Fisheries in EMS Habitats Regulations Assessment for Amber and Green risk categories

European Marine Site: Braunton Burrows SAC

Fishing activities assessed: Intertidal handwork

Gear/feature interactions assessed:

D&S IFCA Interaction ID	Fishing Activity	Sub-feature(s)
HRA_UK0012570_L19	Handworking (access from vessel)	Intertidal mudflats and sandflats
HRA_UK0012570_L20	Handworking (access from land)	Intertidal mudflats and sandflats

IFCA reference:
BBSAC_002

Contents

1. Introduction

1.1 Need for an HRA assessment

In 2012, the Department for Environment, Food and Rural Affairs (Defra) announced a revised approach to the management of commercial fisheries in European Marine Sites (EMS). The objective of this revised approach is to ensure that all existing and potential commercial fishing activities are managed in accordance with Article 6 of the Habitats Directive.

This approach is being implemented using an evidence based, risk-prioritised, and phased basis. Risk prioritisation is informed by using a matrix of the generic sensitivity of the sub-features of EMS to a suite of fishing activities as a decision making tool. These sub-feature-activity combinations have been categorised according to specific definitions, as red, amber, green or blue.

Activity/feature interactions identified within the matrix as red risk have the highest priority for implementation of management measures by the end of 2013 in order to avoid the deterioration of Annex I features in line with obligations under Article 6(2) of the Habitats Directive.

Activity/feature interactions identified within the matrix as amber risk require a site-level assessment to determine whether management of an activity is required to conserve site features. Activity/feature interactions identified within the matrix as green also require a site level assessment if there are “in combination effects” with other plans or projects.

Site level assessments are being carried out in a manner that is consistent with the provisions of Article 6(3) of the Habitats Directive. The aim of this assessment is to determine whether management measures are required in order to ensure that fishing activity or activities will have no adverse effect on the integrity of the site. If measures are required, the revised approach requires these to be implemented by 2016.

The purpose of this site specific assessment document is to assess whether or not in the view of Devon & Severn Inshore Fisheries and Conservation Authority (D&S IFCA) the fishing activities handworking (access from vessel and land) have a likely significant effect on the ‘intertidal mudflats and sandflats’ of the Braunton Burrows SAC, and on the basis of this assessment whether or not it can be concluded that handworking will not have an adverse effect on the integrity of this EMS.

1.2 Documents reviewed to inform this assessment

- Natural England’s risk assessment Matrix of fishing activities and European habitat features and protected species[1]
- Reference list (Annex 1)
- Natural England’s consultation advice (Annex 2)
- Site map(s) – sub-feature/feature location and extent (Annex 3)
- Fishing activity data (map(s), etc.) (Annex 4)

[1] See Fisheries in EMS matrix: http://www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/populated_matrix3.xls

2. Information about the EMS

Braunton Burrows is one of the largest dune systems in Britain, about 5km long and 1.5km wide, with lime-rich dunes up to 30m high and extensive system of variably-flooded slacks, grassland and scrub, inland of a wide sandy foreshore. The foreshore consists mainly of sandy flats, rich in lime from broken shells, with some intertidal shingle grading to silt in the adjacent estuary. Devon and Severn IFCA will only be assessing fishing activities occurring within the intertidal.

2.1 Overview and qualifying features (Figure 2, Annex 3)

Braunton Burrows qualifies as a SAC for the following Annex I habitats as listed in the EU Habitats Directive (Natural England, 2014):

- Mudflats & sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats
- Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram
- Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland
- Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*); Dunes with creeping willow
- Humid dune slacks
- *Petalophyllum ralfsii*; Petalwort

Intertidal mudflats and sandflats: Most of the exposed sediment in the intertidal is classified as A2.231 'polychetes in littoral fine sand' and the mussel bed located on Sprat Ridge A2.72 'littoral mussel beds on sediment'.

2.2 Conservation Objectives

The site's conservation objectives which apply to the **Special Area of Conservation** and the natural habitat and/or species for which the site has been designated are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species
- the structure and function (including typical species) of qualifying natural habitats
- the structure and function of the habitats of qualifying species
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- the populations of qualifying species
- the distribution of qualifying species within the site

3. Interest feature(s) of the EMS categorised as 'red' risk and overview of management measure(s) (if applicable)

- No 'red' risk features within Braunton Burrows SAC.

4. Information about the fishing activities within the site

Handworking on the intertidal occurs on Sprat Ridge for the collection of mussels. Cefas shellfish classification zone map for mussels can be seen in Annex 4, Figure 7.

