Coquet to St Mary's MCZ Fisheries Assessment

Revision history		
Date	***Revision***	***Editor***
12/10/2021	Document created.	BH
23/11/2021	Document drafted.	BH
14/12/2021	Document reviewed internally.	AA
20/12/2021	Sightings data updated and Table of knowledge gaps added.	BH
June 2023	Evidence day, 1st review with NE	AA/CS/BH/KS
July 2023	Evidence day review and draft sent to NE	CS/AA
Nov 2023	NE returned document and comments addressed	CS/PW/KO
29/01/2024	Chapter 1 and 2 Assessment agreed	CS/PW/AA/KO
02/12/2024	Evidence day review - chapters 3-5 agreed	CS/PW/SR/AA
04/12/2024	Document combined and formatted	SR
16/12/2024	Document reviewed	AA
19/12/2024	Document finalised	SR

Note: sections of this document have been taken directly from or modified from the MMO Fisheries Assessment Template, Flyde MCZ Fisheries Assessment and West of Walney MCZ Fisheries Assessment.

Marine Protected Area	**Coquet to St Mary's MCZ**
Features	High energy infralittoral rock, High energy circalittoral rock, High Energy Intertidal Rock, Intertidal Coarse Sediment, Intertidal Mixed Sediments Intertidal Mud, Intertidal Sand & Muddy Sand, Intertidal Underboulder Communities, Low Energy Intertidal Rock, Moderate energy Infralittoral Reef Moderate Energy Intertidal Rock, Peat & Clay Exposures, Subtidal Coarse Sediment, Subtidal Mixed Sediments, Subtidal Mud, Subtidal Sand
Gear Type	Hand work (access from land)
Gear/Feature Interaction Reference	CSMMCZ-317 CSMMCZ-319 CSMMCZ-315 CSMMCZ-309 CSMMCZ-310 CSMMCZ-307 CSMMCZ-308 CSMMCZ-316 CSMMCZ-313 CSMMCZ-318 CSMMCZ-314 CSMMCZ-320 CSMMCZ-312 CSMMCZ-311 CSMMCZ-306 CSMMCZ-305

Contents

1.1 Summary

Table 1 shows a summary of the outcomes of the Coquet to St Mary's MCZ Assessment.

Table 1: Assessment Summary

Features	Activity/gear	Part A outcome	Part B outcome	In-combination assessment	Confidence
High energy intertidal rock Intertidal under boulder communities Low energy intertidal rock Moderate energy intertidal rock	Handwork from land	Capable of affecting (other than insignificantly)	Not capable of affecting (other than insignificantly)	No significant risk	M
Intertidal mixed sediments Intertidal mud Intertidal sand and muddy sand Intertidal coarse sediment Subtidal coarse sediment Subtidal mixed sediments	Handwork from land	Not capable of affecting (other than insignificantly)	N/A	No significant risk	H

Subtidal sand Subtidal mud					
Peat and clay exposures (at this time only known to be intertidal)	Handwork from land	Not capable of affecting (other than insignificantly)	N/A	No significant risk	M
	Handwork from land*	Not capable of affecting (other than insignificantly)	N/A	No significant risk	H

*Gear/feature interaction does not occur within Coquet to St Mary's MCZ because the activity does not occur or the interaction is incapable of occurring (blue interaction).

1.2 Introduction

Table 2 shows the name and legal status of the site.

Table 2: Site details

Name and legal Status of site(s):	Name of site(s)	Legal status
	Coquet to St Mary's MCZ	MCZ

Coquet to St Mary's Marine Conservation Zone (MCZ) is an inshore site that runs along the southern half of the Northumberland Coast, within the northern North Sea in the north-east of England. The site covers approximately 192 km² of intertidal and subtidal habitats, stretching from Alnmouth in the north to Whitley Bay to the south, and from mean high water out to approximately 7.5km at its seaward-most extent. Coquet to St Mary's MCZ contains a mosaic of sediment and hard substrate benthic habitats, which in turn support a wide range of diverse communities.

The intertidal habitats range from rocky shore platforms and outcrops, to large sandy bays and beaches, each supporting unique communities. Rocky shores support large abundances of red algae, fucoids and kelp, whilst intertidal boulders provides shelter and habitat for a wide variety of crustaceans, molluscs, anemones and encrusting bryozoans. Elsewhere mud and sand flats contain burrowing bivalves and worm communities, whilst amphipods dominate the strandline of sandy beaches. Rare exposures of intertidal peat and clay are found along patches of the coastline, including fossilised tree roots from millions of years ago.

Shallow sloping infralittoral rock platforms also support thriving communities of macroalgae, which in turn support species including hydroids, sponges and anemones. The infralittoral rocky seabed gives way to circalittoral rock, where light penetration is too low to support diverse faunal communities, but instead a large diversity of benthic fauna flourish, including dead man's fingers, hornwrack and sponges. Circalittoral rocky habitats are interspersed between wide areas of subtidal mud, sand and mixed sediments, each of which support their own range of species, including burrowing bivalves, bristle worms, sea pens and urchins. Sandwaves and ripples are formed by underwater currents shaping sediments on the seafloor.

The northern edge of the MCZ abuts with the Berwickshire and North Northumberland Coast SAC, and much of the northern section of the site overlaps with the Northumberland Marine SPA. The site overlaps with the intertidal parts of Coquet Island SPA and St Mary's Island Local Nature Reserve, but does not include the terrestrial parts.

These sites are important for other species too, including marine mammals and seabirds. Grey seals make extensive use of St Mary's Island in the south of the MCZ as a haul out site, whilst the area is also important for white-beaked dolphins and minke whales. The site surrounds Coquet Island SPA, which supports internationally important numbers of terns, including the largest breeding colony of roseate terns in England. These species make extensive use of the MCZ for foraging and other activities.

The conservation objectives for all MCZs are that the features:

(a) so far as already in favourable condition, remain in such condition; and
(b) so far as not already in favourable condition, be brought into such condition, and remain in such condition.

More specific information on how to achieve the conservation objective of an MCZ is provided in the general management approach within the factsheet for each site[1].

This assessment uses an initial screen of fishing activities and designated features, based on the Matrix of fisheries gear types and European marine site protected features[2] (hereafter 'the Matrix') developed as part of Defra's revised approach to the management of commercial fishing in European marine sites (EMS)[3]. The Matrix classifies interactions between EMS features and different fishing activities as red, amber, green or blue.

All interactions classified as 'blue' are screened out of this assessment as there is no pathway for impact. Interactions classified as 'green' are considered low risk but are included in this assessment and when assessing impacts in-combination with other activities. Interactions classified as amber are subject to full assessment. A classification of 'red' indicates that an assessment is not required and the interaction should automatically be addressed through a management measure, however they are included in this assessment.

MCZs are associated with an overlapping but different set of designated features to those associated with EMS. Therefore, for the purposes of the initial screen in this assessment, the designated features have been matched with equivalent EMS features. Where there is no clear match, a precautionary (i.e. more sensitive) EMS feature has been used. This precautionary matching applies only to the initial screen, and not to the later, more detailed assessment.

Table 3 shows the features for which this MCZ has been designated and associated general management approach, while Figure 1 shows the locations of features within the MCZ.

[1] MCZ factsheets are available online: http://publications.naturalengland.org.uk/category/1721481
[2] www.gov.uk/government/publications/fisheries-in-european-marine-sites-matrix
[3] https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery

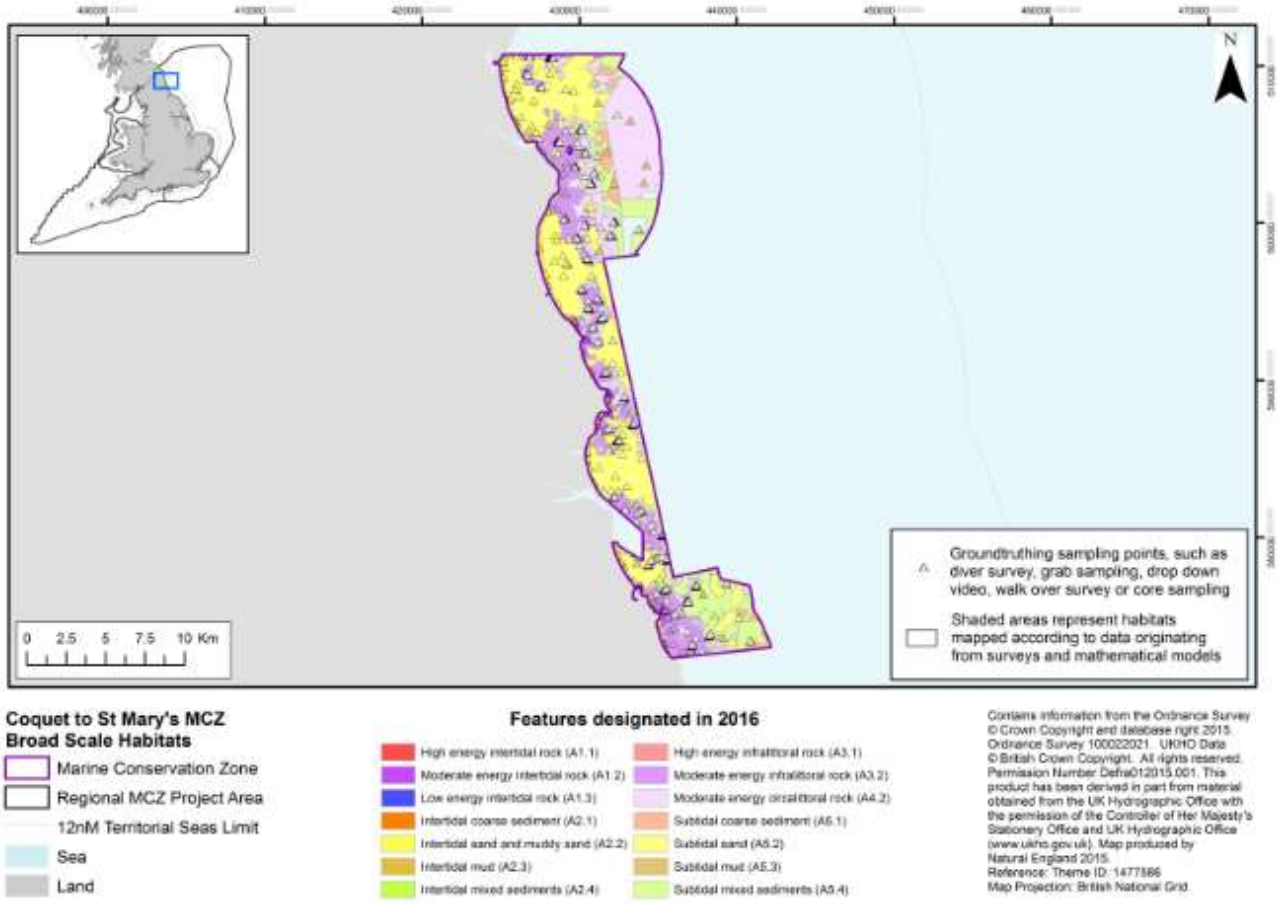

Figure 1. Coquet to St Mary's MCZ Feature Locations

Table 3: Designated features and general management approach

Feature	Fisheries Matrix Sub-feature	General Management Approach
High energy infralittoral rock	Sub-tidal bedrock reef	Maintain in favourable condition
High energy intertidal rock	Intertidal bedrock reef	Maintain in favourable condition
Intertidal coarse sediment	Intertidal gravel and sand	Maintain in favourable condition
Intertidal mixed sediments	Intertidal mixed sediments	Maintain in favourable condition
Intertidal mud	Intertidal mud	Maintain in favourable condition
Intertidal sand and muddy sand	Intertidal mud and sand	Maintain in favourable condition
Intertidal under boulder communities	Intertidal boulder and cobble reef	Maintain in favourable condition
Low energy intertidal rock	Intertidal bedrock reef	Maintain in favourable condition

Moderate energy circalittoral rock	Sub-tidal bedrock reef	Maintain in favourable condition
Moderate energy infralittoral rock	Sub-tidal bedrock reef	Maintain in favourable condition
Moderate energy intertidal rock	Intertidal bedrock reef	Maintain in favourable condition
Peat and clay exposures	N/A	Maintain in favourable condition
Subtidal coarse sediment	Coarse Sediment	Maintain in favourable condition
Subtidal mixed sediments	Subtidal mixed sediments	Maintain in favourable condition
Subtidal mud	Subtidal mud	Maintain in favourable condition
Subtidal sand	Subtidal sand	Maintain in favourable condition

1.2.1 High energy infralittoral rock

High energy infralittoral rock is located below the low tide water limit, but close enough to the surface for plants and algae to grow. This feature is exposed to the full force of strong tidal currents and waves. As a result, this habitat is often dominated by the hardier and current-loving kelp and red algae. This feature is formed by open bedrock shelves, shallow sloping flat reefs, rocky outcrops, gullies and ledges. Areas of boulders may also occur, but all finer sediments are stripped away by the tide and waves.

Kelp forests thrive in this high energy environment, dominating the infralittoral fringe. Kelp holdfasts provide stability and shelter for a range of species, protecting them against predators, as well as strong tide and waves. Hardy red algae, such as dulse and sea beech, also thrive in this feature, either attaching to the rock or attaching epiphytically to the kelp canopy or stipes. Kelp holdfasts form microhabitats by providing refuge from the high energy environment for a diverse community of fauna, such as chitons, hydroids, sponges and topshells. Common lobster and anemones may shelter within cracks and crevices within the bedrock, whilst the bread crumb sponge and keel worms cover stable rocky areas.

