LUNDY MARINE MANAGEMENT PLAN 2017

Respect, Protect, Enjoy!

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PREFACE

The following Marine Management Plan supersedes the previous plan published in 2001. It has been written and designed by Rebecca MacDonald (Lundy Warden, 2013-2016) on behalf of the Lundy Management Forum and revised by Robert Irving (Sea-Scope Marine Environmental Consultants/Lundy MPA Advisory Group). Funding was provided by Natural England.

Lundy's marine environment has been protected for over 40 years through national, European and international conservation designations. The all-encompassing term of 'Marine Protected Area' has been adopted after consultation with the island stakeholders to describe the reserve around the island. This term therefore will be used throughout this document. For details of the specific conservation designations that are included in the Marine Protected Area, please refer to Section 1.2 Conservation Status, to the Glossary of Terms in section 9 and also to Annex A.

This plan is designed to address issues relevant to the protection of Lundy's Marine Protected Area and its associated habitats and species in a holistic and practical manner, and therefore incorporates some elements that are not traditionally included within a Marine Management Plan. Each section relates to a specific colour-coded theme, allowing users to locate the information that they require easily. By so doing, it is intended that the necessary resources are readily available to implement effective management measures and thereby protect Lundy's seascape and marine biodiversity for future generations.

Information from a variety of sources has been collated to produce this plan, drawing upon published and unpublished studies as well as the personal knowledge of individuals. Whilst none of the sources has been referenced specifically within the text itself, the most relevant references are listed at the end of each section. In addition, a list of all sources used is available in the 'Sources and Further Information' section and this should be referred to when further detail is required.

Acknowledgments

This Management Plan has been developed through consultation with the National Trust, Historic England, Natural England, the Environment Agency, Devon and Severn Inshore Fisheries Conservation Authority, RSPB, the Marine Management Organisation, the Lundy Field Society and the Lundy Marine Protected Area Advisory Group. We would like to thank all those who have contributed to the Plan and we are grateful for their continued commitment to ensure that it will fulfill its purpose as an informative and comprehensive document for all those who support the sustainable use of Lundy's Marine Protected Area.

SUMMARY

LUNDY'S MARINE PROTECTED AREA

Rising 140m out of the Bristol Channel, the island of Lundy is a spectacular granite outcrop, home to a wealth of marine and terrestrial wildlife such as beautiful cup corals, Atlantic puffins and the endemic Lundy cabbage.

The sea around Lundy has been protected since 1973, initially as a Voluntary Marine Nature Reserve and today as a Marine Protected Area encompassing a Special Area of Conservation, a Site of Special Scientific Interest and a Marine Conservation Zone with a No Take Zone. The Marine Protected Area covers around 13.9km^2 and extends all around the island's 15km long coastline.

CONSERVING AND ENHANCING LUNDY

The management scheme set out in this plan has been created to inform and advise users of ways to conserve and enhance Lundy's natural and historic resources, including measures to mitigate the impacts of potentially detrimental activities. Its purpose is to support the following overall aim:

To manage Lundy's Marine Protected Area for the benefit of its wildlife, to promote the ecologically sustainable use of resources and the use of the protected area for education, research and the enjoyment of all aspects of the marine and coastal environment.

A series of principles has been identified to steer the approach to conserve and enhance the marine environment at Lundy through management which:

- ***Benefits and enhances both marine and terrestrial wildlife***
- ***Promotes the ecologically sustainable use of resources***
- ***Raises awareness and understanding through education and active engagement***
- ***Considers multi-users and supports associated recreational activities***
- ***Supports research and monitoring***

Through working together in partnership, all organisations, stakeholders and those with an interest in the island can continue to enhance and promote the unspoilt nature of Lundy's natural and historic resources long into the future.

This Management Plan aims to provide an easy-to-access, informative document to allow all users to obtain the information that they seek. As all users of Lundy's marine environment are responsible for acting on the policies and achieving the objectives of this Management Plan, there is no formal Action Plan associated with this document. We hope that, where further information is required to inform delivery of the Plan, specific projects can be set up and (where necessary) funded to allow continual progress towards achieving the goals it sets out. This Management Plan will be a living document, where issues and policies can be added and addressed, as and when they arise.

CONTENTS

1. INTRODUCTION

1.1 SITE CHARACTERISTICS

The island of Lundy, 5km long by 1km wide and about 4.3km^2 in area, lies approximately 17km off the nearest point of the North Devon coast, where the Bristol Channel meets the Atlantic Ocean (51° 11'N, 4° 40'W; OS grid. ref. SS136465). Its location and underlying geology have created a spectacular marine landscape that supports a wealth of rare and sensitive species.

Aerial view of Lundy from the south

1.1.1 PHYSICAL ENVIRONMENT

Geology and Geomorphology

The majority of the island's bedrock is formed of Tertiary granite with the exception of the south-eastern peninsula where Devonian slates are found. The granite is of similar age (c. 59-52 Ma) to the igneous centres of the Inner Hebrides, though is much younger than the granite outcrops found on Dartmoor and in Cornwall (362-290 Ma). There are several types of intrusive dykes running through both the granite and slate including a unique orthophyre termed 'Lundyite'. The erosion of many of these dykes has led to the formation of at least 37 sea caves that are a feature of the Special Area of Conservation.

When considering Lundy's coastal scenery, the west coast is the most dramatic and rugged, with steep cliffs covered in cropped vegetation rising out of the Atlantic Ocean. In contrast, the east coast is sheltered from the prevailing south-westerly winds allowing the gentler slopes to be more heavily colonized by vegetation including a few trees and various flowering plant species including the endemic Lundy cabbage. The cliffs that form Lundy's coastline act as a natural form of protection: they limit access by people and by doing so, help to provide relatively undisturbed areas for wildlife. Excluding the Landing Beach, there are only a few places where there is relatively easy access to sea level from the land.

About 90% of the 15km of intertidal coastline is composed of granite bedrock, with a number of dolerite and basalt dykes. The remaining coastline is primarily formed of Devonian shales and boulder shores. Coarse sand and slate shale are only found at the Landing Beach. Beneath the

waves, the complexity of the seabed can be summarised as consisting of finer sediments on the sheltered east coast and gradually sloping bedrock on the west coast, extending for approximately 1km offshore to a depth of about 40m.

Steep, granite cliffs form a dramatic coastline along the more exposed west side of Lundy

By contrast, the island's east coast remains relatively sheltered from the prevailing south-westerly winds

Intertidal and seabed habitats

Of the 15 km total length of the intertidal coastline, 11.1 km are estimated to be bedrock (9.2 km granite, 1.9 km slate) and of the remaining length 3.8 km consists of boulder shores. Only 0.1 km, at the Landing Beach, is of coarse sand/slate shale. On the more exposed west coast, the granite shores are steeper and therefore more limited in extent than on the east coast. The slate on the south-east coast has weathered to form a long shore platform with ridges and gullies. Several caves extend backwards for many tens of metres. The subtidal substrata on the west, north and south seabed are predominantly bedrock whereas on the eastern coast there are extensive areas of sediment.

Gradually sloping bedrock on the west coast extends to 35 or 40m depth at 1km offshore and is then replaced by coarse sand. Rock surfaces are for the most part unbroken with occasional pinnacles, gullies and steep-sided canyons. In places large boulders overlie the bedrock and patches of small boulders and stones are found in gullies off the south part of the west coast. Small patches of sand are found in shallow water.

A gradually sloping bedrock plain also exists on the south coast, with gullies to 1km offshore and extensive areas of sand and scattered rock reefs at, for example, Rattles Anchorage, south of Rat Island and South Light [see Annex D for locations of place names]. South-west of Black Rock the seabed is very broken and slate pinnacles reach 6m high. At a distance of 35m south of Lee Rocks there is a sharp boundary between bedrock and a plain of stones and gravel. Pockets of clean shell gravel are found in gullies.

On the north coast occasional mud and gravel pockets occur on the gradually sloping bedrock. In the vicinity of Seals' hole vertical cliffs drop steeply to 20m depth and are followed by a steep boulder slope only about 30m offshore. At approximately 30m depth the boulder slope gives way to a plain of stones.

The east coast contains a wide range of substrata and habitats. Along most of its length (from Quarter Wall to Gull Rock and from Frenchman's Landing to Gannets Rock) boulder slopes give way to a band of mud-covered sediments several hundred metres wide, which then merge with muddy gravel and muddy sand. Rock outcrops are frequent among the sediments. East of Rat Island rock

outcrops surrounded by broken slates occur and off the Landing Bay the seabed consists of extensive rock outcrops amongst gravel. The Knoll Pins constitute three tips (Outer, Inner and Submerged) of a rock pinnacle, surrounded by sediments to the north, south, and west and a stone plain to the east. The sediments vary from coarse sand on the west, to mud-covered sediments to the north and coarse gravel to the south. To the east of Gannets' Rock there is a north facing vertical and overhanging cliff rising from a stone plain at 33m to a depth of 10m above which a gradual slope extends to 5m. The pinnacle extends about 200m offshore and is bordered to the east by boulder scree and to the south by a gravel bank.

Hydrology

There are several short water courses that drain from the plateau directly into the surrounding sea. The largest volume of freshwater run-off comes from the Pondsbury area and drains off the west coast through the Devil's Punchbowl. Gannets' Combe has a similar drainage system where freshwater enters directly into Gannets' Bay, a favourite haul-out area for grey seals.

The most modified drainage runs through Millcombe Valley where the Heaven family altered the natural watercourse to enable easy access to water for the gardens and allotments. This water course is joined by the island's sewage outfall which is regulated through an agreement with the Environment Agency. Sewage passes through a septic tank system, allowing filtration and biodegradation of waste matter, before it enters the end section of the Millcombe Valley watercourse. The run-off from this system drains beneath the valley and directly into the sea. The high tidal activity of the area ensures that the run-off is removed and dispersed with each tide.

Environmental parameters affecting the waters surrounding Lundy.

Category	Value	Notes
Mean tidal heights	MHWS: 8.0m MHWN: 5.9m MLWS: 0.8m MLWN: 2.7m	Mean tidal range is 7.2m for spring tides and 3.2m for neap tides. Max. tidal range is 8.4m to +0.4m
Tidal streams [See also Annex C]	Max. flow rate approx. 5 knots (260cm/s) (spring tides), off parts of north and south coasts. "Weak and irregular" off parts of the west and east coasts	Tidal streams run from west to east on a flooding tide; and from east to west on an ebbing tide. Current speeds are greatest around the north and south ends of the island (the 'races').
Residual currents	Predominantly from south-west (Lands End Corner Current with some Lusitanian input)	Water mass predominantly of coastal origin with some input of oceanic water
Sea surface temperatures	Range: 8°C (February) - 16°C (September)	A max. of 16.9°C was recorded in 1998 from the data logger attached to the wreck of the MV *Robert* at approx. 20m depth (EN Lundy Marine Management Plan, 2001).
Prevailing wind direction	West	See also Hiscock (1983); Jenkins (2016)

1.1.2 MARINE BIOLOGICAL INFORMATION

The variety of marine habitats and species at Lundy is outstanding, largely due to the wide range of environmental conditions that affect them, especially in relation to wave exposure, tidal current strength and substratum type (see Table above). To date, there have been 753 animal species and over 315 species of algae (a particularly high number from such a small area – indeed, Lundy

remains the richest known location for algae in Britain) recorded from within the MPA. Impressively, these numbers constitute about one eighth of all of the recorded multicellular seabed species known from the British Isles.This extensive list also includes a high proportion of Mediterranean-Atlantic species, some of which are at, or near the northern limit of their distribution and are considered to be nationally rare or scarce and therefore nationally important. These include the scare scarlet and gold star coral *Balanophyllia regia*, the rare sunset cup coral *Leptopsammia pruvoti*, the kelp *Laminaria ochroleuca* and the Weymouth carpet coral *Hoplangia durotrix*. Additionally, species such as the pink sea fan *Eunicella verrucosa* and a number of axinellid sponges are so fragile and long-lived that they are considered a conservation priority due to their high level of vulnerability from anthropogenic activities.

Lundy's remote location has created a haven not only for marine life but also for a considerable number of migratory and resident seabird and land bird species. The island's seabird colonies represent the largest in the south-west and include species of international conservation concern such as Manx shearwater *Puffinus puffinus*, storm petrel *Hydrobates pelagicus*, kittiwake *Rissa tridactyla* and puffin *Fratercula arctica*. Whilst land birds are not considered in this Management Plan, the improvements made by this scheme should benefit these species too as it is intended that the measures implemented will enhance the health of the island ecosystem as a whole.

