Marine Conservation Zone Assessment

Site name: Erme Estuary MCZ
UKMCZ0059

Protected feature(s):
High energy intertidal rock
Low energy intertidal rock
Moderate energy intertidal rock
Estuarine rocky habitats

Fishing activities assessed at this site:
<u>Stage 1 Assessment</u>
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
ERM-MCZ-001

Contents

Version control history			
Author	**Date**	**Comment**	**Version**
Sarah Curtin	October 2021	Draft assessment	0.1
	February 2022	Updated using other estuarine MCZ advice packages with similar habitat	0.2
	April 2022	Minor amendments by SC	0.3
	November 2022/ January 2023	Finalised by J. Stewart and reviewed by Sarah Clark	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 Erme Estuary MCZ is an inshore site of approximately 1km^2 in size. The Erme is located in South Devon and opens into the Western Channel and Celtic Sea region. The MCZ designation covers the whole estuary from the mouth of the river to the limits of the tidal influence near the village of Ermington. The MCZ falls within the Erme Estuary Site of Special Scientific Interest as well as overlapping with the Prawle Point to Plymouth Sound and Eddystone Site of Community Importance at the mouth of the river.

The wide variety of habitats found within the Erme Estuary support a large number of important species including several that are rare, such as the tentacled lagoon worm, *Alkmaria romijni*. This tiny bristleworm grows up to 5mm in length and creates and lives in tubes within the mud habitats of the estuary. These worms have tentacles around their mouths used for gathering food from the surrounding muddy sediments. The tentacled lagoon worm is particularly vulnerable to activities that cause changes in its habitat.

Estuaries create important areas for wading and migratory birds to feed and rest and form nurseries for juvenile species of fish. The large areas of mudflats and muddy gravel produce films of algae which become exposed at low tide, making them important foraging grounds for several species. The estuarine rocky habitats provide a hard surface for algae and animals to attach in an area dominated by sand and mud with variable salinity. At low tide these areas become foraging grounds for birds and crustaceans and at high tide they create shelter for juvenile species of fish.

At the mouth of the river exposed rocks provide a hard surface for mussels, limpets and barnacles to attach to in areas dominated by sediment and muddy gravel (Defra, 2019).

Further information regarding the MCZ and its protected features can be found in the Erme 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**
High energy intertidal rock	Maintain in favourable condition
Low energy intertidal rock	Maintain in favourable condition
Moderate energy intertidal rock	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

Intertidal handwork: Handworking (access from vessel), Handworking (access from land)
There may be some minor hand gathering for cockles, but this activity appears to be occurring at a very low level (one respondent replied out of a possible 148, to a request for information advising they carry out this activity, on average twice a month).

Miscellaneous: Crab tiling
Surveys were not undertaken on the River Erme in 2020 due to no tiles being present in previous years. There is no evidence that this activity is taking place within the Erme Estuary MCZ. However, there is no evidence that it is not occurring at a low, undetected level and therefore cannot be completely ruled out.

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 (or other forms of handworking) on the Erme Estuary.

D&S IFCA circulated a request for information on bait digging to the local community and the landowner of the Erme Estuary to gather evidence and better understand fishing activity within the site. The landowner of the Erme Foreshore and Estuary advised that low levels of bait digging (1-2 bait diggers three to four times a year) does occur on the western side of the estuary at low tide on the exposed sand flats in front of the coastguard cottages. In addition, one respondent (out of 148) from the request for information advised they dig for bait on average twice a month.

