Marine Conservation Zone Assessment

Site name: Otter Estuary MCZ
UKMCZ0065

Protected feature(s):
Intertidal coarse sediment
Intertidal mud

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

D&S IFCA Reference
OTT-MCZ-003

Contents

Version control history			
Author/ Reviewer	**Date**	**Comment**	**Version**
Sarah Curtin	October 2021	Draft assessment	0.1
Sarah Curtin	February 2021	Updating assessments with call for information data	0.2
Sarah Clark	January 2023	Final Review	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 Otter Estuary MCZ is a small inshore site covering an area of approximately 0.11km^2. The estuary is located on the south coast of Devon near the town Budleigh Salterton. The site extends from the mouth of the river up to the aqueduct near East Budleigh.

Although the Otter Estuary is small, it is an important ecosystem supporting a range of habitats and wildlife. It is an essential link from the sea to the River Otter where it acts as a migratory route for European eel, Atlantic salmon, Sea trout and Shad. The mouth of the estuary is dominated by a shingle bank of intertidal coarse sediment extending from the west coast of the river. The sheltered areas behind the bank consist of highly productive intertidal mudflats and saltmarshes.

The Otter Estuary is one of the most extensive saltmarsh networks in Devon, providing important foraging grounds for wading birds and wildfowl and a sheltered refuge from high tide. Several species of specialised salt and flood-tolerant flowering plants can be found within the saltmarshes as well as an abundance of worms, crustaceans, and tiny snails.

The intertidal muds are a highly productive habitat and support a diverse range of species including ragworms, mudshrimps and the commercially important cockle. At low tide these areas form vital feeding grounds for wading and migratory birds, while at high tide flatfish and others migrate to these areas to forage for food (Defra, 2019).

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

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

Table 1 - Protected features relevant to this assessment

Feature	General management approach
Intertidal coarse sediment	Maintain in favourable condition
Intertidal mud	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

Static – pots/traps: Pots/creels, cuttlepots
There are 17 vessels that have been issued with potting permits in the East of the district. The base ports include: Budleigh Salterton (5), Exmouth (9), Ladram Bay (1), and Sidmouth (2). The vessels have a total of 5,848 pots between them made up of 112 inkwells, 2,280 parlours/creels, 1,680 whelk pots, and 1,470 Cuttle pots and 306 prawn pots. The target species are brown crab, lobster, spiny lobster, cuttle, whelk, and prawns.

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 (65 individuals), and other stakeholders including the landowner. No responses were received from the request for information to indicate that this activity is taking place with the Otter Estuary MCZ. However, there is no evidence that it is not occurring at a low, undetected level and therefore cannot be completely ruled out.

Fish Traps
There are no records of this activity taking place within the Otter 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 Otter 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 (2021) for more information regarding fishing activities occurring in the Otter 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 **Error! Reference source not found.**.

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)	

The relevant targets for favourable condition were identified within Natural England's conservation advice supplementary advice tables (Natural England, 2021). Table 3 shows which targets were identified as relevant to the activity assessed. The impacts of pressures on features were assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives.

Table 3 - Relevant favourable condition targets for identified pressures.

Feature	Attribute	Target
Intertidal coarse sediment; Intertidal mud;	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal coarse sediment and intertidal mud communities
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal coarse sediment and intertidal mud
	Structure and function; presence and abundance of key structural and influence species	(Maintain OR Recover OR Restore) the abundance of listed species to enable each of them to be a viable component of the habitat
	Structure; species composition of component communities	Maintain the species composition of component communities

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

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 of fishing with crustacean traps on benthic species. The effect of *Nephrops* creels on different sea pen species in Scotland was studied. 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 km^2 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) compared benthic assemblages inside the NTZ with areas nearby still subject to potting (equivalent to approximately 2,000 pots per km^2 per year) by scuba divers. 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 and recovery could take a lot longer.

D&S IFCA commissioned a PhD, 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 are on the seabed (for 25 minutes), 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 do 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 $6.7m^2$ and the length of the realised haul corridor (area actually impacted) was $3.2m^2$ (Gall, 2016). Of the 22 taxa identified, 14 suffered some form of interaction with the pots, including all five indicator taxa, and individuals of six were removed from the reef, including one indicator taxa (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).

There is an evidence gap for literature on certain pot types including whelk pots and cuttlepots (Walmsley et al., 2015). Cuttlepots are generally lightweight rigid structures, either square or round. Cuttlepots are used between May and July and on subtidal sediments.

