Marine Conservation Zone Assessment

Site name: Axe Estuary MCZ
UKMCZ0052

Protected feature(s):
Intertidal coarse sediment
Intertidal mixed sediment
Intertidal mud
Estuarine rocky habitats

Fishing activities assessed at this site:
Stage 1 Assessment
Seine nets & other: Beach seine

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
AXE-MCZ-007

Contents

Version control history			
Author	**Date**	**Comment**	**Version**
Sarah Curtin	October 2021	Draft assessment	0.1
Sarah Curtin	February 2022	Updating assessment with call for information data	0.2
	March 2022	Reviewed by J. Stewart	0.3
	April 2022	Finalised by JS & SC	1.0

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
Intertidal coarse sediment	Maintain in favourable condition
Intertidal mixed sediment	Maintain in favourable condition
Intertidal mud	Maintain in favourable condition
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

- Seine nets & other: Beach seine.

See Curtin (2021) for more information regarding 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 22 shows the fishing activities and pressures included for assessment. The justifications for the pressures chosen for inclusion in this assessment can be seen in Annex 2.

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

Activity	Pressures
Seine nets and other: Beach seine	Abrasion/disturbance of the substrate on the surface of the seabed Changes in suspended solids (Water clarity) Penetration and/or disturbance of the substratum below the surface of the seabed including abrasion Removal of non-target species Smothering and siltation rate changes (Light)

The relevant targets for favourable condition were identified within Natural England's conservation advice supplementary advice tables (Natural England, 2021). Table 33 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
Intertidal coarse sediment	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal coarse sediment communities
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal coarse sediment
	Structure and function; presence and abundance of key structural and influence 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
Intertidal mixed sediment	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal mixed sediment communities
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal mixed sediment
	Structure and function;	(Maintain OR Recover OR Restore) the

	presence and abundance of key structural and influence species	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
Intertidal mud	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal mud communities
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal mud
	Structure and function; presence and abundance of key structural and influence 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
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 estuarine rocky habitat (subject to natural variation in sediment veneer)
	Structure and function; presence and abundance of key structural and influence 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

- Enforcement of current byelaws
- Monitoring and review of current byelaws
- Monitoring of activities in the estuary
- The Netting Permit Byelaw can gauge where any future changes or developments may occur.
- Changes can be made to the permit conditions, via consultation, if the D&S IFCA deems it to be necessary. This could include limitations or spatial/temporal restrictions. The permitting system allows for adaptive management.

8. Referenced supporting information to inform assessment

Abrasion, removal of target and non-target species

The effects of fishing on a benthic community will depend on the type of gear used, the nature of the substratum and the sensitivity of individual species concerned (Lamberth *et al.*, 1995). Beach seine nets may interact with the features considered when the net is drawn ashore. Possible direct effects of a net being dragged over the seafloor include damage to sedentary organisms or entrapment and removal of non-target species. Indirect effects include alteration of substratum, and sediment resuspension which could result in smothering (Caddy, 1973; de Groot, 1979).

Lamberth *et al.,* (1995) looked at the impact of beach seine netting on the benthic flora and fauna of False Bay. They found no difference in the abundance or species composition between sites inside and outside the seine area. Macrophyte and invertebrate bycatches were infrequent as fishers try to avoid such catches due to the resulting reduced capture efficiency of target species. They therefore concluded that beach seine netting does not have a detrimental effect on the benthic flora and invertebrate fauna in False Bay.

Beach seine fishermen generally avoid netting in areas where there is rocky habitat and large quantities of suspended macrophyte as this can cause bottom snags and slow down the speed of the haul. Snagging can result in seine rolling reducing capture efficiency (Pierce *et al.*, 1990). It is therefore unlikely that this activity will affect the estuarine rocky features of the site.

Beach seine nets are usually worked slightly clear of the seabed or with very light contact, therefore any impacts of abrasion are thought to be minimal (Seafish, 2022). Due to the small quantities of substrate that would be disturbed, it is therefore not expected that the features will be affected (other than insignificantly).

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)**
Crab tiling	Activity is occurring with 245 counted on the Axe estuary in 2020. This figure may increase once the west side of the estuary is surveyed. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	Abrasion/disturbance of the substrate on the surface of the seabed Habitat structure changes – removal of substratum (extraction) Removal of target species Removal of non-target species Penetration and/or disturbance of the substratum below the surface of the seabed,
Bait digging	Activity is occurring, but only at low levels and in limited locations. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	
Hand working (access from land/access from vessel)	Activity is occurring, but only at low levels. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	
Static – pots/traps: Pots/creels, cuttlepots, fish traps	As there is little to no level of this activity in the Axe Estuary MCZ, no in-combination effect thought to be possible. Additionally, as the	

	activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	including abrasion Smothering and siltation rate changes (Light) Genetic modification & translocation of indigenous species Introduction of microbial pathogens Introduction or spread of invasive non-indigenous species (NIS)
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 in accordance with paragraph 3.2 of the Netting Permit Conditions. 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.	
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 in accordance with paragraph 3.2 of the Netting Permit Conditions. 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.	
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 in accordance with paragraph 3.2 of the Netting Permit Conditions. 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. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	
Aquaculture	There is no evidence that this activity is currently occurring. It is thought there is no in-combination effect.	

