

**Marine Conservation Zone Assessment document: AlnMCZ-SRA 012**

<b>Marine Conservation Zone:</b>	<b>Aln Estuary MCZ</b>
<b>Generic sub-feature(s):</b>	<b>Estuarine rock (boulder, cobble and bedrock), Intertidal mud, Saltmarsh spp, Salicornia and Seablite.</b>
<b>Gear type(s):</b>	<b>Intertidal hand work (access from land).</b>
<b>NIFCA MCZ Assessment type:</b>	<b>Detailed</b>
<b>Gear/feature interaction reference(s):</b>	<b>ALNMCZ-078, ALNMCZ-079, ALNMCZ-080.</b>

<b>Revision history</b>		
<b><i>Date</i></b>	<b><i>Revision</i></b>	<b><i>Editor</i></b>
07/06/2018	Document created	NW
24/09/2018	Pressures and Conservation objectives added	NW
26/06/2018	Information added to Q5	AA
06/06/2019	Document edited	AA
14/04/2019	Document slightly revised and agreed	AA, NW, CS

**Test for Likely Significant Effect (LSE)****ALNMCZ-078: Estuarine rock (boulder, cobble and bedrock),**

<b>1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?</b>	No
<b>2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)?</b>  <i>Pressures listed are all those for which the feature is deemed to be</i>	<p>Abrasion/disturbance of the substrate on the surface of the seabed<sup>1</sup></p> <p>Habitat structure changes - removal of substratum (extraction)<sup>1</sup></p> <p>Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion<sup>1</sup></p> <p>Removal of non-target species<sup>1</sup></p> <p>Deoxygenation<sup>1</sup></p>

<sup>1</sup> Tyler-Walters et al., 2018

<p>sensitive. Pressures in bold are Medium-High Risk. The sensitivities listed are based on the 2018 conservation Advice for Aln Estuary MCZ available on Natural England's Designated Site System.</p>	<p>Introduction of light<sup>1</sup></p> <p>Introduction or spread of invasive non-indigenous species (INIS)<sup>1</sup></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>The conservation objectives for Estuarine rock are to <b>Maintain*</b>:</p> <ul style="list-style-type: none"> <li>- <u>the presence and spatial distribution of estuarine rocky habitat communities.</u></li> <li>- <u>the abundance of listed species, to enable each of them to be a viable component of the habitat.</u></li> <li>- the total extent and spatial distribution of estuarine rocky habitat [subject to natural variation in sediment veneer].</li> <li>- the characteristic morphology of the habitat</li> <li>- the surface and structural complexity, and the stability of the estuarine rocky habitat</li> <li>- <u>the species composition of component communities</u></li> <li>- 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.</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 Good Ecological Status [(specifically <math>\geq</math> XX mg per litre (at 35 salinity) for 95 % of the year)], avoiding deterioration from existing levels.</li> <li>- 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.</li> <li>- natural levels of turbidity (eg concentrations of suspended sediment, plankton and other material) across 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> <li>- 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.</li> </ul> <p>Those conservation objectives that might be affected by intertidal hand gathering activity are underlined.</p>
<p><b>5. What are the potential effects/impacts of</b></p>	<p>Direct impacts of periwinkle collection in intertidal areas are due to:</p> <ul style="list-style-type: none"> <li>- Physical damage to flora and fauna from disturbance (Berthelon et al., 2004) from boulder turning and trampling which can cause a reduction</li> </ul>

**the pressure(s) on the feature, taking into account the exposure level?**

***(reference to conservation objectives)***

in habitat stability and biodiversity reduced (Davenport and Davenport, 2006). This can damage under-boulder communities which require stable boulder habitats. It can also adversely impact organisms that depend on upper rock surfaces, such as seaweeds (Liddard et al., 2011). Reduction in habitat stability from boulder turning can be lethal to fauna, algae, and under-boulder communities through crushing, smothering and desiccation (Berthelon et al., 2004).

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

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 and Frid, 1998). Periwinkles are key grazers within rocky intertidal communities and are a key species for the classification of various biotopes therefore changes in frequency or abundance could change community composition (JNCC, 2014). 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; Pertraitis, 1989; Cervin and Aberg, 1997) with some species increasing and others decreasing.

