

**Habitat Regulations Assessment document:** LINSIPA – tLSE 025

<b>Marine Conservation Zone:</b>	<b>Lindisfarne SPA</b>
<b>Generic sub-feature(s):</b>	<b>Intertidal rock, Intertidal biogenic reef: mussel beds, Estuarine birds, Benthic feeding birds</b>
<b>Gear type(s):</b>	<b>Handwork (access from land)</b>
<b>NIFCA MCZ Assessment type:</b>	<b>Detailed</b>
<b>Gear/feature interaction reference(s):</b>	<b>LINSIPA-622 LINSIPA-389 LINSIPA-627 LINSIPA-108</b>

<b>Revision history</b>		
<b>Date</b>	<b>Revision</b>	<b>Editor</b>
12/12/2018	Document created	AA
21/11/2024	Document edited	SR
26/11/2024	Map added, document edited	SR
28/01/2025	Document edited, references, benthic birds feature, updated sightings data and maps added	SR
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17/07/2025	Finalised	SR

## Test for Likely Significant Effect (LSE)

LINSPA-622: Intertidal bedrock reef

<p><b>1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?</b></p>	<p>No</p>
<p><b>2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)?</b></p> <p>Pressures listed are all those for which the feature is deemed to be sensitive.          Pressures in bold are Medium-High Risk.          The sensitivities listed are based on the 2018 conservation Advice available on Natural England's Designated Site System.</p>	<p><b>Abrasion/disturbance if the substrate on the surface of the seabed</b></p> <p><b>Habitat structure changes – removal of substratum (extraction)</b></p> <p><b>Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion</b></p> <p><b>Removal of non-target species</b></p> <p><b>Removal of target species</b></p> <p>Deoxygenation</p> <p>Introduction of light</p> <p>Introduction or spread of invasive non-native species</p>
<p><b>3. Is the feature potentially exposed to the pressure(s)?</b></p>	<p>Yes</p>

**4. What are the conservation objectives for the feature?**

\*Conservation advice for the feature is not available for Lindisfarne SPA, therefore advice for the feature 'moderate energy intertidal rock' from Coquet to St Mary's MCZ available on the Natural England Designated Site System has been used to inform this assessment.

Expert judgement has been used to determine which features may be exposed to the pressure(s) resulting in inferred COs. These COs are assigned a degree of uncertainty i.e. a subjective confidence level based on evidence 'High,' 'Medium,' 'Low', and 'Unknown'.

The conservation objectives for Intertidal bedrock reef:

**Maintain\***

- the presence and spatial distribution of intertidal rock communities
- the total extent and spatial distribution of intertidal rock, subject to natural variation in sediment veneer
- the surface and structural complexity, and the stability of the rock structure
- the species composition of component communities
- the natural physical energy resulting from waves, tides, and other water flows, so that the exposure does not cause alteration to the biotopes and stability, across the habitat
- the natural physico-chemical properties of the water
- the natural rate of sediment deposition
- the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically  $\geq 5.7$  mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels
- water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels
- natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat

**Restrict or Reduce**

- the introduction and spread of non-native species and pathogens, and their impacts
- aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels

[Maintain OR Recover OR Restore] the abundance of listed species, to enable each of them to be a viable component of the habitat.

Those conservation objectives that might be affected by handwork (from land) activity are underlined.

**5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?**

**(reference to conservation objectives)**

Lindisfarne, or Holy Island, is a large island off the north east coast of Northumberland. The SPA, designated in 1990, is also a Ramsar site and a National Nature Reserve, managed by Natural England. Lindisfarne NNR covers approximately 3,380.53 ha (8,353.29 acres) with much of the reserve in the inter-tidal zone. The principal threats from human influences are water quality problems (from sewage discharges and agricultural run-off ), wildfowling and recreational disturbance including bait-digging.

Colonisation by *Spartina* posed a long-term threat to intertidal habitat, however experimental management techniques to control *Spartina* by roto-burying has prevented its regeneration in recent years (EA, 2021).

The issue of water quality in input streams and sedimentation/siltation within the site is currently being monitored by the Environment Agency. English Nature monitor and manage recreational and wildfowling use of the site to address issues of disturbance and bait-digging is controlled by a SNCO (Special Nature Conservation Order).

Hand gathering involves the collection of periwinkles or shore crab by hand from the intertidal rocky areas, which can involve turning rocks, cobbles or boulders. Cleeking is a traditional method of catching lobster involving using a long pole with a hook to tease lobsters from under rocks or in crevices. Lobster will use their claws to clamp onto the hook and are removed from the sea. The activity is highly seasonal concentrated during the summer months. Both activities occur on rocky intertidal areas, the habitat of the target species. These activities occur along the rocky intertidal/infralittoral habitats on the Northumberland Coast. In addition, there is a low level of collection of *Salicornia* and other species such as *Fucus spp.* and *Osmundea pinnatifida* (*pepper dulce*) at the site (NE LNNR staff, pers comm). However, this activity occurs at a very low level as it has not been observed by NIFCA. Annex 1 shows a map of the SPA and its associated EUNIS habitats.

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water ( $\pm 2$  hours). Within Lindisfarne SPA between October 2016 and December 2024 NIFCA officers observed 4 people in total hand gathering for periwinkles on two separate occasions in 2021 and 1 occasion in 2023. There are 6 other instances of hand gathering activity just outside the SPA including one instance of cleeking. No other hand gathering activity was observed by officers on patrol during another 14 site visits, therefore this assessment will focus on hand gathering periwinkle only. Annex 2 shows a map of hand gathering sightings (including sightings that are slightly outside of the MPA).

Direct impacts of periwinkle collection in intertidal areas are due to:

- Physical damage to flora and fauna from disturbance (Berthelon et al., 2004) from boulder turning and trampling which can cause a reduction in habitat

stability and biodiversity reduced (Davenport & Davenport, 2006). This can damage under-boulder communities which require stable boulder habitats. It can also adversely impact organisms that depend on upper rock surfaces, such as seaweeds (Liddiard et al., 1989). Reduction in habitat stability from boulder turning can be lethal to fauna, algae, and under-boulder communities through crushing, smothering and desiccation (Berthelon et al., 2004).

- Reduction in species composition through trampling can reduce biodiversity, abundance, and biomass
- It can lead to a higher percentage of bare rock with a decrease in algal cover (Liddiard et al., 1989; Tyler-Walters, 2008). These effects can be seen at low trampling with long term impacts (Povey & Keough, 1991). These impacts are variable, dependent upon intensity, duration, and frequency of the trampling (Natural England & JNNC, 2011).
- These disturbances can negatively alter community structure, they vary spatially and temporally and most severely impact long lived sedentary species that are slow to reproduce (Berthelon et al., 2004).

Indirect impacts of periwinkle harvesting from impacts of the removal of periwinkles include:

- Altered community interactions: impacts to predators, prey, and/or competitors of periwinkles (Quigley, 1999). Periwinkles are key grazers within rocky intertidal communities, a reduction in abundance could alter this role as both predator and prey for birds and crab (Buschbaum, 2000). Evidence of changes in abundance of other species following exclusion of periwinkles has been documented (Buschbaum, 2000; Petraitis, 1989; Cervin & Åberg, 1997) with some species increasing and other decreasing. While some species may benefit all changes related to human activity are unnatural (Tinlin-Mackenzie, 2018).

Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-Mackenzie, 2018). As part of the study, observations of hand gathering activity were made at Lindisfarne on one day in 2015. 1 collector was observed gathering periwinkles within the boundaries of the Lindisfarne SPA, this was scaled up to estimate the number of collectors per year with 15 individuals estimated to take 207 kg annually (Tinlin-Mackenzie et al., 2019).

The impacts of periwinkle collection on size and local population abundance have been described by Tinlin McKenzie (2019) and Quigley (1999). Periwinkle size was compared by Tinlin-McKenzie to previous studies. On the most heavily collected shore studied (Boulmer) the largest shell height had not decreased suggesting harvesting periwinkles had not led to a reduction in maximum shell height over the last 50 years. In other areas of the UK, periwinkle size and density was found not to correlate to harvesting pressures at

current exploitation levels (Tillin et al., 2010). Natural variation in density between shores is likely to have a greater impact than that of harvesting, with factors such as habitat selection likely to have a greater impact (Gendron, 1977). However, Quigley revealed differences in the size distributions and mean size of periwinkle between “collected” and “uncollected” populations within the BNNC SAC, and that the maximum size attained by *Littorina* on “collected” shores was smaller than that from “uncollected” suggesting that high levels of collection could have an impact on periwinkle size (Quigley, 1999).

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

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

NIFCA received multiple reports that activity has increased in certain areas since 2018. This increase in activity triggered additional survey and monitoring work in neighbouring MPA’s in the NIFCA district which is currently ongoing in 2025 (Harvey, 2022).

Removal of non-target species as a pressure is not a concern as the selective nature of hand gathering means bycatch of other species is low.

