burrow formation. Although not a feature in its own right, SPBM will be afforded indirect protection. Sea-pens are indicative of stable sediments whilst the bioturbation created by the megafaunal burrowers may increase the food supply for suspension feeding OQ and sea-pens (Hughes, 1998; Hill <i>et al.</i>, 2010). As a filter feeder, OQ represents a benthic-pelagic link, removing plankton and detritus from the water column (Lancaster <i>et al.</i>, 2014).</p>	
2a Result	Guideline met
Guideline 2b - The Area of Search contains features with naturally high biodiversity (for habitats only)	

Subtidal (sublittoral) sand	Within Outer Belfast Lough the pMCZ habitat feature, Subtidal (sublittoral) sand , is a broad and complex habitat. This is sand dominated with occasional small patches of gravelly muddy sand (confirmed by particle size analysis, PSA). The biotopes A5.354 (<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp with <i>Pecten maximus</i> on circalittoral sandy or shelly mud) and A5.262 (<i>Amphiura brachiata</i> with <i>Astropecten irregularis</i> and other echinoderms in circalittoral muddy sand) are present. In addition, other biotopes have been recorded within the pMCZ (A5.444 : <i>Flustra foliacea</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral mixed sediment, and A5.361 : Seapens and burrowing megafauna in circalittoral fine mud) indicating the existence of both muddy sand and sandy mud. The Ocean quahog, <i>Arctica islandica</i> , is the primary selection reason for the pMCZ.
2b Result	Guideline met.
Guideline 2c - The Area of Search contains coherent features not smaller fragmented ones	
Ocean quahog (<i>Arctica islandica</i>)	<p>OQ population in the AoS represents one of the best examples in terms of population density and age of the population compared to other known <i>A. islandica</i> populations in the Irish Sea. The Outer Belfast Lough population has been found to have a high density in a very narrow area with some individuals up to 200 years old (Ridgway <i>et al.</i>, 2012). OQ are distributed throughout the pMCZ with the greatest density in the northern section, around the 20m depth contour line. Records are likely to be under-represented because the species is often missed by grab sampling. Further camera tows/survey work is required to detect surface signs (siphon holes) within the area, but visibility is greatly affected by the maritime traffic sediment plume and open sea conditions and depth.</p> <p><i>A. islandica</i> is exceptionally long-lived; recent work suggests that individuals may live for up to 400 years (Ridgway & Richardson, 2010). They have a very small home range but widely dispersing larvae (in excess of 40km depending upon local hydrographic conditions). There is no information regarding the size of the area required for a minimum viable population (Hill <i>et al.</i>, 2010) but in the absence of disturbance or changes in habitat suitability, populations of the species are considered likely to persist.</p>
Subtidal (sublittoral) sand	Spyball and grab sample data in the area confirms the SS habitat comprised a mosaic of different sediment types. The different biotopes of the pMCZ habitat SS are considered typical for Northern Irish coasts. There has been very little research on the spatial and temporal variability on the seabed in the area. However, this area has been recommended for protection as it provides suitable sediment for OQ colonisation. Summary reviews presented in Hill <i>et al.</i> (2010) suggest that majority of resident species in this habitat have a larval phase capable of

	dispersing and levels of OQ recruitment in SS appear stable in this area (Ridgway <i>et al.</i> , 2012). In the absence of significant disturbance species such as OQ are expected to persist (see details in the Data Confidence Assessment).
2c Result	Guidelines met
Guideline 2d - The Area of Search contains features considered least damaged/more natural	
Ocean quahog (<i>A. islandica</i>)	<p>Side-scan sonar (DOE, 2015; Figure 3 & Plates 1-3) clearly shows that large areas, particularly within the southern sector, have been subject to mobile fishing gear. This, combined with Vessel Monitoring System (VMS) data from fishing vessels (during 2009-2013) indicates that the OQ and its habitat may have been modified by exposure to demersal fishing (scallop dredging), resulting in a coarser sediment and making it less suitable for burrowing. Despite the site having evidence of damage it is the best known OQ bed in Northern Ireland. Indication of change or damage to this pMCZ feature has been reported in recent surveys (Ridgway <i>et al.</i>, 2012; Clements & Loureiro, 2014; DOE North Channel disposal grounds monitoring programme 1990-2014; AFBI, 2015; DOE spyball survey 2015; DOE side-scan survey, 2015 (Figure 3 & Plates 1-3); refer to the Data Confidence Assessment for more details). However, there is insufficient data relating to the long-term trends of the OQ population and whether this has been affected by anthropogenic activities.</p> <p>Although the scale and subsequent impact of mobile fishing gear in the area has not been significant the lack of records of OQ in the mid-lower section of the AoS suggest the population might have been affected by historic fishing (refer to Conservation Objectives and potential Management Options for Outer Belfast Lough for further detail).</p>
Subtidal (sublittoral) sand	In the wider area surrounding the AoS this feature is considered to be largely natural due to the hydrographic processes with different sedimentation rates causing a range in sediment types. There is no direct evidence on the condition of SS in the area. However, side-scan (DOE, 2015) and VMS data (from 2009-2013) indicates that the habitat may have been modified by exposure to demersal fishing (scallop dredging) resulting in a coarser sediment. Boat anchoring, particularly from large ships has the potential to pose a risk to the seabed in the AoS (DOE, 2015).
2d Result	Guidelines met

