

Title: Inner Dowsing, Race Bank and North Ridge European Marine Site (specified areas) bottom towed gear byelaw impact assessment IA No: MMO03 Lead department or agency: Marine Management Organisation Other departments or agencies: Defra, Natural England, Eastern Inshore Fisheries and Conservation Authority	Impact Assessment (IA)
	Date: 09/12/2013
	Stage: Development/Options
	Source of intervention: Domestic
	Type of measure: Secondary Legislation
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Summary: Intervention and Options	RPC Opinion: RPC Opinion Status

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
NA	NA	NA	No	NA
<p>What is the problem under consideration? Why is government intervention necessary?</p> <p>The Marine Management Organisation (MMO) is proposing this byelaw because there is a need to protect designated annex I biogenic (<i>Sabellaria spinulosa</i>) reef features within this European marine site (EMS) from fishing using bottom towed gear.</p> <p>This byelaw is proposed in accordance with the revised approach introduced by the Department for Environment, Food and Rural Affairs (Defra) to ensure the full compliance with Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the Birds Directive) with respect to commercial fishing activity.</p> <p>Intervention is required to redress market failure in the marine environment by implementing appropriate management measures (e.g. this byelaw) to conserve features to ensure negative externalities are reduced or suitably mitigated. Implementing this byelaw will ensure continued provision of public goods in the marine environment.</p> <p>The revised approach to commercial fishery management is being implemented using an evidence based, risk-prioritised, and phased basis. The approach is informed by an agreed matrix showing how fishing activities could affect features designated in EMSs. Each activity/feature interaction has been categorised as red, amber, green or blue according to the potential risks that specific gear types present to the interest features. A red category indicates that there is a high risk to the feature, and that management actions should be prioritised and implemented by the end of 2013. All remaining gear type/feature interactions identified within the matrix will be assessed and appropriate management measures implemented, if required by 2016.</p>				

The interaction between bottom towed gear and the *Sabellaria spinulosa* reef features in the Inner Dowsing, Race Bank and North Ridge Site of Community Importance (SCI) has been identified as red, and therefore a priority for management to remove the risk of damage to the feature from bottom towed gear. The proposed byelaw will ensure that the fishing activity/feature interaction is managed in accordance with Article 6 of the Habitats Directive. The interactions between other fishing gear types and the *Sabellaria spinulosa* reef features have been identified as lower priority and will therefore be considered at a later date.

The other designated features within the site are Annex I subtidal sandbanks. The interactions between fishing gears and sandbank features have been identified as lower priority, and will therefore be considered at a later date.

For sites located between 0 and 6 nautical miles (nm), Defra expects the relevant Inshore Fisheries and Conservation Authority (IFCA) to be the lead regulatory authority. For sites between 6 and 12nm, the MMO is the lead regulatory authority and measures introduced on a non-discriminatory basis in accordance with the relevant Common Fishery Policy (CFP), Article 9 of Council Regulation 2371/2002.

Following discussions between the MMO and Eastern IFCA, it has been agreed that, a MMO byelaw will be used to manage the *Sabellaria spinulosa* reef features within the 0 to 12nm area. Therefore an MMO byelaw for the part of the EMS between 0 and 12nm is the preferred option.

What are the policy objectives and the intended effects?

- To prevent the deterioration of *Sabellaria spinulosa* reef features within the section of the Inner Dowsing, Race Bank and North Ridge SCI, between 0 and 12 nm, from impacts associated with deployment of bottom towed fishing gears.
- To further the conservation objectives stated for the Inner Dowsing, Race Bank and North Ridge SCI.
- To ensure compliance with the Habitats Directive in line with Defra's revised approach.
- To promote sustainable fisheries while conserving the marine environment.
- To minimise the impact on bottom towed gear fishing activity, by maintaining access, where possible, to fishing grounds within the SCI.
- To reduce external negativities and ensure continued provision of public goods.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

1. Do nothing.
2. Voluntary measures.
3. MMO byelaw prohibiting bottom towed gears throughout the SCI ('full site closure').
4. MMO byelaw to prohibit bottom towed gears over bedrock reef feature with appropriate buffering ('zoned management').
5. Management of activity through a Statutory Instrument, Regulating Order or fishing licence condition.

The preferred option is option 4 which will promote both sustainable fisheries and conserve the marine environment and will ensure compliance with the Habitats Directive.

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Will the policy be reviewed? It will be reviewed. If applicable, set review date: Not applicable					
Does implementation go beyond minimum EU requirements?			No		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro Yes/No	< 20 Yes/No	Small Yes/No	Medium Yes/No	Large Yes/No
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)			Traded:		Non-traded:

I have read the impact assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: _____ Date: _____

Summary: Analysis & Evidence Policy Option 1

Description:

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate:
2013	2013	10			

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excluding transition) (Constant Price)	Total Cost (Present Value)
Low	No	Optional	Optional
High	No	Optional	Optional
Best Estimate		Optional	£0.20m

Description and scale of key monetised costs by 'main affected groups'

Estimated annual enforcement costs to be faced by MMO range between **£22,475** to **£23,475**. The best estimate of enforcement costs is assumed to be the mid-point of the low and high cost scenarios (**£22,975**), which results in a present value of costs over 10 years of **£0.2m**. One-off costs are not anticipated.

Estimated annual loss of UK landings within the prohibited area including buffer zone is **£34.86** and the value of GVA affected is **£10.60¹**. Present value of GVA over the 10 year IA timeframe is **£91**.

Due to minimal displacement caused by the intervention, as alternative fishing grounds are easily accessible, total cost estimates do not include loss of GVA. Costs to fisheries in that case are likely to be an overestimation as no displacement has been assumed and 100% of GVA in the areas affected is assumed lost.