High energy infralittoral rock is found just offshore from Seaton Sluice, running down the coast to surround St Mary's Island (Natural England, 2013). This feature is observed close to the intertidal zone, where the wave action is greatest, and is surrounded by moderate energy infralittoral rock on the seaward side.

The extent of this habitat is estimated to be 21.9 ha

1.2.2 High energy intertidal rock

High energy intertidal rock is subject to the full force of the tide and waves. Very high exposure to the hydrodynamic forces removes all of the fine sediments, such as sand and mud, from the environment, leaving bare rock and large cobbles behind. This feature can form a wide range of different structures, including sloping bedrock, large gullies and crevices, outcrops, ledges, boulders and temporary rock pools at low tide.

The force of the tide and waves results in resilient communities of hardy plants and animals, such as limpets and acorn barnacles. Cracks and crevices in the rock support dahlia anemones, dog whelks and hermit crabs. Mid-shore rock pools, exposed at low tide, may support coralline red algae crusts, sponges,

and some areas of ephemeral green macroalgae (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Wracks and red algae, such as false Irish moss, are found on the lower intertidal rock, whilst kelp dominates the infralittoral fringe. The canopy, stipes and holdfasts of oarweed and dabberlocks provides important refuge from the strong tide and waves for a wide range of species, including chitons, hydroids and anemones (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

High energy intertidal rock can be found at Amble, the eastern side of Coquet Island, between Cresswell and Lynemouth and around Newbiggin. This feature is also observed at the coastline between Seaton Sluice and St Mary's Island (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014), (Natural England, 2013).

The extent of this habitat is estimated to be 52.5 ha.

1.2.3 Intertidal coarse sediment

Coarse intertidal shores are comprised of shingle and gravel, sometimes interspersed with sand and empty shells. Coarse sediment beaches are found on exposed and open shores, where the force of the tide and waves wash away fine sands, silts and muds, leaving the larger material behind. This exposed and highly-mobile environment is often unstable and supports relatively low species diversity, especially during the winter months. However, hardy and resilient communities are able to thrive in this highly mobile and disturbed environment. During summer, the more stable cobbles and shells may be colonised by opportunistic macroalgae and barnacles, whilst amphipods dominate the strandline and seek shelter in decaying seaweed and debris. Harbour crabs and brittlestars may also be found within this feature.

Areas of coarse sediment can be found on beaches at Cambois, Blyth and Amble, as well as between Lynemouth and Cresswell (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). A small section of gravel is also observed at Whitley Sands (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

The extent of this habitat is estimated to be 30.9 ha.

1.2.4 Intertidal mixed sediments

Intertidal mixed sediment consist of a range of unsorted gravels, rocks, sands and mud. This feature is found in variable energy environments with changeable exposure to the tide and waves, resulting in the poor sorting of sediments. This allows fine sands and silts to accumulate around larger pebbles and cobbles, creating a diverse mosaic of substrates. As a result, areas of intertidal mixed sediment can support a diverse range of communities, which include polychaete worms, crabs and brittlestars, whilst talitrid amphipods dominate the upper shore and strandline. Opportunistic green macroalgae may attach to the larger and more stable pebbles and cobbles.

Isolated patches of intertidal mixed sediment are observed between St Mary's Island and Seaton Sluice.

The extent of this habitat is estimated to be 4.7 ha.

1.2.5 Intertidal mud

Intertidal mud is formed in very sheltered coastal inlets along the sea shore, where the weak influence of the tide and waves is insufficient to strip away fine sediments, allowing fine sand, silts and clay to accumulate. Intertidal mud is a highly hospitable and nutrient rich environment, which supports a diverse community dominated by bivalves, such as the Baltic tellin, and polychaete worms, such as the lugworm, and other burrowing infauna. This in turn provides important feeding grounds for larger species, such as wading birds, some of which feed exclusively upon burrowing invertebrates within this feature during winter. Opportunistic green macroalgae may form mats on the mud during summer.

Intertidal mudflats are located on the flanks of Seaton Burn (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

The extent of this habitat is estimated to be 2.0 ha.

1.2.6 Intertidal sand and muddy sand

Intertidal sand and muddy sand represents the vast majority of the intertidal sediment within the site, forming wide beaches along the Northumberland coastline. Pure sandy shores are often highly mobile and species poor, often dominated by polychaete and oligochaete worms, ephemeral green macroalgae and amphipod communities which are resilient to the clean, abrasive and mobile environment. Sandhoppers (talitrid amphipods) reside within the strandline on the upper shore, seeking refuge amongst the decomposing seaweed and debris (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Clean intertidal sand can be found at Whitley Sands, Blyth North and South Beaches, and Newbiggin Beach.

Where sandy shores occur in more sheltered locations, muds and silts can accumulate, forming muddy-sand. This allows the features to support a much wider and diverse community, including burrowing infauna such as lugworm, horseshoe worms, and the Baltic tellin. Striped venus clams and polychaete worms burrow within the sediment. Fucoid wracks and red algae grow on the lower shore of muddy-sand beaches, such as at Cresswell (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014), which also support burrowing bristleworms. Epifauna such as shore crabs and hermit crabs are also found within this feature.

Muddy sandy shores are located at the top of Whitley Sands, Newbiggin Beach, Druridge Bay, Hauxley Beach and Alnmouth Bay (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

The extent of this habitat is estimated to be 500.9 ha.

1.2.7 Intertidal under boulder communities

Intertidal boulders host diverse under-boulder communities as a result of the shelter they provide from the tide and waves. Micro-habitats are created underneath boulders and large rocks, and within crevices and cracks in the rock. These rocks can provide a mosaic of habitats and a refuge for life, with the boulders providing a hard substratum for organisms to attach to, whilst also sheltering biological communities from the sun and waves.

The underneath of boulders support diverse and vibrant communities. The boulders themselves are encrusted by mussel sprat, limpets, acorn barnacles, sponges, coralline red algae and bryozoans. Other regularly occurring species include winkles, dog whelk, brittlestars and anemones (Marine Ecological

Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Crabs, lobsters and small fish may also reside in cracks within or underneath the boulders, seeking refuge at low tide. Filamentous red algae and fucoids also attach to the more stable boulders, including dulse, sea beech, red rags and toothed wrack. In an intertidal verification survey for the site, 59 out of the 86 species found were recorded within underboulder communities, thereby demonstrating the biological diversity and importance of this habitat (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

Intertidal underboulder communities are found distributed throughout the site, including at St Mary's Island, Blyth beaches, Newbiggin, Lynemouth and Cresswell (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

The extent of this habitat is estimated to be 0.25 ha.

1.2.8 Low energy intertidal rock

Low energy intertidal rock is found on rocky shores sheltered from the full force of the tide and waves. Often in the form of shallow sloping bedrock, with the addition of rocky boulders, cobbles and gullies. When the tide goes out rockpools may form, providing temporary and highly competitive microhabitats. Due to the low energy of the tide and waves, plants and algae are able to anchor on to the rock and grow in this environment. A thin veneer of sand and mud may also accumulate where the tide and waves are weak.

Low energy intertidal rock supports a wide range of plants and algae through zonation of the intertidal area, which in turn provides a wide variety of habitats for animal communities. Spiral wrack, channelled wrack and green algae dominate the upper intertidal, whilst bladder wrack and knotted wrack dominate the mid-shore. Mussels, limpets and acorn-barnacles colonise the bare rock, whilst dog whelk and winkles reside in the cracks and crevices within the rock.

Rock pools within the mid to upper intertidal support coralline red algae crusts, with some areas of ephemeral green algae (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Rockpools also provide habitat for the beadlet anemone, hermit crab, and common starfish. Toothed wrack can be found at the lower shore and infralittoral fringe, and may host the epiphytic sea mat bryozoan (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

Low energy intertidal rock is found interspersed with other rocky habitats across the site, often on the landward side of other rock formations, which help to shelter this feature from the waves and tide. Examples of low energy intertidal rock are found at Newbiggin Beach, Cresswell and around Coquet Island.

The extent of this habitat is estimated to be 57.6 ha.

1.2.9 Moderate energy circalittoral rock

Moderate energy circalittoral rock is located in deep waters, below the level where light can penetrate enough for extensive plant growth. However, where the majority of plant life is unable to survive, faunal turfs and diverse animal communities can be found. This feature consists of open bedrock, shallow sloping reefs, rocky outcrops, gullies and ledges.

Circalittoral boulders, cobbles and bedrock support a wide range of species, which may differ depending on the seabed topography, depth and tidal strength. Regularly occurring species include sponges, dead man's fingers, keel worms, hydroid and hornwrack (Amec, 2011). Faunal turfs of bryozoans, sponges and

hydroids coat the bedrock and are grazed by edible urchins. Other common species include edible crabs, lobsters, brittlestars and common starfish.

Moderate energy circalittoral rock is common within the site's deep water habitats, located at the eastern side of the MCZ, offshore from Blyth, Newbiggin, Lynemouth and Cresswell. Additional areas are located offshore from Druridge Bay, Amble and east of Coquet Island. This feature is often overlaid by patches of subtidal mud, which can form a thin veneer over the bedrock (EMODnet, 2016) (Environment Agency (EA) and Cefas, 2014).

The extent of this habitat is estimated to be 6118.0 ha.

1.2.10 Moderate energy infralittoral rock

Moderate energy infralittoral rock lies just below the low tide mark, and is constantly submerged by seawater but close enough to the surface to allow plants and algae to flourish. This feature is formed by open bedrock shelves, shallow sloping flat reefs, rocky outcrops, gullies and ledges. Areas of boulders and cobbles may also occur.

Kelp forests of cuvie, dabberlocks and oarweed dominate the intertidal-infralittoral fringe, which in turn support red seaweeds, such as dulse and red rags. Within and below the kelp canopy, red algae grow epiphytically on the kelp stipes and holdfasts, as well as on the rock face. These include sea belt, pink crustose algae and sea beech (Amec, 2011). The kelp canopy and holdfasts provide stability and shelter for a diverse community of fauna, including the dahlia anemone, winkles, top shells, chitons, hydrozoans and bryozoans, protecting them against the tide and waves. Rock gunnels and common lobster may also shelter within the cracks and crevices of the rock face, whilst urchins graze the faunal and algae turfs which grow on the rocks.

This feature is highly abundant within the MCZ, and is observed offshore from Whitley Bay and St Mary's Island, up to Seaton Sluice (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Moderate energy infralittoral rock is also found off the coast from Blyth North Beach, Newbiggin, Lynemouth and Cresswell. This feature is also present off the coast of Low Hauxley, Amble and Coquet Island (Natural England, 2013) (EMODnet, 2016) (Environment Agency (EA) and Cefas, 2014).

The extent of this habitat is estimated to be 1166.9 ha.

1.2.11 Moderate energy intertidal rock

This feature is moderately exposed to the force of the tide and waves, which is at a sufficient strength to strip the environment of much of the finer sediments, such as sands and silts, which may overlay the bedrock. Moderate energy intertidal rock can form a wide range of different structures which provide a range of habitats. These include sloping bedrock, large gullies and crevices, ledges, boulders and temporary rock pools at low tide.

Moderate energy intertidal rock supports a wide range of biological communities within the site. Exposed rock on the mid to upper shore support acorn barnacles, limpets, tar lichen and filter feeders, whilst the cracks and crevices in the rock face provide refuge for the beadlet anemone, dog whelks, winkles, hermit crabs, edible crabs and rock gunnels. Mid-shore rock pools, exposed at low tide, may support coralline

crusts of red algae with some areas of ephemeral green algae (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014).

Bladderwrack, toothed wrack and red seaweeds, such as pepper dulse, attach to the bedrock at the lower shore, hosting a range of species including topshells and epiphytic bryozoans. Kelps dominate the infralittoral fringe, including cuvie, oarweed and dabberlocks. The stability and shelter of kelp canopies, stipes and holdfasts create microhabitats for a range of species, including crustose sponges, hydroids, anemones and the epiphytic dulse.

Moderate energy intertidal rock is found throughout the rocky shores of this site, including around Hauxley, Coquet Island, and the headlands of Druridge Bay and Blyth.

The extent of this habitat is estimated to be 62.5 ha.

1.2.12 Peat and clay exposures

Peat and clay exposures are rare features which occur when strata of peat and clay breach the surface sediment layers, either in the intertidal or subtidal environment. Exposures can constitute of either peat or clay, or both strata can occur together. The influence of the waves and tide can cause areas of erosion and the mobilisation of fine sediments across the site. As a result, peat and clay exposures can be ephemeral, as the local hydrodynamic regime can cover and uncover this feature in a thin veneer of sediment.

Within the site this feature takes the form of exposed intertidal banks of peat or clay. Pebbles and stones on the surface of this feature may provide a hard and stable attachment point for opportunistic green macroalgae in summer. Along the Amble coastline, fossilised peat tree roots can be observed, having been formed millions of years ago. Peat and clay exposures are vulnerable to damage from anthropogenic activities and has no recoverability due to this feature having been formed millions of years ago (Joint Nature Conservation Committee (JNCC), 2008).