1.2 CONSERVATION STATUS

The conservation and enhancement of the natural environment and its biodiversity, along with features of historic importance, are fundamental to the prominence and reputation of Lundy and consequently support the overall economy of the island. To ensure that these features are protected and managed effectively, a series of conservation designations has been applied to Lundy and the surrounding sea over the years:

Designation	Area	Date	Type	Details
Voluntary Marine Nature Reserve (vMNR)	1690ha	1973	Local/Voluntary	Boundary extended all around the island's High Water Mark to 1km offshore.
Marine Nature Reserve (MNR)	3071ha	1986	National/Statutory	The first statutory protection afforded to the intertidal and subtidal zones around the island; and the first MNR in the UK.
Special Area of Conservation (SAC) [Note that, as this is an EC designation, it is not yet known what a post-Brexit counterpart to a SAC might be]	3071ha	1996	European/ Statutory	The seaward boundary is the same as for the MNR and has 4 corners at: 51°13'N, 4°42'W; 51°13'N, 4°38'W; 51°09N, 4°42'W; & 51°09N, 4°38'W to mean high water mark. Designated features: reefs, Atlantic grey seals *Halichoerus grypus*, sea caves and subtidal sandbanks. [A further possible SAC, Bristol Channel Approaches SAC (which would include Lundy), is currently (2016) being considered, with the harbour porpoise *Phocoena phocoena* as its designated feature.]
OSPAR Marine	3071ha	2005	International/	Lundy's Special Area of Conservation is recognised as

Designation	Area	Date	Type	Details
Protected Area			Statutory through SAC	part of the OSPAR MPA network.
Marine Conservation Zone (MCZ)	3071ha	2010	National/ Statutory	Exact same boundary as the MNR/SAC. This designation replaced the MNR designation. Designated feature: crawfish/spiny lobster *Palinurus elephas.*
No Take Zone (NTZ)	330ha	2003	Local/Statutory	Selected area off the east coast reaching from the Sugarloaf 51°10.07'N to the North-east point 51°12.04'N and east to 004°39.00'W.
Site of Special Scientific Interest	347ha	1987	National/ Statutory	The majority of the island is designated down to mean low water mark. Designated features are: Atlantic grey seals *Halichoerus grypus*, guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, Manx shearwater *Puffinus puffinus*, puffin *Fratercula arctica*, razorbill *Alca torda, Calluna vulgaris* heath and other vascular plant assemblages.
Protected wrecks	2 sites	1990	National	*Iona II* and Gull Rock wreck sites are designated.
Heritage coast	~15km	1990	National/ Non-statutory	Lundy's Heritage Coast covers the island's entire coastline.
Scheduled Monuments	41 sites	Various	National	Some are located directly on the coastline and are considered in this Plan.
Wildlife and Countryside Act, Schedule 5 species	N/A	1981	National	It is an offence to intentionally or recklessly kill, injure, take, possess or sell any (whether live or dead), to disturb the animal, or to damage, destroy or obstruct access to its place of shelter or protection for: minke whale *Balaenoptera acutorostrata*; common dolphin *Delphinus delphinus;* harbour porpoise *Phocoena phocoena*; basking shark *Cetorhinus maximus*; and pink sea fan *Eunicella verrucosa.*
Species of Principal Importance (previously Biodiversity Action Plan species)			National	Species within or passing through the Marine Protected Area: minke whale *Balaenoptera acutorostrata*; common dolphin *Delphinus delphinus;* bottle-nosed dolphin *Tursiops truncatus*, harbour porpoise *Phocoena phocoena*; pink sea fan *Eunicella verrucosa*; sea fan anemone *Amphianthus dorhnii;* red sea fingers *Alcyonium glomeratum*; sunset cup coral *Leptopsammia pruvoti*; Weymouth carpet coral *Hoplangia durotrix*.
Habitats of Principal Importance (previously Biodiversity Action Plan Habitats)			Various	[Marine] HoPI found at Lundy: Fragile sponge and anthozoan communities on subtidal rocky habitats; and intertidal under-boulder communities.
National Trust Reserve		1969	Local	The Trust has powers to create byelaws relating to access and land management.

1.2.1 QUALIFYING FEATURES FOR THE SPECIAL AREA OF CONSERVATION (SAC)*

There are a number of qualifying habitats and species listed in the EC Habitats Directive (1992) whose presence at a site may merit its designation as a SAC. In Lundy's case, it is the presence of **reefs**, listed as an 'Annex I habitat', that was the primary reason for selection of this site as a SAC (http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUcode=UK0013114):

> "Lundy is a granite and slate reef system and is selected for its outstanding representation of reef habitats in south-west England. Lundy Island is exposed to a wide range of physical conditions as a result of differing degrees of wave action and tidal stream strength on sheltered and exposed coasts and headlands. This range of physical conditions, combined with the site's topographical variation, has resulted in the presence of an unusually diverse complex of marine habitats and associated communities within a small area. The reefs of Lundy extend well over 1 km offshore and drop steeply into deep water in some areas. The variety of habitats and associated species on the reefs is outstanding and includes, for example, a large number of seaweeds and many rare or unusual species, including Mediterranean-Atlantic species representing biogeographically distinct communities at, or very close to, their northern limit of distribution. In particular, fragile long-lived species, such as the soft coral *Parerythropodium coralloides*, sea-fan *Eunicella verrucosa* and a variety of erect branching sponges, are found in deep, sheltered conditions, particularly on the east coast of the island. All five British species of cup-coral are found here, including the scarlet and gold star-coral *Balanophyllia regia* and the sunset cup-coral *Leptopsammia pruvoti*".

There were two other Annex I habitats which were regarded as being 'qualifying features':

- **Sandbanks which are slightly covered by sea water all the time**
- **Submerged or partially submerged sea caves**

and one Annex II species which was regarded as being a qualifying feature:

- **Grey seal *Halichoerus grypus***.

[* It should be noted that, at the time of writing this Plan, no post-Brexit counterpart for the SAC designation has yet been created.]

1.3 TENURE

The National Trust acquired the freehold of Lundy, down to the mean high water mark, (350ha) on 29th September 1969. Immediately afterwards, The Landmark Trust signed a 60 year lease to restore, maintain and run the island. An area of foreshore and seabed adjacent to the Landing Bay beach are also leased by The Landmark Trust from the Crown Estate for use as an anchorage.

The intertidal area between the mean high water mark and mean low water mark are included in both the Special Area of Conservation and the Site of Special Scientific Interest. The seabed below the mean low water mark extending to the boundary of the Special Area of Conservation/Marine Conservation Zone is leased by Natural England from the Crown Estate. Several of the shipwrecks around the island are privately owned, although diving on all bar the two protected wrecks is permitted without the need for special permission.

1.4 History of Conservation Management

The 1960s saw a gradual increase in scuba diving activity around the island, with many wanting to experience 'adventurous diving' and to see the wealth of marine life and wrecks which Lundy had to offer. However, concerns were raised when it became apparent that marine life souvenirs of these trips were being removed from the island, particularly sea fans and urchins. Some of these souvenirs were to be sold as curios along with the many crawfish that were also collected from the island. In an effort to put a stop to this 'plundering', in 1969, Ilfracombe Dive Club members Heather and Ron Machin, together with the Nature Conservancy Council's local area officer John Lamerton, proposed creating a marine reserve around Lundy. Shortly after The Landmark Trust took over the management of the island, Dr Keith Hiscock approached John (later Sir John) Smith (founder of the Trust) with this idea and his response was very positive.

In 1973, the UK's first Voluntary Marine Nature Reserve was established at Lundy with a boundary extending 1km from the mean low water mark. This achievement led the way for the establishment of other similar voluntary Marine Nature Reserves around the UK, including at Skomer (off Pembrokeshire) and at St Abbs (Berwickshire).

The Wildlife and Countryside Act of 1981 provided, for the first time, a means to protect rare and delicate seabed habitats and species through the establishment of statutory Marine Nature Reserves, of which Lundy became the first in November 1986. This change was marked with an increase in the protected area (to 3071ha) and the implementation of a revised Marine Management Plan in 1986.

In 2003, after 30 years of protection, Lundy became host to the UK's first No Take Zone by means of a byelaw which excluded the extraction of all sea fish from an area of 3.3km^2 (330ha) adjacent to much of the island's east coast (see the Zoning Scheme map, section 2.5). This designation was established to protect the sensitive and slow-growing reef communities (rather than the populations of lobster and crab which were also present, though designation also served this purpose), and to enhance our understanding of the effects of these zones and their role in wildlife management. Note that in the non-statutory Code of Conduct, *all* extractive activities are prohibited from within the No Take Zone (unless under the auspices of a scientific licence).

Additional protection for the habitats, communities and species at Lundy was established in April 2005 when the Marine Nature Reserve also became a Special Area of Conservation under the European Habitats Directive. This designation was originally proposed for the reef systems found around the island and later developed to cover the island's subtidal sandbanks, sea caves and Atlantic grey seal population.

Shortly after the implementation of the Marine and Coastal Access Act (2009), Lundy's Marine Nature Reserve designation was superseded by a new type of designation: that of Marine Conservation Zone. As the first in the UK, Lundy's Marine Conservation Zone marked the start of a new 'network' of Marine Protected Areas to be established around the coastline of England and Wales.

1.5 HISTORY OF RESEARCH AND MONITORING

As an island, Lundy has long been of interest to researchers and naturalists due to its location and the distinct nature of its marine and terrestrial ecology. There are published records of the findings of visiting naturalists dating back to the 1850s. The island's marine algae were first studied by G.F. Tregelles in 1934 and Prof. L.A. Harvey undertook studies of intertidal life in the late 1940s and early 1950s. An intensive investigation of subtidal areas in particular was carried out during the 1970s by various experts under the guidance of Dr Keith Hiscock.

The Lundy Field Society has been integral in the development of research on the island, being established in 1946 with an original ornithological intention. However, the Society soon broadened its interests to include all aspects of marine and terrestrial ecology, geology and archaeology. The research studies undertaken by Society members have been published in the Society's Annual Reports since 1946 and, since 2008, academic papers have been published in the Journal of the Lundy Field Society.

The island has also had close associations with other groups and universities that have carried out their own research projects on Lundy, often utilising undergraduate or postgraduate students. These have included Exeter University, Oxford University, Bristol University, University College of North Wales, the Open University, Plymouth University and more recently, the Universities of Westminster and of Middlesex.

During the 1980s, the Nature Conservancy Council funded a number of intertidal and subtidal monitoring studies at Lundy, particularly relating to the longevity of certain species of nature conservation interest. A number of sites were established which were subsequently revisited on an annual basis for at least five years. Several of these sites, particularly intertidal ones, are still being revisited and re-recorded. A requirement of the SAC is the assessment of its designated features at least once every 6 years, determining if the feature in question is in a favourable or an unfavourable condition. The first such assessment of the reef feature was carried out in 2003/04, with the most recent being in 2014/15.

2. MANAGEMENT FRAMEWORK

2.1 ISLAND WARDEN

In 1946, one of the first actions undertaken by the Lundy Field Society was to employ an ornithological Warden to run the island's national bird observatory and to oversee the hostel accommodation in the Old Light. Until 1973, the Warden's duties were mainly centered on these roles. Between 1968 and 1971, and again between 1974 and 1985 (though excluding 1978 when a temporary Marine Warden was appointed during the summer months), there was no Warden on the island, primarily due to a lack of funding. Although there were no formal records or observations taken during this time, visitors to the island were encouraged to enter their own natural history and archaeological observations in a Logbook kept in the Marisco Tavern, thus helping to ensure a continuation in the recording of the island's wildlife.

The role of the island Warden has evolved considerably since the first bird Warden, Rowland Barker, in 1946 and the first marine Warden, Nigel Thomas in 1978. Today's Lundy Warden is responsible for a wide variety of activities (detailed below) that incorporate both terrestrial and marine responsibilities including the requirements of this Management Plan, the island's Higher Level Stewardship Agreement and the terrestrial Conservation Management Plan.

Activity	Details
Conservation advice and legal obligations	• Provide initial conservation advice pertaining to the management of any works carried out on Lundy which could impact the Site of Special Scientific Interest, Special Area of Conservation or Historic features. • Submit applications for consents/licences. • Report breaches of obligations. • Oversee the corporate licence for the Protected Wrecks *Iona II* and the Gull Rock site.
Communication	• Maintain and nurture contacts with key partners including dive clubs, charter skippers, fishermen, universities, active scientific groups and individuals, and members of the Lundy Management Forum. • Produce reports for and attend appropriate meetings including Lundy Management Forum, Lundy Marine Protected Area Advisory Group and Lundy Field Society Annual General Meeting. • Develop interpretation for Lundy to promote the conservation and protection of the islands historic and natural features. • Provide a visitor events programme. • Develop educational resources and provide educational access for local schools. • Produce reports for meetings as required and to meet the requirements of any external funding.

Activity	Details
	• Produce a monthly 'Letter from Lundy' to engage and inform the local community. • Participate in any opportunities to promote the island and surrounding Marine Protected Area to a wider audience.
Emergency response	• Provide conservation advice to the Islands management team in the event of an oil spill or other pollution incident.
Funding	• Pursue opportunities for funding to cover research and monitoring opportunities to the benefit of Lundy and the Marine Protected Area.
Research and monitoring	• Assist researchers to gain consents for projects of benefit to the Site of Special Scientific Interest, Special Area of Conservation, Marine Conservation Zone, No Take Zone, Protected Wrecks and Scheduled Monuments. • Undertake monitoring and surveys – Biosecurity monitoring & Natural England terrestrial funded: seabird productivity monitoring (Higher Level Stewardship); Natural England marine funded: seal population surveys, cup coral population monitoring, intertidal biotope monitoring and rockpool community survey (*funding concerns for 2016 onwards*).
Conservation team	• Oversee the delivery of the programme of works for the conservation team. • Volunteer management. • Team, visitor and volunteer safety and welfare.
Recreational activities	• Monitor activities. • Advise visitors of Codes of Conduct and sustainable use of the island and surrounding Marine Protected Area.