Other key non-monetised costs by 'main affected groups'

The MMO proposes to use other enforcement bodies such as UK Border Agency and the police in order to fully utilise their resources for surveillance and enforcement. These costs cannot be monetised at present as they are requested on an ad hoc basis and costs can vary. These additional costs can be added if required at a later date.

Only UK vessels have access rights within the 0 to 12nm limit in this area therefore, estimated non-UK landings data not required.

Benefits (£m)	Total Transition (Constant Price) Years	Average Annual (excluding transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	Optional

¹ Further details on the approach is available in Annex H7 for the MCZ IA <http://publications.naturalengland.org.uk/publication/1940011>

High	Optional		Optional	Optional
Best Estimate				
Description and scale of key monetised benefits by ‘main affected groups’ No monetised figures are available for the benefits of the recommended closure. However, significant potential benefits are described below.				
Other key non-monetised benefits by ‘main affected groups’ The environmental benefits from the introduction of this byelaw will be significant as it will protect the <i>Sabellaria spinulosa</i> reef features within the site from bottom towed gear. This will contribute to meeting the ‘maintain or restore’ conservation objective. This will have an added benefit on other features within the SCI and will have an overall benefit to the reef habitat as a result of the prohibition recommended. This may promote more recreational use in the area such as divers and recreational anglers which could potentially benefit the local economy (see evidence base).				
Key assumptions/sensitivities/risks			Discount rate (%)	3.5%
<p>Average cost estimates for the fishing industry are based on MMO landings values estimated within the SCI within ICES division VIIe statistical rectangles 35F0 & 35F1. It is unknown what proportion of the total landings value was actually derived directly from the proposed prohibited area, which makes up less than 0.045% of an ICES statistical rectangle (3840 square km). The statistics data presented in this IA was produced using reported activity within the ICES rectangles that cover the defined SCI areas. The reported activity (quantity and value of landings along with details of gear involved) is taken from the MMO Ifish database and includes all logbook entries for UK registered fishing vessels. Further descriptions of the methodology used to produce costings are detailed in Annex A.</p> <p>Reported GVA was calculated by multiplying the value of landings by percentage of total income that constitutes GVA for the relevant gear type/region. The provided estimate of GVA as a percentage of total income (30% for bottom trawls and 33% for dredges) was also used in the calculations for the proposed MCZs.</p> <p>Information gathered from fishers and other stakeholders during the pre-consultation meetings is used to support the evidence base and assumptions with the caveat that it is anecdotal evidence only. The information gathered was opportunistic and is only a snapshot from the respondents available to provide comments on the day. The number of respondents reflects only those who independently came forth with the information rather than the number who necessarily agree or disagree with the statement.</p>				

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs:	Benefits:	Net:	No	NA

Evidence base

1. Introduction

1.1 Site: Inner Dowsing, Race Bank and North Ridge SCI²

1.2 Inner Dowsing, Race Bank and North Ridge SCI has been designated for reef (*Sabellaria spinulosa*) and subtidal sandbanks (sandbanks which are slightly covered by seawater all the time). *Sabellaria spinulosa* reef features have a number of important effects on the physical environment. They often stabilise sands, gravels and stones; the shells or tubes of the organisms themselves provide hard substrata for attachment of sessile organisms; they may provide a diversity of crevices, surfaces and sediments for colonisation; and accumulated faeces, pseudo faeces and other sediments may be an important source of food for other organisms (Holt *et al.*, 1998; Hendricks *et al.*, 2011; Limpenny *et al.*, 2010). For these reasons many biogenic reefs have a very rich associated fauna and flora, which at least in terms of macrofauna is often much richer and more diverse than in surrounding areas (Holt *et al.*, 1998; Hendrick *et al.*, 2011; Pearce *et al.*, 2007)³.

1.3 The Department of Food, Environment and Rural Affairs (Defra) has introduced a revised approach to the management of fisheries in EMS (see section 2.1). This has resulted in the need for the MMO to establish measures to protect the *Sabellaria spinulosa* reef features from bottom towed fishing gears in the SCI within the 0 to 12 nm limit to ensure full compliance with Article 6 of the Habitats Directive⁴.

1.4 Bottom towed gear means any fishing gear which is pushed or pulled through the sea and contacts the seabed. This includes demersal otter and beam trawls and shellfish dredges. Management measures restricting these activity/feature interactions are therefore required.

1.5 This IA has been prepared to outline the costs and benefits of the proposed MMO byelaw to prohibit bottom towed gears for the protection of the reef features. The IA also indicates why the option being recommended is the preferred option for management. A draft of this IA has been subject to public consultation.

1.6 Data and evidence to inform this IA has been gathered from Natural England (NE), IFCA and the MMO. In addition, MMO in conjunction with Eastern IFCA attended drop-in sessions in King's Lynn on the 11/6/2013 and Boston on the 17/6/2013 to meet stakeholders to ask direct questions and gather evidence as to the economic impacts of the proposed prohibited areas. The resulting comments from industry indicated that there is very little use of bottom towed gear within the proposed prohibited areas. Information and statements from interviews with commercial fishermen were recorded and incorporated into this IA as anecdotal evidence.

1.7 As part of the statutory byelaw process, drafts of the proposed byelaw and IA for this site were formally consulted on from 10/9/2013 to 22/10/2013.

² Sites of Community importance (SCIs) are sites that have been adopted by the European Commission but not yet formally designated as SACs by the UK Government.

³ NE and JNCC formal site advice

http://jncc.defra.gov.uk/pdf/IDRBNR_Reg%2035_Conservation%20Advice_v4.0.pdf

⁴ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

2. Rationale for intervention

2.1 In August 2012 Defra undertook a review into the management of fisheries within EMS in order to identify future management required to ensure site features are maintained at favourable condition. This resulted in a revised approach⁵ to management of fishing in EMS.