Braunton Burrows SAC overlaps with part of the Taw-Torridge Estuaries SSSI. Under the protection of the SSSI, Natural England manages the collection of mussels due to their importance as a food source for bird species. From previous surveys, the tonnage of mussels on the Taw Torridge Estuary, as a whole, was fed into a bird food model. This model was used to quantify the amount of mussel that could be removed by commercial handgatheres from the mussel beds in the estuary. The current management conditions (as of March 2015), which apply to the whole estuary and not one single mussel bed, are:

1. No more than 500kg of mussels should be removed from the SSSI per month.
2. Any business wishing to remove mussel must notify NE and D&S IFCA of their intentions to do so by 23rd of the month prior to the month when mussel harvesting is proposed. This will allow NE and D&S IFCA to advise if your planned removal will, in combination with other planned activities, be likely to result in the 500kg limit being exceeded. If this is the case, planned removal by all individuals will need to be reduced accordingly.
3. Applications to remove mussels after the 23rd of the month prior to the month when mussel harvesting is proposed will not be considered for the following month's harvesting.
4. In addition the business must inform D&S IFCA and NE by phone on the day of mussel removal prior to harvesting taking place. This will allow inspection of the catch.
5. Records of quantity of mussel removed (including location) together with copies of movement documents should be submitted to NE & D&S IFCA no more than 14 days after harvesting.

Devon and Severn IFCA is contacted regarding the harvesting of mussels, Table 1 below shows the amount harvested and from which bed.

Table 1 - Taw Torridge mussel monthly harvesting

Month	Mussel harvested (kg)	Mussel Bed
01/05/2016	30	Yelland
01/04/2016	480	Spratt Ridge
01/03/2016	490	Yelland
01/02/2016	?	-
01/01/2016 & 01/12/2015	180	Lifeboat
01/11/2015	500	-
01/10/2015	380	-
01/09/2015	-	FSA closure for E. coli
01/08/2015	-	FSA closure for E. coli
01/07/2015	400	Coolstone & Lifeboat
01/06/2015	300	Coolstone & Lifeboat
01/05/2015	350	Spratt Ridge
01/04/2015	540	Spratt Ridge
01/03/2015	60	Spratt Ridge
28/01/2014	-	FSA closures to all beds

The mussel stock survey for 2016 has been carried out and awaiting analysis. When this has been completed, Natural England will review their advice and provide a further update on the level of collection of mussels.

Devon and Severn IFCA have the following byelaws, which relate to the collection of mussels:

- Byelaw 9, Temporary of Shellfish Beds, enables the Authority to temporarily close shellfish beds for the collection and removal of mussels, oysters, clams and periwinkles, in order to ensure recovery.
- Byelaw 7 (inherited by the Authority from the Environment Agency in April 2011) , Shellfish - Minimum size: no person shall remove from a fishery any mussel of less than 2 inches length.

Mussel stock of Sprat Ridge:

The extent of the mussel bed from 2012 to 2016 can be seen in Annex 3, Figure 4. Sprat Ridge was once split into two separate areas and Table 2 and 3 demonstrate this. However, due to loss of mussel stock (thought to be because of storm in winter 2014) and change in sediment distribution, Sprat Ridge Far End is no longer a quantifiable bed (Table 3). With this in mind, it is worth noting that the boundary of Sprat Ridge is subject to the natural variation in the sediment distribution and thus the site boundary used for Sprat Ridge in Annex 3, Figure 3 is not a definite site boundary.

Table 2 - Comparison of Sprat Ridge mussel bed area and stock from past surveys

Year	2012	2013	2014	2015	2016	2015 to 2016 percentage change
Area (ha)	7.4	8.7	6.7	8.7	7.1	-18%
Stock<50mm (tonnes)	566	536	269	203	151	-26%
Stock >50mm (tonnes)	210	310	209	162	204	+21%
Total Stock (tonnes)	776	846	478	365	355	-3%

Table 3 - Comparison of Sprat Ridge Far End mussel bed area and stock from past surveys

Year	2012	2013	2014	2015	2016
Area (ha)	1.5	1.5	0.2	0	0
Stock<50mm (tonnes)	25	0	0	0	0
Stock >50mm (tonnes)	92	101	1	0	0
Total Stock (tonnes)	117	101	1	0	0