The evidence suggests that on boulder/cobble reef areas where activity is low this activity will not have an adverse impact on target species size and abundance.

In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 4) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. NIFCA monitor this code of conduct during patrols, while adherence to the measures is difficult to determine, there is no evidence to suggest it is not being followed.

**NIFCA conclude, with moderate confidence, that this activity will not adversely impact the conservation objectives of the site through the pressures listed above.**

<p><b>6. Condition and Conservation Objective Inferences</b></p>	<p>No definitive conservation objective is given for ‘intertidal rock’ in Lindisfarne SPA, however, as per other assessments a conservation objective of Maintain would be appropriate.</p>	
<p><b>7. Is the potential scale or magnitude of any effect likely to be significant?</b></p>	<p><b>Alone:</b></p> <p><b>No</b></p> <p>NIFCA can say with moderate confidence that on areas of intertidal bedrock reef within the Lindisfarne SPA where activity levels are low, adverse impacts to the habitat are unlikely.</p> <p>This will be monitored through the monitoring and control plan process which is currently under development for this activity, and any significant increase in activity levels will trigger a reassessment in the SPA</p>	<p><b>OR In-combination</b></p> <p><b>No</b></p> <p>See ‘in-combination’ assessment below</p>
<p><b>8. Have NE been consulted on this LSE test? If yes, what was NE’s advice?</b></p>	<p><b>Yes, NE have been consulted throughout the assessment process.</b></p>	

## Test for Likely Significant Effect (LSE)

LINSPA-622: Intertidal biogenic reef: mussel beds

<p><b>1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?</b></p>	<p>No</p>
<p><b>2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)?</b></p> <p>Pressures listed are all those for which the feature is deemed to be sensitive. Pressures in bold are Medium-High Risk. The sensitivities listed are based on the 2018 conservation Advice available on Natural England's Designated Site System.</p>	<p><b>Abrasion/disturbance of the substrate on the surface of the seabed</b></p> <p><b>Habitat structure changes - removal of substratum (extraction)</b></p> <p><b>Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion</b></p> <p><b>Removal of non-target species</b></p> <p><b>Removal of target species</b></p>
<p><b>3. Is the feature potentially exposed to the pressure(s)?</b></p>	<p>Yes</p>

<p><b>4. What are the conservation objectives for the feature?</b></p> <p>Conservation advice for the feature is not available for Lindisfarne SPA, therefore advice for the feature from Berwick to North Northumberland SPA available on the Natural England Designated Site System has been used to inform this assessment.</p> <p>*key species are not currently identified therefore cannot be assessed; however Periwinkle are likely to qualify as a key species.</p>	<p>The conservation objectives for 'Intertidal' supporting habitat for designated bird feature(s) are set to:</p> <p><b>Restore</b></p> <ul style="list-style-type: none"> <li>- <u>the total extent and spatial distribution of mussel beds within the site, and recover the extent of the mussel bed at Fenham flats (Ross) to greater than 40 ha</u></li> <li>- <u>Restore a balanced age / size frequency and distribution within the population across the extent of the sub feature, to increase resilience and encourage a healthy, productive population</u></li> <li>- <u>Restore the density of mussels</u></li> </ul> <p><b>Maintain</b></p> <ul style="list-style-type: none"> <li>- the presence and spatial distribution of reef communities</li> <li>- the total extent, spatial distribution of the mussel beds within the site</li> <li>- the species composition of the mussel bed community</li> <li>- the surface and structural complexity, and the stability of the reef structure</li> <li>- the natural water flow velocity to the intertidal mussel beds, to provide high levels of oxygen and food and prevent 'mussel mud' forming</li> <li>- the natural physico-chemical properties of the water</li> <li>- the natural rate of sediment deposition</li> <li>- the dissolved oxygen (DO) concentration at levels equating to High Ecological Status</li> <li>- the water quality at mean winter dissolved inorganic nitrogen levels</li> <li>- natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat</li> </ul> <p><b>Reduce</b></p> <ul style="list-style-type: none"> <li>- Reduce aqueous contaminants to levels equating to High Status</li> </ul> <p><b>Maintain OR Recover OR Restore</b></p> <ul style="list-style-type: none"> <li>- the abundance of listed species*, to enable each of them to be a viable component of the habitat</li> </ul> <p><b>Restrict</b></p> <ul style="list-style-type: none"> <li>- the introduction and spread of non-native species and pathogens, and their impacts</li> </ul> <p>Those conservation objectives that might be affected by handwork (from land) activity are underlined.</p>
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<p><b>5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?</b></p> <p><i>(reference to conservation objectives)</i></p>	<p>Intertidal handwork within the SPA may include periwinkle, shore crab and lobster gathering (cleeking) on intertidal reef features. In addition, there is a low level of collection of <i>Salicornia</i> and other species such as <i>Fucus spp.</i> and <i>Osmundea pinnatifida</i> (<i>pepper dulse</i>) at the site (NE LNNR staff, pers comm). However, this activity occurs at a very low level as it has not been observed by NIFCA. Annex 1 shows a map of the SPA and its associated EUNIS habitats.</p> <p>NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (<math>\pm 2</math> hours). Within Lindisfarne SPA between October 2016 and September 2024 NIFCA officers observed 4 people in total hand gathering for periwinkles on two separate occasions in 2021 and one in 2023. There are 6 other instances of hand gathering activity just outside the SPA including one instance of cleeking. No other hand gathering activity was observed by officers on patrol during another 14 site visits, therefore this assessment will focus on hand gathering periwinkle only. Annex 2 shows a map of hand gathering sightings (including sightings that are slightly outside of the MPA).</p> <p>On intertidal habitats, surface abrasion is likely to result from recreational access and trampling by humans. Within Lindisfarne SPA periwinkle collection is carried out on foot in the intertidal areas to the south west of the island on intertidal rocky reef, close to where the mussel beds are located and around Castle Head rocks on the north of the island (NE LNNR staff, pers comm) (Annex 3). Trampling has the potential to cause structural changes to the habitat and a study by Mendez in 2018 found that loss of mussels from trampling was caused by the crushing of individual mussels, in addition to dislodgement which causes damage to the byssal threads, weakening the attachment to the underlying substrate (Mendez et al., 2018).</p> <p>NIFCA sightings data shows that periwinkle collection does occur within the SPA, however it is not seen on the intertidal mussel beds at Holy Island Sands and Fenham Flats. Holy Island Sands mussel bed is accessible on foot at low tide to hand gatherers, although there are no hand gathering sightings on the mussel bed, most sightings are recorded on the south west corner of the island which is close to the mussel bed. Fenham Flats is more difficult to access on foot and can only be accessed on foot through private land or via the King Charles III England coastal path at certain times of the year therefore very few members of the public generally access this bed. This area is isolated and difficult to patrol and there are no sightings recorded by NIFCA near to, or on these beds (Annex 3), but this does not mean there is no activity in the area.</p> <p>Removal of non-target species as a pressure is not a concern as the selective nature of hand gathering means bycatch of other species is low.</p> <p>Therefore, due to the difficulty in accessing the intertidal mussel beds at Lindisfarne SPA and the lack of sightings or reports of intertidal collection on mussel beds within the SPA, NIFCA can conclude with high confidence that this activity will not significantly impact the conservation objectives of this feature. However, mussel beds in the SPA have declined and are in poor condition due to pressures other than collection, see section 6 for further details.</p>
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**6. Condition and Conservation Objective Inferences**

Northumberland IFCA conduct annual monitoring surveys on the following mussel beds in Lindisfarne SPA : Holy Island Sands and Fenham Flats.

Survey results from March 2024 indicated that percentage cover at Fenham Flats and Holy Island Sands were the lowest recorded since surveys began in 2006 (Table 1) and 2018 (Table 2).

The estimated values obtained for density, biomass and total number of mussels have decreased significantly compared to the 2023 surveys at both sites. However, mean mussel length at Fenham Flats has continued to follow an increasing trend, in contrast to mean mussel length at Holy Island Sands, which was lower than in previous years, exhibiting a pattern of decline.