2.2 The revised approach is being implemented using an evidence based, risk-prioritised, and phased basis. Risk prioritisation is informed by a matrix⁶ which categorises the risks from interactions between fishing activity and ecological features. Activity/feature interactions have been categorised as red, amber, green or blue. Those classified as red have been prioritised for the implementation of management measures by the end of 2013 (regardless of the actual level of activity) to avoid the deterioration of designated features in line with obligations under Article 6(2) of the Habitats Directive. Interactions which are categorised as amber require a site-level assessment to determine whether management of an activity is required to protect features. Interactions which are categorised as green also require site-level assessment if there are “in-combination” effects. A categorisation of blue indicates that there is no feasible interaction, and as such no further assessment is required⁷.

2.3 Paragraphs 6(1) and 6(2) of the Habitats Directive require that, within special areas of conservation (SACs) and special protection areas (SPAs), member states:

- establish the necessary conservation measures which correspond to the ecological requirements of the Annex I natural habitat types and the Annex II species present on the sites;
- take appropriate steps to avoid the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated.

2.4 Regulation 8(1) of the Conservation of Habitats and Species Regulations 2010 defines an EMS as any (among others) SAC, SPA and SCI. Part 6 of these regulations lay out the management requirements for EMS, in line with articles 6(2), 6(3) and 6(4) of the Habitats Directive.

2.5 Inner Dowsing, Race Bank and North Ridge SCI contains *Sabellaria spinulosa* reef features which have been categorised as red risk with regard to bottom towed gears and therefore management measures are required to remove this risk. MMO is responsible for implementing management to prohibit the interaction between the *Sabellaria spinulosa* reef features and bottom towed fishing gear. The interaction of other fishing gear types with *Sabellaria spinulosa* reef features and the interactions between all fishing gear types and subtidal sandbank features will be assessed during the amber/green assessment process.

⁵ Fisheries in EMS policy document:

www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/policy_and_delivery.pdf

⁶ Matrix:

www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/populated_matrix3.xls

⁷ Centre for Environment, Fisheries and Aquaculture Science (CEFAS) review of matrix and supporting evidence:

http://www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/cefas_matrix_review.pdf

2.6 This site lies across three administrative areas: 0 to 6nm, 6 to 12nm and offshore of 12nm. There are potentially five areas of *Sabellaria spinulosa* reef feature within Inner Dowsing, Race Bank and North Ridge SCI. Area 1 lies within the 6 to 12nm area, Areas 2 and 3 lie within the 6nm limit. There is another potential area located in 0 to 6nm, which is currently subject to further validation (see 2.8). There is one further area which is located offshore of 12nm, therefore will be managed by the European Commission. Areas 1 to 3 are the subject of this IA.

2.7 The specific location and extent of the *Sabellaria spinulosa* reef features was provided by NE⁸. The buffers are based on NE draft guidance⁹, which recommends the size of the buffer based on the depth of the feature being protected. Areas 2 and 3 are based on 'core reef' areas which support consistently occurring, high quality reef. These areas have a buffer of 100 metres each, based on a four times depth of 25 metres. Area 1 has identified *Sabellaria spinulosa* as present but the extent has not been identified. Area 1 buffer is 650 metres based on 500 metres plus three times depth (as recommended for buffering of point data) of 50 metres. The boundaries of the buffers were then smoothed to facilitate compliance and enforcement.

2.8 Additional areas in the Lynn Knock area have been surveyed only once in 2008. Additional survey work has been undertaken but not analysed as yet and a report from NE/Cefas will be delivered to the MMO in January 2014. Additional protection of *Sabellaria spinulosa* reef features will be implemented by the MMO by May 2014, if required.

2.7 Intervention is required to redress market failure in the marine environment by implementing appropriate management measures (e.g. this byelaw) to conserve features to ensure negative externalities are reduced or suitably mitigated. Implementing this byelaw will ensure continued provision of public goods in the marine environment.

2.8 Market failures occur when the market does not deliver an efficient outcome.¹⁰ In the context of the marine environment these failures can be described as:

- For public goods and services – A number of goods and services provided by the marine environment such as climate regulation and biological diversity are 'public goods' (no-one can be excluded from benefiting from them and consumption of the service does not diminish the service being available to others). The characteristics of public goods mean that individuals do not necessarily have an economic incentive to voluntarily contribute effort or money to ensure the continued existence of these goods leading to undersupply or in this case under-protection.
- Negative externalities – Negative externalities occur when damage to the marine environment is not fully borne by the users causing the damage. In many cases no monetary price is attached to marine goods and services therefore the cost of damage is not directly priced by the market. Even for those goods that are traded (such as wild fish), market prices often do not reflect the full economic cost, which is ultimately by other individuals and society as a whole.

2.9 Government intervention is required to redress both these sources of market failure in the marine environment. Management measures to conserve designated features of EMS will ensure negative externalities are reduced or suitably mitigated. Management measures will also support

⁸ NE letter to MMO 2013

⁹ NE buffer advice (draft), April 2013.

¹⁰ HMT Green Book (2003)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

continued provision of public goods in the marine environment, for example conserving the range of biodiversity in England's seas.

3. Policy objectives and intended effects

3.1 The Marine and Coastal Access Act 2009¹¹ (MaCAA) established MMO to lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry.

3.2 The policy objective pertinent to this IA is to further the conservation objectives of this site by ensuring that the *Sabellaria spinulosa* reef features are protected from the risk of damage from bottom towed gear.

3.3 The conservation objectives of this site are:

- Subject to natural change, to maintain or restore:
 - Extent of the habitat (and elevation and patchiness for reef)
 - Diversity of the habitat
 - Community structure associated with the habitat (e.g. population structure of individual notable species and their contribution to the functioning of the habitat)
 - Natural environmental quality (e.g. water quality, suspended sediment levels, etc.)

3.4 The intended effects are that the risk of deterioration to *Sabellaria spinulosa* reef features will be reduced and obligations under article 6 of the Habitats Directive will be met. In addition, the economic impacts of management intervention will be minimised where possible.