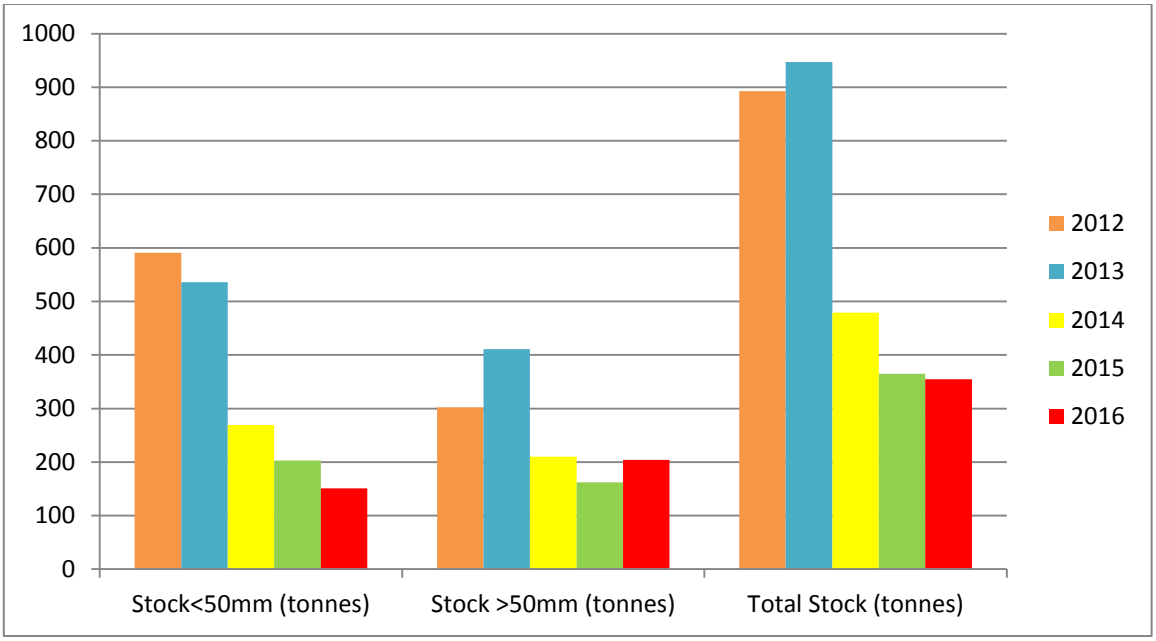


Figure 1 – Mussel stock of Sprat Ridge (Table 2 and 3 combined) from 2012 to 2016

5. Test for Likely Significant Effect (LSE)

5.1 Table 3: Assessment of LSE

1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?	**No**	
2. What pressures (such as abrasion, disturbance) are potentially exerted by the gear type(s)	• Abrasion/ disturbance of the substrate on the surface of the seabed • Removal of target species **See Annex 6 for pressures audit trail**	
3. Is the feature potentially exposed to the pressure(s)?	**Yes,** but there are currently management measures in place that can prohibit the use of mussel collection in Braunton Burrows SAC if needed (see Section 4).	
4. What are the potential effects/impacts of the pressure(s) on the feature, taking into account the exposure level?	Handworking occurs for the collection of mussel from Sprat Ridge. Handworking could significantly impact the mussel bed through direct mussel removal and the associated impacts of trampling.	
5. Is the potential scale or magnitude of any effect likely to be significant?	**Alone**	**Unsure**, there is an interaction present and hand gathering has the ability to impact the features assessed so an appropriate assessment has been carried out.
	In-combination	**No, see section 8 for more information**
6. Have NE been consulted on this LSE test? If yes, what was NE's advice?	**No**, not at this stage.	

6. Appropriate Assessment

6.1 Potential risks to features

The potential pressures, impacts and exposure by gear type(s) for each feature/sub-feature are summarised in Table 4.

Table 4: Summary of Impacts

Feature/ Sub feature(s)	**Target Attributes/ Conservation Objectives** (Natural England, 2015a)	**Potential pressure (such as abrasion, disturbance) exerted by gear type(s)**	**Potential ecological impacts of pressure exerted by the activity/activities on the feature** *(reference to conservation objectives)*	**Level of exposure of feature to pressure**	**Mitigation measures**
Intertidal mudflats and sandflats	**Target Attribute:** Maintain or restore the total extent and spatial distribution **Conservation Objective:** Maintain or restore the extent and distribution of qualifying natural habitats and habitats of the qualifying species.	• Abrasion/ disturbance of the substrate on the surface of the seabed • Removal of target species	Handworking would not have an effect on the extent and distribution of intertidal mudflats and sandflats (most of the exposed sediment in the intertidal is classified as A2.231 'polychetes in littoral fine sand'). However, on Sprat Ridge the mussel bed (A2.72 'littoral mussel beds on sediment') extent and distribution could be impacted by the direct removal of mussels and associated impacts of trampling from individuals collecting. These impacts on the mussel bed are assessed in further detail in the rows below.	No exposure See below	No mitigation measures necessary See below
Intertidal mudflats and sandflats	**Target Attribute:** Maintain or restore the presence and spatial distribution of sub-feature communities **Conservation Objective:** Maintain or restore the extent	• Removal of target species	Mussels that are removed by handworking have to be greater than 2 inches (50.8mm). Mussels have to be riddled immediately on the bed whilst uncovered from the tide. Juvenile/ undersize mussels are returned and spread evenly on the bed. Riddling gives the juvenile mussels the best chance to re-establish, as they have to re-attach to the bed before high tide in order to survive and not be washed away. In May 2016, there was 204 tonnes of mussel	Hand working only occurs on Sprat Ridge in Braunton Burrows SAC. Mussel collection occurs on a low level on Sprat Ridge and only accessible by boat at low tide. There is currently a limit of 500kg of mussels that can be removed from the	Devon and Severn IFCA and Natural England are consulted monthly on the amount of mussels removed by individuals. The stock levels of the mussel bed are monitored annually. If there are any significant changes in stock levels, the current management

