Marine Management Organisation

MMO Marine Non-licensable Activity Assessment: Allonby Bay HPMA

March 2025

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Executive Summary

This assessment analyses the impact of marine non-licensable activities (mNLA) on the designated feature of Allonby Bay Highly Protected Marine Area (HPMA). The assessment sets out the evidence considered and analyses the quality of that evidence. The assessment used conservation advice provided by Natural England. The assessment finds that there is a significant risk of the pressures associated with anchoring by powerboats (including fishing vessels) and sailing vessels (with or without an engine) hindering the conservation objective of the HPMA. The Marine Management Organisation (MMO) will therefore introduce management measures to prohibit anchoring activities throughout Allonby Bay HPMA.

1 Introduction

This assessment considers whether marine non-licensable activities (mNLA), within the remit of the Marine Management Organisation (MMO) may result in a significant risk of hindering the achievement of the conservation objective of Allonby Bay Highly Protected Marine Area (HPMA).

This HPMA was designated by the Department for Environment, Food and Rural Affairs (Defra) in July 2023 under section 116 of the Marine and Coastal Access Act 2009 and as such MMO has duties to further the conservation objective[1] of the HPMA.

HPMAs are a type of Marine Conservation Zone (MCZ) defined by the UK Government as 'areas of the sea that allow the protection and recovery of marine ecosystems by prohibiting extractive, destructive and depositional uses and allowing only non-damaging levels of other activities to the extent permitted by international law'[2].

HPMAs aim to achieve this by setting aside areas of the sea with higher levels of protection than in existing marine protected areas (MPAs).

This assessment uses the best available evidence to review site characteristics and mNLA and determine if there is a significant risk of these activities hindering the achievement of the conservation objective of the site. If so, MMO will develop and introduce suitable management measures, for example MMO byelaws. If MMO byelaws are required, these will be subject to public consultation and will require confirmation from the Secretary of State to come into force.

2 Site information

2.1 Overview

The Natural England conservation advice package[3] for Allonby Bay HPMA was used for background on site geography, designated features, conservation objective and activity pressures evidence in this assessment:

Allonby Bay is a crescent shaped bay on the north-western shore of Cumbria, between Maryport and Mawbray, in the Solway Firth. Allonby Bay HPMA forms part of Allonby Bay and extends 5.6 kilometers (km) seaward from the mean high-water mark, covering an area of 27.6 square kilometres (km^2) with a maximum depth of 6.6

[1] For more information: http://www.legislation.gov.uk/ukpga/2009/23/section/125

[2] For more information: https://www.gov.uk/government/publications/government-response-to-the-highly-protected-marine-areas-hpmas-review/government-response-to-the-highly-protected-marine-areas-hpmas-review

[3] Natural England Conservation Advice Package - Allonby Bay HPMA: designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKEHPMA001(Last accessed 21/02/25)

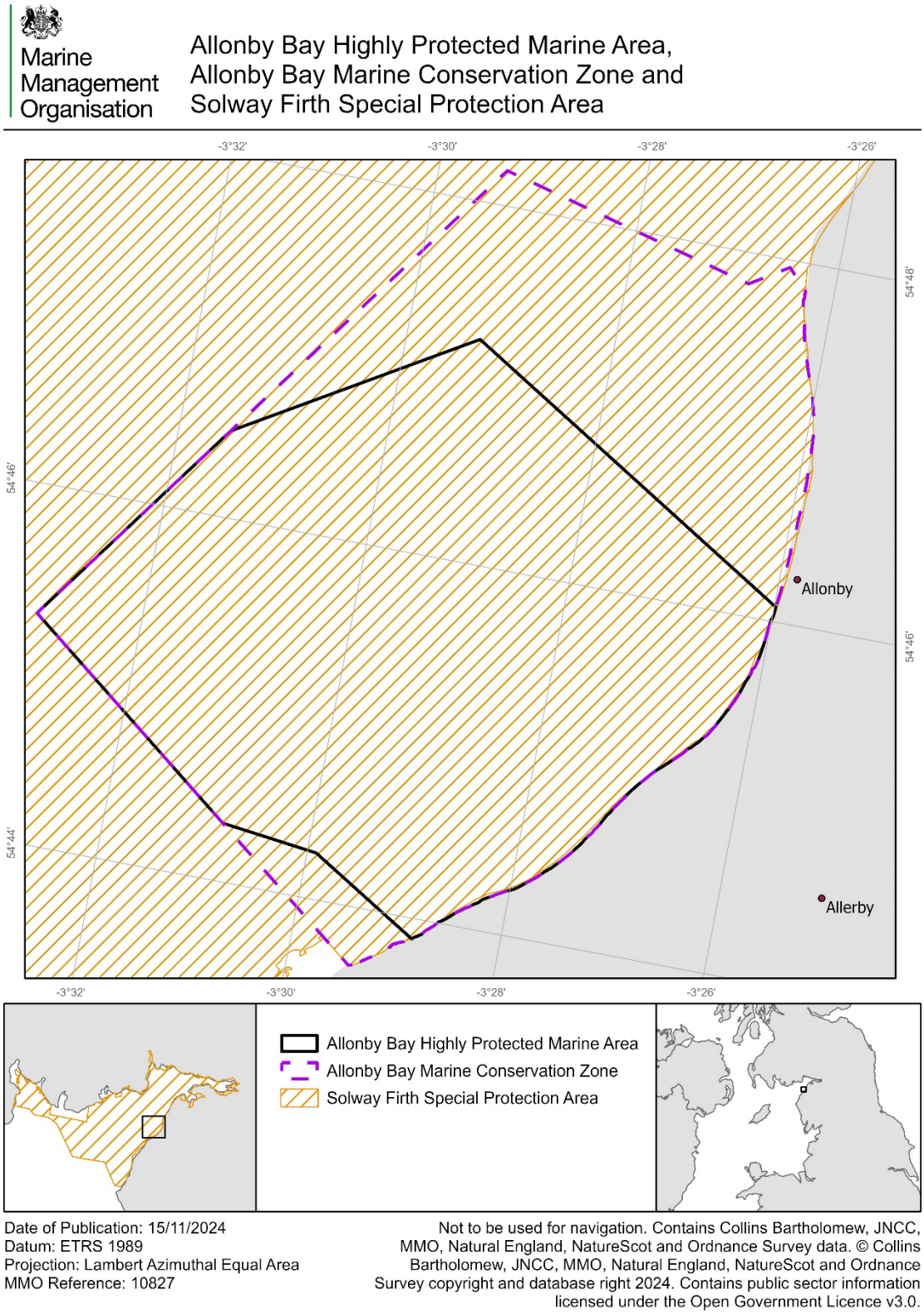

Figure 1: Allonby Bay Highly Protected Marine Area, Allonby Bay Marine Conservation Zone and Solway Firth Special Protection Area.

metres (m). Allonby Bay HPMA is within both the Allonby Bay Marine Conservation Zone (MCZ) and the Solway Firth Special Protection Area (SPA) and falls entirely within 6 nautical miles (nm) so located within the 12 nautical mile (nm) territorial sea limit of the Irish Sea region (**Figure 1**).

Allonby Bay HPMA was designated[4] by Defra in 2023 to protect the whole ecosystem within the site boundary. The protected feature of a HPMA is the marine ecosystem of the area which means all marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in or on the seabed, water column and the surface of the sea. This includes mobile species such as marine mammals, birds and fish when in or on the seabed, water column or sea surface.

Table 1 details the designated feature and conservation objective for Allonby Bay HPMA. The conservation objective sets a more ambitious level of protection for HPMAs than that of standard marine protected areas (MPAs).

Table 1: HPMA designated feature and conservation objective.

Designated feature	Conservation objective
The marine ecosystem of the area, which means all marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in or on the seabed, water column and the surface of the sea.	To achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the HPMA, to a natural state, and prevent further degradation and damage to the protected feature, subject to natural change.

There is no condition assessment available for Allonby Bay HPMA however, according to Statutory Nature Conservation Bodies (SNCBs), the HPMA has a relatively high species abundance (for the Irish Sea region) with over 200 species recorded and consists of a complex mix of habitats (Natural England and Joint Nature Conservation Committee, 2023). Some of the best examples of honeycomb worm (*Sabellaria alveolata)* reef in the UK exist in Allonby Bay HPMA, as well as fifteen broad scale habitats (Defra, 2022). These fall into the following European Nature Information System (EUNIS) Level 2 habitats:

- A1 - Littoral rock and other hard substrata
- A2 - Littoral sediment
- A3 - Infralittoral rock and other hard substrata
- A4 - Circalittoral rock and other hard substrata

[4] Allonby Bay HPMA Designation Order 2023: https://www.legislation.gov.uk/ukmo/2023/2/pdfs/ukmo_20230002_en.pdf

- A5 - Sublittoral sediment

These habitats support a diverse range of species including birds, marine mammals, seaweeds, invertebrates and fish (Natural England, 2024[3]). Allonby Bay HPMA is considered to represent a relatively natural ecosystem with limited disturbance identified (Defra, 2022).

2.2 Scope of this assessment

The geographic scope of this assessment covers the entire Allonby Bay HPMA and its designated feature. This document assesses mNLA (activities that do not require a marine licence under section 66 of the Marine and Coastal Access Act 2009[5]) within the remit of MMO. Please note, anchoring is a licensable marine activity that is exempt from licensing. As such, for the purposes of this assessment MMO will treat anchoring as a mNLA, and includes both recreational and commercial anchoring of vessels. MMO have previously assessed fishing activities (both commercial and recreational) and are implementing management to prohibit fishing throughout Allonby Bay HPMA[6]. The presence of fishing vessels, even if not actively fishing, results in similar pressures to other vessels engaged in mNLA. As such, these, non-fishing, fishing vessel pressures have also been considered in this assessment.

MMO is responsible for the management of mNLA which take place within its jurisdiction (0-12 nm). However, there are many foreshore mNLA which already fall within the remit of existing regulators. MMO does not propose adding further layers of management unnecessarily and as such considers the following activities outside of scope due to existing regulatory presence[7]:

- walking (including dog walking)
- motorised and non-motorised land craft
- general beach activities
- wildlife watching from the land
- coasteering
- bait collection and recreational fishing (management proposed via MMO Highly Protected Marine Areas Fishing Byelaw 2024[6]).

These activities and their related pressures will however be considered in combination with pressures associated with mNLA activities which progress to Part C of this assessment.

[5] For more information: https://www.legislation.gov.uk/ukpga/2009/23/section/66

[6] For more information: https://consult.defra.gov.uk/mmo/hpma-fishing-formal-consultation/

[7] For more information: https://assets.publishing.service.gov.uk/media/629745f7e90e07039ae3ec0a/Management_of_Marine_Non-Licensable_Activities.pdf

3 Part A Identified pressures on the MPA

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 of the Marine and Coastal Access Act 2009[8].

Part A assesses the interactions between pressures from mNLA and the designated feature of Allonby Bay HPMA, screening for interactions that require further consideration. Assessment of interactions not screened out in Part A will form Part B of the assessment. For each activity assessed in Part A, there are two possible outcomes for each identified pressure-feature interaction:

1. The pressure-feature interactions **are not** included for assessment in Part B and screened out:
    a. if the feature is not exposed to the pressure, and is not likely to be in the future;
    b. if the pressure is not capable of affecting the feature, other than insignificantly; or
    c. if MMO have information that the activity or pressure is not occurring in the site and/or does not need to be considered further.

