



Lyme Bay Fisheries and Conservation Reserve: Integrated Fisheries Management Plan



Final report
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Report prepared for Blue Marine on behalf of the Lyme Bay Fisheries and Conservation Reserve Working Group by



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Version: 18/09/2014. This is a final report for the full Lyme Bay Working Group. It follows previous technical review from the IFCA's, MMO, NE, Plymouth University and Andy Woolmer (Salacia Marine); review by the wider Working Group and presentation/discussion at a workshop; and comments have since been addressed.

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Executive Summary

Overview

Lyme Bay has been named as a marine biodiversity hotspot, containing nationally acclaimed subtidal reefs. This biodiversity has led to it being an important area for commercial fisheries with some of the best scallop fishing grounds in the UK prior to management measures being introduced. With concern for the environment, 60 square miles were closed to mobile fishing in 2008, via the Lyme Bay Designated Area (Fishing Restrictions) Order 2008; and a slightly larger area was proposed in 2010 as a candidate Special Area of Conservation (cSAC) under the EC Habitats Directive¹. The cSAC features require consideration in the context of fisheries management and in response the IFCAs have introduced further spatial management under Byelaws.

With subsequent operational change and economic impact to the fishery industry, The Lyme Bay Fisheries & Conservation Reserve Project was established to address these complex issues set against the need for conservation. The Working Group including local fishermen and fisheries and conservation managers, commissioned work to pull together evidence on the sustainability of fishing activity in the area. This has allowed options to be formed to enable the Working Group to develop an Integrated Fisheries Management Plan for Lyme Bay, pulling together all the work of the IFCAs, MMO and Cefas to date, amongst others. The aim of this work was to enable the Working Group to collectively plan for the future and support ecologically and commercially sustainable fisheries and a prosperous fishing community.

Project Components

The project integrates assessments across a number of areas relevant to fisheries operating in Lyme Bay. These include a desk review of information, data collection and consultation; followed by the habitat and species risk assessment, and fisheries sustainability assessment; and finally a synthesis of the findings, review of management practice and options for integrated management. Building on these, the management options aim to inform the Working Group's future implementation of best practice, through a collaborative approach. This has potential to inform a future management plan for the Lyme Bay reserve, with the ultimate aim to improve both the environmental and economic sustainability of the inshore fishing fleet in Lyme Bay.

¹ Status of the SAC officially is not cSAC but a Site of Community Interest. However as this is pending with the European Commission, the term cSAC has been used throughout due to the lack of use of the SCI term in the wider community.

Risk assessment

The habitat risk assessment and fisheries assessment both highlighted a number of potential risks, both to the conservation features of Lyme Bay, and with respect to the sustainability of the fisheries. In general, the areas of highest risk are already being managed; many other risks are also on track to being addressed by current and planned work. There are, however, some gaps which might be addressed by Working Group action. There is a need for better understanding of the interactions between fisheries and Endangered, Threatened and Protected (ETP) species, and a strategy to reduce risks by following best practice. Most fisheries are managed at multiple levels, yet lack a management plan specific to each species which pulls everything together. This could address current gaps (including monitoring of fishery/ETP interactions) and potentially address differences in management between jurisdictions (such as different minimum sizes between IFCAs, or the lack of protection for berried lobsters outside the 6nm limit). There is a need to understand how significant landings of bass from recreational fisheries are; and while diving is likely to give relatively low risks, there are opportunities to ensure there are no risks to some conservation features.

Management options

The management analysis in this report examined how well these risks are being mitigated by current management, and by work already in development. Any gaps, i.e. risks not directly mitigated, were identified; where appropriate, options to address some of these gaps were suggested. Options for how the Working Group might approach addressing these shortfalls are in a structured format. However, the report also details plenty of opportunities to highlight and promote the good work within Lyme Bay, e.g. brown crab, which is a key fishery, could potentially be taken forward to full MSC Assessment.

SWOT Analysis

A 'SWOT' analysis brings together the assessment findings and adds socio-economic context to highlight the industry's key Strengths, Weaknesses, Opportunities and Threats, a summary outline for which is provided below. The SWOT analysis draws out positives in that there is already strong collaboration between stakeholders, current management of key risks, current work to further develop these and a key opportunity for branding of brown crab. However there are some areas highlighted for further attention, such as the impact of fisheries on mobile species of conservation interest, the potential impact of diving on seabed habitats, the impact of recreational fishing on total fishing effort of bass and some fisheries stock sustainability.

Good news	Attention needed
Existing management is already addressing many of the risks identified showing that the current approach to management is working well.	There is a need to understand how fisheries affect mobile species of conservation importance, both inside the Reserve and in Lyme Bay, which may require monitoring and a strategy to reduce risks.
Many other risks are likely to be addressed as a result of current research and/or pending management actions, therefore not requiring extra work.	There is a need to understand how recreational fishing contributes to total fishing effort for bass.
There are lots of examples of good work to highlight, giving cause for opportunities in local branding. This is particularly true of the brown crab, which has a healthy stock status locally. Branding can be leveraged to strengthen support for the Code of Conduct.	Some stocks aren't within sustainable limits, and all fisheries could do with a clear management plan setting out who does what.
Strong collaborative management approach involving all key stakeholders.	The Code of Conduct may benefit from some guidance for commercial diving, to make sure risks to sensitive seabed habitats and species are understood and minimised.

This project provides a baseline study integrating the full environmental and fisheries components, and is the first time that this information has been brought together. It is hoped that it will prove valuable to the Working Group in informing and shaping its work in Lyme Bay over the coming years.

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Appendix I	Fisheries sustainability assessment: Main documented assessment

All Appendices are available electronically through the website:

<http://lymebayreserve.co.uk/>

Acronyms and Abbreviations

AOI	Area of Interest
ASSIST	Applied Science to Support the Industry in delivering an end to discards
CEFAS	Centre for Environment, Fisheries and Aquaculture Science

CFP	Common Fisheries Policy
cSAC	Candidate Special Area of Conservation
DEFRA	Department for Environment, Food and Rural Affairs
DSIFCA	Devon and Severn
EC	European Commission
EDF	Environmental Defence Fund Inshore Fisheries and Conservation Authority
EMF	European Marine Fund
EMFF	European Marine Fisheries Fund
EMS	European Marine Sites
ETP	Endangered, Threatened and Protected
FDF	Fully Documented Fisheries
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authorities
IUCN	International Union for Conservation of Nature
iVMS	Inshore Vessel Monitoring System
MCZ	Marine Conservation Zones
MLS	Minimum Landing Size
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
MPA	Marine Protected Areas
MPC	Marine Planning Consultants
MSC	Marine Stewardship Council
NE	Natural England
NERC	Natural Environment and Rural Communities
NM	Nautical Mile
RSA	Recreational Sea Angling
SAC	Special Area of Conservation
SCI	Site of Community Interest
SIFCA	Southern Inshore Fisheries and Conservation Authorities
SWOT	Strengths, Weaknesses, Opportunities and Threats
VMS	Vessel Monitoring Systems
WG	Working Group
WGNEW	Working Group Assessment of New MoU Species

Overview

“The future has to be with fishermen and scientists working together towards a common goal of sustainability, protecting areas but still keeping the fishing communities going. If we can show that we are fishing sustainably, then we are creating a better product than people who aren't.”²

About the Project

Context

The Lyme Bay Fisheries and Conservation Reserve is the product of an innovative partnership between fishermen, scientists, managers and conservationists in Lyme Bay, one of the UK's largest inshore Marine Protected Areas (MPAs). The Reserve aims to protect the valuable ecosystems of Lyme Bay, whilst safeguarding and adding value to the local fishing industry. The partnership is being led by Blue Marine Foundation, developed through the Lyme Bay Working Group (the Working Group) comprising of fishery and conservation stakeholders, including fishermen representing the ports of Axmouth, Beer, Lyme Regis, and West Bay, the Devon and Severn, and Southern Inshore Fisheries and Conservation Authorities (IFCA), the Marine Management Organisation (MMO) and Natural England.

The Working Group commissioned this project to produce options to inform an Integrated Fisheries Management Plan. This will ensure that members have an up to date summary of evidence and science to inform the development of fisheries management practices that will improve both the environmental and economic sustainability of the inshore fishing fleet. Previous scientific studies in Lyme Bay have on occasion led to misunderstandings and mistrust between scientists, fishermen and government agencies and regulators. Fishermen have not always felt engaged in the process and their first hand expertise has not always been utilised. A key way of moving forward is to use fishermen's local knowledge of the resources which they work closely with. This will help influence appropriate options for management of these resources, ensuring both sustainability and supporting profitability.

The outputs and findings of this work have been guided by and developed for the Working Group to plan for the future of the fishery in Lyme Bay. The project seeks to better inform practical management options and tools for the working group and stakeholders. The review will lend support to the confidence held in the traceability and quality of the area's local seafood, conservation measures to promote sustainable exploitation and its capacity to produce profit.

² Alex Jones, Fisherman and member of the Working Group
<http://www.guardian.co.uk/environment/2012/jul/02/fishing-limit-lyme-bay-catches>

The science and evidence drawn on in this project is independent; however all Working Group members have been engaged and consulted at every stage. The methods and approach have been agreed at Working Group meetings. This project has maintained links with other work commissioned by the Working Group such as the Lyme Bay potting trials (Plymouth University), the fishermen’s environmental monitoring pilot and traceability work with the Environmental Defence Fund (EDF), but also incorporates the findings of research undertaken outside of the Working Group, both within the Lyme Bay area and elsewhere in the UK and Internationally.

Geographic scope

This study Area of Interest (AOI) is focused on the Lyme Bay Fisheries and Conservation Reserve, including the Lyme Bay and Torbay candidate Special Area of Conservation and the Lyme Bay Designated Area. The project AOI also encompasses the subtidal environment between Sidmouth and Abbotsbury, as shown in **Figure 1**, extending out to 6 nm, coinciding with the limits of the IFCA’s management jurisdiction. The AOI extends beyond the cSAC and Designated Area boundaries in order to assess any displacement activities and associated risk and management options required to mitigate.

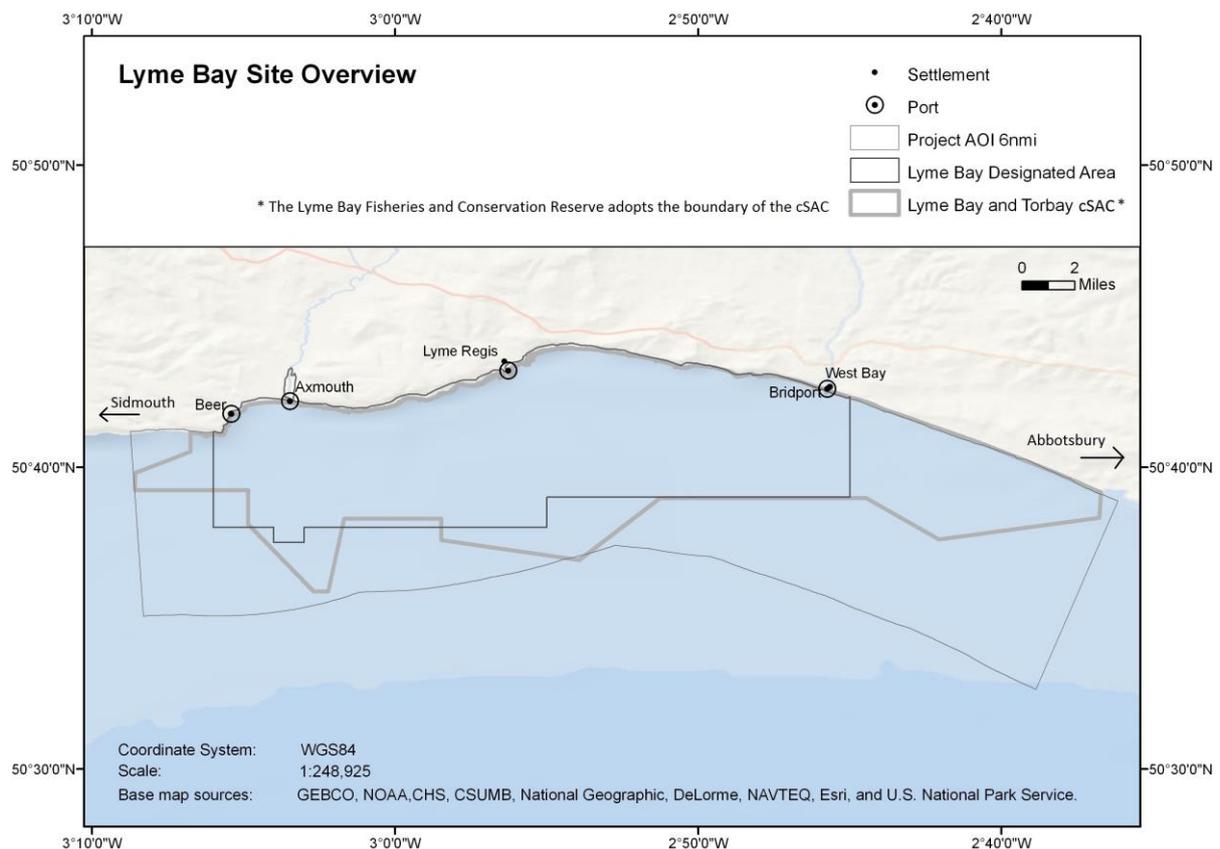


Figure 1: Location of the Lyme Bay Fisheries and Conservation Reserve and the geographical scope of the Project Area of Interest (AOI)

Nature of Lyme Bay Fisheries and Assessment of Risk and Sustainability

The project integrates assessments across a number of areas relevant to fisheries operating in Lyme Bay. These include a desk review of information, data collection and consultation; followed by the habitat and species risk assessment and fisheries sustainability assessment; and finally a synthesis of the findings, review of management practice and options for integrated management. Whilst the main body of this report focuses on the options for management, the other components of the work are provided in the Appendices. Each of these are summarised briefly below with reference to the relevant Appendix.

Desk review (excluding fisheries)

For full detail of the desk review (excluding fisheries) see **Appendix A**.

The desk review compiled and presented all relevant environmental data made available within the project timescales including a full habitat and species inventory and identification of species' conservation status. Also included was information on industry and recreation use of the area, together with socio-economic interactions.

Desk review of fisheries

For full detail of the fisheries component of the desk review see **Appendix B**.

The fisheries desk review compiled and presented all fishery related data including the nature and geographical extent of commercial fisheries operating in the area, the location of core fishing grounds and issues facing the local fishing communities. This included information provided by the fisherman.