In order to help manage the nature conservation and archaeological aspects of the island, there is now a Conservation Team consisting of: the Warden (who leads the Team), a voluntary seasonal Assistant Warden, a Ranger, and voluntary seasonal Assistant Ranger. However, funding for these positions is not guaranteed and so the number of posts which are 'active' in any one year may vary.

2.2 LUNDY MARINE PROTECTED AREA ADVISORY GROUP

The Lundy Marine Protected Area Advisory Group (LMPAAG) meets twice yearly (usually in April and October) with representatives from the Landmark Trust, Devon and Severn Inshore Fisheries and Conservation Authority, Natural England, Historic England, the Lundy Field Society and local stakeholders including divers, fishermen, charter boat companies and other users/interested parties.

The Group meets to discuss the developments, project proposals and the on-going management of the Marine Protected Area. The meetings also provide an opportunity for any issues or concerns to be raised and addressed.

Established in 1985, originally as the Lundy Marine Consultation Group, the Group aims to:

1) Provide a nucleus of expertise on the marine habitats and waters surrounding Lundy;
2) Provide a forum for exchanging views on present and proposed activities around Lundy;
3) Safeguard the interests of all those who use the waters around Lundy and its natural resources;
4) Provide marine advice to the Lundy Management Forum.

The outcomes of these meetings are brought to the attention of the Lundy Management Forum through verbal reports presented by the Advisory Group's Secretary. Minutes of each meeting of the Advisory Group are produced and distributed within the Group's membership. In 2016, it was agreed by the Group that these minutes should be posted on-line, within the structure of the MPA website.

2.3 LUNDY MANAGEMENT FORUM

Members of the Lundy Management Forum meet twice a year (usually in April and October) to discuss matters regarding the management of the island and its protected features/areas. Forum meetings usually take place the day after the meetings of the Lundy Marine Protected Area Advisory Group to allow any issues or comments from the users of the MPA to be highlighted and addressed. The organisations that are members of the Forum, and their roles and responsibilities with regard to Lundy, are shown below.

Organisation	Roles and responsibilities towards Lundy
The Landmark Trust	Present island leaseholder that manages, finances and administers Lundy through its wholly owned company The Lundy Co Ltd. which takes responsibility for the management of Lundy as regards: • Access • Tourism • Education • Volunteer and visitor engagement • Farming – feral and domestic stock • Conservation – culture, community, landscape and buildings, management of the marine environment through our Island-based Warden • Maintenance – infrastructure, landscape and buildings • Visitor safety and welfare • Emergency services • Wildlife conservation

Organisation	Roles and responsibilities towards Lundy
The National Trust	Permanent island owner extending to mean low water. Retains active interest in all aspects of conservation and makes contributions where appropriate. Responsible for: • All ruins • Working holidays • Advice • Vegetation monitoring
Historic England	Historic England is the organisation tasked with providing conservation advice, management support and grants for designated heritage assets, as well as responding to planning applications and applications for Scheduled Monument Consent and Listed Building Consents and other statutory consultations. The rich and fragile historic environment on Lundy includes 47 nationally important protected structures and sites, including the Marisco Castle, the Church of St Helen and the lighthouses as well as numerous prehistoric burial cairns, standing stones and early settlement remains. One of the statutory functions of Historic England is to advise on the protection and management of shipwrecks in English territorial waters designated under Section 1 of the Protection of Wrecks Act 1973. Currently (January 2016) there are two protected wreck sites in the waters around Lundy: the *Iona II* and Gull Rock.
Natural England	The Government's advisor for the natural environment in England, helping to protect England's nature and landscapes for people to enjoy and for the services they provide. Responsible for the conservation designations of the island and its marine environment. Also responsible for providing advice on how to ensure conservation targets are achieved, and for assessing the condition of the designated features. Natural England can enforce conservation legislation, and provide licences for handling or working with protected species and consent or assent for activities within the Site of Special Scientific Interest. Responsible also for the administration of the agri-environment scheme (currently Higher Level Stewardship) on the island.
Environment Agency	The Governmental body responsible for: regulating major industry and waste; water quality and water resources; fisheries; inland river, estuary and harbour navigations and conservation and ecology. We work to create better places for people and wildlife, and support sustainable development. Environment Agency priorities are to work with businesses and other organisations to manage the use of resources and to protect and improve water, land and biodiversity. The Environment Agency is also the body which leads on managing the risk of flooding from main rivers, reservoirs, estuaries and the sea. They are able to offer advice to Lundy on the disposal and treatment of waste water and pollution prevention.

Organisation	Roles and responsibilities towards Lundy
Devon and Severn Inshore Fisheries Conservation Authority	Devon and Severn IFCA is the statutory body responsible for the management of fisheries and fishing activities in its district which extends along the south and north coasts of Devon out to 6nm including Lundy Island, and along the Severn Estuary to the border with Wales. The IFCA's duties include seeking to ensure that fishing related activities are carried out sustainably; that a balance is sought between the social and economic benefits of fishing related activities with the need to protect the marine environment and to balance the needs of all persons, engaged in fishing, both recreationally and commercially, within its district. Within the Lundy Marine Protected Area, the IFCA has brought in management through permitting byelaws to protect the marine environment and ensure the sustainability of fish and shellfish stocks. The IFCA also carries out research within the Marine Protected Area to inform management both locally and nationally. Crustacea catch per unit effort surveys feed into national crab and lobster stock assessment. The IFCA is responsible for assessing the appropriateness of all fishing activities in the Marine Protected Area relating to the significance of the impact of fishing gears on the designated features of the Marine Protected Area. Devon and Severn IFCA is also working jointly with the fishing industry, recreational users and Natural England to development monitoring of Marine Protected Area features.
Marine Management Organisation	The MMO monitor activities occurring within the Special Area of Conservation/Marine Conservation Zone and are the lead body for the management of non-fishing related activities within these Marine Protected Areas. Devon and Severn IFCA are the lead body for activities relating to fishing within the 6nm limit and the MMO offer support to the IFCA in regulating fishing-related activities. The MMO are responsible for the enforcement of UK fisheries legislation, monitor the catches of commercial vessels and issue fishing vessel licences. The MMO also issue Marine Licences for any development, dredging or deposition activity in the marine environment and Wildlife Licences (e.g. for research or education purposes) for any activity that may impact upon a UK or European marine protected species. The MMO are also responsible for the enforcement of wildlife legislation in the marine environment which includes offences such as the disturbance of cetaceans and unlawful shooting of seals.
RSPB	The RSPB's activities relate to the protection and recovery of the island's important seabird colonies, in particular as a key partner in the Seabird Recovery Project and subsequently undertaking regular monitoring of the island's seabird colonies. The RSPB works closely with the island to support Lundy's Rat Biosecurity Plan and incursion response planning. As a wildlife charity, the RSPB has no statutory role on Lundy.

Organisation	Roles and responsibilities towards Lundy
Lundy Field Society	The LFS provides a forum for those who study or are interested in the history, archaeology and natural history of the island. It is a learned society that organises or helps to organise fieldwork including working parties; disseminates information through its publications; and holds meetings where members can share their knowledge and enthusiasm. It makes small grants to assist fieldworkers. Its members include professionals who can advise on aspects of Lundy's history, archaeology and wildlife including in relation to management.

The Lundy Management Forum has agreed to the overall aim:

To manage Lundy's Marine Protected Area for the benefit of its wildlife and to promote the ecologically sustainable use of resources and the use of the protected area for education, research and the enjoyment of all aspects of the marine and coastal environment

This has been modified (by now using the title Marine Protected Area) from the aim originally published in the 1994 Lundy Management Plan ('Managing Lundy's wildlife'). In order to achieve this aim, a framework of eight key policies was agreed. For each key policy a series of appropriate 'long term objectives' was produced. The relevant policies are stated on each of the subject management pages.

The table on the following page details these policies and their objectives.

Policy and Objectives
P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the Marine Protected Area; to maintain the ree within the Lundy Special Areas of Conservation in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vert and overhanging circalittoral rock communities, and circalittoral bedrock and stable boulder communities; to maintain the subtidal sandbanks, sea caves and grey se within the Lundy Special Area of Conservation in favourable condition, taking account of natural change; to maintain or increase populations of species that are liste 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lu which result from human activities. 1.1 Protect habitats, communities and species from damage. 1.2 Identify key risks to the listed features and manage activities accordingly. 1.3 Ensure that any commercial activities at Lundy are managed on an ecologically sustainable basis. 1.4 Maintain water quality around Lundy. 1.5 Monitor habitats, communities and key species to highlight any changes, particularly those caused by climate change. 1.6 Monitor and prevent encroachment of invasive species, where possible, to prevent adverse ecosystem changes.
P2 **To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled Monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.** 2.1 Map, describe and monitor the sites. 2.2 Promote the conservation of these sites through appropriate interpretative means. 2.3 Provide opportunities to identify and monitor habitats, communities and species residing on features of historical importance.
P3 **To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.** 3.1 Monitor productivity of those species named through the Sites of Special Scientific Interest (guillemots, razorbills, Manx shearwater, puffins, kittiwakes) . 3.2 Minimise disturbance to all seabird colonies. 3.3 Maintain the rat-free status of Lundy. 3.4 Carry out conservation works to enhance the suitable areas for colonization.

Policy and Objectives
P4 **To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.** 4.1 Promote the Lundy Marine Protected Area as the flagship site for marine protection in the UK. 4.2 Use the marine conservation work at Lundy to promote a wider understanding of marine management issues.
P5 **To optimize the interpretation and education potential of Lundy to island visitors and users.** 5.1 Ensure that visitors and users are aware of the existence and purpose of the Marine Protected Area. 5.2 Provide additional facilities to ease access to the Marine Protected Area. 5.3 Provide interpretation for visitors on the Marine Protected Area and Site of Special Scientific Interest. 5.4 Provide additional on-site and off-site information to engage visitors with the ecology and conservation of Lundy.
P6 **To encourage informed and sympathetic recreational use.** 6.1 Provide interpretation on the Marine Code of Conduct and Zoning Scheme for wide distribution. 6.2 Monitor recreational use.
P7 **To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.** 7.1 Maintain an overview of research and monitoring work and priorities. 7.2 Support research and monitoring to inform adaptive management of the Marine Protected Area and support condition assessments.
P8 **To provide an administrative structure which facilitates decision making, reserve management and effective communication with outside bodies and meets national international conservation obligations, ensuring that objectives 1-7 meet legal constraints and obligations.** 8.1 Ensure that the management of the Marine Protected Area and Site of Special Scientific Interest complies with established legislation. 8.2 Identify any breaches of the codes of conduct and legislation and pass on required information to enforcing authorities. 8.3 Ensure full consultation over policy development. 8.4 Implement the Management Plan. 8.5 Review and update the Management Plan annually through the Lundy Management Forum and/or when there is significant change.

2.4 Day-to-day management of the MPA

The island of Lundy (and the waters that surround it) is one of the best protected sites in the country in terms of the number of conservation designations which have been bestowed upon it over the years. Geographically-speaking, this Plan excludes most of the terrestrial (non-marine influenced) parts of the island, with the exception of those features which are affected by the marine conditions (i.e. seabird nesting sites on cliffs and slopes; and certain archaeological features).

This Plan concerns itself primarily with the intertidal zone (from High Water Mark of Ordinary Spring Tides to the Low Water Mark of Ordinary Spring Tides) and the subtidal zone (from the Low Water Mark of Ordinary Spring Tides to the seaward extent of the MPA). In the early 1980s, when the Nature Conservancy Council were proposing Lundy becoming a statutory MNR, it was decided to make the original seaward boundary a straightforward rectangle. This was primarily for ease of identification, particularly so that the MNR's boundary could be easily plotted on Decca navigation charts which were the main navigation tool used by fishermen at the time. It was understood that the extent of the subtidal reefs would be contained within the designated box (whose boundaries were drawn along lines of minutes longitude and minutes latitude). The most recent underwater mapping exercise (conducted by Devon & Severn IFCA in 2013) shows the reef feature to extend a small distance beyond the seaward boundary of the MCZ in places (see the Features map on p.29). However, a 50 m buffer zone is included around all of the reef feature and, according to the D&SIFCA byelaw, no towed fishing gear is permitted to encroach on this buffer zone whether inside or outside the MCZ boundary, thus ensuring greater protection for the whole reef feature.