**Table 1:** Results for the Fenham Flats mussel survey between 2006 and 2024.

Year	Bed area (ha)	Average % cover	Total number of mussels (millions)	Mean shell length (mm)	Mussel density (no./m <sup>2</sup> )	Biomass (g/m <sup>2</sup> )	Total biomass (tonnes)
2006	41.53	60	133.6	41	321.6	4,480	1,861
2007	37.18	79.81	193.2	45	519.5	8,396	3,122
2008	36.72	78.58	338.5	40	921.7	12,895	4,734
2009	34.43	72.1	288.5	34.5	837.8	9,020	3,105
2010	36.28	78.41	376.4	34.7	1037.3	9,974	3,618
2011	45.65	64.91	243.6	36	533.5	5,498	2,510
2012	43.8	67.9	178.1	43.5	406.7	5,364	2,349
2013	41.3	66.5	128.8	48.2	311.8	5,642	2,330
2014	31.82	54.84	95.6	47.42	300.5	5,776	1,838
2015	40.49	69.01	147.3	49.56	363.6	7,232	2,928
2016	44.9	59.95	115.1	51.2	230.2	5,916	2,654
2017	42.9	58.61	58.4	55.5	145.9	4,822	2,068
2018	39.7	54.8	62.2	50.76	156.61	4,336	3,141
2019	46	41.8	31.0	57.83	67.3	2,503	1,151
2020	52.66	42.9	15.1	59.95	28.74	971	511
2021	46.58	43.47	13.6	44.67	29.12	828	386
2022	46.58*	17.39	2.1*	47.35	4.43*	149	70*
2023	48.10	4.37	0.2	48.32	0.52	19	9
2024	20.81	3.67	0.1	52.89	0.51	20	4

\*calculated using 2021 bed area

**Table 2:** Results for the Holy Island mussel survey between 2018 and 2024.

Year	Bed area (ha)	Average % cover	Total number of mussels (millions)	Mean shell length (mm)	Mussel density (no./m <sup>2</sup> )	Biomass (g/m <sup>2</sup> )	Total biomass (tonnes)
2018	3.11	90	8.58	35.15	276.0	3,749	116.58
2019	4.04	66	5.07	48.08	125.4	2,314	93.48
2020	4.02	75	4.31	48.29	107.25	2,072	83.3
2021	3.59	59	2.52	40.64	70.31	1,188	42.66
2022	3.41	70	0.86	42.02	25.2	496	16.92
2023	3.01	11.5	0.06	46	1.88	40	1
2024	2.53	6.27	0.03	35.79	1.10	17	0.43

The Lindisfarne mussel beds at Fenham Flats and Holy Island Sands have continued to exhibit a pattern of decline across all of the metrics collected during the annual mussel surveys. The cause of this decline is still unknown, however future surveys will aim to continue to monitor these

	<p>trends and will guide further investigation into the drivers of this decline (Boon et al., 2024). The declines seen are likely not attributed to periwinkle collection at the site.</p>	
<p><b>7. Is the potential scale or magnitude of any effect likely to be significant?</b></p>	<p><b>Alone:</b></p> <p><b>No</b></p> <p>Periwinkle collection activity on the mussel beds at Holy Island Sands and Fenham Flats has not been recorded by NIFCA Therefore NIFCA can conclude with medium confidence that this activity alone will not adversely impact the conservation objectives of the site.</p> <p>This will be monitored through the monitoring and control plan process which is currently under development for this activity and any significant increase in activity levels will trigger a reassessment in the SPA.</p>	<p><b>OR In-combination</b></p> <p><b>No</b></p> <p>See ‘in-combination’ assessment below</p>
<p><b>8. Have NE been consulted on this LSE test? If yes, what was NE’s advice?</b></p>	<p><b>Yes, NE have been consulted throughout the assessment process.</b></p>	

## Test for Likely Significant Effect (LSE)

### LINSPA-627: Estuarine birds

<p><b>1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?</b></p>	<p>No</p>
<p><b>2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)?</b></p> <p>Pressures listed are all those for which the feature is deemed to be sensitive. Pressures in bold are Medium-High Risk. The sensitivities listed are based on the 2018 conservation Advice available on Natural England's Designated Site System.</p> <p>*Applies to Red-breasted merganser only **Applies to Red-breasted merganser and Shelduck only</p>	<ul style="list-style-type: none"> <li>- <b>Removal of Non-target species</b></li> <li>- <b>Visual disturbance</b></li> <li>- <b>Above water noise</b></li> <li>- Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)</li> <li>- Collision BELOW water with static or moving objects not naturally found in the marine environment*</li> <li>- Introduction of light</li> <li>- Introduction or spread of invasive non-indigenous species (INIS)**</li> <li>- Transition elements &amp; organo-metal (e.g. TBT) contamination</li> <li>- Underwater noise changes*</li> </ul>
<p><b>3. Is the feature potentially exposed to the pressure(s)?</b></p>	<p>Yes</p>

<p><b>4. What are the conservation objectives for the feature?</b></p> <p>There are <b>no</b> specific Conservation Objectives for 'Estuarine birds' in the Conservation Advice. Therefore these Conservation Objectives have been taken from the listed seabird features of the SPA.</p>	<p><b>Restore</b></p> <ul style="list-style-type: none"> <li>- the size of the non-breeding population to : <ul style="list-style-type: none"> <li>o 16,400 Wigeon</li> <li>o 3,500 Greylag geese</li> <li>o 3,600 Redshank</li> <li>o 7,500 Bar-tailed godwit</li> <li>o 9,000 Dunlin</li> <li>o 95 Whooper swan</li> </ul> </li> <li>- water quality to mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features</li> </ul> <p><b>Maintain</b></p> <ul style="list-style-type: none"> <li>- safe passage of birds moving between roosting and feeding areas</li> <li>- the size of the non-breeding population at : <ul style="list-style-type: none"> <li>o 490 Ringed plover</li> <li>o 110 Red-breasted merganser</li> <li>o 2,700 Light-bellied brent geese</li> <li>o 900 Shelduck</li> <li>o 160 Sanderling</li> <li>o 2,350 Golden plover</li> </ul> </li> </ul> <p>whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.</p> <ul style="list-style-type: none"> <li>- concentrations and deposition of air pollutants below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (<a href="http://www.apis.ac.uk">www.apis.ac.uk</a>)</li> <li>- the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures and ensure these measures are not being undermined or compromised</li> <li>- the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding). The extent of the following supporting habitats is not currently known: Intertidal rock, Intertidal coarse sediment, Intertidal sand and muddy sand, Intertidal mud, Intertidal mixed sediments, Intertidal seagrass beds, Intertidal biogenic reef: Sabellaria spp., Intertidal biogenic reef: mussel beds, Intertidal stony reef, Coastal lagoons, Freshwater and coastal grazing marsh, Saltmarsh, which comprises of the following features: Salicornia and other annuals colonising mud and sand, Spartina swards (<i>Spartinion maritimae</i>), Atlantic salt meadows (<i>Glauco-puccinellietalia maritimae</i>)</li> <li>- the distribution, abundance and availability of key food and prey items (e.g. invertebrates, marine worms, crustaceans and molluscs, Arenicola, Nereis, Bathyporeia and Mytilus spat, wrack flies, sandhoppers, cereal grains and potatoes, <i>Lolium perenne</i>, <i>Trifolium repens</i>, <i>Phleum pratense</i>, <i>Poa</i> spp., <i>Festuca</i> spp., earthworm, leatherjacket, beetles, spiders, grassland/marsh invertebrates, Hydrobia, Macoma, Corophium, hatching midges, Macoma, Crangon, Carcinus, dipertan flies, caddisfly, wasps, sawflies, mayflies, Potomageton, Ranunculus, Chara spp., Elodea, Zostera, Ruppia, cereal grains, rape, potatoes and turnips, <i>Lolium perenne</i>, <i>Alopecurus geniculatus</i>, <i>Phleum pratense</i>, salmon, brook lamprey, minnow, gobies, eels, stickleback, gobies, flatfish, herring, shrimps, <i>Ulva</i> spp., <i>Polygonum</i>, <i>Eleocharis</i>, <i>Rumex</i>, <i>Ranunculus</i>, <i>Agrostis stolonifera</i>, <i>Puccinellia maritima</i>, <i>Salicornia</i> spp., <i>Spergularia</i>, <i>Aster trifolium</i>, <i>Plantago</i>, <i>Salicornia</i> spp, <i>Agrostis stolonifera</i>, <i>Trifolium repens</i>) at preferred sizes</li> <li>- the availability of grasslands in close proximity (typically &lt;50 m) to open water bodies</li> <li>- the frequency of wide (typically 10-30m) river sections.</li> </ul>
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- the water availability in feeding sites and maintain the area of soggy or flooded land overall
- the water availability within feeding areas to maintain moderately high water tables that provide shallow surface water
- the availability of fresh water on mudflats within feeding and resting areas
- the availability of fresh water on mudflats within feeding and resting areas
- the hydrology of waterbodies used as a feeding site such that water levels are able to fluctuate
- a high density of channel networks within intertidal feeding areas and shallow slope gradients to the length/perimeter of ditches, drains, pools and scrapes.
- a high density of channel networks within intertidal feeding areas
- the width of beach sections
- open and unobstructed terrain around roosting and feeding sites
- open and unobstructed terrain and overall field sizes in and around feeding and roosting areas and no overall reduction in field size where relevant
- the extent and distribution of predominantly short grassland swards in areas used for feeding
- a vegetation structure of key roost sites dominated by bare ground or a short sparsely-vegetated sward
- the number and size of waterbodies of optimal size
- the availability of standing water at optimal depths on site
- the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically  $\geq 5.7$  mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels
- natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat

**Reduce**

- aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels

**Restrict**

- the frequency, duration and / or intensity of disturbance affecting roosting, foraging, feeding, moulting so that they are not significantly disturbed