4. The options

4.1 As part of Defra's revised approach, the preferred management tools are MMO byelaws within 6 to 12nm, and for MMO to lead the management of sites that straddle the 6nm boundary. Following discussions between MMO and Eastern IFCA, it has been agreed that, an MMO byelaw will be used to manage the *Sabellaria spinulosa* reef features between 0 and 12nm. Therefore an MMO byelaw for the part of the SCI between 0 and 12nm is the recommended option.

4.1.2 Option 1: Do nothing

This option would not involve introducing any permanent management measure. This option would mean that risks to the site from damaging activities would not be addressed and that obligations under Defra's revised approach and Article 6 (2) of the Habitats Directive would not be met.

4.1.3 Option 2: Voluntary agreement

This option would involve the development of voluntary codes of practice to protect features. MMO has considered this option in light of Better Regulation Principles, which require that new regulation is introduced only as a last resort, and Defra's revised approach, under which there is an expectation that management measures will need to be regulatory in nature to ensure adequate protection is achieved. Defra's revised approach also requires measures to be implemented to address high risk (red) interactions between designated features and fishing gears by the end of December 2013. MMO considers that due to the need to protect features quickly,

¹¹ www.legislation.gov.uk/ukpga/2009/23/contents/enacted

and the risk that even low levels of interaction could lead to deterioration of the feature, voluntary measures are not appropriate in this case.

4.1.4 Option 3: MMO byelaw prohibiting bottom towed gear throughout the EMS ('full site closure')

Prohibiting bottom towed gear throughout the whole SCI is not necessary to achieve protection of the *Sabellaria spinulosa* reef features and would result in unnecessary economic loss for fishermen using other parts of the SCI. The estimated overall loss of landings as documented in Table 1 would be £17,430.80 instead of for the preferred option of £34.86 and the enforcement costs to administer would be much higher.

4.1.5 Option 4: MMO byelaw to prohibit bottom towed gears over *Sabellaria spinulosa* reef features with appropriate buffering ('zoned management')

This is the preferred option and a full analysis of this option is included below.

4.1.6 Option 5: Management of activity through a statutory instrument, regulating order or fishing licence condition

These mechanisms for management were considered not to be appropriate in this instance. MMO byelaw making powers as designated under the MaCAA¹² are more appropriate because they are designed to be used to manage activity within marine protected areas, providing the appropriate level of power, flexibility, consultation and speed.

4.2 Recommended option:

4.2.1 MMO byelaw to prohibit bottom towed gears over *Sabellaria spinulosa* reef features with appropriate buffering ('zoned management').

4.2.2 This option is recommended because it is the most cost effective option. MMO is the most appropriate authority to take forward fisheries management measures between 0 and 12nm as it has powers to make byelaws throughout this area to further the conservation objectives of EMSs. The boundaries of the proposed prohibited areas within the SCI were determined taking into account the best available existing evidence of the extent of the features identified by NE as well as the need for a 'buffer' between the features and the byelaw boundary (detailed in section 2.7). The final advice received on the location of the *Sabellaria spinulosa* reef features was submitted to the MMO on 15 August 2013. Ease of enforcement and the need to have clear demarcation to promote compliance was also taken into account when considering the shape of the prohibited area.

5. Evidence Base

5.1 Impacts of bottom towed gear activity on *Sabellaria spinulosa* reef:

5.1.1 The available evidence¹³ highlights the impact of towed demersal gears as a significant threat to *Sabellaria spp.* reef. It is acknowledged that different fishing gears are likely to have variable levels of impact and there is limited peer reviewed empirical data demonstrating impacts. However, these factors are not considered to outweigh a precautionary rating of red particularly in the context of known declines of this feature in the OSPAR region. There are clear links between human activity and threat to *Sabellaria spinulosa* reefs, the most significant of which is physical damage caused by towed demersal trawling (Jones *et al.* 2000, Holt *et al.* 1998 and OSPAR,

¹² www.legislation.gov.uk/ukpga/2009/23/contents/enacted

¹³ See *Sabellaria spinulosa* Red risk audit:

