Marine Conservation Zone Assessment

Site name:	Devon Avon Estuary MCZ UKMCZ0058
Protected feature(s):	Intertidal mud Intertidal sand and muddy sand Moderate energy intertidal rock Tentacled lagoon worm (Alkmaria romijni)

Fishing activities assessed at this site:
Stage 1 Assessment
Static – pots/traps: Pots/creels
Static – pots/traps: Cuttlepots
Static – pots/traps: Fish traps

Devon & Severn IFCA Inshore Fisheries and Conservation Authority

D&S IFCA Reference
DAV-MCZ-003

Contents

Version control history			
Author	**Date**	**Comment**	**Version**
Lauren Henly	10/2021	First draft	0.1
Lauren Henly	23/02/2022	Additional content from call for information	0.2
	01/07/2022	Reviewed and updated by J Stewart	0.3
Lauren Henly	06/07/2022	Comments addressed	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 Devon Avon Estuary MCZ is an inshore site located on the coast of south Devon in the south west of England. The site covers an area of 2 km^2 and extends from the mouth of the estuary up to a tidal weir at Aveton Gifford. This site protects a wide range of habitats and species, including a number of rare species. Estuaries are important contributors to a healthy environment and have an important role as a nursery ground for juvenile fish and is potentially important for seahorse populations as it provides suitable food and shelter. Various species of worm, crustacean and shrimp can be found here, including the nationally scarce tentacled lagoon worm *Alkmaria romijni*. This is a tiny bristleworm which grows up to 5 mm in length. It 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.

The saltmarshes provide habitat for crustaceans (such as crabs, lobsters and barnacles), molluscs (such as mussels and oysters) and a nursery area for fish, as well as feeding grounds for birds.

Further information regarding the MCZ and its protected features can be found in the Devon Avon Estuary MCZ Factsheet (Defra, 2019).

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 mud	Maintain in favourable condition
Intertidal sand and muddy sand	Maintain in favourable condition
Moderate energy intertidal rock	Maintain in favourable condition
Tentacled lagoon worm (*Alkmaria romijni*)	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
- Static – pots/traps: Cuttlepots

- Static – pots/traps: Fish traps

See Henly (2021) for more information regarding fishing activities occurring in the Devon Avon 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	Abrasion/disturbance of the substrate on the surface of the seabed
	Removal of non-target species

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 mud	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal mud communities.
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal mud.
	Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.
Intertidal sand and muddy sand	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal sand and muddy sand communities.
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal sand and muddy sand.
	Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.
Moderate energy intertidal rock	Distribution: presence and spatial distribution of biological communities	Maintain the presence and spatial distribution of intertidal rock communities.
	Extent and distribution	Maintain the total extent and spatial distribution of intertidal rock subject to natural variation in sediment veneer.

	Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.
Tentacled lagoon-worm (Alkmaria romijni)	Population: population size	Maintain the population size within the site.
	Population: recruitment and reproductive capability	Maintain the reproductive and recruitment capability of the species.
	Presence and spatial distribution of the species	Maintain the presence and spatial distribution of the species.
	Structure and function: biological connectivity	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.
	Supporting habitat: extent and distribution	Maintain the extent and spatial distribution of the following known supporting habitat: intertidal mud.

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 storms 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.

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. 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). 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 in the long term. There were also no control sites that had not previously been subject to fishing activities in this study which makes direct impacts difficult to determine.

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 km² 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). However, the experimental pots were set for five days in June and July every year for four years, which is not necessarily a good representation of fishermen's effort intensity. There were also natural environmental differences between the control (west of Lundy) and NTZ sites (east of Lundy) of depth, wave exposure and rock type.

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 came into contact with the seabed (as opposed to 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). 86% of soaks showed no movement, 8% of soaks had some occasional movement which were very sporadic and small, and 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 species such as *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).

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 (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).

Removal of non-target species:

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, as well as non target species 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.

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).