2. The pressure-feature interactions **are** included for assessment in Part B:
    a. if the feature is exposed to the pressure, or is likely to be in the future;
    b. if the pressure is capable of affecting the feature, other than insignificantly;
    c. if it is not possible to determine whether the pressure is capable of affecting the feature, other than insignificantly; or
    d. if MMO have information that the activity or pressure is occurring in the site and/or does need to be considered further.

3.1 Activities taking place

Following advice and evidence detailed in **section 4.2**, activities covered by this assessment include:

- vessel anchoring (includes fishing vessels, powerboats and sailing vessels, with or without an engine)
- launching, recovery and general participation of vessels (includes powerboats, motorised personal watercraft and sailing vessels, with or without an engine)
- launching, recovery and general participation of non-motorised watercraft (includes kayaks, kitesurfing, windsurfing, dinghies and stand up paddle boards)

All other activities have been screened out of further assessment at this time as they do not take place in Allonby Bay HPMA. Activity types, frequency and location will be monitored/reviewed.

[8] For more information: www.legislation.gov.uk/ukpga/2009/23/section/126

In the Allonby Bay HPMA Conservation Advice Package[3] SNCBs have categorised activities as either 'likely to hinder the conservation objective of an HPMA and should be avoided, unless the Public Authorities' MCZ Assessment Process determines otherwise'; or activities which 'may hinder the conservation objective of an HPMA but must be assessed to establish non-damaging levels'.

Natural England have developed receptor groups which together represent the whole marine ecosystem which is the designated feature of a HPMA. Further information on receptor groups can be found in **section 4.4**.

For the assessed activities, potential pressures were identified using the "Advice on achieving the conservation objective of an HPMA" section of the Natural England Conservation Advice. **Table 2** shows the potential pressures identified for each activity and pressure-receptor interaction. Dark blue represents a medium to high risk of potential damage to the receptor (medium to high risk pressure profile in the Natural England Conservation advice), and light blue represents a low risk (low risk pressure profile in the Natural England Conservation Advice). All pressures from specific activities on the designated feature will be taken into Part B for assessment Although the low risk pressures may not be induced by the activity to a level of concern, due to the higher level of protection of HPMAs, all pressures from specific activities on the designated feature will be taken into Part B for assessment.

3.2 Significance of effects/impacts

Given the high level of protection afforded to Allonby Bay HPMA, Natural England advise it is not possible to determine whether pressures are capable of affecting the feature, other than insignificantly; and therefore all identified pressures (medium to high and low risk) are to be taken through to Part B.

4 Part B

Part B of this assessment was carried out in a manner that is consistent with the "significant risk of hindering the achievement of the conservation objectives" test required by section 126 of the Marine and Coastal Access Act 2009[8].

Table 2 shows the mNLA and pressures identified in Part A. All identified pressures have been included for assessment in Part B.

4.1 Existing management

Although fisheries management measures for the Allonby Bay area already exist and are regulated by North West Inshore Fisheries and Conservation Authorities, the management proposed via MMO Highly Protected Marine Areas Fishing Byelaw 2024[6] captures the prohibition of all fishing activities in the HPMA including recreational angling and bait digging.

Table 2: Potential pressures exerted by mNLAs on the HPMA designated feature. (Dark blue represents a medium to high risk of potential damage to the receptor, and light blue represents a low risk. White represents no pathway between the pressure and receptors) Receptor key: marine mammals (MM), birds (B), benthic habitats and species (BHS), fish and mobile shellfish (FMS), water column (WC).

Potential Pressures	Activity likely to hinder the conservation objective	Activity may hinder the conservation objective	
	Powerboating or sailing with an engine* & sailing without and engine: anchoring	Non-motorised watercraft (e.g. kayaks, windsurfing, dinghies)	Powerboating or sailing with an engine* & sailing without an engine: launching and recovery, participation
Above water noise	MM, B	MM, B	MM, B
Abrasion/disturbance of the substrate on the surface of the seabed	BHS, FMS	BHS, FMS	BHS, FMS
Collision BELOW water with static or moving objects not naturally found in the marine environment			MM, FMS, B
Hydrocarbon & Polycyclic aromatic hydrocarbons (PAH) contamination**	WC, BHS, MM, FMS, B		WC, BHS, MM, FMS, B
Introduction of light	WC, BHS, MM, FMS, B		WC, BHS, MM, FMS, B
Introduction or spread of invasive non-indigenous species (INIS)	WC, BHS, MM, FMS, B	WC, BHS, MM, FMS, B	WC, BHS, MM, FMS, B

Potential Pressures	Activity likely to hinder the conservation objective	Activity may hinder the conservation objective	
	Powerboating or sailing with an engine* & sailing without and engine: anchoring	Non-motorised watercraft (e.g. kayaks, windsurfing, dinghies)	Powerboating or sailing with an engine* & sailing without an engine: launching and recovery, participation
Litter	WC, BHS, MM, FMS, B	WC, BHS, MM, FMS, B	WC, BHS, MM, FMS, B
Organic enrichment	WC, BHS, MM, FMS, B		
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	BHS, FMS	BHS, FMS	BHS, FMS
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	WC, BHS, MM, FMS, B		WC, BHS, MM, FMS, B
Transition elements and organo-metal (e.g. TBT) contamination	WC, BHS, MM, FMS, B		WC, BHS, MM, FMS, B
Underwater noise changes**			BHS, MM, FMS, B
Visual disturbance	MM, FMS, B	BHS, MM, FMS, B	BHS, MM, FMS, B

*Includes fishing vessels
**Pressure only relevant to powerboating or sailing with an engine

Other marine activities are also already regulated in the area by the relevant regulatory bodies in the form of national laws and regulations, which a number of regulators (such as Environment Agency, Harbour Authorities and Local Authorities) use to manage coastal development, recreation and pollution (Defra, 2016). MMO has a duty under section 126 of the Marine and Coastal Access Act[8] to consider the conservation objectives of Allonby Bay MCZ and Allonby Bay HPMA when determining applications for marine licensable activities.

The Solway Firth Partnership have published a guide[9] to promote voluntary best practice to minimise bird disturbance and reduce littering on beaches on the Cumbrian coast, and regular community beach cleans[10] are organised in Allonby Bay.

4.2 Evidence sources

To determine the levels and types of activities taking place in Allonby Bay HPMA, the following evidence sources were used:

- Automatic Identification System (AIS) data for recreational vessels
- MMO1136 - Non-licensable Activity Impacts on Marine Protected Areas
- Allonby Bay HPMA stakeholder workshop
- MMO MPA inspections (MPASum)
- Expert opinion provided by MMO marine officers and Natural England area teams
- Evidence reports published and unpublished
- Strava Global Heatmap data

For more information about the above evidence sources, please see **Annex 1** which describes mNLA activity evidence and their strengths and limitations.

4.3 mNLA activity level summary

4.3.1 Automatic Identification System (AIS) Data

Global Fishing Watch AIS vessel presence data[11] suggests limited vessel activity in Allonby Bay HPMA with an annual average of 34 hours of vessel activity in the site

[9]For more information: https://www.solwayfirthpartnership.co.uk/wp-content/uploads/2020/06/Solway-Cumbrian-Coast.pdf

[10]For more information: https://www.solwayfirthpartnership.co.uk/environment/marine-litter/

[11] Copyright [2024], Global Fishing Watch, Inc. Accessed on 03/09/2024 https://globalfishingwatch.org/

Global Fishing Watch has made every attempt to ensure the completeness, accuracy and reliability of the information provided on this Site. However, due to the nature and inherent limitations in source materials for information provided, Global Fishing Watch qualifies all

from 14 separate incidences of vessel occurrence (**Table 3**). Of these, approximately a third derive from fishing vessels. As there are proposed management measures to prohibit fishing activity in Allonby Bay HPMA[6] the limited vessel activity that has taken place is likely to be an overestimate of future activity given fishing vessels are less likely to be present in the HPMA if they are unable to fish. If vessel presence from fishing is excluded from the analysis based on this assumption, the majority of mNLA activity occurs in summer (quarter 3).

4.3.2 Stakeholder engagement

4.3.2.1 MMO1136 Non-licensable activity impacts on MPAs - activity data layer

This project concluded a low intensity (intensity index score of 1-8) of paddle sports (kayaking and canoeing) and motorised personal watercraft and a low-medium intensity (intensity index score of 9 to 20) of board sports (kitesurfing and windsurfing) in Allonby Bay MCZ. The data were used to produce an activity data layer in Arc GIS. This data is displayed in **Figure 2** for the Allonby Bay HPMA area

4.3.2.1 Allonby Bay HPMA stakeholder engagement workshop

Activities occurring in and around Allonby Bay HPMA were identified by stakeholders and are displayed in the Marine non-licensable activity (mNLA) – Allonby Bay Highly Protected Marine Area web map[12]. Stakeholders observed that kitesurfing takes place mostly in the northern extent of Allonby Bay HPMA with most using a specific carpark to set up equipment and initiate their activity. Allonby is a well-known kitesurfing location nationally due to the westerly winds pushing up the Solway, however numbers of kitesurfers will vary due to the transient nature of the sport as people will travel to the area only if the conditions are good. Generally, kitesurfers will stay close to the shore and tac back and forth.

Stand up paddle boarding and windsurfing mainly occurs close to the car park and town facilities just north of the of the HPMA boundary keeping close to shore.

Kayaking can occur across the whole site, however the general route is usually within 500 meters of the shore with occasional routes across to Scotland. Kayaking and canoeing is usually 1 or 2 people or small groups if part of a club.

Contrary to MMO report (MMO1136) detailed in **section 4.3.2.1**, stakeholders no longer believe that motorised personal watercraft occur in the site.

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designations of vessel fishing activity, including synonyms of the term “fishing activity,” such as “fishing” or “fishing effort,” as “apparent,” rather than certain. And accordingly, the information is provided “as is” without warranty of any kind

[12] Marine non-licensable activity (mNLA) – Allonby Bay Highly Protected Marine Area web map: https://defra.maps.arcgis.com/apps/dashboards/ff296e9974c74f9fa72fc7c53f80b883 (last accessed: 21/02/25)

Table 3: Summarised Global Fishing Watch AIS presence data for Allonby Bay HPMA 2019 to 2023. Vessel presence represents a count of the number of vessel occurrences within the HPMA. Vessel hours represent the sum of time spent in Allonby Bay HPMA by vessels. Data in brackets represents the contribution to vessel presence/hours by fishing vessels. Data excludes cargo vessels which do not represent mNLA. Annual average figures exclude data from 2020 to avoid under estimating vessel activity due to the impact of COVID-19.