Habitat and species risk assessment

For full detail of the habitat risk assessment see:

- **Appendix C** – Executive Summary
- **Appendix D** – Full documented assessment
- **Appendix E** – Data tables
- **Appendix F** – GIS (Geographic Information Systems) processing
- **Appendix G** – Literature review of risk categories and confidence

Lyme Bay has been named as a marine biodiversity 'hotspot' (Hiscock and Breckels, 2007) and this was reflected by the large number of species identified through this project,

accounting for a total of 951 benthic species, 251 algae and lichen species, 80 fish species, 6 cetaceans, 3 turtles and 55 seabirds recorded within the Lyme Bay AOI³.

The risk assessment was focused on a tabular risk matrix of habitats and selected species ('features') with conservation interest. Whilst only Annex I⁴ reefs are designated for the site, **other habitats and species were included based on their national and international status**, in terms of both legislation and other status lists. Species were selected based on the strength of supporting spatial and temporal evidence and the weight of the conservation status / legislation. The risk summarised in **Table 1** was determined based on the spatial footprint across the site for habitats and benthic species; for mobile species, full coverage was assumed. Risk was assessed according to a set of criteria:

Red: Score 3 = high risk, will certainly pose a risk if interact

Amber: Score 2 = medium risk, will interact but the extent of risk unknown

Green: Score 1 = low risk, interaction possible but unlikely, unlikely to pose a risk if interact

Blue: Score 0 = no risk, interaction will not take place

Note these risk levels are not solely based on SAC features but take into account all habitats and species of conservation interest, often termed Endangered, Threatened and Protected (ETP). Similarly, the risk levels have slightly different connotations to those used for the SAC management. For full details on the assessment approach, definitions, spatial evidence used, conservation status of each species and outcomes in finer detail, see the Habitat Risk Assessment (**Appendix D**). In summary, there are very few areas of RED or priority risks identified for habitats (**Table 1**). These are primarily related to Annex I reef exposed to demersal towed gear on the unprotected areas of reefs to the southeast of the cSAC (i.e. outside the cSAC and Designated Area). However Endangered, Threatened and Protected mobile species with assumed full coverage of the AOI are also exposed to RED risk, for example: Basking Shark, Dolphins⁵ and Porpoise (gear type causing RED risk differs between species as demonstrated but is limited to bottom towed gear and netting). See the end of this document for full Latin names of species.

Note that fish of conservation status were also included in the assessment (**Appendix D**) but where these were commercial species, e.g. Atlantic Cod, Plaice and Whiting⁶, these have been scoped out of the final management assessment (the main body of this report) as they

³ Sourced from all publically available data identified including the Devon Biodiversity Records Centre, the NBN Gateway / JNCC, Seasearch, Bangor University, Marine-LIFE and the University of St Andrews.

⁴ EC Habitats Directive

⁵ Assessed as two feature types with differing sensitivities: the general 'Dolphins' group and the separated Bottlenose Dolphin

⁶ Plaice, Atlantic Code and Whiting are included as ETP species in the Habitat & Species Assessment due to their inclusion on the OSPAR Threatened and Declining list (Atlantic Cod) and English NERC List [Species of Principle Importance] (Plaice, Whiting).

are managed through ICES and have detailed management plans in place to support healthy stock status. Overall, the level of confidence in the impact of fishing activities on habitats and species was, however, variable, particularly low for mobile species.

Table 1: The Lyme Bay Risk Matrix

			Trawling	Dredging	Scalloping	Potting	Cuttle potting	Whelking	Crabbing	Netting	Diving
Full coverage map	Habitat	Coarse sediment (high energy)	Orange	Orange	Orange	Green	Green	Green	Green	Green	Green
		Subtidal sand (high energy)	Orange	Orange	Orange	Green	Green	Green	Green	Green	Green
		Subtidal mixed sediments	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Subtidal gravel and sand	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Subtidal muddy sand	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Subtidal mud	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Brittlestar beds	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Subtidal bedrock reef	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Orange
		Subtidal boulder and cobble reef	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Orange
Point locations	Benthic	Sabellaria spp reef	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Orange
		Maerl	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
		Mytilus beds	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
		Pink Sea-fan	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
		Native oyster	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
		Ocean quahog	Orange	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
Assumed to cover the whole AOI	Fish	Sharks	Red	Red	Red	Green	Green	Green	Green	Red	Green
		Rays	Red	Red	Red	Orange	Orange	Orange	Orange	Red	Green
		Dogfish	Red	Red	Red	Orange	Orange	Orange	Orange	Red	Green
		Basking Shark	Red	Orange	Orange	Orange	Orange	Orange	Orange	Red	Green
		European Eel	Red	Orange	Orange	Orange	Orange	Orange	Orange	Red	Green
		Cod	Red	Orange	Orange	Orange	Orange	Orange	Orange	Red	Green
		Whiting	Red	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Ling	Red	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
		Anglerfish	Red	Red	Red	Orange	Orange	Orange	Orange	Orange	Green
		Sand goby	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green
	Plaice	Red	Red	Red	Orange	Orange	Orange	Orange	Red	Green	
	Mammals & Turtles	Grey and Common Seal	Orange	Blue	Blue	Orange	Blue	Orange	Orange	Orange	Blue
		Dolphins & Porpoise	Orange	Orange	Orange	Green	Green	Green	Green	Red	Green
		Bottlenose Dolphin	Red	Orange	Orange	Green	Green	Green	Green	Red	Green
Whales		Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green	
Turtles		Orange	Orange	Orange	Green	Green	Green	Green	Red	Green	
Foraging distance	Birds	Surface feeding birds	Green	Blue	Blue	Orange	Blue	Orange	Orange	Green	Blue
		Pursuit and plunge diving birds	Orange	Blue	Blue	Orange	Blue	Orange	Orange	Orange	Blue

Table Notes:

- a) High risk = red (score of 3), medium risk = amber (2), low risk = green (1), no risk = blue (0).
- b) Blue text is shown for species added by this project since the EMS risk matrix was developed by the Government
- c) Habitats and species are highlighted as light grey for Tier 1 species taken forward to risk assessment; and dark grey for Tier 2 where spatial evidence was weaker
- d) See the end of this document for full Latin names of species
- e) Due to the different types of fishing gears provided in the source data and the use of more than one source in the assessment, there is some overlap between gear types

Fisheries sustainability assessment

For full detail of the fisheries assessment see:

- **Appendix H** – Executive Summary
- **Appendix I** – Full documented assessment

Five key Lyme Bay fisheries that represent over 80% of catches from the Lyme Bay area based on first sale landings value and landing weight were evaluated in the fishery sustainability assessment based on data provided by the MMO: Crab (Potting), Lobster (Potting), Whelk (Potting), Sole (Netting), Bass (Lining). See the end of this document for full Latin names of species assessed. The choice of species was agreed by the Working Group. These were assessed for good/sustainable practice and aspects likely to require improvement. A summary of the assessment is shown in **Table 2**, where green = pass, orange = conditional pass and red = some issues identified. The scores shown are the lowest for each category. Whilst this provides a brief summary, the full context, data sources, data analysis and evaluation are provided in the separate Desk Review and Fisheries Sustainability Assessment (**Appendix D and I**).

Table 2: Fisheries sustainability assessment results for five key fisheries

	Stock Status	Stock Management	Retained species	Bycatch species	Endangered, Threatened or Protected Species	Habitats	Ecosystem	Governance and Policy	Fishery specific management system
Crab	Green	Amber	Amber	Green	Amber	Green	Green	Amber	Amber
Lobster	Red	Amber	Green	Green	Amber	Green	Green	Amber	Amber
Whelk	Red	Green	Amber	Green	Amber	Green	Green	Amber	Red
Sole	Amber	Amber	Amber	Amber	Amber	Green	Green	Green	Green
Bass	Red	Amber	Green	Green	Amber	Green	Green	Amber	Amber

Much of the assessment was positive, due to the strong higher-level management (governance and policy) that is in place (in most cases lacking only a fishery-specific management plan), and the relatively low impact of static gear on bycatch, habitats and ecosystem. The key risks to fisheries sustainability are summarised in **Table 3**. Many of the risks did not result in a failure to reach the minimum standard, but were simply highlighted as areas which require improvement

Table 3: Summary of fisheries sustainability assessment risks

Stock	Environment	Management
<ul style="list-style-type: none"> • Poor stock status along with a lack of appropriate harvest control (lobster, whelk) • Unknown stock status due to a lack of information (bass, whelk) • Lack of harvest control rules even where stock status is good (crab) 	<ul style="list-style-type: none"> • Uncertainty over bycatch composition and effects on species other than targeted species • Uncertainty over nature and extent of interaction with Habitats and Species of Conservation Importance • Lack of a bycatch management strategy 	<ul style="list-style-type: none"> • Lack of “incentive for sustainable fishing” for non-quota species • No fishery-specific management plan for most fisheries • Not all fishers are subject to the same legislation, nor are all signed up to the Code of Conduct; similarly recreational fisheries are not monitored

Management analyses and options

Drawing on these contributory reviews and assessments, the next sections of the report now bring all components together to inform a review of management in Lyme Bay, together with opportunities for better practice. This serves as a synopsis to the whole project, whilst emphasising how to take the project findings forward. The management options provided in this report aim to inform the Working Group’s future implementation of best practice, through a collaborative approach. This has potential to inform a future management plan for the Lyme Bay reserve, with the ultimate aim to improve both the environmental and economic sustainability of the inshore fishing fleet in Lyme Bay.

Management Practice in Lyme Bay

Current Management Practice

Management to Comply with Legislation

Jurisdiction

Within 0-12 nm offshore, the European Commission's Common Fisheries Policy Regulation (EC 1380/2013) Article 9 allows member states to introduce non-discriminatory measures for managing fish stocks and marine ecosystems. At a high level, prohibition orders are applied to all member states that may work in the area, i.e. at a European scale. Following this the Marine Management Organisation manages fisheries at a national level for the 0-12nm marine area and the Inshore Fisheries and Conservation Authorities (IFCAs) operate regionally for 0-6nm. The roles, responsibilities and powers of MMO and IFCA Officers (and the organisations themselves) are set down in the Marine and Coastal Access Act 2009⁷.

The project Area of interest is divided into two IFCA districts: i) the Southern IFCA extends from the east up to Lyme Regis; and ii) the Devon and Severn IFCA extends from Lyme Regis to the west. Both the IFCAs and MMO operate byelaws, and the MMO enforces fishing licence conditions (Section 4 of the Sea Fish (Conservation) Act 1967) and fishing restriction orders (Section 5 of the Sea Fish (Conservation) Act 1967).

The 0-12nm offshore area is further managed by the Marine Management Organisation in terms of conservation of habitats and species at potential risk from any sector (i.e. not fisheries alone). This is informed through advice from Natural England and is controlled by i) designation of areas to meet European and national law as well as ii) licencing duties to comply with both European and national law to give permission for certain activities to be carried out.

Designated Areas

The candidate Lyme Bay and Torbay Special Area of Conservation (cSAC) will carry legal duties to maintain or restore the Annex I reefs to favourable condition in Lyme Bay, once designated in compliance with the European Commission Habitats Directive⁸. Whilst the fisheries sector is generally not required to obtain permission to use this area or to carry out an 'Appropriate Assessment' like other sectors, IFCAs must now manage the risk of fishing activity impacts on reefs, as set out in the 'Revised approach to management of commercial fisheries in European Marine Sites (EMS)'. Each IFCA addresses this duty through a

⁷ Further details and content of the Marine and Coastal Access Act here:
<http://www.legislation.gov.uk/ukpga/2009/23/contents>

⁸ Currently a "Site of Community Importance" (SCI) whilst pending designation by the European Commission

combination of Byelaws and areas closed to fishing (see below). The Lyme Bay part of the cSAC covers the majority of the project Area of Interest with greater coverage inshore 0-3nm, but extending overall out to ~6nm. (Note SACs are also termed European Marine Sites (EMS).)

A licence variation prohibits vessels from deploying mobile bottom gear except for in certain parts of the cSAC, and in these areas only if they are operating an inshore Vessel Monitoring System (iVMS) to the MMO specification. In Lyme Bay this is applicable to three discrete areas: Abbotsbury Ledges, south of Lyme Regis and south of Beer. This licence variation was put into effect for trialling use of iVMS in Lyme Bay but has since been continued post-trials.

The Lyme Bay Statutory Instrument, now termed the Lyme Bay Designated Area (Fishing Restrictions) Order 2008, prohibits use of bottom towed gear in an area of 206 km² (60 nm²). This mostly fits to the cSAC delineation, with small differences, e.g. additional coverage in the southwest and reduced coverage in the east. This designation replaced former voluntary closures of a reduced part of this area, due to their perceived lack of success and their reduced coverage (2001-2005), and also replaced subsequent legal closure of ~41km² agreed between the Secretary of State and South West Inshore Scallopers Association (2006-2008), owing to their historic target of what was some of the best scallop fishing grounds in the UK (Natural England, 2010⁹).

Current Byelaws

A full list of IFCA Byelaws is included in the Desk Review, but this is a summary of the current measures applying to Lyme Bay.

Devon & Severn IFCA:

- Restriction on fishing times and season for scallops, and constraints on the gear used
- An increased minimum landing size for male brown crab
- Mandatory escape gaps in pots used to fish crab and lobster
- A ban on landing egg bearing lobsters and those which have been “v-notched”¹⁰
- Ban on bottom towed gear across sensitive reef areas within Lyme Bay cSAC (through a permitting byelaw)
- Maximum vessel size

Southern IFCA District¹¹:

- Ban on bottom towed gear across sensitive reef areas within Lyme Bay cSAC

⁹ Evidence Base for designation of Lyme Bay and Torbay Special Area of Conservation
http://www.naturalengland.org.uk/Images/LBT-finalIA_tcm6-21648.pdf

¹⁰ Mark made by fishermen on female lobsters to protect from harvest

¹¹ Southern IFCA Byelaws (detail) <http://www.southern-ifca.gov.uk/byelaws>

- Gear restrictions (construction of nets) within Lyme Bay
- Vessel size restrictions
- Restrictions on fishing times and gear for scallop dredging
- A ban on landing egg-bearing lobsters

Additionally, Southern IFCA operate a scheme to encourage the use of escape gaps in pots, via the provision of funding to fishermen to adapt their gear. This is not a Byelaw but a voluntary scheme.

Note that further detail on the Byelaws is available in the Desk Review.

National Management

British registered commercial fishing vessels must have a license to fish. This carries MMO licence conditions which vary depending on the type (category) of license a fishing vessel has. There are different categories for under- and over-10m vessels, for example. The licence category and accompanying conditions may restrict how much of certain “quota species” fishing a vessel can retain, and where they can fish. Quota is a key stock management tool for species such as cod, sole and plaice. Access to quota and conditions for each licence category is adaptively managed by the MMO through licence variations¹².

Additionally, there are a number of Statutory Instruments which specify minimum landing sizes and other technical conservation measures. Some enact EC Directives within UK law. Further detail is available in the Desk Review (**Appendix A**).

