Marine Conservation Zone Assessment

Site name: Erme Estuary MCZ
UKMCZ0059

Protected feature(s):
Intertidal coarse sediment
Intertidal mixed sediment
Sheltered muddy gravels
Tentacled lagoon worm (*Alkmaria romijni*)

Fishing activities assessed at this site:
Stage 1 Assessment
Static – pots/traps: Pots/creels, cuttlepots, fishtraps
Lines: Longlines (demersal)

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
ERM-MCZ-004

Contents

Version control history			
Author	**Date**	**Comment**	**Version**
Sarah Curtin	February 2022	First draft	0.1
	February 2022	Updated using other estuarine MCZ advice packages with similar habitat	0.2
	December 2022	Updated information on potting	0.3
	January 2023	Finalised assessment (J. Stewart) and review (S. 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
Intertidal coarse sediment	Recover to favourable condition
Intertidal mixed sediment	Maintain in favourable condition
Sheltered muddy gravels	Maintain in favourable condition
Tentacle lagoon worm (*Alkmaria romijni*)	Maintain in favourable condition

The conservation objectives for these features are that they are brought to, and 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

Static – pots/traps: Pots/creels, cuttlepots

As of February 2022, there are 46 vessels that have been issued with potting permits in the South of the district. The base ports include: Hope Cove (3), Plymouth (21), River Yealm (1), Salcombe (20), and Saltash (1). The vessels have a total of 18,328 pots between them made up of 4,245 inkwells, 10,809 parlours/creels, 2,270 whelk pots, 394 cuttle pots, and 480 wrasse pots, 70 prawn pots and 60 soft eye pots. The target species are brown crab, lobster, spiny lobster, cuttle, whelk, wrasse and prawns. It should be noted that the live wrasse fishery is restricted to Plymouth Sound and therefore any targeting of wrasse in the Erme Estuary would not be for use as cleaner fish.

In order to provide data regarding potting in the MCZ, a request for information was sent to permit holders who were deemed local to the estuary (148 individuals), and other stakeholders including the landowner. Low levels of potting for lobster and crab does occur around the Erme Estuary (two respondents from the call for information advising they carry out this activity and the landowner confirmed that pots are intermittently used by two to three people). The potting observed by the landowner occurs just within the mouth of the estuary and therefore just inside the MCZ. However, this activity is occurring at a low level on the west side of the estuary, which is away from designated features. The landowner advised that the Estuary dries out completely at low tide and therefore is not suitable for pots.

Fishtraps
There are no records of this activity 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.

Lines: Longlines (demersal)
There are no records of this activity 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.

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 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.

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

Activity	Pressures
Static pots/traps; pots/creels, cuttlepots, fishtraps	Abrasion/disturbance of the substrate on the surface of the seabed Removal of non-target species
Lines; Longlines (demersal)	

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), alongside considering site specific information.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Conservation advice package used
Intertidal coarse sediment	Axe Estuary MCZ
Intertidal mixed sediment	
Sheltered muddy gravels	No alternative CA package found, intertidal mud used as proxy
Tentacle lagoon worm (*Alkmaria romijni*)	Dart Estuary MCZ

Section 8 provides detail on the activity and literature review to support this assessment.

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 Potting 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

Fishing activity in and around the Erme estuary MCZ has been assessed via consultation with permit holders and the local landowner, and is summarised in the Erme Estuary MCZ Fishing Activity Report (Curtin, 2022).

Abrasion:

Disturbance and abrasion of the substrate could occur from gear landing on the seabed, the movement of the gear from tide, current and storm activity and the subsequent recovery of gear from the pots dragging along the sea floor when unable to lift vertically (Eno et al., 2001; Coleman et al., 2013). Long-lived, sessile fauna are considered to be at most risk from potting. Vulnerable species include the pink sea-fan (*Eunicella verrucosa*), dead man's fingers (*Alcyonium digitatum*),

ross coral (*Pentapora fascialis*) and various erect branching sponges (e.g. *Axinella spp., Raspalia spp*.) (Coleman et al., 2013).