Quarter	2019		2020		2021		2022		2023		Annual Average (excl. 2020)	
	Vessel presence	Vessel hours	Vessel presence	Vessel hours	Vessel presence	Vessel hours	Vessel presence	Vessel hours	Vessel presence	Vessel hours	Vessel presence	Vessel hours
1	8 (3)	20 (6)	6 (5)	21 (19)	6 (4)	22 (14)	3 (3)	16 (16)	1 (1)	2 (2)	5 (3)	15 (10)
2	3 (1)	6 (1)	1 (0)	1 (0)	2 (0)	2 (0)	4 (1)	9 (3)	1 (1)	1 (1)	3 (1)	5 (1)
3	6 (2)	9 (2)	1 (0)	1 (0)	4 (1)	10 (1)	7 (1)	21 (1)	4 (1)	8 (1)	5 (1)	12 (1)
4	3 (1)	6 (3)	2 (1)	6 (5)	0	0	3 (1)	5 (2)	0	0	2 (1)	3 (1)
Total	20 (7)	41 (12)	10 (6)	29 (24)	12 (5)	34 (15)	17 (6)	51 (22)	6 (3)	11 (4)	14 (5)	34 (13)

Stakeholders stated that anchoring was not commonly observed within the site, except for during sea cadet training and potentially the odd dayboat over a good weather weekend. Sail boats were occasionally observed to transit through the site with the tide, but rarely larger leisure boats due to the shallow depth. Other than the sea cadet safety boat, powerboats were not observed in the site.

It was highlighted that there is a navigational marker located just outside the northern corner boarder of the HPMA used by commercial vessels so passage or anchoring of these vessels within the HPMA would only be in case of an emergency.

Stakeholders also submitted forms (19) detailing recreational activities personally undertaken within Allonby Bay HPMA. The only activities within the scope of this assessment were powerboating (including anchoring) and kayaking. These activities were identified in 10% (2) of the forms submitted. The remaining 90% (17) of submitted forms identified walking (26%), beach cleaning (16%), dog walking (11%), educational activities (e.g. coastal school) (11%), swimming (11%), beach recreation (10%) and birdwatching (5%) which are outside the scope of this assessment.

4.3.3 Expert opinion: MMO

Local MMO marine officers have described a low level of kitesurfing and kayaking in the site and MPASum inspections carried out by the MMO during working hours (Monday – Friday) in Allonby Bay MCZ identified one mNLA activity event (kitesurfing) over 6 years.

The evidence also suggests that Allonby Bay HPMA is not known to be and is unlikely to be used as a launching and recovery location for powerboats and sailing vessels due to lack of slipways to the foreshore.

Table 4 : Levels of mNLAs taking place in Allonby Bay HPMA

Activity	Level of activity
Non-motorised watercraft: kayaks, dinghies, windsurfing	low
Non-motorised watercraft: stand up paddle boards, canoes/row boats, kitesurfing	moderate
Powerboating or sailing with an engine	low to moderate
Sailing without an engine	low (autumn and winter), moderate (spring and summer)

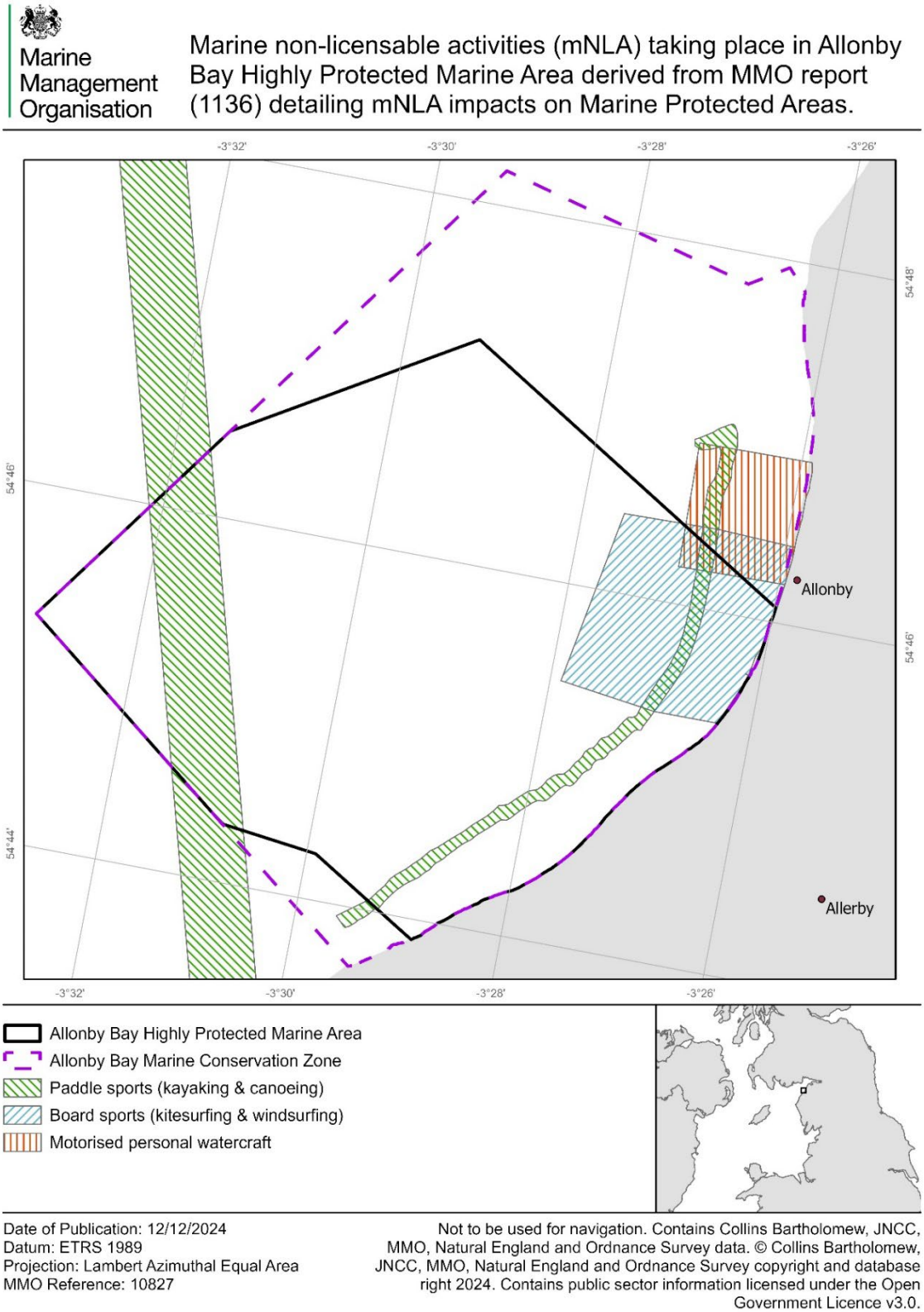

Figure 2: Marine non-licensable activities (mNLA) taking place in Allonby Bay MCZ derived from data collated from stakeholder engagement for a MMO report detailing mNLA impacts on Marine Protected Areas.

4.3.4 Allonby Bay Candidate HPMA Recreational Survey Report

Water sports including windsurfing, sailing, canoeing, kayaking, kitesurfing and stand up paddle boarding made up 2% of recreational activity occurring in the Allonby Bay candidate HPMA. The remaining 98% included other non-licensable activities (out of the scope of this assessment) such as walking with dogs (53%), walking without dogs (24%), beach activities (11%), photography/sitting and admiring view (4%), collecting seaweed/driftwood (3%), metal detecting (1%), horse riding (<1%), beach cleaning (<1%) and trail biking (<1%). Activities such as sea angling (2%) and bait digging (<1%) were also recorded.

4.3.5 Defra consultation on proposals to designate candidate Highly Protected Marine Areas (HPMAs)

No significant areas of anchoring or mooring were identified within the Allonby Bay HPMA. Four of twelve respondents who reported anchoring in the candidate HPMA for fishing and recreational purposes used the area 'often'. However, as fishing, including recreational angling, is being prohibited via the proposed MMO Highly Protected Marine Areas Fishing Byelaw 2024[6], anchoring activity is likely to reduce, given anchoring for the purpose of fishing should no longer take place. It was also stated that AIS and Royal Yachting Association's Safetrx app indicated low use of the area by recreational vessels, although it is noted not all vessels make use of AIS especially small recreational vessels.

4.3.6 Strava Global Heat Map data

This data shows that of all water sports activities recorded by Strava, only kitesurfing has been recorded to occur in Allonby Bay HPMA. Mostly they launch this activity from a site near Allonby using the car park between Christ Church and Mealo Beck, in the Eastern corner of the HPMA.

4.3.7 mNLA activity level conclusion

Based on the evidence available there is limited mNLA occurring in the site. Sailing with or without and engine, powerboating, kayaking, kitesurfing, and motorised personal watercraft are considered to occur with kitesurfing appearing to be most frequent (although moderate). Whilst there is the potential for anchoring to occur, evidence suggests activity is limited as vessel presence is low and no areas of significant anchoring have been identified in Allonby Bay HPMA. Vessel activity that does occur is likely to originate from outside the site as there are no slipways and limited launching possibilities in the site.

4.4 Supporting ecosystem receptors

Natural England have developed receptor groups to represent the whole marine ecosystem which is the designated feature of a HPMA. **Table 5** details the receptor groups. Shaded rows indicate only the receptor groups currently relevant to Allonby Bay HPMA (dark blue represents permanent and light blue represents transient components of the designated feature).

Table 5: Receptor groups representing the whole marine ecosystem

Receptor Group	Description
Coastal habitats	includes habitats which have been defined as coastal and includes for example coastal saltmarshes and saline reedbeds, *Spartina* swards, Atlantic salt meadows and dunes.
Geology and geomorphology	includes geological and geomorphological interests for example cliffs, bays and glacial valleys.
Water column	the vertically continuous mass of water from the sea surface to the seabed.
Benthic habitats and species	includes a wide range of different marine benthic habitats and species. Natural England aggregated their advice on marine benthic biotopes to EUNIS Level 2 marine habitats and benthic species. Collectively these represent the benthic habitats and species which form the HPMA feature.
Marine Mammals	includes a range of different species. Natural England split their advice into two groupings: cetaceans (whales, dolphins and porpoises) and pinnipeds (seals).
Fish and mobile shellfish	includes a large number of species. Natural England split their advice into groupings: demersal, migratory and pelagic fish and mobile shellfish.
Birds	includes breeding and non-breeding birds that utilise the coastal and marine environment for a range of different purposes such as breeding, feeding, loafing and maintenance activities.

4.4.1 Allonby Bay HPMA usage by marine mammals, birds and migratory fish

Due to their mobile nature, marine mammals, birds and migratory fish are a transient component of the designated feature of Allonby Bay HPMA. When present in the water column or, with respect to marine mammals and birds, on the foreshore, or on the sea surface within the site, they become part of the marine ecosystem of the area, and its marine fauna.

As a result, the likelihood or frequency of their presence within Allonby Bay HPMA will affect the potential impact mNLA may have. To support this assessment, the marine mammal, bird and migratory fish species and their potential usage of Allonby Bay HPMA are detailed below.

4.4.1.1 Marine Mammals - Pinnipeds

Allonby Bay HPMA is not a designated haul out site for grey (*Halichoerus grypus*) or harbour (*Phoca vitulina*) seals but both are present in small numbers in the Solway Firth (Solway Firth Partnership, 2024; Baxter et al., 2011) (the area in and around Allonby). There are two designated haul out sites on the Scottish side of the Solway Firth (Solway Firth Partnership, 2024; Baxter et al., 2011) and there have been sightings of both species in the vicinity of Allonby Bay HPMA (NBN Trust, 2024). Allonby Bay HPMA falls within the Southwest Scotland Seal Management Area and surveys suggest numbers of grey and harbour seals in the region appear stable with no evidence of population decline. This differs to other areas of Scotland which have seen significant declines in the numbers of harbour seals around the east and north coast and in the Northern Islands (SMRU, 2024).