	and distribution of qualifying natural habitats and habitats of the qualifying species. **Target Attribute:** Maintain or restore the species composition of component communities **Conservation Objective:** Maintain or Restore the structure and function (including typical species) of qualifying natural habitats.		stock over 50mm (Table 2, Section 4). If all the mussels over 50mm were to be removed there would be 151 tonnes of undersized mussel (43% of the total mussel) still present and forming a viable mussel bed. Table 2 and Figure 1 in Section 4 indicate there is year on year variability in mussels over 50mm. Additionally there has been a decreasing trend in spatfall and standing stock. There is a certain level of natural variability of the mussel bed (Annex 3, Figure 4). The reduced amount of spat has been seen throughout the D&S IFCA District and is not thought to be a site specific issue. The results of Smith & Murray (2005) indicate that visitor trampling and removal of mussels *Mytilus californianus* by fishers can significantly reduce mussel cover, density, biomass, and size. They found that removal for bait of only two mussels per month in a 0.35m^2 area can result in a shift in the size structure of the population if larger mussels are targeted for extraction. Fisher activity has been shown to be negatively related to mussel cover at southern Californian sites, where mussel beds exposed to a high level of recreational fisher use had more gap space and less mussel cover than beds at sites with lower fisher use. The effects of trampling alone on mussel beds are discussed in the row below. Smith & Murray (2005) found mussel mass decreased by 80% in areas of removal and trampling (300 steps). Reductions in mussel cover ranged from 57.5% in removal only areas to 78.9% in removal and trampling areas. However, due to the ENSO, control plots experienced a reduction in mussel cover	Taw-Torridge SSSI. Sprat Ridge is one of five mussel beds within the SSSI. The 500kg maximum collection of mussels per month is spread out over these five beds. There are six individuals that have expressed their interest in collecting mussels. Table 1, Section 4 shows the recent amount (kg) of mussel harvested and from which bed it was collected. Due to recent stock loss from storms in 2014, Sprat Ridge is considered to be a single-layered mussel bed. The mussel stock assessment in May 2016 found the highest density of mussel was within the centre and northern part of the bed (Annex 3, Figure 5). The percentage cover reduced to loose patches of mussels as officers walked off the bank on the southern side, down to the level of low water (Annex 3, Figure 6).	conditions can be amended by Natural England to reflect the amount of mussel that can be removed for a sustainable fishery. Additionally if too much effort is being directed towards individual beds or too much disturbance is being caused to the undersized mussel Devon and Severn IFCA has the ability under Byelaw no. 9 to temporarily close the mussel bed to ensure recovery. Through the IFCA's Byelaw Review process, D&S IFCA will be reviewing all byelaws relating to hand-gathering. There is the intention to create a permitting byelaw in 2017 that covers hand-gathering. This would allow the IFCA to monitor levels of handgathering activity in the future, and adapt permit conditions to changes in effort/ environmental conditions if necessary.

			of 40.8% during the study. Despite this, removal and trampling areas lost 20-40% more coverage than controls. An average of 6% of the loss of mussel cover in removal areas attributed to the immediate effect of removing two mussels per month and 15% of the loss in trampled plots due to the crushing of mussels. Only a proportion of total cover loss during the study was immediate, direct results of the experiment. The remaining losses occurred during intervals between the treatments. Smith and Murray (2005) suggested that there was an indirect effect of trampling, weakening the byssal thread attachments between adjacent mussels which increases their susceptibility to wave disturbance. Brosnan and Crumrine (1994) similarly suggested that trampling may weaken areas of a mussel bed, resulting in losses that would not normally occur during winter storms. In addition, they observed that mussel cover continued to decline for almost a year after their experimental trampling finished. Natural disturbance to mussel communities is relatively common (e.g. gaps in mussel beds created by strong waves). Small disturbance gaps produced by the removal of a few individuals can recover quickly due to the encroachment of adjacent mussels. However, larger gaps must be recolonised, so can take several decades to fully recover. Brosnan and Crumrine (1994) found more severe mussel cover losses in Oregon during a non-ENSO period. Plots with single-layered mussels lost up to 65% cover from the more extreme trampling treatment (4,167 steps m^2) used in their study. They also found that plots with multi-layered mussels lost most of the top layer when trampled but showed no decrease		

			in substratum cover because a bottom layer of mussels remained. Brosnan and Crumrine (1994) concluded that tightly packed mussel beds were less susceptible to trampling compared with mussels aggregated in loose patches. Werfhorst and Pearse (2007) examined *M. californianus* abundance at sites with differing levels of trampling disturbance. The highest percentage of mussel cover was found at the undisturbed site, while the severely disturbed site showed low mussel cover. The studies discussed were conducted on rocky intertidal sites on US wave exposed coasts for *M. californianus*. The mussel bed on Sprat Ridge of *M. edulis* is located on a sediment bank in the Taw-Torridge Estuary, UK. Therefore, there are limitations on using the studies as a proxy for the effect of trampling on the Sprat Ridge mussel bed.		
Intertidal mudflats and sandflats	**Target Attribute:** Maintain or restore the presence and spatial distribution of sub-feature communities **Conservation Objective:** Maintain or restore the extent and distribution of qualifying natural habitats and habitats of the qualifying species.	• Abrasion/ disturbance of the substrate on the surface of the seabed	Most of the exposed sediment in the intertidal is classified as A2.231 'polychetes in littoral fine sand' and the mussel bed located on Sprat Ridge is A2.72 'littoral mussel beds on sediment'. Sand and occasional small pebbles surround the mussel bed of Sprat Ridge. The sediment is highly mobile in the estuary and the boundary of Sprat Ridge naturally varies. Therefore due to the dynamic nature of the estuary any form of trampling from people hand gathering is not believed to impact the intertidal sediment. Trampling on the mussel bed may result in dislodgement and/ or damage to the shells of mussels from the weight of people walking with	See above	See above