See Curtin (2022) for more information regarding fishing activities occurring in the Erme 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
Shore based activities: Handworking, crab tiling, bait collection	Abrasion/disturbance of the substrate on the surface of the seabed
	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
	Removal of target species
	Removal of non-target species

It should be noted that no conservation advice package is currently available (November 2022) for the Erme Estuary MCZ. Therefore, relevant advice on operations and supplementary advice tables for other sites with similar features were used (Table 3**Error! Reference source not found.**), alongside considering site specific information.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Conservation advice package used
High energy intertidal rock	No alternative CA package found, moderate energy intertidal rock used as proxy
Low energy intertidal rock	Dart Estuary MCZ
Estuarine rocky habitats	
Moderate energy intertidal rock	Devon Avon Estuary MCZ

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 future 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

Bait digging has been found to have a range of impacts on both the habitat it occurs on, and the communities within it:

Impacts on rocky habitats
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, 2008). The pre-adaptation of macroalgae and sessile organisms to wave action does not necessarily provide protection or tolerance against 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 and Arnold, 2008) 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, 2008).

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

Impacts on target species
Both blow lugworm (*Arenicola marina*) and king ragworm (*Alitta virens*) are targeted by bait diggers throughout the D&S IFCA's District.

Contrasting evidence exists as to the *direct* environmental effects of bait digging for lugworm. Relative to other exploited intertidal invertebrates, blow lugworms are relatively resilient to exploitation and disturbance because of their relative fecundity and widespread distribution (Fowler, 1999). In addition, *A. marina* exhibit a marked annual cycle in the numbers and condition of individuals, so that any changes in population structure correlated to bait digging, would have to control for these factors (Olive, 1993). Removal rates of 50-70% of worms in the area dug have been reported in the literature (Blake, 1979; Heiligenberg, 1987) but D&S IFCA's observations suggest this may be much lower in some areas, especially where large populations of lugworm exist and holes are relatively well spread out. A D&S IFCA bait density survey of lugworms at Burnham-on-Sea, Berrow, Brean, Weston-Super-Mare and Sand Bay found remarkably similar spatial patterns of abundance and densities to those reported in the 1970's, suggesting no long-term decline in lugworm populations (Ross, 2013).

A wide range of responses by *A. marina* to exploitation or experimental simulations of exploitation have been found, relating to local environmental conditions and the intensity and distribution of bait digging activity. Olive (1993) describes the scenario which led to removal of essentially all lugworms from a large area of a National Nature Reserve in Northumberland in 1984, with densities falling from >40m^{-2} to <1m^{-2}. When the site was closed to bait digging it repopulated within a matter of months, thanks to the presence of extensive non-exploited populations nearby. Similarly, lugworm populations in the Dutch Wadden Sea appear to be unaffected by large scale commercial exploitation, with an estimated 2 x 10^7 individuals taken annually. However, Cryer *et al.* (1987) found no recovery in worm densities after 6 months following experimental removal, although natural densities at the test site in South Wales were low (9-16 m^{-2}) and the survey ran through the less productive winter months. The capacity of a population to withstand bait digging activities therefore relies on a number of factors including the size of the exploited area relative to the total lugworm bed, the presence of other lugworm beds nearby, the presence of nursery areas, the relative exploitation of adult and juvenile lugworms, and the intensity and seasonality of bait digging. However, on the whole they are thought to be resilient to bait digging.

King ragworm, *A. virens,* is a keystone intertidal species as prey for fish, birds and crustaceans, is a predator of other invertebrates and has an important role in bioturbation of the sediment (Watson *et al.*, 2017). *A. virens* are generally found in more sheltered sediment areas but they can also be found in more mixed sediments. Differing reports exist of the life-history and population characteristics of *A. virens.* Whilst early studies of North American populations suggested a mean age at breeding of >3 years with the population dominated by 0-group individuals, a population from the Menai Straight, Wales was thought to mature later, and to have very few 0-group individual present. The latter population was therefore seen as being vulnerable to exploitation. On the North East coast of England, a study found similar densities (~15m^2 during the summer, ~3m^2 during the winter) of *A. virens* in both exploited and unexploited populations Blake (1979), suggesting that at least some populations are unaffected by bait digging. In other cases the change in macrofaunal community has been thought to benefit *A. virens*, due to its opportunistic nature (Evans *et al.*, 2015).