Eno et al. (2001) examined the effects on benthic species of fishing with crustacean traps, specifically focussing on the effect of *Nephrops* creels on different sea pen species in Scotland. Sea pens were observed to bend in response to the pressure wave before the creel made contact with the muddy substrate. In addition, observations of lobster and crab pots being hauled from rocky substrate in Lyme Bay and west Wales, revealed that the rocky habitats and communities appeared to have little or no immediate effect by the fishing activity (equivalent to around 1,000,000 pot hauls per km² per year). Immediate effects of hauling pots showed evidence of *E. verrucosa* bending under the weights of pots and returned upright once passed, although some detachment of ascidians and sponges were noted and individual *P. fascialis* colonies were damaged (Eno et al., 2001). However, long term damage from on-going activities was not accounted for in this study, in which potting occurred over one month. Other than the damage caused to individual ross corals this study concluded that short-term impacts of potting were insignificant and that habitats and their communities appear unaffected by potting. However, it could not be determined as to how repeated “hits” would affect more resilient species and communities as a whole in the long term. Other limitations of the study include no control sites that had not previously been subject to fishing activities.

A four-year study by Coleman et al., (2013) in Lundy Island No Take Zone (NTZ) used scuba divers to compare benthic assemblages inside the NTZ with areas nearby still subject to potting (equivalent to approximately 2,000 pots per km² per year). Potting had no detectable effect on reef epifauna over the timescale of the experiment and can be considered to have limited impact (Coleman et al., 2013). Limitations of this study include the experimental pots were set for five days in June and July every year for four years, which is not a good representation of fishermen’s effort intensity. There were natural environmental differences between the control (west of Lundy) and NTZ sites (east of Lundy) of depth, wave exposure and rock type. Additionally, the results were based on the hypothesis of detectable effect after four years, whereas recovery could take longer than this.

D&S IFCA commissioned a PhD project, part of which looked at the impact of inkwells and parlour pots on reef features within the Start Point to Plymouth Sound and Eddystone SAC. The effects of pots landing, movement, rope scour and hauling were monitored using video cameras. Only the rims of the pot come into contact with the seabed (not the whole base) and took on average 3.5 seconds to settle (Gall, 2016). The study found that the pots are fairly stationary during the time they were on the seabed (for 25 minutes in this experiment), with 86% of soaks showing no movement and 8% of soaks with some occasional movement which were very sporadic and small. Only one pot made large movements throughout the soak. When hauling, the pots did not drag for long distances on the seabed. Pots took 41 seconds to haul and the total time that the pots came into contact with the seabed was approximately half the time (20.7 seconds). Rope movement was minimal, only moving slightly by the tide and no scour or species impacts were observed for 46% of the time. In instances where movement and impact occurred abrasion was found on *A. digitatum* and *E. verrucosa*, although no individuals were removed. However, during hauling, five instances occurred where damage caused abrasion and removal of two *A. digitatum*. The assumed haul corridor (area that could be impacted during hauling) was 6.7m² and the length of the realised haul corridor (area actually impacted) was 3.2m² (Gall, 2016). Of the 22 taxa identified, 14 experienced some form of interaction with the pots, including all five indicator taxa, and individuals of six were removed from the reef, including one indicator taxon (Table 4).

Table 4 - Total number of individuals (individuals m^{-2}) and number of individuals (individuals m^{-2}) Not Damaged (ND), Damaged (D) and Removed (R) during the haul. An asterix (*) denotes indicator taxa. Table from Gall (2016).