<p><b>5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?</b></p> <p><i>(reference to conservation objectives)</i></p>	<p>Intertidal handwork within the SPA may include periwinkle, shore crab and lobster collection (cleeking) on intertidal reef features. In addition, there is a low level of collection of <i>Salicornia</i> and other species such as <i>Fucus</i> spp. and <i>Osmundea pinnatifida</i> (pepper dulse) at the site (NE LNNR staff, pers comm). However, this activity either does not occur or occurs at a very low level as it has not been observed by NIFCA.</p> <p>Shore-based fishing activity has the potential to interact with the seabird features of the SPA in two main ways. The first is by targeting the prey species of the seabirds, the second is by causing visual/noise disturbance, which can cause displacement of birds. Shore-based activity could affect the availability of key prey species for seabirds, if carried out at very high level.</p> <p>Removal of non-target species as a pressure is not a concern as the selective nature of hand gathering means bycatch of other species is low where hand gatherers are experienced, however there is potential for undersized periwinkle and other species to be taken.</p> <p>NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (<math>\pm 2</math> hours) when this activity takes place. Within Lindisfarne SPA between October 2016 and September 2024 NIFCA officers observed 4 people in total hand gathering for periwinkles on two separate occasions in 2021 and 1 occasion in 2023. There are 6 other instances of hand gathering activity just outside the SPA including one instance of cleeking. No other hand gathering activity was observed by officers on patrol during another 14 site visits, therefore this assessment will focus on hand gathering periwinkle only. Annex 2 shows a map of hand gathering sightings (including sightings that are slightly outside of the MPA).</p> <p>In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 4) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. NIFCA will monitor adherence to this code of conduct, and if found it is not being adhered to, plan to develop management measures.</p> <p>At current levels, periwinkle collection in the intertidal zone is unlikely to cause significant adverse impacts to the estuarine bird features diet as they do not utilise periwinkle as a food source.</p> <p>Estuarine bird species are highly susceptible to human disturbance to foraging and roosting areas and disturbance by handwork is possible for the following estuarine bird species that use intertidal rock as a supporting habitat:</p> <ul style="list-style-type: none"> <li>- Bar-tailed godwit</li> <li>- Dunlin</li> <li>- Grey plover</li> <li>- Redshank</li> <li>- Ringed plover</li> <li>- Sanderling</li> <li>- Shelduck</li> <li>- Wigeon</li> </ul> <p>The limited number of people engaged in hand gathering on the rocky shore, especially during the winter, mean that a significant adverse effect on estuarine birds is unlikely. Both activities occur at low tide when birds are less likely to be disturbed and have space to avoid people, so disturbance is unlikely to have a significant adverse impact even in combination. Thus, due to the low level of handwork in the</p>
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	<p>SPA the risk of disturbance to estuarine bird features is low. In addition, the LNNR byelaws under byelaw 2 (1)(p) states that 'digging, collection and/or removal of bait of any description by hand or mechanical means' is expressly prohibited unless licenced.</p> <p><b>NIFCA conclude, with medium confidence relating to survey effort that this activity will not adversely impact the conservation objectives of the site through the pressures listed above.</b></p>																																																						
<p><b>6. Condition and Conservation Objective Inferences</b></p>	<p>Estuarine Bird population numbers for Lindisfarne SPA are referenced from the British Trust for Ornithology Wetland Bird Counts (Woodward et al., 2023, 2024).</p> <table border="1" data-bbox="414 535 1445 1501"> <thead> <tr> <th>Species</th> <th>2022/23 Counts</th> <th>2023/24 Counts</th> </tr> </thead> <tbody> <tr> <td>Bar-tailed Godwit</td> <td>1,584</td> <td>1,508</td> </tr> <tr> <td>Common Scoter</td> <td>440+</td> <td>100</td> </tr> <tr> <td>Dunlin</td> <td>5,159</td> <td>5,795</td> </tr> <tr> <td>Eider</td> <td>303</td> <td>441</td> </tr> <tr> <td>Golden Plover</td> <td>2,077</td> <td>2,235</td> </tr> <tr> <td>Grey Plover</td> <td>772</td> <td>1,352</td> </tr> <tr> <td>Greylag Goose</td> <td>325</td> <td>10</td> </tr> <tr> <td>Little Tern</td> <td>21+</td> <td>140</td> </tr> <tr> <td>Long-tailed Duck</td> <td>0</td> <td>10+</td> </tr> <tr> <td>Red-breasted Merganser</td> <td>43+</td> <td>46+</td> </tr> <tr> <td>Redshank</td> <td>637</td> <td>1,543</td> </tr> <tr> <td>Ringed Plover</td> <td>392</td> <td>643</td> </tr> <tr> <td>Roseate Tern</td> <td>0</td> <td>3</td> </tr> <tr> <td>Sanderling</td> <td>166</td> <td>162+</td> </tr> <tr> <td>Shelduck</td> <td>2,052</td> <td>2,136+</td> </tr> <tr> <td>Whooper Swan</td> <td>0</td> <td>25+</td> </tr> <tr> <td>Wigeon</td> <td>16,431</td> <td>19,599</td> </tr> </tbody> </table> <p>Some seabird species have been adversely impacted by Avian Influenza during the 2022 and 2023 breeding seasons and this has impacted both population numbers and the breeding success of some species in the SPA, due to the high mortality of adult birds. Data is not yet available to show the full impact at the four main breeding sites that make up the SPA.</p>	Species	2022/23 Counts	2023/24 Counts	Bar-tailed Godwit	1,584	1,508	Common Scoter	440+	100	Dunlin	5,159	5,795	Eider	303	441	Golden Plover	2,077	2,235	Grey Plover	772	1,352	Greylag Goose	325	10	Little Tern	21+	140	Long-tailed Duck	0	10+	Red-breasted Merganser	43+	46+	Redshank	637	1,543	Ringed Plover	392	643	Roseate Tern	0	3	Sanderling	166	162+	Shelduck	2,052	2,136+	Whooper Swan	0	25+	Wigeon	16,431	19,599
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<p>7. Is the potential scale or magnitude of any effect likely to be significant?</p>	<p><b>Alone:</b></p> <p><b>No</b></p> <p>NIFCA can say with medium confidence in relation to low patrol effort that estuarine birds within the Lindisfarne SPA where handwork activity levels are low that adverse impacts to the bird features are unlikely.</p> <p>This will be monitored through the monitoring and control plan process which is currently under development for this activity and any significant increase in activity levels will trigger a reassessment in the SPA</p>	<p><b>OR In-combination</b></p> <p><b>No</b></p> <p>See 'in-combination' assessment below</p>
<p><b>8. Have NE been consulted on this LSE test? If yes, what was NE's advice?</b></p>	<p><b>Yes, NE have been consulted throughout the assessment process.</b></p>	

## Test for Likely Significant Effect (LSE)

### LINSPA-108: Benthic feeding birds\*

<p><b>1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?</b></p>	<p>No</p>
<p><b>2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)?</b></p> <p>Pressures listed are all those for which the feature is deemed to be sensitive. Pressures in bold are Medium-High Risk. The sensitivities listed are based on the 2018 conservation Advice available on Natural England's Designated Site System.</p> <p>*Includes Eider duck, Common scoter, Red breasted merganser and Long-tailed duck.</p>	<p><b>Removal of non-target species (Sensitive)</b></p> <p><b>Visual disturbance (Sensitive)</b></p> <p>Above water noise (Sensitive)</p> <p>Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures) (Sensitive)</p> <p>Collision BELOW water with static or moving objects not naturally found in the marine environment (Sensitive)</p> <p>Hydrocarbon and PAH contamination (Not-assessed)</p> <p>Introduction of light (Sensitive)</p> <p>Litter (Sensitive)</p> <p>Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals) (Not-assessed)</p> <p>Transition elements &amp; organo-metal (e.g. TBT) contamination (Not assessed)</p>
<p><b>3. Is the feature potentially exposed to the pressure(s)?</b></p>	<p>Yes</p>

**4. What are the conservation objectives for the feature?**

\*There are no specific Conservation Objectives for 'benthic feeding birds' in the Conservation Advice. Therefore these Conservation Objectives have been taken from the listed seabird features of the SPA.

