

Marine Conservation Zone Assessment document: TSAC – Detailed 034

Marine Conservation Zone:	Tweed Estuary SAC
Generic sub-feature(s):	Infralittoral rock, Intertidal rock.
Gear type(s):	Hand work (access from land)
NIFCA MCZ Assessment type:	Detailed
Gear/feature interaction reference(s):	TSAC – 339 TSAC - 343

Revision history		
<i>Date</i>	<i>Revision</i>	<i>Editor</i>
18/09/2018	Document created	NW
28/09/2018	Some features removed, and information added	AA
17/06/2019	Condition info added to section 6.	NW
24/06/2019	Information added to section 5	AA
30/11/2022	Document signed off	CLS/AA

Test for Likely Significant Effect (LSE)

TSAC – 337: Estuarine rock

TSAC – 341: Intertidal boulder and cobble reef

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)?	<p>Abrasion/disturbance of the substrate on the surface of the seabed</p> <p>Habitat structure changes - removal of substratum (extraction)</p> <p>Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion</p> <p>Removal of non-target species</p> <p>Removal of target species</p> <p>Deoxygenation</p> <p>Introduction of light</p> <p>Introduction or spread of invasive non-indigenous species (INIS)</p>

3. Is the feature potentially exposed to the pressure(s)?

Yes

4. What are the conservation objectives for the feature?

The conservation objectives for Estuaries (of which Estuarine rocks and Intertidal boulder cobble and reef are an attribute):

Maintain*

- the presence and spatial distribution of estuary communities according to the map.
- the total extent and spatial distribution of the estuary to ensure no loss of integrity, while allowing for natural change and succession.
- connectivity of estuarine features to surrounding rivers, freshwater, marine and coastal habitats, to ensure larval dispersal and recruitment, maintain nursery grounds for mobile species, and to allow movement of migratory species.
- the natural freshwater flow / volume into the estuary.
- the estuary zonation, which is affected by both changes in salinity gradient and tides in the estuary from river to sea (horizontally) and with shore height (vertically) from terrestrial to subtidal.
- the characteristic morphology of the estuary.
- the sediment regime and budget within the estuary, including sediment sources, sinks and movement.
- the species composition of component communities.
- composition and character of substrate, across the feature (and each of its subfeatures) (presence / absence of areas mapped in GIS), compared to an established baseline, to ensure continued structural habitat integrity and connectivity.
- the tidal range, currents and circulation patterns across the feature (and each of its subfeatures).
- the characteristic physical form (eg coastal plain, bar built, ria, complex), topographic features of the estuary and the overall topography on which the morphology relies.
- the natural water density or gradient across the feature (and each of its subfeatures).
- the natural physical energy resulting from waves, tides and other water flows, so that the exposure does not cause alteration to the biotopes, natural disturbance levels and stability, across the feature.
- Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg per litre (at 35 salinity) for 95 % of the year), avoiding deterioration from existing levels.
- 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, particulates, plankton and other material) across the habitat.
- **[Maintain OR Recover OR Restore]** the abundance of listed typical 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.**
- **Restrict:** surface sediment contaminant levels to concentrations where they are not adversely impacting the infauna of the feature.
- **Restrict:** aqueous contaminants to levels equating to High / Good Status according to Annex VIII and X of the Water Framework Directive, avoiding deterioration from existing levels.

Those conservation objectives that might be affected by intertidal handwork 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)

Potential activities include: Cleeking (targeting lobster with a long pole with a hook on the end) and winkle picking. Both activities result in movement over intertidal areas (trampling), and collection of periwinkles involves turning boulders to search underneath for the target species, direct impacts include:

- Physical damage to flora and fauna from disturbance from boulder (Berthelon et al., 2004) turning which can cause a reduction in habitat stability and biodiversity (Davenport and Davenport, 2006). This may negatively impact **the presence and spatial distribution of intertidal underboulder communities**. If activity is carried out regularly, 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). Although unlikely to affect **total extent and spatial distribution of intertidal rock**.
- 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 **the species composition of component communities** (Berthelon et al., 2004) and most severely impact long lived sedentary species that are slow to reproduce (Berthelon et al., 2004).

NIFCA officers record sightings of intertidal hand work activity observed during routine patrols when a site visit coincides with low water (± 2 hours). Within the Tweed Estuary SAC, between October 2018 and September 2018, 26 visits were made to handwork locations by officers. No intertidal hand work activity was recorded within the Tweed Estuary SAC.

Tinlin-Mackenzie (2018) observed 5 periwinkle gatherers during broad scale observation at Berwick on 24th January 2015. Note these observations were not within the Tweed

	<p>Estuary SAC but were in the vicinity and are therefore noted in this assessment.</p> <p>Due to the low activity recorded at this site during this time, it is unlikely that this activity has an adverse impact on the site.</p>	
<p>6. Condition and Conservation Objective Inferences</p>	<p>Infralittoral rock There is currently no site-specific evidence available for the infralittoral rock sub-feature within the Tweed Estuary. Information will be updated when it becomes available.</p> <p>Intertidal rock The largest area of intertidal rock is located at Calot Shad on the north shore of the estuary mouth, where the bedrock occurs in roughly parallel bands running down the shore (Jarvis et al., 2003; Brazier et al., 1998). On the southern shore between the life boat station and the dock pier there is a small rocky outcrop in the middle shore composed of bedrock or boulders overlying bedrock (Jarvis et al., 2003). Small outcrops of bedrock also occur between the Royal Tweed Bridge and Royal Border Bridge (Jarvis et al., 2003) and occasional intertidal rock is present on the north bank between Berwick Bridge and Royal Tweed Bridge (Hubble et al., 2014).</p> <p>The intertidal rock community in the Tweed Estuary is characterised by bladder wrack (<i>Fucus vesiculosus</i>) and barnacles. Knotted wrack (<i>Ascophyllum nodosum</i>) is also present in more sheltered intertidal rock areas. Where freshwater inputs influence the intertidal rock, the red alga <i>Porphyra purpurea</i> and the green alga <i>Enteromorpha</i> species are characteristic.</p> <p>No information on the condition of the Tweed Estuary SAC features is available on Natural England’s Designated Site System.</p>	
<p>7. Is the potential scale or magnitude of any effect likely to be significant?</p>	<p>Alone:</p> <p>No</p>	<p>OR In-combination</p> <p>No</p>
<p>8. Have NE been consulted on this LSE test? If yes, what was NE’s advice?</p>	<p>Yes</p>	

Conclusion

Is the proposal likely to hinder the conservation objectives of the MCZ either 'alone or in combination' on the Coquet to St Mary's MCZ?

No

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

Date of document completion/'sign-off':	30/11/2022
--	-------------------

References

- 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.
- Brazier, D. P., Davies, J., Holt, R. H. F. and Murray, E. 1998. Marine Nature Conservation Review Sector 5. South-east Scotland and north-east England: area summaries: Joint Nature Conservation Committee (Coasts and Sea of the United Kingdom MNCR Series).
- 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
- 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.
- Hubble, M., Pears, S. and Perez-Dominguez, R. 2014. Tweed Estuary SAC: Biotope Survey 2013: APEM Aquatic Scientists.
- Jarvis, S., Mazik, K., Allen, J., Thomson, S., Burdon, D. and Cutts, N. 2003. Survey of Littoral Sediments of the Tweed Estuary cSAC.: Institute of Coastal Studies, University of Hull.
- 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*.
- Povey, A. and Keough, M.J. (1991) 'Effects of trampling on plant and animal populations on rocky shores', *Oikos*, pp. 355-368.
- 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).