EU Fisheries Management

Aside from general strategy, which is guided by the Common Fisheries Policy, the key EU management measures of direct relevance to Lyme Bay fisheries are the technical measures (EC 850/98 – Technical measures for the conservation of fishery resources). These include minimum landings sizes (MLS) for fish and shellfish, stipulations on gear (for example, mesh sizes, net construction) and where it can be used. The implementation of the “discards ban” (EC 1380/2013) has implications for bycatch management and replaces minimum landing sizes with minimum conservation reference sizes.

Other

Aside from the designated cSAC Annex I reef, it is possible for legal offences to occur within the project Area of Interest under certain legislation including: i) the Wildlife and Countryside Act 1981, ii) the Natural Environment and Rural Communities Act 2006 (both national law) and iii) the EU Habitats Regulations 2010 (European law). These state various offences regarding listed species, to deliberately: a) capture, injure or kill; b) disturb and impair its functions; c) to take/destroy eggs; d) to damage/destroy breeding site/resting

¹² The latest MMO licence variations are published here:
<https://www.gov.uk/government/publications/fishing-vessel-licence-variations>

place; and e) to keep/transport/sell/exchange. As with designated areas, these are informed by wider non-legislative lists such as the Bern Convention, Bonn Convention and IUCN Red List.

Voluntary Management

The Lyme Bay Fisheries and Conservation Reserve

This 'Reserve' corresponds to the boundary of the Lyme Bay cSAC and is managed by a Working Group whose membership includes key local and national government bodies (including the MMO, Natural England, the IFCA), NGOs, academics and local fisheries representatives. The Working Group has contributed towards managing the area to date through Voluntary Codes of Conduct (see below) amongst other deliverables and aspires to build on this in the future, potentially informed through this project.

Voluntary Codes of Conduct

The Lyme Bay Fisheries and Conservation Reserve Working Group has completed two Codes of Conduct relevant to the cSAC. These are distributed and promoted around the area, and measures include (but are not limited to):

Commercial fishing

- Use of inshore Vessel Monitoring System (vessel tracking)
- Effort limitation (caps on number of pots, traps and nets used)
- Fitting escape hatches to pots to allow small, non-target fish and shellfish to escape
- Ban on using undersize fish and shellfish as bait
- Moving nets if significant bycatch of crustaceans occurs

Recreational sea angling

- "Catch and release" and limited hooks encouraged
- Return of undersized fish
- Be careful not to drag vessel's anchor on sea bed
- Only taking fish for own consumption

Work underway

IFCA work

The IFCA are compelled by their governing objectives and vision to work towards sustainable management of marine fisheries resources. Both Devon & Severn and Southern IFCA have work ongoing or pending which relates to management within Lyme Bay.

Habitat Risk Matrix

In conjunction with Natural England, all IFCA have to put in place management to address risks identified to features within European Marine Sites within their District. Locally, this has led to Devon & Severn IFCA introducing the Mobile Fishing Permit Byelaw earlier this

year, requiring vessels to hold permits and comply with conditions including the closure of areas to bottom towed gear within the Lyme Bay and Torbay cSAC. Similarly, Southern IFCA's Bottom Towed Fishing Gear Byelaw prohibits the use of said gear over reef habitat, including that of Lyme Bay. This addresses all RED risk for the reef feature.

Further management is being considered for additional features and gears as part of an ongoing review process. Over time, it is likely that many of the risks identified in the assessments will be addressed. Defra has set a December 2016 deadline by which time all remaining (amber and green) risks must have been reviewed, existing activity management assessed and (where necessary) appropriate mitigation implemented.

Devon & Severn IFCA Potting Permitting Byelaw

Devon & Severn IFCA has proposed a new permitting byelaw, which should be in place by early 2015 and would apply throughout the District. This would: introduce further measures such as increased minimum landing size for female brown crab; put in place restrictions on the number of pots and catch per day for recreational potters; and allow for the introduction of further measures as new data arise from research.

Whelk Research

Devon & Severn IFCA is due to publish the results of some recent research into whelks¹³, which will examine size at sexual maturity, spawning seasonality and shell shape (height versus width), all of which are intended to inform future management of this species to ensure it is exploited sustainably. This will help to address the current lack of local data, which was highlighted under the Fisheries Assessment for whelk as a shortfall.

Ongoing engagement with recreational fishing interests

Recreational Sea Angling (RSA) is one of several activities outside commercial fishing which the IFCAs have a responsibility to take into account in their management of fisheries resources. Southern IFCA is developing a management strategy for sea angling, and has started to consult anglers through the use of questionnaires and other engagement. Devon & Severn IFCA has recently produced its own Draft RSA Strategy, and has been consulting with all relevant parties on the development of angling "zones" within the District.

Fully Documented Fisheries

This project aims to develop a system that will enable a comprehensive spatial picture of the Lyme Bay fisheries. This project enables participating fishermen to record catches via an iPhone App, tied to inshore VMS (vessel monitoring systems) data collection to give high resolution spatial effort and catch information. It has the potential to provide landings data at a better resolution than is currently available by the Monthly Shellfish Activity Returns and other MMO data.

¹³ Common whelk *Buccinum undatum*: the same species as assessed in this report

Data from the project should help to address the current lack of information on the catch composition within static netting and lining fisheries, providing information on species retained in addition to the target fishery (allowing for better assessment of overall sustainability). Spatial effort data from the inshore VMS will provide a means of addressing current uncertainty over risk to ETP species, which is highlighted in both assessments.

Lyme Bay Potting Intensity Project

This is a 3 year study with Plymouth University Marine Institute looking into the physical effects that differing intensities of potting have on seabed features and associated mobile and sessile fauna within Lyme Bay, in particular crab and lobsters, which carry a commercial interest. Experimental areas have been introduced throughout the bay, in which potting intensity has been manipulated. Seasonal quantitative sampling and annual video monitoring is being undertaken to assess the impact of potting and to enable comparisons of the impact of different potting densities to be drawn. This project will be novel in many respects, but mostly in that it will involve direct collaboration between scientists and fishermen in the regulation and maintenance of experimental areas as well as in the collection of data. The project also aims to incorporate the use of, and facilitate the development of, the technology introduced as part of the Fully Documented Fisheries initiative used for recording catch data. Outcomes from this project will strengthen the information baseline for the Lyme Bay pot fisheries, and could inform fishery-specific or gear-based management within Lyme Bay. These findings may have the potential to then influence other comparable pot fisheries throughout the UK.

Defra review of crab and lobster management

This review is recently underway, and will look at whether current management is appropriate and conducive to sustainable fisheries. Defra are discussing management options with relevant stakeholders, including the IFCAs, Cefas, the MMO, Natural England, Fishermen's organisations, the Shellfish Association of Great Britain, Seafish and others (no outputs at time of publication).

Cefas work

Current Cefas work includes a large shellfish research project "Enhancing the ability to provide advice on data limited shellfish stocks"¹⁴ focussing on a number of species including whelks, which currently lack a formal stock assessment. This project could help managers address many of the shortfalls in stock management highlighted in this report and in the fisheries sustainability assessment. There is also work underway looking at the issue of bycatch and discards from all fisheries. The Defra ASSIST project will "Investigate how the introduction of catch quotas and their implementation will affect different sectors of the fishing industry; identify and exchange information with regional groups of fishermen to

¹⁴ http://randd.defra.gov.uk/Document.aspx?Document=11606_MF02342pagesummaryfinal.pdf

validate current estimated catch and discard patterns and drivers; identify and evaluate practical measures to avoid unwanted catches, meet environmental objectives and maximise revenues; facilitate the move to managing a land-all-catch policy, including developing and evaluating methods that enable total catch monitoring".¹⁵

ICES

A recent ICES report, published after the assessment had been completed, advises on the need of a management plan for bass¹⁶. ICES notes that measures are needed urgently to reduce fishing mortality as the combined catches of commercial and recreational fisheries are above sustainable levels of exploitation. A large proportion of catches are from trawlers in the channel, and the UK and France are both key players - so the issue of stock management is wider than Lyme Bay. The lack of catch quota remains a risk because there is no mechanism to reduce effort to the recommended levels that can operate on a regional level.

Further, as previously alluded to in the assessment (see various Appendices) and throughout this report, recreational catch is "known to be substantial but cannot be fully quantified". A recent estimate of recreational landings suggested that they could account for almost 30% of total fishery removals, although this proportion is likely to fluctuate. The advice given is that total landings (and any management to limit effort) should take into account both commercial and recreational fisheries.

None of this information changes the findings of the assessment; rather the need for species-specific management and better information on recreational effort are underlined. Given the need for management at an EU Level, and the importance of bass to both the commercial and recreational fishermen-members of the Working Group, the WG could consider how it might help to raise the profile of the situation, by lobbying politicians or using the media influence of BLUE to publicise the need for change in bass management.

¹⁵ http://randd.defra.gov.uk/Document.aspx?Document=11438_MF1232initialtwopagesummaryfinal.pdf

¹⁶ ICES (2014) ICES advice for bass (5.5.32), June 2014:

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/bss-47.pdf>

Addressing Environmental Risk

Approach

The risks of different fishing methods are discussed here in descending order of overall risk, based on the findings of both the habitat risk assessment (**Appendix D**) and fisheries assessment (**Appendix I**). The risk or shortfall is shown along with appropriate mitigation that is being provided by current management (including IFCA Byelaws, Working Group actions, the Codes of Conduct and more). Any remaining gaps are identified, and finally some options are suggested that the Working Group could explore. In some cases there are no direct actions for the working group to take that are feasible, however options might include lobbying relevant parties external to the Lyme Bay Working Group. There is more discussion of options in the next section.

The risk analysis in **Table 4** below details:

- **GEAR TYPE:** table structured by grouped gear types.
- **RISK SUMMARY:** based on both the Habitat Risk Assessment of Conservation habitats and species, and Fisheries Sustainability Assessments of commercial fish species, splits out differences between individual gear types within group. Note that ETP refers to Endangered, Threatened and Protected species and these may have been identified either in the Habitat Risk Assessment (most of the cases) or the fisheries assessment (in terms of bycatch).
- **MITIGATION:** Current management measures in place to address and mitigate some/all of this risk, e.g. specific IFCA byelaws, plus any relevant studies underway.
- **WHO:** Organisations involved in current mitigation.
- **GAPS:** Given current mitigation, addresses remaining risks.
- **OPTIONS:** Details options that the Working Groups may carry out to mitigate remaining risks at a local level.

Additional information on source of information is in the footnotes¹⁷.

¹⁷ Note1. The RED, AMBER, GREEN terminology was only used in the habitat risk assessment (**Appendix D**). However the fisheries sustainability assessment coloured up scores in the table similarly, and so the terminology of RED, AMBER, GREEN has been used for both assessments in this table. In addition, GREY = not assessed in full fisheries sustainability assessment.

Note 2. In the habitat risk assessment, some habitats and species were shown to have no risk (BLUE) and these have been excluded from the table.

Note 3. Reef always refers to bedrock and stony reef.

Note 4. Rod and line was not assessed for the habitat and species risk assessment due to lack of spatial data on fishing activity with this gear type.

Note 5. ETP

Table 4. Risk Analysis, Mitigation & Options

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
M O B I L E G E A R					
1	<p>RED risk to benthic habitats and ETP</p> <ul style="list-style-type: none"> • Reef • Pink sea-fan 	<p>Inside cSAC, already being addressed by MMO/IFCAs in compliance with Habitats Regulations 2010. The ban on mobile bottom gear over protected features in the Designated Area (<i>Lyme Bay Designated Area Order</i> and MMO license conditions) has been extended by:</p> <ul style="list-style-type: none"> • (D&S IFCA) Mobile Fishing Permit Byelaw & Annex 3 • (SIFCA) Bottom Towed Fishing Byelaw <p>These prohibit bottom towed gear throughout most of the cSAC except some marginal areas where reef is not present. There is compulsory monitoring by iVMS for those marginal areas of cSAC where towed gear is allowed.</p> <p>Outside of the cSAC and Designated Area, no spatial evidence for pink sea-fan exists, but reef in southeast is at risk.</p>	<p>MMO IFCA NE Defra EU</p>	<p>None, as the features at risk are within the cSAC.</p> <p>Risk to features outside spatial management</p>	<p>This is an example of how management is working well, and can be promoted as part of branding.</p> <p>This is most appropriately addressed by the relevant statutory bodies (IFCA, NE) as part of their general duties.</p>
2	<p>RED risk to mobile ETP fish</p> <ul style="list-style-type: none"> • Cod, plaice, whiting (trawling only) 	<p>Fish removals are managed via ICES stock assessments and EU quotas, MMO licensing etc.</p> <p>Technically, fish habitat for listed species is also protected. Given that a large proportion of Lyme Bay is protected from mobile gear and no important nursery or spawning grounds are known of outside the cSAC, spatial closures mitigate risk here (see above).</p>	<p>MMO ICES EU IFCA NE</p>	<p>None</p>	<p>Management of most finfish takes place at regional/stock levels, so local measures are not appropriate (and, in this case, not needed).</p>
3	<p>RED risk to other mobile ETP species</p> <ul style="list-style-type: none"> • Basking shark & bottlenose dolphin 	<p>Within the cSAC, no mobile gear is allowed throughout most of the area – except some marginal areas.</p> <p>Outside the cSAC, there is legal protection of ETP species but no direct mitigation.</p> <p>iVMS can provide a better understanding of where fisheries effort is distributed.</p> <p>Risk to habitats is managed as part of the general duty of statutory regulators, such as NE and MMO, in conjunction with local bodies including IFCAs, within the marine planning framework – for example, the MPA network (including SACs, the new MCZs) addresses the need to protect a range of habitat as part of a network. This acts as mitigation.</p>	<p>IFCA MMO NE Defra EU</p>	<p>Understanding if, where and how fisheries interact with ETP species.</p> <p>Monitoring of ETP interactions.</p>	<p>Organise workshop - how to address risks locally; training and raising awareness among fishermen.</p> <p>Add to code of conduct – best practice training on ETP encounters, carry species ID cards, logging system for sightings and interactions</p> <p>Team with local NGOs, NE, IFCAs etc. to discuss how WG can help improve monitoring of marine mammal, turtles and birds.</p>
4	<p>AMBER risk to ETP species</p> <ul style="list-style-type: none"> • Other seabed habitats • ETP species including basking shark, cod, whiting, bottlenose dolphin (excl. trawling) • Other Dolphins (excluding 	<p>Risk to habitats is managed as part of the general duty of statutory regulators, such as NE and MMO, in conjunction with local bodies including IFCAs, within the marine planning framework – for example, the MPA network (including SACs, the new MCZs) addresses the need to protect a range of habitat as part of a network. This acts as mitigation.</p>			

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
	<p>bottlenose dolphin) and porpoise (all gear)</p> <ul style="list-style-type: none"> Grey and common seal, pursuit and plunge birds (trawling only) 				
5	<p>GREEN risk to mobile ETP species</p> <ul style="list-style-type: none"> Surface feeding birds (trawling only) 			Low risk – monitoring suggested	Whilst GREEN risks are possible through interaction of fishing activity and habitats/species, they are unlikely to have any significant impact. Monitor as part of ETP measures, as above.