The Sea Mammal Research Unit estimated at-sea distribution of both harbour and grey seals in the British Isles which resulted in similar conclusions. The analysis shows grey seals are present in and around Allonby Bay HPMA albeit in relatively low densities with density of harbour seals around Allonby Bay HPMA appearing to be lower still.

4.4.1.2 Marine Mammals - Cetaceans

A number of whales, porpoises and dolphins have been sighted in the vicinity of Allonby Bay HPMA particularly within the Solway Firth. Harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), minke whale (*Balaenoptera acutorostrata*), white-beaked dolphin (*Lagenorhynchus albirostris*) and Risso's dolphin (*Grampus griseus*) are considered present or commonly seasonal visitors to the Solway Firth with the former three species being most common and recorded annually (Solway Firth Partnership, 2024; Baxter et al., 2011). It is therefore probable that these species may occasionally be present within Allonby Bay HPMA with bottlenose dolphins and common dolphins most likely to be present (NBN Trust, 2024; Hebridean Whale and Dolphin Trust 2024).

Harbour porpoise were noted as an important marine mammal species for Allonby Bay HPMA in the Pre-consultation scientific advice to Defra on the ecological merit of the of the site (JNCC and Natural England, 2023) and there is some anecdotal evidence to suggest the waters in and around Allonby Bay may be an important pupping ground for harbour porpoise with mothers and young calves frequently seen in the area.

While these cetacean species may be present in Allonby Bay HPMA the area would not be considered a "hotspot" for these species with low population densities compared to the wider UK populations.

4.4.1.3 Birds

There are a number of bird species that make use of Allonby Bay HPMA and the surrounding area. The SNCB pre-consultation scientific advice to Defra on the ecological merit of the site identifies 16 important bird species. This assessment

considers bird species which are particularly abundant and or particularly sensitive to disturbance from mNLA activities.

Common scoter (*Melanitta nigra*) are known to be present in Allonby Bay HPMA however their usage of the site is low in the context of the overlapping Solway Firth SPA for which they are a designated feature. By area, Allonby Bay HPMA makes up 2% of the Solway Firth SPA yet recent population estimates for common scoter suggest a density of 0.38 individuals per km^2 within Allonby Bay HPMA which accounts for just 0.16% of the common scoter population of the Solway Firth SPA. Common scoter appear to favour the Scottish side of the Solway Firth with much greater densities observed on the Scottish coast (Humphries and Bogart, 2024). It is possible the lack of presence in Allonby Bay may be due to mNLA or other activities occurring in Allonby Bay but given the limited scale of activities occurring this is considered unlikely and more likely due to habitat preferences.

Red throated diver (*Gavia stellata*) are also a designated feature of the Solway Firth SPA and are considered winter visitors to the Solway Firth SPA and therefore Allonby Bay HPMA (Natural England, 2024). Recent surveys identified three red throated divers present in Allonby Bay HPMA representing an estimated population of 16 birds within the HPMA at a density of 0.55 red throated divers per km^2. This accounts to 4% of the Solway Firth population. Given Allonby Bay HPMA makes up 2% of the Solway Firth SPA by area this suggests a higher than average importance of the HPMA compared to the wider SPA. However, this still equates to a relatively average use of the site by red throated divers when compared to other, high use areas within the Solway Firth SPA (Humphries & Bogart, 2024).

Other bird species including curlew (*Numenius arquata*), oystercatcher (*Haematopus ostralegus*), guillemot (*Uria aalge*), gannet (*Morus bassanus*), razorbill (*Alca torda*), pink-footed goose (*Anser brachyrhynchus*), and pintail (*Anas acuta*) have been recorded in the HPMA. Some shore birds form large aggregations[13], although presence appears sporadic with a recent survey (Humphries and Bogart, 2024). identifying no or very limited presence of shore birds in the HPMA. It should however be noted that data for bird usage of, and presence in, the HPMA is very limited and the data that is available will have variable detection rates for different birds depending on methods used and the time of year the survey was undertaken. As such, presence of species may be greater than currently recorded and more species may be found to be present in future.

Other bird species that may be present in the site have not been considered further due to their limited presence in the site (NBN Trust, 2024; Woodward et al., 2024; Humphries and Bogart, 2024) and, or limited sensitivity to pressures associated with mNLA.

[13] Highly Protected Marine Areas: Allonby Bay: https://www.gov.uk/government/publications/highly-protected-marine-areas-allonby-bay/highly-protected-marine-areas-allonby-bay

4.4.1.4 Migratory fish

Limited evidence is available regarding utilisation of Allonby Bay HPMA by migratory fish however the following species are known or expected to be present at varying times of the year.

- Atlantic Salmon (*Salmo salar*)
- European eel (*Anguilla Anguilla*)
- European smelt (*Osmerus eperlanus*)
- Sea lamprey (*Petromyzon marinus*)
- Sea trout (*Salmo trutta*)
- Shad (*Alosa sp.*)
- River lamprey (*Lampetra fluviatilis*)

These species will not be resident in Allonby Bay but will pass through during the year as they migrate to and from freshwater habitats that drain into Allonby Bay.

Black Dub, Crookhurst Beck and Scad Beck all drain into Allonby Bay HPMA or the wider Allonby Bay area and all have recorded European eel presence and are mapped migration routes for the species (Environment Agency pers. comms).

4.5 Pressure assessment

This section summarises the best available evidence on the impacts of relevant mNLA pressures on the HPMA feature, and considers this alongside site specific information, including the conservation objective, intensity of mNLA taking place and exposure to natural disturbance.

As the different benthic habitats and biotopes found in Allonby Bay HPMA collectively represent a part of the HPMA feature (i.e. the whole marine ecosystem of the area) they have been grouped together despite varying sensitivities to the pressures. They have been considered together as impacts to one biotope may have indirect impacts on others within the same ecosystem receptor group.

4.5.1 Pressures

Table 2 lists the pressures from the mNLA taking place in Allonby Bay HPMA that have the potential to be damaging to the HPMA feature (Natural England's Allonby Bay HPMA Conservation Advice Package[3]).

4.5.1.1 Abrasion/disturbance of the substrate on the surface of the seabed and penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion.

The pressures "abrasion or disturbance of the substrate on the surface of the seabed" and "penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion" have been consolidated due to the similar nature of their impacts on the designated feature.

The “abrasion” and “penetration” pressures have the potential to be damaging to the HPMA designated feature through the impact to two ecosystem receptor groups: “benthic habitats and species” and “fish and mobile shellfish”.

These pressures have the potential to be damaging to benthic habitats and species directly by damaging or disrupting habitat, and exposing, removing or damaging epifauna and flora which develop on the substrata (Natural England, 2024). This may result in a change to seabed type, community abundance, biomass or diversity, as well as damage or loss of biotopes (Natural England, 2024). Benthic species may be impacted through damage, exposure or removal of individuals, potentially leading to mortality (Natural England, 2024).

With regard to fish and mobile shellfish the pressures may temporarily displace demersal species due to the physical disturbance (van Deurs et al., 2009) while migratory and pelagic species may be impacted indirectly through the damage to supporting habitat for key life cycle stages (e.g. spawning sites) (Hold et al., 2019 as cited in Natural England, 2024). Crustacean shellfish species such as shrimp and lobster may also be directly impacted due to their close association with benthic habitats (e.g. burrowing, feeding) (Natural England, 2024; Perez-Dominguez, 2016). Additionally, structural damage and loss of the habitat may reduce shelter availability and increase mortality in all fish and mobile shellfish (Hold et al., 2019 as cited in Natural England, 2024)

4.5.1.2 Underwater noise changes

The “underwater noise changes” pressure has the potential to be damaging to the HPMA designated feature through the impact to four ecosystem receptor groups: “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

Underwater noise may cause direct tissue trauma, behavioural reactions and masking of natural sounds that are important to fish (Pérez-Domínguez et al., 2016), including audible communication from other fish, and sounds produced by predators or prey (Bates, 2012). The pressure may cause permanent or temporary physical injury to hearing in marine mammals and disrupt behavioural patterns such as migration, nursing, breeding, feeding or sheltering due to avoidance from an area (Erbe et al., 2018; Pérez-Domínguez et al., 2016). The pressure may directly impact benthic and water column feeding birds more so than surface feeding birds, potentially by causing barotraumas (damage to body tissues), temporarily stunning and altering behaviour (Pérez-Domínguez et al., 2016).

Whilst there is potential for underwater noise to cause damage to marine benthic habitats and species, there is no current evidence to suggest there is an interaction between this pressure and the majority of habitats and species in this receptor group (Natural England, 2024).

Impact from this pressure will be influenced by the sensitivity of species to underwater noise; sensitivity is established by looking at both sound exposure level (SEL) which takes into account both level and duration of exposure; and sound

pressure level (SPL) which is the absolute maximum exposure to sound at any one time (NRW, 2023).

4.5.1.3 Visual Disturbance and above water noise

In accordance with Natural England advice, the pressures “visual disturbance” and “above water noise” have been consolidated due to their tendency to occur simultaneously from the same source.

The “visual disturbance” pressure has the potential to be damaging to the HPMA designated feature through the impact to three ecosystem receptor groups: “marine mammals”, “fish and mobile shellfish” and “birds” whereas only “marine mammals”, specifically seals, and “birds” have the potential for impact from “above water noise”.

For marine mammals such as cetaceans and pinnipeds, visual disturbance and, for pinnipeds, above water noise, has the potential to be damaging through physical and behavioural effects. Behavioural effects in marine mammals can include disruption to migration patterns, reproduction, feeding, and/or sheltering (Erbe et al., 2018). Physical effects may include permanent hearing damage or temporary hearing impairment (Pérez-Domínguez et al., 2016).

For birds visual disturbance and above water noise pressures may have immediate and longer term impacts. Disturbance may induce an immediate flight response (flushing) displacing birds and reducing time spent foraging leading to longer term impacts related to mortality/reduced fitness and impaired reproductive success (Fliessbach et al., 2019, cited in Spencer et al., 2022).

For fish and mobile shellfish, evidence is limited, however visual disturbance pressures have the potential to be damaging to fish and mobile shellfish through invoking predator avoidance behaviours and increasing energy expenditure and reducing time spent feeding Hold et al., 2019 as cited in Natural England, 2024).

Such impacts to mammals, birds and fish and mobile shellfish may reduce fitness and survivability and lead to avoidance of high activity areas which may affect their general presence in the HPMA impacting the composition of its characteristic biological communities (Scottish Power Renewables 2021; Irwin et al., 2019).

4.5.1.4 Introduction or spread of invasive non-indigenous species (INIS)

The “introduction or spread of invasive non-indigenous species (INIS)” pressure has the potential to be damaging to the HPMA designated feature through the impact to all five ecosystem receptor groups: “water column”, “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

INIS has the potential to be damaging by impeding the recovery of the HPMA to a natural state by causing an unnatural alteration to the designated feature. This may be through altering benthic habitats, or outcompeting native benthic species, birds, fish and mobile shellfish for space and other resources (e.g. food, light and nutrients) (JNCC, 2004). The presence of INIS may lead to displacement of native species potentially altering community abundance, biomass and diversity.