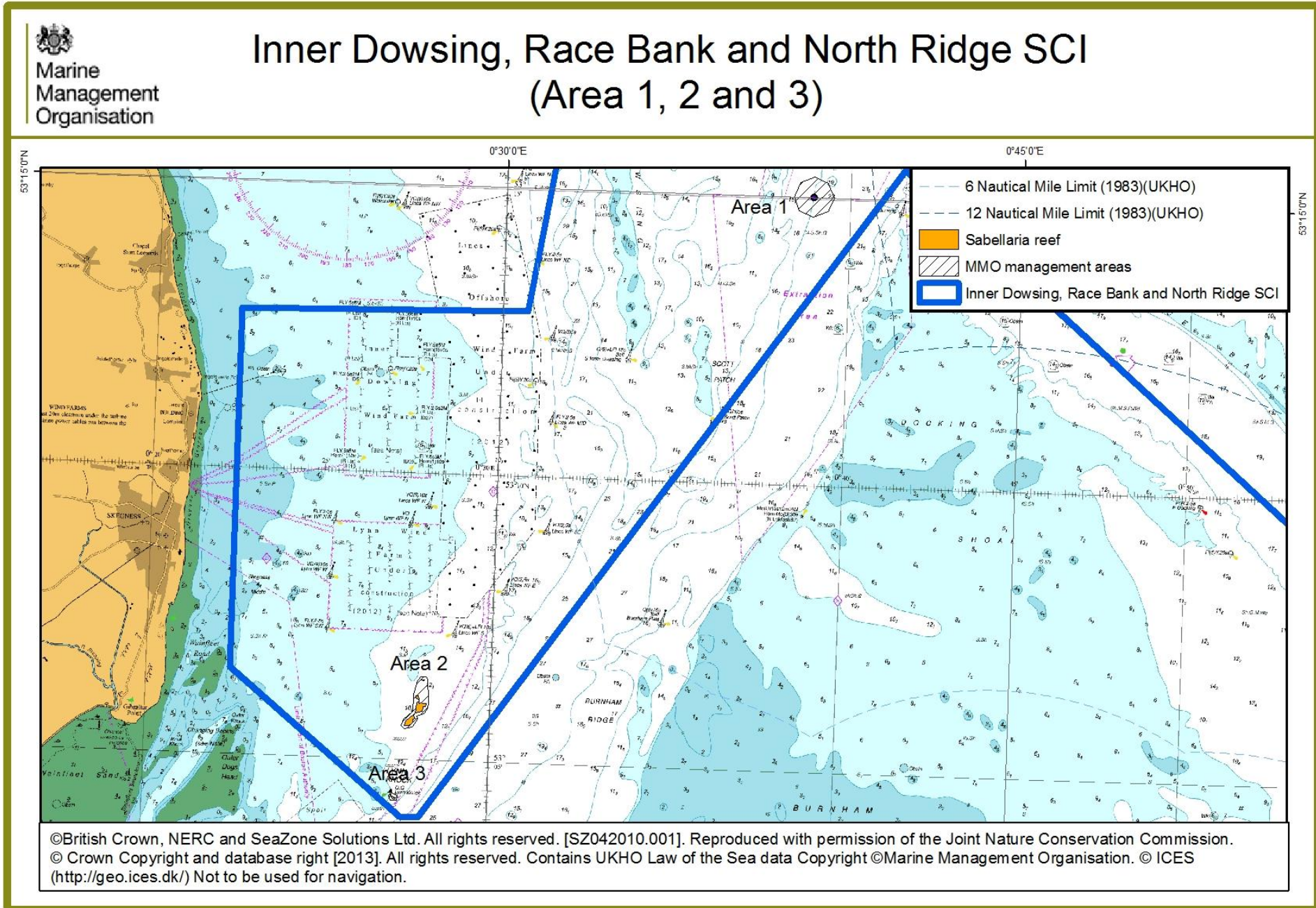
www.marinemanagement.org.uk/protecting/conservation/documents/ems_fisheries/sabellaria.pdf

2010). The impact of towed demersal gear is to break apart the worm tubes resulting in direct mortality (death) of the worms and in a reduction of the structure and complexity of the habitat which may no longer support the associated animals and plant communities (UK BAP 2000). One study (Volberg 2000) conducted off the coast of France and in the Wadden Sea challenges the view that all towed gears constitute a great risk to all *Sabellaria spp.* reef; however, the study findings relate exclusively to short-term effects following once-only disturbance and conclude that the possibility of impairment by shrimp trawling in the medium to long-term cannot be ruled out in the event of intensive fishing, despite the relatively light weight of the gear used.

5.2 *Sabellaria spinulosa* reef feature distribution

Figure 1 below identifies the location of the *Sabellaria spinulosa* reef features within the SCI.

Figure 1: Site and Feature Map



6. Sectors affected

6.1 Fishing industry

There are relatively low levels of fishing activity in the site by over and under 15m vessels. There are mobile demersal towed gears, dredges and beam trawls in use primarily for brown shrimp and seed mussels. No scalloping activity is apparent in the site so impact on UK scallop industry is likely to be virtually nil. Vessels fishing in this area predominantly land into four ports: Grimsby, Boston, Kings Lynn and Wells. The majority of the landings from shrimp and mussel seed fishing vessels are based at the ports in the Wash and it was understood during the pre-consultation meetings that the majority of fishing is within this area. This site lies adjacent to the Wash therefore potential impact is likely to be minimal. It is not expected that the intervention will have an impact on non fisheries sectors.

6.2 Local economies and society: The potential for social and economic costs to the UK local communities as a result of potential landings lost and resulting impact on the local fishery is low. This is due to alternative fishing grounds being accessible and therefore displacement will be minimal. The wider benefits of protecting the *Sabellaria spinulosa* reefs are outlined in section 7.

6.3 Enforcement bodies: The lead responsibility of enforcing the proposed prohibited area falls to MMO in the 6 to 12nm area and Eastern IFCA within the 0 to 6nm area, and therefore the additional enforcement costs would impact on MMO and Eastern IFCA. These estimated costs are outlined in section 7.

7. Analysis of costs and benefits

7.1 Costs for recommended option

7.1.1 The prohibition of bottom towed gear in the proposed areas could result in the following costs:

- Direct cost to the fishing industry from reduced fishing grounds
- Costs to the fishing industry associated with displacement to other fishing grounds
- Potential environmental impacts related to possible increased damage to habitats on other areas due to displacement
- Costs to MMO for the administrative and enforcement of management

7.1.2 Costs to the fishing industry, including potential displacement costs, and administrative and enforcement costs to MMO can be monetised and these estimated values have been collated and presented as part of this impact assessment (Tables 1 and 2 below). Environmental costs due to possible increased damage of habitats are difficult to value and are therefore described here as non-monetised costs.

7.2 Analysis of fisheries costs

7.2.1 Information used to assess the impacts of the proposed closure has been taken from:

- Landings data for vessels from 2008 to 2011 taken from entered log book and sales note data provided by MMO statistics
- Landings data to ICES rectangle level. Further analysis to estimate catch and estimated landings for the SCI and reef/buffer area for UK (Tables 1)
- Information gathered from fishers during pre-consultation engagement, June to August 2013, by MMO

- Information gathered from stakeholders during MMO formal byelaw consultation, 10 September to 22 October 2013
- Local MMO and IFCA coastal officer's knowledge

7.3 Uncertainty and data assumptions

7.3.1 Average cost estimates have been based on UK landings values estimated within the SCI within ICES statistical rectangles 35F0 and 35F1 (See Figure 2). It is unknown what proportion of the total landings value was actually derived directly from the proposed prohibited area which makes up less than 0.045% of an ICES rectangle. The statistical data was produced using reported activity within the ICES rectangles that cover the defined SCI areas. The reported activity (quantity and value of landings along with details of gear involved) is taken from MMO Ifish database. See Annex A for further information on the methodology used and the statistic tables for this SCI.

