Marine Conservation Zone Assessment

Site name:	Dart Estuary MCZ UKMCZ0057
Protected feature(s):	Estuarine rocky habitats Low energy intertidal rock

Fishing activities assessed at this site:

Stage 1 Assessment

Intertidal handwork: Handworking (access from vessel), Handworking (access from land)
Miscellaneous: Crab tiling
Bait collection: digging with forks

Devon & Severn IFCA
Inshore Fisheries and Conservation Authority

D&S IFCA Reference
DAR-MCZ-004

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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 Dart 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 471 ha and encompasses the upper part of the Dart Estuary down to Anchor Stone, south of Dittisham. 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. Large areas of the site consist of intertidal mud, which is a highly productive habitat and provides feeding and resting grounds for wading and migratory birds. This is also an important habitat for the nationally scarce tentacled lagoon worm *Alkmaria romijni*. This is a tiny bristleworm which 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.

The north of the site contains areas of coastal saltmarshes and reedbeds. These provide a refuge for wading birds during high tide and storms and are home to a wide variety of worms, molluscs and crustaceans living in the damp environment between the vegetation.

Estuarine rocky habitats form in flooded river valleys or 'rias', such as the Dart, and provide a hard surface for animals and seaweeds to attach to in areas dominated by sandy and muddy environments. The seaweed species that attach themselves to the rocks form foraging areas for crustaceans and birds at low tide as well as foraging areas and a refuge for juvenile fish at high tide from beaches of intertidal sand, which are exposed to the air at low tide and below water at high tide, to subtidal sediment and rock habitats, which are permanently submerged.

Further information regarding the MCZ and its protected feature can be found in the Dart 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
Estuarine rocky habitats	Recover to favourable condition
Low energy intertidal rock	Recover to 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

- Intertidal handwork: Handworking (access from vessel), Handworking (access from land)
- Miscellaneous: Crab tiling
- Bait collection: digging with forks

See Henly (2021) for more information regarding fishing activities occurring in the Dart 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
Shore based activities: Hand working, crab tiling, bait collection	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

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
Estuarine rocky habitats	Distribution: presence and spatial distribution of biological communities	Recover 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.
	Structure: morphology	Maintain the characteristic morphology of the habitat.
Low energy intertidal rock	Distribution: presence and spatial distribution of biological communities	Recover 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.

7. Can D&S IFCA exercise its functions to further the conservation objectives of the site?

Yes,
Evidence: Monitoring and Control Arrangements

- Monitor activity levels

- Introduction of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity.

On the 14th November 2019, the D&S IFCA Byelaw & Permitting Sub-Committee discussed the different options that exist to manage hand working types of fishing activity as set out in a report (D&S IFCA, 2019). The development of a new byelaw was the option selected, however it is envisaged that it will be a slightly different regulatory format as compared to the D&S IFCA permit based byelaws already implemented to manage other fishing activity.
The potential need for a permit to conduct the different activities will become a factor in the on-going drafting work. It is envisaged that the requirement for a permit to conduct bait collection and hand gathering will be dependent on the amounts of resource taken. The Hand Working Permit Byelaw would introduce fixed provisions that apply to all persons. Fixed provisions are expected to include a series of catch limits (bag limits) for different species (sea fisheries resources) that are targeted by different types of hand working fishing methods. The bag limits would provide an upper level of catch (a threshold) that would apply to all persons but providing the individual take of the specified species was below the levels set for personal use, it is not envisaged that a permit would be required for the collection of the resources. Commercial activity would exceed the bag limits for recreational take and would therefore be regulated by conditions of use that would be placed in the permits issued by D&S IFCA. D&S IFCA will be seeking the views of all stakeholders to better inform the decision making needed to set the initial bag limits.
The development of a Hand Working Permit Byelaw is now a longer-term commitment for D&S IFCA. As a reflection of the time and resource required and available to conduct the required elements of the work, including reporting and the decision-making of D&S IFCA's Byelaw and Permitting Sub-Committee, the development of this Byelaw is not included in D&S IFCA's 2022–23 Annual Plan (D&S IFCA, 2022). Key Tasks for 2022-23 reflect what is deliverable with the current level of staffing and financial resourcing available to D&S IFCA.