Birds are most vulnerable to the introduction or spread of INIS during the breeding season, where the predation of eggs and chicks can take place (Natural England, 2024). Although evidence of shore nesting birds in the HPMA is limited, there is the potential for breeding birds to be present (Natural England, 2024) however their nests are likely to be outside of the site, further inshore of the HPMA boundary.

INIS has the potential to impact the water column by changing pelagic primary production affecting water column-benthos nutrient fluxes (Pérez-Domínguez et al., 2016) and altering planktonic community structures which may favour INIS (Pérez-Domínguez et al., 2016).

An INNS Rapid Assessment Survey was carried out on Allonby Bay and no invasive non-native species (INNS) were identified (Natural England pers. comms).

4.5.1.5 Litter

The “litter” pressure has the potential to be damaging to the HPMA designated feature through the impact to all five ecosystem receptor groups: “water column”, “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

Litter has the potential to damage mammals, birds and fish and mobile shellfish through entanglement and ingestion which may impact individual fitness, survivability and mortality (Natural England, 2024; Pérez-Domínguez et al., 2016). Ingestion can also lead to the bioaccumulation of small particles into the food chain with potentially damaging effects (Natural England, 2024).

Litter has the potential to smother benthic habitats and species, impacting communities by reducing gas and/or nutrient exchange, creating anoxic conditions and reducing light availability (Green et al., 2015; Natural England, 2024). Plastic debris may be ingested by benthic species as microplastics with potentially toxic compounds (Natural England, 2024). Litter may also act as a vector for the transport of INIS and provide a surface for species to settle (Katsanevakis et al., 2007; Natural England, 2024). These impacts may lead to changes in community abundance, biomass and diversity (Natural England, 2024).

4.5.1.6 Introduction of light

The “introduction of light” pressure has the potential to be damaging to the HPMA designated feature through the impact to all five ecosystem receptor groups: “water column”, “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

The introduction of light has the potential to disturb fish and bird species by impacting key behaviours. Light pollution may disturb bird feeding, roosting or breeding and may especially impact nocturnal seabirds attracted to artificial light (Montevecchi, 2006, cited in Pérez-Domínguez et al., 2016).

Although the evidence is limited, marine mammals such as seals may also be influenced by anthropogenic light (Perez-Domingues et al., 2016).

The introduction of light may impact the water column by interfering with natural processes such as diel vertical zooplankton migration (Natural England, 2024).

For benthic habitats and species changes in light conditions have the potential to impact light availability for primary productivity for algal species and alter behaviours of nocturnal species and species that can detect light or visual cues (Lynn et al., 2021; Natural England, 2024). This may impact species abundance, biomass or biodiversity, resulting in the alteration or loss of the biotope (Natural England, 2024).

Impact from this pressure will vary across species and be influenced by the duration, intensity and time of day the artificial light is introduced (Natural England, 2024).

4.5.1.7 Organic Enrichment

The “organic enrichment” pressure has the potential to be damaging to the HPMA designated feature through the impact to all five ecosystem receptor groups: “water column”, “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

High concentrations of nutrients in the water column can damage the HPMA designated feature through eutrophication which has the potential to smother sediments, reduce dissolved oxygen availability and cause anoxic conditions (Natural England, 2024). This may impact each of the five ecosystem receptors by limiting growth, fitness and community structure of habitats and species in the ecosystem (Perez-Dominguez et al., 2016; Hold et al., 2019, cited by Natural England, 2024). The pressure may indirectly impact fish and shellfish through displacement or mortality (Maes et al., 2007), and impact birds by reducing the abundance and availability of prey species (Pringle and Burton, 2017).

4.5.1.8 Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals), Hydrocarbon & PAH contamination and Transition elements and organo-metal (e.g. TBT) contamination

The pressures “synthetic compound contamination (inc. pesticides, antifoulants, pharmaceuticals)”, “hydrocarbon & PAH contamination” and “transition elements and organo-metal (e.g. TBT)” have been consolidated due to the similar nature of their impacts on the designated feature.

The pressures have the potential to be damaging to the HPMA designated feature through the impact to all five ecosystem receptor groups: “water column”, “benthic habitats and species”, “marine mammals”, “fish and mobile shellfish” and “birds”.

If the concentration of these pressures is above the threshold set out under the Water Environment Regulations (WER) and Environmental Quality Standards Directive (EQSD), they have the potential to damage or cause an unnatural alteration to the designated feature, impeding recovery towards a natural state (Natural England, 2024).

There is the potential for these pressures to damage benthic species across a wide range of biotopes, and exposure can cause a wide variety of adverse effects leading

to changes to community abundance, biomass and/or diversity, altering biotopes within the site (Natural England, 2024). Contamination of synthetic compounds may reduce primary productivity, larval settlement, and cause changes in burrowing or feeding behaviour and potentially direct mortality (Collier and Pinn, 1998; Lam et al., 2010; Nielsen and Dahllöf, 2007; Schoor and Newman, 1976). Contamination of hydrocarbon and polycyclic aromatic hydrocarbon (PAH) may reduce feeding, growth, or fertilisation success, cause immunotoxicity and direct mortality (Barron et al., 2021; Morales-Caselles et al., 2009; Lewis et al., 2008). Contamination of transition elements and organo-metals such as tribuyltin (TBT) may bioaccumulate in organisms, and cause changes in burrowing, feeding activity and respiration rates, and potentially direct mortality (Absil et al., 1996; Bat and Raffaelli., 1998; Buffet et al., 2012; Freitas et al., 2017). These pressures may also result in secondary changes in behaviour, competition, predation or grazing, which may alter benthic community composition (Fleeger et al., 2003).

For marine mammals it is likely that potential damage is linked to chronic exposure to relatively low levels of pollutants or cocktails of different chemicals (Pérez-Domínguez et al., 2016). The susceptibility of harbour porpoise to fatal infectious diseases has been seen to increase with increasing polychlorinated biphenyls (PCB) concentration (Pérez-Domínguez et al., 2016). The UK Cetacean Strandings Investigation Programme (CSIP) examined concentrations of persistent organic pollutants (POPs) in strandings of marine mammals and found that pollutant thresholds in individuals were significantly higher in those stranded on more industrialised coastlines (Williams et al., 2023).

Evidence is limited on potential for these pressures to damage fish and mobile shellfish however, pollution of rivers and estuaries from industry and agriculture has shown the potential to result in a decline of estuarine fish (Pérez-Domínguez et al., 2016). Pollutants may cause lesions on fish gills and affect respiration (Pérez-Domínguez et al., 2016), reduce reproductive success (Hold et al., 2019, as cited in Natural England, 2024), and lead to abnormal chromosome division, malformation and mortality of fish embryos, and mitotic abnormalities in adults (Hold et al., 2019, as cited in Natural England, 2024). Damaging effects may be linked to chronic exposure to relatively low levels of pollutants or cocktails of different chemicals (Pérez-Domínguez et al., 2016).

In mobile shellfish synthetic compounds have been found to increase mortality, cause deformities and affect the endocrine system of lobsters (Hold et al., 2019, as cited in Natural England, 2024) and brown shrimp are known to avoid sediment contaminated with pesticides (Hold et al., 2019, as cited in Natural England, 2024) Exposure to crude oil results in a high level of accumulation of hydrocarbons in crabs and a reduction in respiration and growth rate and increased mortality in brown shrimp (Hold et al., 2019, as cited in Natural England, 2024) Recovery of burrowing species is likely to be prohibited due to persistence of synthetic compounds and hydrocarbons in sediments (Hold et al., 2019, as cited in Natural England, 2024). Elevated levels of trace metals (e.g. mercury) may lead to mortality and impact larval supply of lobsters and crabs by inhibiting proteasome activity (Hold et al., 2019, as cited in Natural England, 2024).

Being top predators, birds are exposed to relatively high concentrations of environmental contaminants through bioaccumulation (Blévin et al., 2017). 'Due to structural similarities with endogenous hormones many POPs are known as endocrine-disrupting chemicals (EDCs), mimicking or blocking the effects of these hormones (Jennsen, 2006).' Oil spills are a major source of hydrocarbon and PAH contamination and can cause large scale mortality of seabirds through suffocation, hypothermia, drowning, starvation and supressed immune systems (Spencer et al., 2022). Oil, even trace amounts, disrupts feather integrity and impacts thermal insulation, buoyancy and ability to dive or fly (King et al., 2020; Troisi et al., 2016). The large numbers affected (tens to hundreds of thousands of birds) can have wide-scale impacts on population dynamics can result (Votier et al., 2005). Bioamplification of heavy metals in the food chain may lead to metal contamination in seabirds impacting reproduction, immune function, behaviour and cell development (Spencer et al., 2022; Pérez-Domínguez et al., 2016).

The biological impacts of the pressures will depend on the sensitivity of the habitats and species, and the nature and level of exposure of the contaminant.

4.5.1.9 Collision BELOW water with static or moving objects not naturally found in the marine environment

The "collision BELOW water with static or moving objects not naturally found in the marine environment" pressure has the potential to be damaging to the HPMA designated feature through the impact to three ecosystem receptor groups: "marine mammals", "fish and mobile shellfish" and "birds".

Collision below water has the potential to cause severe injury and/or death, to each of the three ecosystem receptor groups therefore causing unnatural alteration to the designated feature, impeding recovery towards a natural state (Pérez-Domínguez et al., 2016).

4.5.2 Activities

4.5.2.1 Powerboating or sailing (with or without an engine) (anchoring)

Pressures caused by anchoring activity by powerboats and sailing vessels (including fishing vessels) are listed in **Table 2**.

According to the Natural England conservation advice package[3] the pressures "**abrasion or disturbance of the substrate on the surface of the seabed**" and "**penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion**" represent a medium – high risk of potential damage to the HPMA designated feature. All other pressures represent a low risk.

Section 4.5.1.1 details impacts caused by the "abrasion" and "penetration" pressures on the ecosystem receptors. "**Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion**" may result from when an anchor makes contact with the seafloor and may cause damage to the seabed upon deployment, subsequent dragging, and upon recovery. **"Abrasion or disturbance of the substrate on the surface of the seabed**" may result from chain scour whilst at anchor.

The footprint of an anchoring event will depend on the type and size of anchor and vessel, weight of anchor, deployment and retrieval events (e.g. dragged when set / required resetting), duration at anchor, level of swing, environmental conditions, sediment type and skill of the vessel crew (Griffiths et al., 2017). Impacts from the pressures are likely to be localised and of short duration and recovery can begin when the anchor is removed. Length of recovery will be dependent on habitat and species impacted (Griffiths et al., 2017). Evidence on impacts to UK habitats is limited, however there is potential for small vessel anchors to cause surface 'scars' of typically 1-4 m2 (Collins et al., 2010).

This activity has the potential to impact the designated feature of the HPMA through alteration, damage or destruction to flora, fauna and the seabed with implications for ecosystem function and processes.

The impact of these pressures on the designated feature will vary according to the intensity of anchoring activity taking place. Data from automatic identification systems (AIS) indicate minimal recreational boating occurring within Allonby Bay HPMA (**Table 3**) with an average of 1.2 days of vessel presence a year over a 5 year period. The majority of vessel presence is likely to be transitory, rather than anchoring. It should be noted that not all vessels make use of AIS so this data is likely to be an underestimate, however evidence from MMO Marine Officers, Natural England and local stakeholders suggest similar limited vessel presence (detailed in **section 4.3.2**). This indicates minimal anchoring activity is likely to be taking place within Allonby Bay HPMA. No data is available on either the size of vessels and anchors, or location of any anchoring if occurring. Natural England highlighted the need for precaution with regards to anchoring activity, as despite attempts to develop an appropriate risk assessment to identify thresholds and ‘tipping points’ for resistance and resilience of habitats to anchoring, it has been unsuccessful due to uncertainties regarding level of impact and recovery (Griffiths et al., 2017).