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 (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

<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 Otter 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>Crab tiling</td><td>There is no evidence that this activity is occurring. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.</td><td rowspan="4">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</td></tr>
<tr><td>Bait digging</td><td>There is no evidence that this activity is occurring. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.</td></tr>
<tr><td>Hand working (access from land/access from vessel)</td><td>There is no evidence that this activity is occurring. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.</td></tr>
<tr><td>Static – fixed nets: Gill nets, Trammels, Entangling</td><td>This activity is currently not permitted to take place within the Otter 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.</td></tr>
</table>

	Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	Changes in suspended solids (water clarity) Smothering and siltation rate changes (Light) Genetic modification & translocation of indigenous species Introduction of microbial pathogens Introduction or spread of invasive non indigenous species
Passive – nets: Drift nets (demersal)	This activity is currently not permitted to take place within the Otter 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 Otter 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.	
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.	
Aquaculture	There is no evidence that this activity is occurring. Additionally, as the activities assessed (section 5) are not occurring, it is thought there is no in-combination effect.	

D&S IFCA concludes there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within Table 5.

10. NE consultation response

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

11. Conclusion

The activities assessed are not believed to be occurring within the MCZ. Therefore, D&S IFCA concludes that there is no significant risk of the activities hindering the achievement of the conservation objectives for Otter 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	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 See Annex 2 for pressures audit trail	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	Activities not believed to be occurring or occurring at a very low level. 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

	component communities			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) 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) A direct effect of potting includes the removal of target species such as lobsters		permitting system allows for adaptive management.

				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.		
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 to enable each of them to be a viable component of	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 See Annex 2 for pressures audit trail	See above	See above	See above

	the habitat Maintain the species composition of component communities					

13. References

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Annex 1: Site Map(s)