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within Table 4.

10. NE consultation response

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

11. Conclusion

The activities assessed are not believed to be occurring within the MCZ. Therefore, D&S IFCA concludes that there is no significant risk of the activities hindering the achievement of the conservation objectives for Axe Estuary MCZ.

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**
Intertidal coarse sediment	Maintain the presence and spatial distribution of intertidal coarse sediment communities Maintain the total extent and spatial distribution of intertidal coarse sediment [Maintain OR Recover OR Restore] the abundance of listed species to enable each of them to be a viable component of the habitat Maintain the species	Commercial fishing; Seine nets and other: Beach seine	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Smothering and siltation rate changes (Light) See Annex 2 for pressures audit trail	The effects of fishing on a benthic community will depend on the type of gear used, the nature of the substratum and the sensitivity of individual species concerned (Lamberth *et al.*, 1995). Beach seine nets may interact with the features considered when the net is drawn ashore. Possible direct effects of a net being dragged over the seafloor include damage to sedentary organisms or	Activities not believed to be occurring D&S IFCA concludes that there is no significant risk of the activities hindering the achievement of the conservation objectives.	Yes, Management measures could include: • Enforcement of current byelaws • Monitoring and review of current byelaws • Monitoring of fishing activity in the Estuary • Changes can be made to the permit conditions, via consultation, if the D&S IFCA deems it to be necessary. This could include limitations or spatial/temporal restrictions. The permitting system allows for adaptive management.

	composition of component communities			entrapment, and removal of non-target species. Indirect effects include alteration of substratum, and sediment resuspension which could result in smothering (Caddy, 1973; de Groot, 1979). Lamberth *et al.,* (1995) looked at the impact of beach seine netting on the benthic flora and fauna of False Bay. They found no difference in the abundance or species composition between sites inside and outside the seine area. Macrophyte and invertebrate bycatches were infrequent as fishers try to avoid such catches due to reduced capture efficiency		

Intertidal mixed sediment	Maintain the presence and spatial distribution of intertidal mixed sediment communities Maintain the total extent and spatial distribution of intertidal mixed sediment [Maintain OR Recover OR Restore] the abundance of listed species to enable each of them to be a viable component of the habitat Maintain the species composition of component communities	Commercial fishing; Seine nets and other: Beach seine	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Smothering and siltation rate changes (Light) See Annex 2 for pressures audit trail	See above	See above	See above

Intertidal mud	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 Maintain the species composition of component communities	Commercial fishing: Seine nets and other: Beach seine	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Smothering and siltation rate changes (Light) See Annex 2 for pressures audit trail	See above	See above	See above
Estuarine rocky habitats	Maintain the presence and spatial distribution of estuarine rocky habitat communities.	Commercial fishing: Seine nets and other: Beach seine	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Penetration and/or disturbance of the substratum below the surface	See above	See above	See above

	Maintain the total extent and spatial distribution of estuarine rocky habitat(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 Maintain the species composition of component communities		of the seabed, including abrasion • Removal of non-target species • Smothering and siltation rate changes (Light) See Annex 2 for pressures audit trail			

13. References

Caddy, J. F. 1973. Underwater Observations on Tracks of Dredges and Trawls and Some Effects of Dredging on a Scallop Ground. Journal of the Fisheries Research Board of Canada, 30: 173–180. NRC Research Press.

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de Groot, S. J. 1979. An assessment of the potential environmental impact of large-scale sand-dredging for the building of artificial islands in the North Sea. Ocean Management, 5: 211–232.

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Pierce, C., Rasmussen, J., and Leggett, W. 1990. Sampling Littoral Fish with a Seine: Corrections for Variable Capture Efficiency. Canadian Journal of Fisheries and Aquatic Sciences - CAN J FISHERIES AQUAT SCI, 47: 1004–1010.

Seafish. 2022. Beach Seine. https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/beach-seine/ (Accessed 18 August 2020, updated 07 March 2022).