MMO concludes that although there is minimal anchoring activity currently taking place in Allonby Bay HPMA, due to the high level of protection afforded to the site, the impact of the pressures abrasion, penetration and/or disturbance from ongoing and future anchoring activity has the potential to significantly hinder the conservation objective of the HPMA, especially if the level of activity increases in future. MMO therefore propose management of the activity (see section 6).

Sections 4.5.1.2– 4.5.1.9 details potential impacts caused by the remaining low risk anchoring pressures, on the ecosystem receptor groups listed in **Table 2**. As management of anchoring has been proposed based on the impact to the HPMA designated feature from the pressures abrasion, penetration and/or disturbance, the remaining pressures will not be discussed further.

4.5.2.2 Powerboating or sailing (with or without an engine) (launching and recovery, participation)

Pressures caused by launching, recovery and participation activity by powerboats and sailing vessels (including fishing vessels) are listed in **Table 2**.

All pressures represent a low risk of potentially damaging the designated feature of the HPMA.

The pressures **“abrasion or disturbance of the substrate on the surface of the seabed”** and **“penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion"** detailed in **section 4.5.1.1** may result from trampling and the use of trailers at access points (Saunders et al., 2000). Vessels with an engine may also cause propeller damage to the seabed when operated in shallow water (Saunders et al., 2000). Due to the evidence in **section 4.3.4** suggesting low vessel presence and lack of suitable launching point in Allonby Bay HPMA the impact is likely to be minimal so deemed not capable of affecting (other than insignificantly) the designated feature of the HPMA.

The pressure **“Collision BELOW water with static or moving objects not naturally found in the marine environment”** detailed in **section 4.5.1.9** may result from collision of a species with the hull and/or propeller of a vessel. Whilst the speed of vessels in the area is unknown, given the limited vessel activity in Allonby Bay HPMA the likelihood of collision is considered low.

The pressure **“Underwater noise changes”** detailed in **section 4.5.1.2** may result from engine noise associated with recreational powered vessels

Limited evidence is available with respect to the impacts of vessel noise on fish however some studies have shown vessel noise can potentially mask vocalisations and increase stress responses (Celi et al., 2015; Neenan et al., 2016). The response of fish to vessel noise will vary depending on species specific sensitivities (Natural England, 2017a).

The level of noise produced by small motorised watercraft is dependent on speed and operation of the vessels but is generally considered low (75- 159 dB re 1µ Pa m) (OSPAR, 2009). Likelihood of noise injury in marine mammals at these levels is considered unlikely particularly given the limited vessel activity and limited presence of marine mammals in Allonby Bay HPMA (Natural England, 2017a).

While noise injury may be unlikely there is the potential for disturbance of marine mammals as a result of underwater noise changes and negative impacts as a result. Lusseau et al., 2005 demonstrated that cetacean abundance negatively correlated with vessel activity, with the frequency of bottlenose dolphin presence reducing with increasing vessel traffic suggesting the population avoid areas utilised by boats. This is likely a result of underwater noise pressure (Natural England, 2024) however it is difficult to differentiate between the impacts of underwater noise changes, above water noise and visual disturbance as a result of recreational vessels due to the potential for each to cause disturbance separately and simultaneously (Pirotta et al., 2015). For further information on disturbance from visual and auditory stimuli see section below on visual disturbance and above water noise pressures.

For birds, underwater noise changes will only be relevant when feeding below the surface. Limited data is available with regard to sensitivity of diving birds to underwater noise and responses to vessel disturbance (Dooling and Therrien, 2012),

however, evasion responses are most likely (Natural England, 2017a) which may result in reduced opportunities for feeding.

The pressures **"Visual disturbance"** and **"Above water noise"** detailed in **section 4.5.1.3** may result from: visual stimuli created by the movement of vessels and or people, above or below the water; and auditory stimuli created by the movement of vessels and or people; respectively. Both pressures can induce a disturbance response in marine mammals (Saunders et al., 2000; Liley et al., 2012; Liley et al., 2010; Chatwin et al., 2013) and birds (BirdLife International, 2012; Rodgers and Schwikert, 2002; Smit and Visser, 1993; Southall et al., 2007; Richardson et al., 1995), with the latter unlikely to directly impact cetaceans or fish and mobile shellfish (Natural England, 2024).

Visual cues and noise stimuli may be linked to the tendency for Harbour porpoise to actively move away from vessels (Dunn et al., 2012) with visual disturbance resulting from perceived threatening behaviour of vessels, for example: engine revving, sudden or erratic changes in speed or direction of travel, particularly if in direction of the animals themselves (Oakley et al., 2017). Vessel type and speed rather than presence seem to be important factors for harbour porpoise disturbance with 75% of negative reactions resulting from high-speed planing-hulled vessels such as speed boats, pleasure craft, motorised personal watercraft and rigid inflatable boats (RIBs) (Oakley et al., 2017).

Seals are likely one of the most at risk marine mammal groups with regard to visual disturbance, interrupting resting and breeding behaviours when on land (Hoover-Miller et al., 2013). However, as detailed in **section 4.4.1.1** Allonby Bay HPMA is not a known haul out site and there have been no known recordings of hauled out seals in the site so resting and breeding behaviours are unlikely to be impacted.

Disturbance distances for seals appear much larger (i.e. disturbance occurs at a greater distance) for vessels than pedestrians (Anderson et al., 2012) and the level of disturbance response is likely dependent on a range of factors such as weather, habituation to source of disturbance, age and species (Scottish Executive Environment and Rural Affairs Department, 2007[14]).

As noted in **sections 4.4.1.1** and **4.4.1.2** cetaceans and seals are infrequent visitors to Allonby Bay HPMA.

The pressures "**Visual disturbance**" and "**Above water noise**" have the potential to impact the full range of bird guilds present within the HPMA. Red throated diver and common scoter are understood to be the most sensitive bird species to these disturbance pressures (Fliessbach et al., 2019; Garthe and Hüppop, 2004; Cook and Burton, 2010; Pérez-Domínguez et al., 2016). Disturbance and flushing of birds may reduce foraging efficiency and result in avoidance behaviours if disturbance is frequent (Irwin et al., 2019; Scottish Power Renewables, 2021) with potential energetic costs and impacts to overall fitness (Samia and Blumstein, 2015).

[14] For more information: https://www.legislation.gov.uk/ssi/2007/126/pdfs/ssien_20070126_en.pdf

Red-throated divers show clear avoidance of areas with high shipping intensity (Schwemmer et al., 2011) with boat traffic resulting in a disturbance rate of 95% and escape distances of 750 m (Fliessbach et al., 2019). Disturbance of red throated divers by ships could occur from as much as 5 km away (Mendel et al., 2019) although questions have been raised over the analysis used to derive this disturbance radius (Natural England, 2024).

Common scoter have some of the highest flush distances for seaduck species (Schwemmer et al., 2011 cited in Pérez-Domínguez et al., 2016) with evidence from Liverpool Bay suggesting large vessels can flush common scoter at distances of up to 2 km (Kaiser et al., 2006). The duration of temporary habitat loss as a result of flushing also appears longer for common scoters than other seaduck species (Schwemmer et al., 2011 cited in Pérez-Domínguez et al., 2016).

Even when areas hold high levels of prey biomass common scoters are absent or observed in low numbers if disturbance levels are intense (Kaiser et al., 2006).

Other common bird species occurring as a feature of Allonby Bay HPMA include shore birds such as curlew and oystercatcher and diving and foraging seabirds such as guillemots, gannets and razorbills. With the exception of curlew and guillemots, all of these birds appear to have low sensitivity to disturbance (Cook and Burton, 2010; Fliessbach et al., 2019; Van Der Vliet et al., 2010).

With regard to guillemots, they have been shown to exhibit a moderate sensitivity to visual disturbance (Cook and Burton, 2010).

The intertidal habitat preference of curlew means they are unlikely to be disturbed by vessels at sea. The launching and recovery of vessels from shore is the most likely cause of mNLA disturbance to curlew from power and sailing vessels, however as noted previously, the lack of suitable access points mean launching and recovery of vessels is unlikely to occur in Allonby Bay HPMA.

As noted in **section 4.4.1.3** red throated divers and common scoters are relatively infrequent visitors to Allonby Bay. Additionally, red throated divers appear to be winter visitors when disturbance from recreational activities appear reduced (**section 4.3).**

Other bird species with more regular occurrence as a feature of the site tend to be less sensitive to visual and noise disturbance pressures or are unlikely to be impacted significantly by the activities taking place. This includes pink footed goose and pintail which mostly utilise terrestrial land and farmland for foraging and roosting which will be outside the HPMA boundary. While they may be occasionally present in the HPMA they are unlikely to be impacted by mNLA.

Due to accessibility of data, the majority of studies on birds involve large vessels, however Fliessbach et al. (2019) noted that bigger and/or faster ships might cause greater disturbance to birds than smaller, slower vessels. As detailed in **section 4.3.1** there appears to be little vessel activity occurring in Allonby Bay HPMA with most vessels likely smaller and thus less likely to have less of a disturbance effect. While motorised personal watercraft use in the HPMA was noted by MMO (MMO,

2019) and would represent fast vessel activity this was noted as occurring in low-moderate intensity and the recent workshop suggests this activity no longer occurs.

Fish and mobile shellfish may have the potential for permanent and frequent presence in Allonby Bay but given the limited activity levels and types of activities taking place visual disturbance are likely to be limited.

There is very limited anchoring activity taking place and infrequent presence recorded, as a feature of the site, for a number of the sensitive species. As a result, the potential for mNLA, and the visual disturbance and above water noise pressures they cause, occurring in the same space at the same time as these ecosystem receptors is likely to be low.

The pressure **"Litter"** detailed in **section 4.5.1.5** may be sourced from recreational vessels. MARPOL Annex V[15] generally prohibits the discharge of all litter into the sea. Unless expressly provided otherwise, Annex V applies to all ships including recreational boats. There are substantial penalties for offenders dumping refuse at sea and there are rules for ports and terminal operators to provide adequate disposal facilities ashore. The pressure from this activity is unlikely to be at a high enough level to be significant due to the limited vessel activity in Allonby Bay HPMA and low likelihood of boat owners disposing of rubbish at sea (Saunders et al., 2000).

The pressure **"Introduction or spread of invasive non-indigenous species (INIS)"** detailed in **section 4.5.1.4** may result from the transport of non-native species as biofouling on vessels. Prevention of introductions and spread of INIS is the most economic management strategy (Leung et al., 2002; Lodge et al., 2006). Therefore voluntary measures and legislation have been implemented to reduce the risk of INIS. For example, since 2011 the government has been running the Check Clean Dry[16] (CCD) public awareness campaign aimed at improving biosecurity amongst water users. A European Code of Conduct on Recreational Boating[17] was also developed in 2016 under the Bern Convention. Under domestic legislation, the Wildlife and Countryside Act (1981) (as amended)[18] provides a general prohibition on the release or allowing the escape of most non-native species of animal and many plants in England. The risk of introduction and spread of invasive non-native species through recreational boating is likely to be minimal and considered not at a level of concern due to the limited vessel activity in Allonby Bay.