P O T T I N G

6	<p>HIGH risk to commercial species:</p> <ul style="list-style-type: none"> Lobster Whelk (Stock status, harvest strategy, stock assessment, species management plan) 	<p>Basic minimum landing size (MLS) set at EU level.</p> <p>Escape gaps (D&S IFCA Byelaw, SIFCA voluntary), berried lobster byelaws (both IFCA), higher MLS (D&S only)</p> <p>D&S IFCA have permitting byelaw for potting in the pipeline, to include limits for recreational fishermen (pot limit, bag limit) and the potential for a maximum landing size.</p> <p>Research on whelk underway (D&S IFCA) and a report is due soon. Additionally, Cefas are running a large shellfish research study, which addresses whelks.</p> <p>Defra currently reviewing crab & lobster management, and likely to look at harvest control rules (but has only just got underway).</p> <p>Potting limits (voluntary code) within the cSAC; discretionary v-notching.</p>	<p>IFCA</p> <p>MMO</p> <p>Cefas</p> <p>EU</p> <p>WG</p>	<p>Fishery-specific management plan (although may be covered by Cefas/Defra work)</p> <p>Differences in management between IFCA</p>	<p>In terms of stock assessment, harvest control and other measures – direct action not needed at Working Group level. There is a lot of work underway.</p> <p>Obtain Cefas advice to determine which stock (the “failing” southeastern/ Channel or the “above limits” western channel) the Lyme Bay specific lobster stock falls into – this has relevance to sustainability assessments.</p> <p>The WG could coordinate species-specific plans for Lyme, or perhaps discuss whether to bridge the boundary between IFCA and whether a Lyme Bay-wide minimum landing size is appropriate.</p> <p>If evidence from the potting study shows that intensity is too high, could reduce via Voluntary Code (or IFCA permitting).</p> <p>Can also support/contribute to Defra review of management, if members think appropriate.</p>
7	<p>MEDIUM risk to commercial species:</p> <ul style="list-style-type: none"> Crab (harvest strategy, stock assessment, species management plan only) 	<p>Stocks are good, so the relevant mitigation relates specifically to management:</p> <ul style="list-style-type: none"> Defra review of crab and lobster management is underway, and likely to look at harvest strategy and stock assessment. 			
8	<p>MEDIUM risk to commercial stock (bycatch species):</p> <ul style="list-style-type: none"> Spider crab 	<p>D&S IFCA escape gap byelaw and SIFCA voluntary & funded escape gaps reduce risk to undersize animals.</p> <p>D&S IFCA potting permit byelaw to increase minimum landing size for</p>	<p>IFCA</p> <p>MMO</p> <p>EU</p> <p>WG</p>		

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
		<p>female to same as male</p> <p>S IFCA are currently doing a study on bycatch in potting fisheries.</p> <p>The Lyme Bay Potting Study will also contribute better understanding of bycatch.</p> <p>The Fully Documented fisheries project can improve information on landings (catch composition) of non-target retained species</p>			
9	<p>AMBER risk to benthic ETP species and habitats</p> <ul style="list-style-type: none"> Seabed habitats (all except coarse sediment and sand) Pink sea-fan 	<p>The potting study is looking at the effect of potting intensity on the seabed within the Designated Area (the results of which will be relevant to all areas both within and outside).</p> <p>iVMS is available as a voluntary scheme and provides a better understanding of where fisheries effort is distributed.</p> <p>Peer reviewed study (Eno et al, 2001¹⁸) showing potting had low impact on habitats and benthic fauna, including pink sea fan, which was observed to bend and then recover on contact with pots.</p> <p>Risk to habitats is managed as part of the general duty of statutory regulators, such as NE and MMO, in conjunction with local bodies including IFCA, within the marine planning framework – for example, the MPA network (including SACs, the new MCZs) address the need to protect a range of habitat as part of a network. This acts as mitigation.</p>	<p>NE</p> <p>IFCA</p> <p>MMO</p> <p>WG</p>	None	<p>Mitigation already underway likely to address the key risks.</p> <p>Await the results of the Lyme Bay Potting Study for information that will inform if further action is needed. In particular, effects on pink sea fan.</p> <p>If evidence from the potting study that intensity shows impacts are too high, could reduce via Voluntary Code (or IFCA permitting).</p>
10	<p>AMBER risk to ETP species:</p> <ul style="list-style-type: none"> Basking shark, cod, whiting, plaice (all gears) Grey and common seal, pursuit and plunge birds, surface feeding birds (pots/creels and fish traps only) 	<p>There is legal protection of ETP species but no direct mitigation.</p> <p>iVMS can provide a better understanding of where fisheries effort is distributed.</p> <p>Fish removals are managed via ICES stock assessments and EU quotas, MMO licensing etc.</p>	<p>IFCA</p> <p>NE</p> <p>Defra</p> <p>EU</p>	<p>Understanding of where and how fisheries interact with ETP species.</p> <p>Monitoring of ETP interactions.</p>	<p>Organise workshop - how to address risks locally; training and raising awareness among fishermen.</p> <p>Add to code of conduct – best practice training on ETP encounters, carry species ID cards, logging system for sightings and interactions</p> <p>Team with local NGOs, NE, IFCA etc. to discuss how WG can help improve monitoring of marine mammal, turtles and birds.</p>
11	<p>GREEN risk to ETP species:</p> <ul style="list-style-type: none"> Grey & common seal, pursuit and plunge birds, surface feeding birds (cuttle 				

¹⁸ Eno, NC; MacDonald, DS; Kinnear, J; Amos, SC; Chapman, C; Clark, R; Bunker, F; Munro, C (2001) Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science 58: pp11-20. Available here: <http://icesjms.oxfordjournals.org/content/58/1/11.full.pdf>

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
	potting, whelking and crabbing only)				
12	<p>LOW risk to commercial stock:</p> <ul style="list-style-type: none"> Crab stocks are healthy 	<p>EU minimum landing size (MLS), IFCA escape gap byelaws, in place. Higher MLS for male crab in D&S IFCA District.</p> <p>Potting effort management via IFCA permitting (D&S) pending. Voluntary potting effort cap within Code of Conduct.</p> <p>Additional work underway via Defra review of crab and lobster management.</p>	<p>EU</p> <p>IFCA</p> <p>MMO</p> <p>Cefas</p> <p>Defra</p> <p>WG</p>	None	<p>Promote crab as a good choice (branding etc.).</p> <p>Potentially would pass MSC, particularly if measures for ETP species (discussed above) are addressed. The WG could explore or discuss the MSC accreditation option.</p>

N E T T I N G

13	<p>RED risk to ETP species</p> <ul style="list-style-type: none"> Cod 	<p>Contrary to the findings of the Habitats and Species Risk Assessment, the Fisheries Sustainability Assessment shows that cod stocks (which are managed via ICES stock assessments and the CFP) are in good condition locally.</p>	<p>ICES</p> <p>EU</p>	None – recent stock assessments were good	None suggested.
14	<p>RED risk to ETP species:</p> <ul style="list-style-type: none"> Basking shark, plaice, dolphins and porpoise, bottlenose dolphin 	<p>There is legal protection of ETP species but no direct mitigation.</p> <p>iVMS can provide a better understanding of where fisheries effort is distributed.</p>	<p>IFCA</p> <p>NE</p> <p>Defra</p> <p>EU</p>	<p>Understanding if, where and how fisheries interact with ETP species.</p> <p>Monitoring of ETP interactions.</p>	<p>Organise workshop - how to address risks locally; training and raising awareness among fishermen.</p> <p>Add to code of conduct – best practice training on ETP encounters, carry species ID cards, logging system for sightings and interactions</p> <p>Team with local NGOs, NE, IFCA's etc. to discuss how WG can help improve monitoring of marine mammal, turtles and birds.</p>
15	<p>HIGH risk to commercial species</p> <ul style="list-style-type: none"> Spider crab (as bycatch in netting fisheries) 	<p>Lyme Bay Voluntary Code – if significant crustacean bycatch occurring, move to new ground</p>	WG	Understanding of general impact of netting fisheries locally in terms of key species caught – both those retained and landed, and those discarded - and how intensity of effort might affect this	Possible study (perhaps similar setup to potting study) on impact of netting locally (although the Defra/Cefas ASSIST work may address much of this).
16	<p>AMBER risk to ETP species</p> <ul style="list-style-type: none"> Whiting <p>MEDIUM risk to commercial species</p> <ul style="list-style-type: none"> Fisheries Sustainability Asst. identified risks to non-target retained bycatch species, 	<p>Whiting is not a significant part of Lyme Bay landings according to landings data (see Desk Review Appendix B) so risk to this species likely to be low. Whiting are controlled under quota, so if a vessel exceeds its quota but is catching whiting (even if not as a target species), it will need to stop fishing under the new EU landings obligation (also known as a “discards ban”).</p> <p>Fully Documented Fisheries Project will provide better data to supplement</p>	<p>MMO</p> <p>EU</p> <p>IFCA</p> <p>Cefas</p> <p>WG</p>	Understanding of general impact of netting fisheries locally in terms of key species caught – both those retained and landed, and those discarded - and how intensity of effort might affect this	<p>Data from the Fully Documented Fisheries Project will help demonstrate catch composition of retained species, but not discards.</p>

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
	due to a lack of information – what these are and their stock status	<p>existing MMO returns and help understand catch composition from netting fisheries (among others).</p> <p>Voluntary restriction on total net length per vessel (Code of Conduct) caps risk.</p> <p>Minimum landing sizes, quota and seasonality all affect uptake of fishing opportunities. Technical measures regarding net construction.</p> <p>Cefas are doing a lot of work on discards including from static nets (via the ASSIST project). CFP discard ban pending.</p> <p>Fish removals are managed via ICES stock assessments and EU quotas, MMO licensing etc.</p>			
17	<p>AMBER risk to benthic ETP species and habitats:</p> <ul style="list-style-type: none"> Mixed sed, gravel and sand, muddy sand and mud substrates Reef Pink sea-fan 	<p>Risk to habitats is managed as part of the general duty of statutory regulators, such as NE and MMO, in conjunction with local bodies including IFCA, within the marine planning framework – for example, the MPA network (including SACs, the new MCZs) address the need to protect a range of habitat as part of a network.</p>	NE MMO IFCA	Impact of netting on wide range of seabed types not fully understood	In addition to the EMS specific revised approach to fishing, Defra is developing wider work on the risks of fishing to habitats. The WG could discuss ways to contribute (and look at impact specifically in Lyme Bay). – potentially similar to potting study.
18	<p>GREEN risk to benthic ETP species:</p> <ul style="list-style-type: none"> Coarse sed and sand substrate habitats 	<p>Defra’s “Revised approach to the management of fisheries in European Marine Sites¹⁹” has led to an assessment of risks of fishing to habitats and species. The highest priority (red) risks have been addressed; remaining risks must be dealt with by end 2016.</p>		Low risk – but see above	
19	<p>LOW risk to commercial stock</p> <ul style="list-style-type: none"> Sole (good stock status, harvest control and species specific management) 	<p>Management of stock at ICES level with a fishery-specific plan, quota, minimum landing size. Enforcement by MMO and IFCA fishery officers.</p>	ICES EU MMO IFCA	None	None suggested.
L I N I N G					
20	<p>HIGH risk to stock (target species):</p> <ul style="list-style-type: none"> Bass (stock status, harvest control rules) 	<p>Stock management recently taken on by ICES through the Working Group on Assessment of New MoU Species (WGNEW) Working Group.</p> <p>IFCAs have duty to manage RSA; both are working on RSA strategies although no specific measures are in place yet relating to bass management.</p> <p>The Lyme Bay Voluntary Code of Conduct for recreational fishermen promotes best practice for sea angling.</p>	ICES MMO IFCA WG	Monitoring / management of RSA removals	<p>Management of bass appropriately takes place at a stock level. The main gap is recreational fisheries, which are not regulated – although many clubs have conservation-related rules.</p> <p>Locally, the WG could explore monitoring of</p>

¹⁹ <https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery>

NO	RISK	MITIGATION	WHO	GAPS	OPTIONS
					bass landings from recreational fishing, developed in conjunction with clubs, charter operators etc.
21	MEDIUM risk to ETP species in relation to commercial fisheries assessment (lack of a management approach)	Risk level was assessed as low for this gear type (Fisheries Sustainability Assessment), but the need for a management approach was flagged.	IFCA NE Defra Police	Understanding of where and how fisheries interact with ETP species. Monitoring of ETP interactions.	See No. 14 re: WG options for ETP work.
22	UNKNOWN risk to commercial species <ul style="list-style-type: none"> Thornback ray (stock) Other key target species not fully assessed 	The MSC pre-assessment in Project Inshore flagged up Thornback ray as having issues relating to stock status, information about the stock, and management (which had failed to follow through on scientific advice). No mitigation locally. Fully Documented Fisheries Project could provide information useful to managers.	ICES MMO	Poor stock information Issues with management	Given the issues raised, there is little the WG can feasibly do locally to directly affect management. Monitoring as part of wider study on catch composition would improve understanding. Could be fed back to management level.

D I V I N G

23	AMBER risk to benthic ETP habitats <ul style="list-style-type: none"> Reef 	It is unlikely that this medium level of risk (identified by the EMS matrix but without supporting information) will often materialise, other than malicious damage or possible accidental damage from anchoring or vessel impact. D&S IFCA are looking at permitting for diving within a forthcoming byelaw.	NE IFCA Defra Police WG	Diving-specific reference within Voluntary Code	The risks from diving on conservation features are probably minor. They could be addressed within the Voluntary Code of Conduct – WG could discuss details of “just in case” measures with divers.
24	GREEN risk to benthic ETP species and habitats <ul style="list-style-type: none"> All other seabed habitats Pink sea-fan Grey and common seal, surface feeding birds, pursuit and plunge birds 				
25	UNKNOWN risk to commercial species: King Scallops (unknown stock status, lack of harvest control rules and management plan)	There is an EU minimum landing size for king scallops. D&S IFCA permitting for diving could allow for conditions relating to hand collection (if deemed appropriate). Fully Documented Fisheries to provide information on effort and landings	EU IFCA	Understanding of stock in Lyme Bay Harvest control rules, management plan	Landings from diving are not always easily separated from those via other methods (dredging). The Fully Documented Fisheries Project will show the proportion of landings from dive-caught fishing. Stock surveys within the reserve could be of benefit, and ensure harvesting continues to be at sustainable levels (IFCA).