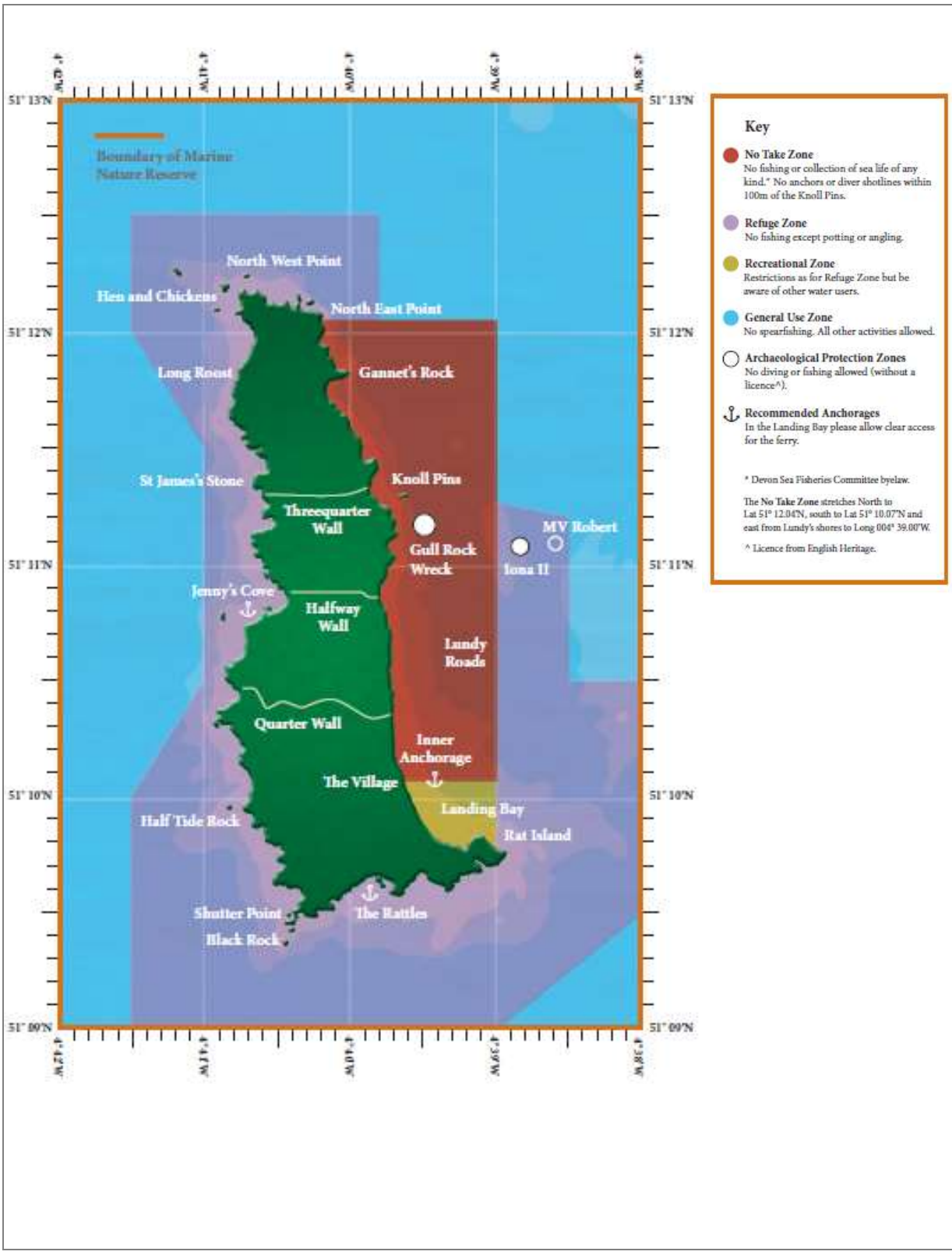
2.5 The MPA Code of Conduct and Zoning Scheme

In order for all visitors and users of the MPA to understand what the MPA entails, a straightforward Code of Conduct is in place to which all are asked to adhere (see Annex B). This document is the first port of call for the Warden concerning any misdemeanour that might have occurred within the MPA before more stringent forms of redress (i.e. byelaws) are considered. Wherever possible, the MPA is run through self-policing – users of the MPA are encouraged to report any suspicious activity they may witness to the Warden, who can then investigate the matter further. The Warden is also able to relay observations of any suspected fishing-related infringements directly to the Devon and Severn IFCA.

A Zoning Scheme for the MNR was first introduced in 1993 as a pilot project, being officially adopted in 1995 after a two-year consultation period. The first revision of this Scheme took place in 2003 (taking into account the No Take Zone); the latest revision of the Scheme is included in this Plan. The Zoning Scheme allows one to see at a glance where a particular activity is permitted (or not permitted, as the case may be) within the MPA.

A recent initiative between the island authorities and the UNESCO North Devon Biosphere Reserve has resulted in a local Wildlife Safari Operators Accreditation Scheme come into being, which promotes responsible boat operations within North Devon's coastal waters. Aimed at charter boat operators in particular, the one-day training course encompasses all one might want to know about commercial marine wildlife watching. The course includes how best to watch wildlife responsibly whilst minimising disturbance. The training is fully recognised as a WiSe (Wildlife Safe) scheme, the UK standard for such courses. Once trained, boat operators are allowed to display the WiSe accreditation on their craft.

ZONING SCHEME MAP



2.6 PREVIOUS MARINE MANAGEMENT PLANS

The following list sets out earlier iterations of Lundy marine management plans (in chronological order):

Hiscock, K., Grainger, I.G., Lamerton, J.F., Dawkins, H.C. & Langham, A.F. 1972. Lundy Marine Nature Reserve – a policy for the management of the shore and seabed around Lundy. *Annual Report of the Lundy Field Society*, 23: 39-45.

Whilst not strictly a management plan, this document set out the case for creating a voluntary marine reserve around Lundy, incorporating the intertidal area to high water mark and extending to 1 km offshore. It proposes a management policy covering fishing, recreational diving, scientific collecting, the excavation of wrecks, the operation of watercraft, the alteration of the seabed, the dumping of refuse or polluting substances and the use of explosives.

Hiscock, K. 1983. Lundy Marine Nature Reserve Management Plan. (Draft December 1983). Nature Conservancy Council, Huntingdon. iv and 87 pp.

This iteration was the first to draw together all that was known at the time concerning Lundy's marine environment. It was accompanied by two supplementary 'Information Files' – the first covering the littoral ecology and the second on the sublittoral ecology.

Willcox, N. 1988. *Management Plan for Lundy – Draft*. Produced for the Nature Conservancy Council.

An unpublished draft, incorporating both marine and terrestrial elements, the first since the designation of the statutory MNR in 1986.

Warman, S. & Duncan, K. 1993. *Lundy Marine Nature Reserve Management Plan 1993.* Produced for English Nature, Devon.

An unpublished draft management plan, building on the marine section of the Willcox (1988) draft plan.

English Nature. 1994. Managing Lundy's wildlife. A management plan for the Marine Nature Reserve and Site of Special Scientific Interest.

This published iteration uses the 1993 draft but also incorporates the terrestrial SSSI within its scope for the first time as well as a Zoning Scheme for the MNR.

English Nature. 1999. *Lundy Island: Candidate Special Area of Conservation, Marine Nature Reserve and Site of Special Scientific Interest Management Plan Revision Draft II – March 1999.* Produced for English Nature, Devon.

The driving force behind this draft was the naming of the Lundy MNR as a candidate Special Area of Conservation (in 1996). It was eventually designated as a SAC in April 2005.

English Nature. 2001. Lundy Management Plan (March 2001).

Published iteration of the 1999 draft plan.

English Nature. 2006. Lundy Island Management Scheme 2006-2011 (draft).

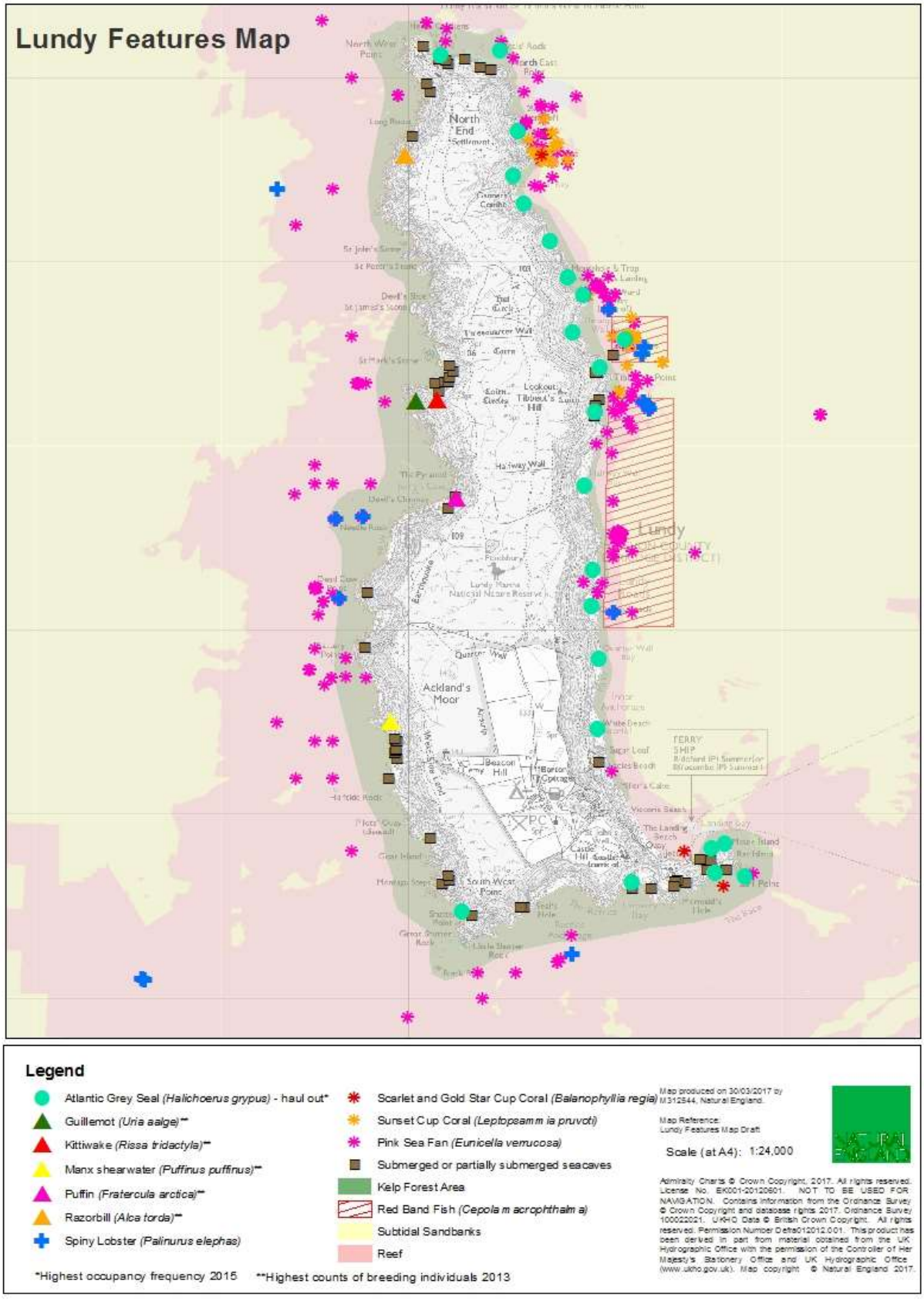
A draft Management Plan incorporating the SAC, MNR and SSSI. Produced in consultation with Landmark Trust, National Trust and Devon Sea Fisheries Committee. This Scheme included for the first time an overall aim for the SAC/MNR/SSSI – which has been adapted in this current MPA Management Plan and appears on p.18.

2.7 HOW THE CONDITION OF THE MPA IS ASSESSED

The Marine Protected Area is governed by a variety of legislative edicts including a number of Acts of Parliament (one the direct result of a European Union directive), local byelaws as well as a voluntary Code of Conduct. Several of these overlap both geographically and in the statutes which they contain. An indication of what these are and how they overlap is set out in the table overleaf.