Peat and clay exposures are observed within the intertidal zone near Amble and to the north of Seaton Sluice (Marine Ecological Surveys Limited (MES) and The Marine Biological Association (MBA), 2014). Peat and clay exposures within the MCZ are found close to the shore where the tide and waves strip sediments away from this feature, which is characterised by soft rock and fossilised tree roots. Some ephemeral green and red algae may be found within this feature, including Ulva spp. and false Irish moss, Mastocarpus stellatus. Exposures may also be present ephemerally within the subtidal zone, but no records are currently available (Fitzsimmons et al., 2015). Much less is known about peat and clay exposures when located in deeper waters.

The extent of this habitat is estimated to be 2.7 ha.

1.2.13 Subtidal coarse sediment

Subtidal coarse sediment is a high energy environment consisting of gravel, shingle, shell fragments and coarse sand. This substrate is scoured by strong tidal currents and waves, which strip away fine sediments, such as silts and clay. The regular and extensive movement of coarse sediment causes significant disturbance and abrasion, resulting in a relatively low diversity but specialised community.

The more stable areas of subtidal coarse sediment support dead man’s fingers, tube building worms, hornwrack and hydroids. Hermit crabs, common starfish and brittlestars can be found in abundance on the

sea floor, whilst keel worms form tubes on stable rocks, cobbles and shells. Burrowing infauna includes bivalves and the sea potato. Flatfish, such as plaice and dab, hunt over this feature and can submerge themselves within the sediment.

Areas of subtidal coarse sediment are located in the north-eastern section of the site, offshore from the Amble coast, and offshore from Whitley Bay, in the south-eastern corner of the MCZ (Foster-Smith, 1998) (Seasearch, 2013). The confidence in the extent of this feature is low, in the initial site assessment document (SAD) the extent of this feature was reported as 1.00 km^2 with low confidence. A post-survey site report using the findings of a dedicated seabed survey conclude that this feature was identified as present but not included in the updated broad-scale habitat (BSH) map as there was insufficient data to reliably map it (Fitzsimmons et al., 2015).

The extent of this habitat is estimated to be 8.7 ha.

1.2.14 Subtidal mixed sediments

Subtidal mixed sediments are comprised of a mosaic of substratum, ranging from small rocks, cobbles and shingle, to sand, shell fragments, silts and mud. This feature can have a high diversity in substrate types depending upon the environmental conditions. Fine sands and silts will accumulate in lower energy environments, whilst stronger tides and waves can strip these fine sediments away leaving a coarser substrate composition.

The diversity of habitat types within this feature support a wide variety of plant and animal communities, including both infaunal and epifaunal. Bivalves, such as the white furrow shell, and polychaetes burrow into the mixed sediment, whilst dead man's fingers, keel worms and the bryozoan hornwrack attach to the more stable rocks and cobbles. Brittlestars, starfish, hermit crabs and harbour crabs are common mobile epifauna upon tide-swept mixed sediments.

This feature is found in the deeper offshore water in the north of the site, offshore from the Amble coast. Mixed sediment is also located offshore from St Mary's Island and Whitley Bay (EMODnet, 2016) (Environment Agency (EA) and Cefas, 2014). The confidence in the extent of this feature is low, in the initial site assessment document (SAD) the extent of this feature was reported as 2.58 km^2 with low confidence. A post-survey site report using the findings of a dedicated seabed survey conclude that this feature was identified as present but was not included in the updated broad-scale habitat (BSH) map as there was insufficient data to reliably map this (Fitzsimmons et al., 2015).

The extent of this habitat is estimated to be 37.0 ha.

1.2.15 Subtidal mud

Subtidal mud is comprised of very fine sediments which accumulate in sheltered and low energy environments. As a result, subtidal mud is often found in deeper waters where the tidal currents are weaker and are insufficient to mobilise and remove fine mud and silt sediments.

Subtidal mud can be a highly productive environment, supporting a diverse community of burrowing bivalves, including the white furrow shell, the Baltic tellin and the striped venus clam. The sea potato, lugworms, polychaete worms and the economically important Norway lobster also burrow within the muddy sediment. The slender sea-pen is also found within this habitat. The surface of subtidal mud is also used by

the flatfish plaice and dab for camouflage and hunting. However, the particular community which subtidal mud supports depends on the softness and cohesiveness of the local sediment.

A large area of subtidal mud is located in the northern offshore area of the MCZ, ranging offshore from the Amble coast down to Druridge Bay. Another area of subtidal mud can be found at the southern end of the MCZ near St Mary's Island. Subtidal mud occupies 29% of the MCZ, the confidence in its extent is medium-high (Fitzsimmons et al., 2015).

The extent of this habitat is estimated to be 4643.1 ha.

1.2.16 Subtidal sand

Subtidal sand is one of the most dominant features across the site, extending out to sea from Northumberland's wide sandy bays. Subtidal sand is highly mobile and is shaped by the waves, currents and tides, forming underwater sandwaves and ripples.

Subtidal sand supports a wide diversity of species, especially further offshore where the stability of the seabed is greater (Amec, 2011). A rich infaunal community includes burrowing polychaete and oligochaete worms, such as bristle worms and catworms. Nematodes and bivalves are common, such as the razor clam, Baltic tellin and the striped venus clam. Hermit crabs, edible crabs, brittlestars and common starfish live on the surface of the sand, whilst flatfish, such as plaice and dab reside and hunt over subtidal sand.

Large areas of subtidal sand can be found extending offshore from the site's sandy beaches. Areas of subtidal sand are found offshore from Alnmouth Bay, Druridge Bay, Cambois, Blyth South Beach and Lynemouth (Environment Agency (EA) and Cefas, 2014) (Fitzsimmons et al., 2015) (EMODnet, 2016).

The extent of this habitat is estimated to be 6422.9 ha.

1.3 Scope of this assessment - fishing activities assessed

The geographic scope of the assessment covers the whole site, and therefore includes all 16 designated features. As the whole site falls within the Northumberland Inshore Fisheries and Conservation District (Figure 2), the assessment and management of fishing activity will be carried out by Northumberland Inshore Fisheries and Conservation Authority (NIFCA).

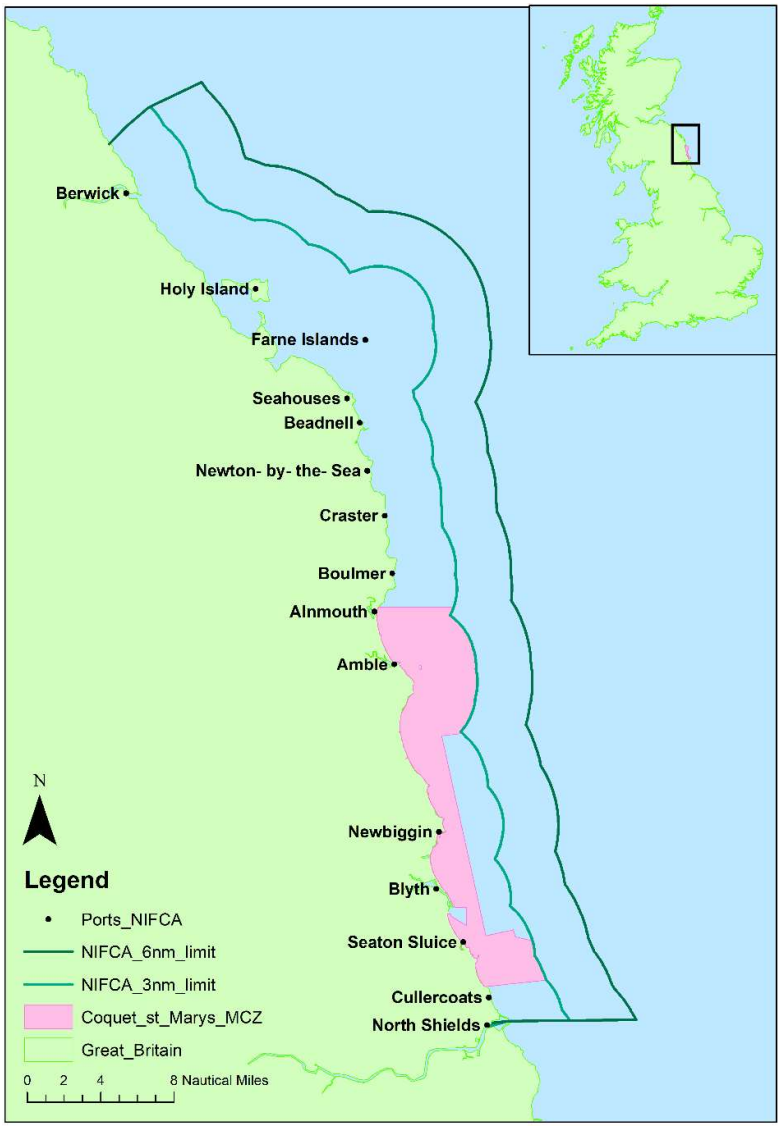

Figure 2. Location of Coquet to St Mary's MCZ in relation to the NIFCA District.

All fishing activity/feature interactions at this site identified as 'red', 'amber' and 'green' in the Matrix of fisheries gear types and European marine site protected features[2] (hereafter 'the Matrix') were considered for inclusion in this assessment. Fishing activity-feature interactions are also assessed if there are in-combination effects with other activities.

Annex 1 shows the fishing activities with amber interactions assessed at this site. The 'Matrix gear type' column shows the categories used in the Matrix. These are matched to the 'aggregated method' categories used in Natural England conservation advice packages.

Commercial and recreational sea fishing have the potential to vary in nature and intensity over time. This assessment considers a particular range of recent and likely future activity based on activity levels and type as identified in section 1.4.3 Fishing gear types used.

[2] www.gov.uk/government/publications/fisheries-in-european-marine-sites-matrix

To ensure the achievement of the conservation objectives of the site is not hindered should future activity occur outside of this range, activity will be monitored at this site, and this assessment will be reviewed should certain limits be triggered, please see section 7. Review of this assessment.

1.4 Activity description: All occurring activities

1.4.1 Fisheries Access/existing management

UK vessels operate throughout this site. However, as the MCZ is an inshore MCZ (within 0-3nm), no non-UK vessels operate within the boundary of the site.

There are various Northumberland IFCA byelaws[3] that pertain to Coquet to St Mary's MCZ. The byelaws below are therefore relevant to this assessment:

TRAWLING

- Restricted assess: a permit is required to fish using a trawl within the NIFCA district.
- Vessel size restrictions: no vessels over 12m in length can fish in the inner area (0-3nm from shore), no vessel over 18.3m can fish in the outer area (3-6nm).
- Gear restriction: only a single trawl fitted with a single cod end and one pair of otter boards is permitted.
- This byelaw prohibits the use of bottom towed fishing gear within the Coquet to St Mary's MCZ except using specified gear in accordance with an exemption from the Authority.

DREDGING

- A person must not use a dredge for the exploitation of sea fisheries resources within the Northumberland IFCA district and therefore the whole MCZ.
- A relevant fishing vessel transiting through the District must have all dredges onboard, lashed and stowed.

CRUSTACEA CONSERVATION

- Prohibits landing of v-notched or mutilated lobster, and soft or berried (egg bearing) edible crab and lobster, and detached parts of velvet crab, edible crab and lobster.

MINIMUM SIZES BYELAW

- This byelaw prohibits the removal from the fishery, retention on board, transhipping, landing, transporting, storing, selling, displaying or offering for sale specified marine organisms below specified sizes.

CRUSTACEA AND MOLLUSC PERMITTING AND POT LIMITATION

- Restricted assess: a permit is required to fish within the Northumberland IFCA district and therefore the whole MCZ.
- Pot limitation restricts the number of pots fished per permitted vessel to 800.
- Restricts the number of specified species that can be retained per day dependent on permit type.

MARKING OF FISHING GEAR AND KEEP BOXES

- All static fishing gear should be marked with a marker buoy or dahn that is clearly visible on the surface of the water and marked with the identification of the boat or contact details of the owner.

[3] https://www.nifca.gov.uk/byelaws/

FIXED ENGINES

- Spatial and seasonal closures for static nets.

1.4.2 Evidence Sources

To determine the levels of fishing activity, the following evidence sources and analyses were used (Table 4):

- VMS data
- I-VMS data
- NIFCA patrol sightings, recording GPS location of vessel and fishing activity.
- NIFCA shore patrol sightings of intertidal activities within two hours of low tide
- Expert opinion from inshore fisheries and conservation officers (IFCOs).
- Information from the fishing industry and stakeholders.