	Target Attribute: Maintain or restore the species composition of component communities **Conservation Objective:** Maintain or Restore the structure and function (including typical species) of qualifying natural habitats.		possible mortality. Smith & Murray (2005) studied the effects of visitor trampling and bait collection on mussel beds *Mytilus californianus* on a rocky shore in southern California. Trampling treatments were zero, 150 or 300 steps in 0.35m² plots for 12 months. They found that mussel mass, density, and cover were strongly impacted by trampling. Mean mussel density was significantly lower in trampled areas. Trampling treatments crushed an average of four mussels per plot during each application. Aspects of changes in mussel coverage from removal and trampling effects combined from this study are reviewed in the row above (removal of target species). Additional information regarding the effects of trampling on mussel beds is summarised in the row above too as trampling causes direct removal of the target species, mussels, through crushing, dislodgment or weakening attachment strength. Indirect effects of trampling could remove species that interact through competition, predation or habitat provision. Natural predation of mussel beds can be from a range of crab, starfish, fish and bird species. Brosnan and Crumrine (1994) found barnacle and algal epibionts on mussels were significantly reduced by trampling.		

7. Conclusion

Handworking occurs for the collection of mussels. The maximum amount of mussels that can currently be collected per month is 500kg which is monitored and regulated by Devon and Severn IFCA and Natural England. Only mussels over 50mm can be removed. Studies reviewed in the Appropriate Assessment identified significant effects of the removal of mussels on population size, and trampling caused significant decreases in mussel bed density and cover. However, the mussel bed is surveyed annually and management measures are in place to protect the mussel bed if needed. These measures include the management conditions under the Taw Torridge SSSI and under the Devon and Severn IFCA Byelaw 9 to close the mussel bed for collection. At the current low levels of mussel collection, the effect of removal and trampling is not thought to significantly affect the presence, distribution and communities of Sprat Ridge mussel bed.

8. In-combination assessment

8.1 Other fishing activities

The following fishing activities are either occurring or have not been able to have been ruled out as occurring in the Braunton Burrows SAC.

Longlines – Activity is occurring on Sprat Ridge. Officers have recorded 18 full longlines and 3 single posts. The level of effort is currently unknown. Due commercial handworking occurring on a low level on Sprat Ridge, no in-combination effect thought to be possible.

Digging with forks - Digging with forks has not yet been assessed by D&S IFCA.

The following activities have been ruled out as not occurring: crab tiling, static pots/ traps, static fixed nets, passive nets, beach seine/ ringnets, shrimp push nets, fyke and stakenets and bait dragging.

D&S IFCA conclude there is no likelihood of significant adverse effect on the interest features from in-combination effects with other fishing activities addressed within section 8.1.

8.2 Other activities

Currently there are no known proposed plans or projects in Braunton Burrows which could theoretically interact with the intertidal sub-features addressed.

Other*:* The impact of future plans or projects will require assessment in their own right, including accounting for any in-combination effects, alongside existing activities.

D&S IFCA conclude there is no likelihood of significant adverse effect on the interest features from in-combination effects with other plans or projects addressed within section 8.2.

9. Summary of consultation with Natural England

Natural England was consulted in January 2016 regarding the inclusion of plans/projects for in-combination assessments.

Natural England was consulted in February 2016 for advice on assessing activities within Braunton Burrows SAC without a conservation advice package.

10. Integrity test

Conclusion of adverse effect/non-adverse effect either alone or in-combination. This will be reliant on the consideration of mitigation measure(s) documented in the AA and summarised here in conclusion.

It can be concluded that handworking, alone or in-combination, within Braunton Burrows SAC does not adversely affect intertidal mudflats and sandflats assessed and that the conservation objects can be met. There are management measures already in place which, if needed, can limit the amount of mussel removed or close the bed completely to collection.

Annex 1: Reference list

Brosnan, D.M. and Crumrine, L.L., (1994) Effects of human trampling on marine rocky shore communities. Journal of Experimental Marine Biology and Ecology, 177: 79-97.