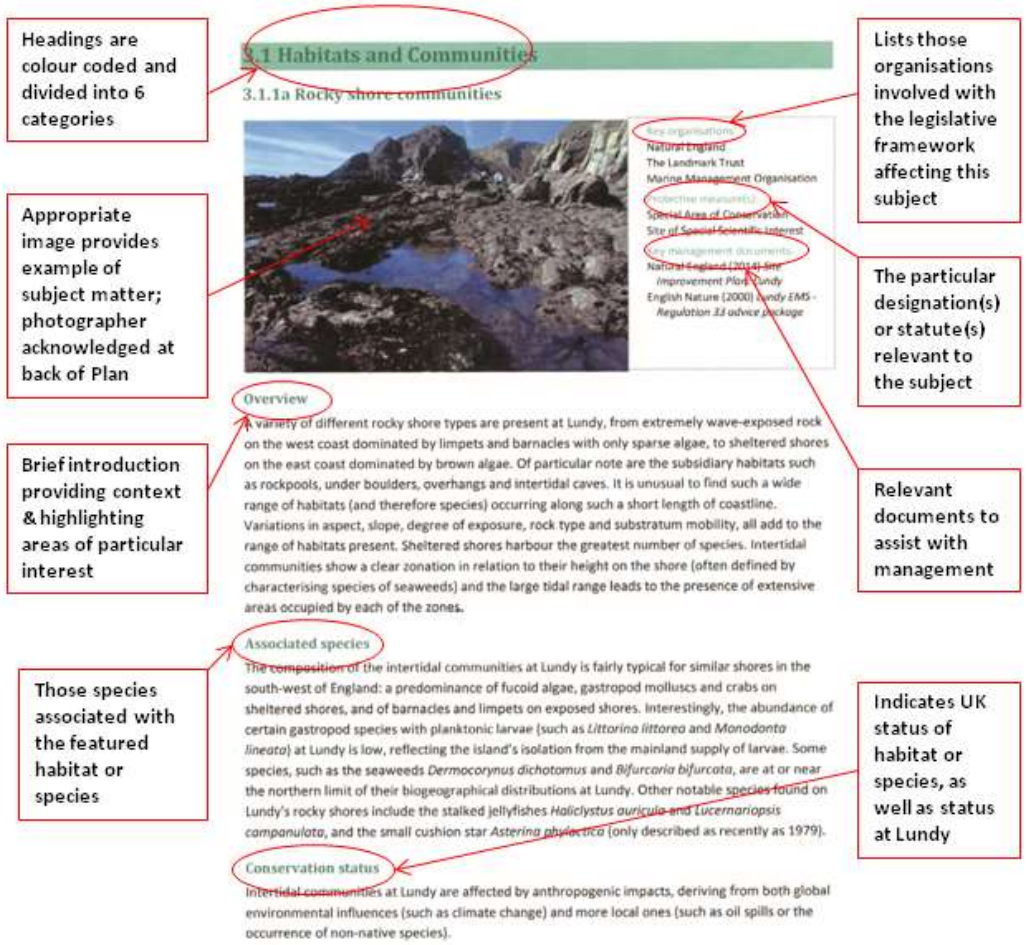
Designation	Statute	Required assessment	Compet
Site of Special Scientific Interest (SSSI) [intertidal area only]	National Parks and Access to the Countryside Act 1949; SSSI re-notified under the Wildlife & Countryside Act 1981 in 1987	There is no requirement for regular monitoring or condition assessment of the intertidal area of the SSSI. However, this area is also covered by the SAC and regular monitoring of shores and rockpools are undertaken as part of the overall reef feature assessment.	Natural
(statutory) Marine Nature Reserve (MNR)	Wildlife & Countryside Act 1981 (sections 36 & 37)	There is no statutory requirement for regular monitoring or condition assessment. However, annual monitoring of certain subtidal reef features took place between 1984-1990.	Natural
Special Area of Conservation (SAC)	EC Habitats Directive (92/43/EC) 1992, adopted in English law as the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Annex IV lists animals & plants in need of strict protection and includes all cetaceans; and Annex V lists species protected by management methods and includes the grey seal *Halichoerus grypus*.	Reporting on whether the identified features of the SAC are 'in favourable' or 'in unfavourable' condition is required at least once every 6 years. The features are: Reefs Grey seal *Halichoerus grypus* Subtidal sandbanks Caves A monitoring programme is currently in place to undertake a 'condition assessment' of the features. The latest assessment of the subtidal reef condition was undertaken in 2014/15 – see Vance & Ellis (2016).	Natural Reports EU on be whole of Joint Nat Conserva (JNCC).
No Take Zone (NTZ)	Devon Sea Fisheries Committee (now Devon & Severn Inshore Fisheries Conservation Authority) byelaw (2003)	There is no statutory requirement to monitor the condition of the NTZ. However, an annual monitoring programme was undertaken for the NTZ's first 5 years (2004-2008) – see Hoskin *et al.* (2008) for a summary of the programme's findings.	D&SIFCA
Marine Conservation Zone (MCZ)	Marine and Coastal Access Act (2009)	There is no statutory requirement to monitor the condition of the one protected feature of the MCZ (European spiny lobster). However, D&SIFCA are considering ways by which the population can be assessed. An MMO-directed MCZ assessment process is only required to take place if a marine licence application is received which could affect the protected feature of the MCZ (European spiny lobster).	D&SIFCA Marine M Organisa
Protected wreck	Protection of Wrecks Act (1973)	There is no statutory requirement to monitor the condition of either of the two protected wrecks at Lundy. However, it is presumed that, given the natural environmnetal conditions which surround them, each will gradually deteriorate or become heavily overgrown with marine life given time. Historic England last undertook a condition assessment of both sites in 2008 – see Wessex Archaeology (2009).	
Site of Special Scientific Interest (SSSI) [Seabird populations]		There is no statutory assessment undertaken. However, the island's Conservation team carry out annual checks on all seabird sepecies and the RSPB undertake a full inventory every five years (the latest taking place in 2012).	

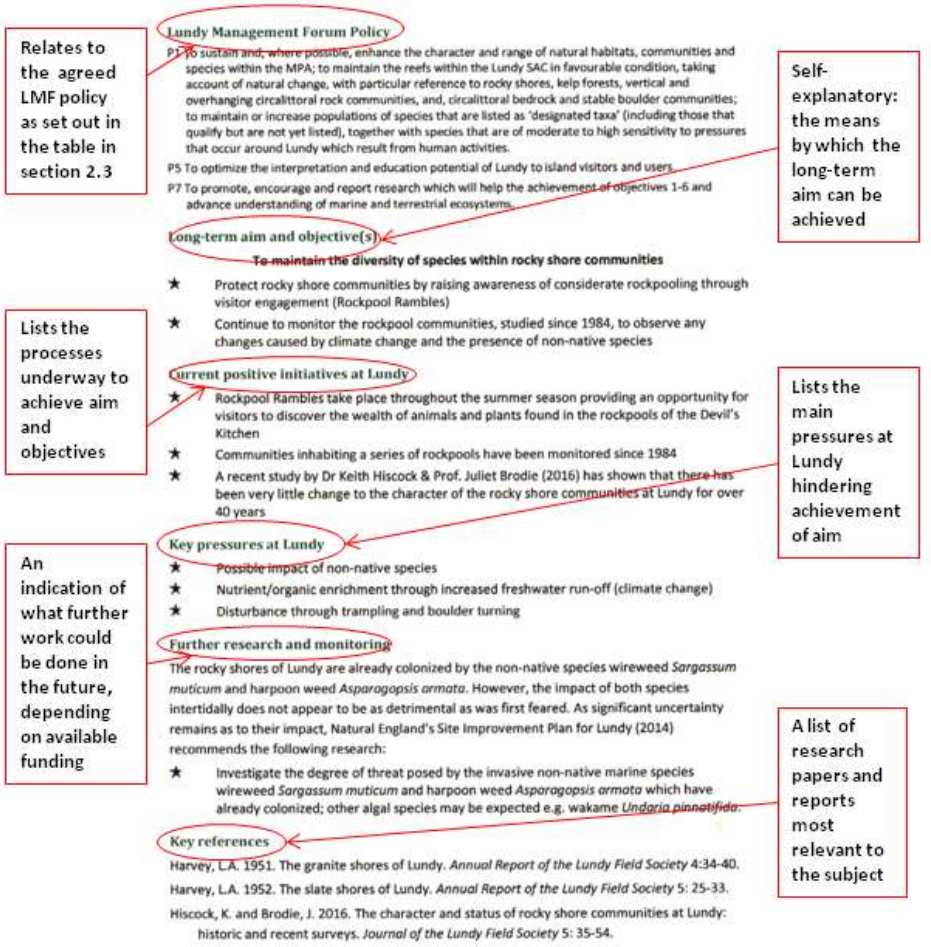
FEATURES MAP



FEATURE PAGES

The following pages follow a standard format. Each of the main feature categories has been given a distinguishing colour scheme. An explanation of the terms used for the headings for each entry is given below.

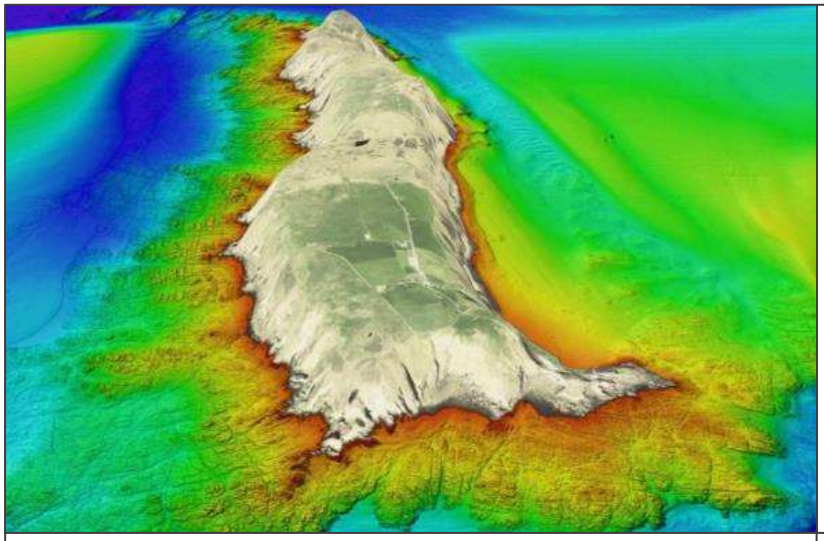




3.1 HABITATS AND COMMUNITIES

Seabed species that characterise habitats are noted in the text as are species that are listed as of conservation importance in statutes or to support statutes or requirements of conventions. Additionally, seabed species that also qualify as rare, scarce, in decline or threatened with decline (known as Nationally Important Marine Species) and that occur at Lundy are listed in Annex Aii.

3.1.1 Reefs



Combined LIDAR and sonar images of the seabed surrounding Lundy. The extensive subtidal reef feature is clear to see off the south and west coasts, when viewed from the south-west. Note that the colours indicate depth bands, each approximately 10m deep.

Key organisations:
Natural England
Devon & Severn IFCA
Marine Management Organisation

Protective measure(s):
Special Area of Conservation

Key management documents:
English Nature (2000). Lundy EMS – Regulation 33 advice package

Overview

Reefs are defined as rocky structures that rise from the seabed. They can be subtidal (when covered by seawater all the time) or intertidal (when present on the shore and exposed to the air at low tide). Reefs are renowned for supporting highly diverse assemblages of marine algal species and invertebrates, along with a variety of more mobile species such as fish, all of which are specially adapted to the prevailing environmental conditions affecting each site (light, geology, topography and exposure).

The term 'reef' is very broad, covering a wide range of habitats and supporting a variety of communities and species. At Lundy, the reef systems are considered to be important at a European level and were the original qualifying feature of the Special Area of Conservation (see also section 1.2). Reefs exhibit a number of sub-features and there are four at Lundy which are regarded as being of particular importance (as identified in the Regulation 33 document for Lundy). Species of Conservation Concern are covered in Section 3.2.

- Rocky shore communities
- Kelp forest communities
- Vertical and overhanging circalittoral rock communities
- Circalittoral bedrock and stable boulder communities

In addition to the sub-features listed above, Lundy's Habitats of Principal Importance (as listed in the table in Section 1.2, Conservation status) include 'Intertidal under-boulder communities' and 'Fragile sponge and anthozoan communities on subtidal rocky habitats'.

Current positive initiatives at Lundy

- Bottom towed gear (or demersal mobile gear) is prohibited on all of the reef feature
- Anchoring is prohibited within 100m of the Knoll Pins, a sensitive reef system
- Photography competitions (such as Splash In!) which engage divers and rockpoolers with the spectacular marine environment at Lundy thereby promoting its conservation for the future

At Lundy there are concerns over the localised impacts from recreational use of the intertidal reef area (by tourists) and of the subtidal rocky reef from snorkelling and scuba-diving. The latter primarily consists of physical damage and possible unlicensed removal of organisms such as shellfish. Recreational boats anchoring around the island have also been identified as having a potential impact on the kelp forests and the pink sea fan *Eunicella verrucosa*. Lost equipment from recreational angling and other forms of anthropogenic waste could also be impacting these important communities.

3.1.1a Rocky shore communities

Key organisations:
Natural England
The Landmark Trust
Marine Management Organisation

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest

Key management documents:
Natural England (2014) *Site Improvement Plan: Lundy*
English Nature (2000) *Lundy EMS - Regulation 33 advice package*

Overview

A variety of different rocky shore types are present at Lundy, from extremely wave-exposed rock on the west coast dominated by limpets and barnacles with only sparse algal coverage to sheltered shores on the east coast dominated by brown algae. Of particular note are the subsidiary habitats such as rockpools, under boulders, overhangs and intertidal caves. It is unusual to find such a wide range of habitats (and therefore species) occurring along such a short length of coastline. Variations in aspect, slope, degree of exposure, rock type and substratum mobility, all add to the range of habitats present. Sheltered shores harbour the greatest number of species. Intertidal communities show a clear zonation in relation to their height on the shore (often defined by characterising species of seaweeds) and the large tidal range leads to the presence of extensive areas occupied by each of the zones.