Table 4: Summary of generic confidence associated with fishing activity evidence (evidence used in this assessment highlighted in yellow)

Evidence source	Confidence	Description, strengths and limitation
VMS data	Low	VMS data were requested from the MMO. Vessels over 12m must be fitted with VMS. VMS sends routine 'pings' to the control centre every 2 hours to track a vessel's course and speed. NIFCA has worked with the MMO to get information for every vessel operating in the district. The data has been filtered for speed (only boats travelling under 4 knots analysed). From this, officers have inferred that no mobile gear fishing activity can be detected in or around the MCZ. However, this can only be **inferred** from these data (see limitations below). The VMS data from the MMO is not fit for purpose in this case. Inferences can be made from the data available, however the infrequency of the tracking 'pings' (every 2 hours per vessel) and the lack of detail about the vessel's activity makes it unsuitable for detecting fishing activity with confidence. Further, information is only available for vessel over 12m, any activity within the MCZ will be carried out by vessels under 12 m (NIFCA Byelaw 1). Data analysed was from 2017 and 2018.
I-VMS	Low - Moderate	I-VMS devices monitor inshore fishing activity by under-12 metre vessels and are more accurate than VMS devices. However, I-VMS data are not available for all <12m vessels who have indicated that they fish within Coquet to St Mary's MCZ. I-VMS tracks vessel activity, location and speed every three minutes. Inferences can be made to differentiate fishing activity as either being paused or steaming to identify speeds and distances at which vessels are likely to be fishing. In this instance trawling was determined to take place if I-VMS points were between 140-310m from each other, and vessel speeds were between 1.5-4.3 knots (nautical miles per hour). NIFCA have moderate confidence in the data for vessels fitted with I-VMS that report trawling in the MCZ via their permit returns. However, gaps lie where vessels do not have I-VMS working, and have not stated they are trawling in the MCZ. One full year of data was analysed from March 2022 to February 2023 to identify vessels potentially fishing within the MCZ.
NIFCA patrol sightings - At sea - On shore	Moderate	<u>At sea</u> NIFCA officers conduct routine at sea patrols throughout the district. Officers record all vessels sighted and their activity (fishing or steaming). Due to the nature of how this is recorded sightings data is estimated to be accurate to within 100m. NIFCA sightings data has a low sampling effort as it is limited by the number of patrols and the proximity of the patrol vessel to fishing activity <u>On shore</u>

		NIFCA officers conduct routine shore patrols throughout the district. Officers record all sightings of individuals fishing in intertidal areas when two hours either side of low tide. Activities include periwinkle gathering, lobster potting, bait digging and other forms of collection. The location and timing of these is accurate and is now submitted via an app contemporaneously, increasing accuracy from the beginning of 2021. To calculate the proportion of patrols where activities are sighted, sightings of 'No Activity' are also recorded which are likely less accurate or well-represented, though data is checked against patrol locations to account for this. This data is impacted by variables such as patrols targeting commercial fishing locations leading to some areas being underrepresented.
Expert judgement (IFCOs)	Moderate	The NIFCA district is a relatively small area (~1400km^2) and a number of NIFCA officers have been in post for many years. Coquet to St Mary's MCZ is in the south of the district located in close proximity to the NIFCA patrol vessels and the NIFCA office. This results in a higher patrol effort in the south than the north if the district. Broad scale knowledge of fishing activity for this area is therefore very good.
Information from fishing industry and stakeholders	Low - Moderate	NIFCA maintain a good working relationship with the local fishing industry and through which information on fishing activity, extent and intensity can be shared. NIFCA also have the capacity to run consultations in order to get the views of stakeholders on different topics. For example, in 2020 NIFCA sent out a Hand Gathering Call for Information, an open-ended consultation to summarise the thoughts and opinions of stakeholders in relation to bait collection and hand gathering activities throughout the district. From this, NIFCA are able to identify that activity occurs and, with a reasonable degree of confidence, where it occurs but cannot quantify effort due to a lack of available data such as VMS, log books etc.

1.4.3 Fishing gear types used

1.4.3.1 Intertidal handwork (intertidal handwork from land)

The title 'Intertidal handwork' covers a number of different activities involving the collection of organisms from the intertidal area either for human consumption or for use as bait for angling. Intertidal hand gathering activity the is known to occur in Coquet to St Mary's MCZ includes:

- Periwinkle gathering, this involves the collection of periwinkles by hand from the intertidal rocky areas, which can involve turning rocks, cobbles or boulders.

- Cleeking is a traditional method of catching lobster involving using a long pole with a hook to tease lobsters from under rocks or in crevices. Lobster will use their claws to clamp onto the hook and are removed from the sea.

- Collection of shore crab ('peeler'/green crab) *Carcinus maenus,* in rocky intertidal areas this involves turning rocks of looking under crevices for crab in their soft-shelled state. This is usually in the Spring/Summer months when the crab has just moulted, however there have been reports of this as a year-round activity where collectors will keep crabs 'in captivity' until they moult and can be used as effective angling bait.

- Seaweed collection, seaweed is collected from intertidal areas when exposed at allow tide. Collection areas will depend on the target species.

Chapter 2 Part A Assessment

2.1 Introduction

Part A of this assessment was carried out in a manner that is consistent with the 'capable of affecting (other than insignificantly)' test required by section 126(1)(b) of the Marine and Coastal Access Act 2009[4].

For each fishing activity, a series of questions were asked:

1. Does the activity take place, or is it likely to take place in the future?
2. What are the potential pressures exerted by the activity on the feature?
3. Are the pressures capable of affecting (other than insignificantly) the protected features of the MCZ?

For each activity assessed in Part A, there were two possible outcomes for each identified pressure-feature interaction:

1. The pressure-feature interactions were not included for assessment in Part B if:
    a. the feature is not exposed to the pressure, and is not likely to be in the future; or
    b. the pressures are not capable of affecting (other than insignificantly) the protected features of the MCZ.

2. The pressure-feature interactions were included for assessment in Part B if:
    a. the feature is exposed to the pressure, or is likely to be in the future; and
    b. the pressure is capable of affecting (other than insignificantly) the feature; or
    c. it is not possible to determine whether the pressure is capable of affecting (other than insignificantly) the feature.

Consideration of exposure to or effect of a pressure on a protected feature of the MCZ includes consideration of exposure to or effect of that pressure on any ecological or geomorphological process on which the conservation of the protected feature is wholly or in part dependent.

Table 5 shows the Natural England conservation advice package used to inform this assessment.

Table 5: Advice packages used for assessment

Feature	Package	Link
High energy infralittoral rock High energy intertidal rock Intertidal coarse sediment Intertidal mixed sediments Intertidal mud Intertidal sand and muddy sand Intertidal under boulder communities Low energy intertidal rock Moderate energy circalittoral rock	Natural England Conservation Advice for Marine Protected Areas Coquet to St Mary's MCZ	https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0030&SiteName=coquet&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

[4] www.legislation.gov.uk/ukpga/2009/23/contents

Moderate energy infralittoral rock Moderate energy intertidal rock Peat and clay exposures Subtidal coarse sediment Subtidal mixed sediments Subtidal mud Subtidal sand		

2.2 Activities not taking place

Table 6 shows activities which are excluded from further assessment as they either do not interact with the features in the ‘Feature’ column, do not take place and are not likely to take place in the future.

Table 6: Activities that do not interact with the features in the 'Feature' column or not taking place and not likely to take place in the future. Row highlighted in green relevant to this assessment.

Feature	Gear type	Justification
Intertidal mud and sand, Intertidal gravel and sand, Intertidal mixed sediments, Intertidal Underboulder Communities/intertidal boulder and cobble reef, Intertidal Bedrock Reef/High energy intertidal rock, Intertidal Bedrock Reef /Moderate energy Intertidal Rock, Intertidal Bedrock Reef /Low energy intertidal rock, Peat and Clay	Light otter trawl, Heavy Otter trawl, Scallop Dredging, Gill Nets, Trammel Nets and Entangling Nets	No interaction between activity and features within the Coquet to St Mary's MCZ or the surrounding area/NIFCA district (NIFCA Officer and Mark Southerton, pers. comms.).
Intertidal Underboulder Communities, Intertidal Bedrock Reef/High energy intertidal rock, Intertidal Bedrock Reef /Moderate energy Intertidal Rock, Intertidal Bedrock Reef /Low energy intertidal rock, Intertidal coarse sediment, Peat and Clay Exposures.	Digging with forks	No interaction between features and activity within Coquet to St Mary's MCZ (NIFCA Officer, pers. comms.).
Intertidal coarse sediment Intertidal mixed sediments Intertidal mud Intertidal sand and muddy sand	Handwork from land	No interaction between features and activity within Coquet to St Mary's MCZ (NIFCA Officer, pers. comms.).
Subtidal sand (high energy), Subtidal mud, Intertidal mud, Intertidal mud and sand, Intertidal gravel and sand, Intertidal mixed sediments, Subtidal mixed sediments, Coarse sediment (high energy),	Commercial diving	No current activity (NIFCA Officer, pers. comms., 2018).
	Bait dragging	No current activity (NIFCA Officer, pers. comms., 2018).
	Crab tiling (Fisheries Aggregation Devices)	No current activity (NIFCA Officer, pers. comms., 2018).
	Intertidal handwork (from vessel)	No current activity (NIFCA Officer, pers. comms., 2018).
	Trammel netting	No current activity (NIFCA Officer, pers. comms., 2018).
	Drift nets	No current activity (NIFCA Officer, pers. comms., 2018).

Intertidal Underboulder Communities/intertidal boulder and cobble reef, Intertidal Bedrock Reef/High energy intertidal rock, Intertidal Bedrock Reef /Moderate energy Intertidal Rock, Intertidal Bedrock Reef /Low energy intertidal rock, High energy infralittoral rock/ Subtidal bedrock reef & Subtidal boulder & cobble reef, Moderate energy infralittoral rock/ Subtidal bedrock reef & Subtidal boulder & cobble reef, High energy circalittoral rock/ Subtidal bedrock reef & Subtidal boulder & cobble reef, Peat and Clay Exposures (Intertidal).	Beam Trawl (shrimp)	No current activity (NIFCA Officer, pers. comms., 2018).
	Beam Trawl (whitefish)	No current activity (NIFCA Officer, pers. comms., 2018).
	Beam Trawl (pulse/wing)	No current activity (NIFCA Officer, pers. comms., 2018).
	Multi-rig trawls	Regulated activity Multi-rig trawls is prohibited within the NIFCA district (NIFCA Byelaw 1: Trawling). No current activity within the Coquet to St Mary's MCZ or the surrounding area/NIFCA district (NIFCA Officer, pers. comms., 2018).
	Pair trawling	Regulated activity pair trawling is prohibited within the NIFCA district (NIFCA Byelaw 1: Trawling). No current activity within the Coquet to St Mary's MCZ or the surrounding area/NIFCA district (NIFCA Officer, pers. comms., 2018).
	Anchor Seine	No current activity (NIFCA Officer, pers. comms., 2018).
	Scottish/fly seine	No current activity (NIFCA Officer, pers. comms., 2018).
	Dredges (towed): - Mussels, clams, oysters;	No current activity (NIFCA Officer, pers. comms., 2018).
	Dredges (other): - Suction (cockles) - Tractor	No current activity (NIFCA Officer, pers. comms., 2018).
	Cuttle pots	No current activity (NIFCA Officer, pers. comms., 2018).
	Fish traps	No current activity (NIFCA Officer, pers. comms., 2018).
	Seine nets and other: - Beach sine/ring nets - Shrimp push-nets - Fyke and stakenets.	No current activity (NIFCA Officer, pers. comms., 2018).
Peat and Clay Exposures (Intertidal).	Pots/creels (crustacea/gastropods)	No interaction between features and activity within Coquet to St Mary's MCZ (NIFCA sightings data) for intertidal peat and clay. Subtidal peat and clay has not been considered in this assessment due to insufficient evidence.

2.3 Potential pressures exerted by the activities on the feature

For the remaining activities on intertidal rock features, potential pressures were identified using the Natural England conservation advice identified in table 5 and associated advice on operations tables. All pressures identified other than those categorised as 'not relevant' were included. This assessment is focussed on intertidal handwork and so only pressures from those activities have been included here. Other activities have been assessed in other MCZ assessment documents.

Tables 7a-b show the potential pressures identified for each feature.

Table 7a: Potential pressures for gears on Intertidal Underboulder Communities (pressures capable of effecting other than insignificantly are in bold).

Aggregated method	Potential pressures
Intertidal handwork (access from land)	**Abrasion/disturbance of the substrate on the surface of the seabed**
	Habitat structure changes - removal of substratum (extraction)
	Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
	Removal of non-target species
	Introduction of light
	Introduction or spread of invasive non-indigenous species (INIS)

Table 7b: Potential pressures for gears on Low, Moderate & High energy Intertidal Rock (pressures capable of effecting other than insignificantly are in bold).

Aggregated method	Potential pressures
Intertidal handwork (access from land)	**Abrasion/disturbance of the substrate on the surface of the seabed.**
	Habitat structure changes - removal of substratum (extraction)
	Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
	Removal of non-target species
	Removal of target species
	Deoxygenation
	Introduction of light
	Introduction or spread of invasive non-indigenous species (INIS)

2.4 Significance of effects/impacts

To determine whether each pressure is capable of affecting (other than insignificantly) the site's feature(s), the sensitivity assessments and risk profiling of pressures from the advice on operations section of the Natural England conservation advice package were used.

Tables 8a-b identify the pressures from particular gears which are capable of affecting (other than insignificantly) each feature. Where a pressure from a particular gear is identified as not being capable of affecting (other than insignificantly), justification is provided (grey). Features with similar sensitivities have been considered together. Where a pressure from a particular gear is identified as being capable of affecting a feature, it is highlighted in red and taken to the next stage of assessment.

To ensure the effects of fishing activities in-combination with other activities (including other fishing activities) are fully assessed, the pressures from amber activities which are not capable of affecting (other than insignificantly) the site's feature(s) but which do interact with the feature(s) are included in the in-combination assessment (Chapter 4).

Table 8a: Summary of pressures from specific activities on Intertidal Underboulder Communities taken to Part B.