	Total	Inkwell			Parlour		
		ND	D	R	ND	D	R
Alcyonidium diaphanum	0.33 ± 0.11	0.09 ±0.04	0.04 ± 0.02	0.00	0.39 ± 0.15	0.15 ± 0.06	0.003 ± 0.003
**Alcyonium digitatum*	1.75 ± 0.28	0.76 ±0.16	0.32 ± 0.09	0.11 ± 0.03	1.53 ± 0.32	0.48 ± 0.10	0.28 ± 0.11
Asterias rubens	0.11 ± 0.03	0.06 ± 0.02	0.00	0.00	0.16 ± 0.05	0.00	0.00
*Branching sponges	0.18 ± 0.06	0.06 ± 0.02	0.06 ± 0.02	0.00	0.19 ±0.10	0.04 ± 0.02	0.00
**Cliona celata*	0.10 ± 0.02	0.04 ± 0.01	0.05 ± 0.02	0.001 ± 0.001	0.08 ± 0.04	0.02 ± 0.01	0.001 ± 0.001
Dendrodoa grossularia	8.46 ± 2.95	6.34 ± 3.39	3.88 ± 2.24	0.01 ± 0.01	4.43 ± 1.16	2.10 ± 0.97	0.15 ± 0.14
Diazona violacea	0.003 ± 0.002	0.00	0.00	0.00	0.01 ± 0.00	0.00	0.00
Echinus esculentus	0.03 ± 0.01	0.02 ±0.01	0.00	0.00	0.04 ± 0.02	0.00	0.00
**Eunicella verrucosa*	0.12 ± 0.03	0.06 ± 0.02	0.07 ± 0.02	0.00	0.08 ± 0.03	0.04 ± 0.02	0.00
Flustra foliacea	0.22 ± 0.10	0.07 ± 0.04	0.05 ± 0.03	0.00	0.22 ± 0.14	0.10 ± 0.05	0.00
Gymnangium montagui	0.005 ± 0.005	0.00	0.00	0.00	0.00	0.01 ± 0.01	0.00
Holothuria forskali	0.09 ± 0.02	0.08 ±0.03	0.00	0.00	0.10 ± 0.03	0.00	0.00
Laminaria digitate	0.003 ± 0.003	0.01 ± 0.01	0.001 ± 0.001	0.00	0.00	0.00	0.00
Macroalgae	2.20 ± 0.40	1.56 ± 0.33	0.59 ± 0.21	0.02 ± 0.02	2.01 ± 0.62	0.22 ± 0.08	0.00
Marthasterias glacialis	0.26 ± 0.04	0.26 ±0.06	0.00	0.00	0.26 ± 0.07	0.01 ± 0.01	0.00
Massive sponges	0.13 ± 0.04	0.07 ±0.04	0.04 ± 0.02	0.00	0.11 ± 0.07	0.04 ± 0.02	0.00
Nemertesia antennina	0.23 ± 0.09	0.15 ± 0.10	0.02 ± 0.02	0.00	0.24 ± 0.14	0.05 ± 0.03	0.00
**Pentapora foliacea*	0.07 ± 0.02	0.01 ± 0.01	0.05 ± 0.02	0.002 ± 0.002	0.06 ± 0.03	0.03 ± 0.02	0.002 ± 0.002

Walmsley et al., (2015) reviewed literature and the evidence indicated no significant impacts from potting have been found on benthic species and communities of reefs, although there are site-specific considerations.

Algal communities associated with infralittoral rock should be much less sensitive to disturbance from potting because of their annual life-cycles and relatively fast growth rates (Coleman et al., 2013). Walmsley et al., (2015) reviewed literature of potting impacts and found no primary literature on the impacts on potting on kelp communities. An unpublished master's thesis assessed the impact of potting on chalk reef communities in Flamborough Head EMS (Young, 2013: reviewed by Walmsley et al. (2015). A statistically significant difference in community assemblage was identified between NTZ and fished sites. A higher abundance of benthic taxa, namely Mollusca, Hydrozoa and Rhodophyta was identified inside the NTZ. A higher abundance of kelp, *Sacharinna latissimi*, was observed in the fished site compared to the NTZ. This was inconsistent with other taxonomic groups observed. However, there are limitations of the results due to adverse weather, which scoured the seafloor in both sites, and surveys were conducted at different states of tide, which affected visibility in the fished site.

Walmsley et al., (2015) reviewed literature of potting impacts and found there is currently no primary literature on the impact of potting on subtidal coarse sediment or subtidal sand. There is however, sensitivity assessments for potting on subtidal gravel and sand which indicate that, if the pots are deployed correctly, their limited bottom contact means the impacts are not considered to

be a major concern. However, there is potential for snagging and entanglement of gear to damage epifauna of stable habitats (Walmsley et al., 2015).