Generic conservation objectives for Benthic feeding seabirds in the Lindisfarne SPA are to :

**Maintain\*:**

- the size of the breeding population
- safe passage of birds moving between nesting and feeding areas
- the overall heights of vegetation patches within nesting areas
- the overall size of the feature population
- the availability of water 2-4m deep
- the distribution, abundance and availability of key prey items
- adult survival and body condition
- the extent and distribution of supporting habitat
- water quality to a standard which supports the feature
- concentrations and deposition of critical air pollutants to below the site relevant Critical Load
- the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised

**Restore**

The size of the non-breeding population to:

- 2,500 Eider duck
- 370 Long-tailed duck
- 670 Common Scoter
- 110 Red Breasted Merganser

**Maintain or Recover**

- productivity so that breeding success is maximised within the constraints of the site

**Reduce**

- the frequency, duration and intensity of disturbance within nesting, foraging and roosting areas
- the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed
- predation and disturbance caused by native and non-native predators
- aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels

**Restrict or Reduce**

- the introduction and spread of pathogens, including Highly Pathogenic Avian Influenza, and their impacts

<p><b>5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?</b></p> <p><i>(reference to conservation objectives)</i></p>	<p>Intertidal handwork within the SPA may include periwinkle, shore crab and lobster (cleeking) collection on intertidal reef features. In addition, there is a low level of collection of <i>Salicornia</i> and other species such as <i>Fucus spp.</i> and <i>Osmundea pinnatifida</i> (<i>pepper dulse</i>) at the site (NE LNNR staff, pers comm). However, this activity occurs at a very low level as it has not been observed by NIFCA.</p> <p>Shore-based fishing activity has the potential to interact with the seabird features of the SPA in two main ways. The first is by targeting the prey species of the seabirds, the second is by causing visual/noise disturbance, which can cause displacement of birds. Shore-based activity could affect the availability of key prey species for seabirds, if carried out at a very high level.</p> <p>NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (<math>\pm 2</math> hours) when this activity occurs. Within Lindisfarne SPA between October 2016 and September 2024 NIFCA officers observed 4 people in total hand gathering for periwinkles on two separate occasions in 2021 and 1 occasion in 2023. There are 6 other instances of hand gathering activity just outside the SPA including one instance of cleeking. No other hand gathering activity was observed by officers on patrol during another 14 site visits, therefore this assessment will focus on hand gathering periwinkle only. Annex 2 shows a map of hand gathering sightings (including sightings that are slightly outside of the MPA).</p> <p>In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 4) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. NIFCA will monitor adherence to this code of conduct, and if found it is not being adhered to, plan to develop management measures.</p> <p>Removal of non-target species as a pressure is not a concern as the selective nature of hand gathering means bycatch of other species is low where hand gatherers are experienced, however there is potential for undersized periwinkle and other species to be taken.</p> <p>Eider duck (<i>Somateria mollissima</i>) is part of the non-breeding population of benthic feeding seabird species found in Lindisfarne SPA year-round. Whilst eider are a non-breeding feature, the birds also breed on Lindisfarne during the summer months. They are concentrated around the south-eastern corner of Lindisfarne and within channels running across Fenham Flats. In June 2025 it was reported that one eider female is nesting in the SPA at Black Law (Andrew Craggs, pers comm). They feed on crustaceans and molluscs, particularly crabs and mussels generally in subtidal areas (Guillemette, 1998). Nesting females and eider chicks may feed on periwinkles, but generally they are not considered their primary food source (Leopold &amp; Sovon, 2001; Skirnisson, 2016). Female Eider with chicks could feed near to intertidal areas where periwinkle collection may occur (Figure 1), therefore visual disturbance could potentially affect eider in high collection areas (Bustnes, 1995). Eider are known to be relatively tolerant of human disturbance when nesting and protecting their eggs, additionally they may use this to their advantage to protect chicks from predators (Goodship &amp; Furness, 2022). The long term trend for Eider in Lindisfarne SPA can be seen in Figure 2. As Lindisfarne SPA has low levels of collection any impact with regards to disturbance would be low.</p>
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**Figure 1** – Map showing MNP Eider sightings (2020-2024) and NIFCA Periwinkle gathering sightings (2016-2024) overlap of activity in Lindisfarne SPA (Berwickshire Marine Nature Partnership, 2025)

Common Scoter (*Melanitta nigra*) are part of the non-breeding population of sea ducks that overwinter in Lindisfarne SPA arriving in October departing from March. The mouth of Budle Bay is an important area for scoter, they are also found in the channel west of Old Law Dunes off Goswick Sands and around Lindisfarne. They are generally found in large flocks and will feed on crustaceans and molluscs in addition to aquatic insects and small fish such as sandeels. They exclusively feed by diving and there is no literature to indicate that they are dependent on periwinkles as a food source (RSPB, 2025a; Sweet, 2008). Common Scoter are generally found in shallow inshore waters (5-15m) so would not be affected by human disturbance from periwinkle gathering on land (Goodship & Furness, 2019). The long term trend for Common Scoter in Lindisfarne SPA can be seen in Figure 2 (Woodward et al., 2024).

Long-tailed ducks (*Clangula hyemalis*) are part of the non-breeding population of sea ducks that overwinter in the Lindisfarne SPA, they do not breed in the UK but are winter visitors and passage migrants. The mouth of Budle Bay is an important area for this duck, but they can be seen all around Lindisfarne. They have a varied diet feeding on mussels, cockles, clams, crabs, small fish and periwinkles (RSPB, 2025). They are generalist feeders able to switch their food source dependent upon availability (Forni et al., 2022; Žydelis & Richman, 2015). Due to their varied diet and low levels of periwinkle collection in the SPA adverse effects upon the diet of the long-tailed duck are unlikely. Long-tailed duck have low sensitivity to shore based activity as they are generally found foraging in deeper water away from land (Goodship & Furness, 2019). The long term trend for Long-tailed ducks in Lindisfarne SPA can be seen in Figure 3

Red Breasted Merganser (*Mergus serrator*) are part of the non-breeding population of sea ducks that overwinter in Lindisfarne SPA. Whilst red-breasted merganser is a non-breeding feature, the birds also breed on Lindisfarne during the summer months. They are found in shallow tidal waters and feed on small

fish such as herring, salmon and trout (RSPB, 2025b). There is no literature to indicate that they are dependent on periwinkles as a food source therefore would not be impacted by periwinkle gathering. Red breasted merganser are sensitive to human disturbance but there are few studies to make any firm conclusions (Natural England, 2025). The long-term trend for Red Breasted Merganser in Lindisfarne SPA can be seen in Figure 3

With the low level of periwinkle collection as seen from NIFCA patrol effort within the SPA, disturbance to this species is not known but is unlikely to be of concern.

Two out of four of the benthic bird species (eider and long-tailed duck) use periwinkles as a source of food. Female eider and their young may feed on periwinkles, but long-tailed ducks are generalist feeders that have a varied diet and periwinkles are not their primary source of food. Hand gathering for periwinkle within Lindisfarne SPA is low in relation to patrol effort, although the number of NIFCA patrols to this area is also low, which decreases confidence in activity estimates. However, local knowledge from Natural England Nature Reserve staff indicates activity levels are potentially higher.

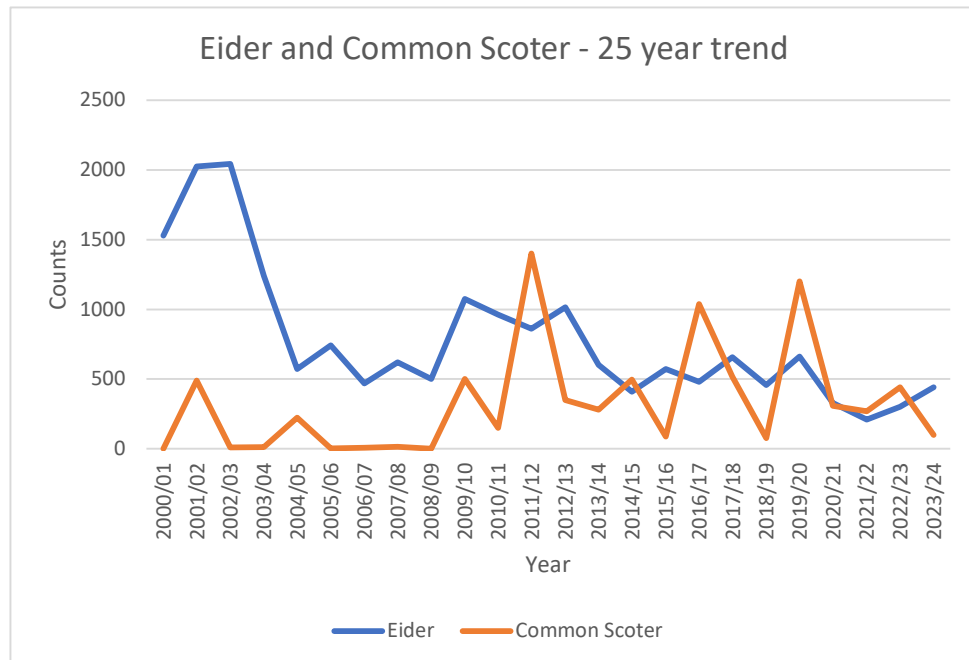
In 2020 NIFCA published a voluntary Periwinkle Gathering Code of Conduct (Annex 4) which is posted at intertidal sites within the district, with guidelines for minimising disturbance to intertidal rocky shores and a recommendation to only collect periwinkles over the minimum market size of 12mm shell length. NIFCA monitor this code of conduct during patrols, while adherence to the measures is difficult to determine, there is no evidence to suggest it is not being followed.