8. Referenced supporting information to inform assessment

The assessed shore-based activities mainly occur directly on the intertidal mud and other sediments, however, indirect pressures such as trampling have the potential to alter the rocky habitats near the mud due to abrasion and disturbance.

There have been many studies assessing the impact of trampling on intertidal rocky shore habitats, but very few focussed on the estuarine equivalent. Conditions in estuaries are distinctly different to those on the open coast, where rocky habitats are generally more abundant. Rocky habitats in estuaries are typically located in low wave energy environments with reduced salinity,

and experience accelerated tidal streams with increased turbidity and siltation. The communities present on rocky habitats are adapted to these conditions and consequently their composition and character is different to that found on similar substrata on the open coast (JNCC, 2008). Estuarine rocky communities may have a different assemblage composition to rocky shores, but many of the species present in the estuarine habitats are the same. In general terms, the supralittoral of rocky habitat supports yellow and grey lichens, with a band of the black lichen *Verrucaria maura* below(JNCC, 2008). These bands may be unusually narrow in areas of low wave exposure. The remainder of the shore can be dominated by fucoids and kelp with an understorey of barnacles, algae, grazing molluscs and gammarids, and occasionally sponges and sea squirts.

In rocky shore habitats, trampling has been shown to be a type of physical disturbance that has effects over and above that of disturbance caused by wave exposure (Tyler-Walters and Arnold, Chloe, 2008). The pre-adaptation of macroalgae and sessile organisms to wave action does not necessarily provide protection or tolerance of the effects of trampling. The bare space caused by trampling is reported to likely be chronic in nature and more frequent in spring and summer (less so in winter) (Brosnan and Crumrine, 1994). Many species are adapted to take advantage of bare space left by winter storms, and peak recruitment for many species (e.g. algae and barnacles) occurs in spring and summer, which coincides with peak periods for visitation of shores, and hence trampling (Brosnan and Crumrine, 1994).

Lichens are considered to be intolerant of trampling (Tyler-Walters, 2005a) as physical disturbance (such as trampling) may reduce species richness and while growth rates are variable between growth forms, colonization is slow. Brown algae characterized by fucoids (Fucus spp. in the UK) are particularly intolerant of trampling, depending on intensity (Boalch *et al.*, 1974; Boalch and Jephson, 1981). Associated infauna also responds deleteriously to trampling, showing reduced diversity in more heavily trampled areas (Tyler-Walters and Arnold, Chloe, 2008).

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 Dart 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)**
Static – pots/traps: Pots/creels, cuttlepots, fish traps	As there is little to no level of this activity in the Dart Estuary MCZ, no in-combination effect thought to be possible.	Abrasion/disturbance of the substrate on the surface of the seabed Removal of non-target species Changes in suspended solids (water clarity) Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
Static – fixed nets: Gill nets, Trammels, Entangling	This activity is currently not permitted to take place within the Dart 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 4, a permit holder or named representative is not authorised to use any net other than a seine net in accordance with paragraph 3.2 of the Netting Permit Conditions. Therefore no in-combination effect is thought to be possible.	
Passive – nets: Drift nets (demersal)	This activity is currently not permitted to take place within the Dart 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 4, a permit holder or named representative is not authorised to use any net other than a seine net in accordance with paragraph 3.2 of the Netting Permit Conditions. Therefore no in-combination effect is thought to be possible.	Smothering and siltation rate changes (Light)
Lines: Longlines (demersal)	As there is little to no level of this activity in the Dart Estuary MCZ, no in-combination effect thought to be possible.	
Seine nets & other: Beach seine/ring, shrimp push nets, Fyke and stakenets	As there is little to no level of this activity in the Dart Estuary MCZ, no in-combination effect thought to be possible.	
Aquaculture	Activity is occurring in the Dart Estuary MCZ, but as the activities assessed in this assessment are only occurring occasionally and at low levels, 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.	

D&S IFCA conclude there is no likelihood of significant adverse effect on the interest features from in-combination effects addressed within Table 4.

10. NE consultation response

Natural England has been consulted and have provided formal advice on this assessment and the conclusions it makes. For consistency with the formal advice received for DAR-MCZ-001, the assessment conclusions have been updated to provide more detail on the level of crab tiling within the estuary.