Guideline 2e - The Area of Search contains features at risk⁵ of damage by human activity	
Ocean quahog (<i>A. islandica</i>)	On the basis of the risk assessment (Annex III, Conservation Objectives and potential Management Options for Outer Belfast Lough MCZ document), undertaken at a local level of the Outer Belfast Lough pMCZ, this feature is considered to be at moderate risk of significant damage associated with anthropogenic activities. This is a result of potential exposure to pressures associated with fishing activity (scallop dredging is considered to present a high risk while demersal trawling and fishing with traps presents a moderate risk), Shipping (anchoring and mooring specifically present a moderate to high risk), and recreation and leisure activities (anchoring and mooring present a moderate risk). Side-scan data (Figures 3 & 4; Plates 1-3) (DOE, 2015) shows damage in the south- eastern corner of the pMCZ (refer to Guideline 2d).
Subtidal (sublittoral) sand	SS is considered to be at moderate risk of damage due to activities occurring in the area. This is due to pressures associated with scallop dredging and demersal trawling (high risk of altering the seabed type and moderate risk associated with other fishing pressures), Shipping (mooring and anchoring considered to present a moderate to high risk) and recreation and leisure activities (anchoring and mooring present a moderate risk).
2e Result	Guidelines met

⁵ Risk of damage to the feature(s) is based on the sensitivity of the feature to activities and their associated pressures. The information is organised by the type of activity, and briefly describes potential impacts on the features and potential management options. The grouping of activities was based on the standardised UK pressures-activity matrix (http://jncc.defra.gov.uk/pdf/Final_HBDSEG_P_A_Matrix_Paper_28b_Website_edit%5B1%5D.pdf), as developed by JNCC (2013), which classed similar activities that exerted similar pressures together. Since the public consultation, a new [Pressures-Activities Database \(PAD\)](#) has been developed by Cefas and APBmer (2015). This database and the list of activities are currently under review by JNCC in conjunction with each country agency. The Department has used this database and the improved activities list along with a revised methodology ([Marine Evidence based Sensitivity Assessment, MarESA](#), developed by JNCC and Natural England) to review the vulnerability assessments for the MCZs (where applicable). The degree to which a feature is exposed to activities associated with pressures to which it is sensitive in each MCZ region was assessed to provide a qualitative measure of risk. Risk assessments for the various activities were examined to produce an overall qualitative risk assessment for each MCZ. The management options will only consider those activities assessed as capable of affecting the features of the MCZ, based on the risk of damage assessment. More detailed information on the process can be found on the papers: Guidance on the development of Conservation Objectives and potential Management Options and Outer Belfast Lough Conservation Objectives and potential Management Options (the latter contains the risk assessment for Outer Belfast Lough MCZ).