Summary of gaps

The management gaps identified are:

- **Understanding, monitoring and management of fishery interactions with ETP species** – the level of interaction of all fisheries with Endangered, Threatened and Protected species (such as marine mammals, sharks, and birds) is not certain, and there is not any monitoring or management strategy in place.
- **Fishery-specific management** – while there is management of different aspects of most fisheries, it is somewhat ad hoc when viewed in the context of Lyme Bay: for example, there are sometimes cross-jurisdictional differences between the two IFCA's (for example, in minimum landing sizes) within the Bay. These differences exist because of a focus on local fisheries management, which is generally positive, but the boundaries are “local” in the context of administrative rather than ecosystem considerations.
- **No protection of reef outside the Reserve** – the spatial closures prohibiting mobile gear do not apply (this affects an area of reef in the southeast of Lyme Bay) and whilst not formally designated, due to there being an adequate amount of reef already being protected nationally, it is still an offence under the EC Habitats Directive to damage these in certain circumstances (see Current Management Practice). This is the responsibility of individuals, i.e. fishermen; however their exposure to committing an offence could be managed.
- **Understanding on the impact of netting fisheries** locally in terms of key species caught – those retained and landed, and those discarded; and on different seabed habitats and ETP species (though reefs will be assessed for the EMS as an AMBER risk). Also, how intensity of effort might affect this.
- **Monitoring of recreational bass fishery removals** to address a potential information gap not likely to be fulfilled by other means.
- A lack of **guidance towards avoiding diving impacts** on conservation features.

Filling the gaps – what the risk analysis means

Q: There seemed to be a lot of risks! Looks like bad news...

It's important to stress that just because there are risks, it doesn't mean that fishing in Lyme Bay is unsustainable. What it often means is that there are areas of uncertainty. Most commonly, evidence is needed or management can be tightened in some way.

Q: Okay, so there's good news, then?

Yes! There's a lot of work going on – as shown under “mitigation” – that is already addressing the risk areas identified. This includes the ongoing work of the Working Group and the IFCA's, MMO, Cefas, Natural England and others.

Q: So what does the analysis show? What are gaps?

The gaps are things that may not quite be addressed by the current mitigation work. These will probably require some attention.

Q: Why do there seem to be fewer gaps for the higher “RED” risks?

Because management is working – the areas of highest risk are those which have had the most mitigation put in place already. This is because these were the first priority under the review of conservation management that is still ongoing.

Q: What about the “options”?

These are some ideas of work that might help to address the remaining gaps, and that don't repeat work already going on. There are some things outside the scope of the Working Group, but the focus is on options that the Working Group might like to consider – things that are likely to be appropriate in a local, Lyme Bay context these are explored in a little more detail below.

Adopting Best Practice Management

What more can be done?

The Lyme Bay Working Group is in the unique position of having a strong and locally specific evidence base, commissioned and owned by the group, to help plan for the future. The presence of this baseline and systematic approach to assessing risk and sustainability can give all stakeholders, from tourists to retailers, fisherman and regulators, confidence that the Lyme Bay fisheries product is in safe hands and being developed sustainably. There is plenty of good work going on at local and national level. The options outlined below aim to identify further opportunities to add value to the fishing product and to enhance conservation outcomes.

CASE STUDY 1: Dutch brown shrimp (*Crangon crangon*) fishery ETP Strategy

This fishery is currently undergoing MSC assessment, and managers have had to put together an appropriate bycatch strategy. Rather than opting for an observer scheme (as many larger fisheries – such as the New Zealand Orange Roughy trawl fishery – have done) the Dutch fishery managers have chosen to introduce self-regulation. Fishermen must:

- Keep a list of local endangered, threatened and protected species on board
- If caught, take a record of it, submit this record to their Producer Organisation, and return the animal to sea alive

There is an inspector who audits compliance, checking that lists are on board and that skippers understand the requirements, but no regular monitoring.

It remains to be seen whether or not this strategy is enough to pass the MSC Assessment, so it would be worth paying attention to the results.

Key lessons: A strategy might be fairly basic and self-regulated

Further information:

<http://www.garnalenvisserij.com/wp-content/uploads/2012/02/2.3-Background-document.pdf>

Endangered, Threatened and Protected (ETP) Species

The level of interaction of fisheries with ETP species (such as pink sea-fan, marine mammals, sharks, and birds) is often not certain, especially for mobile species. However the confidence assessments revealed basking shark to have the lowest confidence in the risk levels assigned (i.e. due to lack of evidence in the literature), followed by dolphins. Diving is the activity with the least confidence to support risk levels allocated, followed by potting and dredging, then netting and trawling. (Pink sea-fan had high confidence for all gear impact risk levels.)

Whilst there is no specific monitoring or management in place on these interactions for Lyme Bay, ETP issues are slowly gaining increased attention worldwide, as identified in the development of the risk matrix in this project and associated confidence levels. Whilst this knowledge develops at a national scale, an option for the Working Group is to consider looking

at local gear interactions through monitoring in Lyme Bay. The ranking of confidence levels described above can therefore help target which activities and gear types to prioritise. For example, little is known about how often commercial diving fisheries encounter marine mammals. As this fishery is relatively new and growing in importance within Lyme Bay, it is important to better understand such risks to a higher degree of certainty. Dive caught scallops, where well managed, could be a good candidate for successful sustainability accreditation. Being able to present evidence that monitoring of ETP interactions is in place would help in this regard.

One way to address monitoring is to introduce voluntary measures to the Code of Conduct encouraging the reporting of any interactions between fishing operations and ETP species, with a particular focus on those (as identified in this project) where there is not a good evidence base (Tier 2) and about which more information is needed.

“Interactions” may simply be any sightings, rather than only direct contact or entanglement, but any recording scheme would help answer questions about how frequently fishing operations encounter such species.

In fisheries where there is a high risk to ETP species (e.g. netting and trawling for bottlenose dolphin and basking shark), observer schemes are able to place people to monitor a proportion of fishing trips, but this is expensive and probably not needed in Lyme Bay.

Instead, a self-monitoring approach, as shown in CASE STUDY 1 (Dutch brown shrimp fishery), is likely to be more appropriate. A simple “best practice” guide for handling of discards, and perhaps an identification card and reporting form for ETP sightings could be produced; beyond the purpose of encouraging good practice, such materials would also raise general awareness.

Where (and if) monitoring indicates there is a risk locally, mitigation options are available: for example, acoustic “pingers” attached to set nets can reduce the risk of marine mammal entanglement. These have been trialled in inshore fisheries in the southwest, by Cornwall Wildlife Trust²⁰ and are currently being trialled in under everyday commercial use by members of the Welsh Fishermen’s Association.

A workshop could be organised for fishermen to introduce and discuss a draft ETP strategy, explain its importance and allow questions to be asked. This could be informed by prior research on how ETP strategies have been developed for other fisheries as a discrete piece

²⁰ Hardy, T; Williams, R; Caslake, R; Tregenza, N (2012) An investigation of acoustic deterrent devices to reduce cetacean bycatch in an inshore set net fishery. *Journal of Cetacean Research and Management* 12(1) pp 85-90. Available here: http://www.cornwallwildlifetrust.org.uk/Resources/Cornwall%20Wildlife%20Trust/PDF%20Documents/Pinger_trial_scientific_paper_JCRM_12-1_pp_85_90_March_2011.pdf

of work. Although many of the fisherman will be aware of many of the species, a further session could focus on improving general awareness.

There are multiple advantages of such an approach. Fisherman can make an additional contribution to improving the evidence, complementing data produced from the Fully Documented Fisheries Pilot to help improve management; they can demonstrate to the market that this is an example of going 'beyond compliance' to ensure that activities are sustainable. This offers a practical demonstration to wider stakeholders of the important environmental stewardship role played by the Lyme Bay fisherman.

Fishery-specific management

One of the consistent messages from the fisheries assessments was that current management is lacking in a fishery-specific plan for most species. While there is management of most aspects for the majority of fisheries, it is somewhat ad hoc when viewed in the context of Lyme Bay, and there are sometimes cross-jurisdictional differences (for example, in minimum landing sizes) within the Reserve.

It is important to stress that this is unlikely to be a big sustainability risk in context. Whilst management for most fisheries is multi-level, and (with reference to IFCA jurisdictions) cross-boundary, this doesn't mean that it isn't working or needs urgent attention. However, the reason it's flagged by the Sustainability Assessment is that having a basic plan for each fishery which sets out how it is managed can be a good idea: it makes it clear who has responsibility for each aspect of the fishery's management. This way, nothing important falls through the gaps. The Working Group could consider coordinating species-specific plans for Lyme Bay. Those which are managed primarily through local management and which were identified as potentially at risk in the sustainability assessments (lobster, whelk, spider crab, scallop) could be prioritised. For example, lobster's stock status is uncertain, due to the current IFCA district boundary used for stock assessments. This would be something to address within a management plan for the species (and could involve the Working Group working with Cefas and Defra to redefine the boundary so that Lyme Bay falls within one stock). Having these specific plans in place may enable fisherman to attract a sustainability premium for a Lyme Bay brand (Lyme Bay Lobster for example) and/or move towards schemes such as the Marine Stewardship Council.

A management plan does not need to be a big, complicated document; it could consist of a few pages describing how the stock is assessed, harvest controls, any environmental risks and how these are mitigated, as well as the key organisations participating in management, research and enforcement. The key would be to keep the plans specific to Lyme Bay, making them more relevant and fit for purpose than anything which might exist at a regional or

national level. For those less familiar with the process, guidance is available on how to construct a fisheries management plan, and what is needed²¹.

Where an aspect of the plan for a given fishery is met by an existing strategy, reference can be made to the relevant document. A lot of this information is already covered by this report, so the focus of the plans would be on management of the stock, and addressing the need for harvest control measures linked to stock assessment.

The impact of netting fisheries

The impact of netting on species caught and on the wider ecosystem (i.e. seabed habitats and ETP species) is one of the key residual risks identified. There is quite a lot of relevant research being undertaken by Cefas, particularly addressing discard levels, discard survival and impacts on conservation features²². However, understanding the nature of the impact within Lyme Bay will depend on having better data on which species are caught: the catch composition of netting fisheries locally. Data from the Fully Documented Fisheries Project will help demonstrate the catch composition of retained species, but not discards. This aspect of the bycatch would not be shown in landings data, and yet an understanding of the species composition and volume of discards is important when it comes to assessing the full impact of a fishery.

Better understanding of the distribution and intensity of netting effort, thanks to the Fully Documented Fisheries and inshore VMS, will also be important and can be added to this baseline of evidence. In addition, current work by Devon & Severn IFCA – including a census of netting effort (geographical spread, number and length of nets, species targeted and seasonality) and research on impacts on benthic habitats (to form Habitats Regulations assessments) – is likely to provide excellent, local information.

The Working Group could discuss with Cefas how this information can be used in combination with their work to build a better picture of netting impacts specifically within Lyme Bay. If there could be any gains from local research (in a similar manner to the current Potting Intensity Project), there are opportunities for the Working Group to lead on this work. It is possible that pioneering such research could attract European funding or other research funding which can further add to the Lyme Bay Working group's credentials of being a science led and innovative management group. It is also possible that such research, at a Lyme Bay level, can give fisherman "first mover advantage" in terms of being able to demonstrate sustainability of netting effort (although at this stage it is not possible to

²¹ How to Manage a Fishery: a simple guide to writing a fishery management plan (MRAG, 2005) was produced for the UK Department for International Development. Designed for use in developing countries with small scale fisheries, it is a useful reference: <http://r4d.dfid.gov.uk/pdf/outputs/R8468d.pdf>

²² The Defra-funded ASSIST project is looking at bycatch issues and mitigation in the context of implementing the Discard Ban under the EU Common Fisheries Policy. Further information here: randd.defra.gov.uk/Document.aspx?Document=11438_MF1232initialtwopagesummaryfinal.pdf

anticipate the outcome of such research which could identify both positive and negative issues).

Monitoring of recreational bass fishery removals

Bass are a focus species because they are high value, and a “sport” species, making them of interest to both commercial and recreational fishermen. There are currently gaps in information about the stock, and also the total level of fishing effort. Stock assessment is being addressed by ICES (International Council for Exploration of the Sea), supported by national work by Cefas. Species-specific management is also starting to be addressed by ICES, although this is at a relatively early stage. Locally, the Fully Documented Fisheries scheme will contribute to better understanding of commercial landings.

The remaining gap is the contribution of recreational sea fishing to total bass fishery removals. This has been of some concern to the Working Group and there have been anecdotal reports of recreational fishing interests, selling their product.

The IFCA's have a duty to work with the recreational sector, and both Devon & Severn and Southern IFCA's are developing strategies for this. Within Lyme Bay, the Voluntary Code for commercial fishermen has recently been supplemented by a complementary code for Recreational Sea Anglers. Building on this, the Working Group could explore how willing anglers might be to reporting catches on a voluntary basis.

This might be administered by clubs or through charter operators, or both; or it could be down to individual anglers to volunteer information by submitting completed monitoring forms. To encourage participation, sponsorship could be found for a lottery, with prizes for those contributing information. The benefits of monitoring to understanding the sustainability of bass should be made clear.

The Working Group could discuss the potential for monitoring and how best to approach it in partnership with the IFCA's as well as the local recreational sector.

Diving impacts on conservation features

There is a lack of guidance towards avoiding diving impacts on conservation features. The main risk identified is AMBER risk to reef habitats which may result from physical abrasion from anchoring, or accidental impact between diving vessels and reef biological communities. In reality, the risks are likely to be minor, with only a few divers operating commercially across the area and the divers associated with the Working Group are both experienced and knowledgeable. Also, the areas targeted by commercial scalloping divers are usually between the reefs on soft substrate, hence avoiding reefs almost entirely. However with an increase in diving in Lyme Bay, it would be useful to demonstrate how this AMBER risk is, in all likelihood, mitigated already. These risks are easily mitigated through discussion with divers and the creation of best practice guidelines; these could be added to

the Voluntary Code of Conduct. The Working Group could coordinate discussion of potential best practice between relevant members.

Good news stories

As well as taking the opportunity to address some of the gaps, it is important for the Working Group to be able to acknowledge what is already working very well. In some cases this project provides a level of independent evidence that can help demonstrate this, going beyond what has been achieved around many other parts of the coast.

Major risks already dealt with

As previously mentioned, the biggest risks to conservation features – relating to the impact of bottom towed gear on seabed features - have already been addressed successfully, leaving no gaps inside the cSAC/Designated Area. This is great news, as it demonstrates that management is working as it should. It can help build confidence in the management system and the approach that is being taken by the relevant authorities (Natural England, the IFCAs, MMO).