11. Conclusion

The literature detailed in section 8 found that trampling associated with bait digging and other shore-based activities including to crab tiling and hand gathering has the potential to influence the species assemblages on the rocky habitats assessed if levels of shore-based activities were sufficiently high and over a prolonged period.

Within the Dart Estuary MCZ, bait digging is only known to occur occasionally on the intertidal mud at Flat Owers (Henly, 2021). The total number of crab tiles in the MCZ has decreased from ~11,700 in 2000/1 to ~4,700 in 2020 (>50% decrease). Reports from local stakeholders suggest there are a number of crab tiles that are not regularly visited in the Dart Estuary. One individual that does use crab tiles in the estuary hight that their tiles are worked three to four times per month depending on the tides, and that there are many more crab tiles on the Estuary in the winter months (October – March). The evidence in section 8 suggests that bare space caused by

trampling is reported to likely be chronic in nature in spring and summer (less so in winter). Based on the current levels of these activities on the Dart Estuary there is not believed to be a significant impact of the shore-based activities on the protected features assessed. It is believed that these activities are occurring infrequently and at low levels, particularly in the summer months when the effects of trampling would be the most chronic. This likely gives the disturbed areas time to recover before they are revisited and disturbed again.

D&S IFCA are considering the introduction of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity in the District. The introduction of a byelaw would introduce fixed provisions that apply to all persons. Fixed provisions are expected to include a series of catch limits (bag limits) for different species (sea fisheries resources) that are targeted by different types of hand working fishing methods. The bag limits would provide an upper level of catch (a threshold) that would apply to all persons thus limiting the effort of shore-based activities on the Estuary. As outlined in section 7, the development of a Hand Working Permit Byelaw is now a longer-term commitment for D&S IFCA and has not been included in D&S IFCA's Annual Plan for 2022–2023.

The activities assessed are believed to be occurring at a very low level within the MCZ. Therefore, D&S IFCA conclude that there is no significant risk of the activities hindering the achievement of the conservation objectives for the Dart 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**
Estuarine rocky habitats	Recover the presence and spatial distribution of intertidal rock communities. Maintain the total extent and spatial distribution of intertidal rock. [Maintain OR Recover OR Restore] the abundance of listed species Maintain the characteristic morphology of the habitat.	Commercial fishing; Intertidal handwork: Handworking (access from vessel), Handworking (access from land) Miscellaneous: Crab tiling Bait collection: digging with forks	• See Annex 2 for pressures audit trail	Trampling associated with these activities may cause abrasion/ disturbance of the features assessed	Based on the current levels of these activities on the Dart Estuary there is not believed to be a significant impact of the shore-based activities on the protected features assessed	Yes, Management measures could include: 1. Monitor activity levels 2. Introduction of a new Hand Working Permit Byelaw to manage the use of crab tiles, bait digging and many other hand gathering types of fishing activity.
Low energy intertidal rock	Recover the presence and spatial distribution of intertidal rock	Commercial fishing; Intertidal handwork: Handworking	• See Annex 2 for pressures audit trail	See above	See above	See above

	communities. Maintain the total extent and spatial distribution of intertidal rock [Maintain OR Recover OR Restore] the abundance of listed species	(access from vessel), Handworking (access from land) Miscellaneous: Crab tiling Bait collection: digging with forks				

13. References

Boalch, G. T., Holme, N., Jephson, N., and Sidwell, J. C. 1974. A Resurvey of Colman's Intertidal Traverses at Wembury, South Devon.

Boalch, G. T., and Jephson, N. 1981. A re-examination of the seaweeds on Colman's intertidal traverses at Wembury, South Devon. Proceedings of the International Seaweed Symposium.

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D&S IFCA. 2019. Managing Hand Working Fishing Activity: A Focus on Bait Digging. Supplementary Report for the B&PSC – Information & Evidence, V2.0. Devon & Severn Inshore Fisheries and Conservation Authourity, Brixham, Devon.

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JNCC. 2008. UK Biodiversity Action Plan Priority Habitat Descriptions - Estuarine Rocky Habitats. https://data.jncc.gov.uk/data/0a9b6b43-4827-44a4-ab06-0f94d5ad6b93/UKBAP-BAPHabitats-13-EstuarineRockyHabitats.pdf (Accessed 9 August 2021).