Potential pressures	Intertidal handwork
	Intertidal handwork (access from land)
Abrasion/disturbance of the substrate on the surface of the seabed	Capable of affecting (other than insignificantly) – Abrasion/surface disturbance can be caused by contact between the gear and the sea bed.
Habitat structure changes - removal of substratum (extraction)	Not capable of affecting (other than insignificantly) – Gears not designed to remove substratum.
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	Not capable of affecting (other than insignificantly) – Gears not designed to penetrate the seabed.
Removal of non-target species	Capable of affecting (other than insignificantly) – Removal of non-target species by fishing activities will affect the presence and/or population size of the feature.
Introduction of light.	Not capable of affecting (other than insignificantly) – Introduction of light from fishing activities is unlikely to significantly affect the feature.
Introduction or spread of invasive non-indigenous species (INIS).	Not capable of affecting (other than insignificantly) – Ballast water is the principal vector for invasive non-indigenous species[5]. Fishing vessels less than 45m must have permanent ballast and thus this vector is not available[6].

Table 8b: Summary of pressures from specific activities on Low, Moderate & High energy Intertidal Rock taken to Part B.

Potential pressures	Intertidal handwork
	Intertidal handwork (access from land)
Abrasion/disturbance of the substrate on the surface of the seabed	Capable of affecting (other than insignificantly) – Abrasion/surface disturbance can be caused by contact between the gear/anchors and the sea bed.
Habitat structure changes - removal of substratum (extraction)	Not capable of affecting (other than insignificantly) – Gears not designed to remove substratum.
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	Not capable of affecting (other than insignificantly) – Gears not designed to penetrate the seabed.
Removal of non-target species	Capable of affecting (other than insignificantly) – Removal of non-target species by fishing activities will affect the presence and/or population size of the feature.
Removal of target species	Capable of affecting (other than insignificantly) - Removal of target species by fishing activities will affect the presence and/or population size of the feature.
Introduction of light.	Not capable of affecting (other than insignificantly) – Introduction of light from fishing activities is unlikely to significantly affect the feature.
Introduction or spread of invasive non-indigenous species (INIS).	Not capable of affecting (other than insignificantly) – Ballast water is the principal vector for invasive non-indigenous species[7]. Fishing vessels less than 45m must have permanent ballast and thus this vector is not available[8].
Deoxygenation	Not capable of affecting (other than insignificantly) – Coquet to St Mary's MCZ is a highly dynamic environment, oxygen levels will be replenished by wave and tidal movements.

[5] http://qsr2010.ospar.org/media/assessments/p00440_Shipping_Assessment.pdf
[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/441098/MGN_501_Combined.pdf
[7] http://qsr2010.ospar.org/media/assessments/p00440_Shipping_Assessment.pdf
[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/441098/MGN_501_Combined.pdf

Organic enrichment	Not capable of affecting (other than insignificantly) – Habitat is subject to a degree of wave action or tidal currents suitable enough to make organic enrichment unlikely

Chapter 3 Part B Assessment

3.1 Hand work (access from land) x Intertidal Underboulder Communities, High Energy Intertidal Rock, Moderate Energy Intertidal Rock, Low Energy Intertidal Rock

Part B of this assessment was carried out in a manner that is consistent with the 'significant risk' test required by section 126(2) of the Marine and Coastal Access Act 2009.

Tables 9a-b show the fishing activities and pressures included for assessment in part B. Pressures with similar potential impacts to a particular feature were grouped to save repetition during this assessment. Pressures capable of affecting (other than insignificantly) the conservation objectives of the site are shown in white rows.

This chapter is the assessment for the interaction between intertidal handwork (access from land) and intertidal rock features (high energy intertidal rock, moderate energy intertidal rock and moderate energy intertidal rock).

Table 9a: Fishing activities and pressures included for part B assessment for Intertidal Underboulder Communities**.**

Natural England Aggregated Method	Fishing gear type	Pressures
Intertidal handwork	Intertidal handwork (access from land)	• Abrasion/disturbance if the substrate on the surface of the seabed. • Removal of target species • Removal of non-target species.

Table 9b: Fishing activities and pressures included for part B assessment for Low, Moderate & High energy Intertidal Rock.

Natural England Aggregated Method	Fishing gear type	Pressures
Intertidal handwork	Intertidal handwork (access from land)	• Abrasion/disturbance if the substrate on the surface of the seabed. • Removal of non-target species. • Removal of target species.

The important targets for favourable condition were identified within Natural England's conservation advice supplementary advice tables. 'Important' in this context means only those targets relating to attributes that will most efficiently and directly help to define condition. These attributes should be clearly capable of identifying a change in condition.

Tables 10 shows which targets were identified as important. The impacts of pressures on features were assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives. Information highlighted in red is where pressures listed a bove may impact on favourable condition targets.

Table 10: Relevant favourable condition targets for identified pressures to High, Moderate and Low Energy Intertidal Rock, and Intertidal Underboulder Communities. Rows in red show relevant targets that may be affected by one or more pressures, rows in grey show targets that cannot be affected by pressures, rows in yellow show targets that may be affected, but cannot be quantified with the current level of information available.

Attribute	Target	Relevance/justification
Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of rock communities.	Relevant to all pressures.
Extent and distribution	Maintain the total extent and spatial distribution of infralittoral rock, subject to natural variation in sediment veneer.	Pressures will not significantly alter the extent and distribution of the feature.
Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.	Key species are not currently identified therefore cannot be assessed, however Periwinkle are likely to qualify as a key species.
Structure: non-native species and pathogens	Restrict the introduction and spread of non-native species and pathogens, and their impacts.	Pressures will not result in the introduction and spread of non-native species and pathogens, and their impacts at a significant level.
Structure: physical structure of rocky substrate	Maintain the surface and structural complexity, and the stability of the reef structure.	Relevant to: • Abrasion/disturbance if the substrate is on the surface of the seabed.
Structure: species composition of component communities	Maintain the species composition of component communities.	Relevant to all pressures.
Supporting processes: energy / exposure	Maintain the natural physical energy resulting from waves, tides and other water flows, so that the exposure does not cause alteration to the biotopes and stability, across the habitat.	Pressures will not significantly alter the energy or exposure of the feature.
Supporting processes: physico-chemical properties	Maintain the natural physico-chemical properties of the water.	Pressures will not significantly impact upon the natural physico-chemical properties of the water.
Supporting processes: sedimentation rate	Maintain the natural rate of sediment deposition.	Pressures will not significantly alter sedimentation rate.
Supporting processes: water quality - contaminants	Restrict aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels.	Pressures will not significantly impact upon nutrient levels.
Supporting processes: water quality - dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.	Pressures will not significantly impact levels of dissolved oxygen.
Supporting processes: water quality - nutrients	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication	Pressures will not significantly impact upon nutrient levels.

	(opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels.	
Supporting processes: water quality - turbidity	Maintain natural levels of turbidity (eg concentrations of suspended sediment, plankton and other material) across the habitat.	Pressures will not significantly impact upon turbidity.

3.2 Fishing activity description

Intertidal handwork within the MCZ includes periwinkle, shore crab and lobster (cleeking) on intertidal reef features. Intertidal activities are carried out both commercially and recreationally in Coquet to St Mary's MCZ, however given that the impacts to protected features will be similar from both commercial and recreational collection, all activity has been assessed regardless of the end point of the catch.

3.2.1 Periwinkle

Hand gathering for periwinkle is carried out both commercially and recreationally on the Northumberland Coast. Commercial collectors sell periwinkle through two wholesalers in Berwick where they are exported to Europe, mainly to France where there is a large market. Wholesalers only take periwinkle above the minimum market size of 12 mm. At the wholesalers, periwinkle are put through a riddle which grades them by size into small, medium and large categories (small = 12-14mm, medium = 14-17mm, large = 17+mm). Wholesalers report that they return the discards to a suitable area of rocky shore through trusted collectors and fishers. Prices offered to gatherers vary but are usually around £1/kg for small, £2/kg for medium and £3/kg for large, this can increase to £5/kg for large size classes around Christmas. Commercial collectors collect periwinkle by hand, as described above (section 1.4.3.1), into 'onion' sacks which hold around 25kg of periwinkle.

3.2.2 Shore crab

Shore crab are collected for use as bait by anglers, there are two known methods of collection on the Northumberland Coast. One involves collection by hand on rocky intertidal areas, methods of collection are similar to collection of periwinkle in that the same habitat is searched with rocks turned to expose sheltering shore crab which are then collected. The other known method is the placement of artificial shelters (termed fisheries aggregation devices or FADs), the majority of which are tyres on the North East coast, to create shelter for shore crabs in muddy estuaries. From here, they can be easily collected. FADs are found both within Marine Protected Areas and outside of them in the Northumberland IFCA district. No FADs are placed within Coquet to St Mary's intertidal rocky reef features. This activity therefore falls outside of the remit of this assessment, however assessments for this activity in the Aln Estuary MCZ (Aln MCZ – SRA 016) and Northumberland Marine SPA (NCSPA – tLSE 038) will be carried out.

3.2.3 Cleeking for lobster

Cleeking is a low impact activity and completely recreational, those engaged in the activity walk over intertidal areas to reach the sea at low tide. Cleekers use a long pole which is used to disturb lobsters hiding in crevices or under rocks and boulders. Disturbed lobsters will use their claws to 'clamp on' to the pole and will not release it until they feel secure. The activity occurs over low water on big tides to best access lobster habitat.

3.2.4 Other

NIFCA have received reports of activity other than those described above. In the past year, we have received information on people using chisels, other similar devices to remove limpets off rocks. This seems to occur when people are collecting other species from the intertidal area.

3.3 Fishing activity levels in Coquet to St Mary's MCZ

Compared to the Berwickshire North Northumberland Coast SAC, NIFCA considers there to be relatively lower levels of recreational intertidal handwork activity in the MCZ. Activity has been observed throughout the site with higher levels recorded at Whitley Bay (St Mary's), Seaton Sluice, Blyth and Amble.

3.3.1 Periwinkle

Natural England commissioned a study to look at the scale, locale and impacts of intertidal collection activity targeting periwinkle and lugworm (Tinlin McKenzie, 2018). The study focussed on the BNNC SAC, however given the proximity of this site to Coquet to St Mary's MCZ, conclusions of this study have been inferred for the MCZ. Periwinkle collection activity has been reported to be higher in summer, with the most activity recorded in August (Tinlin McKenzie, 2018). Collection is higher over spring tides. On average, collectors carry out 5 trips per month, spending 3 hours collecting per trip. They collect, on average, 13.9 kg per trip (Tinlin McKenzie, 2018).

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Between January 2016 and September 2024, 278 visits to handwork locations within CSM MCZ were made by officers with hand gathering recorded on 83 (3037%) of those patrols. 106 individuals were observed hand gathering for winkles or shore crab with 1.50.42 people seen per patrol on average. Given the lack of collection of shore crab as outlined above, for the purpose of this assessment these sightings have been classed as periwinkle collection sightings.
Areas where activity is known to occur in the NIFCA district has been classified as High, Medium and Low based on NIFCA patrol sightings data on the average number of individuals gathering periwinkles per NIFCA patrol to each area (see Table 11) where High >=0.53 individual/patrol, Medium >=0.14, Low >= 0.04. Classifications were checked against officers' knowledge and changed where necessary, and corroborated using the findings of Tinlin-McKenzie (2018) and from reports to NIFCA on activity.

Within CSM MCZ, Cresswell, Cambois, and Hadston (North Druridge Bay) St Mary's Island have been categorised as high pressure and Creswell, St Mary's and Whitley Bay as medium pressure (Table 11, Figure 3.1). These collection pressure categories have been updated since the initial

drafting of this document with Cresswell and St Mary's Island classified as high collection areas previously. Collection intensity will be monitored through the NIFCA Hand Gathering Monitoring and Control Plan.
In comparison, periwinkle harvest levels described in Ireland and Scotland are estimated to be 4000 tonnes per year (McKay et al, 1997; Cummins et al., 2002). When equated by coastline area to the BNNC SAC the exploitation rates in Ireland and Scotland are approximately double the exploitation rates on the Northumberland Coast (25 tonnes and 13.4 tonnes respectively) (Tinlin McKenzie, 2018). This represents a smaller level of collection on the Northumberland Coast compared elsewhere in the UK, although this doesn't necessarily mean a smaller impact. NIFCA currently does not have any stock assessment information to fully understand the impacts of collection at any level on the population.

All hand gathering will continue to be monitored through routine and target patrols throughout the district. NIFCA have implemented a Code of Conduct (Annex 2) for hand gathering for periwinkles in the district that aims to stop any adverse impacts from the activity including avoiding the collection of small (below minimum market size – 12 mm), reducing disturbance to floral and faunal communities and to birds. NIFCA will monitor adherence to this code of conduct, and if found it is not being adhered to, plan to develop management measures.

Table 11. Periwinkle gathering activity classifications for all sites within the BNNC SAC from NIFCA intertidal patrols between 2016 and September 2024. Showing total number of patrols, the proportion of patrols periwinkle collection was sighted on, the average number of individuals per sighting, the average number of individuals per patrol (proportion of patrols x average number per sighting) and the maximum number of collectors sighted at one time. Periwinkle activity rankings (Low – High) were based on average number of collectors per patrol to the area from NIFCA patrols, in addition to officer knowledge. Further to these sightings Seahouses and Newton have been identified as medium areas of collection intensity (Tinlin MacKenzie, 2018). There have been no sightings in these areas during NIFCA patrols, these sites will be prioritised for NIFCA patrols in the future.