**At current levels, NIFCA conclude with medium confidence that periwinkle collection activity in the intertidal zone will not cause significant adverse impacts to the conservation objectives of the benthic bird species within the site through the pressures listed above.**

**6. Condition and Conservation Objective Inferences**

In 1990 the non-breeding population of common scoter (*Melanitta nigra*) was 670 individuals, which represented 2% of the British population. The Lindisfarne population of common scoter has decreased in number over the last 26 years from 670 to 589 individuals. However, common scoter and other sea ducks are often under-recorded due to challenges of observing them, especially in poor weather conditions. Common crustaceans and molluscs in addition to aquatic insects and small fish such as sandeels.

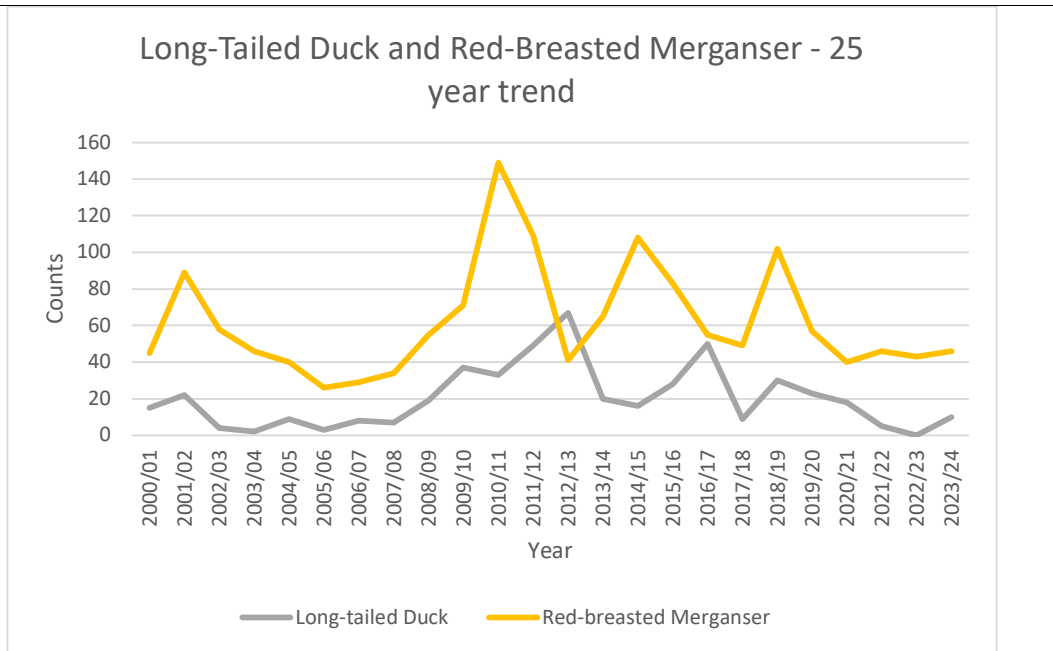
The non-breeding population of eider (*Somateria mollissima*) in 1990 was 2,500 individuals, which represented 5% of the British population. The Lindisfarne population of eider has decreased in number over the last 26 years from 2,500 to 704 individuals. These sea ducks feed by diving for crustaceans and molluscs, particularly blue mussels and shore crab. Nesting females and young eider are known to eat periwinkles as part of their diet.



**Figure 2** – Wetland bird counts at Lindisfarne SPA over the past 25 years (Woodward et al., 2024)

The non-breeding population of long-tailed duck (*Clangula hyemalis*) in 1990 was 370 individuals. The Lindisfarne population of long-tailed duck has decreased in number over the last 26 years from 370 to 92 individuals. Long-tailed duck will feed on mussels, cockles, clams, crabs, small fish and periwinkles.

The non-breeding population of red-breasted merganser (*Mergus serrator*) in 1990 was 110 individuals, which represented 1% of the British population. The Lindisfarne population of red-breasted merganser has decreased in number over the last 26 years from 110 to 81 individuals. Red breasted merganser feed on small fish such as herring, salmon and trout.



**Figure 3 - Wetland bird counts at Lindisfarne SPA over the past 25 years (Woodward et al., 2024)**

Recent population counts from 2022/2023 and 2023/2024 for benthic bird population numbers for Lindisfarne SPA are referenced from the British Trust for Ornithology Wetland Bird Counts (Woodward et al., 2023, 2024)

Species	2022/23 Counts	2023/24 Counts
Common Scoter	440+	100
Eider	303	441
Long-tailed Duck	0	10+
Red-breasted Merganser	43+	46+

Some seabird species have been badly hit by Avian Influenza during the 2022 and 2023 breeding seasons and this has impacted both population number and the breeding success of some species in the SPA, due to the high mortality of adult birds. Data is not yet available to show the full impact at the four main breeding sites that make up the SPA.

<p><b>7. Is the potential scale or magnitude of any effect likely to be significant?</b></p>	<p><b>Alone:</b></p> <p><b>No</b></p> <p>NIFCA concludes with <b>medium</b> confidence that hand work from land is unlikely to have a significant effect on the benthic feeding seabirds where handwork activity levels are low.</p> <p>Benthic feeding birds in the SPA have a varied diet and periwinkles are not their primary food source. However, nesting eider and eider chicks may eat them in the absence of other food resources such as the declining biogenic mussel reef. These nursery areas are rarely found within the SPA and there are large areas of habitat which are difficult to access for land based fishers that they can utilise.</p> <p>This will be monitored through the monitoring and control plan process which is currently under development for this activity and any significant increase in activity levels will trigger a reassessment in the SPA</p>	<p><b>OR In-combination</b></p> <p><b>No</b></p> <p>See 'in-combination' assessment below</p>
<p><b>8. Have NE been consulted on this LSE test? If yes, what was NE's advice?</b></p>	<p><b>Yes, NE have been consulted throughout the assessment process.</b></p>	

**Table 1** In-combination assessment of hand work from land with other activities within Lindisfarne SPA.

<b>Fishing Activity</b>			
<b>Activity</b>	<b>Description</b>	<b>Potential Pressure</b>	<b>Assessment</b>
Potting on <ul style="list-style-type: none"> <li>- intertidal bedrock reef</li> <li>- intertidal biogenic reef : mussel beds</li> <li>- estuarine Birds</li> <li>- benthic feeding birds</li> </ul>	<p>Potting for European lobster (<i>Homarus gammarus</i>) and brown crab (<i>Cancer pagurus</i>) is the principal fishery within the NIFCA district. Most fishers in the district use parlour pots of various sizes and pots are typically worked in fleets of 10-40, dependant on the size of the vessel.</p> <p>Potting occurs predominantly in and around rocky habitat for lobster and brown crab both commercially and recreationally. Commercial potting takes place on subtidal rocky ground with recreational potting generally taking place on intertidal rocky ground.</p>	<p>In 2023 NIFCA issued 85 Commercial Shellfish Permits to fishers, compared to 93 in 2022, 108 in 2021. The total number of pot hauls in the District was 2,464,412 in 2022, compared to 2,766,681 in 2021 and 2,750,768 in 2020. Pots are limited to 800 per shellfish permit and the fishery is governed by multiple IFCA byelaws.</p> <p>In the NIFCA district recreational potting occurs and numbers are monitored through a permit system. A permit allows fishers to use 5 pots, which must be fitted with escape gaps. In 2023 268 recreational permits were issued.</p>	<p>There will be very limited overlap with hand work from land and potting. The only spatial and species overlap will be from shore based 'cleeking' and recreational potting in the intertidal, both targeting lobsters.</p> <p>However, lobsters are not a prey species of any of the seabird features.</p> <p>NIFCA can therefore conclude with high confidence that potting and hand work from land will not 'in-combination' increase pressures on the listed features of the SPA.</p>
Digging with forks in the intertidal	<p>Digging with forks entails collecting worms from the intertidal at low tide, primarily lugworms and ragworms. This activity occurs in estuaries across the NIFCA district.</p> <p>NIFCA officers record any intertidal fishing activity observed during routine patrols whenever a site visit coincides with low water (<math>\pm 2</math> hours), as well as 'no activity.'</p>	<p>Within Lindisfarne SPA 17 patrols have been made between October 2016 and December 2023. Bait digging has been observed on none of these patrols (0/17).</p> <p>Bait digging is prohibited within most of the LNNR and is restricted to a voluntary bait-collection zone for anglers to collect lug and ragworm for their own use.</p> <p>Bait digging activity has a seasonal aspect and sightings per unit effort (SPUE) is highest from September-January, outside of the seabird breeding season.</p> <p>Digging with forks has the potential to impact the bird features through visual/noise disturbance and the removal of prey species.</p>	<p>Whilst digging with forks and hand work from land could co-occur, bait digging is not observed to occur within Lindisfarne SPA except in a designated area where the impact upon disturbance to the bird features has been considered. However, due to lower patrol effort in the area, confidence is low.</p> <p>Digging with forks does not occur on 'intertidal bedrock reef' or 'intertidal biogenic reef - mussel beds.'</p> <p>NIFCA can therefore conclude with medium confidence that bait digging and hand work from land will not 'in-combination' significantly increase pressures on the listed features of the SPA.</p>
Aquaculture	<p>Pacific Oyster Aquaculture</p> <p>There is a pacific oyster aquaculture operation located on Fenham Flats in</p>	<p>The operation is co-located with the mussel bed. There has been suggestion that the presence of the oyster aquaculture operation could have a negative impact on the mussel bed. Mainly</p>	<p>The operation is consented through Natural England's consenting process in SSSIs. Natural England monitor the size of the operation through regular surveys. They</p>