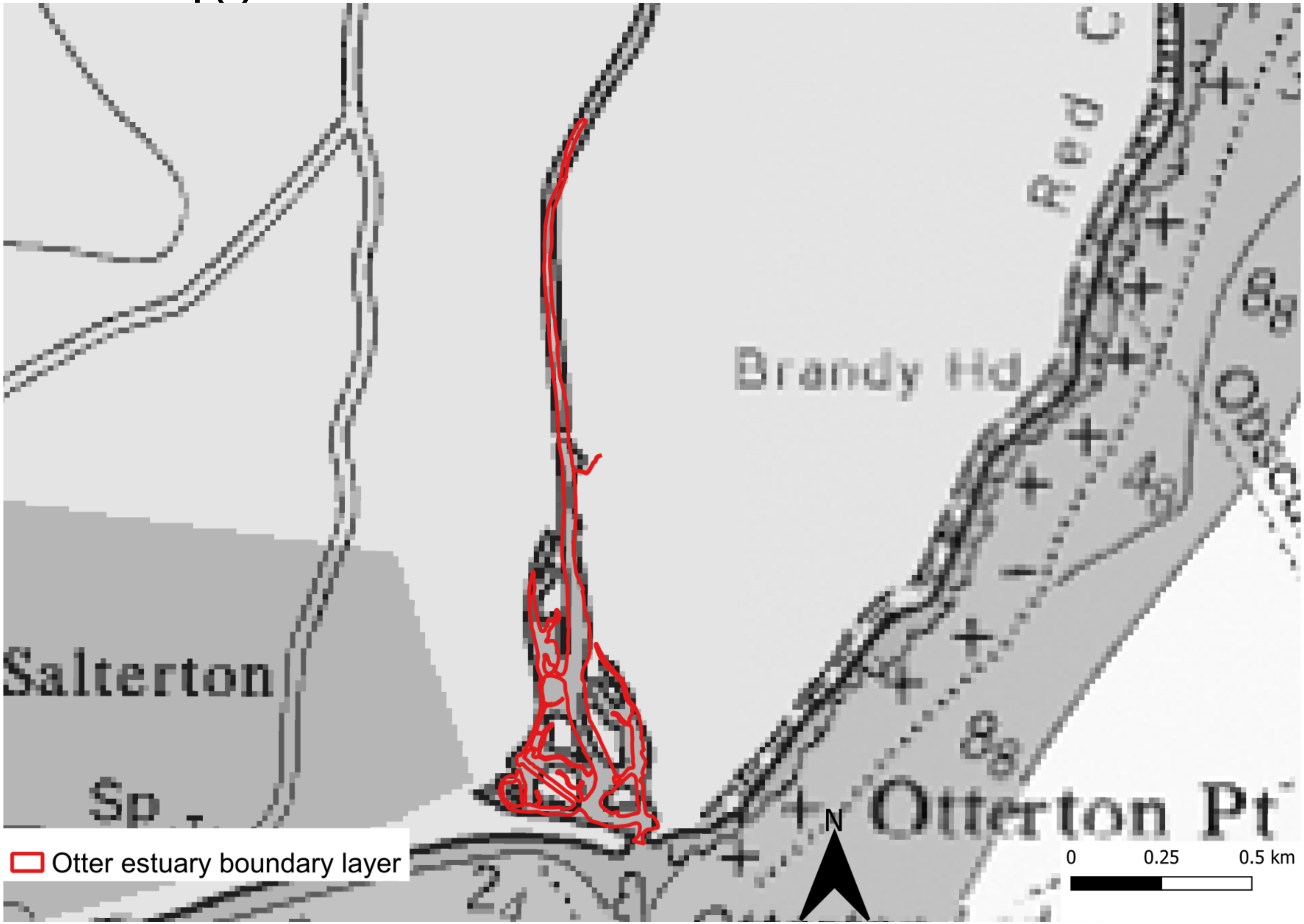


Figure 1 – Otter Estuary MCZ

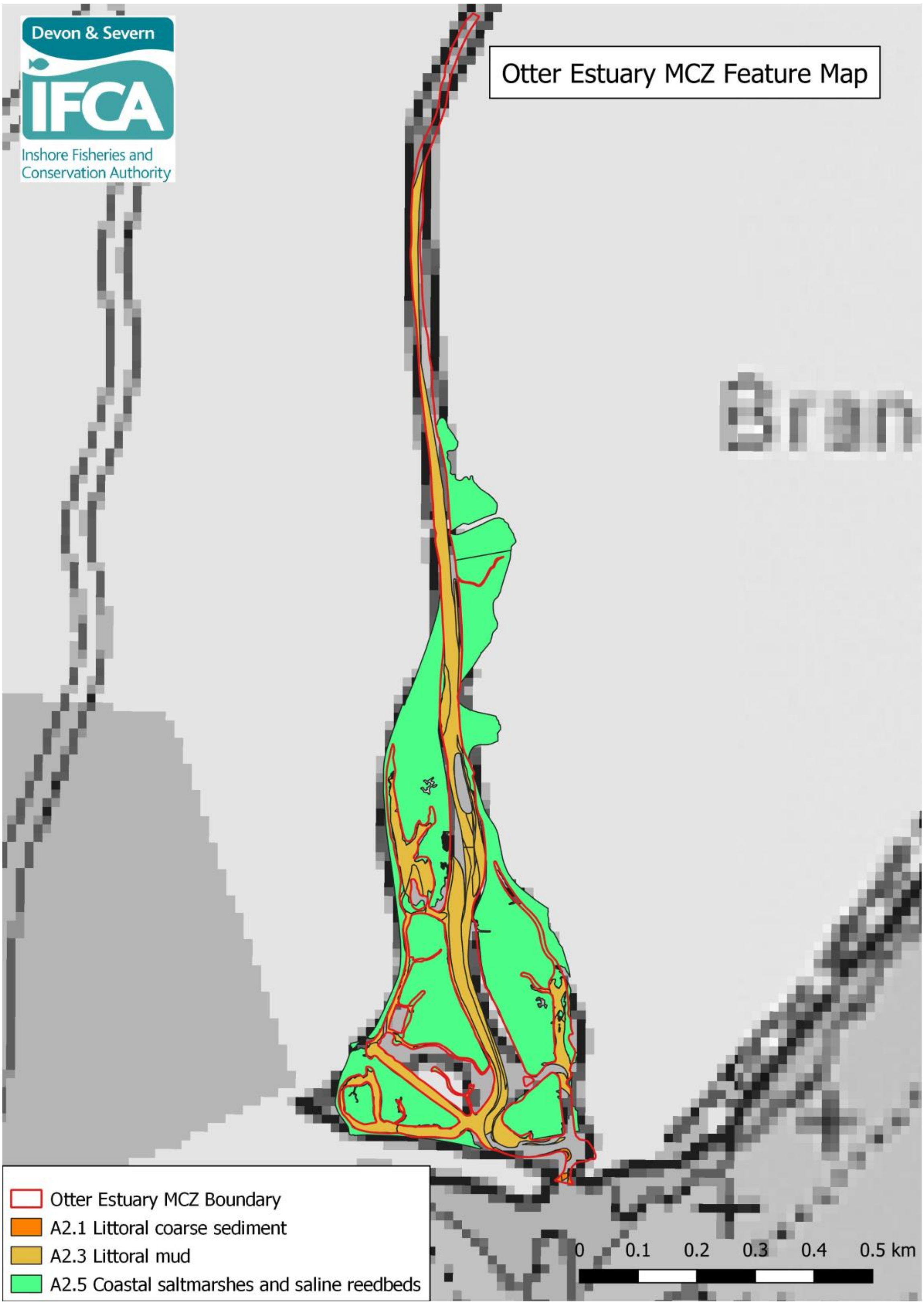
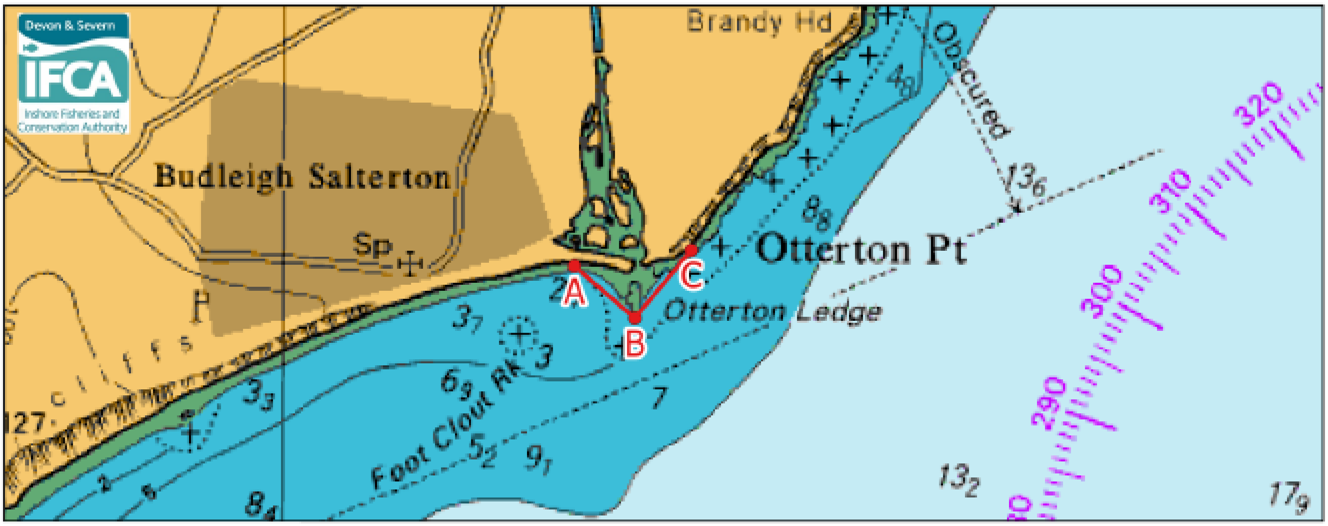


Figure 2: Extent of features, intertidal coarse, intertidal mud, and coastal saltmarshes and saline reedbeds) designated in the Otter Estuary MCZ

Annex 2 Chart of River Otter 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 Otter closing line latitude and longitude positions:

Point	Latitude	Longitude
A	50° 37.791'N	003° 18.676'W
B (Otterton Ledge)	50° 37.626'N	003° 18.399'W
C (Otterton Point)	50° 37.821'N	003° 18.143'W

Figure 3: River Otter 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: Anchored nets/lines Traps	**Intertidal coarse sediment**	**Intertidal mud**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	NS	S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species		S	IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Barrier to species movement		NS	OUT – Not applicable
Deoxygenation	NS	NS	OUT – Not applicable
Hydrocarbon & PAH contamination	NA	NA	OUT – Not applicable
Introduction of light		NS	OUT – Not applicable
Introduction or spread of invasive non-indigenous species (INIS)		S	OUT – Insufficient activity levels to pose risk at level of concern
Litter	NA	NA	OUT – Not applicable
Organic enrichment	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	OUT – Insufficient activity levels to pose risk at level of concern
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	NA	OUT – Not applicable
Transition elements & organo-metal (e.g. TBT) contamination	NA	NA	OUT – Not applicable