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
Aquaculture: Shellfish aquaculture: bottom culture, trestle culture

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
AXE-MCZ-006

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	Finalised by 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
Coastal saltmarshes and saline reed beds	Maintain in favourable condition
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

- Aquaculture: shellfish: bottom and trestle culture

See Curtin (2022) 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?

No,
Evidence:

This activity is not thought to be occurring in the Axe Estuary MCZ so there is no risk that such activities are hindering the conservation objectives of the MCZ. See Curtin (2022) for a review of the fishing activities that are occurring at the site. However, for completeness, 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, 2022). Table 2 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 to this assessment.

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

Activity	Pressures
Aquaculture; Shellfish bottom and trestle culture	Abrasion/disturbance of the substrate on the surface of the seabed
	Changes in suspended solids (water clarity)
	Genetic modification & translocation of indigenous species
	Introduction of microbial pathogens
	Introduction or spread of invasive non-indigenous species (INIS)
	Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
	Removal of non-target species
	Removal of 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, 2022). 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
Intertidal coarse sediment; Intertidal mixed sediment; Intertidal mud;	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 of feature and spatial distribution
	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

Within estuaries, land may be privately owned by individual estate owners and leased to shellfishers for the cultivation of shellfish.

- Monitoring of activities in the estuary.
- Review D&S IFCA's Mariculture Strategy to ensure development of aquaculture is sustainable in line with D&S IFCA's obligations under Section 153 (2) of the Marine and Coastal Access Act (2009).
- The review of D&S IFCA byelaws can gauge where any future changes or developments may occur.

8. Referenced supporting information to inform assessment

Currently, blue mussels and Pacific oysters are the only mariculture species being actively farmed and harvested within the D&S IFCA's District, although scallop ranching is being developed within Torbay. These activities are not undertaken in the Axe Estuary MCZ (D&S IFCA, 2021; Curtin, 2022). Literature on the environmental impacts of aquaculture is dominated by changes to sediment and associated infaunal assemblages beneath cultivation areas (Forrest *et al.*, 2009). A review of impacts is also provided in D&S IFCA's Mariculture Strategy (D&S IFCA, 2021). This evidence is less relevant to the Axe Estuary given the absence of aquaculture activities.

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. However as the activities assessed (section 5) are not occurring within the MCZ, 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) Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion Removal of non-target species Removal of target species 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
Bait digging	Activity is occurring, but only at low levels and limited locations. Additionally, as the activities assessed (section 5) are not occurring within the MCZ, it is thought there is no in-combination effect.	
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. 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. 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. 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.	
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 within the MCZ, it is thought there is no in-combination effect.	
Beach seine netting	There is no evidence that this activity is currently occurring. 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.	

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

10. NE consultation response

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

11. Conclusion

The literature review conducted as part of D&S IFCA's Mariculture Strategy, referenced in section 8, demonstrates a range of positive and negative impacts of aquaculture on sediment characteristics, biodiversity and habitats more broadly. However, shellfish harvesting is not occurring within the Axe Estuary and the waters are not classified for shellfish harvesting. In addition, the estuary is privately owned and therefore any future shellfish farming is unlikely to be approved. D&S IFCA will continue to monitor activities on the estuary and ensure any future development of aquaculture is sustainable in line with D&S IFCA's Mariculture Strategy and obligations under Section 153 (2) of the Marine and Coastal Access Act (2009). As the activities assessed are not believed to be occurring within the MCZ, 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, 2022)	**Activity**	**Potential pressures from activity and sensitivity of habitats to pressures.** (Natural England, 2022)	**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; Aquaculture; Shellfish bottom culture / shellfish trestle culture	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Genetic modification & translocation of indigenous species • Introduction of microbial pathogens • Introduction or spread of invasive species non-indigenous species (INIS) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Removal of target species • Smothering and siltation rate changes (Light) See Annex 2 for pressures audit trail	No exposure Shellfish farming is not currently occurring within the Axe estuary and no CEFAS classification maps.	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: • Monitoring of activities in the estuary. • Review the mariculture strategy to ensure development of aquaculture is sustainable in line with D&S IFCA's obligations under Section 153 (2) of the Marine and Coastal Access Act (2009). • The review of D&S IFCA byelaws can gauge where any future changes or developments may occur.