Annex 1: Site Map(s)

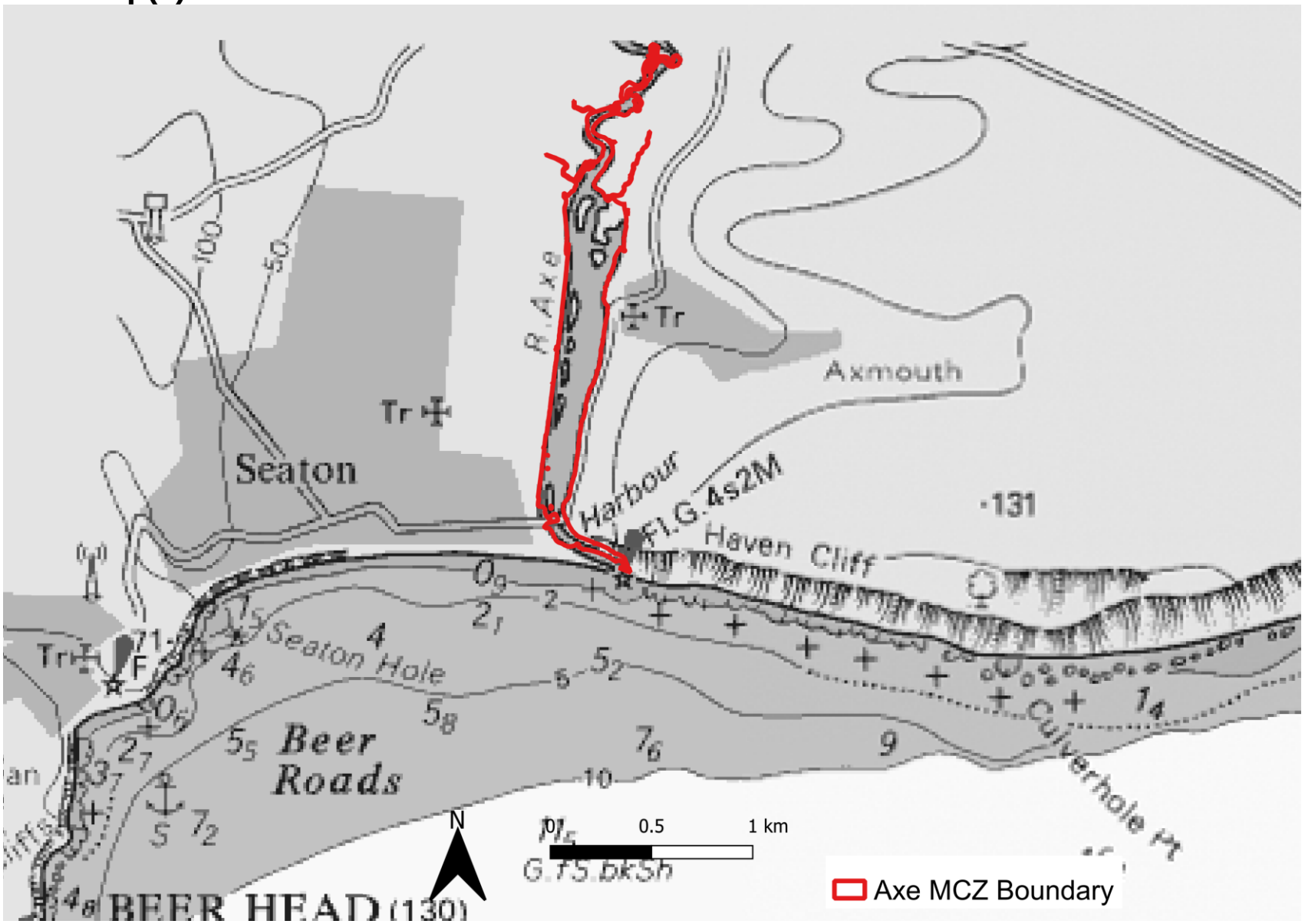

Figure 1 – Axe Estuary MCZ

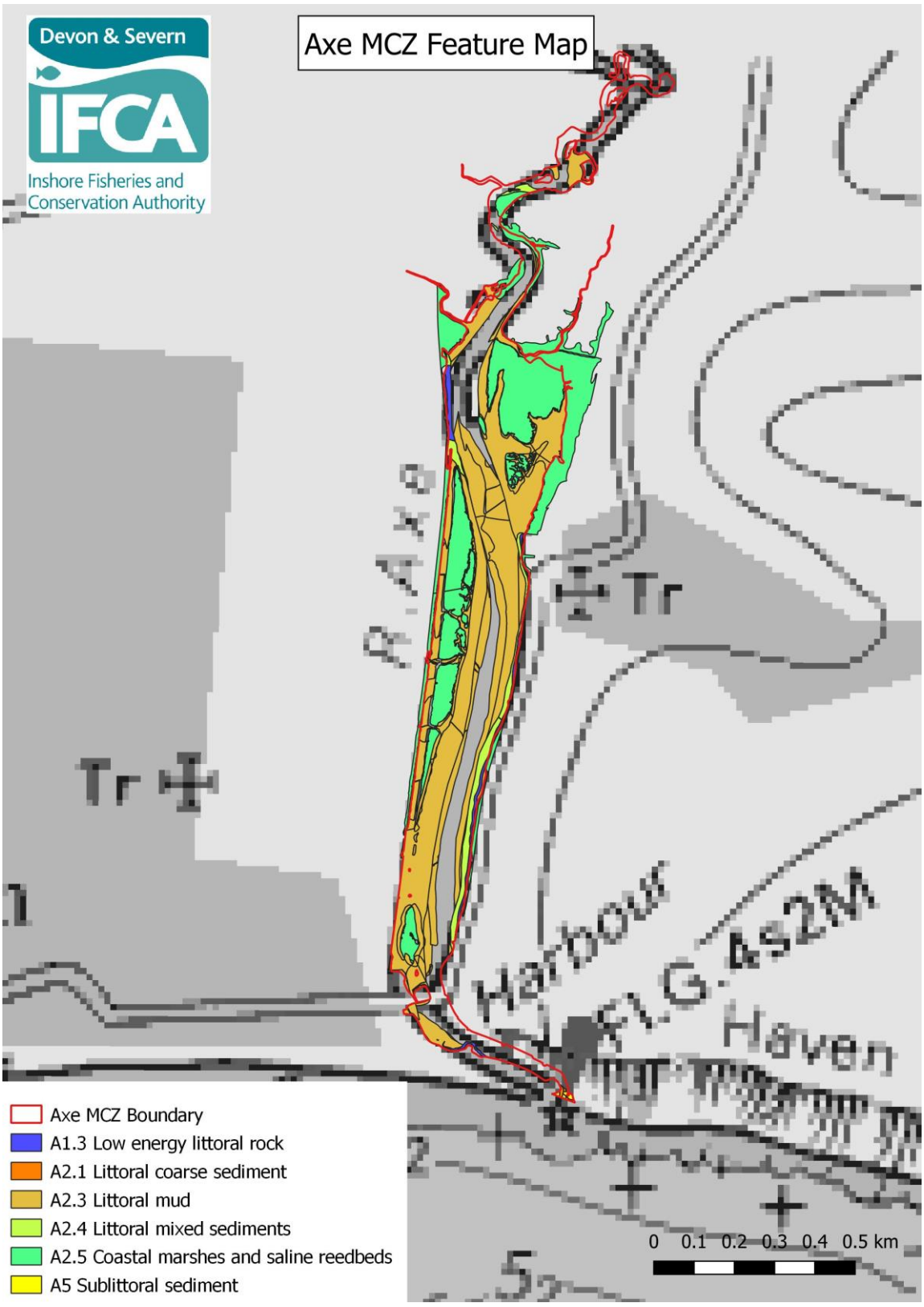

Figure 2: Extent of features (estuarine rocky habitats, intertidal coarse and mixed sediment, intertidal mud, and coastal saltmarshes and saline reedbeds) designated in the Axe Estuary MCZ

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: Seine nets	Intertidal coarse sediment	Intertidal mixed sediment	Intertidal mud	Estuarine rocky habitats	Screening Justification
Abrasion/disturbance of the substrate on the surface of the seabed	NS	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Changes in suspended solids (water clarity)	NS	S	S	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	NS	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species		S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Smothering and siltation rate changes (Light)	NS	S	S	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Deoxygenation	NS	S	NS	NS	OUT – Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination	NA	NA	NA	NA	OUT – Not applicable
Introduction of light		IE	NS	S	OUT – Insufficient activity levels to pose risk at level of concern
Introduction or spread of invasive non-indigenous species (INIS)		S	S	S	OUT – Insufficient activity levels to pose risk at level of concern
Litter	NA	NA	NA	NA	OUT – Insufficient activity levels to pose risk at level of concern
Nutrient enrichment	NS	NS	NS	IE	OUT - Not applicable
Organic enrichment	NS	NS	NS	S	OUT – Insufficient activity levels to pose risk at level of concern
Physical change (to another seabed type)				S	OUT – Insufficient activity levels to pose risk at level of concern
Physical change (to another sediment type)	S	S	S		OUT – Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	NA	NA	NA	OUT – Not applicable
Transition elements & organo-metal (e.g. TBT) contamination	NA	NA	NA	NA	OUT – Not applicable
Underwater noise changes				IE	OUT - Not applicable