Natural England. 2021. Conservation Advice for Dart Estuary Marine Conservation Zone (MCZ). https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0057&SiteName=Dart&countyCode=&responsiblePerson=&unitId=&SeaArea=&IFCAArea=&NumMarineSeasonality=,0&SiteNameDisplay=Dart%20Estuary%20MCZ&HasCA=1&NumMarineSeasonality=0&SiteNameDisplay=Dart%20Estuary%20MCZ#sitemaps (Accessed 3 August 2021).

Tyler-Walters, H., and Arnold, Chloe. 2008. Sensitivity of Intertidal Benthic Habitats to Impacts Caused by Access to Fishing Grounds. Report to Cyngor Cefn Gwlad Cymru / Countryside Council for Wales from the Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth. https://www.marlin.ac.uk/assets/pdf/CCW_version_Fisheries_Access_Rpt08_Final.pdf (Accessed 9 August 2021).

Annex 1: Site Map(s)

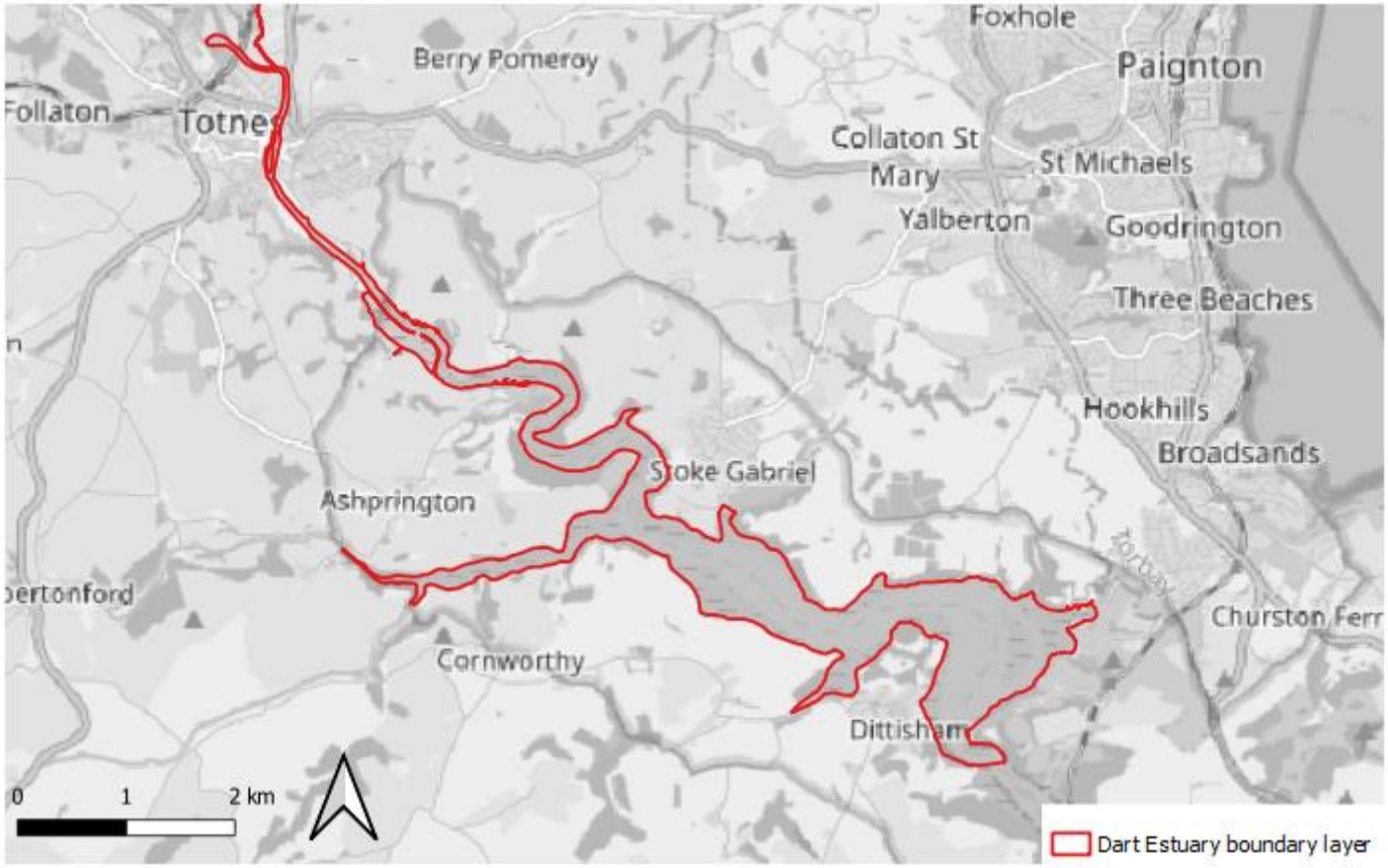


Figure 1: Dart Estuary MCZ boundary

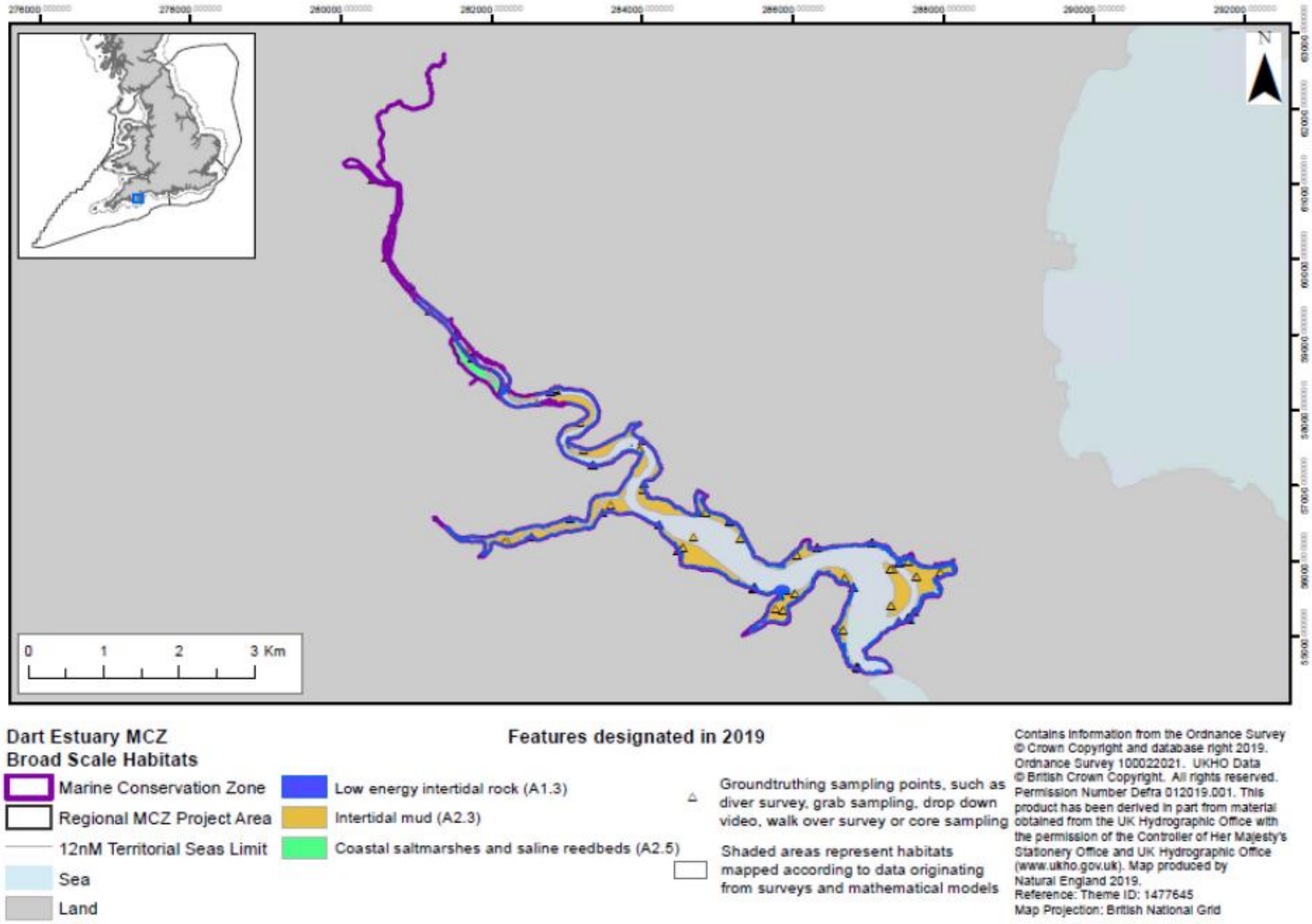


Figure 2: Extent of features (low energy intertidal rock, intertidal mud, and coastal saltmarshes and saline reedbeds) designated in the Dart Estuary MCZ