Some of the richest rocky shore communities can be found on the broken slate shore at the Devil's Kitchen in the south-east corner of the island. Indeed, this area has been described as being "…as rich as any comparable shore found in the British Isles" (Boyden, C.R., 1971). Here can be found a wide diversity of seaweeds and a good variety of invertebrate species too, all within easy access from the Beach Road (and hence particularly useful for interpretation). Shores on the south, west and north coasts are far less accessible, which restricts their value for study but increases their isolation from disturbance.

Associated species

The composition of the intertidal communities at Lundy is fairly typical for similar shores in the south-west of England: a predominance of fucoid algae, gastropod molluscs and crabs on sheltered shores, and of barnacles and limpets on exposed shores. Interestingly, the abundance of certain gastropod species with planktonic larvae (such as *Littorina littorea* and *Monodonta lineata*) at Lundy is low, reflecting the island's isolation from the mainland supply of larvae. Some species, such as the seaweeds *Dermocorynus dichotomus* and *Bifurcaria bifurcata*, are at or near the northern limit of their biogeographical distributions at Lundy. Other notable species found on Lundy's rocky shores include the stalked jellyfishes *Haliclystus auricula* and *Lucernariopsis campanulata*, and the small cushion star *Asterina phylactica* (described as a new species in 1979). The non-native wireweed

Sargassum muticum (section 3.4.1) and harpoon weed *Asparagopsis armata* (section 3.4.2) have colonized a number of the rockpools here over the past few years. Other non-native species include hookweed *Bonnemaisonia hamifera*, the red alga *Antithamnionella spirographidis*, oyster thief *Colpomenia peregrina*, Devil's tongue weed *Grateloupia turuturu* (to date only recorded subtidally) and the Australasian barnacle *Austrominius modestus*.

Conservation status

Intertidal communities at Lundy are affected by anthropogenic impacts, deriving from both global environmental influences (such as climate change) and more local ones (such as oil spills or the occurrence of non-native species). Monitoring of Lundy's rocky shore communities was first established in 1984. Since the designation of the SAC, it has become a requirement to assess the condition of the intertidal reef feature. This is done by looking at three specific attributes:

- The distribution of the characteristic range of biotopes
- The species composition of rockpool communities
- Populations of the scarlet and gold star coral and the Devonshire cup coral

The interpretation and presentation of data gathered from the rocky shore monitoring programme are currently being reviewed by Natural England, so a definitive condition assessment is not available at present (early 2017).

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

To maintain the diversity of species within rocky shore communities

- Protect rocky shore communities by raising awareness of considerate rockpooling through visitor engagement (Rockpool Rambles)
- Continue to monitor the rockpool communities, studied since 1984, to observe any changes caused by climate change and the presence of non-native species
- Provide sustainable alternatives to live bait and raise awareness of the impacts of collecting live bait on shore communities
- Maintain records of species observed and continue to encourage and support rocky shore surveys to allow comparison of rocky shore species from the 1940s with those of today

Current positive initiatives at Lundy

- Rockpool Rambles take place throughout the summer season providing an opportunity for visitors to discover the wealth of animals and plants found in the rockpools of the Devil's Kitchen
- Animal and plant communities inhabiting a series of rockpools have been monitored since 1984
- A population of scarlet and gold star corals within the Devil's Kitchen has been regularly monitored since 1971
- A recent study by Dr Keith Hiscock and Prof. Juliet Brodie (2016) has shown that there has been very little change to the character of the rocky shore communities at Lundy for over 40 years

Key pressures at Lundy

- Removal of species, particularly crabs such as the unusual Risso's crab *Xantho pilipes* and Montagu's crab *Lophozozymus incisus*, for bait
- Pollution from fuel and oil spills
- Possible impact of non-native species
- Nutrient/organic enrichment through increased freshwater run-off (climate change)
- Increased storminess and coastal erosion causing scour and abrasion (climate change)
- Disturbance through trampling and boulder turning

Further research and monitoring

The rocky shores of Lundy are already colonized by the non-native species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*. However, the impact of both species intertidally does not appear to be as detrimental as was first feared. As significant uncertainty remains as to their impact, Natural England's Site Improvement Plan for Lundy (2014) recommends the following research:

- Investigate the degree of threat posed by the invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata* which have already colonized; other algal species may be expected e.g. wakame *Undaria pinnatifida*.
- If there is found to be an issue with the invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*, investigate options to control these species reliably.

Key references

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Hiscock, K. (ed.) 1984). *Littoral surveys and monitoring at Lundy, April 14th to 19th, 1984*. Field Studies Council, Oil Pollution Research Unit, Pembroke. Nature Conservancy Council, Peterborough (unpublished report).

Hiscock, K. & Brodie, J. 2016. The character and status of rocky shore communities at Lundy: historic and recent surveys. *Journal of the Lundy Field Society* 5: 35-54.

Hiscock, K. & Hiscock, S. 1980. Rocky shore communities on Lundy: vertical zonation at four sites. *Annual Report of the Lundy Field Society* 30: 40-48.

3.1.1b Kelp forest communities

Key organisations:
Natural England
Marine Management Organisation
Devon and Severn IFCA

Protective measure(s):
Special Area of Conservation
Marine and Coastal Access Act 2009

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws
Natural England (2014) *Site Improvement Plan: Lundy*
English Nature (2000) *Lundy EMS - Regulation 33 advice package*

Overview

Kelp forests are considered to be the underwater equivalent of tropical rainforests due to their high levels of associated species' diversity. The term 'kelp' is the common name for any large brown seaweed found in the shallowest parts of the subtidal zone (between the sublittoral fringe and the deepest part of the infralittoral zone). However there are many different species of kelp, some of which are excellent indicators of environmental change. At Lundy, the algal species within the kelp forests are of particular interest as a number are rare and some are at or near the limit of their biogeographical distributions (for instance, the golden kelp *Laminaria ochroleuca* is currently at its northern limit at Lundy). The change in the abundance of such species around the island could indicate changes in the environment, particularly that of sea temperature.

Associated species

The kelp forest at Lundy is dominated by oarweed *Laminaria digitata* (close to the sublittoral fringe) and cuvie *Laminaria hyperborea* in deeper water. This latter species is of particular ecological importance: its rough stipe (stem) allows other seaweeds to grow on it; its blade (leaf) will often have encrusting bryozoans growing on it, providing a food supply for predatory sea slugs; and its holdfast (anchoring point) has holes within it, allowing several small animal species to hide within it. At least 15 species of algae are known to grow on *L. hyperborea* stipes, the most common of which are *Palmaria palmata*, *Membranoptera alata* and *Phycodrys rubens*. Other species of kelp present at Lundy include sea belt *Saccharina latissima* and furbellows *Saccorhiza polyschides*. The forest itself provides excellent cover for juvenile fishes, crustaceans (such as the European lobster *Homarus gammarus* and the edible crab *Cancer pagurus*) and numerous fish species including various wrasse. The nationally scarce trumpet anemone *Aiptasia mutabilis* can also be found within these communities around the jetty.

Conservation status

Kelp forests establish where there are suitable shallow areas of rock and boulder grounds all around the UK. As a feature of temperate waters, potential climate change is a major threat to the species composition of these communities.

Monitoring of Lundy's kelp forest communities is a requirement of SAC designation. This is done by looking at two specific attributes:

- The distribution and range of kelp biotopes
- Algal species composition within the kelp zone

The interpretation and presentation of data gathered from the kelp forest monitoring programme are currently being reviewed by Natural England, so a definitive condition assessment is not available at present (early 2017).

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to kelp forests; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

To maintain the coverage, distribution and diversity of species within kelp forests

- Provide alternatives to anchoring (where possible) for areas containing kelp forests
- Raise awareness of the importance of kelp forests and their associated species through visitor engagement
- Monitor kelp communities to identify any encroachment by non-native species or changes resulting from climate change
- Encourage responsible diving within these communities through raising awareness of the importance of good buoyancy, not touching marine life and keeping a distance from delicate marine life

Current positive initiatives at Lundy

- A mooring is available within Gannets' Bay to prevent damage by anchoring in this area.
- In addition, as a result of recent concerns regarding damage to kelp by boat anchors which has been brought to the attention of the Lundy MPA Advisory Group, a mooring will soon be installed off Brazen Ward to protect the kelp forest there
- Snorkel Safaris allow visitors to immerse themselves within the kelp forest communities
- Underwater photography competitions (such as Splash In!) engage divers with the spectacular marine environment at Lundy, thereby promoting its conservation for the future
- Kelp forests within the No Take Zone are protected from extractive activities
- Bottom towed gear (or demersal mobile gear) is prohibited on all reef features including the kelp forest communities.

Key pressures at Lundy

- Physical disturbance including anchoring and anchor drag, trampling (when exposed at low water) and potting activity.

- Non-native species competing with native species, affecting the balance of the natural ecosystem
- Smothering through siltation from dredging activities within the Bristol Channel
- Pollution from fuel and oil spills
- Diver collection of shellfish species
- Nutrient/organic enrichment

Further research and monitoring

Natural England's Site Improvement Plan for Lundy (2014) identifies a potential increase in sea temperature around Lundy along with the colonisation of non-native species and as such has recommended the following:

- Investigate algal species richness to assess any changes. There is uncertainty around whether there has been a reduction in species richness since designation.
- Investigate potential changes to subtidal fauna and flora which may be expected under current climate change predictions.
- Investigate the degree of threat posed by invasive non-native marine species wireweed *Sargassum muticum,* harpoon weed *Asparagopsis armata* and *Grateloupia turuturu* which have already colonised; other algal species may be expected e.g. wakame *Undaria pinnatifida*.
- If there is found to be an issue with the invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*, investigate options to control these species reliably.
- Investigate the effects of recreational anchoring around the island to assess its impact on the kelp forest.

Further reading

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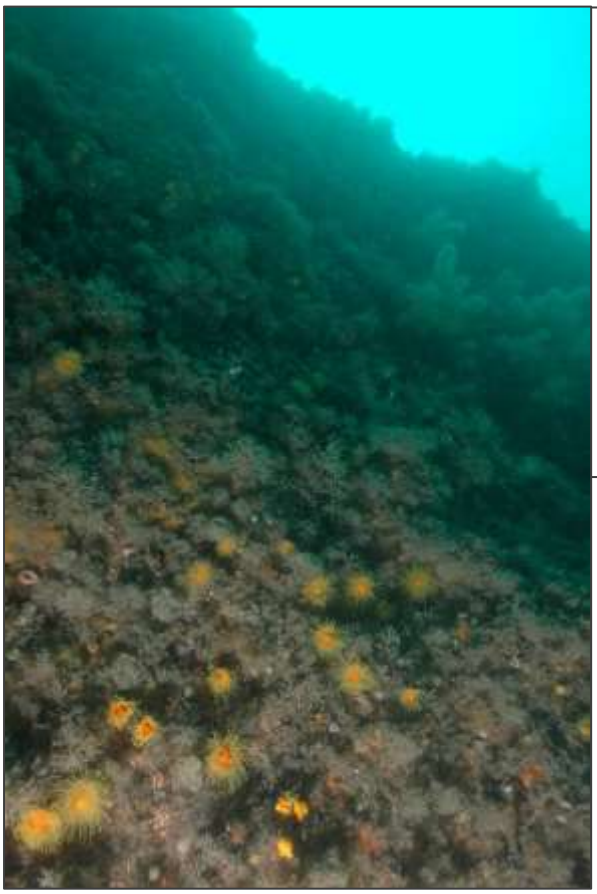
3.1.1c Vertical and overhanging circalittoral rock communities



Key organisations:
Natural England
Marine Management Organisation
Devon and Severn IFCA

Protective measure(s):
Special Area of Conservation
Devon and Severn IFCA byelaws

Key management documents:
Natural England (2014) *Site Improvement Plan: Lundy*
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Subtidal rocks dominated by animals occur all around the island except off the SE coast (which is dominated by sediments). Some of those rock surfaces are vertical or overhanging so that they are shaded and largely silt-free. Where tidal currents and/or wave action are strong, the rock surfaces are likely to be dominated by jewel anemones *Corynactis viridis*, but off the wave-sheltered east coast, rich communities of often rare or scarce species have developed. Rocks are likely to be colonised by sheets of encrusting sponges with extensive growths of erect, turf-forming sea mats. Here, four of the five shallow water species of stony coral that are present in Britain occur: *Caryophyllia smithii*, *C. inornata*, *Hoplangia durotrix* and *Leptopsammia pruvoti*.

Associated species

Other species of interest include the branching sponge *Axinella damicornis*, red sea fingers *Alcyonium glomeratum*, pink sea fingers *A. hibernicum* and the sponge *Thymosia guernii*. 'Sheets' of the yellow cluster anemone *Parazoanthus axinellae* are often found and, less frequently, a white cluster anemone that has taxonomic uncertainty but may be *Parazoanthus anguicomus*. There are other encrusting sponges, several of which have yet to be identified with certainty.

