Marine Conservation Zone Assessment

Site name:	Axe Estuary MCZ UKMCZ0052
Protected feature(s):	Estuarine rocky habitats

Fishing activities assessed at this site:

Stage 1 Assessment

Intertidal handwork: Handworking (access from vessel), Handworking (access from land)
Miscellaneous: Crab tiling
Bait collection: Digging with forks

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
AXE-MCZ-003

Contents

Version control history			
Author	**Date**	**Comment**	**Version**
Sarah Curtin	October 2021	Draft assessment	0.1
Sarah Curtin	February 2022	Updating assessments with call for information data	0.2
	March 2022	Reviewed by J. Stewart	0.3
	April 2022	Reviewed by JS following alterations by SC	0.4
	April 2022	Finalised by JS and SC	0.5

1. Introduction

This assessment has been undertaken by Devon & Severn Inshore Fisheries and Conservation Authority (D&S IFCA) in order to document and determine whether management measures are required to achieve the conservation objectives of marine conservation zones (MCZs). The IFCA's responsibilities in relation to management of MCZs are laid out in Sections 124 to 126, & 154 to 157 of the Marine and Coastal Access Act 2009.

2. MCZ site name(s), and location

The Axe Estuary MCZ is an inshore site of approximately 0.404km^2. The Axe Estuary runs from Colyford to Axmouth and Seaton, opening into Lyme Bay. The sites lies adjacent to the Seaton Wetlands which are a series of local nature reserves. The Axe Estuary forms an important link between the surrounding wetlands and the sea. The costal saltmarshes, intertidal sediments and rocky habitats are important nursery grounds for juvenile fish, including sea bass. In addition, these areas act as habitats for sensitive species of birds, crustaceans and molluscs. The estuary is also home to the critically endangered European eel.

Costal saltmarshes and saline reedbeds support a wide variety of species, providing important foraging ground for wading birds, wildfowl and providing shelter at high tide. They are one of the most productive ecosystems in the world, with significant economic value. The specialised salt and flood tolerant flowering plants not only help to stabilise the sediment and prevent erosion but the damp sediment surrounding the vegetation provides an important habitat for marine worms, crustaceans and tiny snails.

The areas of intertidal sediments, consisting of mud, coarse and mixed sediment, create a mosaic of different habitats supporting a wide variety of species. The shoreline habitats protected by the MCZ, in particular the rocky areas, saltmarshes and reed beds support a diverse range of species including juvenile fish, and shrimp like sandhoppers which feed on plant material washed up (Defra, 2019).

Further information regarding the MCZ and its protected features can be found in the Axe Estuary MCZ Factsheet.

3. Feature(s) / habitat(s) of conservation importance (FOCI/HOCI) and conservation objectives

Table 1 - Protected features relevant to this assessment

Feature	General management approach
Estuarine rocky habitats	Maintain in favourable condition

The conservation objectives for these features are that they remain in, favourable condition.

4. Gear/feature interaction in the MCZ categorised as 'red' risk and overview of management measure

None - There are no gear/feature interactions in the MCZ that are categorised as 'red' risk.

5. Activities under consideration

Intertidal handwork: Handworking (access from vessel), Handworking (access from land)
There may be some minor hand gathering of peeler crabs, mussels and Pacific oysters on the eastern side of the channel, but this activity appears to be occurring at a very low level (three respondents replied out of a possible 47, to a request for information, advising they carry out this activity). One respondent advised they hand gather peeler crabs from April to September and pick two dozen oysters twice a month. The second respondent hand gathers peeler crabs once or twice a month. The third respondent hand gathers mussel and peeler crab but has not confirmed how often. D&S IFCA has attempted to find out the frequency of the third respondents' activities but has been unable to obtain this information

Miscellaneous: Crab tiling
Crab tiling is occurring in the Axe Estuary MCZ. Surveys on the River Axe were carried in 2020, during which 245 tiles were observed on the east bank of the Axe and in a small area of the west bank under the B3172/Harbour Road bridge. This is a 46% increase relative to 2016. The rest of the west bank of the River Axe was not surveyed due to Covid-19 restrictions limiting surveys and the requirement of two officers due to muddy conditions.

Bait collection: digging with forks

D&S IFCA conducted bait digging surveys in summer and autumn of 2020. During these surveys no evidence was found of bait digging on the Axe Estuary.