Local evidence

Potting in D&S IFCA's District is managed under D&S IFCA's Pottig Permit Byelaw. In 2022, D&S IFCA circulated a request for information to all relevant permit holders, seeking information on their potting activities in or near to the Devon Avon Estuary MCZ. Of the four users of the estuary that highlighted the use of pots, two use only one or two pots infrequently. Though the other two did not specify the number of pots used, they are bound by the conditions of the Potting Permit Byelaw to use a maximum of five pots in any one day for fishing in D&S IFCA's District. Both of these individuals are seasonal recreational fishers (April – October), and one is thought to pot outside of the MCZ rather than inside.

9. In-combination assessment

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

Plans and Projects		
Activity	**Description**	**Potential Pressure(s)**
No other plans or projects known to be occurring within Devon Avon Estuary MCZ	The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.	N/A
Other activities being considered		
Activity	**Description**	**Potential Pressure(s)**
Crab tiling	Activity has previously occurred, but there has been no evidence of crab tiles on the estuary since 50 were observed in 2003/04. As the activities assessed (section 5) are occurring at low levels and limited locations with very limited impact, it is thought there is no in-combination effect. The location of the activities assessed are unlikely to overlap with the crab tiling activity in the MCZ.	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. Visual disturbance
Bait digging	Activity is occurring, but thought to be only at low levels and in limited locations. As the activities assessed (section 5) are occurring at low levels and limited locations with very limited impact, it is thought there is no in-combination effect. The location of the activities assessed are unlikely to overlap with the bait digging activity in the MCZ.	
Hand working (access from land/access from vessel)	There is some evidence of low levels of hand gathering in the estuary. However, As the activities assessed (section 5) are occurring at low levels and limited locations with very limited impact, it is thought there is no in-combination effect The location of the activities assessed are unlikely to overlap with the hand working activity in the MCZ.	
Seine netting	There this activity is currently occurring at low levels in the MCZ. As the activities assessed (section 5) are occurring at low levels and limited locations with very limited impact, it is	

	thought there is no in-combination effect. The location of the activities assessed are unlikely to overlap with the seine netting activity in the MCZ.	
Aquaculture	Activity is occurring in the Devon Avon Estuary MCZ, but as the activities assessed in this assessment are only occurring occasionally and at low levels, and the spatial extend of the assessed activities is unlikely to overlap with that of Aquaculture, no in-combination effect is thought to be possible. This element of the assessment can be revisited following the upcoming review of consents for Pacific oyster mariculture in MCZs, being undertaken by Cefas (Fish Health Inspectorate) and Natural England, if this review process highlights areas of concern and pathways for in-combination impacts.	Abrasion/disturbance of the substrate on the surface of the seabed Changes in suspended solids (water clarity) Introduction of microbial pathogens Introduction or spread of invasive non-indigenous species (INIS) Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion Removal of non-target species Smothering and siltation rate changes (Light) Visual disturbance

D&S IFCA conclude 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

Although potting is occurring in the MCZ, it is thought to be occurring at very low levels and in limited locations. Based on the evidence outlined in section 8, low levels of potting is unlikely to result in a significant effect on the condition of the features within the site. Therefore, D&S IFCA concludes that there is no significant risk of the activities hindering the achievement of the conservation objectives for Devon Avon 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 mud	Maintain the presence and spatial distribution of intertidal mud communities. Maintain the total extent and spatial distribution of intertidal mud. [Maintain OR Recover OR Restore] the abundance of listed species*, to enable each of them to be a viable component of the habitat.	Commercial fishing; Static – pots/traps: Pots/creels Static – pots/traps: Cuttlepots Static – pots/traps: Fish traps	• See Annex 2 for pressures audit trail	Limited exposure to infrequent recreational potting. Of the four users of the estuary that highlighted the use of pots, two use only one or two pots infrequently. Though the other two did not specify the number of pots used, they are bound by the conditions of the Potting Permit Byelaw to use a maximum of five pots in any one day for fishing in D&S IFCA's District. Both of these individuals are seasonal	Based on the current levels of these activities on the Devon Avon 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. Enforcement of current byelaws 2. Monitoring and review of current byelaws 3. Monitoring of activities in the estuary 4. The Potting Permit Byelaw can gauge where any future changes or developments may occur. 5. 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

				recreational fishers (April – October), and one is thought to pot outside of the MCZ rather than inside.		restrictions. The permitting system allows for adaptive management.
Intertidal sand and muddy sand	See above	Commercial fishing; Static – pots/traps: Pots/creels Static – pots/traps: Cuttlepots Static – pots/traps: Fish traps	• See Annex 2 for pressures audit trail	See above	See above	See above
Moderate energy intertidal rock	See above	Commercial fishing; Static – pots/traps: Pots/creels Static – pots/traps: Cuttlepots Static – pots/traps: Fish traps	• See Annex 2 for pressures audit trail	See above	See above	See above