Impacts on non-target species

Bait digging can have adverse effects on a wide variety of species as a result of physical damage, burial, smothering and/or exposure to desiccation or predation to non-target invertebrates. Recovery of small short-lived invertebrates will usually occur within a year, but populations of larger, long-lived invertebrates may take much longer (Fowler, 1999). In some extreme cases local diversity may be reduced, which may be especially true in physically fragile environments such as eelgrass or mussel beds (Fowler, 1999). Similarly, Beukema (1995) found that within a 1km^2 area of the Dutch Wadden Sea, the local lugworm stock declined by more than 50% over a four-year mechanical digging period. As a result of this decline, total zoobenthic biomass also declined, with short lived species showing a marked reduction during the digging period. Recovery of the benthos took several years, especially by the slower establishing species. However, if disturbance by digging is short term, benthic communities can recover within six months (Beukema, 1995). Mosbahi *et al.* (2015) also explored the impacts of bait digging on the macrofauna of intertidal mudflats. The fauna of their study area (the tidal mudflats of Kneiss Islands, Tunisia) was mainly composed of polychaetes, the more abundant families being the Nereididae, Arenicolidae (fishing target species) and the Cirratulidae. They found the number of taxa and abundance of individuals were affected by bait digging; the abundance estimates at the control stations were significantly higher than those estimated at the three stations before and after bait collection, with some polychaete species disappearing after one month of bait digging. This indicates that the intertidal macrozoobenthic biodiversity at the impacted stations is affected by the bait digging activity, or possibly by trampling.

Jackson and James (1979) investigated the effects of bait digging on cockle populations. They found that increased digging in an area caused higher cockle mortality, particular on smaller individuals. The cause of mortality was due to burial/smothering as individuals that were buried at a depth of 10cm rarely survived.

Rossi *et al.* (2007) investigated the effects of trampling on mudflats, such as that associated with recreational activities like bait digging. They found that trampling did not influence mobile species such as *Hydrobia ulvae* and *Hediste diversicolor,* but clearly modified the abundance and population dynamics of bivalves such as the clam *Macoma balthica* and the cockle *Cerastoderma edule.* There was a negative impact on adults of both species, which was attributed to footsteps directly killing or burying the animals, leading to asphyxia. Abundance of small-sized/juvenile *C. edule* showed no response to trampling. It is likely that the population-level abundance of small animals could recover more quickly because trampling occurred during the reproductive season (April to October), which meant that there was likely a continuous supply of larvae and juveniles in the water column to replace those displaced by the trampling. In contrast, trampling seemed to indirectly enhance the recruitment rate of *M. balthica*. In an environment with little trampling, adult cockles can easily outcompete larvae and spats of other bivalves; disturbance of sediment whilst feeding or moving and high filtration of planktonic larvae can reduce the settling and recruitment of other bivalves. The direct impacts of trampling (e.g. a reduction in adult cockle abundance), can therefore indirectly increase the recruitment opportunities for other bivalve species such as *M. balthica*, which take advantage of the reduced competition from *C. edule* adults. Over the long term, this could ultimately cause a shift towards a dominance of *M. balthica* in the macrofaunal assemblage, at the cost of *C. edule*, thereby potentially affecting ecosystem functioning. Therefore, despite potentially fast recovery times, Rossi *et al.* (2007) concluded that human trampling is a relevant source of disturbance for the conservation and management of mudflats.

Wynberg & Branch (1997) assessed the impacts of trampling associated with the use of suction pumps for the collection of prawns as bait, by comparing areas that had been sucked over with a prawn pump, to areas that had been trampled only. Prawn densities were depressed six weeks following both sucking and trampling but recovered by 32 weeks. Macrofaunal numbers declined in most treatment areas and macrofaunal community composition in the most-disturbed areas was distinct from that in other areas. They determined that the trampling itself has almost the same effect as sucking for prawns, on both the prawns and on the associated biota.

