Marine Conservation Zone Assessment document: AlnMCZ-SRA 011

Marine Conservation Zone:	**Aln Estuary MCZ**
Generic sub-feature(s):	**Intertidal mud**
Gear type(s):	**Bait collection digging with forks**
NIFCA MCZ Assessment type:	**Detailed**
Gear/feature interaction reference(s):	**ALNMCZ-159**

Revision history		
Date	***Revision***	***Editor***
07/06/2018	Document created	NW
20/09/2018	Pressures, activity level and CO added	NW
25/09/2018	Content added to section 5.	NW
06/06/2019	Content added to section 6.	NW
11/06/2019	Section 6 completed.	NW
14/06/2019	Document slightly revised and agreed.	NW, AA, CS
28/08/2019	Information added to section 6.	AA

Test for Likely Significant Effect (LSE)

ALNMCZ-159: Intertidal mud

1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?	No
2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)? Pressures listed are all those for which the feature is deemed to be sensitive. Pressures in bold are Medium-High Risk. The sensitivities	**Abrasion/disturbance of the substrate on the surface of the seabed** **Habitat structure changes - removal of substratum (extraction)** **Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion** **Removal of non-target species** **Removal of target species** Introduction or spread of invasive non-indigenous species (INIS)

listed are based on the 2018 conservation Advice for Aln Estuary MCZ available on Natural England's Designated Site System.	
3. Is the feature potentially exposed to the pressure(s)?	Yes
4. What are the conservation objectives for the feature?	• Maintain the presence and spatial distribution of intertidal mud communities. • Maintain the total extent and spatial distribution of intertidal mud. • [Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat. • Restrict the introduction and spread of non-native species and pathogens, and their impacts. • Maintain the distribution of sediment composition types across the feature. • Maintain total organic carbon (TOC) content in the sediment at existing levels. • Maintain the species composition of component communities. • Maintain the presence of topographic features, while allowing for natural responses to hydrodynamic regime, by preventing erosion or deposition through human-induced activity. • Maintain the natural physical energy resulting from waves, tides and other water flows, so that the exposure does not cause alteration to the biotopes and stability, across the habitat. • Maintain the natural physico-chemical properties of the water. • Reduce surface sediment contaminants (<1cm from the surface) to below the OSPAR Environment Assessment Criteria (EAC) or Effects Range Low (ERL). • Maintain Sediment transport pathways to and from the feature to ensure replenishment of habitats that rely on the sediment supply. • Restrict aqueous contaminants to levels equating to High Status (according to Annex VIII and X of the Water Framework Directive), avoiding deterioration from existing levels. • Maintain the dissolved oxygen (DO) concentration at levels equating to Good Ecological Status [(specifically ≥ XX mg per litre (at 35 salinity) for 95 % of the year)], avoiding deterioration from existing levels. • Maintain 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. • Maintain natural levels of turbidity (eg concentrations of suspended sediment, plankton and other material) across the habitat.
5. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level? ***(reference to conservation objectives)***	The physical disturbance of bait digging can: • directly damage and kill infauna, or bury them within the sediment to depths were they may be incapable of surviving (Chandrasekara and Frid, 1998). • disrupt the sediment layers, releasing pollutants from the anoxic layer, and increasing the heavy metal content (Howell, 1985; Fowler, 1999). • reduce the amount of organic matter within the sediment (Watson *et al.*, 2017), diminishing food availability for many species. The impact of bait digging is proportional to the intensity of digging, which means commercial digging will have a greater impact than recreational digging (Anon, 1992 as cited by JNCC and Natural England, 2011). NIFCA officers record sightings of bait digging activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Within Coquet to St Mary's MCZ between October 2016 and September 2018 NIFCA officers observed no bait digging activity was observed during 21 site visits. Tinlin-Mackenzie (2018) carried out 72 shore observations at the Aln Estuary throughout an x month survey period observed, 2 bait diggers targeting lugworm were observed on 2 of the 72 visits. Another 2 bait diggers were recorded during a broad scale observation on 24th January 2015 (note this date was chosen to maximise number of collectors observed, it was a weekend, in peak winter bait digging season, one day before a major local fishing competition). Due to the low level of activity at the site impacts of bait digging on the intertidal mud feature are unlikely (Natural England, 2018).
6. Condition and Conservation Objective Inferences	No information on the condition of the Aln Estuary MCZ features is available on Natural England's Designated Site System. Benthic invertebrates and sediment samples were taken by the Environment Agency in 2016, Infaunal Quality Index (IQI) was categorised as moderate. There has been no change in this status since 2016 (EA pers. comms.).

7. Is the potential scale or magnitude of any effect likely to be significant?	**Alone:** **No** This conclusion is made with medium-high confidence based on the number sightings and patrol effort in the window 2 hours before and 2 hours after low tide when fishers would be prosecuting the feature**.**	**OR In-combination** **No**
8. Have NE been consulted on this LSE test? If yes, what was NE's advice?	Yes, NE agrees and recommends monitoring continues to determine whether or not incidences of bait digging increase. See monitoring and control plan.	

Conclusion

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

No

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

Date of document completion/'sign-off':	**14/06/2019**

References

Chandrasekara, W. U., & Frid, C. L. J. (1998). A laboratory assessment of the survival and vertical movement of two epibenthic gastropod species, Hydrobia ulvae (Pennant) and Littorina littorea (Linnaeus), after burial in sediment. *Journal of Experimental Marine Biology and Ecology*, *221*(2), 191-207.

Fowler, S.L. (1999). Natura 2000:Guidelines for managing the collection of bait and other shoreline animals within UK European Marine Sites. English Nature IK Marine SACs Project.

Howell, R. (1985). The effect of bait-digging on the bioavailability of heavy metals from surficial intertidal marine sediments. *Marine Pollution Bulletin*, *16*(7), 292-295.

Natural England (2018). Bait collection and hand gathering impact card July 2018 Sediments. Hand digging.

Tinlin-Mackenzie, A. (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*. PhD Thesis. School of Natural and Environmental Sciences. Newcastle University.

Watson, G. J., Murray, J. M., Schaefer, M., Bonner, A., & Gillingham, M. (2017). Assessing the impacts of bait collection on inter-tidal sediment and the associated macrofaunal and bird communities: the importance of appropriate spatial scales. *Marine environmental research*, *130*, 122-133.