D&S IFCA circulated a request for information on bait digging to the local community and harbour master to gather evidence and better understand fishing activity within the site. The harbour master advised that little bait digging occurs on the Axe Estuary. Responses from the request for information indicate that bait digging is occurring within the Estuary, but this is likely to be at low levels (only three respondents replied out of 47, advising they dig in the MCZ on average two to three times a month).

See Curtin (2021) for more information on fishing activities occurring in the Axe Estuary MCZ.

6. Is there a risk that activities are hindering the conservation objectives of the MCZ?

Yes,
Evidence:
To determine whether each pressure is capable of affecting (other than insignificantly) the site's feature(s), the sensitivity assessments and risk profiling of pressures from the advice on operations section of the Natural England conservation advice package were used (Natural England, 2021). Table 2 shows the fishing activities and pressures included for assessment.

Table 2 - Fishing activities and pressures included in this assessment.

Activity	Pressures
Shore based activities: Hand working, crab tiling, bait collection	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

The relevant targets for favourable condition were identified within Natural England's conservation advice supplementary advice tables (Natural England, 2021). Table 3 shows which targets were identified as relevant to the activity assessed. The impacts of pressures on features were

assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Attribute	Target
Estuarine rocky habitats	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of estuarine rocky habitat communities
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal rock (subject to natural variation in sediment veneer)
	Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.
	Structure: species composition of component communities	Maintain the species composition of component communities.

7. Can D&S IFCA exercise its functions to further the conservation objectives of the site?

Yes,
Evidence: Monitoring and Control Arrangements

- Monitor activity levels
- Consideration of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity.

On the 14th November 2019, the D&S IFCA Byelaw & Permitting Sub-Committee discussed the different options that exist to manage hand working types of fishing activity as set out in a report (D&S IFCA, 2019). The development of a new byelaw was the option selected, however it is envisaged that it will be a slightly different regulatory format as compared to the D&S IFCA permit based byelaws already implemented to manage other fishing activity.

The potential need for a permit to conduct the different activities will become a factor in the on-going drafting work. It is envisaged that the requirement for a permit to conduct bait collection and hand gathering will be dependent on the amounts of resource taken. The Hand Working Permit Byelaw would introduce fixed provisions that apply to all persons. Fixed provisions are expected to include a series of catch limits (bag limits) for different species (sea fisheries resources) that are targeted by different types of hand working fishing methods. The bag limits would provide an upper level of catch (a threshold) that would apply to all persons but providing the individual take of the specified species was below the levels set for personal use, it is not envisaged that a permit would be required for the collection of the resources. Commercial activity would exceed the bag limits for recreational take and would therefore be regulated by conditions of use that would be placed in the permits issued by D&S IFCA. D&S IFCA will be seeking the views of all stakeholders to better inform the decision making needed to set the initial bag limits.

The development of a Hand Working Permit Byelaw is now a longer-term commitment for D&S IFCA. As a reflection of the time and resource required and available to conduct the required elements of the work, including reporting and the decision-making of D&S IFCA's Byelaw and Permitting Sub-Committee, the development of this Byelaw is not included in D&S IFCA's 2022–

2023 Annual Plan (D&S IFCA, 2022). Key Tasks for 2022-2023 reflect what is deliverable with the current level of staffing and financial resourcing available to D&S IFCA.

8. Referenced supporting information to inform assessment

There have been many studies assessing the impact of trampling on intertidal rocky shore habitats, but very few focussed on the estuarine equivalent. Conditions in estuaries are distinctly different to those on the open coast, where rocky habitats are generally more abundant. Rocky habitats in estuaries are typically located in low wave energy environments with reduced salinity, and experience accelerated tidal streams with increased turbidity and siltation. The communities present on rocky habitats are adapted to these conditions and consequently their composition and character is different to that found on similar substrata on the open coast (JNCC, 2008). Estuarine rocky communities may have a different assemblage composition to rocky shores, but many of the species present in the estuarine habitats are the same. In general terms, the supralittoral of rocky habitat supports yellow and grey lichens, with a band of the black lichen *Verrucaria maura* below (JNCC, 2008). These bands may be unusually narrow in areas of low wave exposure. The remainder of the shore can be dominated by fucoids and kelp with an understorey of barnacles, algae, grazing molluscs and gammarids, and occasionally sponges and sea squirts.