Crab stocks are healthy

Locally, brown crab stocks are at sustainable levels, suggesting management is sound. Based on the Project Inshore pre-assessment, it is feasible that brown crab would gain MSC accreditation, if this was something that the Working Group considered would add value. There were no outright failures identified, and some the gaps identified are already addressed locally. The remaining area, concerning management of ETP interactions is something that the Working Group could address. Evidence that these gaps are being filled should strengthen the scoring. However this would depend on whether Lyme Bay is an appropriate area “unit” for certification; the MSC could perhaps advise on this.

If the Working Group wanted to proceed with certification, funding might be available to support this work. Irrespective of whether the Working Group wish to pursue MSC, there is enough evidence on the sustainability of brown crab to enable a Lyme Bay brand to market itself on this basis.

Co-management approach

The contribution of the Working Group to date, e.g. supporting the Experimental Potting Intensity Study, helping to develop the Fully Documented Fisheries project, and more fundamentally facilitating the collaboration of diverse interests towards a common goal, is an excellent example of collaborative management. Given the complexity of the marine environment and the different ways in which it is valued, this is not always easy. However, co-management is an important element of what is called the “ecosystem approach”, which is becoming the new paradigm for environmental management.

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of natural resources...It recognizes that humans, with their cultural diversity, are an integral component of ecosystems²³.

Notably, the ecosystem approach sees humans as integral, not apart from, the ecosystem as a whole. This is why the engagement of fishermen and locals in the Lyme Bay Reserve is important, and why the outcomes of this engagement – such as the Voluntary Codes of Conduct – are also important.

The ecosystem approach is the basis for the European Marine Strategy Framework Directive, which is to inform the approach to marine management. Lyme Bay is already off to a good start.

The way forward

Measuring and monitoring success

One of the keys to good management is monitoring the performance of projects or management measures to see if they are having the desired effect. For this, a baseline of evidence is required (provided by the desk reviews in **Appendices A** and **B**) clear objectives are needed – either specific to the fisheries (another good reason for plans) or for Lyme Bay as a whole. Then there will be something tangible against which progress can be benchmarked. The Chesapeake Bay Program CASE STUDY no. 2 (below) shows how monitoring can be achieved even in a complicated site, although Lyme Bay is much smaller and more manageable.

²³ Convention on Biological Diversity. Further information: <http://jncc.defra.gov.uk/default.aspx?page=6276>

From a sustainability point of view, re-evaluating fisheries against either (or both) the assessment frameworks used here could be a simple gauge as to how far management has come, particularly given the amount of work already underway to address many of the issues raised.

For some habitats and species, evaluation of the success of management should relate to the outcomes of condition monitoring that Natural England will undertake as part of the management of the cSAC. However, many of the ETP species are not monitored as “features” of the site, so data from bird surveys, marine mammal sightings and other records – perhaps even in-house monitoring (see “Enhancing the Voluntary Codes) could be used.

Having both long term goals and annual or biannual milestones is a way of keeping momentum, and keeping all parties engaged. Any existing monitoring by partner organisations should be referred to.

CASE STUDY 2:

Monitoring for adaptive management in Chesapeake Bay

Chesapeake Bay is the largest estuary in the USA. Its catchment area is huge, spanning seven states with over 18,000 local government authorities. The fisheries are of high economic importance, but there are many environmental issues too – some relating to fishing activity, but many as a result of other factors such as nutrient runoff.

The complexity of the issues and the administrative boundaries is daunting. The Chesapeake Bay Program, established in 1983 was created as a regional partnership including local, state and federal government, NGOs, academic institutions and citizen groups. The Program coordinates the activities of all partners to work towards shared goals.

These goals are divided into work-stream areas (such as Fisheries, Water Quality), and each is the responsibility of a team. The team organises its work using the adaptive management model:

One of the things the Program has found is that, in addition to longer term goals (for example, 5 years) having milestones over a shorter period (such as two years) has increased the rate of improvement in work areas such as reducing nutrient levels, and restoring habitat.

Key lessons:

- Have clear goals and understand what achieving them “looks like”.
- Look for gaps and overlaps in existing management
- Develop a management strategy (listing goals and factors critical to achieving them)
- Develop a monitoring program and assess performance by having clear success milestones – these may be at both long/medium term and shorter term timescales
- Is it working? If not, change management – if it is, are new goals needed?

Further information: <http://www.chesapeakebay.net/>

Branding, incentives and local awareness

The evidence assessed has systematically shown that the Lyme Bay Fisheries and Conservation Reserve Brand has the potential to be a strong economic asset. This no longer relies on opinion but is firmly justified by the work undertaken here. Such branding could also be used to lever change and improve sustainability by creating incentives. By licensing the use of a Lyme Bay Reserve mark to those signed up to the Code of Conduct, signatories would benefit from a higher status for their product which both highlights commitment to sustainability and local origin. It is important to stress that such measures are fundamentally linked to the quality of the product and therefore sit with other Working Group initiatives (such as ice machines and storage) to further enhance quality and marketability. Further up the supply chain, businesses using fresh or processed product from Lyme Bay branded fisheries could also benefit. The scheme might be able to bring in other benefits to those involved, such as preferential rates on insurance or local services (perhaps through commercial sponsorship).

This would involve creating a set of standards, but these do not have to be prescriptive, although they should be meaningful (see Gulf of Maine example, CASE STUDY 3).

The criteria should be clear and transparent, and demonstrate how local industry (through the Code of Conduct) commits to best practice and is striving for improvements. It is important to be realistic and honest about the sustainability of stocks, however, and to distinguish between quality and sustainability, if both are to be elements of local branding.

CASE STUDY 3:

Gulf of Maine Research Institute Seafood Branding Program

This is part of a wider Sustainable Seafood Initiative, and highlights locally produced seafood that meet a set of criteria, set out in a Responsibly Harvested Standard. The goals are to reward and encourage sustainable practice, create a shared brand identity for the seafood industry, and provide consumers with information on and confidence in branded local produce.

The Standard was developed with reference to guidelines for ecolabelling and existing standards (including the MSC) and relates both to sustainable fishing and chain of custody. To achieve the standard, fisheries must:

- Be managed by a competent authority and with a management plan in place, incorporating best scientific evidence
- Have controls within management plans whereby, if stocks are below target levels, they must be rebuilt within an appropriate time frame
- Informed by sufficient data to determine harvest levels
- Have monitoring of compliance and reporting, and enforcement of regulations
- Be traceable to the area

Key lessons: It's possible to "do it yourself", and create a local ecolabel. This combines sustainability certification and branding. But it needs to be meaningful, and isn't necessarily an easy pass.

Further information:

<http://www.gmri.org/community/display.asp?a=5&b=25&c=189>

While the MSC ecolabel is well-known, it has faced criticism²⁴ and some of the many fisheries it has certified have attracted controversy. By presenting a rigorous, local sustainability and quality standard unique to Lyme Bay fisheries, there is an opportunity to present qualifying fisheries as premium product distinct from other ecolabels.

Seeing is believing

As part of the Lyme Bay Brand development, the Working Group should consider how the science and evidence base is made accessible and disseminated. This provides a resource both for researchers, and for customers and the wider market, demonstrating in an open and transparent way how the area is being managed. In the future one option could be to develop the website to provide regular information from the Fully Documented Fisheries project, iVMS and voluntary sightings. It could be possible to even have such information in real-time (although in depth consultation with fisherman and strict controls on commercial confidentiality are required). Such an open approach tailored to different audiences can enhance the profile and trustworthiness of the brand.

²⁴ <http://www.nature.com/news/eco-label-seafood-body-attempts-to-convince-critics-1.13409>

SWOT Analysis

This section draws on the findings of the risk analysis, management analysis and additional local socio-economic context. It is presented as a SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis, to highlight at a broad, strategic level the key internal and external factors affecting the sustainability of the fishing industry in Lyme Bay. The analysis applies to the project Area of Interest (AOI) as a whole, but with a focus on the Reserve in particular.

Strengths

Management

Good management framework

Across all fisheries, the management framework was identified as strong, with good higher level governance and policy, long term objectives to support sustainable fisheries, and the opportunity for all interested parties to contribute. There are statutory organisations responsible for fisheries and conservation issues at a local and a national level. The structure of the IFCA's supports the development of collaborative and responsive locally-based management, and there is direct involvement of representatives of the fishing industry on the IFCA Committee, in addition to a process for individuals to make their concerns and views known. The Lyme Bay Fisheries and Conservation Reserve project and Consultative Committee, whilst not having statutory management powers, is establishing voluntary measures that contribute to the management framework. Control, monitoring and surveillance systems ensure good compliance.

Key fisheries are operating sustainably

Brown crab, one of the most important fisheries by landings volume and sales, is low risk, with stocks in a healthy condition. Similarly, sole, cod and plaice currently have good stock status and strong harvest control rules. The fishing gears used within the Lyme Bay cSAC do not present a high risk to habitats and benthic species of conservation importance.

Strong partnership working

There is a history of good collaborative management at all levels – from the relationship between the industry and local IFCA's, to the partnerships between fisheries management and conservation agencies, and input from NGOs, Universities and Cefas. For example, the use of iVMS within the Lyme Bay Designated area to allow access to towed gears while protecting reef habitats was through active collaboration between the MMO and the fishing industry. The Lyme Bay Working Group has consolidated existing partnerships and brought focus and a strategic, business-oriented approach to local management. The willingness of the fishing industry to be actively involved in the management of the Reserve and support the Working Group's Code of Conduct is a huge asset.

Socio-economic

Diversity of fisheries

The variety of species available to be fished within Lyme Bay allows the fishing industry to be diverse. This insulates the industry as a whole from changes to the availability of target species (due to quota restrictions) and fishing grounds or the use of certain gears. While any restrictions are unlikely to be popular, the industry is able to (and has) adapted to new opportunities and markets. Matching the information from this project to more 'live' sources of data can enable the Working Group to receive briefings on areas of concern so that fishing patterns and target species can be adapted to give customers and stakeholders confidence that the reserve is responsive and adapting to change.

Strong community identity

There is a long history of fishing locally, and the industry is an important part of the local community and its cultural identity. This can, in part, create an incentive for good practice and encourage sustainable fishing, as there is a sense of ownership of the inshore grounds in particular, and a desire to see success in the long term rather than purely on the basis of short term financial interest. The socio-cultural identity of fishing towns such as those in Lyme Bay contributes to their attraction to tourism²⁵ and forms the basis of a strong local brand.

Large local tourist and recreation industry

The economic health of the area is also linked to tourism, which provides a strong seasonal market for quality local produce that the industry is able to service. There is national and even international awareness of the Dorset/East Devon region as a destination. A large local retail and food industry is built around tourists, and regional food marketing is becoming more established. Spending on recreational activities within Lyme Bay is high, with divers and sea anglers estimated to spend £4m and £17m respectively²⁶.

National recognition of Lyme Bay as a Conservation area

This gives the perception of healthy marine environment, and is an asset to tourism and, potentially, the perception of the fishing industry locally, particularly in relation to the Lyme Bay Marine Reserve.

Perceived benefits of the Lyme Bay Reserve

Opinions of stakeholders including fishermen and recreational users on the impact of the cSAC are mixed, but many divers and anglers felt that the Reserve was of benefit to

²⁵ Reed, M; Courtney, P; Urquhart, J; Ross, N (2013) Beyond fish as commodities: Understanding the socio-cultural role of inshore fisheries in England. *Marine Policy* 37, pp 62-68.

²⁶ Rees, S; Rodwell, L; Attrill, M; Austen, M; Mangi, S (2010) The value of marine biodiversity to the leisure and recreation industry and its application to marine spatial planning. *Marine Policy* 24 pp 868-875.

biodiversity and increasing the recreational value of the area. Some fishermen reported increased catches²⁷.

Weaknesses

Management

Some high risk fisheries

Several of the key fisheries did not achieve a pass under the assessment due to concerns about the health of the stock. In some cases, such as lobster, this is because the stock may be below limit reference points²⁸. In others (bass, whelk), there is not enough data to be certain but the information available suggests there may be issues. Other species not directly assessed (King scallop, cuttlefish, thornback ray and spider crab) are in a similar position. Beyond stock sustainability, the wider ecosystem impact of most fisheries is not high risk but there are moderate concerns with respect to impacts on habitats and species. For some mobile species such as fish, dolphins and sharks, the Conservation Risk Assessment suggests netting activity may be high risk.

Information shortfalls

Even the highest scoring fisheries were constrained from performing more sustainably by current gaps in information. These relate to the biology and stock status of the fisheries, the nature and extent of fishing effort, bycatch composition and environmental effects. This creates a high level of uncertainty and subsequent risk that some fisheries are not operating sustainably. In addition, the adopted precautionary approach can result in certain limitations to fishing activities. This may simply be due to a lack of evidence to show they are not detrimental to the target stock, other species or the environment.

Gap in management of recreational fisheries

There is a strong recreational fishing sector locally, which is currently not restricted or monitored. This is a risk with respect to high value recreational species including bass, where the contribution of recreational catch to total fishery removals may be important but is currently unknown. This has been an area of concern identified by the Working Group and reinforced by the findings in this project.

Management outside the cSAC

There are some areas of reef and mobile species outside the cSAC which are not protected from mobile gear – but are still legally protected, for example under the Wildlife and

²⁷ Rees, S; Attrill, M; Austen, M; Mangi, S; Rodwell, L (2013) A thematic cost-benefit analysis of a marine protected area. *Journal of Environmental Management* 114, pp 476-485.

²⁸ Southall, TD; Cappell, R; Hambrey, JB; Hervas, A; Huntington, TC; Medley, PAH; Nimmo, F; Pfeiffer, N; Tully, O (2013) Project Inshore Stage 2 Report. Prepared for Seafish Industry Authority and the Shellfish Association of Great Britain. Available from: http://www.seafish.org/media/921067/2013.07.23_project_inshore_s2_v5.pdf

Countryside Act 1981 or due to their inclusion on the English NERC (Natural Environment and Rural Communities) List (see Management section). It is unclear how this protection can be effected without management (although this is primarily an issue for statutory regulators).

Management framework gaps

The management setup is good in general, but there are shortfalls when it comes to specifics. Given the different levels of management at European, national and local scales, there is scope for overlap, resulting in a certain level of ambiguity of different organisations' roles. While "ownership" or leadership on certain issues may be implicit or negotiated locally, there is still a need for well-defined fishery plans (for the purposes of the MSC, at least), even if these simply set out responsibilities and objectives already in place. This improves the transparency of the management process and would make it easier to highlight successes and strengths to the general public.