It is important to note that the effects on macrofaunal communities can differ substantially between estuaries. For example, the mud content of an estuary can affect the resilience of the communities to bait digging. Although Dernie *et al.* (2003) found that it was not possible to predict the recovery rates of assemblages based on percentage of silt and clay in the sediment, there was a good relationship between recovery rate and infilling rate, which is linked to the physical characteristics of the sediment. Clean sand habitats were the quickest to recover both in terms of physical and biological characteristics. Other studies have also found extended recovery times for estuaries with high mud content (Carvalho *et al.*, 2013). Infilling rates are also thought to be directly affected by digger behaviour, with infilling rates being improved by diggers backfilling holes after digging.

The site-specific nature of the impacts of bait digging was also demonstrated by Watson *et al.* (2017). They found that responses were both site and disturbance type specific. Their data also showed that responses were not consistent between species (e.g. *Corophium volutator* and *Peringia ulvae*) or even between those within the same trophic group. They, therefore, concluded that bait collection alters the macrofaunal community and the associated sediment characteristics across large spatial scales, but with the caveat that the strength (and type) of the response is site specific.

9. In-combination assessment

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

<table>
<tr><th colspan="3">Plans and Projects</th></tr>
<tr><th>Activity</th><th>Description</th><th>Potential Pressure(s)</th></tr>
<tr><td>No other plans or projects known to be occurring within Erme Estuary MCZ</td><td>The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.</td><td>N/A</td></tr>
<tr><th colspan="3">Other activities being considered</th></tr>
<tr><th>Activity</th><th>Description</th><th>Potential Pressure(s)</th></tr>
<tr><td>Static – pots/traps: Pots/creels, cuttlepots, fish traps</td><td>Potting for lobster and crab does occur but at low levels and at the seaward limit of the MCZ. In addition, these activities will not be occurring in the intertidal, therefore no in-combination effect is thought to be possible.</td><td rowspan="5">Abrasion/disturbance of the substrate on the surface of the seabed

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</td></tr>
<tr><td>Static – fixed nets: Gill nets, Trammels, Entangling

Passive – nets: Drift nets (demersal)

Seine nets & other: shrimp push nets, Fyke and stakenets, ring nets</td><td>This activity is currently not permitted to take place within the Erme Estuary MCZ, in accordance with the D&S IFCA Netting Permit Byelaw. In the estuary landward of the coordinates set out in Annex 1, Figure 4, a permit holder or named representative is not authorised to use any net other than a seine net (with additional restrictions specified in the permit conditions). Therefore no in-combination effect is thought to be possible.</td></tr>
<tr><td>Lines: Longlines (demersal)</td><td>As there is little to no level of this activity in the Erme Estuary MCZ, no in-combination effect thought to be possible.</td></tr>
<tr><td>Seine nets & other: Beach seine</td><td>As there is little to no level of this activity in the Erme Estuary MCZ, no in-combination effect thought to be possible.</td></tr>
<tr><td>Aquaculture</td><td>There is no evidence that this activity is occurring in the MCZ. It is thought there is no in-combination effect</td></tr>
</table>

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within **Error! Reference source not found.**.

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 Erme Estuary MCZ, there is very little bait digging and hand gathering occurring. There may be some minor hand gathering for cockles, but this activity appears to be occurring at a very low level (one respondent replied out of a possible 148, to a request for information advising they carry out this activity, on average twice a month). The landowner advised that low levels of bait digging (1-2 bait diggers three to four times a year) does occur on the western side of the estuary at low tide on the exposed sand flats in front of the coastguard cottages. A conclusion that only very low levels of hand working exist is also supported by the evidence provided in Curtin (2022).

Based on the current levels of these activities on the Erme 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. 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.

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 due to time and resource constraints.

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**
High energy intertidal rock	Maintain the presence and spatial distribution of intertidal rock 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 forks	• 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 Erme 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.