In rocky shore habitats, trampling has been shown to be a type of physical disturbance that has effects over and above that of disturbance caused by wave exposure (Tyler-Walters and Arnold, Chloe, 2008). The pre-adaptation of macroalgae and sessile organisms to wave action does not necessarily provide protection or tolerance of the effects of trampling. The bare space caused by trampling is reported to likely be chronic in nature and more frequent in spring and summer (less so in winter) (Brosnan and Crumrine, 1994). Many species are adapted to take advantage of bare space left by winter storms, and peak recruitment for many species (e.g. algae and barnacles) occurs in spring and summer, which coincides with peak periods for visitation of shores, and hence trampling (Brosnan and Crumrine, 1994).

Lichens are considered to be intolerant of trampling (Tyler-Walters, 2005a) as physical disturbance (such as trampling) may reduce species richness and while growth rates are variable between growth forms, colonization is slow. Brown algae characterized by fucoids (Fucus spp. in the UK) are particularly intolerant of trampling, depending on intensity (Boalch *et al.*, 1974; Boalch and Jephson, 1981). Associated infauna also responds deleteriously to trampling, showing reduced diversity in more heavily trampled areas (Tyler-Walters and Arnold, Chloe, 2008).

As the activities described in table 2 are occurring at low levels the effects of trampling are thought to be minimal.

9. In-combination assessment

Table 4 - Relevant activities occurring in or close to the site

Plans and Projects		
Activity	**Description**	**Potential Pressure(s)**
No other plans or projects known to be occurring within Axe Estuary MCZ	The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.	N/A
Other activities being considered		
Activity	**Description**	**Potential Pressure(s)**
Static – pots/traps: Pots/creels, cuttlepots, fish traps	Low levels of potting do occur around the Axe Estuary. However, the activity occurs outside of the MCZ. Therefore, no in-combination effect is thought to be possible	Abrasion/disturbance of the substrate on the surface of the seabed

Static – fixed nets: Gill nets, Trammels, Entangling	This activity is currently not permitted to take place within the Axe Estuary MCZ as it falls under the D&S IFCA Netting Permit Byelaw. In the estuary landward of the coordinates set out in Annex 1, Figure 3, a permit holder or named representative is not authorised to use any net other than a seine net. Therefore no in-combination effect is thought to be possible.	Removal of non-target species Removal of target species Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion Changes in suspended solids (water clarity) Smothering and siltation rate changes (Light) Genetic modification & translocation of indigenous species Introduction of microbial pathogens Introduction or spread of invasive non indigenous species
Passive – nets: Drift nets (demersal)	This activity is currently not permitted to take place within the Axe Estuary MCZ as it falls under the D&S IFCA Netting Permit Byelaw. In the estuary landward of the coordinates set out in Annex 1, Figure 3, a permit holder or named representative is not authorised to use any net other than a seine net. Therefore no in-combination effect is thought to be possible.	
Seine nets and other; Shrimp push nets, fyke and stakenets, ring nets	This activity is currently not permitted to take place within the Axe Estuary MCZ as it falls under the D&S IFCA Netting Permit Byelaw. In the estuary landward of the coordinates set out in Annex 1, Figure 3, a permit holder or named representative is not authorised to use any net other than a seine net. Therefore no in-combination effect is thought to be possible. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	
Lines: Longlines (demersal)	As there is little to no level of this activity in the Axe Estuary MCZ, no in-combination effect thought to be possible.	
Seine nets & other: Beach seine/ring,	As there is little to no level of this activity in the Axe Estuary MCZ, no in-combination effect thought to be possible.	
Aquaculture	There is no evidence that this activity is currently occurring, no in-combination effect thought to be possible.	

D&S IFCA conclude there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed.

10. NE consultation response

N/A Natural England has not been consulted at this stage.

11. Conclusion

The literature detailed in section 8 found that trampling associated with bait digging and other shore-based activities including crab tiling and hand gathering has the potential to influence the species assemblages on the rocky habitats assessed if levels of shore-based activities were sufficiently high and over a prolonged period.

Within Axe Estuary MCZ, very little bait digging occurs. There is some minor hand gathering of Peeler crabs for bait, mussels and pacific oysters from the eastern side of the channel but the harbour master has suggested that the composition of the river bed has changed from mud to an aggregation in which there is little life, and indicated that hand gathering has declined in the last few years as a result. The evidence presented in section 8 suggests recovery times for both sediment and smaller invertebrates that are impacted by trampling and digging are shorter when activity levels are low. Based on the current levels of these activities on the Axe Estuary there is not believed to be a significant impact of the shore-based activities on the protected features assessed. It is believed that these activities are occurring infrequently and at low levels, which likely gives the disturbed areas time to recover before they are revisited and disturbed again.