Cefas, (2016) https://www.cefas.co.uk/cefas-data-hub/food-safety/classification-and-microbiological-monitoring/england-and-wales-classification-and-monitoring/classification-zone-maps/

MAGIC (2016) Multi-Agency Geographic Information for the Countryside interactive map http://magic.defra.gov.uk/MagicMap.aspx?chosenLayers=sacPIndex,sacIndex,vmlBWIndex,25kBWIndex,50kBWIndex,250kBWIndex,miniscaleBWIndex&box=239892:132120:249587:137589&useDefaultbackgroundMapping=false

Natural England (2014) Marine conservation objectives for Special Area of Conservation: Braunton Burrows (UK0012570)

Smith, J. R. & Murray, S. N. (2005) The effects of experimental bait collection and trampling on a *Mytilus californianus* mussel bed in southern California. Marine Biology, 147:699-706

Werfhorst, L.C., and Pearse, J.S. (2007) Trampling in the rocky intertidal of central California: a follow up study. Bulletin of Marine Science, 81(2): 245-254

Annex 2: Natural England’s consultation advice

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

Annex 3: Site Map

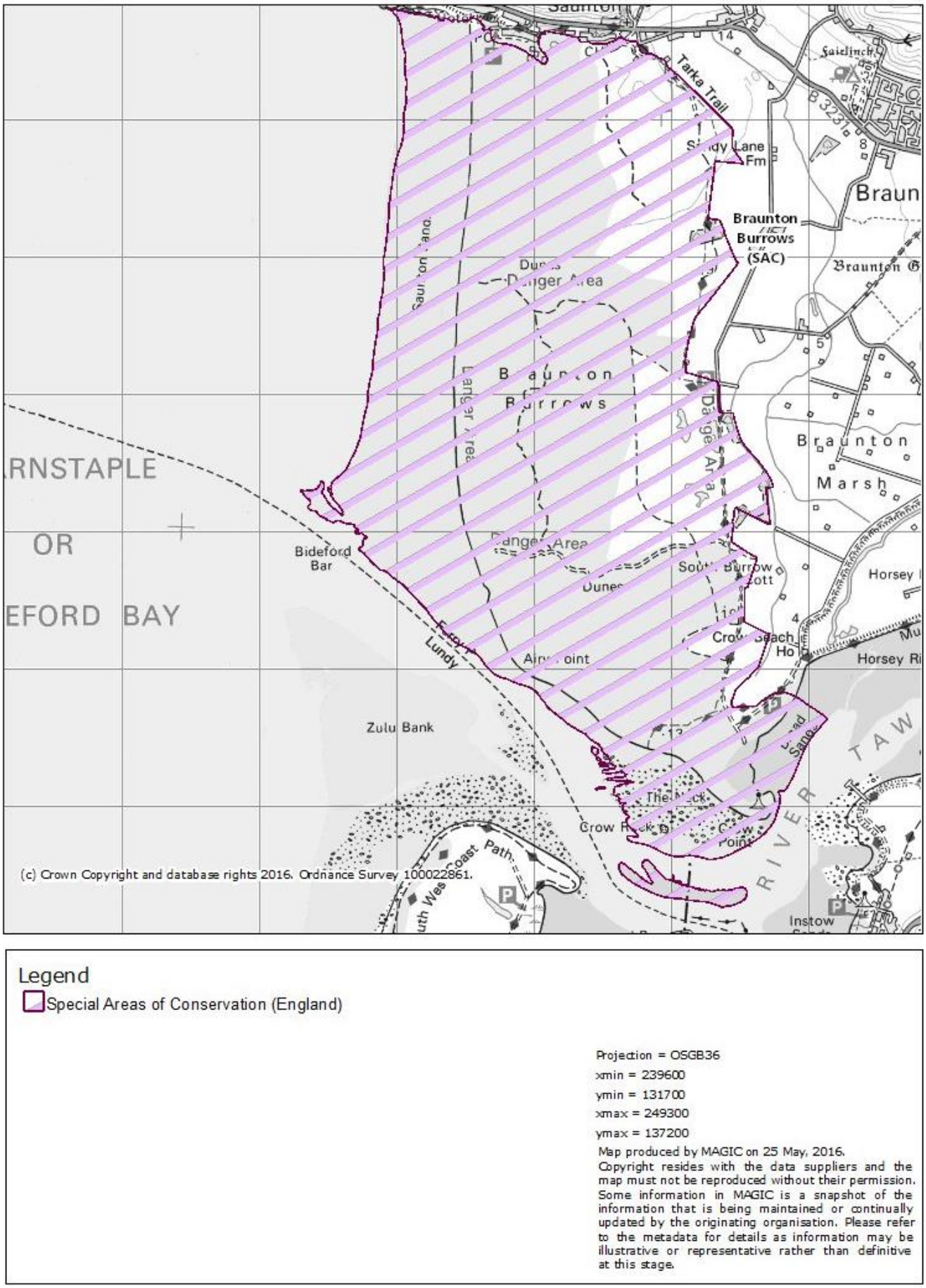


Figure 2 - Area of Braunton Burrows SAC (MAGIC, 2016)