7.3.2 The proposed prohibited area values detailed in Table 1 have been derived by taking the values estimated within the SCI and applying a percentage based on the square area prohibited within the SCI itself. In most cases the square area of the proposed prohibited areas are relatively small compared to the SCI as a whole. Therefore, the estimation detailed should be used with caution will not indicate the true value attributed within the proposed prohibited area. It is also acknowledged that possible increased biodiversity around the reef means that it could be relatively more abundant fishing ground, and the analysis may underestimate value of reduced fishing ground.

7.3.3 Information gathered from fishers and other stakeholders during the pre-consultation meetings is used to support the evidence base and assumptions with the caveat that it is anecdotal evidence only. The information gathered was opportunistic and is only a snapshot from the respondents available to provide comments on the day. The number of respondents reflects only those who independently came forth with the information rather than the number who necessarily agree or disagree with a statement.

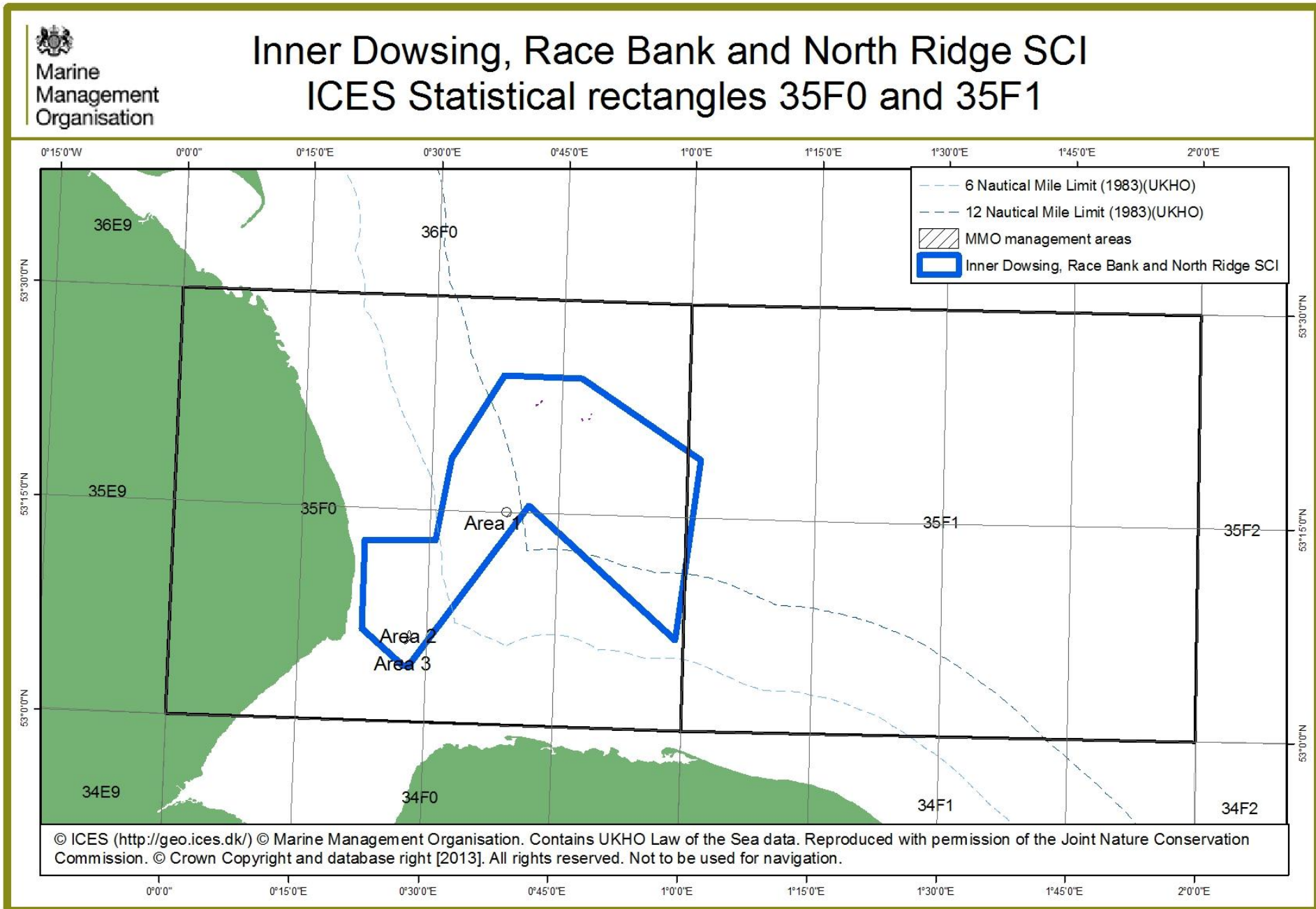
7.4 Fishing activities within Inner Dowsing, Race Bank and North Ridge SAC

7.4.1 Only UK vessels operate within the site targeting demersal species.

7.4.2 The majority of the UK vessels which operated within ICES area 35F0 and 35F1 are under 10 metres in length and are predominantly dredgers (14 vessels) and potters (12 vessels). The 10 – 15 metre vessels are beam trawlers (12 vessels) and potters (7 vessels). There are occasional over 15 metre beam trawlers (25 vessels).