D&S IFCA is considering the introduction of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity in the district. The introduction of a byelaw would introduce fixed provisions that apply to all persons. Fixed provisions are expected to include a series of catch limits (bag limits) for different species (sea fisheries resources) that are targeted by different types of hand working fishing methods. The bag limits would provide an upper level of catch (a threshold) that would apply to all persons thus limiting the effort of shore-based activities on the Estuary. As outlined in section 7, the development of a Hand Working Permit Byelaw is now a longer-term commitment for D&S IFCA and has not been included in D&S IFCA’s Annual Plan for 2022–2023.

12. Summary table

Feature or habitat of Conservation interest	**Conservation objectives/ Target Attributes** (Natural England, 2021)	**Activity**	**Potential pressures from activity and sensitivity of habitats to pressures.** (Natural England, 2021)	**Potential exposure to pressures and mechanism of impact significance**	**Is there a risk that the activity could hinder the achievement of conservation objectives of the site?**	**Can D&S IFCA exercise its functions to further the conservation objectives of the site?** **If Yes, list management options**
Estuarine rocky habitats	Maintain the presence and spatial distribution of estuarine rocky habitat communities Maintain the total extent and spatial distribution of intertidal rock (subject to natural variation in sediment veneer) [Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.	Commercial fishing; Intertidal handwork: Handworking (access from vessel), Handworking (access from land) Miscellaneous: Crab tiling Bait collection: digging with fork	• Abrasion/disturbance of the substrate on the surface of the seabed • Habitat structure changes – removal of substratum • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Removal of target species See Annex 2 for pressures audit trail	Trampling associated with these activities may cause abrasion/ disturbance of the features assessed if it is occurring at high levels, however the activities are either not occurring or occurring at low levels therefore potential exposure is minimal	Based on the current levels of these activities on the Axe Estuary there is not believed to be a significant impact of the shore-based activities on the protected features assessed	Yes, Management measures could include: 1. Monitor activity levels 2. Possible introduction of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity.

	Maintain the species composition of component communities.					

13. References

Boalch, G. T., Holme, N., Jephson, N., and Sidwell, J. C. 1974. A Resurvey of Colman's Intertidal Traverses at Wembury, South Devon.

Boalch, G. T., and Jephson, N. 1981. A re-examination of the seaweeds on Colman's intertidal traverses at Wembury, South Devon. Proceedings of the International Seaweed Symposium.

Brosnan, D. M., and Crumrine, L. L. 1994. Effects of human trampling on marine rocky shore communities. Journal of Experimental Marine Biology and Ecology, 177: 79–97.

Curtin, S. 2021. Axe Estuary MCZ Fishing Activity Report. Devon and Severn IFCA Report.

Defra. 2019. Axe Estuary Marine Conservation Zone factsheet. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914337/mcz-axe-estuary-2019.pdf.

D&S IFCA. 2019. Managing Hand Working Fishing Activity: A Focus on Bait Digging. Supplementary Report for the B&PSC – Information & Evidence, V2.0. Devon & Severn Inshore Fisheries and Conservation Authourity, Brixham, Devon.

JNCC. 2008. UK Biodiversity Action Plan Priority Habitat Descriptions - Estuarine Rocky Habitats. https://data.jncc.gov.uk/data/0a9b6b43-4827-44a4-ab06-0f94d5ad6b93/UKBAP-BAPHabitats-13-EstuarineRockyHabitats.pdf (Accessed 9 August 2021).

Natural England (2021) Draft Conservation Advice for Axe Estuary Marine Conservation Zone (MCZ)

Tyler-Walters, H., and Arnold, Chloe. 2008. Sensitivity of Intertidal Benthic Habitats to Impacts Caused by Access to Fishing Grounds. Report to Cyngor Cefn Gwlad Cymru / Countryside Council for Wales from the Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth. https://www.marlin.ac.uk/assets/pdf/CCW_version_Fisheries_Access_Rpt08_Final.pdf (Accessed 9 August 2021).