Guideline 2f -The Area of Search contains historic sites which could be restored

2f Result

Guideline not met as this is not applicable

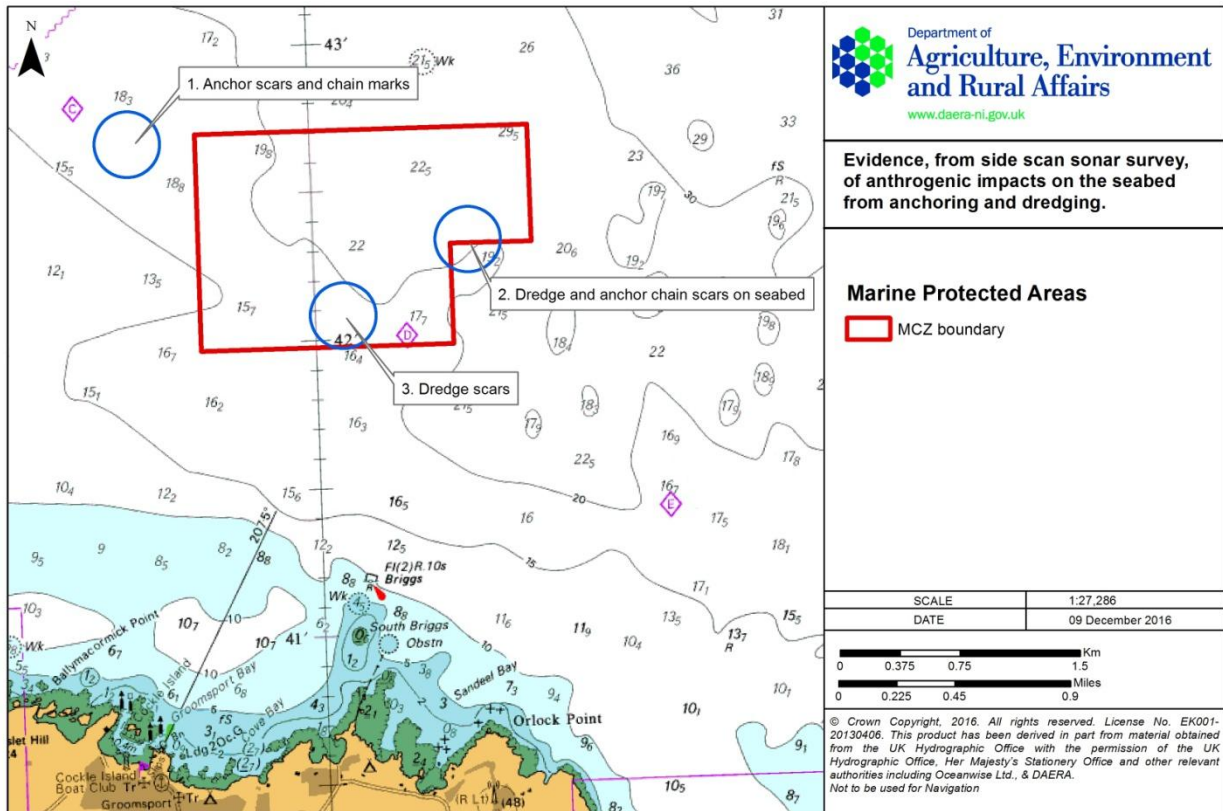


Figure 3 Areas of side scan sonar survey carried out in Outer Belfast Lough pMCZ

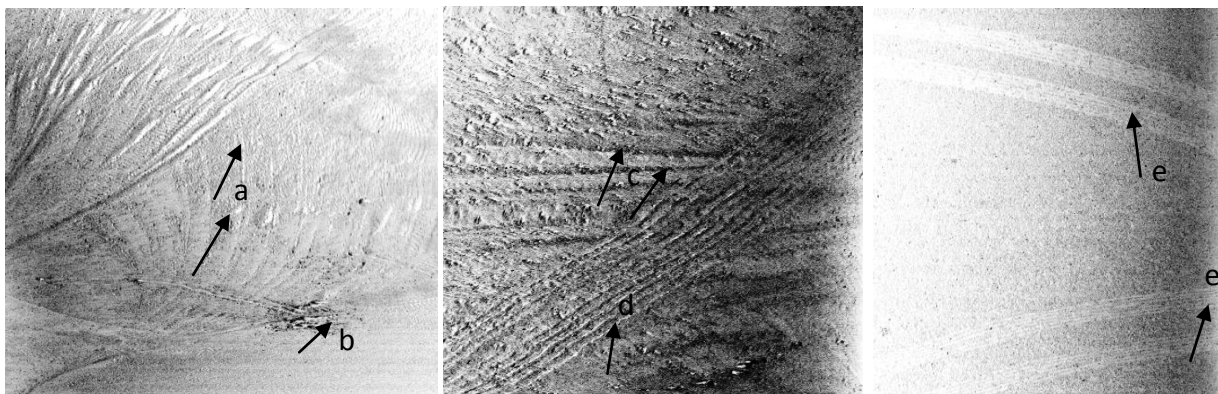


Figure 4 Plate 1-3 Side scan sonar images of physical disturbance to the seabed from anthropogenic activities in Outer Belfast Lough pMCZ. 1. Anchor scar **a** in centre with anchor chain marks **b** radiating out. 2. Scallop dredge scars **c** and chain marks **d** on course ground. 3. Scallop dredge scars **e** on softer ground