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 Aln Estuary MCZ between October 2016 and September 2018, NIFCA officers recorded no hand work activity during 21 site visits. There is potential for collection of periwinkles and *Salicornia* at the site however this activity either does not occur or, occurs at a very low level as it has not been observed by NIFCA patrols.

Natural England commissioned a study investigating the scale, locale, and ecological impacts of harvesting intertidal species including periwinkles (Tinlin-McKenzie, 2017). As part of the study, observations of hand gathering activity were made at Alnmouth. No collectors were observed gathering periwinkles within the boundaries of the Aln Estuary MCZ.

This infers no, or at most very low levels of, activity at the site limiting the impacts of the pressure, listed above, on the features.

<p><b>6. Condition and Conservation Objective Inferences</b></p>	<p>Rocky habitats typically occur only in small patches within the estuary but contribute greatly to the biodiversity. The range of sheltered environments, rock pools and lower levels of salinity create a habitat which supports many different plant and animal species such as kelps, wracks, anemones, barnacles and sea squirts (NE, 2013).</p> <p>The Aln Estuary is of significant historical interest, and the rocky habitats in this area, composed of small boulders and cobbles, are thought to have derived from the remains of early medieval buildings and not naturally occurring. Particularly near the mouth of the estuary, around Church Hill, the remains an old sea wall are thought to contribute to the topographic complexity and biodiversity of the MCZ (NE, 2018).</p> <p>A target of ‘maintain’ has been selected using expert judgement and there is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities (NE, 2018).</p>	
<p><b>7. Is the potential scale or magnitude of any effect likely to be significant?</b></p>	<p><b>Alone:</b> No</p>	<p><b>OR In-combination</b> No</p>
<p><b>8. Have NE been consulted on this LSE test? If yes, what was NE’s advice?</b></p>	<p>Yes, NE agrees and recommends monitoring continues to determine whether or not incidences of hand gathering increase. See monitoring and control plan.</p>	

## Test for Likely Significant Effect (LSE)

### ALNMCZ-080: Saltmarsh spp, Salicornia and Seablite

<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><b>Abrasion/disturbance of the substrate on the surface of the seabed<sup>1 2 3</sup></b></p> <p><b>Habitat structure changes - removal of substratum (extraction)<sup>4</sup></b></p> <p><b>Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion<sup>1 2 3</sup></b></p>	

<sup>1</sup> Fagherazzi et al., 2013

<sup>2</sup> Spencer et al., 2012

<sup>3</sup> Boorman, 2003

<sup>4</sup> Environment Agency, 2007

<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 for Aln Estuary MCZ available on Natural England's Designated Site System.</p>	<p><b>Removal of non-target species</b></p> <p>Introduction or spread of invasive non-indigenous species (INIS)</p> <p>Litter</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?**

The conservation objectives for Estuarine rock are to **Maintain\***:

- the range and continuity of the habitat and its natural transitions within saltmarsh types and to other habitats seaward and landward.
- the total extent and spatial distribution of coastal saltmarshes and saline reedbeds.
- the ability to achieve long-term fluctuations in the extent of habitat in response to coastal processes.
- the abundance of the species listed to enable each of them to be a viable component of the habitat feature. Upper marsh and transitions: *Puccinellia maritima*, *Festuca rubra*, *Elymus pycnanthus*, *Phragmites australis* Mid-upper marsh: *Puccinellia maritima*, *Limonium spp.*, *Plantago maritima*, *Armeria maritima*, *Triglochin maritima*, *Juncus maritimus* Low-mid marsh: *Puccinellia maritima*, *Atriplex portulacoides* Low marsh. *Aster tripolium*, *Puccinellia maritima*, *Salicornia spp.*, *Sueada maritima*.
- naturally-occurring patterns of creeks and salt pans.
- the degree of patterning of patches of bare mud of varying sizes in a mosaic with saltmarsh vegetation.
- the availability and size range of those sediments typical of the feature at the site.
- any desirable variation in elevation and / or topography across the site that supports the habitat type.
- the full range of zonations (low-mid, mid, mid-upper and transitional zones) between component saltmarsh communities found in saltmarsh.
- the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site.
- the concentrations and deposition of air pollutants to, at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System
- adequate inputs of sediment in the water column from the sediment sources (offshore / eroding cliffs, etc).
- the morphological setting of the habitat within the wider estuarine and coastal system.
- both the sediment nutrient status to within typical values for the habitat and the processes that sustain effective nutrient cycling by the saltmarsh feature.
- the sedimentary processes (suspended sediment, sediment transfer, etc) that sustain the elevation and topography of the marsh and reedbed surface.
- the degree of tidal immersion and emersion that supports the function of the habitat type.
- Where the feature is dependent on estuarine water, ensure water quality and quantity is [maintained / recovered] to a standard that provides the necessary conditions to support the feature