Annex 1: Site Map(s)

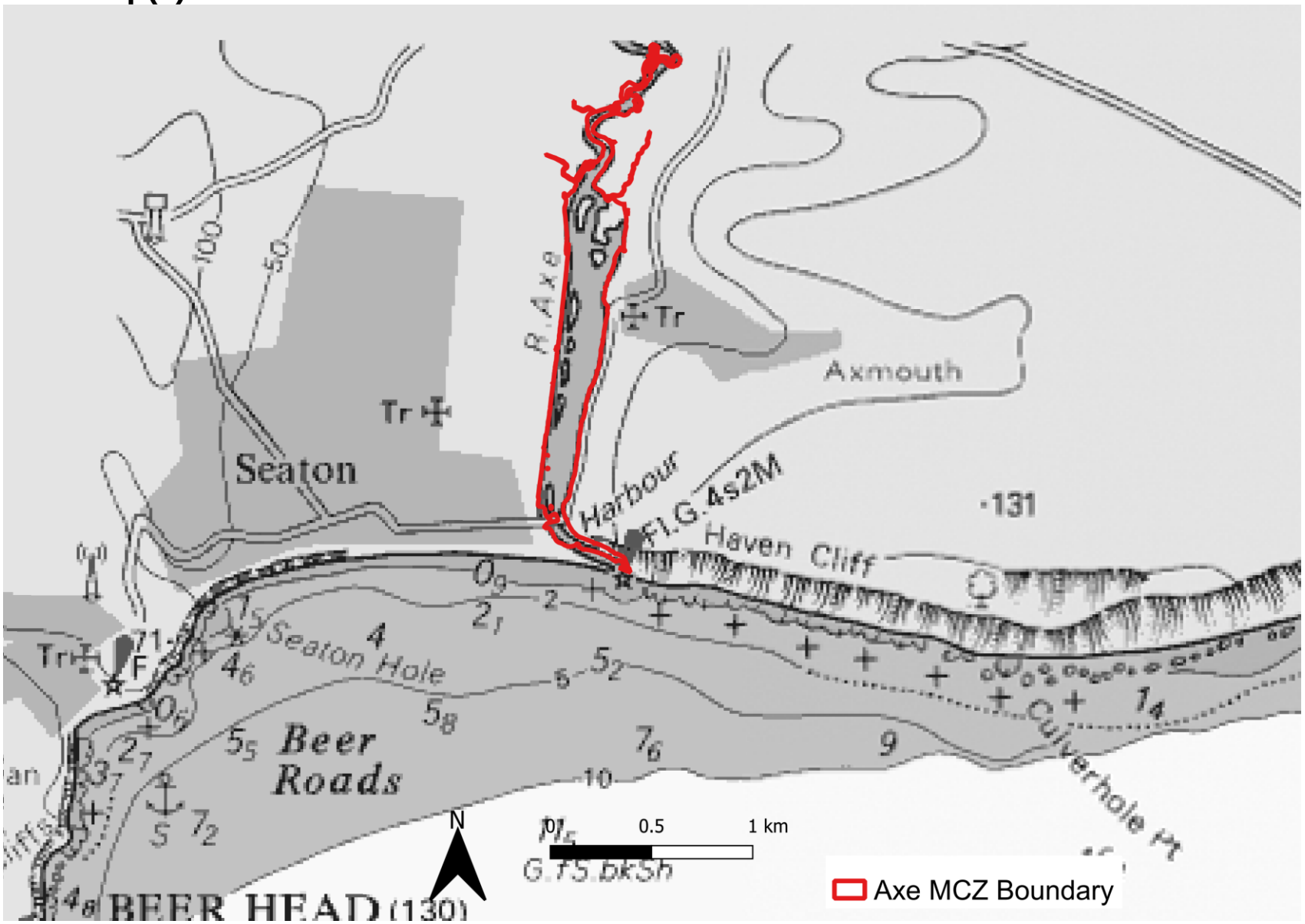

Figure 1 – Axe Estuary MCZ

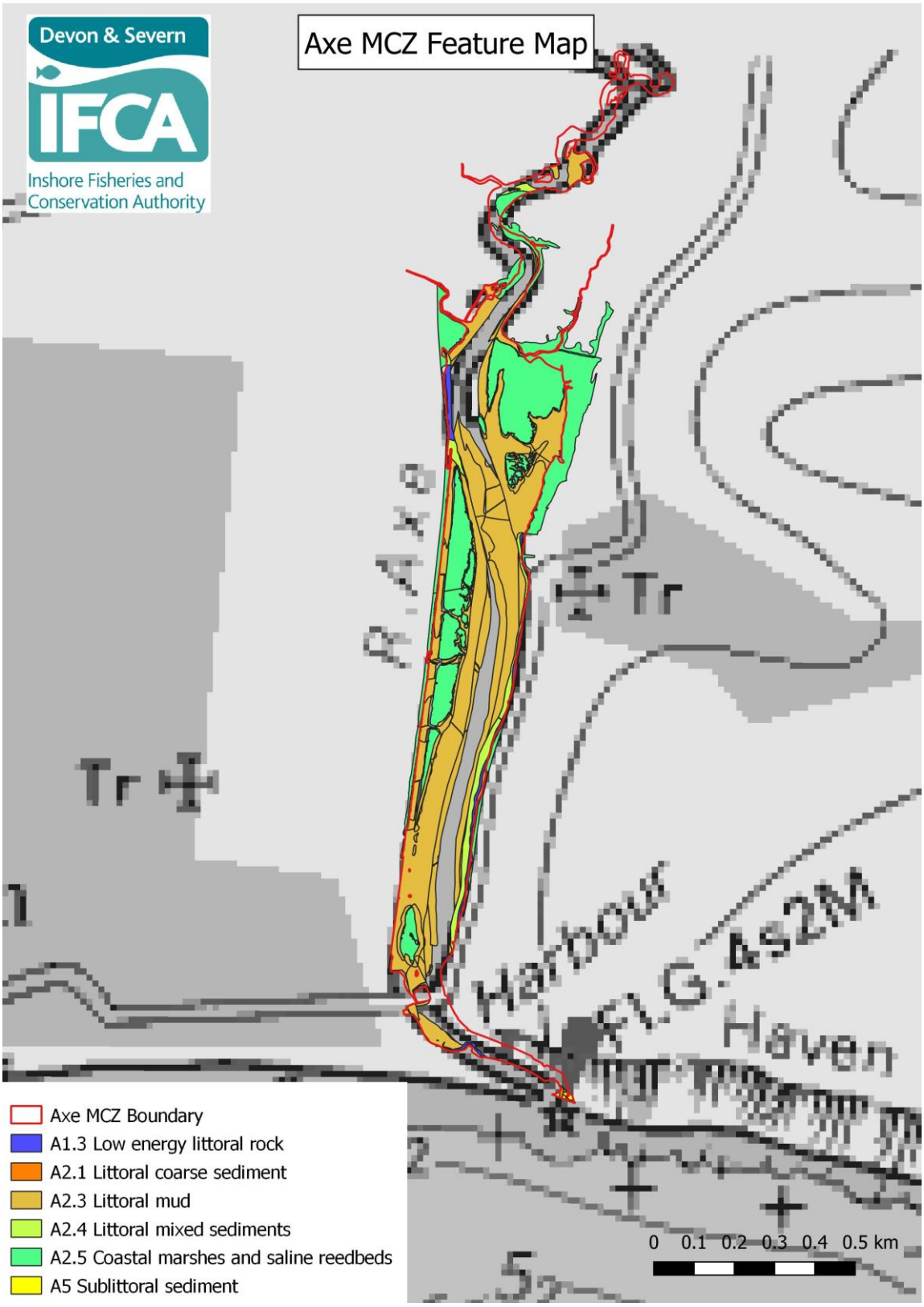

Figure 2: Extent of features (estuarine rocky habitats, intertidal coarse and mixed sediment, intertidal mud, and coastal saltmarshes and saline reedbeds) designated in the Axe Estuary MCZ

Annex 2 Chart of River Axe closing line - No access for the use of nets other than a seine net in accordance with paragraph 3.2 of the Netting Permit Conditions

Estuary closing line

River Axe closing line latitude and longitude positions:

Point	Latitude	Longitude
A	50° 42.135'N	003° 3.354'W
B	50° 42.135'N	003° 3.274'W

Figure 3: River Axe closing line latitude and longitude, from Annex 2 to the Netting Permit Byelaw. No access landward of the line to the use of nets other than a seine net in accordance with paragraph 3.2 of the Netting Permit Conditions

Annex 2: Pressures Audit Trail

Fishing Activity Pressures: Shore based activities	**Estuarine rocky habitats**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Habitat structure changes - removal of substratum (extraction)	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of target species		OUT – Not applicable
Deoxygenation	NS	OUT – Not applicable
Hydrocarbon & PAH contamination	NA	OUT – Not applicable
Introduction of light	S	OUT – Insufficient activity levels to pose risk at level of concern
Introduction or spread of invasive non-indigenous species (INIS)	S	OUT – Insufficient activity levels to pose risk at level of concern
Litter	NA	OUT – Not applicable
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	OUT – Not applicable
Transition elements & organo-metal (e.g. TBT) contamination	NA	OUT – Not applicable
Underwater noise changes	IE	OUT – Not applicable