Low energy intertidal rock	Maintain the presence and spatial distribution of intertidal rock 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 forks	• 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	See above	See above	See above
Moderate energy intertidal rock	Maintain the presence and spatial distribution of intertidal rock communities Maintain the total extent and spatial distribution of	Commercial fishing; Intertidal handwork: Handworking (access from vessel), Handworking (access from land)	• 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 above	See above	See above

	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	Miscellaneous: Crab tiling Bait collection: digging with forks	See Annex 2 for pressures audit trail			
Estuarine rocky habitats	Maintain the presence and spatial distribution of intertidal rock 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	Commercial fishing; Intertidal handwork: Handworking (access from vessel), Handworking (access from land) Miscellaneous: Crab tiling Bait collection: digging with forks	• 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	See above	See above	See above

	enable each of them to be a viable component of the habitat					

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Annex 1: Site Map(s)

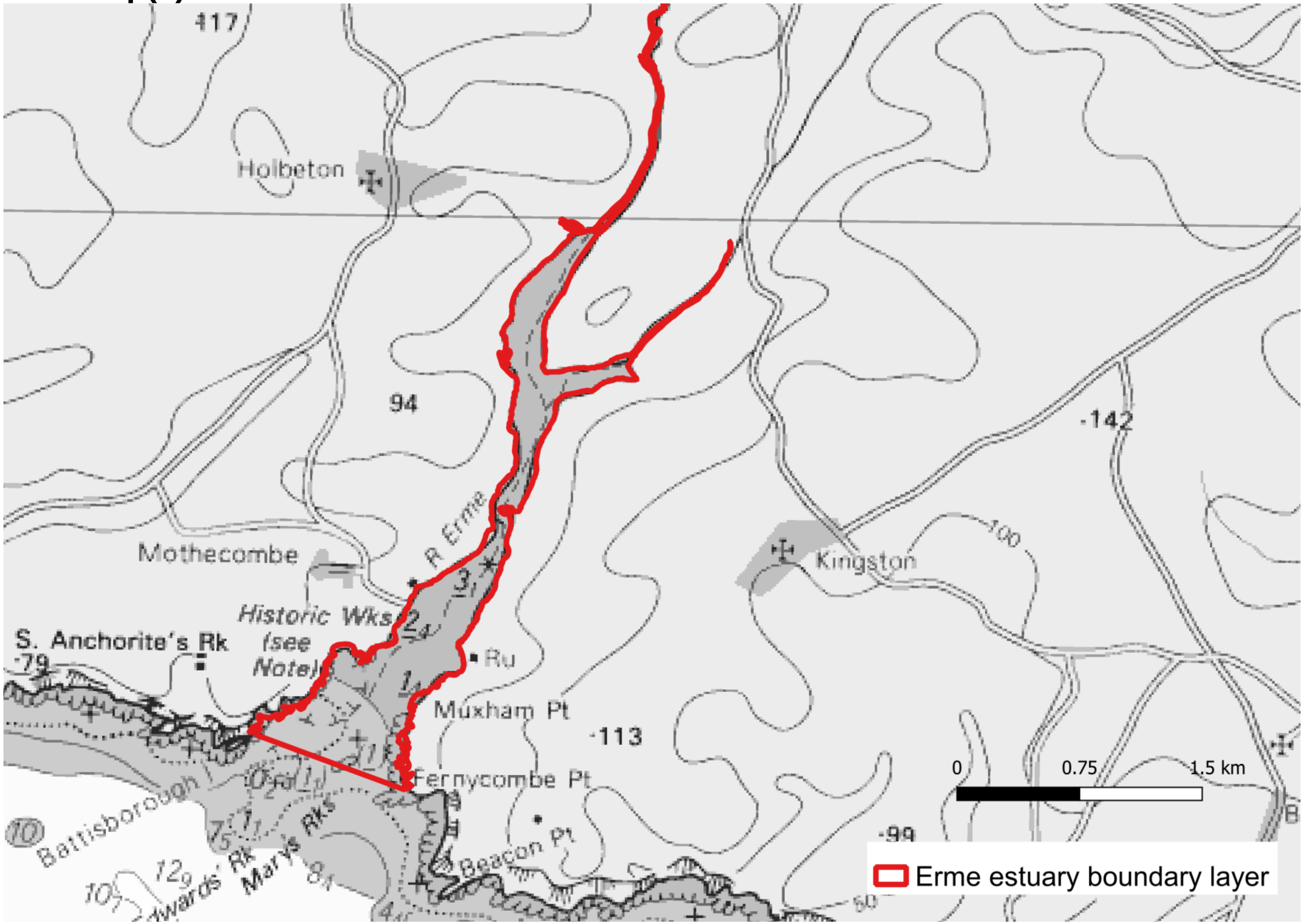


Figure 1 – Erme Estuary MCZ

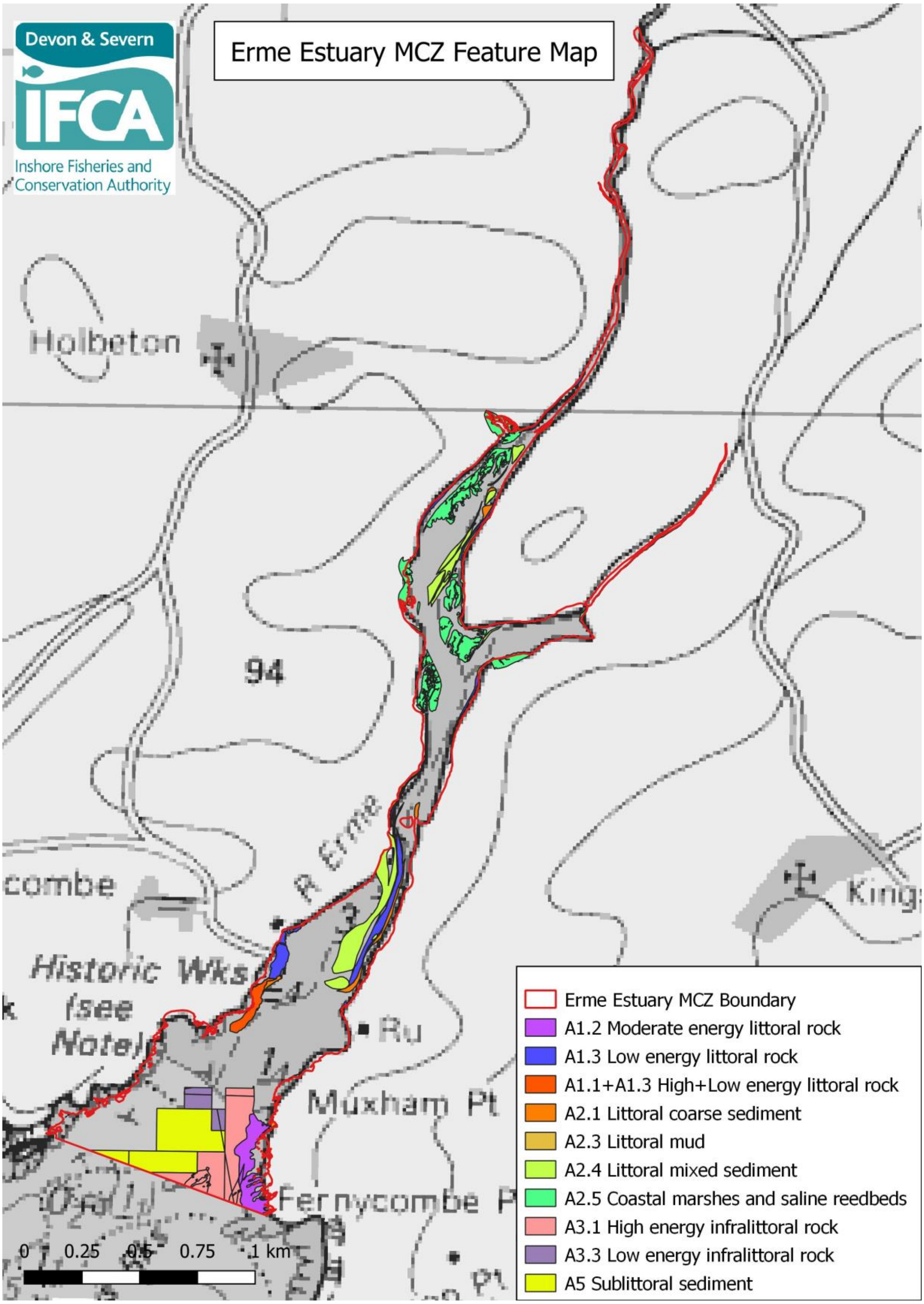
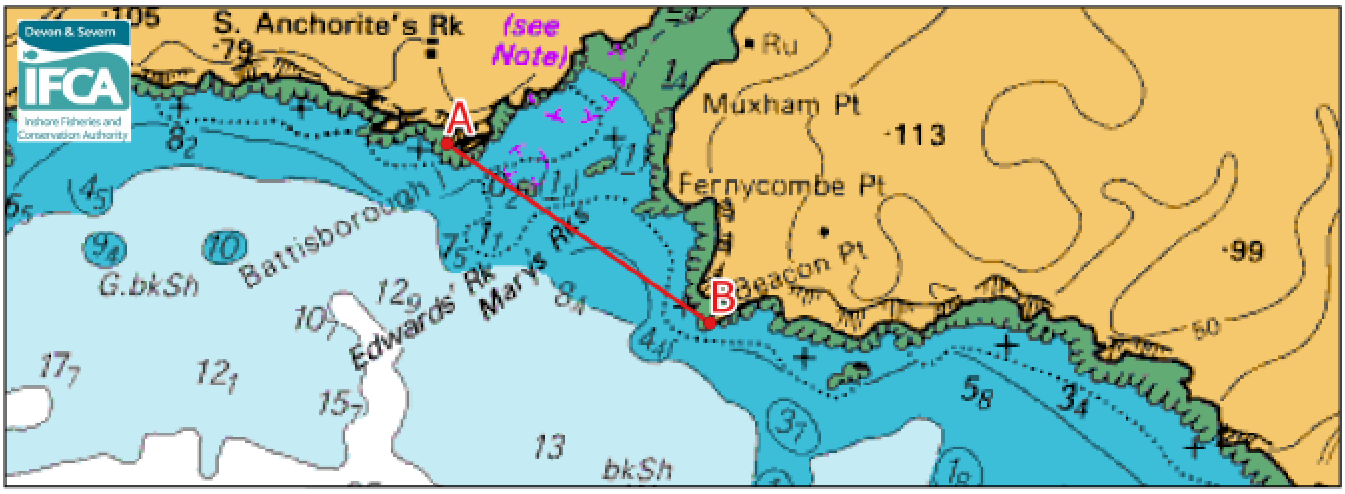


Figure 2: Extent of features designated in the Erme Estuary MCZ

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



Estuary closing line

River Erme closing line latitude and longitude positions:

Point	Latitude	Longitude
A (Battisborough Island)	50° 18.243'N	003° 57.834'W
B (Beacon Point)	50° 17.750'N	003° 56.657'W

Figure 3: River Erme 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	**High energy intertidal rock**	**Moderate energy intertidal rock**	**Low energy intertidal rock**	**Estuarine rocky habitats**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	S	S	IN – Trampling associated with these activities may cause pressure to the features assessed. Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Habitat structure changes - removal of substratum (extraction)	S	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	S	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	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of target species	S	S	S		IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Visual disturbance	NS	NS			OUT – Not applicable
Deoxygenation	S	S	S	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	S	S	S	S	OUT - Insufficient activity levels to pose risk of large scale pollution event
Introduction or spread of invasive non-indigenous species (INIS)	S	S	S	S	OUT – Insufficient activity levels to pose risk of large scale pollution event
Litter	NA	NA	NA	NA	OUT – Not applicable
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	IE	