7.4.3 The main species landed within the SCI are crabs (297 tonnes), brown shrimp (223 tonnes) and lobsters (69 tonnes).

Figure 2: ICES Statistical Rectangle 35F0 & 35F1



7.5 Valuation of affected landings

7.5.1 The direct impact on fishing vessels would be a reduction in catch and therefore landings from bottom towed gear in the proposed prohibited area. In order to estimate potential impacts, landings data collated by the MMO was analysed.

7.5.2 Calculation of affected landings from ICES rectangle area 35F0 & 35F1 (for the UK vessels identified as fishing in the area since January 2008) is shown in Table 1. Estimates in Table 1 are based on average landings from January 2008 to December 2011.

Table 1: Estimated UK landings from ICES area 35F0 & 35F1 as an average per year and average landings within the EMS (January 2008 to December 2011)

Gear Type	Landed weight (tonnes)	Value (£)	Value within EMS (£)	Value within prohibited area (0.20% of EMS) (£)
Beam trawlers	376	788,501	9,312.2	18.62
Dredgers	263	64,685	2,254.6	4.51
Other demersal trawlers	32	51,827	5,864.0	11.73
Total	671	905,013	17,430.8	34.86

7.5.3 Estimated values of landings within the SCI have been calculated by associating available landings data (provided by each fishing vessel at ICES statistical rectangle level) with fishing vessel activity data (based on VMS reports) with the SCI. This approach applies a proportion of the landings for each ICES rectangle to the SCI, based on the level of activity within the SCI.

For the Inner Dowsing, Race Bank and North Ridge SCI, landings data for the ICES rectangles (35F0 and 35F1) were used, and were categorised by size of vessel (over 15 metre vessels, 10 to 15 metre vessels and under 10 metre vessels).

Landings values from within the proposed prohibited area were then estimated as a proportion, (based on the size of the respective areas) of the estimated value from within the SCI.

It is estimated that from the SCI the average annual income for the over 15 metre beam trawling fleets is £3,065. The estimated average annual income from the over 15 metre demersal trawlers is £5,029. For under 10 metre fleet the estimated average annual income for beam trawling dredging and demersal trawling combined was £2,629. For the 10 to 15 metres fleet the estimated average annual income for beam trawling dredging and demersal trawling combined was £6,654. Discussions via pre-consultation engagement with stakeholders suggested that the impact to loss of landings will be small.

7.5.4 It has been estimated that within the MMO management areas (which is **0.20%** of the square area of the SCI) the total loss in landings would be **£34.86**.

7.5.5 The estimated total cost is likely to be an overestimation as no displacement has been assumed.

7.6 Likely effects on fishing fleet from closure

7.6.1 It is expected that the impact on the fishing fleet from this closure will be limited. A number of affected fishers stated during MMO pre-consultation meetings that fishing with bottom towed gear in the proposed prohibited areas is minimal.

7.7 Adaptability

7.7.1 In order to assess the likely effects of the proposed closure on fishing activities, the extent to which vessels would be able to maintain the value of the catch by moving effort to other areas needs to be assessed.

7.7.2 Fishers were asked to complete a questionnaire to inform this assessment and were asked directly as to the degree of displacement incurred to other areas as a result of the proposed closure, and their ability to fish on alternative grounds and adapt in order to maintain catch value. There was limited response from affected fishers; therefore limited assumptions on displacement can be made.

7.7.2 As a result of introducing the preferred option (a specified prohibited areas byelaw) rather than closing the whole site, the level of displacement from vessels using bottom towed gear will be minimised.

7.7.3 It is envisaged that proof of advances in gear technology and impact on sensitive features will be considered during the amber/green assessment process.

7.8 Indirect costs

7.8.1 Environmental costs

7.8.2 For the recommended option, there will be minimal potential for increased costs in terms of fuel costs for vessels travelling further afield to access alternative fishing grounds and to compensate for potential loss of catch due to the proposed prohibited areas. This was indicated as a result of the pre-consultation discussions as fishers are likely to continue to fish in the areas outside of the prohibited areas therefore, the environmental costs will be minimal as displacement will be low.

7.8.3 There is potential for increased fishing effort outside of the prohibited areas which could have an effect on biodiversity and habitats (Rees *et al*, 2013¹⁴).

7.9 Administrative and enforcement costs

7.9.1 The MMO will undertake intelligence led, risk based enforcement approach as adopted by a number of regulatory bodies across government in accordance with the National Intelligence Model¹⁵. Where intelligence suggests non compliance or a risk of non compliance we will develop an enforcement strategy specific to the needs of the MPA and where necessary deploy resources accordingly. This may include a Navy presence, aerial surveillance or joint operations with other agencies (for example the IFCAs, UK Border force or EA). The MMO would coordinate any joint operations. The principals by which the MMO will regulate MPAs are set out by the Legislative and

¹⁴ Rees, S.E., Attrill, M.J, Austen, M.C.,Mangi, S.C., Rodwell, L.D (2013). A thematic cost-benefit analysis of a marine protected area. *Journal of Environment management*, 114, 476 – 485.

¹⁵ www.marinemanagement.org.uk/about/documents/risk-based-enforcement.pdf

Regulatory Reform Act 2006 and the Regulators' Compliance Code and aim to ensure that the MMO is proportionate, accountable, consistent, transparent and targeted in any enforcement action it takes¹⁶.

7.9.2 The enforcement of the proposed byelaw will be met within the current budget. Operating on a fixed budget will require MMO coastal operations team to prioritise management on a risk-based site by site approach. The EU vessel monitoring system (VMS) will be used as a management tool for sea and air enforcement of over 12 metre vessels. Table 2 highlights the estimated enforcement costs for the management of this preferred option.