Another related issue is in differences between the jurisdictions of the two IFCA, which maintain separate Byelaws, but whose boundary effectively bisects the Lyme Bay Designated Area. This is potentially a risk where there are different management measures - for example, a minimum landing size for lobster of 90mm carapace length within the Devon & Severn IFCA District, versus 87mm carapace length in the Southern IFCA District; similarly, escape gaps must be fitted in the Devon & Severn IFCA District, but are voluntarily fitted (with funding available) within the Southern IFCA jurisdiction. Although the IFCA are structured to address management at a local level, sometimes the District-wide scale at which they operate is not local enough. Where there are cross-boundary issues that need even more localised attention and a joint approach, IFCA are working to achieve this.

Incomplete uptake of Code of Conduct

While there has been good support of the Working Group from part of the industry, there is not a complete buy in to the Code of Conduct. While a majority of under-10 vessels and those using static gear are signed up, some larger vessels and/or mobile gear users are not members of the Working Group, and greater effort to bring these fishermen on board would be beneficial. Meanwhile, participation in voluntary measures is restricted, and weakens the potential of the Code as an effective management tool. There is a risk that non signatories either cause damage by not adhering to the code, and/or "free-ride" on the hard work of fisherman who are acting responsibly. Compliance with the Code relies somewhat on peer pressure from other fishermen. The working group have previously expressed concern about this and further discussion as to how to strengthen the code and increase uptake would be worthwhile.

Difficulties collecting data

While information is very much lacking in some cases, in others it exists but is difficult to access as it is deemed commercially sensitive, or is not collected in a suitable resolution / format. Permission may have to be sought from individual fishermen, which is normally time

consuming. Some fisherman, including signatories to the Code of Conduct and Working Group members, were not comfortable sharing data because it is commercially confidential. Whilst this project provides the first baseline assessment for the whole Working Group area, new initiatives such as the Fully Documented Fisheries Project and spatial data from inshore VMS will quickly improve this.

Insufficient spatial activity data

The current study highlighted the paucity of spatial fishing activity data for Lyme Bay. Current fishing activity maps are broadscale and patchy in detail. This is a weakness not only from a management perspective but also puts the fishing industry in a weak position in describing and, possibly defending, its fishing grounds in the development of marine plans and when dealing with offshore renewable and aquaculture developers. The Fully Documented Fishery project will enable the Working Group to gather this data representing a unique opportunity for the participating fishermen to develop an evidence base. The FDF project may even allow for monitoring of ETP species through its specific App.

Socio-economic

Cost of living and barriers to industry

From an economic perspective, the relatively high house prices in the area and operational costs including vessels, fuel and licenses mean that margins are tight, particularly for potential new entrants but also for the industry as a whole. As well as presenting a risk to the future of a viable industry, this can have an impact on the willingness or even availability (in terms of time) of fishermen to participate in management and conservation initiatives even if they may provide long term gain, as short term stability and the very real challenges of earning a living in a difficult industry will always take precedent.

Poor fish prices

Prices for fish (first sale value) can be seasonally variable and are often low. Where landings volume is small, fishermen can have limited access to markets. Work to further enhance the quality of the Lyme Bay product as well as evidence to support sustainability branding can therefore make the difference.

Access to quota for smaller vessels

Many of the local vessels have limited access to quota species, e.g. sole. This lack of fishing opportunity may constrain the under-10 fleet's economic viability where alternatives do not exist or are already fully exploited.

Costs related to change in fishing activity

Some fishermen have reported a rise in costs since the closure of the Designated Area, with those using towed gear noting an increase in fuel use related to longer travel times to fish

outside the protected area. Some larger processors reported having to source scallops from further away, incurring haulage costs²⁹. Additionally, perceived social costs include a feeling of discrimination (namely on the part of mobile gear fishermen), and a sense that traditional property rights had been lost³⁰.

Opportunities

Management

Easy gains to be made

There is already a lot of work current and ongoing within the Working Group and partner organisations that will address many issues and risks identified. The Plymouth University Potting Study, Fully Documented Fisheries Project, IFCA Byelaw and EMS Risk review and Defra review of crab and lobster management are all directly relevant. There is an opportunity to capitalise on the current momentum by making sure results and new information is fed in to management and the activities of the Working Group.

Cost savings from collaboration

There are benefits in collaboration, particularly where there is a clear management strategy with well-defined objectives and responsibilities, which can be divided up between partners. This avoids duplication of effort and saves money. For example, a strategy for managing risk to Endangered, Threatened and Protected species would help organisations such as the IFCA and Natural England meet conservation duties³¹. Being able to demonstrate good practice would also help the fishing industry if there was a desire to pursue MSC accreditation. Logistical considerations including the collection of monitoring data (sightings, interactions) have costs in both a convenience and a monetary sense, but these will be lower for all interested parties if there is collaboration, which the Working Group can facilitate.

Greater agency for fishermen

Fishermen have an opportunity through the Working Group to get more directly involved and influence decision making on an individual basis, as well as collectively through Associations and representative groups. It also increases the exposure of managers in fisheries and conservation to a wider range of voices from the industry, which may not otherwise be heard. This includes recreational sea anglers, who could lead on adding any

²⁹ Mangi, S; Gall, SC; Hattam, C; Rodwell, L (2011) Lyme Bay – Assessing the socio-economic impacts resulting from the closure restrictions in Lyme Bay. Final Report to Defra; University of Plymouth. 119pp.

³⁰ Rees, S; Attrill, M; Austen, M; Mangi, S; Rodwell, L (2013) A thematic cost-benefit analysis of a marine protected area. *Journal of Environmental Management* 114, pp 476-485.

³¹ Even where they are not designated under marine protected area management (e.g. cSAC), species such as the bottlenose dolphin are still protected under the Wildlife and Countryside Act 1981 and/or as an English NERC List species of principle importance. Intentional harm to these species is illegal.

appropriate management (such as voluntary submission of landings information) in a way that is likely to be acceptable and workable.

Pioneering an ecosystem approach within Lyme Bay

The strong co-management ethos and breadth of representation within the Working Group means that it is well placed to facilitate an ecosystem approach to fisheries within Lyme Bay. An ecosystem approach, in a management context, means considering different activities together rather than in isolation. This requires coordination between different management bodies and sea users. It also allows management based on ecological boundaries rather than administrative ones. This is in keeping with the current trajectory of UK government policy, and the implementation of the Marine Strategy Framework Directive. The Working Group can coordinate partners in the same way that a Management Scheme might act as a broker within a European Marine Site.

Socio-economic

Branding

By capitalising on and publicising good practice, highlighting the strong management, participatory approach and commitment to sustainability, the Working Group can enhance the Lyme Bay brand. This can create new markets and opportunities for the industry, and attract sponsorship from third parties to support the continued work of the Working Group. The brown crab fishery may benefit from MSC assessment (particularly if the minor issues are addressed) and has the best chance of successful accreditation.

Market development and provenance

Publicising the work of the Lyme Bay Reserve can create new market opportunities. This may help fishermen achieve more competitive prices for their product. Funding is available for projects which can provide a boost to the local economy via the EU Regional Development Fund, e.g. as administered by the Chalk and Cheese project³². To promote the brand further afield, it would be possible to develop a Lyme Bay “provenance” by EU schemes of geographical indication (such as Protected Designation of Origin).

Opportunities to access new European Funding Streams

The new European Maritime and Fisheries Fund (EMFF) is a new EU fund which aims to help fisherman transition to sustainable fishing, supports coastal communities in diversifying their economies, and finances projects that create new jobs and improve quality of life along European coasts. It is the successor to the current European Fisheries Fund (EFF) which the Working Group has been successful in accessing to fund local improvements. The Working Group should consider how the EMFF can be accessed to both improve the evidence in areas identified by this report, but also provide funding in areas which will

³² <http://www.chalkandcheese.org/>

increase the value of the Lyme Bay product. As part of the EFF scheme, this included a range of opportunities from funding of ice machines, support for the development of i-VMS and Fully Documented Fisheries to the establishment of Fisheries Local Action Groups (FLAGs). FLAGs in other parts of the coast (for example North Norfolk) have secured multi-million pound programmes to improve infrastructure, evidence and science, but also enhance other socio-economic assets – such as tourism and visitor centres. These schemes are expected to be extended and can enable the Lyme Bay Working Group to continue with an ambitious programme into the future.

Threats

Management

Increasing public attention on marine conservation

There is currently more scrutiny of activities and their effects on the marine environment than ever before. Marine Conservation Zones are in the public consciousness through involvement in consultations, their active promotion by NGOs and media coverage (such as the recent Hugh's Fish Fight). This creates additional pressure for all involved, raising the stakes; while this can be a positive thing, it means that failures (as well as successes) are well publicised and can damage long term collaboration. It is also important to recognise that some people feel that such campaigns (and campaigners) are not always as informed on the specifics of the science or local area. The baseline evidence provided by this project can enable a more informed debate to take place.

Climate change and ecosystem effects

The wider health of the ecosystem is not separate from the Lyme Bay fisheries, but is difficult to mitigate for or manage. Global environmental change is having an effect on the range of species from plankton to top predators, affecting the seasonality of key life stage events, the availability and diversity of food, geographic range and more. This creates instability which is undesirable and a risk from an operational point of view as well as an ecological perspective. It also means that the impact of management measures may be less predictable. Looking at changes in fishing from a historical perspective, there has been a tendency to “fish down the food chain³³”; arguably this has been diversification to take the pressure off over-subscribed fisheries, and has also been driven by socio-economic drivers such as the development of new markets for novel species overseas and issues such as poor access to quota. But shellfisheries are potentially at risk from higher exploitation in the future, which could create pressure on stocks which are currently fully sustainably exploited.

³³ Molfese, C; Beare, D; Hall-Spencer, J (2014) Overfishing and the Replacement of Demersal Finfish by Shellfish. PLOSone. Available online at: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0101506>

Factors outside the control of the Working Group

Many fisheries decisions are made at a relatively high level, and may be reasonable from a regional perspective but not fit the needs at a local level. Alternatively, there may be general agreement on the need to review management – and this must first happen at a national or European level, but the process takes a long time, particularly where change may be politically contentious. Bass management is currently undergoing such a review, with different sectors arguing for and against an increase in minimum landing size (from the current 36 cm to 40 cm or more)³⁴ as there is a concern over whether the majority of mature females have a chance to reproduce before they are caught. This is made more difficult due to a lack of information on fishing effort and stock assessment data, to help decide if stocks are sustainable under current management.

Economic pressures

These affect most key partners, and therefore are a risk to the success of the Working Group. The rising cost of living and economic uncertainty can jeopardise the ability of the industry to take a long term approach, restricting participation in conservation initiatives. Most government organisations at local and national level are constrained by funding; many statutory partners are looking for ways to reduce spending and may be less inclined to support the expansion of necessary research.

Funding and future of IFCAs

Defra is currently assessing the performance of the IFCAs over the first four years of their operation, with a report being written for the Secretary of State. The results of this report may affect how the IFCAs operate and how they are able to contribute to management in the future – particularly if the local focus they currently have is lost or diluted. .

Consultation fatigue

There have been, and continue to be, a lot of consultations relating to marine conservation, fisheries, planning applications, and more. Although this is part of a healthy process and a means for widespread participation in marine planning, it also creates a burden on individuals and organisations, due to the time involved. Repetition of similar issues can be demoralising, and can damage faith in the process, resulting in some participants disengaging entirely.

Socio-economic

Misconceptions about fishing

The fishing industry is complex and diverse, but not all sectors are equal in terms of their capacity to promote their interests or defend their activities. Often, the public, media and conservation sector accept an image of fishing as uniformly “bad news”, as the differences

³⁴ UK Parliament Briefing SN/SC/746 on Sea Bass Fishing, March 2013. <http://www.parliament.uk/briefing-papers/SN00745.pdf>

between different sectors and the strengths of many aspects of management are not recognised. These misconceptions can affect the success of talks between different stakeholders, even when there are more common interests than differences.

Displacement of effort and changes in gear

A study looking at the effects of the spatial closures in Lyme Bay³⁵ identified the potential for gear conflict following the departure of towed gear users. Fishing grounds outside the Reserve used by fishermen deploying static gear are now used by the displaced vessels, creating conflict for space. Inside the Reserve, the amount of static gear has increased. The effects of an increase in potting are being studied, but the impacts of netting and an increase in intensity are less understood. Voluntary restrictions within the Code of Conduct cap effort but by nature are not enforced, nor is there full uptake of the Code.

Bad feeling and conflict

There is a risk of exacerbating existing tensions between stakeholders – even within the commercial fishing sector; there have been different experiences of the management and resulting costs and benefits from the Designated Area³⁶. It is important to maintain dialogue even with those fishermen not currently engaged with the Working Group, where practical. The equitable use of fishing grounds in Lyme Bay outside the Reserve should be of concern: where there are tensions surrounding gear use, any efforts to address management of impacts of any gear on conservation features (such as mobile species) outside the cSAC are jeopardised.

³⁵ Mangi, S; Gall, SC; Hattam, C; Rodwell, L (2011) Lyme Bay – Assessing the socio-economic impacts resulting from the closure restrictions in Lyme Bay. Final Report to Defra; University of Plymouth. 119pp.

³⁶ Rees, S; Attrill, M; Austen, M; Mangi, S; Rodwell, L (2013) A thematic cost-benefit analysis of a marine protected area. *Journal of Environmental Management* 114, pp 476-485.

Conclusions

Summary

This report presents a review of management practice in Lyme Bay, based on a number of contributory project components including the Desk Review, Habitats and Species risk assessment and Fisheries Sustainability assessment.

The key risks are highlighted, and a gap analysis shows how current management and complementary work in progress is addressing these risks. The remaining gaps are identified, and these are discussed in further detail, together with opportunities for better practice. Finally, an overview of the key Strengths, Weaknesses, Opportunities and Threats (SWOT) for Lyme Bay Fisheries draws on the findings and puts them in the context of the socio-economics of Lyme Bay. **Table A5** summarises the options discussed throughout the report together with the risks addressed.

Lyme Bay is a diverse and complex marine environment, and the fisheries are similarly varied – which means that a number of potential risks were identified. However, management is in place which has already addressed many of these risks. Others require some additional attention, and there are options available to the Working Group to contribute in this regard.

The SWOT analysis builds a picture of Lyme Bay as an important area for fishing, recreation and tourism, all of which contribute to the economy and culture of the area. There have been both positive and negative impacts on the fishing industry as a result of management, due in particular to the prohibition of mobile gear within the Reserve; some have benefitted – with static gear increasing within the cSAC now there is no conflict with mobile gear. Instead, this conflict is enacted outside the Reserve, where mobile activity has been displaced and found competition for space.

The changes to intensity in static gear use may be mitigated to an extent by the Voluntary Code of Conduct, which puts a limit on gear numbers for individual vessels. The implications of an increase in static gear pressure on the seabed inside the Reserve are uncertain, and the Potting Intensity Study will go some way to providing the necessary information.