	composition of component communities					
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	Commercial fishing; Aquaculture; Shellfish bottom culture / shellfish trestle culture	• Abrasion/disturbance of the substrate on the surface of the seabed •Changes in suspended solids (water clarity) •Genetic modification & translocation of indigenous species •Introduction of microbial pathogens •Introduction or spread of invasive species non-indigenous species (INIS) •Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion •Removal of non-target species •Removal of target species •Smothering and siltation rate changes (Light See Annex 2 for pressures audit trail	See above	See above	See above

	species composition of component communities					
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; Aquaculture; Shellfish bottom culture / shellfish trestle culture	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Genetic modification & translocation of indigenous species • Introduction of microbial pathogens • Introduction or spread of invasive species non-indigenous species (INIS) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Removal of 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 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. Maintain the species composition of component communities.	Commercial fishing; Aquaculture; Shellfish bottom culture / shellfish trestle culture	• Abrasion/disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Genetic modification & translocation of indigenous species • Introduction of microbial pathogens • Introduction or spread of invasive species non-indigenous species (INIS) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Removal of non-target species • Removal of target species • Smothering and siltation rate changes (Light). See Annex 2 for pressures audit trail	See above	See above	See above

13. References

Curtin, S. 2022. Fishing Activity Report – Axe Estuary MCZ. Devon and Severn Inshore Fisheries and Conservation Authority, Brixham, Devon.

D&S IFCA. 2021. Mariculture Strategy v2.0. Devon and Severn Inshore Fisheries and Conservation Authority, Brixham, Devon. https://www.devonandsevernifca.gov.uk/content/download/7026/50190/version/1/file/D%26S+IFCA+Mariculture+Strategy+2021+v2.pdf.

Forrest, B. M., Keeley, N. B., Hopkins, G. A., Webb, S. C., and Clement, D. M. 2009. Bivalve aquaculture in estuaries: Review and synthesis of oyster cultivation effects. Aquaculture, 298: 1–15.

Natural England. 2022. Conservation Advice for Axe Estuary Marine Conservation Zone (MCZ). https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0052&SiteName=axe&SiteNameDisplay=Axe%20Estuary%20MCZ&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=&HasCA=1 (Accessed 5 July 2022).

Annex 1: Site Map(s)