Tentacled lagoon-worm (Alkmaria romijni)	Maintain the population size within the site. Maintain the reproductive and recruitment capability of the species. Maintain the presence and spatial distribution 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 mud.	Commercial fishing; Static – pots/traps: Pots/creels Static – pots/traps: Cuttlepots Static – pots/traps: Fish traps	• See Annex 2 for pressures audit trail	See above	See above	See above

13. References

Coleman, R. A., Hoskin, M. G., von Carlshausen, E., and Davis, C. M. 2013. Using a no-take zone to assess the impacts of fishing: Sessile epifauna appear insensitive to environmental disturbances from commercial potting. Journal of Experimental Marine Biology and Ecology, 440: 100–107.

Defra. 2019. Devon Avon Estuary Marine Conservation Zone. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914487/mcz-devon-avon-estuary-2019.pdf (Accessed 15 October 2021).

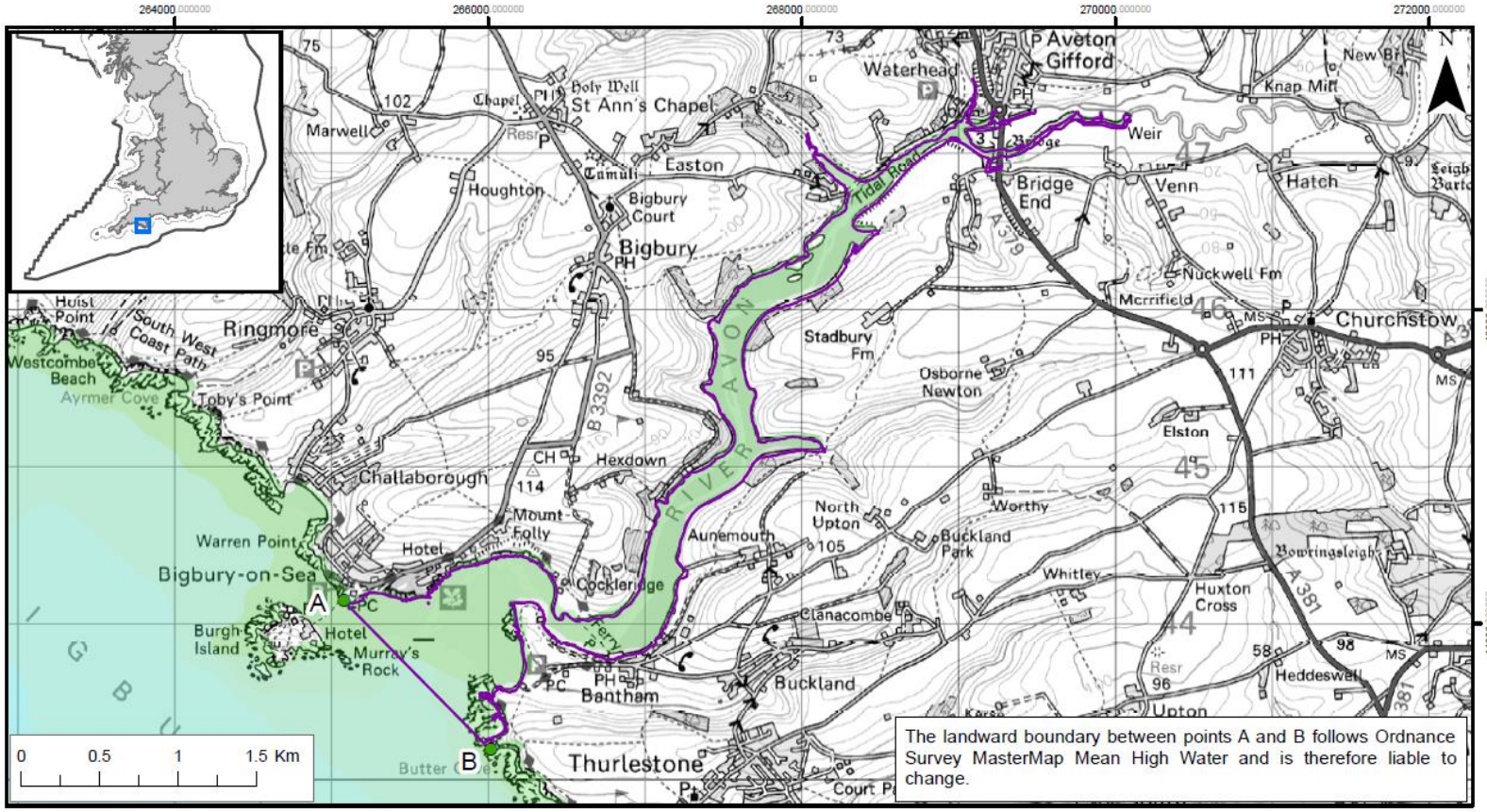
Eno, C., Macdonald, D., Kinnear, J., Amos, S., Chapman, C., Clark, R., St, F., *et al.* 2001. Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science – ICES Journal of Marine Science Aberdeen AB9 8DB, 58: 11–20.