Conservation status

These communities have been identified as a listed sub-feature of the subtidal reefs at Lundy and are considered to be a conservation priority. The delicate nature of many of the constituent species makes these communities very susceptible to anthropogenic activities. Lundy has the peculiar distinction of hosting all five of the scleractinian coral species present in UK waters, all of which are associated with this sub-feature: Devonshire cup coral *Caryophyllia smithi*, southern cup coral *Caryophyllia inornata*, scarlet and gold star coral *Balanophyllia regia* (see also Section 3.2.2), sunset cup coral *Leptopsammia pruvoti* (Section 3.2.3) and Weymouth carpet coral *Hoplangia durotrix*. Four

of them particularly favour deep (circalittoral) overhangs, whilst the fifth, *Balanophyllia regia*, occurs on the lower shore and shallow (infralittoral) subtidal rocks.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the variety of species found within these habitats

- Promote the conservation of these communities by highlighting the importance of some of the species present (awareness campaign)
- Encourage and support volunteer surveys of these communities through initiative such as Seasearch to gain a greater understanding of their ecology
- Encourage responsible diving of these communities through raising awareness of the importance of good buoyancy, keeping away from delicate marine life and damage caused to marine life by bubbles
- Discourage anchoring and the use of shot lines that have the potential to damage this feature

Current positive initiatives at Lundy

- 100m anchor exclusion zone around the Knoll Pins helping to protect the community there
- Underwater photography competitions (such as Splash In!) engage divers with the spectacular marine environment at Lundy, thereby promoting its conservation for the future
- Bottom towed gear (or demersal mobile gear) is prohibited on all reef features and the kelp forest communities
- It is intended to position a permanent mooring at Brazen Ward during 2017 in order to protect the kelp forest there from anchor damage

Key pressures at Lundy

- Pressure from potting activity
- Anchoring and anchor drag (recreational vessels and ships)
- Breach of anchor prohibition at the Knoll Pins
- Discarding of angling waste including weights, hooks, lines and gaffs
- Disturbance and damage by divers through poor buoyancy and the effects of divers' bubbles
- Accidental or deliberate breaches of regulations and byelaws by commercial fishing vessels

Further research and monitoring

Natural England's Site Improvement Plan for Lundy (2014) identifies a potential increase in sea temperature around Lundy and recommends that the implications of this are further investigated. It also recommends further research into the nationally rare sunset cup coral *Leptopsammia pruvoti*, as its populations at Lundy have been declining since the 1980s and a significant level of uncertainty remains regarding the reasons for lack of recruitment and the overall health of the population.

- Investigate potential changes to subtidal fauna and flora which may be expected under current climate change predictions.
- Investigate the health (and potentially the recruitment) of key benthic species such as sunset cup coral *Leptopsammia pruvoti* (see also section 3.2.3). Significant uncertainty remains regarding the reasons for lack of recruitment, decline in population size, overall population health and the degree of change which is occurring within the population of several benthic species.

Further reading

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3.1.1d Circalittoral bedrock and stable boulder communities

Key organisations:
Natural England
Marine Management Organisation
Devon and Severn IFCA

Protective measure(s):
Special Area of Conservation
Devon and Severn IFCA byelaws

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Reefs formed of steeply sloping bedrock with boulders and dominated by animals can be found all around the island except off the SE coast. Where conditions include moderate exposure to wave and/or tidal currents in the circalittoral (deep zone), rich communities are likely to develop with jewel anemones *Corynactis viridis*, erect bryozoans, sea-squirts, sponges and hydroids. It is also here that the European spiny lobster *Palinurus elephas* is likely to be found. The iconic species of Lundy reefs is the pink sea fan *Eunicella verrucosa* which, along with axinellid sponges, is slow-growing and long-lived. Circalittoral (deep) reefs are of the type that is most extensive at Lundy and their condition can be used as a good indicator for the health of the overall reef system as many of the fundamental species (pink sea fan, branching sponges and red sea fingers) are very sensitive to disturbance and siltation. The axinellid sponges and the nationally scarce sponge *Adreus fascicularis* are particularly vulnerable as they recruit infrequently and are unlikely to reappear at Lundy if they become locally extinct.

Associated species

The long-lived pink sea fan *Eunicella verrucosa* is listed as a 'Species of Principal Importance'. It also specifically hosts the nationally scarce sea slug *Tritonia nilsohdneri* and the nationally rare false cowrie *Simnia hiscocki*. The sea fan anemone *Amphianthus dorhnii*, which is nationally scarce, has been recorded just once at Lundy. The sponge *Adreus fascicularis* is nationally scarce and occurs on reefs overlain by sand off the south coast. The rugged terrain created by reef habitats is used by spiny lobsters (crawfish) *Palinurus elephas*, which suffered a great decline in the 1970s due to exploitation and are now the designated feature of the MCZ (see section 3.2.6). Sea slug (nudibranch) species are particularly diverse at Lundy (25 species were listed by Brown & Hunnam in 1976) and are associated with this habitat. Other species include jewel anemones of various colours and erect sponges such as the 'axinellid' species (see also section 3.2.5).

Conservation status

These communities have been identified as a listed sub-feature of the subtidal reefs at Lundy and are considered to be a conservation priority. The delicate nature of many of the constituent species makes these communities very susceptible to physical disturbance.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the variety of species found within circalittoral bedrock and stable boulder communities

- Promote the conservation of these communities by highlighting the importance of some of the species present (awareness campaign)
- Encourage and support volunteer surveys of these communities through initiatives such as Seasearch to gain a greater understanding of their ecology
- Encourage responsible diving through raising awareness of the importance of good buoyancy to reduce chances of damaging fragile species
- Discourage anchoring and the use of shot lines that have the potential to damage this feature

Current positive initiatives at Lundy

- Underwater photography competitions (such as Splash In!) engage divers with the spectacular marine environment at Lundy, thereby promoting its conservation for the future
- The Lundy Marine Protected Area Advisory Group provides a forum for issues to be raised to the Lundy Management Forum
- Those communities within the No Take Zone are protected from direct removal

Key pressures at Lundy

- Pressure from potting activity
- Angling waste including weights, hooks, lines and gaffs
- Diver collection of shellfish
- Physical disturbance including anchoring and anchor drag (recreational vessels and ships)
- Accidental or deliberate breaches of regulations and byelaws by commercial fishing vessels

Further research and monitoring

The pink sea fan *Eunicella verrucosa* is a characteristic species of the circalittoral bedrock and boulder communities at Lundy. In the early years of the current century, many sea fans at Lundy were affected by a necrotic disease that resulted in a dramatic decline in their overall condition, particularly when compared to other south-west populations. Currently, concerns centre on the

slow recovery of the population and whether environmental changes and damage from anchoring may be adversely affecting its recovery. To assess these issues, Natural England's Site Improvement Plan for Lundy (2014) recommends further research to:

- Continue to monitor the sea fan population at Lundy in order to assess its rate of recovery from the necrotic disease infection.
- Investigate the effects of anchoring and potting around the island to assess their impact on the pink sea fan *Eunicella verrucosa.*

Further reading

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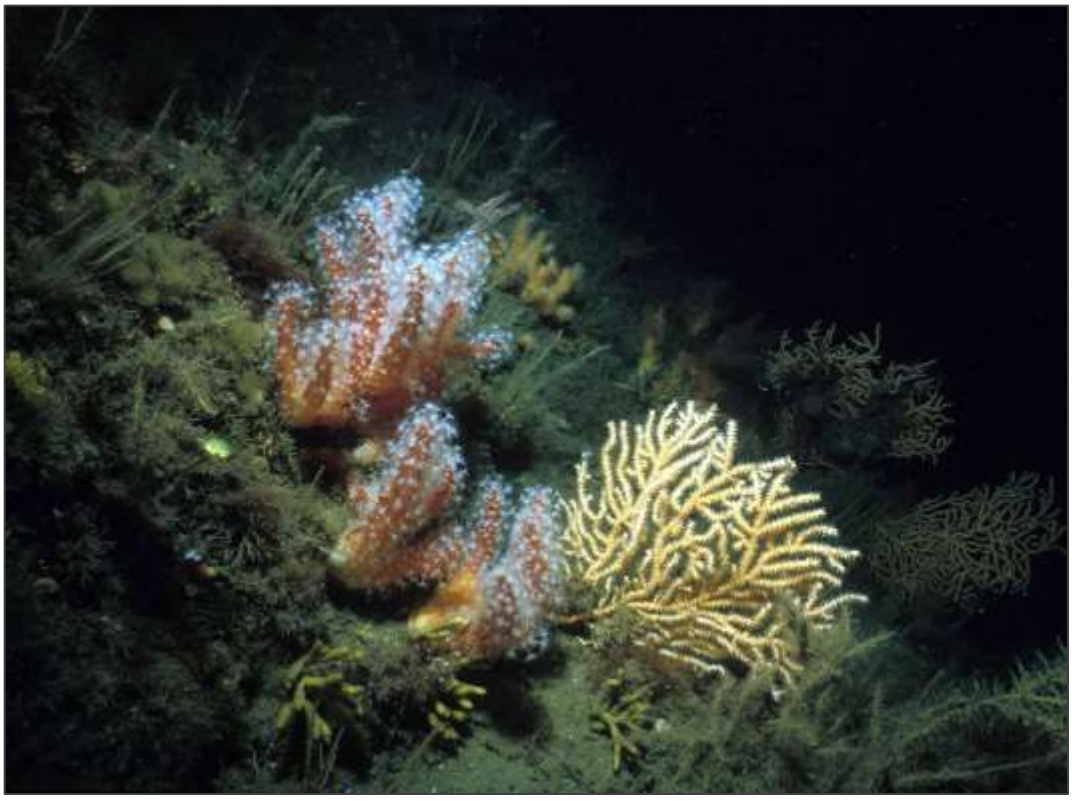
Vance, T. & Ellis, R. 2016. *Lundy SAC: subtidal reef condition assessment and No Take Zone benthic monitoring survey 2014/15*. Published report by PML Applications Ltd. to Natural England. [RP02178 - Lundy SAC: Subtidal Reef Condition Assessment and No Take Zone Benthic Monitoring Survey 2014/15].



Red sea fingers and sea fans on deep bedrock at the Knoll Pins

3.1.2 Subtidal sediments

Key organisations:
Natural England
Marine Management Organisation
Devon and Severn IFCA

Protective measure(s):
Special Area of Conservation
Devon and Severn IFCA byelaws

Key documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Lundy's subtidal sediments may at first glance appear to be underwater deserts. However, on closer inspection, these areas are home to a wealth of marine animals. Sampling a variety of different sediments around Lundy revealed 478 species from 49 survey stations (see the sediment biotope map accompanying this entry). Many of the creatures that live on the sediment are masters of disguise, showing some of the best camouflage that there is in the marine environment. However, it is the large number of organisms hidden within the sediment (the infauna) that is arguably more impressive. The sandy sediments that form the sandbanks off Lundy are dynamic and move regularly, making management of these areas difficult.

Associated species

The most notable species are the burrowing anemone *Mesacmaea mitchelli*, the night anemone *Halcampoides abyssorum* and the nut crab *Thia scutellata*, all of which are nationally scarce. Other characterising species include king scallop *Pecten maximus*, red band fish *Cepola macropthalma*, razor shell *Ensis siliqua*, small gobies *Pomatoschistus* spp., dragonet *Callionymous lyra* and flatfish such as plaice *Pleuronectes platessa*.

Conservation status

Although subtidal sediments are widely distributed around the UK, the muddy gravels found in 15-25m off Lundy's east coast are particularly rich in epifaunal and infaunal species. The communities present here fall within the SAC sub-feature of 'sandbanks which are slightly covered by sea water all the time'.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa'

(including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the variety of species and the extent of the subtidal sediments

- Promote the conservation of these communities by highlighting the importance of some of the species present (awareness campaign)
- Encourage and support volunteer surveys of these communities through initiatives such as Seasearch to gain a greater understanding of their ecology
- Encourage responsible diving on these communities through raising awareness of the importance of good buoyancy to reduce opportunities to damage fragile species

Current positive initiatives at Lundy

- Recent surveys of the sediments around Lundy have shown that they support very diverse communities
- Underwater photography competitions (such as Splash In!) engage divers with the spectacular marine environment at Lundy, thereby promoting its conservation for the future
- Some sediment areas are excluded from demersal fishing activities
- Scallop collection by divers is now controlled and take-restricted through licensing

Key pressures at Lundy

- Accidental or deliberate breaches of regulations and byelaws by commercial fishing vessels
- Physical disturbance including anchoring and anchor drag (recreational vessels and ships); poor diver buoyancy
- Unlicensed and unmonitored collection of scallops by divers

Further research and monitoring

Natural England's Site Improvement Plan for Lundy (2014) lists no specific recommendations for research regarding this community. However, any opportunities to develop our understanding of them should be taken.