Stage 3 - Assess the size of the Area of Search to ensure this is sufficient to maintain the integrity of features protected	
Summary of assessment	<p>The pMCZ reflects the distribution of OQ and the range of SS habitats suitable for OQ colonisation. The SS habitats are also representative of the wider Outer Belfast Lough AoS and include records of SPBM communities which are on the OSPAR T&D list. The proposed boundary is suitable for maintaining the integrity of the features for which the pMCZ is being considered.</p>
	Guideline met
Detailed assessment	
The size of the area of search should be adapted where necessary to ensure it is suitable for maintaining the integrity of the features for which the MCZ is being considered. Account should also be taken where relevant, of the need for effective management of relevant activities	
Ocean quahog (<i>A. islandica</i>)	<p>The AoS focussed on the high numbers of OQ and relevant activities in the area; the size and shape of the Outer Belfast Lough pMCZ boundary has been modified to reflect all survey records of OQ and to include areas of sediments considered a suitable habitat for OQ colonisation (Sabatini & Pizzolla, 2008). The boundary was drawn around the extent of OQ records (main feature) and includes a buffer equivalent to four times the depth (approximately 25x4=100m) in accordance with Joint Nature Conservation Committee (JNCC) guidance. This enables the pMCZ to act as a functional whole, both conserving OQ while representing and maintaining the integrity of all features present.</p>
Subtidal (sublittoral) sand	<p>The pMCZ boundary incorporates examples of different types of SS that are considered representative of the wider Outer Belfast Lough area. This includes the biotopes: circalittoral and infralittoral fine sand (SS.SSa.CFiSa - A5.25 and SS.SSa.IFiSa - A5.23) and circalittoral and infralittoral muddy sand (SS.SSa.CMuSa - A5.26 and SS.SSa.IMuSa - A5.24) (JNCC, 2008). The boundary incorporates a representative range of sand substrates: the majority of the pMCZ consists of gravelly sand with muddy sand in the middle and to the south, with both substrates supporting OQ populations and SPBM communities. To the southeast, along the boundary, coarser substrates such as sandy gravels are present. The extent of SS in the AoS is supported by the broad coverage of grab samples, PSA analysis, predictive habitat mapping (UK SeaMap 2010 and EU SeaMap 2014 v8.3) and biotope assignment from photographic/video images and grab samples (AFBI, 2015; DOE Outer Belfast Lough pMCZ survey 2015).</p>

Stage 4 - Assess the effectiveness of managing features within the proposed Area of Search	
Summary of assessment	There is potential for management measures to be implemented successfully to achieve the conservation objectives of the pMCZ features.
	Guideline met. As a result the original AoS and subsequent pMCZ progresses as potential area for MCZ designation to Stage 5.
Detailed assessment	
There is a high probability that management measures, and the ability to implement them, will deliver the objectives of the MCZ	
<p>As the Outer Belfast Lough MCZ features are in unfavourable condition the conservation objectives have been set to 'recover these features to favourable condition'. The current available evidence indicates that the population of OQ is considered to be in unfavourable condition possibly as a result of historic fishing that has taken place along with reduced recruitment of the species (see 2d). This, combined with a number of activities (present and future) that are capable of adversely affecting the features indicate there is a need to consider what additional management is required. This will aid in the achievement of the conservation objectives for the MCZ features.</p> <p>There are mechanisms through the European Commission under the Fisheries Act (Northern Ireland) 1966 that can be used to support the introduction of spatial fisheries measures to conserve the feature of the MCZ. Under the Marine and Coastal Access Act (2009) the Department has the responsibility for licensing certain activities; in some cases the Environmental Impact Assessment (EIA) process may be applicable. The Department also has powers to introduce bye-laws if required under the Marine Act (Northern Ireland) 2013. The Conservation Objectives and Potential Management Options for Outer Belfast Lough MCZ detail the various activities likely to affect the MCZ feature and suggest management options.</p>	