Whelk pots are thought to occur on subtidal sediments and are fished all year round. Whelk pots are generally made up of plastic containers, and the bottom is weighted by concrete. Eno Et al., (2001) saw no lasting effects of *Nephrops* creels on sea pens in deep soft muddy habitat in Scotland. Seafish (2020) regarded whelk pots to have low environmental impact, with the possibility of some seabed abrasion from movement of the pots in areas of strong tides or bad weather.

Target and non-target species:
A direct effect of potting includes the removal of target species such as lobsters *Homarus gammarus* and brown crab, *Cancer pagurus*. Increases in effort could lead to indirect effects of fishing by depletion of top predators such as lobster (Babcock et al., 2010) which play a role in community structuring in these habitats.

H. gammarus occupies the apex predator role in many ecosystems as a large, aggressive and dominant species predating on a range of species and outcompeting potentially co-existing species such as *C. pagurus*. If numbers of *H. gammarus* decrease through removal this may allow *C. pagurus* to occupy the habitat which could affect community structuring. However, lobsters tend to be found closer inshore due to their preferred habitat rather than across the whole of the site. They also display more site fidelity. Brown crabs are known to migrate westwards along the channel moving across the site (Hunter et al., 2013). This suggests less site fidelity due to their migration behaviour.

Hoskin et al., (2011) looked at the recovery of crustacean populations from potting activity over 4 years in Lundy Island NTZ. They found the population of *H. gammarus* rapidly and significantly increased in the NTZ compared to the fished area (evident after only 18 months of closure), which would indicate that there was an impact from potting, through removal of targeted species. This significant increase in abundance allows *H. gammarus* to fill the role of apex consumer. They prey upon and can physically displace other decapod species from their ecological niche possibly causing the numbers of some species to decline. This may then mean that lower *H. gammarus* populations may be beneficial in increasing community biodiversity and maintaining ecosystem function and stability, however further monitoring is required (Wootton et al., 2015).

The NTZ also caused a small but significant increase in *C. paguru* (Eno et al., 2001). Hoskin et al., (2011) saw a decrease in the abundance of velvet swimming crabs *Necora puber* which was potentially from predation and/ or competition from an increase in *H. gammarus* in Lundy NTZ. Spider crabs *Maja squinado* showed no significant changes in population.

Brown crab exerts top-down control in ecosystems through predation on a range of crustacean and molluscan species, as well as small fish (Wootton et al., 2015). However, there are a large number of UK crab species with similar diets and behaviour occupying a large functional group of species. Therefore, Wootton et al,. (2015) stated that “it is unlikely that the removal of *C. pagurus* from an ecosystem would drastically compromise ecological processes and, in turn, be detrimental to overall ecosystem function, stability and resilience” in terms of top-down control.

During D&S IFCA enforcement patrols, pots are frequently hauled to be checked for escape gaps for juvenile/ undersized crustaceans. Escape gaps must be fitted to all pots that have a soft eye to allow smaller or juvenile crabs and lobsters to escape so providing conservation benefit to the stocks of these species. Undersized crustaceans and berried/ v-notched lobsters are returned under the D&S IFCA Potting Permit Byelaw.

Repeated pot deployment may lead to changes in community structure. The selectivity of pots results in very low by-catch of non-target species. If caught, some fish species may be retained for bait though this rarely happens. Benthic communities are thought to be relatively unaffected by static gear due to the footprint of the gear and the small area of the seabed in direct contact (Eno et al., 2001). However, potential exists for epifauna to be damaged or detached and resistance to this varies with species (Roberts et al., 2010). For benthic sessile fauna, Eno et al., (2001) found some detachment of ascidians and sponges, and individual *P. fascialis* colonies were damaged by potting activity. Removal of species by potting from Gall (2016) can be seen in Table 4.