The pressures **"Synthetic compound contamination (inc. pesticides, antifoulants, pharmaceuticals)"**, **"Hydrocarbon & PAH contamination"** and **"Transition elements and organo-metal (e.g. TBT)"** detailed in **section 4.5.1.8** may result from accidental discharge of oil and fuel, potential overboard discharge of oil-contaminated bilge water, and pollutants from materials used in the operation and

[15]For more information: https://www.imo.org/en/ourwork/environment/pages/garbage-default.aspx

[16]For more information: https://www.nonnativespecies.org/what-can-i-do/check-clean-dry/#

[17]For more information: https://rm.coe.int/1680746815

[18]For more information: https://www.legislation.gov.uk/ukpga/1981/69/section/14

maintenance of boats e.g. cleaning materials, lubricants and antifoulants (Saunders et al., 2000; Turner, 2010; Dafforn et al., 2011). To prevent this, boat owners can take simple measures such as those outlined by the Royal Yachting Association Green Blue[19] to minimise accidental releases by carefully re-fuelling and maintaining their engines so they operate efficiently. As boats are unlikely to be re-fuelling or conducting maintenance operations due to the lack of facilities available, and with voluntary measures in place to minimise accidental releases of fuel and oil, it is considered that this pressure is likely to be localised only and not at significant levels so does not occur at a level of concern.

The pressure **"Introduction of light"** detailed in **section 4.5.1.6** may result from navigational and operational lights on vessels at night. However, due to limited vessel activity impact from this pressure is not considered likely.

MMO concludes that based on the low risk of pressures and low level of activity, the cumulative impact of launching, recovery and participation activities associated with powerboating or sailing (with or without an engine) is deemed not capable of affecting (other than insignificantly) the designated feature of the HPMA and currently does not pose a significant risk of hindering the achievement of the conservation objective of the HPMA.

4.5.2.3 Non-motorised watercraft (e.g. kayaks, kitesurfing, windsurfing, dinghies)

Pressures caused by non-motorised watercraft are listed in **Table 2**.

All pressures represent a low risk of being potentially damaging to the designated feature of the HPMA.

The pressures **"abrasion or disturbance of the substrate on the surface of the seabed"** and **"penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion"** detailed in **section 4.5.1.1** may result from trampling impacts through launching of non-motorised watercraft (Saunders et al., 2000; Natural England, 2017). Due to evidence in **section 4.3** suggesting low to moderate non-motorised watercraft activity, making up only 2% of recreational activity occurring in Allonby Bay HPMA the impact of these pressures is considered likely to be minimal.

The pressures **"Visual disturbance"** and **"Above water noise"** detailed in **section 4.5.1.3** may result from: visual stimuli created by the movement of non-motorised watercraft and or people, above or below the water; and auditory stimuli created by the movement of non-motorised watercraft and or people; respectively. Both pressures can induce a disturbance response in marine mammals (Saunders et al., 2000; Liley et al., 2012; Liley et al., 2010; Chatwin et al., 2013) and birds (BirdLife International, 2012; Rodgers and Schwikert, 2002; Smit and Visser, 1993; Southall et al., 2007; Richardson et al., 1995), with the latter unlikely to directly impact cetaceans or fish and mobile shellfish (Natural England, 2024). Given the limited vessel activity in Allonby Bay HPMA the majority of disturbance events are likely to

[19]For more information: https://thegreenblue.org.uk/

arise from kitesurfing, windsurfing, kayaking and stand up paddle boarding. These activities are still relatively infrequent and in most cases remain close to the shore, further reducing the potential for disturbance of birds and mammals at sea.

Kayaks and other non-motorised watercraft can result in behavioural responses in marine mammals. For kayaks and stand up paddle boards speeds are much slower than that of marine mammals so responses are generally short term, minor responses such as changes in direction of travel or speed and switching from feeding or resting to travelling (Williams et al., 2011; Lusseau, 2006; Lusseau, 2003). Kayaks and stand up paddle boards can cause significant disturbance to resting hauled out seals (Hoover-Miller et al., 2013; Wilson, 2014; Gunvalson, 2011; Henry and Hammill, 2001; Fox, 2008; Lelli and Harris, 2001; Suryan and Harvey, 1999) however this is not known to occur in Allonby Bay HPMA.

Windsurfing and kitesurfing activities are not aimed at wildlife watching or wildlife interactions and are therefore less likely to come into close contact with marine mammals, however due to the greater speeds associated with these activities they are expected to cause disturbance at similar or greater distances to other non-powered craft (Natural England, 2017b).

Given the small scale and limited frequency of these activities in Allonby Bay HPMA, long-term impacts of visual and above water noise disturbance are unlikely.

With regard to birds, windsurfing and kitesurfing have been identified as causing relatively high levels of disturbance, due to their erratic and random movements (Smit and Visser, 1993), with even single events capable of displacing large numbers of birds over non-negligible time periods (Liley et al., 2011).

Evidence suggests windsurfing causes disturbance at greater distances than other non-motorised watercraft such as kayaks due to their greater size, speed and noise created. However, they are generally less likely to cause disturbance than kayaks as interaction with wildlife is not their primary goal. In areas where the visibility of a kayak may be obscured due to winding rivers and inlets or vegetative cover, the intensity of disturbance from kayaks is also considered to be greater than that of windsurfers due to their ability to approach more closely without alerting birds to their presence due to the limited noise they produce (Koepff and Dietrich, 1986 cited in Natural England, 2017b). In the context of Allonby Bay HPMA this is likely less relevant given the open nature of the bay with little to obscure kayakers from view and thus the eliciting of a visual disturbance response ahead of any noise related response.

The level of response to non-motorised watercraft will vary depending on a range of factors such as habituation and disturbance frequency (Natural England, 2017a) with repetitive disturbance events leading to potential long-term effects such as reduced reproductive success, and loss of weight and condition, with potential for population level effects (Durell et al., 2005; Gill, 2007; Goss-Custard et al., 2006; Belanger and Bedard, 1990).

The intertidal habitat preference of curlew (*Numenius arquata*) overlap with areas of recreational use resulting in an increased risk of disturbance. They exhibit clear flight

responses to humans so are considered highly susceptible to visual disturbance pressures (Goodship and Furness, 2022; Pérez-Domínguez et al., 2016). Of particular relevance to this assessment are the potential visual disturbances associated with entrance and exit of the ocean during activities such as kitesurfing and paddle sports. However, given the relatively low presence of curlew in the site, the low frequency of these activities and their limited time spent in the intertidal zone where disturbance will occur, impacts are likely to be limited.

The pressure **"Introduction or spread of invasive non-indigenous species (INIS)"** detailed in **section 4.5.1.4** may result from the transport of non-native species as biofouling on non-motorised watercraft (Davidson et al., 2010 as cited in Natural England, 2024). However, the risk of introduction and spread of invasive non-native species through non-motorised watercraft is likely to be minimal and considered not at a level of concern due to the limited vessel activity in Allonby Bay.

The pressure **"Litter"** detailed in **section 4.5.1.5** may be sourced from small watercraft, however this is likely to be a very small proportion of total litter due to the majority entering from land-based activities or offshore commercial vessels (Natural England, 2024). The pressure from this activity is unlikely to be at a high enough level to be significant due to the low to moderate non-motorised watercraft activity making up only 2% of recreational activity in Allonby Bay HPMA, low likelihood of watercraft owners disposing of rubbish at sea; and the proposed MMO prohibition of fishing activity[6] significantly reducing the risk of loss of fishing gear (Natural England 2024).

MMO concludes that based on the low risk of pressures and low to moderate level of activity, the cumulative impact of non-motorised watercraft activity is deemed not capable of affecting (other than insignificantly) the designated feature of the HPMA and currently does not pose a significant risk of hindering the achievement of the conservation objective of the HPMA.

4.6 Part B conclusion

The assessment of pressures from anchoring by powerboats or sailing vessels (with or without and engine) on the designated feature of Allonby Bay HPMA has concluded that that this mNLA may result in a significant risk of hindering the achievement of the conservation objectives of the HPMA.

Management measures will therefore be implemented for anchoring activities. **Section 6** contains further details of these measures.

The assessment of pressures from non-motorised watercraft activities, launching, recovery and participation activities associated with powerboating or sailing (with or without an engine) on the designated feature of Allonby Bay HPMA has concluded that that these mNLAs, when considered in isolation, will not result in a significant risk of hindering the achievement of the conservation objectives of the HPMA.

The potential for these activities to risk hindering the achievement of the conservation objective in-combination with each other and additional non-licensable activities occurring will be considered in Part C.

5 Part C – In-combination assessment

No marine development infrastructure plans or projects are taking place in Allonby Bay HPMA. This section assesses the effects of mNLA considered as compatible with the conservation objective of the site in Part B, in-combination with each other and other non-licensable activities occurring within the site which are outside of MMO management remit but are included for completeness.

Anchoring activities from powerboating or sailing (with or without an engine) were identified in Part B as requiring management to avoid significant risk of hindering the achievement of the conservation objective of Allonby Bay HPMA. This activity will not be included in Part C.

Non-motorised watercraft activities and launching, recovery and participation activities associated with powerboating or sailing (with or without an engine) were identified in Part B as not requiring management. In combination effects of these mNLA are considered in **section 5.1** and with other, land based, non-licensable activities in **section 5.2**.

5.1 Non-motorised watercraft and Powerboating or sailing (with or without an engine) in-combination pressures

The pressures associated with non-motorised watercraft and launching, recovery and participation activities associated with powerboating or sailing (with or without an engine) rarely occur in isolation. The combined impacts from these activities and their associated pressures will be considered in this section.

As noted in Part B (**section 4.3**) mNLAs associated with motorised and non-motorised watercraft are relatively infrequent within Allonby Bay.

Between 2019 and 2023 there was an annual average of 14 vessel occurrences within the HPMA amounting to 34 hours of vessel activity (**Table 3**). If all vessels are included (i.e. inclusion of cargo vessels) this rises to 49 hours across 26 vessel occurrences. This may be an underestimate as not all vessels use AIS systems and those that do may not have them permanently turned on. However, this may also be an overestimate given approximately a quarter of all vessel hours is associated with fishing vessels which are less likely to occur within the HPMA following confirmation of the proposed introduction of the MMO Highly Protected Marine Areas Fishing Byelaw 2024[6]. Additionally, with the proposed vessel anchoring management detailed in Part B it is likely vessel activity in the site will be further reduced in future.

The low usage of the site by motorised and/or sailing vessels was supported by the MMO Allonby Bay HPMA workshop (October 2024). Sail boats are occasionally observed transiting through the site with the tide, however larger vessels are rare due to the shallow depth of the site. Sea cadet training sometimes takes place in the site which includes use of a powerboat. However, this is used as a safety boat and is generally stationary.

Use of Allonby Bay HPMA by non-motorised watercraft such as kayaks, stand up paddle boards, kitesurfers and windsurfers also appear to be relatively limited.