	Lindisfarne NNR. Oysters are grown in net bags which are supported by trestles. Trestles are arranged in rows and grouped mainly on the northern edge of the bed.	through competition for food resource. There is no firm evidence of any impacts (Cucci et al., 1997; Dame & Prins, 1997; Troost et al., 2009; Tran et al., 2022; Leguerrier et al., 2004; Forrest et al., 2009)	work with the owners to identify and mitigate any areas of concern.  NIFCA can therefore conclude with high confidence that hand work from land will not 'in-combination' significantly increase pressures on the listed features of the SPA.
<b>Non-fishing Activity</b>			
<b>Activity</b>	<b>Description</b>	<b>Potential Pressure</b>	<b>Assessment</b>
Mine water discharge	Abandoned mines are one of the biggest sources of water pollution by metals. There is a mine water treatment scheme at Lynemouth and groundwater upwellings have occurred at Hauxley/Hadston as well as water pumped from a mine, discharged through an existing outfall at Hauxley.	Sediments and invertebrate communities could be negatively impacted by mine water discharges. This could occur where mine water is not treated before release into the marine environment. In the majority of cases significant mine water outflow is identified and treated by the Coal Authority.	Appropriate licence conditions/monitoring has been incorporated to mitigate any impacts.
Coastal management scheme - Northumberland and North Tyneside Shoreline Management Plan 2 (05/2009) covers the coastline from the Scottish border to the River Tyne.	Flood and erosion risk management	Any coastal management works along the coast under the aegis of a Coastal Management Scheme.	As stated in Section (2) of the document projects and plans within the SMP are subjected to its own Appropriate Assessment for proposed work, which assesses any impacts to Lindisfarne SPA.
Coastal Infrastructure and Cable Laying.	Any project in the marine area requiring a marine licence.	Any development in the marine environment with an intertidal element, which may impact features of the site as part of the marine licencing process. Assessments for any development must be carried out in consultation with statutory nature conservations bodies.	All marine licence applications are assessed to ensure appropriate licence conditions/monitoring are in place. These assessments must consider impacts to Marine Protected Areas, with an aim to preferably avoid, then minimise and mitigate impacts to the protected features. NIFCA are consulted on all relevant marine applications, as are other bodies such as Natural England.
<b>Other activities being considered (which are not plans or projects by definition)</b>			
<b>Activity</b>	<b>Description</b>	<b>Potential Pressure</b>	<b>Assessment</b>
Intertidal Recreational Activity: Rock pooling	The rocky intertidal areas of Lindisfarne SPA are potential rock pooling spots. This activity is highly seasonal occurring in the summer months over low tide.	Impacts are likely to be similar to those caused by intertidal hand gathering where rocks are turned and cryptic habitats searched.	In certain areas where rock pooling activity is high, there is a potential in combination impact from rock pooling and periwinkle gathering activities. However activity within Lindisfarne SPA is low. NIFCA therefore

LINSPA – tLSE 025

			conclude that there will not be an in-combination effect with periwinkle collection.
Recreational Angling from Vessels	NIFCA record sightings of recreational angling vessels observed during patrols.	NIFCA consider recreational angling to be a relatively small-scale activity, with only 90 sightings of recreational angling vessels in 2024 compared to 443 sightings of commercial potting vessels.	Recreational angling is targeting seafish and not gastropods such as periwinkles. There will also be no spatial overlap with intertidal collection. NIFCA therefore conclude that there will not be an in-combination effect with periwinkle collection.

## Conclusion

**Is the proposal likely to hinder the conservation objectives of the SPA either 'alone or in combination' on the Lindisfarne SPA?**

No

NIFCA conclude with moderate confidence that handwork (access from land) for periwinkle collection within the Lindisfarne SPA at current levels alone or in combination is NOT having an adverse effect on intertidal rock or intertidal biogenic reef : mussel beds, estuarine birds and benthic birds.

This will be monitored through the monitoring and control plan process which is currently under development for this activity and any significant increase in activity levels will trigger a reassessment in the SPA. It is noted that low patrol effort affects the confidence level of this assessment and NIFCA will work with Natural England staff to gather further evidence on this activity.

<b>Has Natural England been formally consulted on this tLSE (and do they agree)?</b>	<b>Yes, NE have been consulted and agree with the conclusions in this assessment.</b>
<b>Date of document completion/'sign-off':</b>	<b>16/07/2025 (CLS/PW)</b>

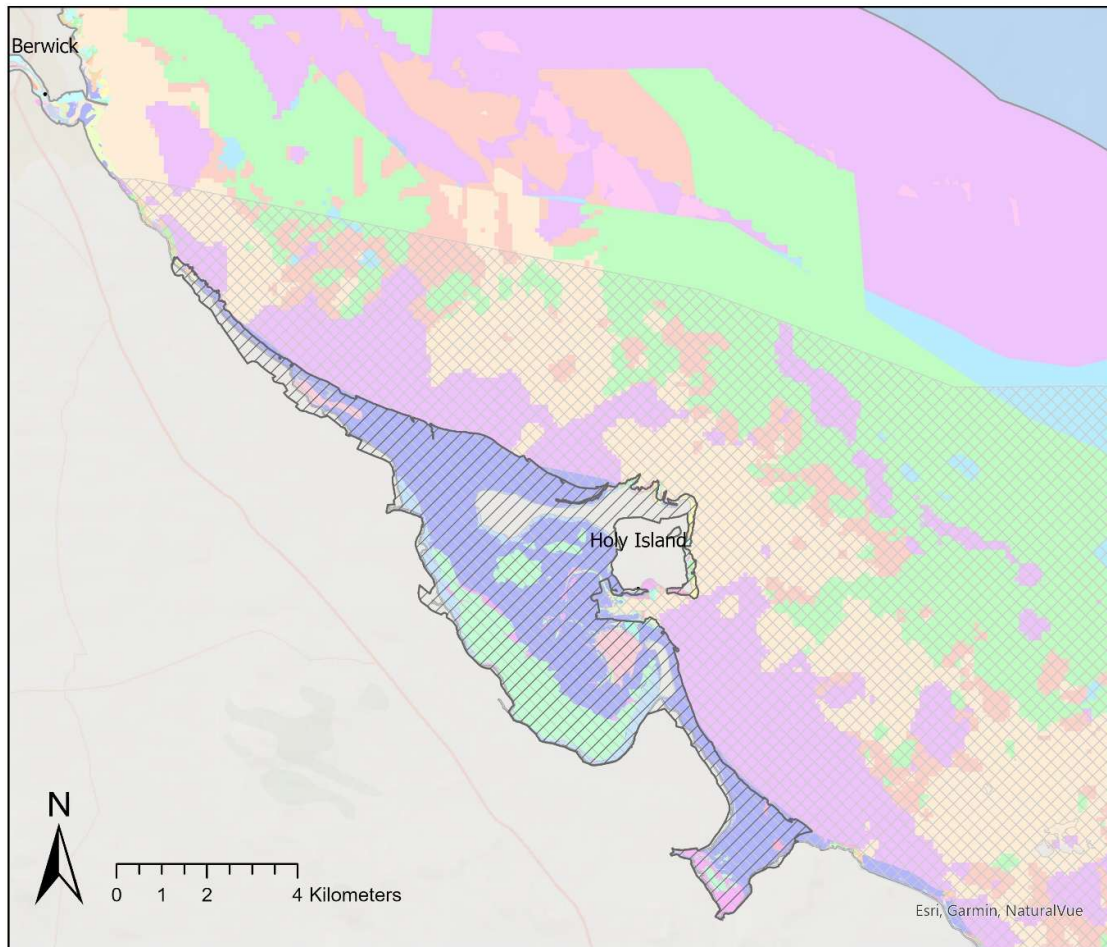
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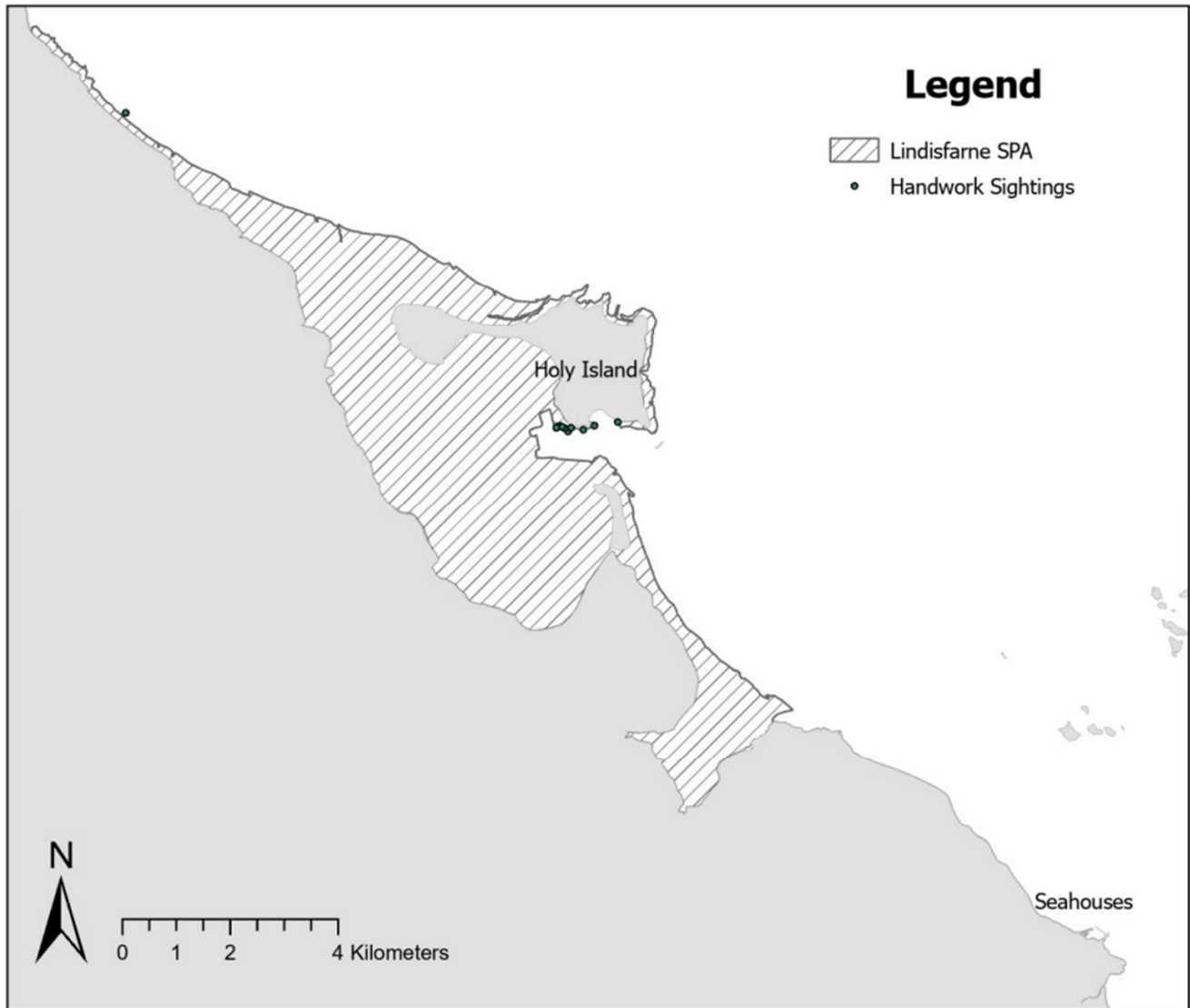
## Annex 1 – Lindisfarne SPA map and EUNIS habitats