Gall (2016) found damage to *E. verrucosa* was limited to abrasion as the pot went past and some individuals were bent under the pot during soak. These did not appear to be damaged as they righted themselves once the pot lifted clear. Tinsley (2006) observed a flattened sea fan that had continued growing, with new growth being aligned perpendicular to the current. Therefore colonies of E. verrucose are able to recover from minor damage and scratches to the common tissue covering the axial skeleton in about one week (Readman and Hiscock, 2017).

For whelk pots and cuttlepots bycatch is negligible as due to the design of the pots, most other species cannot enter or can escape easily before the gear is hauled. Any unwanted by-catch can be returned to the sea alive. By-catch species identified in whelk pots used near South Wales included netted dog whelks, starfish e.g. *Asteria rubens*, crabs e.g. *Necora puber*, and brittlestars e.g. *Ophiura ophiura* (Robson, 2014).

9. In-combination assessment

Table 5 - 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 Erme 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	There is no evidence that this activity is currently occurring. Additionally, as the activities assessed (section 5) are not occurring in the intertidal 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
Bait digging	Activity may be occurring, but only at low levels and limited locations. Additionally, as the activities assessed (section 5) are not occurring in the intertidal it is thought there is no in-combination effect.	
Static – fixed nets: Gill nets, Trammels, Entangling Passive – nets: Drift nets (demersal) Seine nets and other; Shrimp push	This activity is currently not permitted to take place within the Erme 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 (alongside further conditions outlined in the Netting Permit Conditions). Therefore no in-combination effect is thought to be possible.	

nets, fyke and stakenets, ring nets		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
Hand working (access from land/access from vessel)	Activity is occurring, but only at low levels. Therefore, it is thought there is no in-combination effect.	
Seine netting	There is no evidence that this activity is currently occurring. Therefore, it is thought there is no in-combination effect.	
Aquaculture	There is no evidence that this activity is currently occurring. Therefore, 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 5.

10. NE consultation response

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

11. Conclusion

Low levels of potting for crab and lobster does occur around the Erme Estuary mouth and potentially just inside the MCZ. However, the level of activity is low, with the majority of potting occurring at the mouth of the estuary, outside of the MCZ or along the coast to the west of the estuary (Curtin, 2022). In addition, the pots observed by the landowner are on the west side of the estuary away from the designated features. Furthermore, the landowner has advised that the estuary itself typically dries out at low tide, making it generally unsuitable for potting activity. Therefore, D&S IFCA concludes that there is no significant risk of the activities hindering the achievement of the conservation objectives for Erme 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 to enable each of them to be a viable component of the habitat Maintain the species composition of component	Commercial fishing; Static - pots/traps: Pots/creels, cuttlepots, fish traps Lines: Longlines (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed. • Removal of non-target species • Removal of target species See Annex 2 for pressures audit trail	There is potential for impact through gear dropping onto organisms on deployment; the movement of gear on the benthos due to tide, current, and storm activity; and as the gear is retrieved if dragged laterally when lifted. (Eno *et al.*, 2001; Coleman *et al.*, 2013) Eno *et al.* (2001) found some detachment of ascidians and sponges, and individual ross coral colonies were damaged by potting activity. A direct effect of	Activities believed to be occurring at a very low level and outside of the MCZ. At the current levels of activity, D&S IFCA conclude 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 activities in the estuary • The Potting 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

	communities			potting includes the removal of target species such as lobsters *Homarus gammarus* and brown crab, *Cancer pagurus*. Increases in effort could lead to indirect effects of fishing by depletion of top predators such as lobster (Babcock *et al.*, 2010) which play a role in community structuring in these habitats.		allows for adaptive management.
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	Commercial fishing; Static - pots/traps: Pots/creels, cuttlepots, fish traps Lines: Longlines (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed. •Removal of non-target species •Removal of target species See Annex 2 for pressures audit trail	See above	See above	See above

	abundance of listed to enable each of them to be a viable component of the habitat Maintain the species composition of component communities					
Sheltered muddy gravels	Maintain the presence and spatial distribution of sheltered muddy gravel communities Maintain the total extent and spatial distribution of sheltered muddy gravel (Maintain OR Recover OR Restore) the abundance of listed to enable each of them to be a viable component of the habitat Maintain the species	Commercial fishing; Static - pots/traps: Pots/creels, cuttlepots, fish traps Lines: Longlines (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed. • Removal of non-target species • Removal of target species See Annex 2 for pressures audit trail	See above	See above	See above