Site	Number of patrols	Proportion of patrols activity sighted	Average no. of collectors per sighting	Average no. of collectors per patrol	Max. no of collectors	Periwinkle collection activity
Amble	10	0.10	1.00	0.10	1	Very Low
Cambois	40	0.55	1.91	1.05	9	High
Cresswell	49	0.29	1.79	0.51	4	Medium
Druridge Bay	14	0.07	1.00	0.07	1	Very Low
Hadston - N Druridge Bay	24	0.13	6.33	0.79	9	High
Hauxley*	27	0.15	1.25	0.19	2	Low
Lynemouth	11	0.09	2.00	0.18	2	Low
Newbiggin	25	0.08	1.50	0.12	2	Low
Seaton Sluice	86	0.23	1.55	0.36	4	Low
St Mary's	87	0.31	2.15	0.67	5	Medium
Whitley Bay	65	0.17	3.45	0.58	12	Medium

3.3.2 Shore crab

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Between January 2016 and October 2021, 278 visits to handwork locations within CSM MCZ were made by officers with hand gathering recorded on 83 (30%) of those patrols. 106 individuals were observed hand gathering for winkles or shore crab with 0.4 people seen per patrol on average. Given the lack of collection of shore crab as outlined below, for the purpose of this assessment these sightings have been classed as periwinkle collection sightings.
Collection of crab comprises a small proportion of hand gathering activity with less than 10% of NIFCA sightings attributed to this activity. NIFCA have received reports that shore crab are difficult to find on the rocky intertidal, with the best places being around staithes or under shelter on muddy intertidal habitats. In fact, many shore crab collectors will travel to the North West coast as collection is more efficient due to higher abundance of shore crabs found in intertidal areas there (Les Weller, pers. comms. 2020).

On the North East coast, hand gathering for shore crab is typically seasonal with crab targeted when soft shelled just after moulting, which takes place in late Spring and Summer. Therefore, collection occurs in a 3-4 month period from late May to August. There have been reports that some collectors will target shore crab year-round and will keep them until they moult and can be used effective bait. However, anecdotal evidence suggests this practice needs a sophisticated set up and is not common in the North East.

A proportion of the collection of shore crab is carried out in estuaries using artificial shelters. It has been reported that 90% of the shore crab collected within the NIFCA district is collected using artificial shelters (Les Weller, pers. comms). This is thought to be a more efficient method of collection as the target species congregates within the shelter facilitating easier collection than searching and turning rocks on intertidal rocky shores. This activity falls outside of the remit of this assessment, however assessments for this activity in the Aln Estuary MCZ (Aln MCZ – SRA 016) and Northumberland Marine SPA (NCSPA – tLSE 038) will be carried out.

3.3.3 Cleeking for lobster

Cleeking is a low impact activity, those engaged in the activity walk over intertidal areas to reach the sea at low tide. The activity is highly seasonal, concentrated in summer months on big spring tides.

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Between January 2016 and September 2024, 278 visits to handwork locations within CSM MCZ were made by officers with cleeking recorded on 61 (21%) of those patrols. 213 individuals were observed cleeking with 1.21.9 people seen per patrol on average (Figure 3.2).
Activity is relatively moderate in areas of Coquet to St Mary's MCZ. The activity is labour intensive and anecdotally it is in decline as younger generations are not partaking in this traditional activity.

NIFCA byelaws limit the activity: NIFCA Byelaw 4 Crustacea Conservation limits the number of lobster that can be taken using this method to one per person per day.

3.3.4 Other

NIFCA have received three reports of people chiselling limpets, two from outside of the CSM MCZ (Cullercoats Bay and North Shields) and one from within the CSM MCZ at St Mary's Island. There have been no NIFCA sightings of this activity therefore estimates of the frequency of this activity cannot be made.

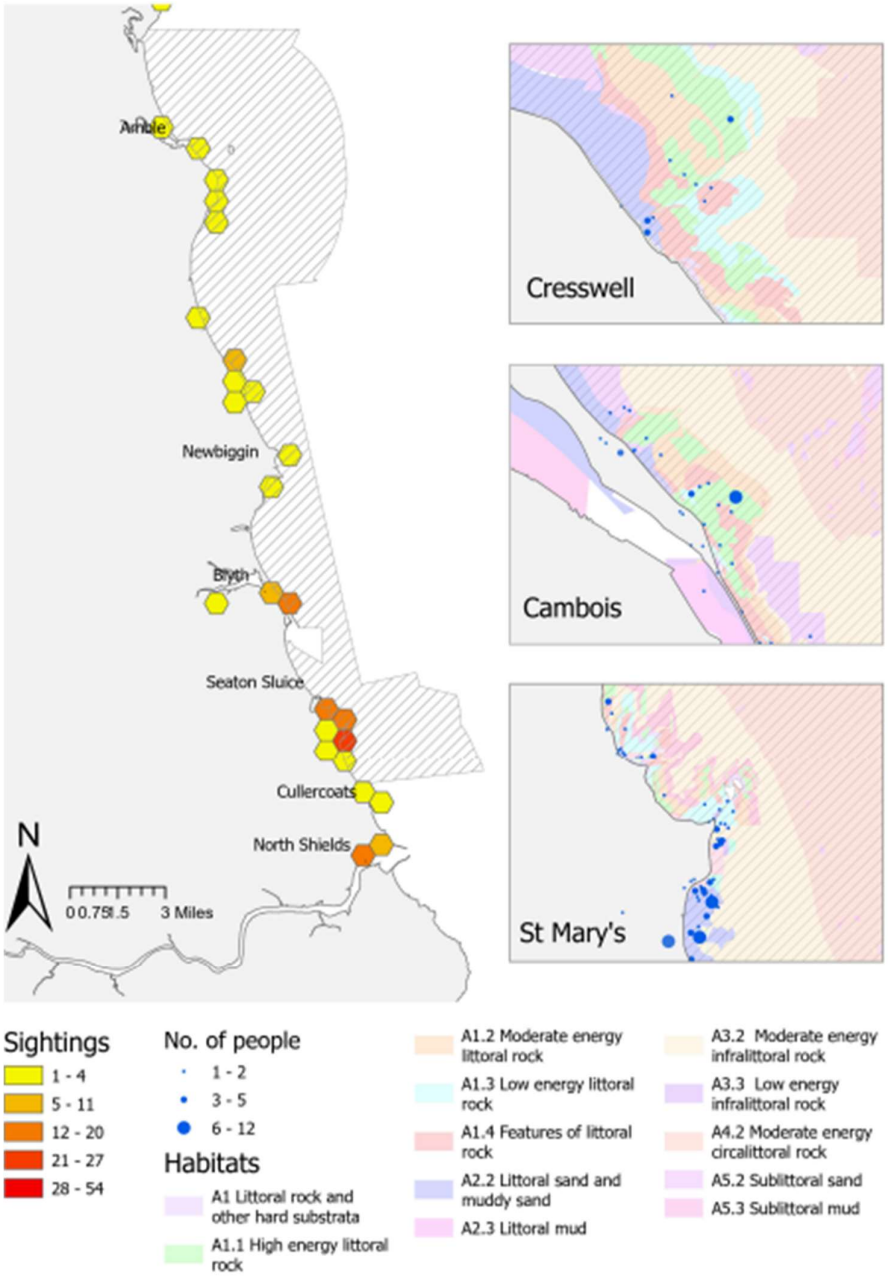

Figure 3.1 Number of periwinkle collection sightings within the CSM MCZ from NIFCA patrols from 2016 - September 2024 showing sighting hotspots at Cresswell, Cambois, and St Mary's Island on rocky intertidal habitats (some sightings at Whitely Bay are shown on top of Littoral sand and muddy sand, this activity is likely to have taken place on intertidal rock and this may be due to positional inaccuracies of activity data collection or habitat maps).

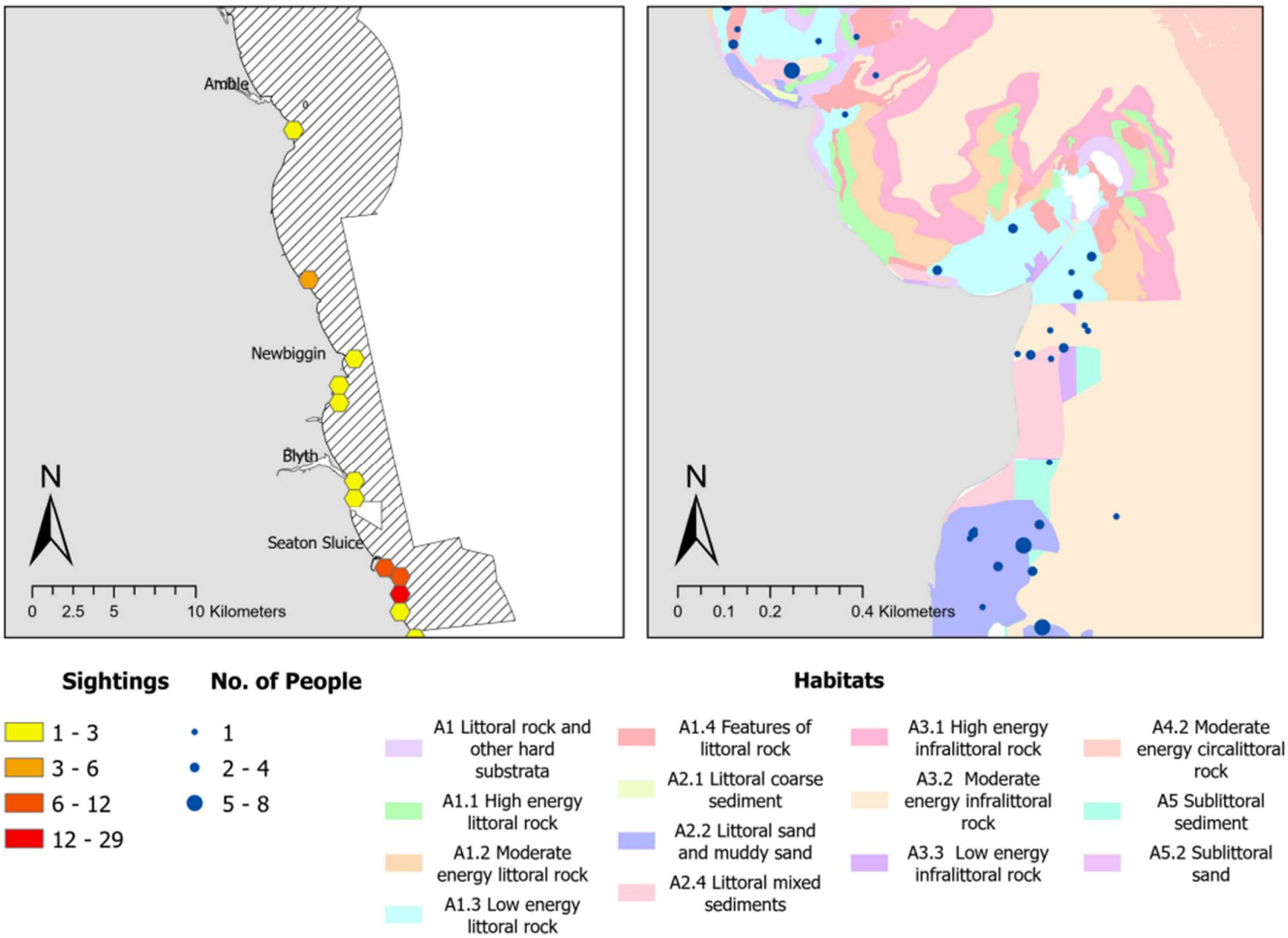

Figure 3.2 Number of cleeking sightings within the CSM MCZ from NIFCA patrols from 2016 - September 2024 showing sighting hotspots at St Mary's Island and Whitley Bay on rocky intertidal habitats (some sightings at Whitley Bay are shown on top of Littoral sand and muddy sand, this activity is likely to have taken place on intertidal rock and this may be due to positional inaccuracies of activity data collection or habitat maps).

3.4 [Pressure 1] Abrasion/disturbance of seabed surface substrate

3.4.1 Periwinkle

Direct impacts of periwinkle collection to associated flora and fauna are due to:

- Physical damage to flora and fauna from disturbance (Berthelon et al., 2004) from boulder turning and trampling which can cause a reduction in habitat stability and reduced biodiversity (Davenport and Davenport, 2006). This can damage under-boulder communities which require stable boulder habitats. It can also adversely impact organisms that depend on upper rock surfaces, such as seaweeds (Liddard et al., 2011). Reduction in habitat stability from boulder turning can be lethal to fauna, algae, and under-boulder communities through crushing, smothering and desiccation (Berthelon et al., 2004).
- Reduction in species composition through trampling can reduce biodiversity, abundance, and biomass (JNCC and NE, 2011). It can lead to a higher percentage of bare rock with a decrease in algal cover (Tyler-Walters, 2008; Liddard et al., 2011). These effects can be seen at low trampling with long term impacts (Povey and Keough, 1991). These impacts are variable, dependent upon intensity, duration, and frequency of the trampling (JNCC and NE, 2011).
- These disturbances can negatively alter community structure, they vary spatially and temporally (Berthelon et al., 2004) and most severely impact long lived sedentary species that are slow to reproduce (Berthelon et al., 2004).