**Recover:**

- The frequency / cover of the following undesirable species are recovered to acceptable levels (decrease) and are not encouraged by

	<p>changes in surface condition, soils, nutrient levels or changes to hydrology: <i>Spartina anglica</i>. Yes, NE agrees and recommends monitoring continues to determine whether or not incidences of bait digging increase. See monitoring and control plan.</p> <ul style="list-style-type: none"> <li>- the management measures (either within and / or outside the site boundary as appropriate) that are necessary to restore the structure, functions and supporting processes associated with the feature.</li> </ul> <p>Those conservation objectives that might be affected by intertidal hand gathering activity are underlined.</p>	
<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>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 Aln Estuary MCZ between October 2016 and September 2018 NIFCA officers observed no hand work activity was observed during 21 site visits.</p> <p>There is potential for collection of periwinkles and <i>Salicornia</i> at the site however this activity either does not occur or occurs at a very low level as it has not been observed by NIFCA.</p> <p>Collection of periwinkles does not occur on saltmarsh habitat therefore there is no possibility if any activity hindering the conservation objectives.</p> <p>There have been no reports or sightings of hand gathering for <i>Salicornia</i> on saltmarsh within the Aln Estuary MCZ. This infers no, or at most very low levels of, activity at the site limiting the impacts of the pressure, listed above, on the features.</p>	
<p><b>6. Condition and Conservation Objective Inferences</b></p>	<p>The extent of coastal saltmarsh in the Aln Estuary MCZ is approximately 3.5 ha (Natural England, 2007). Evidence from condition assessments in 2007 indicates that there has been no decrease in extent from the established baseline (Natural England, 2007).</p> <p>Condition assessments show the presence of <i>Salicornia</i> spp. in the lower marsh areas, and <i>Puccinellia maritima</i> dominant in the mid marsh communities. <i>Atriplex portulacoides</i>, <i>Festuca rubra</i> and <i>Elytrigia atherica</i> are also frequently recorded but little evidence of species recorded within the MCZ but outside of the Alnmouth Saltmarsh and Dunes SSSI (good data available for areas where the two sites overlap) (Natural England, 2018).</p> <p>There are constant natural creeks and pans across the saltmarsh in the south of the Aln Estuary MCZ. Creeks and pans can be variable in size and there are no observed negative attributes or alternation, including realignment of creeks which is absent or rare (Natural England, 2018).</p> <p>A target of 'maintain' has been selected using expert judgement.</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><b>OR In-combination</b></p> <p><b>No</b></p>

<b>8. Have NE been consulted on this LSE test? If yes, what was NE's advice?</b>	Yes, NE agrees and recommends monitoring continues to determine whether or not incidences of hand gathering increase. See monitoring and control plan.
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## Conclusion

**Is the proposal likely to hinder the conservation objectives of the MCZ either 'alone or in combination' on the Aln Estuary MCZ?**

No

<b>Has Natural England been formally consulted on this Simple MCZ Assessment (and do they agree)?</b>	<b>Yes</b>
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<b>Date of document completion/'sign-off':</b>	<b>14/06/2019</b>
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## References