Gear conflict outside the Reserve may inhibit any attempts to manage risks to mobile species of conservation importance, and it is in the interests of everyone to ensure that all sectors of the fishing industry have equity and a voice in the management process. This will be the main risk to the success of the Voluntary Code of Conduct as a management tool, as to have an effect there must be good uptake. This is particularly the case if additional

management is to be added, to address risks to Endangered, Threatened and Protected (ETP) species³⁷ and to bring in some best practice guidance for commercial fishery diving.

Recreational angling is worth millions of pounds to the Lyme Bay economy; anglers and charter boat operators have said that they have enjoyed the benefits of the Reserve, seeing an increase in recreational value, and more fish. The Angling Trust has collaborated with the Working Group in the production of a Voluntary Code of Conduct for the recreational sea angling (RSA) sector. It is important to continue to work with the RSA sector, and the Working Group can consider how such a collaboration might help to develop monitoring of bass removals; this species is important to both recreational and commercial fishermen, and there is a current lack of information on how much is being caught – one of the gaps in management identified.

There are lots of opportunities to capitalise on the “good news” highlighted in this report – and the good stock status of brown crab, one of the most important commercial species, is a prime example. There are opportunities to explore MSC accreditation or even to develop a Lyme Bay “quality mark” that could champion those fisheries which are in good standing. Branding should focus on origin, sustainability and good management. This can be linked into exploring markets regionally and further afield, affirming and promoting the good work that is being done and leveraging it to the gain of the local economy - benefitting the fishing industry and the lucrative recreation and tourism market, and giving the local community something to be proud of.

Finally, a key message is that the Working Group is a great asset to the Reserve. The collaborative approach it has taken has welcomed all-comers and given a voice to a diverse cross-section of the Lyme Bay inshore fishing industry. It has given the opportunity to organisations including the IFCAs, MMO and Natural England to work with commercial fishermen as collaborators seeking a common goal in Lyme Bay: sustainable and healthy fisheries.

³⁷ Alternatively known as species of conservation importance

Summary of Options

Table 5 summarises all options discussed throughout the report. These address any gaps in risks not directly mitigated, with options for how the Working Group might approach addressing these shortfalls, as well as opportunities to highlight and promote the good work within Lyme Bay.

Table 5. Fisheries assessment species common and Latin names

No.	Option	Risk mitigated
Data Collection		
1	Monitor/survey spatial definition of habitats and species for both Tier 1 and Tier 2 features in habitat risk assessment and monitor frequency of occurrence over time for species, especially mobile spp., (e.g. using Fully Documented Fishery project App, see below).	Fisheries: All fisheries
2	Monitor/survey interaction between habitats and species and fishing activity by gear type (e.g. iVMS)	Fisheries: all assessed (lining)
3	Monitor netting species retained, landed and discarded	Fisheries: netting ETP species: all mobile species
4	Monitor recreational landings, in conjunction with recreational fishermen, using clubs, charter operators etc.	Fisheries: Bass (lining)
5	Monitor reef outside of cSAC as focus area for presence / interactions	ETP features: reef, pink sea-fan (bottom towed mobile gear)
6	Monitor stocks where unknown status	Fisheries: King Scallops (diving), Thornback Ray (lining)
7	Monitor performance of projectd (e.g. fisheries sustainability assessment) or management measures against baseline to help benchmark progress	(General)
Branding		
8	Unique Lyme Bay provenance branding of "pass" fisheries: Define set of standards for branding showing best practice (sustainability and product quality)	Fisheries: Brown crab (potting) as priority, also sole, cod, plaice
9	MSC accreditation of pass fisheries, if Lyme Bay is accepted as a suitable MSC unit	Fisheries: Brown crab (potting)

No.	Option	Risk mitigated
Marketing and publicising		
10	Fishery specific management plans	Fisheries: brown crab, lobster, whelk (potting) as priority but spider crab, scallop and others would benefit
11	Guidance on avoiding impacts, e.g. Code of Conduct	ETP features: reef (diving)
12	System for fishermen's monitoring of ETP species in Code of Conduct	ETP features: Mobile species (bottom towed mobile gear, potting, netting, lining)
13	Species ID cards and systems to aid fishermen's monitoring of ETP species	ETP features: Mobile species (bottom towed mobile gear, potting, netting, lining)
14	Guidance on reporting on interactions, handling discards, reducing fishing activity risks and use of 'pingers' to detract marine mammals, e.g. in Code of Conduct	ETP species: reef, pink sea-fan (potting) Fisheries: lobster, whelk (potting)
15	Workshop with fishermen to raise awareness on reducing risks and ETP monitoring	ETP features: Mobile species (bottom towed mobile gear, potting, netting, lining)
16	Disseminate project findings and keep website updated with new information, possibly even live data, e.g. FDF project	(General)
Working with others		
17	Request Cefas to clarify lobster stock status in Lyme Bay specifically	Fisheries: lobster (potting)
18	Explore with IFCA how to implement a single suite of management measures across the Reserve to bridge the district divide.	Fisheries: lobster, whelk (potting)
19	Develop species specific Lyme Bay fisheries management plans with managers, e.g. with minimum landing size	Fisheries: brown crab, lobster, whelk (potting)
20	Explore with IFCA management of risk to ETP features outside of cSAC & Designated Area	ETP features: reef, pink sea-fan (mobile gear)
21	Support / contribute to Defra review of crab and lobster management	Fisheries: lobster, crab (potting)
22	Explore joint working with Defra on impact fishing activity on EMS features with focus on Lyme Bay, similar to potting study (dependent on Defra/Cefas ASSIST project outcomes)	ETP features: reef, pink sea-fan (netting) Fisheries: Spider crab

No.	Option	Risk mitigated
23	Approach NE, IFCA, NGOs etc. for joined up monitoring of ETP species and interactions to mutual benefit	ETP features: Mobile species (mobile gear, potting, netting)
24	Aim to work with greater number of fishermen, not just members, and recreational fishing community	(General)
Funding		
25	Consider / apply for EU Regional Development Fund	(General)
26	Consider / apply for European Maritime & Fisheries Fund (EMFF)	(General)
27	Set up a Fisheries Liaison Action Group (FLAG) through the EMFF	(General)
28	Lottery funding, e.g. to support recreational angling and catch data collected	(General)
Integrating and Updating		
29	Integrate findings of the Working Group, update assessments to reflect new data and maximise on benefits	(General)
30	Assess landings from diving as proportion of all fishing, through the FDF project	Fisheries: King Scallops (diving)
31	Assess catch composition of retained species through the FDF project	Fisheries: spider crab (netting)
32	Assess netting distribution and intensity through the FDF project and through the Devon and Severn IFCA own research (latter including also impact on benthic habitats)	Fisheries: Netting
33	Integrate findings of external organisations, e.g. revised approach to management of commercial fisheries in EMS, other worldwide studies in impact of fishing gears on features (and mitigation options)	ETP species: all
34	Integrate findings from potting intensity study to assess risk levels	ETP feature: pink sea-fan (potting)

Quick Reference to Species Common and Latin Names

Table 6. Habitat risk assessment species common and Latin names

Species Group	Common Name	Latin Name	Strength of Evidence
Benthic / Epibenthic	A sea slug	<i>Tritonia nilsodhneri</i>	Tier 1 (Strong)
	A sea squirt	<i>Phallusia mammillata</i>	
	Devonshire Cup Coral	<i>Caryophyllia (Caryophyllia) smithii</i>	
	Dog Whelk	<i>Nucella lapillus</i>	
	Pink Sea Fan	<i>Eunicella verrucosa</i>	
	Southern Cup Coral	<i>Caryophyllia (Caryophyllia) inornata</i>	
	Sunset Cup Coral	<i>Leptopsammia pruvoti</i>	
	Trumpet Anemone	<i>Aiptasia mutabilis</i>	
	A brittlestar	<i>Ophiopsila aranea</i>	Tier 2 (Weak)
	A bryozoan	<i>Schizobrachiella sanguinea</i>	
	A hydroid	<i>Aglaophenia kirchenpaueri</i>	
	A sea slug	<i>Trapania pallida</i>	
	A sponge	<i>Dysidea pallescens</i>	
	A sponge	<i>Axinella damicornis</i>	
	Blue Mussel	<i>Mytilus edulis</i>	
	Branched yellow sponge	<i>Adreus fascicularis</i>	
	Edible Sea Urchin	<i>Echinus esculentus</i>	
	Honeycomb Worm	<i>Sabellaria alveolata</i>	
	Horse Mussel	<i>Modiolus modiolus</i>	
	Icelandic Cyprine / Ocean Quahog	<i>Arctica islandica</i>	
Native oyster	<i>Ostrea edulis</i>		
Orange Lights Seasquirt	<i>Pycnoclavella aurilucens</i>		
Paper Piddock	<i>Pholadidea loscombiana</i>		

Species Group	Common Name	Latin Name	Strength of Evidence
	Pork scratching sponge	<i>Tethyspira spinosa</i>	
	Purple Sea Urchin	<i>Paracentrotus lividus</i>	
	Ross Worm	<i>Sabellaria spinulosa</i>	
	Sea-fan Anemone	<i>Amphianthus dohrnii</i>	
	Weymouth carpet Coral	<i>Hoplangia durotrix</i>	
Algae & Lichen	Maerl	<i>Lithothamnion</i>	Tier 2 (Weak)
	Maerl	<i>Phymatolithon calcareum</i>	
	Peacocks Tail	<i>Padina pavonica</i>	
	Penny Weed	<i>Zanardinia typus</i>	
Fish	Atlantic Cod	<i>Gadus morhua</i>	Tier 1 (Strong)
	Basking shark	<i>Cetorhinus maximus</i>	
	Plaice	<i>Pleuronectes platessa</i>	
	Sole	<i>Solea solea</i>	
	Whiting	<i>Merlangius merlangus</i>	
	Angler	<i>Lophius piscatorius</i>	Tier 2 (Weak)
	Blue Shark	<i>Prionace glauca</i>	
	European Eel	<i>Anguilla anguilla</i>	
	Ling	<i>Molva molva</i>	
	Nursehound	<i>Scyliorhinus stellaris</i>	
	Sand Goby	<i>Pomatoschistus minutus</i>	
	Spotted Ray	<i>Raja montagui</i>	
	Spurdog	<i>Squalus acanthias</i>	
	Thornback Ray	<i>Raja clavata</i>	
	Thresher Shark	<i>Alopias vulpinus</i>	
Mammals & Turtles	Bottlenose dolphin	<i>Tursiops truncatus</i>	Tier 1 (Strong)
	Common dolphin	<i>Delphinus delphis</i>	
	Grey seal	<i>Halichoerus grypus</i>	
	Harbour porpoise	<i>Phocoena phocoena</i>	Tier 2 (Weak)
	Fin whale	<i>Balaenoptera physalus</i>	
	Green Turtle	<i>Chelonia mydas</i>	

Species Group	Common Name	Latin Name	Strength of Evidence
	Harbour seal	<i>Phoca vitulina</i>	
	Humpback whale	<i>Megaptera novaeangliae</i>	
	Leatherback turtle	<i>Dermochelys coriacea</i>	
	Loggerhead Turtle	<i>Caretta caretta</i>	
	Long-finned pilot whale	<i>Globicephala melas</i>	
	Minke whale	<i>Balaenoptera acutorostrata</i>	
	Risso's dolphin	<i>Grampus griseus</i>	
	White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	
Birds	Arctic Skua	<i>Stercorarius parasiticus</i>	Tier 1 (Strong)
	Arctic Tern	<i>Sterna paradisaea</i>	
	Balearic Shearwater	<i>Puffinus mauretanicus</i>	
	Black-headed Gull	<i>Larus ridibundus</i>	
	Common Guillemot	<i>Uria aalge</i>	
	Common Gull	<i>Larus canus</i>	
	Common Scoter	<i>Melanitta nigra</i>	
	Common Tern	<i>Sterna hirundo</i>	
	Gannet	<i>Morus bassanus</i>	
	Great Black-Backed Gull	<i>Larus marinus</i>	
	Great Cormorant	<i>Phalacrocorax carbo</i>	
	Great Northern Diver	<i>Gavia immer</i>	
	Great Skua	<i>Stercorarius skua</i>	
	Herring Gull	<i>Larus argentatus</i>	
	Lesser Black-backed Gull	<i>Larus fuscus</i>	
	Manx Shearwater	<i>Puffinus puffinus</i>	
	Northern Fulmar	<i>Fulmarus glacialis</i>	
	Razorbill	<i>Alca torda</i>	
	Red Throated Diver	<i>Gavia stellata</i>	
	Sandwich Tern	<i>Sterna sandvicensis</i>	
Black Tern	<i>Chlidonias niger</i>	Tier 2 (Weak)	
Black-legged Kittiwake	<i>Rissa tridactyla</i>		

Species Group	Common Name	Latin Name	Strength of Evidence
	Black-tailed Godwit	<i>Limosa limosa</i>	
	Brent Goose	<i>Branta bernicla</i>	
	Common Sandpiper	<i>Actitis hypoleucos</i>	
	Cory's Shearwater	<i>Calonectris diomedea</i>	
	European Shag	<i>Phalacrocorax aristotelis</i>	
	European Storm Petrel	<i>Hydrobates pelagicus</i>	
	Great Crested Grebe	<i>Podiceps cristatus</i>	
	Little Egret	<i>Egretta garzetta</i>	
	Little Gull	<i>Hydrocoloeus minutus</i>	
	Little Tern	<i>Sterna albifrons</i>	
	Mediterranean Gull	<i>Larus melanocephalus</i>	
	Mute Swan	<i>Cygnus olor</i>	
	Oystercatcher	<i>Haematopus ostralegus</i>	
	Puffin	<i>Fratercula arctica</i>	
	Purple Sandpiper	<i>Calidris maritima</i>	
	Shelduck	<i>Tadorna tadorna</i>	
	Sooty Shearwater	<i>Puffinus griseus</i>	
	Teal	<i>Anas crecca</i>	
	Wigeon	<i>Anas penelope</i>	

Table 7. Fisheries assessment species common and Latin names

Common Name	Latin Name	In depth sustainability assessment in this project?
Bass	<i>Dicentrarchus labrax</i>	Yes
Brown shrimp	<i>Crangon crangon</i>	No
Brown crab	<i>Cancer pagurus</i>	Yes
Cod	<i>Gadhus morhua</i>	No
Cuttlefish	<i>Sepia officianalis</i>	No
Lobster, European Lobster	<i>Homarus gammarus</i>	Yes
Plaice	<i>Pleuronectes platessa</i>	No
King Scallop	<i>Pecten maximum</i>	No
Dover sole	<i>Solea solea</i>	Yes
Spider crab	<i>Maja squinado</i>	No
Thornback ray	<i>Raja clavata</i>	No
Whelk, Common whelk	<i>Buccinum undatum</i>	Yes