Stage 5 - Assess the ecological coherence to prioritise between different areas based on the contribution to the MPA network			
Summary of assessment	This is the only MCZ put forward for Northern Ireland for the OSPAR T&D species OQ so the site contributes significantly to the MPA network. The site also makes a contribution towards the MPA network for the representative biotopes of SS in OSPAR Region III.		
	Guideline met		
Detailed assessment			
The potential area contributes significantly to the coherence of the MPA network in the seas around Northern Ireland			
Feature	Representation	Replication	Adequacy
Ocean quahog (<i>A. islandica</i>)	The MCZ in Northern Ireland is a stronghold as it contains the second densest population of OQ in UK waters. This feature is an OSPAR T&D species (OSPAR, 2009) and a PMF in Northern Ireland.	Replication of this feature in the network is proposed within OSPAR Region III (Offshore and inshore Scottish MPAs). As an OSPAR T&D species in Region II it is considered important to have greater replication for the feature in the wider OSPAR region.	The whole aggregation of OQ is included within the MCZ.
	Viability	Connectivity	Management
	The precautionary approach has been applied as there is no information for the size of area required for a minimum viable population which covers the whole OQ life-cycle (Hill	Not applicable ⁶ .	There is potential for management measures to be implemented successfully to achieve the conservation objectives of the MCZ feature such as fisheries

⁶ Connectivity between different regional networks and individual MPAs has only been assessed for some mobile species and large scale features. There is currently little evidence on linkages for low mobility species and sea-bed habitats in UK waters. More modelling work for assessing linkages is needed.

	<p><i>et al.</i>, 2010). Suggested larval dispersal distance is up to 49km. JNCC guidance suggests a minimum viable patch diameter of 0.5km (Natural England & JNCC, 2010). Where the feature occurs in a restricted location protection of the whole patch is required for viability (Hill <i>et al.</i>, 2010). The MCZ boundary covers the OQ extension with an area of 2.507km².</p>		measures, licensing activities and through bye-laws.
	Best available evidence	Economic, cultural and social issues	
	<p>Best available evidence has been used to arrive at the decision regarding the feature and boundary development. Refer to Data confidence assessment for Outer Belfast Lough MCZ for further details.</p>	<p>For further details refer to Conservation Objectives and potential Management Options for Outer Belfast Lough MCZ and Regulatory Impact Assessment (RIA).</p>	
Subtidal (sublittoral) sand	Representation	Replication	Adequacy
	<p>Representative of NI marine environment. SS sediments are a key habitat supporting populations of OQ. This habitat is considered to be</p>	<p>Replication of this feature in the network is proposed within OSPAR Region III (Offshore and inshore Scottish MPAs).</p>	<p>For adequacy, a minimum proportion target of 15% for SS is suggested to support the network of MPAs (A5.2) (Natural England & JNCC, 2010). At present a current</p>

	<p>functionally linked to OQ and critical to its seabed colonisation. The broad scale habitat SS A5.2 is in the UK list of Priority Species and Habitats (UK BAP).</p>	<p>The feature also contributes towards replication within NI waters as it is also a feature for Waterfoot MCZ.</p>	<p>proportion of 9.7% is protected within Northern Ireland's MPAs, therefore the addition of the MCZ would increase the percentage to 9.85% (JNCC EUSeaMap, 2014)</p> <p>The area of SS in Northern Ireland is 1643.3km² while 159.32km² of this is currently protected in the existing MPA network. The MCZ will increase this area to 161.82km².</p>
	<p>Viability</p>	<p>Connectivity</p>	<p>Management</p>
	<p>The home range of characteristic species for this habitat would be covered by an area less than 10km². This is based on the area required to support a genetically viable population of the majority of the characteristic species. An area of 478m² is thought to be adequate to protect the majority of species utilising Subtidal (sublittoral) sand and be self sustaining (Hill <i>et al.</i>, 2010, Natural England & JNCC, 2010). The current MCZ area is 2.507km².</p>	<p>There are multiple connections in the NI network, including Waterfoot MCZ (Barnard <i>et al.</i>, 2014). This seabed feature with different types of sediment is important for its wider functional significance and its role supporting high biodiversity and provision of migration corridor and increased productivity. The location of the MCZ is within an open area that is connected with the existing MPA network.</p>	<p>There is potential for management measures to be implemented successfully to achieve the conservation objectives of the MCZ features. These may include fisheries measures, licensing activities and though bylaws.</p>

	Best available evidence	Economic, cultural and social issues
	<p>Best available evidence has been used at the time. Refer to Data Confidence Assessment for Belfast Lough MCZ for further details.</p>	<p>For further details refer to Conservation Objectives and potential Management Options Outer Belfast Lough MCZ and RIA.</p>

Data sources and Bibliography

AFBI. 2015. Species and habitat data for Marine Conservation Zone Areas of Interest. Rathlin island, Ballycastle Bay and Outer Belfast Lough. Report to the Department of the Environment

Barnard, S., Burdon, D., Strong A. and Atkins, J. 2014. The Ecological Coherence and Economic and Social Benefits of the Northern Ireland MPA Network. Report to the Northern Ireland Marine Task Force. Institute of Estuarine & Coastal Studies (IECS). Report Ref: YBB238-F-2014.