Figure 3 - Area of Braunton Burrows SAC

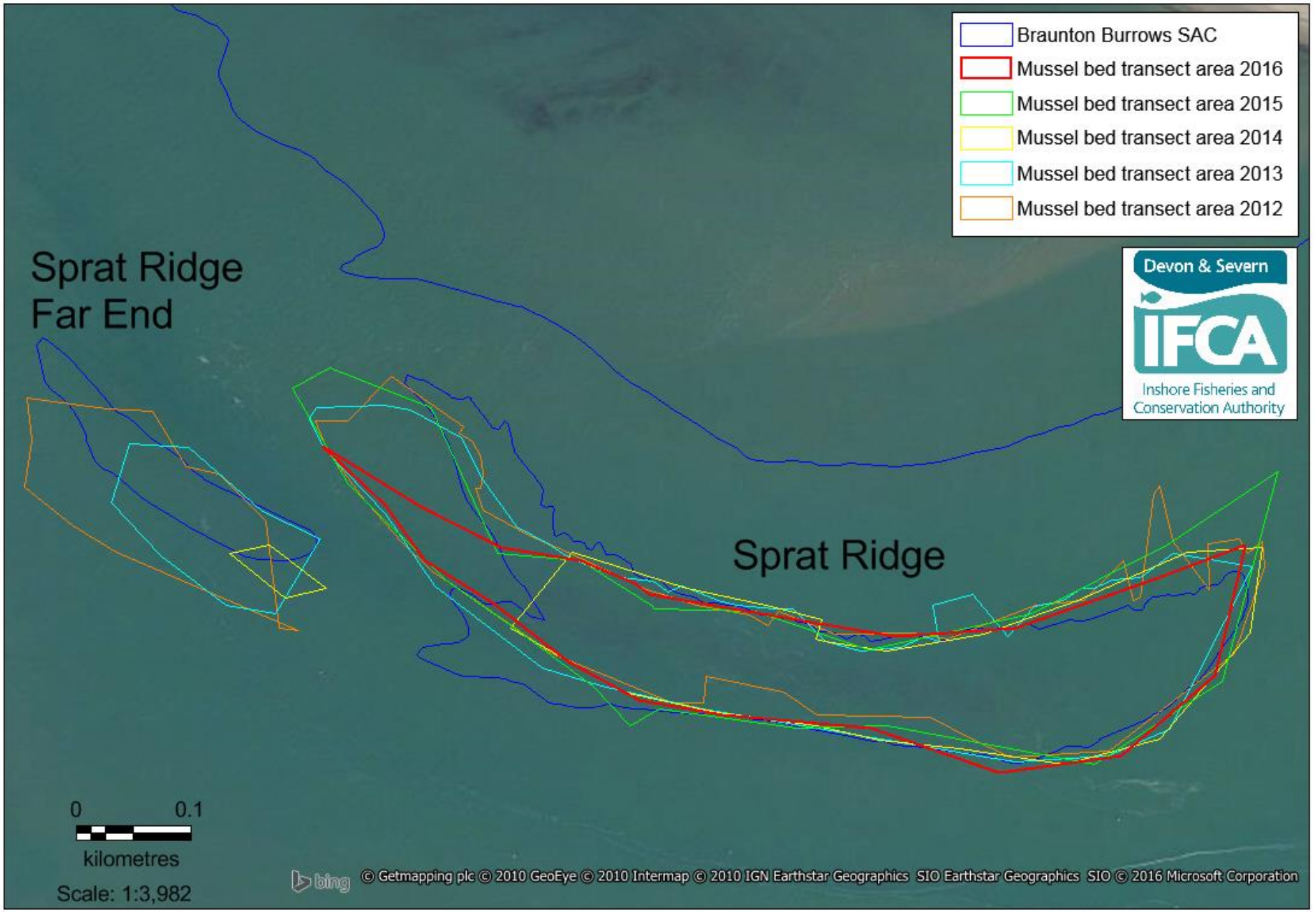
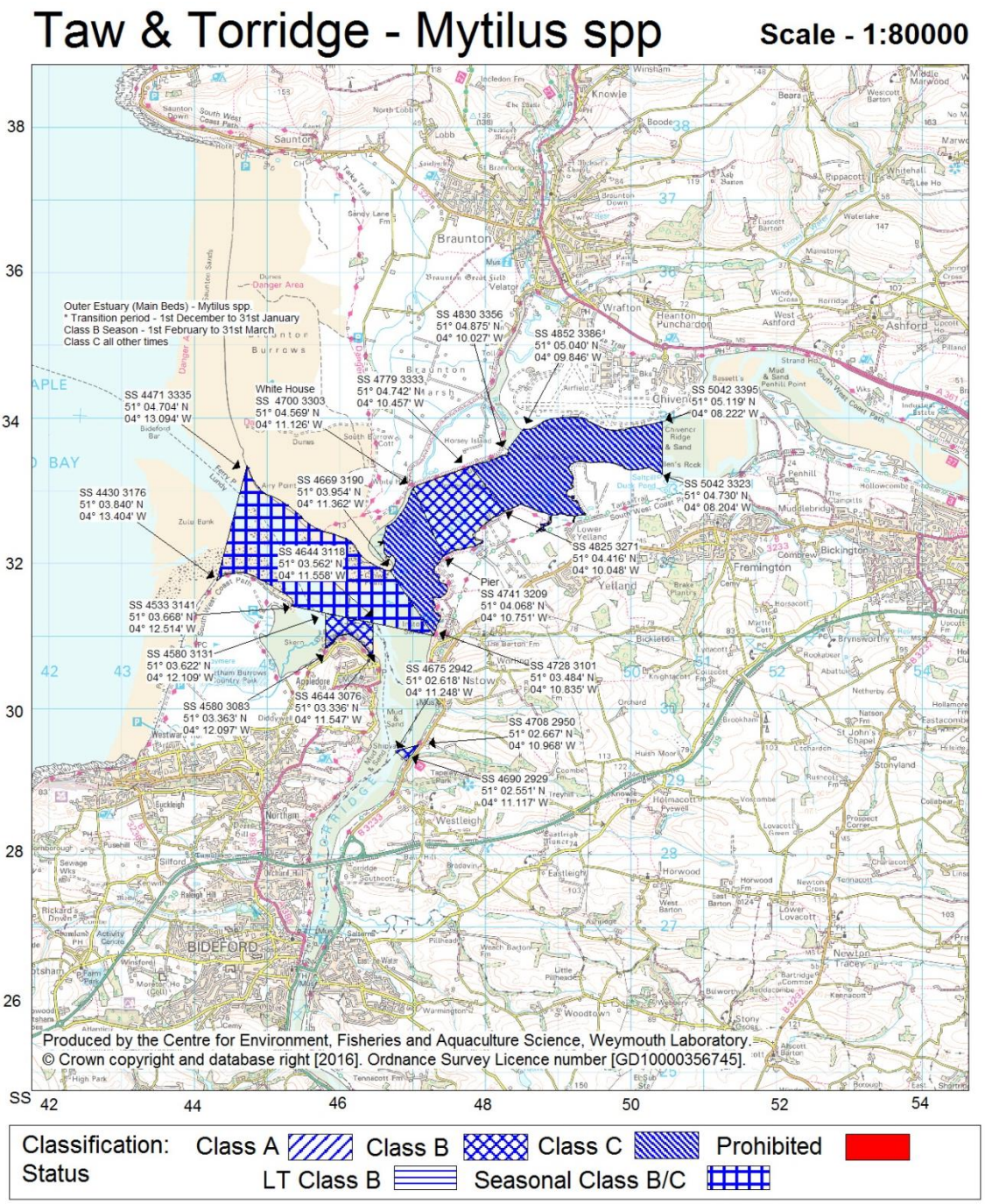