Although previous studies show direct impacts of rocky shore disturbance, the impacts can be difficult to predict locally. The local evidence available (Tinlin-McKenzie, 2018; Quigley, 1999) suggests that periwinkle collection, at current levels, does not appear to be negatively impacting rocky shore floral and faunal communities in the ways described above. Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-McKenzie, 2018). Three shores were observed representing ‘not collected’, ‘low collection’ and ‘high collection’. Results found that periwinkle collection does not appear to correlate with collection intensity when compared across shores. Quigley (1999) reported that between shores in Northumberland with different collection pressures (‘collected’ and ‘uncollected’) two out of three sites showed no significant difference in non-target animal mean abundance.

Overall, the local evidence available suggests periwinkle stocks appear to be relatively resilient to harvesting. However, literature from other areas of the UK suggest the most significant potential impacts appear to be on non-target rocky shore dwelling plants and animals which experience physical disturbance from human activities (Berthelon *et al.*, 2004; Crossthwaite, 2012). The hydrodynamics along the Northumberland Coast are variable, in more exposed areas wave and wind naturally turns some small boulders/cobbles. Thus, intertidal and infralittoral communities subject to this natural disturbance will be more resistant to disturbance pressures than communities in sheltered areas. Overall, the intertidal rocky reef features are subject to naturally high levels of physical disturbance and recovery of rocky reef communities is predicted to be medium (Mieszkowska and Sugden, 2014). However, the impacts of boulder turning are more severe when boulders are left upturned (Davenport and Davenport, 2006; AFBI, 2009).

NIFCA can say with moderate confidence that on area of bedrock reef (i.e. not boulder/cobble reef), and on boulder/cobble reef areas where activity is medium or low this activity will not have an adverse impact on features of the site if boulders are returned to their original position. However, NIFCA have received multiple reports that activity has increased in certain areas since 2018. Further, evidence in the literature from other areas in the UK (Northern Ireland)

(Crossthwaite et al., 2012) suggest that the impact of removal of periwinkle at higher intensity levels of collection could have long term impacts to community composition and structure.

Therefore, at areas of high collection, NIFCA were unsure whether this activity would significantly impact the conservation objectives of this feature. A code of conduct was put in place in 2020 which recommends that collectors return all boulders to their original positions after use to minimise any impacts on communities. Trampling may be too difficult to manage due to the free access of rocky shores to the public undertaking recreational activities.

To further understand the impacts of collection pressure on rocky shore communities, NIFCA carried out a series of surveys in 2020-21. The survey targeted areas that have been identified as high collection pressure areas to further understand impacts at higher levels of collection. The surveys were carried out at five sites within the NIFCA district, two of the sites fall into CSM MCZ (Cresswell and St Mary's Island). Quadrat surveys were carried out to determine species abundance, diversity and richness. Further details on methodology can be found in the full report (Harvey, 2021. Harvey, 2022).

In both sites within CSM MCZ neither faunal nor algal abundance/percentage cover, species richness or diversity was correlated with collection pressure when the five sites surveyed were compared. Though overall faunal abundance is not correlated with the percentage of algae cover, periwinkle abundance is significantly negatively correlated with algae cover ($p<0.001$). Cover of algae was strongly related to algae species richness ($p<0.01$) and diversity ($p<0.05$) therefore generally, sites with higher numbers of periwinkles have both lower percentage cover of algae and algae species richness/diversity.

The surveys were carried out over a two-year period, results were compared between the sites surveyed. The main differences in community composition between the shores surveyed are likely due to the different conditions found at each site, including but not limited to, topography and exposure. While the results of this survey suggest no detectable impacts from the activity in areas of high collection pressure within CSMMCZ, future surveys will allow comparison of data within results in the same site over time in relation to collection pressure.

Given the results of this survey, NIFCA can say with moderate confidence that on area of bedrock reef (i.e. not boulder/cobble reef), and on boulder/cobble reef areas where activity is high this activity will not have an adverse impact on features of the site due to abrasion/disturbance of seabed surface substrate if boulders are returned to their original position. NIFCA will continue to undertake monitoring surveys in areas identified as high collection pressure and feed this information into the Hand Gathering Monitoring and Control Plan. Where any pressures identified as capable of having an adverse impact on the conservation objectives of this feature of the site are identified, this will be monitored and addressed.

3.4.2 Shore crab

The collection of shore crabs from rocky intertidal areas will have similar impacts to hand gathering for periwinkles. Shore crab shelter under rocks or in crevices and so collectors will search these cryptic habitats turning rocks as they search. Similar impacts as described above

can be expected if shore is trampled to reach collection area and if boulders are turned and left uncovered.

Due to the scale of the activity described in section 3.2.2, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features will adversely impact the conservation objectives of these features of the site through this pressure.

3.4.3 Cleeking for lobster

Cognizant of the nature of this activity, it is unlikely that there is potential for this pressure to impact the protected reef features. Rocks are typically left unturned as the aim is not to disturb lobsters as this will cause them to escape. At current declining levels, cleeking in the intertidal zone is unlikely to cause significant adverse impacts to the conservation objectives of this site through the pressures listed above.

The main damage to the marine environment will result from individuals crossing the foreshore, however this cannot be distinguished this from all other activities on rocky shore and trampling may be too difficult to manage due to the free access of rocky shores to the public undertaking recreational activities. Given the limited and declining levels of activity this is unlikely to cause any adverse impacts.

Due to the scale of the activity, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features through this pressure will adversely impact the conservation objectives of these features of the site.

3.4.4 Other

Impacts of using tools to chisel limpets from rocks could cause damage to rock substrates. Use of a tool for removal of organisms has the potential to damage the rock and any organisms in the vicinity. Other organisms have the potential to be disturbed through this activity, for example, moving seaweed canopies out of the way to access the limpets. More information is required on how this activity takes place to determine impacts.

This activity is also likely to cause impact through trampling, as described in section 3.4.1. From the reports NIFCA has received on this activity, it occurs while shore-based collection targeting other species is taking place. Therefore, pressure relating to trampling cannot be separated from pressure caused when targeting other species, such as periwinkle.

3.5 [Pressure 2] Removal of target species

3.5.1 Periwinkles

The impacts of periwinkle collection on size and local population abundance have been described by Tinlin McKenzie (2018) and Quigley (1999). Periwinkle size was compared by Tinlin-McKenzie (2018) to previous studies (Morell 1976; Quigley, 1999). On the most heavily collected shore studied (Boulmer) the largest shell height had not decreased suggesting harvesting periwinkles had not led to a reduction in maximum shell height over the last 50 years. In other areas of the UK, periwinkle size and density was found not to correlate to harvesting pressures at current exploitation levels (Tilin et al., 2010). Natural variation in density between shores is likely to have a

greater impact than that of harvesting, with factors such as habitat selection likely to have a greater impact (Gendron, 1977). However, Quigley (1999) revealed differences in the size distributions and mean size of periwinkle between “collected” and “uncollected” populations within the BNNC SAC, and that the maximum size attained by *Littorina* on “collected” shores was smaller than that from “uncollected” suggesting that high levels of collection could have an impact on periwinkle size.

Densities on Northumberland Coast shores have been found to vary based on collection pressure but with different directions of difference. Quigley (1999) found densities of periwinkle to be higher on two out three shores with ‘high’ collection rates when compared to adjacent shores with ‘low’ collection rates. Relatively high densities may have been sustained due to dispersive larval recruitment from other shores (Jackson, 2008) or refuge areas.

Crossthwaite (2012) found that long-term exploitation did significantly affect population abundance and age structure. However, exploitation levels are higher in these study areas, which are located in Northern Ireland. Local findings suggest that periwinkle populations are maintained at harvestable levels at highly collected shores and communities likely vary from natural variation, rather than harvesting effects (Tinlin-McKenzie, 2018).

Similar to the conclusions above, the evidence suggests that on boulder/cobble reef areas where activity is medium or low this activity will not have an adverse impact on target species size and abundance. However, NIFCA have received multiple reports that activity has increased in certain areas since 2018. Further, evidence in the literature from other areas in the UK (Northern Ireland) (Crossthwaite et al., 2012) suggest that the impact of removal of periwinkle at higher intensity levels of collection could have long term impacts to periwinkle size. Therefore, at areas of high collection, NIFCA are unsure whether this activity will significantly impact the conservation objectives of this feature, especially as there is no stock assessment information.

As described in Section 3.4.1, NIFCA carried out a survey to further understand impacts of periwinkle collection in areas of high collection pressure (Harvey, 2021. Harvey, 2022). The survey consisted of both quadrat surveys and timed searches for periwinkle. All periwinkle found through both survey methods were counted and measured.

There was no correlation between median periwinkle density and collection intensity for the sites within CSM MCZ (Cresswell and St Mary’s Island). However, Berwick, which had the highest collection intensity, also had the lowest periwinkle densities of any location for both survey methods. Boulmer, which had the next highest levels of collection, also had low density in quadrat surveys however comparatively higher densities were found in timed searches, which also occurred at Cresswell. This could indicate periwinkles in those sites are located in areas unsuitable for quadrat surveys for example within crevices or rockpools. While periwinkle density varied significantly between sites, there was no clear relationship to collection intensity.

Periwinkle size varied between locations, with the largest average sizes at Berwick and Boulmer, and the lowest at Cresswell. Size did not appear to be related to collection intensity however was negatively related to periwinkle density: shores with higher densities had lower average sizes. This

is probably due to competition for available food causing lower growth rates where high densities of periwinkles occur.

Periwinkle abundance was higher on shores with a higher coverage of gravel substrate consistent with findings in previous studies (Cummins et al., 2002). There was no significant effect of other substrate types. However, another study (Carlson et al., 2002) found increased densities of periwinkle with higher percentages of bare rock, which we did not find here. They also found increased densities of periwinkle with higher substrate rugosity, or more complex substrates. Substrate composition and complexity could be linked to periwinkle density.

Given the results of this survey, NIFCA can say with moderate confidence that on area of bedrock reef (i.e. not boulder/cobble reef), and on boulder/cobble reef areas where activity is high this activity will not have an adverse impact on features of the site due to removal of target species. NIFCA will continue to undertake monitoring surveys in areas identified as high collection pressure and feed this information into the Hand Gathering Monitoring and Control Plan. Where any pressures identified as capable of having an adverse impact on the conservation objectives of the features of the site are identified, this will be monitored and addressed. In the absence of a stock assessment, it is difficult to fully understand the impacts of collection pressure on periwinkle populations within CSM MCZ. Other knowledge gaps also exist such as the amount removed from the fishery.

3.5.2 Shore crab

Due to the scale of the activity described in section 3.2.2, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features through this pressure will adversely impact the conservation objectives of these features of the site.

3.5.3 Cleeking for lobster

Due to the scale of the activity described in section 3.2.3, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features through this pressure will adversely impact the conservation objectives of these features of the site.

3.5.4 Other

Limpets are grazing herbivores exerting top-down control of algae in many intertidal ecosystems. Their removal in large quantities has the potential to impact rocky shore community interactions (Crowe et al., 2011).

Limpets are protrandric hermaphrodites, where smaller/younger individuals tend to be males before changing sex to female at larger size classes. The shift is not driven by reaching a certain size but due to a number of other cues including the abundance of larger limpets and density. The experimental removal of larger individuals has been found to cause sex changes in *P. vulgata* to occur at smaller sizes (Borges et al., 2015). Fishing pressure, where larger individuals are primarily targeted, could cause changes to sex change dynamics and have implications for limpet populations.

NIFCA have not recorded this activity during routine patrols and have has three reports of this activity from external sources. At present, levels of activity with CSM MCZ appear to be very low. There is not enough information available on scale and intensity of activity to draw any conclusions.

3.6 [Pressure 3] Removal of non-target species

3.6.1 Periwinkle

The selective nature of hand gathering means bycatch of other species is low. Anecdotal evidence suggests incidence of removal of other intertidal species mistaken for periwinkle is low in the district. Reports from wholesalers show that there is no value to collectors to take other species and so they are avoided. NIFCA have implemented a code of conduct with an edible periwinkle guide attached to further ensure fewer identification mistakes.
Main impacts to non-target species from Abrasion and Disturbance pressure, impacts on floral and faunal communities due to disturbance are assessed in section 3.4.1.
NIFCA conclude with moderate confidence that it is unlikely that the collection of periwinkles from intertidal rocky reef features, through this pressure, will adversely impact the conservation objectives of these features of the site.

3.6.2 Shore crab

Due to the selective nature and the scale of the activity, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features through this pressure will adversely impact the conservation objectives of these features of the site.

3.6.3 Cleeking for lobster

Due to the selective nature and the scale of the activity, NIFCA conclude with moderate confidence that it is unlikely that the collection of shore crabs from intertidal rocky reef features through this pressure will adversely impact the conservation objectives of these features of the site.

3.6.4 Other

Removal of limpets is likely to be highly selective. Limpets are easily distinguishable from other rocky shore fauna. Main impacts to non-target species from Abrasion and Disturbance pressure (section 3.4.4) and Removal of target species (section 3.5.4).

3.7 Pressures conclusion

There may be a risk that handwork (access from land), periwinkle gathering, could hinder the conservation objectives of the site through abrasion and disturbance and removal of target species. Given the nature of this activity and the information available in scientific literature, impacts are only likely to be felt at high collection pressure areas, namely St Mary’s Island. Further information is required to confirm conclusions. Table 12 summarises the conclusions of the above assessment of the pressures from handwork (access from land) on protected intertidal features, and outlines NIFCA’s confidence in the conclusions.