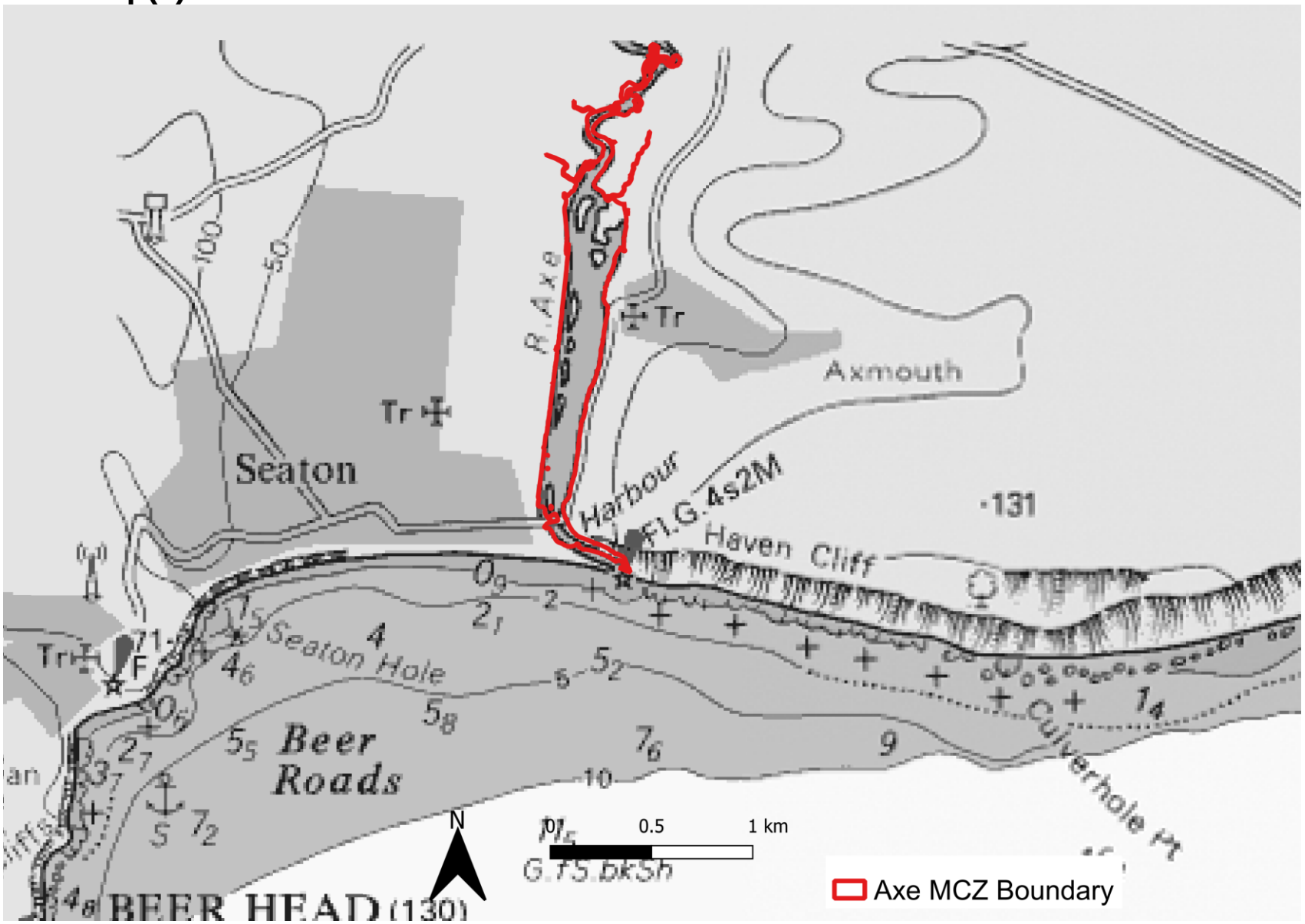

Figure 1 – Axe Estuary MCZ

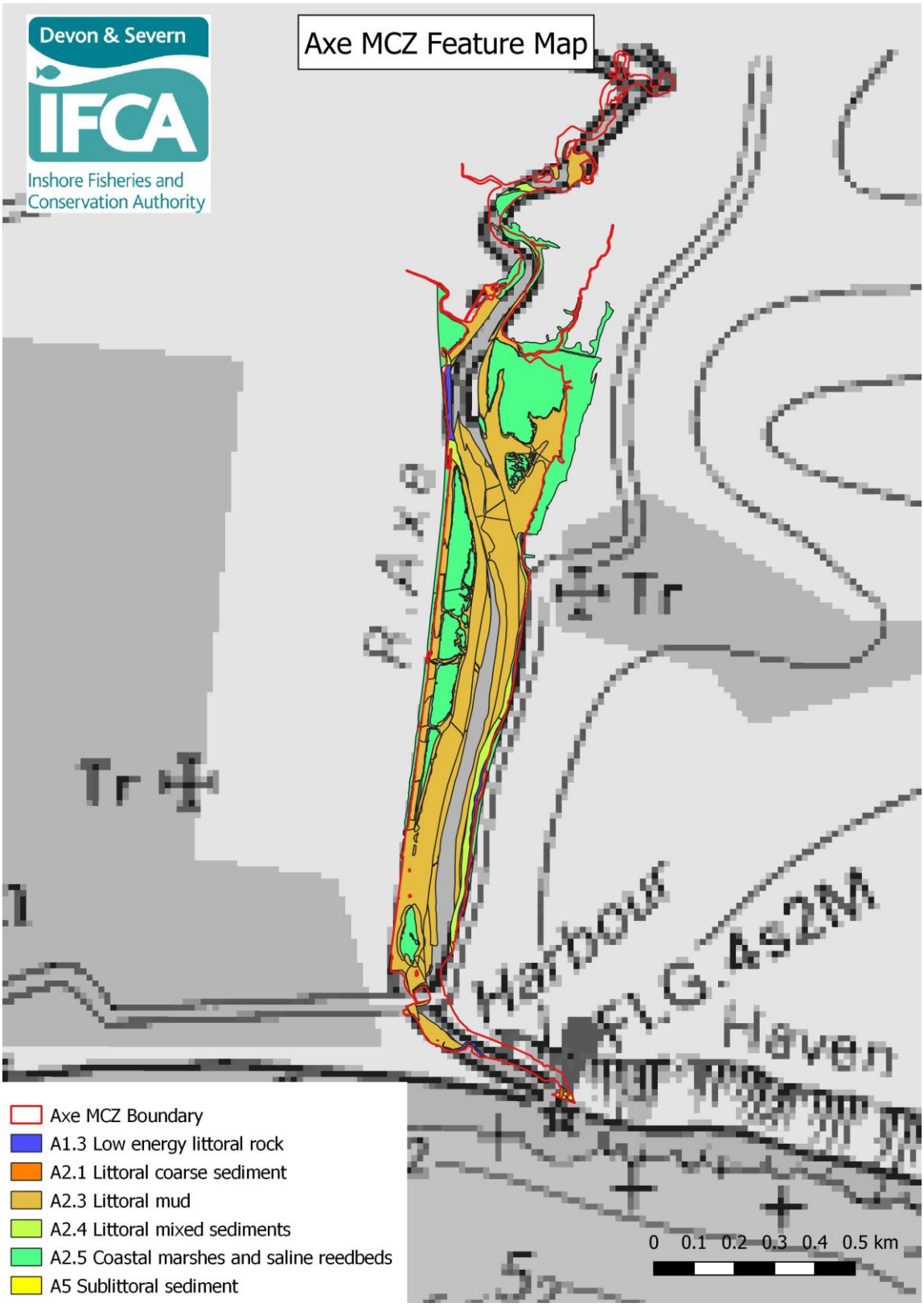

Figure 2: Extent of features (estuarine rocky habitats, intertidal coarse and mixed sediment, intertidal mud, and coastal saltmarshes and saline reedbeds) designated in the Axe Estuary MCZ

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: Aquaculture	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	OUT – Insufficient activity levels to pose risk at level of concern
Changes in suspended solids (water clarity)	NS	S	S	S	OUT – Insufficient activity levels to pose risk at level of concern
Genetic modification & translocation of indigenous species		IE		IE	OUT – Insufficient activity levels to pose risk at level of concern
Introduction of microbial pathogens		S	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
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	NS	S	S	S	OUT – Insufficient activity levels to pose risk at level of concern
Removal of non-target species		S	S	S	OUT – Insufficient activity levels to pose risk at level of concern
Removal of target species				S	OUT – Insufficient activity levels to pose risk at level of concern
Smothering and siltation rate changes (Light)	NS	S	S	S	OUT – Insufficient activity levels to pose risk at level of concern
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 – Not applicable
Litter	NA	NA	NA	NA	OUT – Not applicable
Nutrient enrichment	NS	NS	NS	IE	OUT – Insufficient activity levels to pose risk at level of concern
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