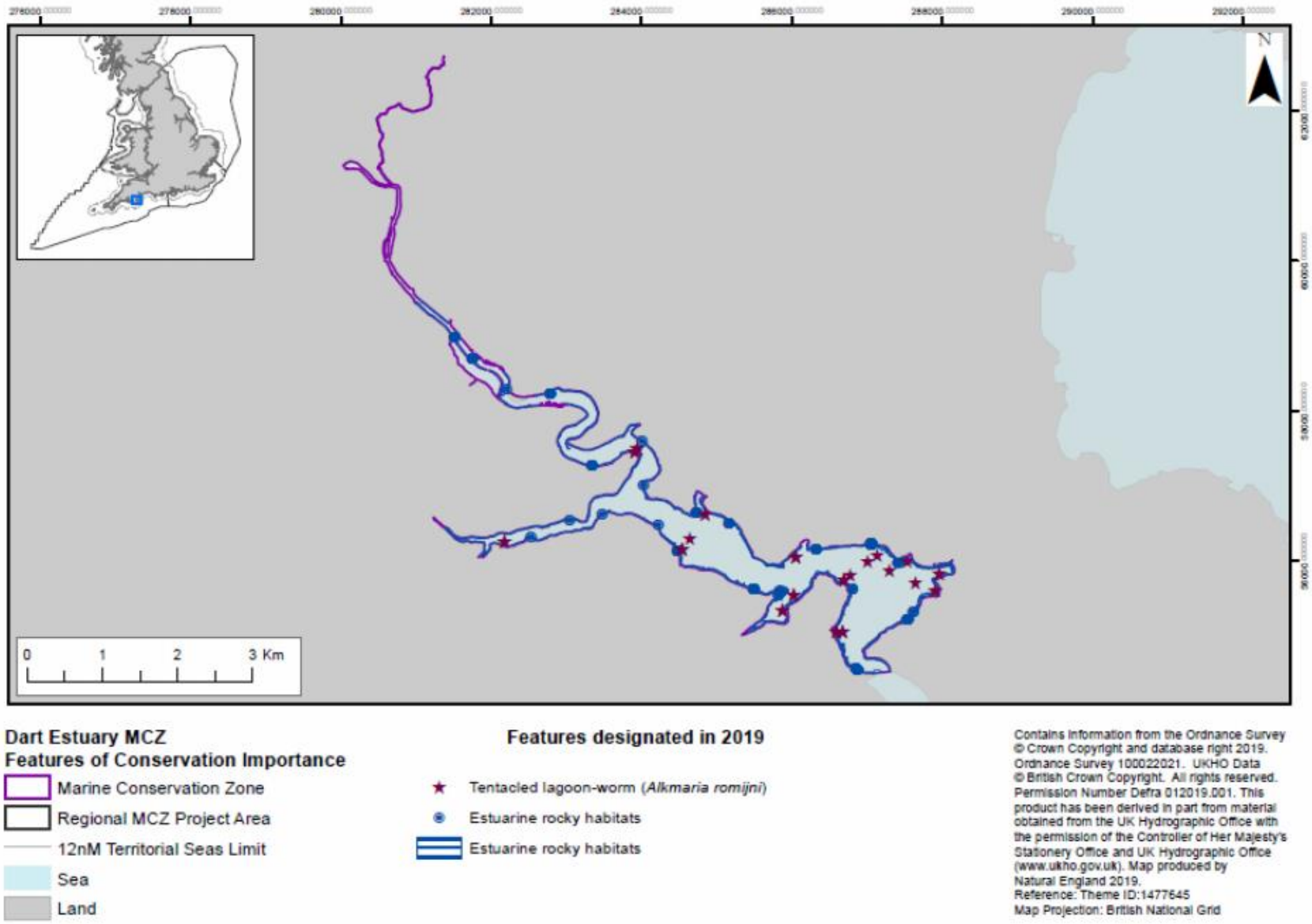
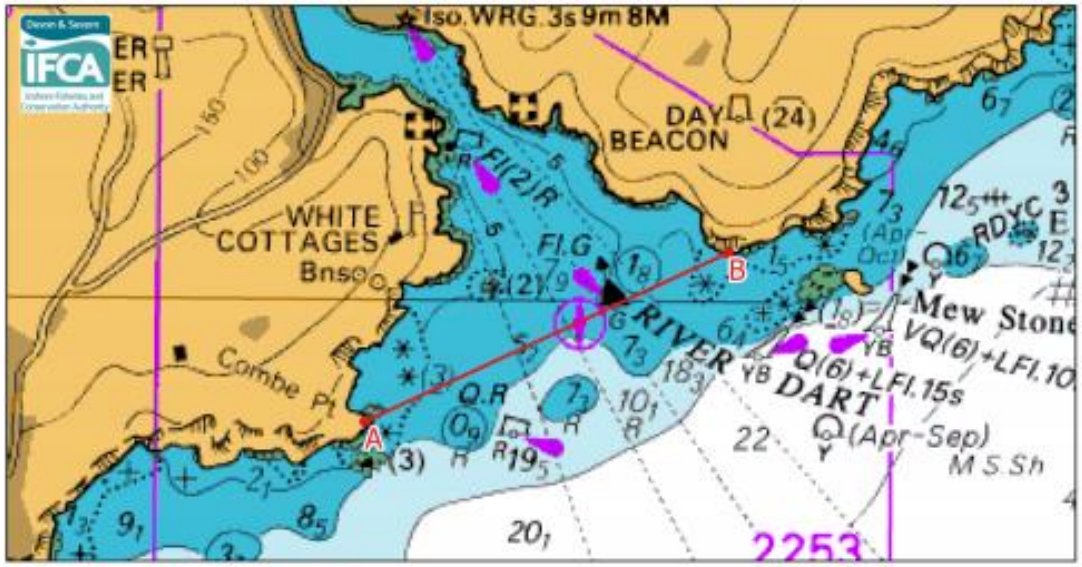