Table 12 Summary of pressures assessment

Pressure	Interest feature	Favourable condition target	Activity	Compatible with conservation objectives?	Confidence
Abrasion and disturbance	High energy intertidal rock And Intertidal under boulder communities And Low energy intertidal rock And Moderate energy intertidal rock	Maintain the presence and spatial distribution of rock communities.	Periwinkle gathering	Y	Moderate for low and medium collection pressure. Low confidence for high collection pressure.
			Shore crab gathering	Y	
			Cleeking	Y	
			Other – Limpet removal	Y	
		Maintain the species composition of component communities.	Periwinkle gathering	Y	
			Shore crab gathering	Y	
			Cleeking	Y	
			Other – Limpet removal	Y	
		Maintain the surface and structural complexity, and the stability of the reef structure.	Periwinkle gathering	Y	
			Shore crab gathering	Y	
			Cleeking	Y	
			Other – Limpet removal	Y	
Removal of target species	High energy intertidal rock And Low energy intertidal rock And Moderate energy intertidal rock	Maintain the presence and spatial distribution of rock communities.	Periwinkle gathering	Y	Moderate for low and medium collection pressure. Low confidence for high collection pressure.
			Shore crab gathering	Y	
			Cleeking	Y	
			Other – Limpet removal	Y	
		Maintain the species composition of component communities.	Periwinkle gathering	Y	
			Shore crab gathering	Y	
			Cleeking	Y	
			Other – Limpet removal	Y	
Removal of non-target species	High energy infralittoral rock And	Maintain the presence and spatial distribution of	Periwinkle gathering	Y	Moderate for low and medium collection pressure.
			Shore crab gathering		

	Moderate energy infralittoral rock And Moderate energy circalittoral rock	rock communities.	Cleeking		Low confidence for high collection pressure.
			Other – Limpet removal		
		Maintain the species composition of component communities.	Periwinkle gathering	Y	
			Shore crab gathering		
			Cleeking		
			Other – Limpet removal		

3.8 Fisheries management measures

Initial assessments suggested that there could be a risk to the site's conservation objectives from periwinkle gathering in parts of the site that are subject to high collection pressure. However, further evidence gathering failed to determine any impacts from activity in high collection pressure areas within the CSM MCZ (moderate confidence).

It is unlikely that the collection of periwinkles will adversely impact the conservation objectives of intertidal rocky reef subfeatures and attributes. However, NIFCA has lower confidence in this conclusion for areas subject to high collection pressure therefore NIFCA will implement a monitoring and control plan to monitor activity levels in relation to the results of the continued intertidal surveys.

The Monitoring and Control Plan for periwinkle collection outlines the methodology and parameters NIFCA will use to collect data for the monitoring of collection activity and its interaction with features/subfeatures. All data (except NE site condition monitoring) will be collated and analysed on an annual basis to access if further management is required, unless a trigger is initiated to prompt an automatic assessment. This will ensure any risks to the site features will be addressed and management measures will remain appropriate and adaptive. NIFCA have introduced a Code of Conduct with the aim of stopping adverse impacts associated with this activity (Annex 3). Adherence to the Code of Conduct will be monitored, with statutory management options considered if not adhered to.

3.9 Part B conclusion (fishing alone)

NIFCA concludes that periwinkle gathering at moderate-low levels and the collection of shore crab and cleeking, assessed alone, will not pose a significant risk to the conservation objectives of Coquet to St Mary's MCZ.
The preceding sections have demonstrated the aspects covered under the title of Handwork (access from land) may impact, other that insignificantly, the conservation objectives of the site. Namely, periwinkle gathering in areas of high collection pressure. Further research has been undertaken based on this conclusion which suggests that Handwork (access from land) will not impact, other than insignificantly, the conservation objectives of the site.

4. In-combination Assessment

Potential risks of in-combination effects have been considered in Table 13 listing current and possible plans and projects and other activities within the site.

In summary, Intertidal handwork (access from land) within Coquet to St Mary's MCZ is not deemed to have a likely significant effect on reefs where activity is low-moderate alone OR where activity is high, moderate or low in-combination with other plans/projects.

Table 13. In-combination assessments of Intertidal handwork (access from land) with other plans and projects within and around Coquet to St Mary's MCZ occurring on reef types.

Plans and Projects			
Activity	**Description**	**Assessment**	**Potential Pressure**
Fishing	Potting In 2016 NIFCA introduced a recreational potting permit which will enable NIFCA to monitor levels of recreational potting within the district. Each permit holders is permitted to fish up to 5 pots within the NIFCA district and can only take 2 lobster (5 brown or velvet crabs, 20 whelks or 5 prawns) per day. In 2019 there were 204 recreational permit holders	A significant proportion of recreational pots are fished within the infralittoral zone from the shore with little overlap with into the intertidal. Recreational potting is often seasonal and carried out infrequently. Activities are unlikely to co-occur on reef features.	Recreational potting occurs on rocky infralittoral areas throughout the MCZ. This activity is small scale in comparison to commercial potting activity. In 2019, NIFCA had 204 registered recreational potting permit holders, as each permit holder is only allowed a maximum of 5 pots this results in a total of 1,020 pots. Cleeking is likely to occur in a similar location to recreational potting, however activity is very low level. The vast majority of commercial potting will not be co-located with the activities assessed here.
Coastal Infrastructure	Outflow pipes Maintenance	Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts.	Small scale – low number of outfall pipes on reefs along the Northumberland Coast. Any intertidal impacts will be connected with maintenance and carried out infrequently.
Coastal management scheme - Northumberland and North Tyneside Shoreline Management Plan 2 (05/2009) covers the coastline from the Scottish border to the River Tyne.	Flood and erosion risk management	As stated in Section (2) of the document projects and plans within the SMP are subjected to its own Appropriate Assessment for proposed work, which assesses any impacts to Coquet to St Mary's MCZ.	Any coastal management works along the coast under the aegis of a Coastal Management Scheme.

Cable laying/infrastructure	Subsea cables with intertidal element	Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts. Plans or projects must obtain a marine licence which must assess impacts to reef features within Coquet to St Mary's MCZ.	Any subsea cables, with an intertidal element, along the coast relating to the relevant plan or projects under Marine and Coastal Access Act.
Other activities being considered (which are not plans or projects by definition)			
Activity	**Description**	**Assessment**	**Potential Pressure**
Intertidal Recreational Activity: Rock pooling	The rocky intertidal areas of Coquet to St Mary's MCZ are popular rock pooling spots. This activity is highly seasonal occurring in the summer months over low tide.	In certain areas where rock pooling activity is high, there is a potential in combination impact from rock pooling and periwinkle gathering activities	Impacts are likely to be similar to those caused by intertidal hand gathering where rocks are turned and cryptic habitats searched.

5. Conclusion

5.1 Assessment Result for Intertidal handwork (Access from land)

5.1.1 Fishing alone

NIFCA conclude that there are no impacts on the MCZ through the pressure assessed in Section 3 (see Section 3.1). Periwinkle gathering, alone, is not sufficient to affect (other than insignificantly) features of the site. Further monitoring is required to ensure no adverse effects to intertidal reef features of the site.

5.1.2 In-combination

NIFCA consider that whilst there is a pathway for disturbance, this is not sufficient to affect (other than insignificantly) the features of the site from the following in-combination factors. This applies to areas of low or medium collection pressure. Some areas identified as high collection pressure also experience high levels of recreational activity from rock pooling (St Mary's Island and Cresswell).

- Intertidal Recreational Activity: Rock pooling

5.2 Proposed Management

No management proposed at this time.

5.3 Review of Assessment

To coordinate the collection and analysis of information regarding activity levels, and to ensure that any required management is implemented in a timely manner, a Hand Gathering Monitoring and Control plan will be implemented.
NIFCA will review this assessment every year through the monitoring and control plans, into which these assessments feed, or more frequently if significant new information is received.

Such information could include:

- updated conservation advice;
- updated advice on the condition of the feature;
- significant change in activity levels.

5.4 Conclusion

NIFCA have had regard to best available evidence and through consultation with relevant advisors and the public, conclude that intertidal handwork activities will not significantly adversely impact the conservation objectives and General Management Approach of this marine protected area with fishing effort at the current level in the identified areas. Future site monitoring is required to ensure there are no impacts in areas of high collection, or changes to collection intensity in this dynamic fishery across the site. This will be monitored through the Hand Gathering Monitoring and Control Plan (which will apply to all MPAs in the NIFCA district).

Has Natural England been formally consulted on this document (and do they agree)?	**Yes**

Date of document completion/signature:	**02/12/2024 (Catherine L Scott & Pete Welby)**

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Annex 1 : Fishing activities with amber interactions to be included for assessment if they take place:

Features	Matrix Gear Type	Natural England Aggregated Method
High energy infralittoral rock	Pots/creels (crustacean/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Anchored nets/lines
	Trammel nets	
	Entangling nets	
	Demersal drift nets	
	Demersal longlines	
	Beach seines/ring nets	Seine nets and other
	Fyke and stake nets	
	Shrimp push-nets	
	Bait dragging	Miscellaneous
	Commercial diving	
High energy intertidal rock	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Longlines (demersal)	Lines
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Intertidal coarse sediment	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	

	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Tractor	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Intertidal mixed sediments	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Tractor	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Intertidal mud	Beam trawl (whitefish)	
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	

	Multi-rig trawls	Towed (demersal)
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Tractor	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging wth forks	Bait collection
Intertidal sand and muddy sand	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Tractor	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	

	Digging with forks	Bait collection
Intertidal under boulder communities	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Longlines (demersal)	Lines
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Low energy intertidal rock	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Longlines (demersal)	Lines
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	

	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Moderate energy circalittoral rock	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Longlines (demersal)	Lines
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Moderate energy circalittoral rock	Pots/creels (crustacean/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Anchored nets/lines
	Trammel nets	
	Entangling nets	
	Demersal drift nets	
	Demersal longlines	
	Beach seines/ring nets	Seine nets and other
	Fyke and stake nets	
	Shrimp push-nets	
	Bait dragging	Miscellaneous
	Commercial diving	
Moderate energy infralittoral rock	Pots/creels (crustacean/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Anchored nets/lines
	Trammel nets	
	Entangling nets	
	Demersal drift nets	
	Demersal longlines	

	Beach seines/ring nets	Seine nets and other
	Fyke and stake nets	
	Shrimp push-nets	
	Bait dragging	Miscellaneous
	Commercial diving	
Moderate energy intertidal rock	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Hand working (access from vessel)	Intertidal handwork
	Hand work (access from land)	
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive - nets
	Longlines (demersal)	Lines
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
	Crab tiling	
	Digging with forks	Bait collection
Peat and clay exposures	Unknown	N/A
Subtidal coarse sediment	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
Subtidal mixed sediments	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	

	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive -nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
Subtidal mud	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	
	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)
	Pots/creels (crustacea/gastropods)	Traps
	Cuttle pots	
	Fish traps	
	Gill nets	Static – fixed nets
	Trammels	
	Entangling	
	Drift nets (demersal)	Passive -nets
	Beach seines/ring nets	Seine nets and other
	Shrimp push-nets	
	Fyke and stakenets	
	Bait dragging	Miscellaneous
Subtidal sand	Beam trawl (whitefish)	Towed (demersal)
	Beam trawl (shrimp)	
	Beam trawl (pulse/wing)	
	Heavy otter trawl	
	Multi-rig trawls	
	Light otter trawl	
	Pair trawl	
	Anchor seine	
	Scottish/fly seine	
	Scallops	Dredges (towed)
	Mussels, clams, oysters	

	Pump scoop (cockles, clams)	
	Suction (cockles)	Dredges (other)

Annex 2 : Periwinkle code of conduct

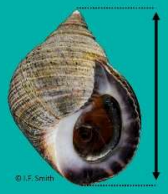
Northumberland IFCA Periwinkle Gathering Code of Conduct

PURPOSE

Collecting periwinkles in large numbers has the potential to damage seaweed and animals found on the rocky shore. Bird life can also be harmed by taking their food resources and causing disturbance.

To reduce these impacts **the guidelines listed below should be followed** by any person removing periwinkles. These guidelines apply to the coastline from the River Tyne to the Scottish border.

GUIDELINES



1. Do not create unnecessary disturbance:
   - rocks that are moved to search for or collect periwinkles should be replaced,
   - Care should be taken not to damage or displace any living organism.
   - Avoid bird disturbance in important feeding and resting areas.
2. Only collect periwinkles above 12 mm (minimum size taken by local wholesalers) to avoid taking juvenile periwinkles.
3. Sort out and return small periwinkles (under 12mm) as close as possible to area of collection. Northumberland IFCA recommends using a sieve or riddle constructed of rigid mesh or bars spaced at least 12 mm apart to separate out smaller winkles.
4. Periwinkles should be measured across the height of the shell from tip to tip (see diagram).
5. Only collect edible periwinkles and no other similar looking species (see guide below).

EDIBLE PERIWINKLE GUIDE

Periwinkles are usually black/ dark grey-brown in colour with a white interior around the mouth

They are usually around 2-3 cm high

They have a smooth or slightly ribbed shell which extends to a pointed tip.

Northumberland IFCA will monitor the collection of periwinkles to check whether the points listed above are followed. If they are not, this may result in the application of statutory measures.

For more information please visit: www.nifca.gov.uk

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