Figure 4 - Area of mussel bed on Sprat Ridge from transects of past mussel bed surveys

Figure 5 - Photograph of mussel bed on Sprat Ridge ©L.Bullock

Figure 6 - Photograph of the mussel bed from the on Sprat Ridge ©L.Bullock

Annex 4: Fishing activity maps



Classification of Bivalve Mollusc Production Areas: Effective from 3 March 2016

The areas delineated above are those classified as bivalve mollusc production areas under EU Regulation 854/2004.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB. (Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Separate map available for C. gigas at Taw & Torridge

* Transition period (1st December to 31st January) - Class B season may commence in this period following two samples <=4600 taken at least 1 week apart

Food Authorities: North Devon District Council (Taw) Torridge District Council (Torridge)

Figure 7 - Taw-Torridge classified shellfish harvesting areas for *Mytilus* spp. (Cefas, 2016).

Annex 6: Pressures Audit Trail

Shore-based activities Pressure(s)	**Feature:** Intertidal sand and muddy sand	**Screening Justification**
Abrasion/disturbance of the substrate on the surface of the seabed	**Sensitivity: S**	**IN** – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure
Genetic modification & translocation of indigenous species	**Sensitivity: IE**	**OUT** - the activity operates in local area only so risk considered extremely low
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	**Sensitivity: NS**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event
Introduction of other substances (solid, liquid or gas)	**Sensitivity: IE**	**OUT** - Insufficient activity levels to pose risk of large scale pollution event
Introduction or spread of non-indigenous species	**Sensitivity: S**	**OUT** – The activity operates in local area only so risk considered extremely low
Litter	**Sensitivity: IE**	**OUT** - Insufficient activity levels to pose risk at level of concern
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	**Sensitivity: S**	**OUT** – Penetration/ disturbance of the substrate would not occur from gathering mussels.
Physical change (to another seabed type)	**Sensitivity: S**	**OUT** – No risk of change to intertidal sandflats and mudflats from activity. There are insufficient activity levels of handworking and no removal of undersized mussels to pose risk at level of concern to the mussel bed.
Removal of non-target species	**Sensitivity: S**	**OUT** – There is no incidental by-catch from hand gathering of mussels.
Removal of target species	**Sensitivity: S**	**IN** – Removal of target species associated with activity e.g. mussels