If present at the same time, the impacts from motorised and non-motorised watercraft occurring in combination could potentially increase the risk of negative effects from their combined pressures. However, weather conditions often dictate the suitability for an activity, with different conditions being suited to different activities. For example: windsurfers and kitesurfers require wind and enjoy the presence of waves and chop whereas kayaks and standup paddle boards prefer calmer seas with less wind. These preferences will further reduce the in-combination impacts of activities as they will tend not to occur at the same time. The low frequency of activities, the low potential for activities to occur at the same time and the low risk of the pressures impacting the designated feature, mean that the in-combination impact is considered insignificant at described levels.

The pressures visual disturbance and above and underwater noise combined could increase the potential disturbance risk to mobile species present within the site. However, given the limited presence of particularly sensitive mobile species and the low potential for mNLA activities to occur at the same time as each other due to weather preferences and at the same time as sensitive mobile species being present, in-combination impacts are likely to be minimal so potential negative impact is considered insignificant. **MMO concludes that there will be no risk of the activities hindering the conservation objectives at the described levels.**

5.2 Non-motorised watercraft and powerboating or sailing (with or without an engine) in combination with other non-licensable activities

Other non-licensable activities (outside of MMO management remit) taking place in Allonby Bay HPMA were identified using the evidence sources in **section 4.3**. Activities included dog walking, horse riding, leisure and beach activities (walking, swimming, wildlife watching, photography, rockpooling, beach cleans, social gatherings, beach games, beach combing, sunbathing) and motorised off-road vehicles (trial bikes and 4x4s).

Pressures associated with non-motorised watercraft activities, and the launching, recovery and participation of activities associated with powerboating or sailing (with or without an engine) and other non-licensable activities rarely occur in isolation, with multiple pressures from one activity and / or many activities occurring in combination. The cumulative impact of multiple pressures from single activities has been assessed in **section 4.5**.

If present at the same time, the combined impacts from multiple mNLA and other non-licensable activities has the potential to increase the risk of negative effects to the designated feature of the HPMA through a combination of their associated pressures. However, given the low frequency of mNLAs and, in most cases, their limited spatial overlap with other, land based, non-licensable activities occurring in the site, the in-combination impact is considered insignificant at described levels. Additionally, the potential impact of other non-licensable activities will be considered by the relevant authority and management implemented for these activities if deemed necessary.

MMO concludes that the combined pressures from non-motorised watercraft activities, and launching, recovery and participation activities associated with powerboating or sailing (with or without an engine) and other non-licensable activities will not result in a significant risk of hindering the achievement of the conservation objective for Allonby Bay HPMA. However, MMO recognises the potential for visual disturbance and above and underwater noise pressures associated with these activities to have negative impacts on sensitive species, should activity/activities occur at the same time or space as sensitive species. No formal management is deemed necessary at this stage.

6 Conclusion and proposed management

This assessment concludes that there is a significant risk of the pressures associated with anchoring by powerboats (including fishing vessels) and sailing vessels (with or without an engine) hindering the conservation objective of the HPMA.

Due to this conclusion, management is being proposed to prohibit anchoring activity and its associated pressures from the HPMA.

To ensure that anchoring activities do not result in a significant risk of hindering the conservation objective of the HPMA, MMO will implement a byelaw to prohibit anchoring throughout Allonby Bay HPMA via the Allonby Bay Highly Protected Marine Areas Anchoring Byelaw 2024.

Given the potential for visual disturbance and above and underwater noise pressures associated with other mNLA to have negative impacts on sensitive, particularly mobile, species, MMO will work with local stakeholders and community groups to promote existing good practices[20] to reduce disturbance to marine wildlife when visiting the coast and consider whether any further messaging or codes of conduct may be required.

7 Review of this assessment

MMO will review this assessment every five years, or earlier if significant new information is received. Such information could include:

- updated conservation advice
- updated advice on the condition of the site's feature
- significant increase in activity levels
- changes in types of activities taking place in the HPMA

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 monitoring

[20] For example: Marine and coastal wildlife code: advice for visitors https://www.gov.uk/government/publications/marine-and-coastal-wildlife-code

and control plan will be implemented for this site. This plan will be developed in line with MMO's Monitoring and Control Plan framework.

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Annex 1

MMO methodology

Assessment process

This marine non-licensable activity assessment has three stages:

Part A: A coarse assessment using generic sensitivity information to identify which non-licensable activities can be discounted from further assessment (Part B) as they are not taking place.

Part B: An in-depth analysis to assess the effects of pressures on the feature of the site.

Part C: An in-combination assessment between all activities occurring

Sources of evidence

Evidence used in the assessments falls into two broad categories:

1. Non-licensable activity information. This includes patterns, intensity and trends of non-licensable activities.

2. Ecological information, in particular the condition, sensitivity and components of the designated feature.

Non-licensable activity information

MPASum Inspection data

MPASum inspections are carried out by MMO Marine Officers. This involves counting the occurrence of water-based activities within the site from a set location over 4 to 5 minutes.

Alongside activity data, environmental conditions are recorded. This includes information on:

- Date
- Time
- Weather
- Temperature
- Sea state
- Wind force and direction

Automatic Identification System data

It is a legal requirement for vessels of 300 gross tonnage or more and all passenger vessels irrespective of size to have AIS installed. These vessels use AIS-A. Other

vessels do not legally require AIS. AIS-B is a non-mandatory form of AIS typically used by small commercial craft, fishing vessels and recreational vessels (MMO, 2014a). To prevent overloading of the available bandwidth, transmission power is restricted to 2 Watts, giving a range of up to 10 nautical miles (MMO, 2014a). Information regarding use patterns by these types of craft from AIS sources alone will therefore significantly underplay the true frequency and use patterns (MMO, 2014a).

AIS transmits information which is manually input and therefore is only as reliable as the operator. As not all vessels are required to have AIS this data is likely to be an underrepresentation of the activity within the site.

Marine Traffic displays live AIS data. Marine Traffic indicates whether vessels are stationary or underway depending on the vessel speed. It can be assumed that stationary vessels indicated by AIS data are anchored or moored.

Global Fishing Watch identify and analyse AIS data collected from vessels. Vessel presence is determined by taking positions transmitted by the vessel's AIS. The data includes all vessel types with AIS capabilities, however for the purposes of this assessment MMO have removed AIS data deriving from cargo vessels as they fall outside of MMO remit.

Expert opinion

Expert opinion provided by MMO coastal and Natural England local area team. MMO may provide additional information and intelligence on the non-licensable activities happening within the site to support MPASum inspections. Natural England collated evidence from local knowledge, unpublished recreational surveys carried out by the Solway Firth Partnership and various stakeholder meetings to detail the types and extent of mNLAs occurring in Allonby Bay HPMA.

MMO Allonby Bay HPMA stakeholder engagement workshop 2024

In October 2024 MMO held both in person and online stakeholder engagement workshops to gain information on recreational activities taking place in Allonby Bay HPMA. Stakeholders provided local knowledge of recreational activities taking place in the site by indicating locations on physical and online maps of the area. These data were transposed onto digital maps and included in this assessment.

MMO1136 Non-licensable activity impacts on MPAs

These data were collected through stakeholder engagement for a MMO report on NLA impacts on Marine Protected Areas (MMO, 2019). Stakeholders provided local knowledge on recreational activities through a questionnaire to identify extent, intensity and trend of non-licensable activities in English MPAs and included data on Allonby MCZ (MMO, 2019).

The questionnaire requested activity information in a standard format for three factors 'frequency', 'duration' and 'participation'. These factors were assigned a score and an 'intensity' index was calculated by multiplying the factors (Intensity = Frequency x Duration x Participation). The index values ranged from 0 to 96 and were classified into a scale of five categories of intensity (1. does not occur, 2. low

intensity, 3. low to medium intensity, 4. medium to high intensity and 5. high intensity).

Allonby Bay Candidate HPMA Recreational Survey

Natural England commissioned the Solway Firth Partnership (SFP) to produce a report (Report on Allonby Bay Candidate HPMA Recreational Survey, 2022, unpublished) gathering evidence on the type, frequency and locations of recreational activities that occur within Allonby Bay candidate HPMA. SFP conducted a series of one hour observational survey sessions to record recreational activities one to two days a week over a two month period (September to October 2022).

Defra consultation on proposals to designate candidate Highly Protected Marine Areas (HPMAs)

Defra produced an Allonby Bay HPMA factsheet for their consultation regarding the designation of candidate HPMAs (Defra, 2022) which detailed their understanding of activities taking place in the HPMA. Following the consultation they produced a Summary of Responses[21] which included further activity information received via the consultation.

Strava Global Heat map

Strava Global Heat Map[22] is a public visualisation of activity data from Strava users. The heatmap is created from activity tracks recorded by Strava users and uploaded to the Strava database. This data can only be viewed online and is a snapshot of monthly data. MMO has screen shot this data monthly to analyse the types of activities, when and where they occur. MMO do not have the necessary permission to include these screenshots in this assessment but have described the data contained.

Strava does not track users without their knowledge and users can opt out of aggregate data usage.

Table A1: Summary of generic confidence associated with recreational activity evidence

Evidence source	Confidence	Description, strengths and limitation
Automatic Identification System data	Low	AIS transmits information which is manually input and therefore is only as reliable as the operator. As not all vessels are required to have AIS this data is likely to be an

[21] For more information: https://www.gov.uk/government/consultations/highly-protected-marine-areas-pilot-sites/outcome/summary-of-responses

[22] Strava global heat map: https://www.strava.com/maps/global-heatmap?sport=All&style=dark&terrain=false&labels=true&poi=true&cPhotos=true&gColor=blue&gOpacity=100#9/37.7749/-122.4194

		underrepresentation of the activity within the site.
MMO1136 - Non-licensable Activity Impacts on Marine Protected	High/Moderate	Evidence base on the full range and types of marine non-licensable activities, their current and potential intensity, and risk of impact on marine protected areas.
Allonby Bay HPMA stakeholder workshop	High	Information provided by stakeholders who are users of Allonby Bay.
MPASum Inspections	High/ Moderate	MPASum inspections are carried out by MMO Marine Officers. This involves counting the occurrence of water-based activities within the site.
Expert opinion	High/Moderate	Expert opinion provided by MMO coastal and IFCA officers and Natural England.
Allonby Bay Candidate HPMA Recreational Survey Report	High	A report gathering evidence on the type, frequency and locations of recreational activities that occur within Allonby Bay candidate HPMA.
Defra consultation on proposals to designate candidate Highly Protected Marine Areas (HPMAs)	High	Defra analysis and understanding of recreational activities in Allonby Bay before and after their Consultation on Highly Protected Marine Areas (HPMAs)
Strava Global Heatmap data	Moderate/Low	Activity tracking data displayed as activity “heat maps”. Maps are updated monthly by Strava and are not cumulative, the data only display the activity of the period displayed. Data only includes that which was recorded by Strava users.

Ecological information

The marine non licensable activity assessment uses the conservation advice packages produced by Natural England. These provide information on the feature of the site and condition. The packages also contain advice on operations and supplementary advice documents which allow the assessment of which pressure/activity combinations a feature may be sensitive too.

Sensitivity and vulnerability

The following definitions of sensitivity and vulnerability are used in MMO assessments.

Sensitivity is defined as:

a measure of tolerance (or intolerance) to changes in environmental conditions[23]

Vulnerability is defined as:

a combination of the sensitivity of a feature to a particular pressure/activity, and its exposure to that pressure/activity.

[23] Tilin et al., 2010; Roberts et al., 2010