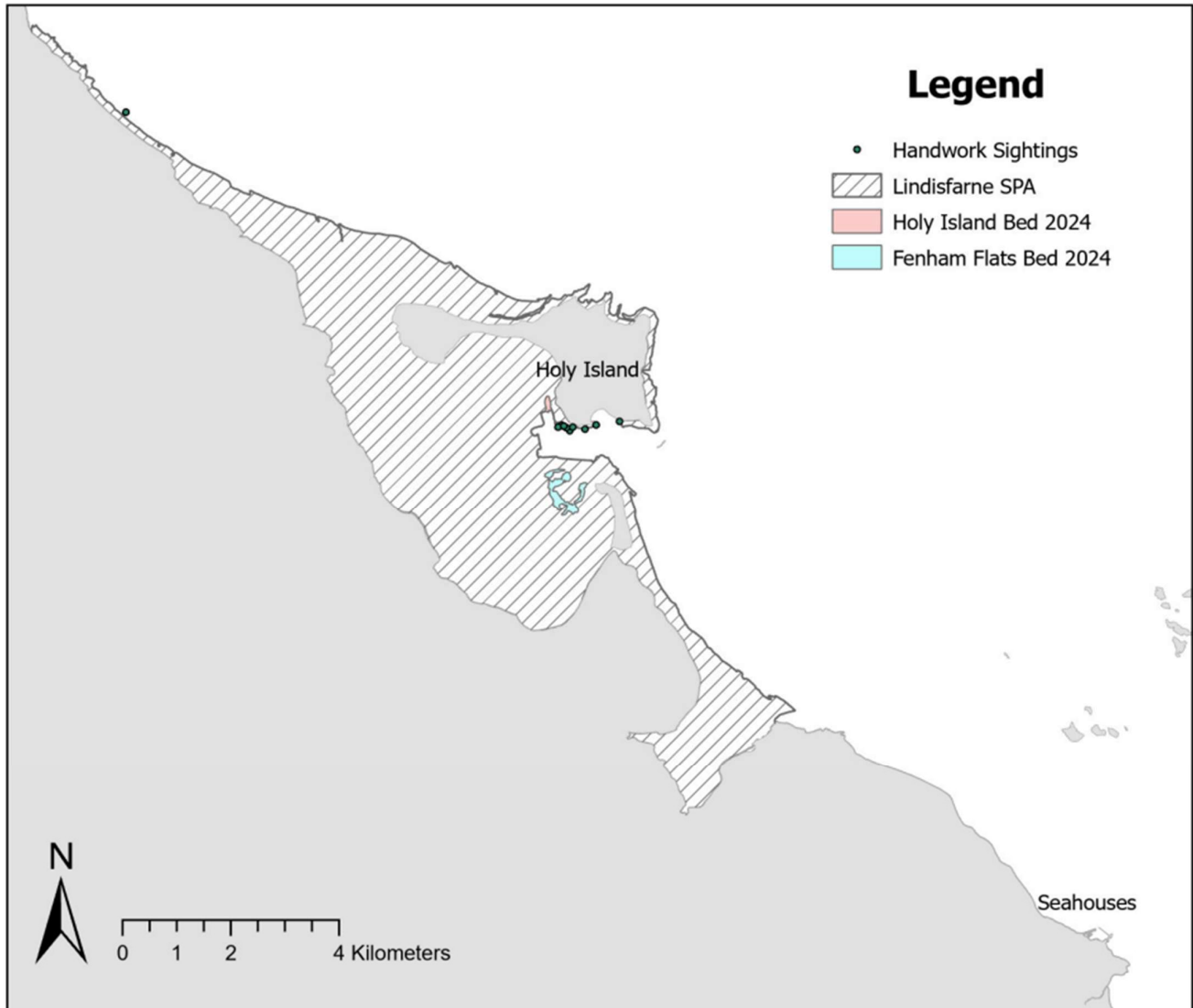
### Legend

 Lindisfarne SPA	 A1.4 Features of littoral rock	 A2.7 Littoral biogenic reefs	 A4.3 Low energy circalittoral rock
 Northumberland Marine SPA	 A2.1 Littoral coarse sediment	 A2.8 Features of littoral sediment	 A5 Sublittoral sediment
<b>Habitat</b>	 A2.2 Littoral sand and muddy sand	 A3.1 High energy infralittoral rock	 A5.2 Sublittoral sand
 A1 Littoral rock and other hard substrata	 A2.3 Littoral mud	 A3.2 Moderate energy infralittoral rock	 A5.3 Sublittoral mud
 A1.1 High energy littoral rock	 A2.4 Littoral mixed sediments	 A3.3 Low energy infralittoral rock	 A5.4 Sublittoral mixed sediments
 A1.2 Moderate energy littoral rock	 A2.5 Coastal saltmarshes and saline	 A4.1 High energy circalittoral rock	 B3.1 Supralittoral rock (lichen or splash zone)
 A1.3 Low energy littoral rock	 A2.6 Littoral sediments dominated by aquatic angiosperms	 A4.2 Moderate energy circalittoral rock	

## Annex 2 – Lindisfarne SPA hand gathering sightings



### Annex 3 – Lindisfarne SPA mussel bed perimeter (2024) and periwinkle gathering sightings 2016 – 2024



## Annex 4 – NIFCA Periwinkle Code Of Conduct



### Northumberland IFCA Periwinkle Gathering Code of Conduct

#### PURPOSE

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

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

#### GUIDELINES



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

#### EDIBLE PERIWINKLE GUIDE

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

They are usually around 2-3 cm high

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



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