Clements, A. and Loureiro, C. 2014. Contemporary population distribution and habitat suitability modelling for the ocean quahog (*Arctica islandica*) in Irish coastal waters. AFBI, U and University of Algarve.

De Wilde, P.A.W.J., Berghuis, E.M. and Kok, A. 1986. Biomass and activity of benthic fauna on the Fladen ground (northern North Sea). Netherlands Journal of Sea Research. Volume 20, Issues 2–3, August 1986, Pages 313–323.

FEAST website (Feature Activity Sensitivity Tool).
<http://www.marine.scotland.gov.uk/FEAST/Index.aspx>.

Hill, J., Pearce, B., Georgiou, L., Pinnion, J. and Gallyot, J. 2010. Meeting the MPA network principle of viability: feature specific recommendations for species and habitats of conservation importance. Natural England Report 043.

Hughes, D.J. 1998. Sea pens & burrowing megafauna (volume III). An overview of dynamics and sensitivity characteristics for conservation management of marine SACs. Scottish Association for Marine Science (UK Marine SACs Project).

JNCC. 2008. UK Biodiversity Action Plan. Priority Habitat Descriptions: Subtidal Sands and Gravels. From: UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock).
http://jncc.defra.gov.uk/PDF/UKBAP_BAPHabitats-54-SubtidalSandsGravels.pdf

JNCC. 2014. JNCC clarifications on the habitat definitions of two habitat FOCI: Mud habitats in deep water and sea-pen and burrowing megafauna. Peterborough, UK.

JNCC EU SeaMap 2014 v8.3. [EMODnet. EUSeaMap: A broad-scale physical habitat map for European Seas.](#)

Lancaster, J. (Ed.), McCallum, S., Lowe, A.C., Taylor, E., Chapman, A. and Pomfret, J. 2014. Development of detailed ecological guidance to support the application of the Scottish MPA selection guidelines in Scotland's seas. Scottish Natural Heritage Commissioned Report No.491. Ocean Quahog Aggregations – supplementary document.

Natural England and JNCC. 2010. Ecological Network Guidance.

http://jncc.defra.gov.uk/PDF/100705_ENG_v10.pdf

OSPAR Commission. 2008a. List of Threatened and/or Declining Species and Habitats. Reference Number: 2008-6. OSPAR Commission. 2008b. Case Reports for the OSPAR List of Threatened and/or Declining Species and Habitats. OSPAR Commission. Biodiversity Series.

http://qsr2010.ospar.org/media/assessments/p00358_case_reports_species_and_habitats_20_08.pdf.

OSPAR Commission. 2009. Background Document for Ocean quahog *Arctica islandica*.

http://www.ospar.org/documents/dbase/publications/p00407/p00407_ocean_quahog.pdf.

Ridgway, I.D. and Richardson, C.A. 2010. *Arctica islandica*: the longest lived non colonial animal known to science. Reviews in Fish Biology and Fisheries 21: 297-310.

Ridgway, I. D., Richardson, C. A., Scourse, J. D., Butler, P. G., and Reynolds, D. J. 2012. The population structure and biology of the ocean quahog, *Arctica islandica*, in Belfast Lough, Northern Ireland. Journal of the Marine Biological Association of the United Kingdom, 92(03), 539-546.

https://www.researchgate.net/publication/259419986_The_population_structure_and_biology_of_the_ocean_quahog_Arctica_islandica_in_Belfast_Lough_Northern_Ireland

Sabatini, M. and Pizzolla, P. 2008. *Arctica islandica*. Icelandic cyprine. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom.

Available from: <http://www.marlin.ac.uk/speciesinformation.php?speciesID=2588>.

Tillin, H.M., Hull, S.C. and Tyler-Walters, H. 2010. Development of a sensitivity matrix (pressures-MCZ/MPA features). Report to the Department of Environment, Food and Rural Affairs from ABPmer, Southampton and the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK. Defra Contract No. MB0102 Task 3A, Report No. 22.

Witbaard, R. and Bergman, M.J.N. 2003. The distribution and population structure of the bivalve *Arctica islandica* L. in the North Sea: what possible factors are involved? Journal of Sea Research 50 (2003) 11–25.



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Photos represent Priority Marine Features found throughout the Northern Ireland Inshore Region

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