Figure 3: Extent of features (Tentacled lagoon worm *Alkmaria romijni,* Estuarine Rocky Habitats) designated in the Dart Estuary MCZ



River Dart closing line latitude and longitude positions:

Point	Latitude	Longitude
A (Combe Point)	50° 19.634'N	003° 34.266'W
B (Inner Froward Point)	50° 20.141'N	003° 32.583'W

Figure 4: River Dart closing line latitude and longitude. No access landward of the line to the use of nets other than a seine net in accordance with paragraph 3.2 of the Netting Permit Conditions.

Annex 2: Pressures Audit Trail

Fishing Activity Pressures: Shore-based activities	**Coastal saltmarshes and saline reedbeds**	**Low energy intertidal rock**	**Intertidal mud**	**Estuarine rocky habitats**	**Tentacled lagoon worm**	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	S	S	S	S	S	IN – Trampling associated with these activities may cause pressure to the features assessed. Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Habitat structure changes - removal of substratum (extraction)	S	S	S	S	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	S	S	S	S	S	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of non-target species	S	S	S	S	IE	IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Removal of target species		S	S			IN – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Deoxygenation	NS	S	NS	NS	NS	OUT – Insufficient activity levels to pose risk at level of concern
Hydrocarbon & PAH contamination	NA	NA	NA	NA	NA	OUT - Not applicable
Introduction of light		S	NS	S		OUT - Insufficient activity levels to pose risk of large scale pollution event
Introduction or spread of invasive non-indigenous species (INIS)	S	S	S	S	IE	OUT – Insufficient activity levels to pose risk of large scale pollution event
Litter	S	NA	NA	NA	NA	OUT – Not applicable
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	NA	NA	NA	NA	OUT - Not applicable
Transition elements & organo-metal (e.g. TBT) contamination	NA	NA	NA	NA	NA	OUT - Not applicable
Underwater noise changes		IE		IE		OUT - Not applicable