Table 2: Annual costs of enforcement of recommended option¹⁷

Activity	Cost per unit (£)	Estimated number of units per year	Total cost per year (£)
Royal Navy surface surveillance per site	£ 4,000 per day	1	£4,000
Joint enforcement patrols with local SFC/IFCA per site	Between £800-1,000 per day	5	£4,000-5,000
Aerial surveillance per site	£ 2,050 per hour	2	£4,100
Investigations/prosecutions per site	£10,375 per case	1	£10,375
Total		9	22,475 – 23,475

Table 3: Annual profile of monetised costs of recommended option- (£m) constant prices

	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇	Y ₈	Y ₉
Transition cost	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Annual recurring cost – Best estimate	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975
Low	0.022475	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975
High	0.023475	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975	0.022975
Total present value of annual costs*:										£0.2m
*For the estimation the Impact Assessment Calculator (https://www.gov.uk/government/publications/impact-assessment-calculator--3) was used considering a 3.5% discount rate, a 10 years appraisal period and 2013 as the price and present value base year.										

¹⁶ www.marinemanagement.org.uk/about/documents/compliance_enforcement.pdf

¹⁷ Enforcement cost estimates from original submission for Defra's revised approach to minister.

7.10 Benefits of recommended option

7.10.1 The exclusion of bottom towed gear from the proposed prohibited areas would prevent the use of bottom towed gear over the *Sabellaria spinulosa* reef features and result in the following benefits:

- Environmental benefits of maintaining or restoring *Sabellaria spinulosa* reef habitats

Environmental benefits are described here as non-monetised benefits.

7.11 Environmental benefits

7.11.1 *Sabellaria spinulosa* reefs provide an important hard substrate within a predominately soft-sediment environment, which provides unique refuge for certain species. Biogenic reefs increase habitat heterogeneity and offer associated species a surface for attachment (e.g. tubeworms, hydroids, bryozoans, sponges and ascidians), and a place to escape from predation (Bruno & Bertness, 2001).

7.11.2 *Sabellaria spinulosa* reefs also provide some degree of coastal protection and are important areas for nutrient cycling, carbon and nitrogen fixing and sediment stabilisation.

7.11.3 A protected *Sabellaria spinulosa* reef habitat is a natural refuge for creating populations of targeted and bycatch species.

7.11.4 The benefits of this byelaw are to afford appropriate protection and a safeguarding of the ecological characteristics that can possibly lead to more abundance of biodiversity compared to the rest of the fishing grounds.

7.11.5 The environmental benefits from the introduction of this byelaw will be significant as it will protect the *Sabellaria spinulosa* reef features within the site from bottom towed gear. This will contribute to meeting the 'maintain or restore' conservation objective. This will have an added benefit on other features within the SCI and will have an overall benefit to the reef habitat as a result of the prohibition recommended. This may promote more recreational use in the area such as divers and recreational anglers, which could potentially benefit the local economy.

7.12 Socio-economic benefits

7.12.1 There is a possibility that the maintain or restore condition of the *Sabellaria spinulosa* reef features and habitat may increase the attraction for recreational users, including divers and anglers (Rees *et al*, 2013¹⁸; Chae *et al*, 2012¹⁹). This could also increase tourism to the area and therefore increase spending in local businesses (Rees *et al*, 2013).

7.12.2 Implementing a zoned approach to management rather than closing the whole site limits the displacement of vessels operating bottom towed gear.

¹⁸ Rees, S.E., Attrill, M.J, Austen, M.C.,Mangi, S.C., Rodwell, L.D (2013). A thematic cost-benefit analysis of a marine protected area. *Journal of Environment management*, 114, 476 – 485.

¹⁹ Chae, D., Wattage, P.,Pascoe, S(2012). Recreational benefits from marine protected area: A travel cost analysis of Lundy. *Tourism Management*, 33, 971 – 977.

7.13 Distribution of costs and benefits

7.13.1 The distribution of social and economic costs is predominantly at a local UK level (excluding the enforcement costs) with the overall environmental benefits covering a wider area and having more of a national impact.

Annex A: Notes of fishery statistics data extraction and tables

Data tables that summarise reported activity within the ICES rectangles that cover the detailed areas defined as the European marine site areas are detailed on the MMO website²⁰.

This level of detail reflects the finest level of detail available within the reported data available to UK fisheries administrations.

This data provides the information on the quantity and value of landings from the rectangles covering the areas, along with details of the vessels, gears used, and the species caught.

In addition to this fishing activity data, vessels over 15 metres in length report their exact position every 2 hours as part of UK Vessel Monitoring Systems.

For these over 15 metre vessels, it has been possible to combine the relatively coarse scale of spatial data from the activity reporting systems with the detailed position reports from the VMS systems to allow estimation of fishing activity at a finer scale. This detailed recasting of the activity data allows estimation of activity within the detailed EMS areas for over 15 metre vessels.

Where available this detail is presented in the tables of data alongside the overall activity within the ICES rectangles, for the over 15 metre vessels; the ratio between these two sets of data has then been applied to the data for other vessel lengths to provide approximate estimates of the activity within the proposed prohibited areas by these vessels less than 15 metres overall length.

Please note that proposed prohibited areas are primarily within inshore waters, therefore using the proportion of activity carried out by over 15 metre vessels within the areas to estimate activity of other UK vessels may be inaccurate as the larger vessels tend to fish further offshore than others, especially the over 10 metre fleet.

This data is shaded grey in the tables to highlight that it is estimated data and should only be used with caution.

The following is a list of the coastal EMS areas covered by this analysis -some rectangles cover more than one area – these are highlighted in yellow:

This overlap means that the total potential coverage of the proposed prohibited areas cannot be estimated by summing the analyses for the individual areas. The table below includes details of the proportion of overall activity in the IECS rectangles involved for each proposed prohibited area that relates to vessels over 15 metres (for these vessels the detailed satellite data is available).

As such, for those vessels with a high proportion of coverage of the EMS sites, the estimates for activity by other length bands based on VMS related activity are likely to be of greater reliability than for those sites with a low proportion of coverage.

²⁰ <http://www.marinemangement.org.uk/protecting/conservation/ems-consultation.htm>