Gall, S. 2016. Evaluating the impacts of integrating fisheries and conservation management. University of Plymouth.

Natural England. 2021. Conservation Advice for Devon Avon Estuary Marine Conservation Zone (MCZ). https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0058&SiteName=Avon&countyCode=&responsiblePerson=&unitId=&SeaArea=&IFCAArea=&NumMarineSeasonality=&SiteNameDisplay=Devon%20Avon%20Estuary%20MCZ&HasCA=1&NumMarineSeasonality=0&SiteNameDisplay=Devon%20Avon%20Estuary%20MCZ (Accessed 14 October 2021).

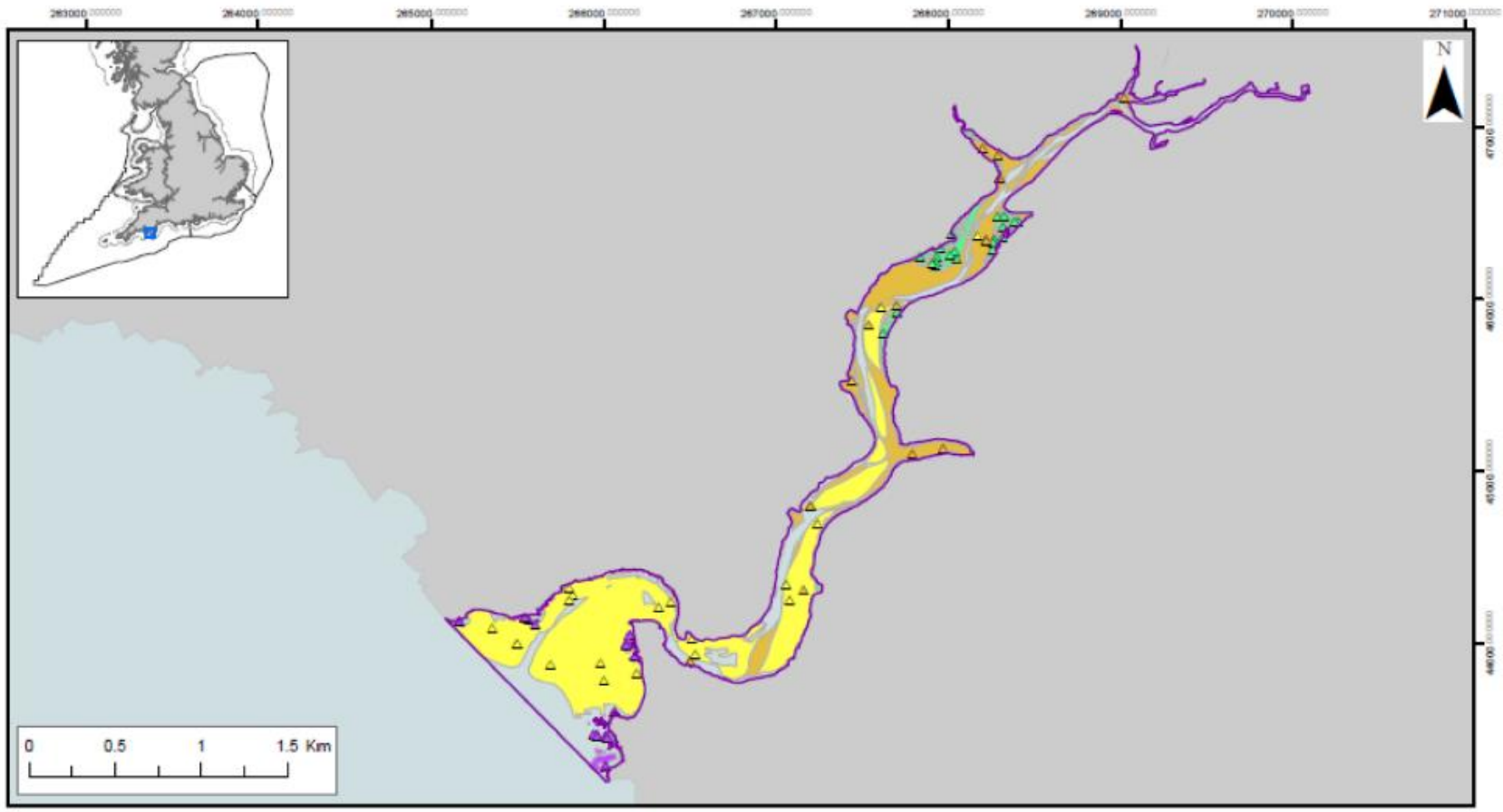
Walmsley, S., Bowles, A., Eno, N., and West, N. 2015. Evidence for Management of Potting Impacts on Designated Features. Defra.