1. Tyler-Walters, H., Tillin, H.M., d'Avack, E.A.S., Perry, F., Stamp, T., 2018. Marine Evidence-based Sensitivity Assessment (MarESA) – A Guide. Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth, pp. 91. Available from <https://www.marlin.ac.uk/publications>
2. Berthelon, S., Paramor, O.A.L. and Frid, C.L.J. (2004) *Effects of bait collection on intertidal ecosystems and Littorina littorea populations*. Report. Newcastle University.
3. Davenport, J. and Davenport, J.L. (2006) 'The impact of tourism and personal leisure transport on coastal environments: a review', *Estuarine, Coastal and Shelf Science*, 67(1), pp. 280-292
4. Liddiard, M., Gladwin, D.J., Wege, D.C. and Nelson-Smith, A. (1989) *Impact of Boulder-turning on Sheltered Sea-shores*. University College of Swansea for the Nature Conservancy Council.
5. JNCC and Natural England (2011) *Advice from the Joint Nature Conservation Committee and Natural England with regard to fisheries impacts on Marine Conservation Zone habitat features*.
6. Tyler-Walters, H. (2008) *Arenicola marina*. Blow lug. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Available from: <http://www.marlin.ac.uk/speciesfullreview.php?speciesID=2592> (Accessed: 13th August ).
7. Povey, A. and Keough, M.J. (1991) 'Effects of trampling on plant and animal populations on rocky shores', *Oikos*, pp. 355-368.
8. Quigley, M and Frid, C. (1999) '*Ecological impacts of the collection of animals from rocky shores*'. Master of Philosophy Thesis, Newcastle University, Newcastle upon Tyne.
9. Buschbaum, C. (2000) 'Direct and indirect effects of *Littorina littorea* (L.) on barnacles growing on mussel beds in the Wadden Sea', *Hydrobiologia*, 440(1-3), pp. 119-128
10. Petraitis, P.S. (1989) 'Effects of the periwinkle *Littorina littorea* (L.) and of intraspecific competition on growth and survivorship of the limpet *Notoacmea testudinalis* (Muller)', *Journal of Experimental Marine Biology and Ecology*, 125(2), pp. 99-115.
11. Cervin, G. and Aberg, P. (1997) 'Do littorinids affect the survival of *Ascophyllum nodosum* germlings?', *Journal of Experimental Marine Biology and Ecology*, 218(1), pp. 35-47.
12. Tinlin-Mackenzie, A.R. (2017) *Intertidal Collection within the Berwickshire and North Northumberland Coast European Marine Site: investigating the scale, locale, and ecological impacts of harvesting *Arenicola marina*, *Arenicola defodiens*, and *Littorina littorea**. Doctor of Philosophy Thesis, Newcastle University, Newcastle upon Tyne.
13. Fagherazzi, S., Marani, M. and Blum, L. K. 2013. 11. Responses of Salt Marshes to Disturbance in an Ecogeomorphological Context, with a Case Study of Trampling by Deer. In: Keusenkothen, M. A. and Christian, R. R. (eds.) *The Ecogeomorphology of Tidal Marshes*. American Geophysical Union.



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14. Spencer, K. L. and Harvey, G. L. 2012. Understanding system disturbance and ecosystem services in restored saltmarshes: Integrating physical and biogeochemical processes. *Estuarine, Coastal and Shelf Science*, 106, 23-32.
15. Boorman, L. 2003. Saltmarsh Review. An overview of coastal saltmarshes, their dynamic and sensitivity characteristics for conservation and management: Joint Nature Conservation Committee.
16. Environment Agency (EA). 2007. Saltmarsh management manual. Appendix C: Natural and human factors leading to saltmarsh change.
17. Natural England. 2018. Conservation Advice Package ALn Estuary MCZ. Accessed at <https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UKMCZ0001&SiteName=aln&SiteNameDisplay=ALn+Estuary+MCZ&countyCode=&responsiblePerson=&SeaArea=&IFCAAarea=>. Accessed on: 06/06/2019
18. Natural England. 2013. ALn Estuary MCZ Factsheet. Accessed at <http://publications.naturalengland.org.uk/publication/6657233332994048>. Accessed on: 06/06/2019
19. Natural England (NE). 2007. Conservation Objectives: Alnmouth Saltmarsh and Dunes SSSI: Natural England (NE).