The Lyme Bay MPA case study: benthic recovery, storm impacts and lessons learnt.

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Marine Conservation Research Group

- Marine Protected Areas – “Recover Reef” FLAG
- Fisheries management
- Marine Renewable Energy
- Offshore aquaculture – “Spillover” FLAG
Lyme Bay reefs
Lyme Bay MPA

Statutory Instruments 2008 No. 1584
Sea Fisheries, England. Conservation
The Lyme Bay Designated Area (Fishing Restrictions) Order 2008

- BTF exclusion
- 200sq km
- Site based
Assess whether degraded temperate reef systems can recover if partially protected?

Provide evidence for sustainable fishing that be promoted via various certifications such as MSC or Reserve Seafood

Highlight concerns where practices need to be managed in order to achieve sustainable fishing and promote recovery

Understand climate change related events
Lyme Bay 2008 - 2019

- Sheehan et al 2010 PLOS ONE;
Indicator spp.
• Davies & Sheehan *in press* Journal of Applied Ichthyology
<table>
<thead>
<tr>
<th>Year</th>
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<td>2008</td>
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<td>2019</td>
<td>European Structural and Investment Funds</td>
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Monitored since 2008
Signs of recovery after 3 years

Abundance of reef species

3 years after Lyme Bay MPA

Before/control

Sheehan et al 2013 PLOS ONE
Sediment veneers

- Common misconception that reef means rock and sediments are mobile and therefore bottom towed fishing is appropriate
- Inter-reef sediments support biogenic reef organisms if protected from destructive fishing activity
- Used by burrowing juvenile lobsters

• Feature based management limits the recovery potential for the biogenic reef
• Sediment veneers support reef associated organisms

Managing marine protected areas in Europe: moving from ‘feature-based’ to ‘whole-site’ management of sites

Jean-Luc Solandt, Thomas Mullier, Sophie Elliott, Emma Sheehan

“Marine Conservation Society, Ross-on-Wye, UK; bMarine Mapping, Exeter, UK; cMuseum National d’Histoire Naturelle (MNHN), Station Marine de Dinard, Dinard, France; dUniversity of Plymouth, Plymouth, UK

Abstract

In 2016 the UK government initiated a major constitutional change as a consequence of the vote to leave the European Union (EU) (‘Brexit’). A significant aspect to this transfer includes EU environmental regulations that relate to UK Marine Protected Area (MPA) designations. As such, there is an opportunity to take stock of the UK’s current approach to MPA management. Here we provide an evidence-based argument for moving from the current costly and overly complex system of MPA designation that requires setting conservation objectives and managing activities for individual conservation features. We suggest moving to comprehensive management measures for sites that deliver ecosystem-based conservation across suites of habitats. Impartial peer-reviewed studies of current approaches to management, legal instruments and ensuing conservation results are analysed to make the case.

Keywords:
Brexit; Laws; MPAs; Management; Complexes; Habitats; Ecosystem-based management.
Then...Storms 2013 - 2014

The Storms That Shook the South West

Last on
Mon 12 May 2014
19:30
BBC ONE

Storm leaves Dawlish railway line dangling

5 February 2014 Last updated at 12:18 GMT

The railway line at Dawlish in Devon is left hanging in mid-air after storms ripped away supporting ballast, wrecking up to 150ft (46m) of track.

Labour MP for Exeter, Ben Bradshaw has called for the government to
Storms 2013 -2014

Wave power, kW m\(^{-1}\)

Winter season

Site 56: pre-storms (2013)
Recovery from storms 2016
Site 56
Ghost-fishing gear in MPAs: Sea Fangles
New movement for sessile organisms

“Starballing”: a potential explanation for mass stranding

Authors

Emma V. Sheehan, Sophie L. Cousins

Journal of Animal Ecology

Motion in the ocean—Paradigm shift in movement ecology requires “sedentary” organisms to be redefined

In Focus | Free Access

Module in the ocean—Paradigm shift in movement ecology requires “sedentary” organisms to be redefined

EMMA V. SHEEHAN

First published: 06 June 2019 | https://doi.org/10.1111/1365-2656.13006

Starballing - Involves starfish being carried along by tidal currents
Offshore aquaculture in Devon

- Total area: 1540 ha
- Total headlines: 790
- Capacity: 10,000 t
- Each headline: 150 m
- Droppers: 10 m
- Active suspension feeders
- Filtering 65 L pmpd
Rope epifauna
These crabs fell off a few hundred metres of rope. The full scale farm will comprise 1.75 million metres of rope.
Infauna
Benthic epifauna
Benthic and Demersal mobile fauna
Mid-water mobile fauna
Plankton, Birds and mammals
Bivalves boost biodiversity

The development potential for sustainable food production in the ocean is vast, with aquaculture capable of meeting global seafood demand using less than 0.05% of the total ocean area.

Molluscan bivalves, such as mussels, oysters and clams, have become one of the fastest-growing animal-food sectors and are increasingly sought after by consumers due to their taste, high nutritional value and perceived positive benefits to the environment. Global production of marine bivalves is increasing, providing new opportunities for expansion.

The urgent need for sustainable food production is an emerging and growing global demand for animal protein while removing the negative environmental impacts are coupled with wild bivalve harvesting and supporting a Blue Growth agenda has boosted interest in bivalve aquaculture. Traditionally, bivalves aquaculture has largely been established in inshore areas either on the seabed or on structures fixed or floating in shallow coastal waters. In this environment, there have been

https://fstjournal.org/features/33-2/offshore-bivalve-farming
Midwater video
Update on Projects ROPE & SPILOVER

Vemco’s Acoustic Release (VR2AR) Receiver

https://www.youtube.com/watch?v=q-Bw366Uis8
Phase 1: Crab & lobster habitat use inside MPA
Awareness raising at ports in Dorset & East Devon
Importance of monitoring

- Recovery/evidence sustainable fishing/understand the impacts of storms etc.
- Need to identify funding to continue this work
- UK needs more examples of Lyme Bay that are regularly monitored and assessed.
Acknowledgments

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Lyme Bay fishermen

Richard Austin for providing storm images
Baited video 2019