	composition of component communities					
Tentacle lagoon worm (*Alkmaria romijni*)	Maintain the population size within the site. Maintain the reproductive and recruitment capability of the species. Maintain connectivity of the habitat within sites and the wider environment to ensure larval dispersal and recruitment, and / or to allow movement of migratory species. Maintain the extent and spatial distribution of the following known supporting habitat: intertidal	Commercial fishing; Static - pots/traps: Pots/creels, cuttlepots, fish traps Lines: Longlines (demersal)	• Abrasion/disturbance of the substrate on the surface of the seabed. • Removal of non-target species • Removal of target species See Annex 2 for pressures audit trail	See above	See above	See above

	mud.					

13. References

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Annex 1: Site Map(s)

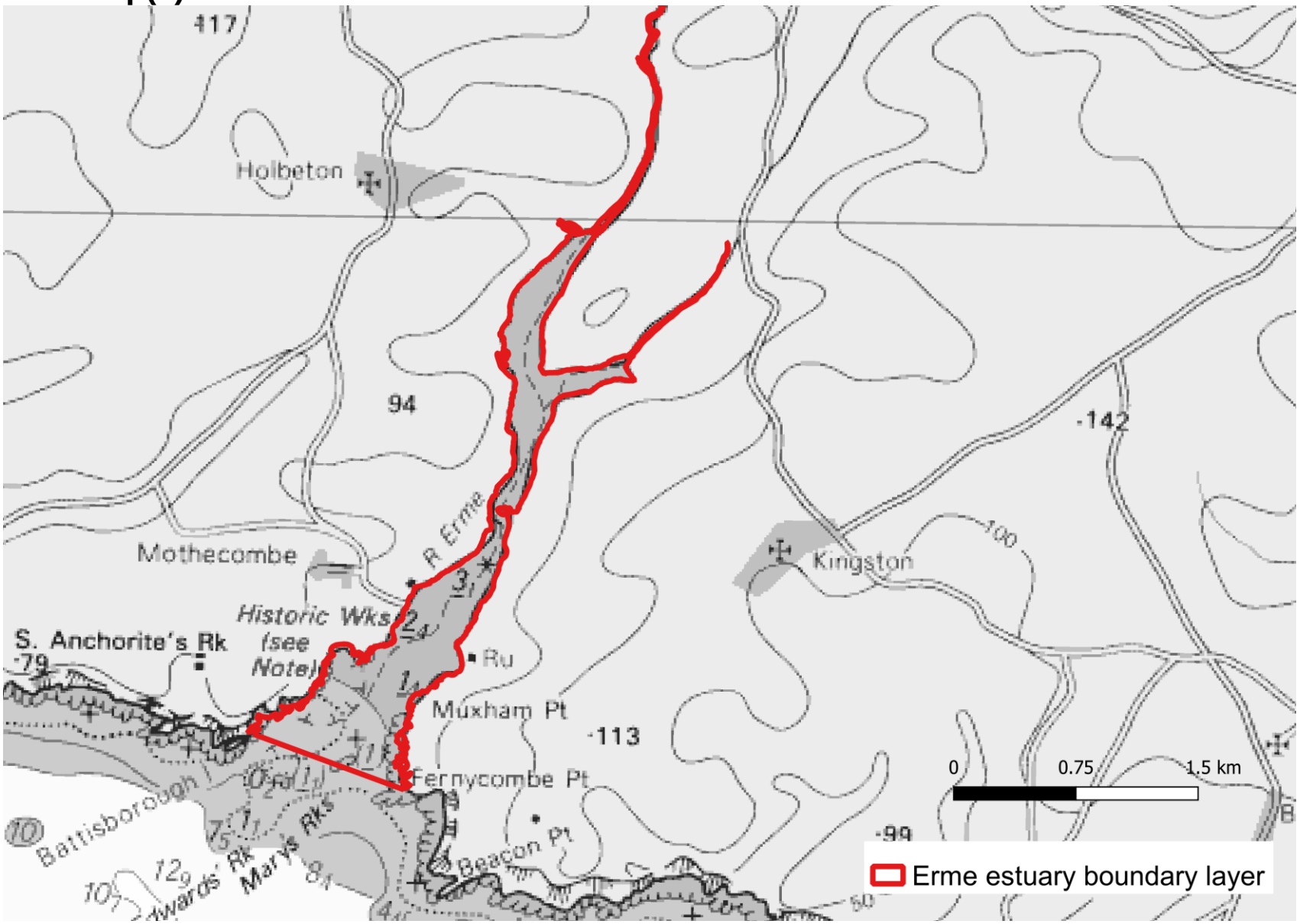


Figure 1 – Erme Estuary MCZ

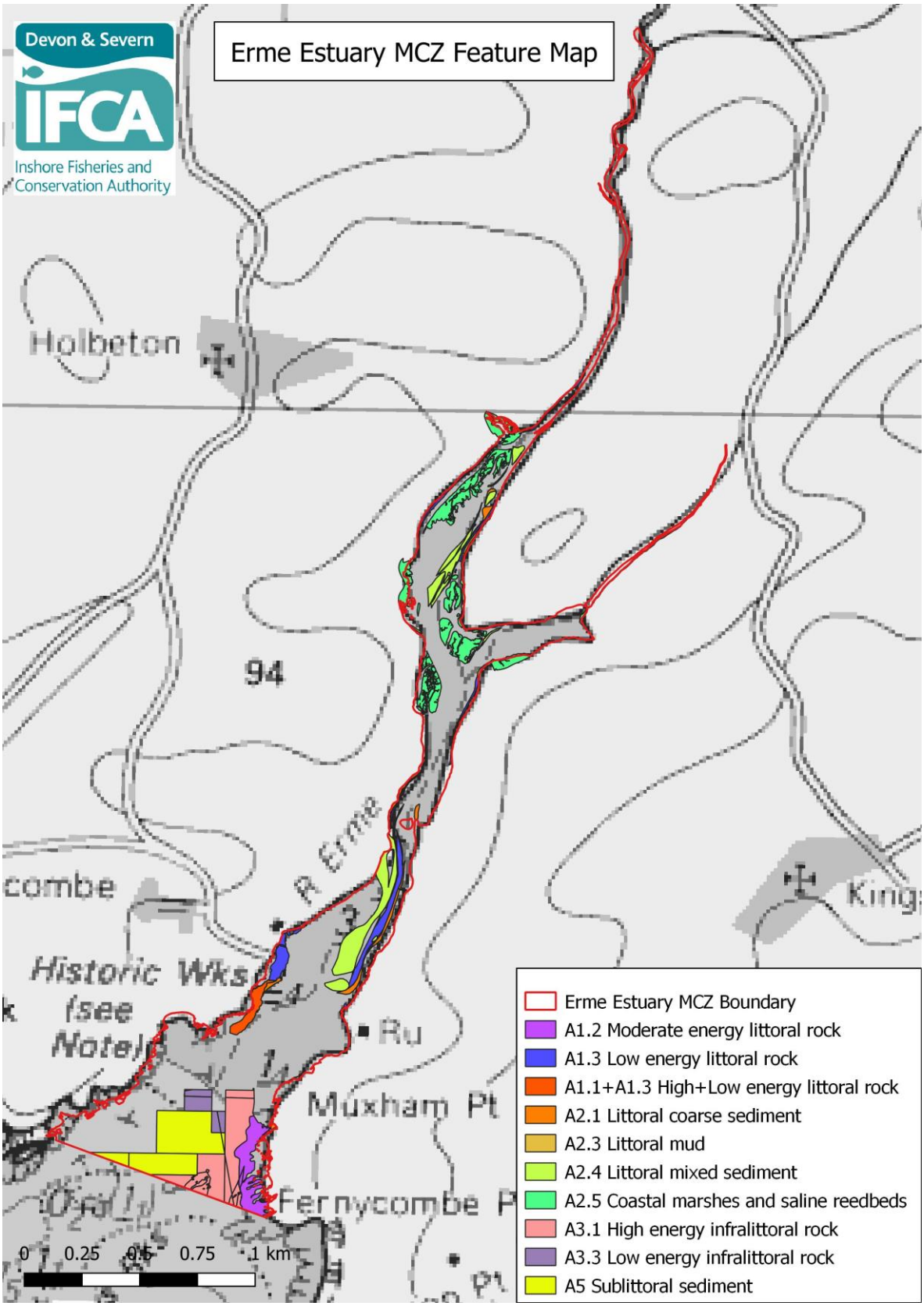
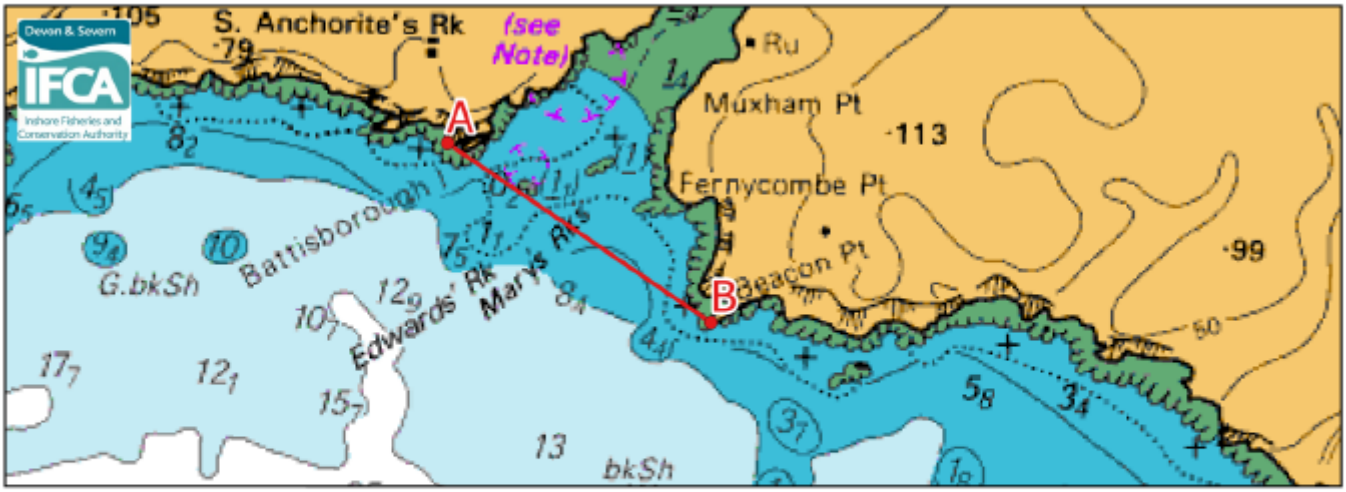


Figure 2: Extent of features designated in the Erme Estuary MCZ

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 of 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: Traps/Lines	**Intertidal coarse sediment**	**Intertidal mixed sediment**	**Sheltered muddy gravels**	**Tentacled lagoon worm (*Alkmaria romijni*)**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	NS	S	S		IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species		S	S		IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of target species					OUT – Not applicable
Barrier to species movement		NS	NS		OUT – Insufficient activity levels to pose risk at level of concern
Deoxygenation	NS	S	NS		OUT – Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination	NA	NA	NA		OUT – Not applicable
Introduction of light		IE	NS		OUT – Insufficient activity levels to pose risk at level of concern
Introduction or spread of invasive non-indigenous species (INIS)		S	S		OUT – Insufficient activity levels to pose risk at level of concern
Litter	NA	NA	NA		OUT – Not applicable
Organic enrichment	NS	NS	NS		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		OUT – Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	NA	NA		OUT – Not applicable
Transition elements & organo-metal (e.g. TBT) contamination	NA	NA	NA		OUT – Not applicable
Underwater noise changes					OUT – Not applicable