Annex 1: Site Map(s)



Point	Lat	Long
A	50° 16' 54.410" N	3° 53' 42.226" W
B	50° 16' 24.493" N	3° 52' 53.862" W

Figure 1 – Devon Avon Estuary MCZ



Devon Avon Estuary MCZ
Broad Scale Habitats

- Marine Conservation Zone
- Regional MCZ Project Area
- 12nM Territorial Seas Limit
- Sea
- Land

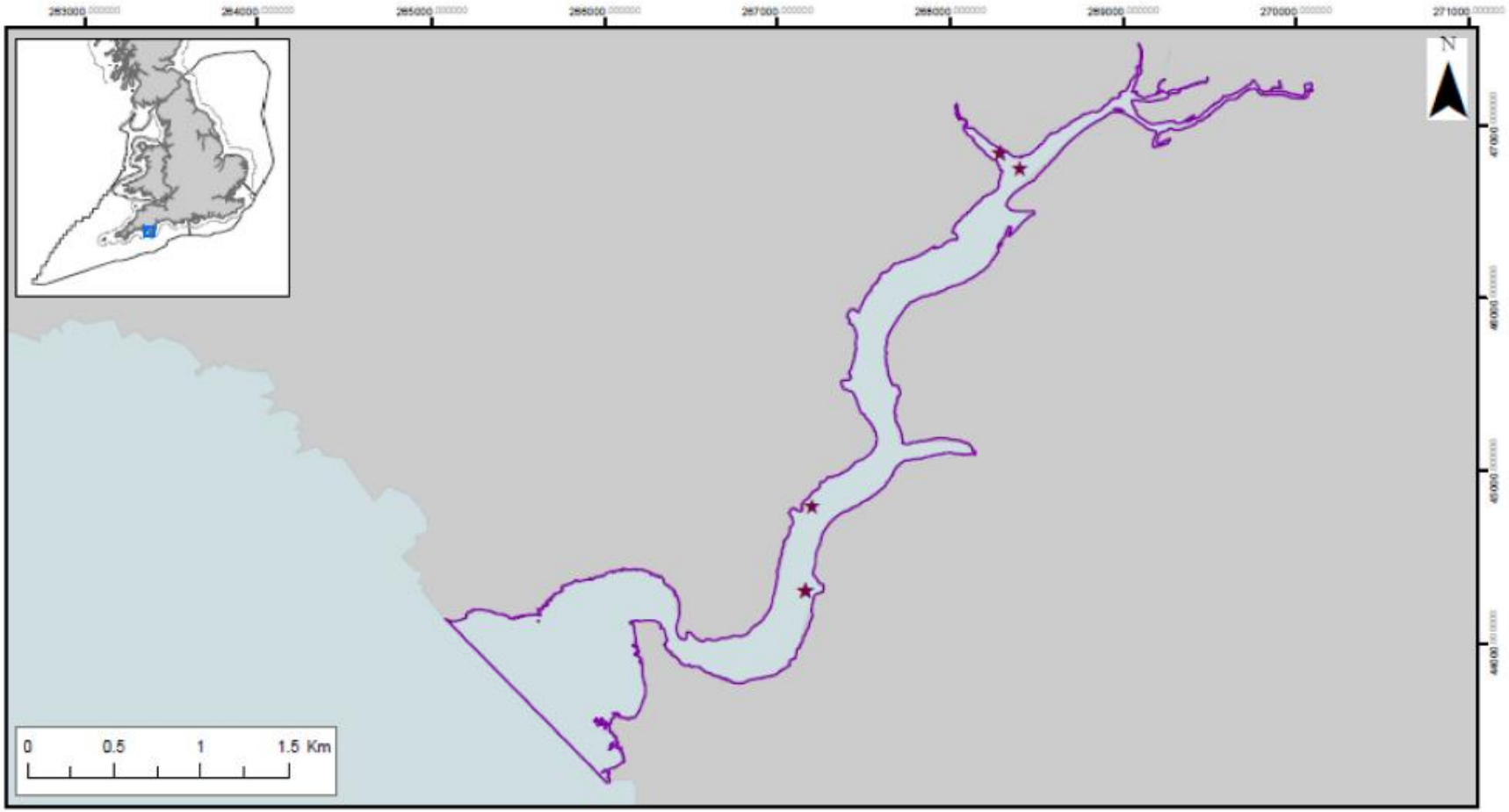
Features designated in 2019

- Moderate energy intertidal rock (A1.2)
- Intertidal sand and muddy sand (A2.2)
- Intertidal mud (A2.3)
- Coastal saltmarshes and saline reedbeds (A2.5)

△ Groundtruthing sampling points, such as diver survey, grab sampling, drop down video, walk over survey or core sampling

Shaded areas represent habitats mapped according to data originating from surveys and mathematical models

Reference: Theme ID: 1477647
Map Projection: British National Grid



Devon Avon Estuary MCZ
Features of Conservation Importance

- Marine Conservation Zone
- Regional MCZ Project Area
- 12nM Territorial Seas Limit
- Sea
- Land

Features designated in 2019

- ★ Tentacled lagoon-worm (*Alkmaria romijni*)

Reference: Theme ID: 1477647
Map Projection: British National Grid

Annex 2: Pressures Audit Trail

Fishing Activity Pressures: Traps	**Habitat**				**Species**	
	Coastal saltmarshes and saline reedbeds	**Moderate energy intertidal rock**	**Intertidal mud**	**Intertidal sand and muddy sand**	**Tentacled lagoon-worm**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed		S	S	S		IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species		S	S	S		IN - Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Barrier to species movement		NS	NS	NS		OUT – Insufficient activity levels to pose risk at level of concern
Deoxygenation		S	NS	S		OUT – Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination		NA	NA	NA		OUT – Not applicable
Introduction of light		S	NS	S		OUT – Insufficient activity levels to pose risk at level of concern
Introduction or spread of invasive non-indigenous species (INIS)		S	S	S		OUT – Insufficient activity levels to pose risk at level of concern
Litter		NA	NA	NA		OUT – Not applicable
Organic enrichment		S	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		S	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
Visual disturbance		NS		NS		OUT – Insufficient activity levels to pose risk at level of concern