Key references

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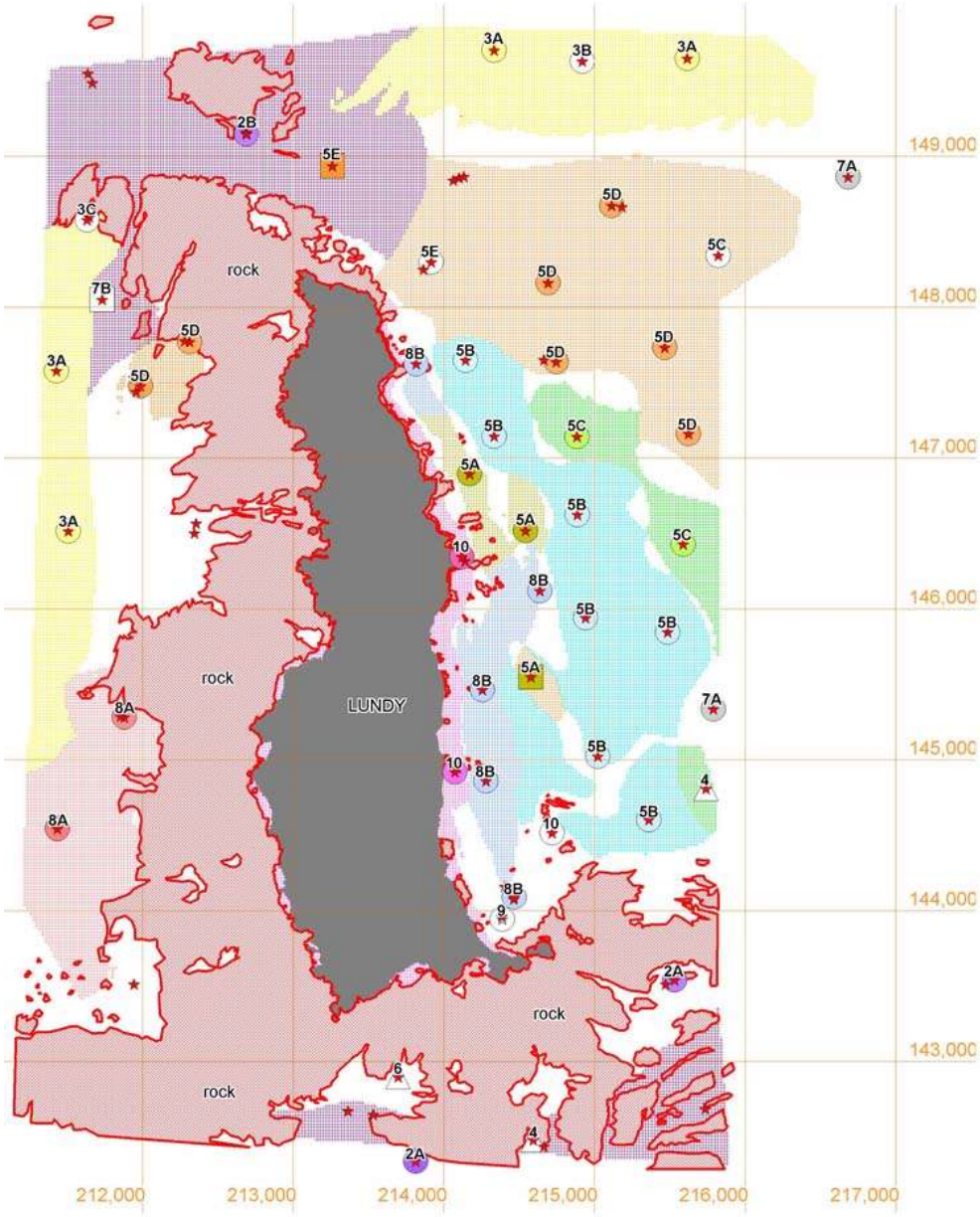


Major sediment biotopes around Lundy (taken from Smith & Nunny, 2012).

Note that the key below is greatly abbreviated from the above paper.

1 *Laminaria hyperborea* on tide-swept, infralittoral mixed substrata

2A&B Versions of '*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles'

3A-C 'Infralittoral mobile clean sand with sparse fauna'

4 Similar to '*Sertularia cupressina* and *Hydrallmania falcata* on tide-swept sublittoral sand with cobbles or pebbles'

5A-D Variations of '*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel'

5E '*Sabellaria spinulosa* on stable circalittoral mixed sediment'

6 Some similarities with '*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel'

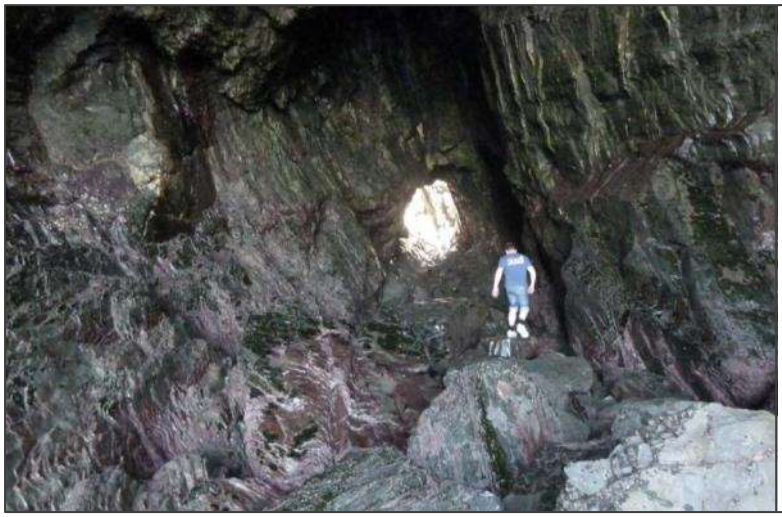
7A&B Similar to '*Hesionura elongata* and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand'

8A&B Intermediate between '*Lagis koreni* and *Phaxas pellucidus* in circalittoral sandy mud and *Abra alba'* and '*Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment'

9 Intermediate between '*Lagis koreni* and *Phaxas pellucidus* in circalittoral sandy mud' and '*Spisula subtruncata* and *Nephtys hombergii* in shallow muddy sand'

10 Species-poor variation of Offshore circalittoral mixed sediment?

3.1.3 Submerged or partially submerged sea caves



Key organisations:
Natural England
Marine Management Organisation
Devon and Severn IFCA

Protective measure(s):
Special Area of Conservation
Devon and Severn IFCA byelaws

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Lundy's coastline is speckled with numerous sea caves, the majority of which occur in the intertidal zone. Some go right the way through headlands and form tunnels, while others may extend into the subtidal. Most do not penetrate very far (only a few metres), although a few are cavernous and may extend deep into the island (at least 70m in one instance). The biological communities found within caves are often distinctly different to those in the immediate vicinity, as their composition is affected by the environmental conditions to which they are subjected, prticularly scour, reduced light levels, wave exposure and the geology of the cave itself. The sea caves found in the intertidal zone of the high energy west coast are often scoured to bare rock but may hold communities of mussels, barnacles, cushion sponges and encrusting bryozoans, as these species can endure exposure to strong currents and waves. The east coast provides more sheltered conditions, creating a more stable environment for the communities within them. In the subtidal, these caves are often not much more than overhangs and provide shelter to species such as encrusting sponges, stony corals, soft corals, sea squirts and crawfish. The most notable littoral cave communities are found within two caves at the northwest corner of Rat Island and one at Tibbetts Point. These are characterised by the presence of anemones, bryozoans and mussels.

Associated species

Several of Lundy's caves are used by the island's grey seal population for resting, moulting and pupping. The presence of these mammals is one of the main reasons why some of these caves have yet to be surveyed, as large bulls are very territorial and will defend the cave systems.

Conservation status

Sea caves are relatively scarce across Europe, with the majority lining the Atlantic coast of the UK. There are 37 intertidal sea caves at Lundy and at least one subtidal cave.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in

favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the sea caves in their current state, allowing for natural changes.

- Collate all information on the cave systems to inform future management and surveys
- Encourage responsible diving when visiting cave communities under water by raising awareness of the importance of good buoyancy and issues caused by bubbles trapped over species within the caves

Current positive initiatives at Lundy

- The sea cave at the Knoll Pins is protected from possible anchor damage by the 100m anchor exclusion zone
- One sea cave close to the Devil's Kitchen is undergoing voluntary survey and monitoring to contribute towards further understanding of the long term changes to its community

Key pressures at Lundy

- Coastal erosion through increased storminess (climate change)
- Rising sea levels
- Inexperienced divers damaging encrusting animals, particularly under overhangs, due to poor buoyancy and uncontrolled exhalation of bubbles

Further research and monitoring

Natural England's Site Improvement Plan for Lundy (2014) lists no specific recommendations for research regarding this community. However, any opportunities to explore the caves and document their communities should be taken.

Key references

Baillie, C.C. & Clark, N.A. 1975. Brief visits to the sea-level caves on the east side of Lundy. *Annual Report of the Lundy Field Society* 25: 59-62.

Hiscock, K. 1984. *Lundy Marine Nature Reserve. Report of the 1983 Lundy Working Party*. Unpublished report by the Underwater Conservation Society. World Wildlife Fund/Lundy Field Society.

Hiscock, K. 1986. *Marine biological monitoring at Lundy, March 26th – 29th and July 26th - August 2nd, 1986*. Unpublished report by the Field Studies Council Oil Pollution Research Unit, Pembroke to the Nature Conservancy Council, Peterborough.

Mills, M.T. 1969. The caves of Lundy. *Annual Report of the Lundy Field Society* 19: 10-30.

3.2 SPECIES OF CONSERVATION CONCERN

3.2.1 Atlantic grey seal *Halichoerus grypus*

Key organisations:
Natural England
Marine Management Organisation

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest
Conservation of Seals Act 1970

Key management documents:
Natural England (2014) *Site Improvement Plan: Lundy*
English Nature (2000) *Lundy EMS - Regulation 33 advice package*

Overview

Grey seals are found on both sides of the North Atlantic; their worldwide population is thought to number about 300,000. There are in the region of 140,000 in the eastern Atlantic population, centered on the British Isles where they tend to be associated with undisturbed rocky coastlines, particularly along the west coast. The colony at Lundy, which numbers in the region of 200-250 individuals (with females outnumbering males), is important in the south-west as it is a known breeding colony. Individually identified seals are known to migrate between the north Cornwall coast, Lundy, the north Devon coast and south-west Wales. It is possible there is mixing with populations from as far afield as Brittany and southern Ireland too.

Unusually, seal pups can be found at Lundy all year round although the main pupping season runs from August to December. Expectant mothers usually choose remote beaches on the island to give birth, such as White Beach, Halfway Bay and Gannets' Bay, though some may choose pebble beaches at the back of certain sea caves. Less shy ones will choose the readily accessible Devil's Kitchen or Landing Bay beach. Grey seals are often spotted from MS *Oldenburg* on the journey across from the mainland, where they are most likely to be foraging for bottom dwelling fish such as sandeels, whitefish and flatfish. Large males have been spotted carrying rays in the Landing Bay.

Associated species

Prey species include bottom dwelling fish such as sandeels, whitefish, flatfish and rays.

Associated habitats

Sea caves, rocky shores, beaches for pupping; inaccessible emergent rocks for hauling-out.

Conservation status

Atlantic grey seal populations are increasing across most locations in the UK. Numbers at Lundy have seen a gradual rise over the past 50 years (the population in 1955 was estimated to be about 130 individuals and is now 200-250). Around 30 pups are born each year, though it is not known what proportion of these survive to adulthood.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain a stable or increasing breeding population of Atlantic grey seals at Lundy

- Support the grey seal breeding colony at Lundy through sustaining their access to haul out sites and applying measures to reduce disturbance
- Increase knowledge and understanding of the grey seal population and pup productivity through monitoring; where possible taking ID images for Lundy ID database
- Raise awareness and promote good practice of responsible marine wildlife watching through appropriate interpretation, media coverage and through maintaining strong links with local operators. Promotion of the Lundy Seals Flickr group to develop the ID database
- Reduce opportunities for entanglements by raising awareness of the issue of marine litter and continuing with the removal of objects from beaches and sea (whenever possible)

Current positive initiatives at Lundy

- Grey seal photo-ID scheme (initiated in 1993) forms the basis of a large database of ID photos of individual seals
- Grey seal leaflet produced for visitors in 2010, incorporating a specific grey seal code of conduct which has been adopted by wildlife safari and dive operators working around Lundy.
- Collaboration between Lundy and UNESCO North Devon Biosphere Reserve for a local Wildlife Safari Operators Accreditation Scheme promoting responsible boat operations along the whole of the North Devon coast
- Monthly seal population surveys have allowed the development of further understanding regarding the breeding population at Lundy
- Marine litter is removed from the beaches and from the sea (whenever possible), with a particular focus on nets and any other pieces that could result in entanglements
- No dogs are permitted on the island, mitigating possible conflict and disease transmission

Key pressures at Lundy

- Public access and disturbance by walkers, divers, snorkelers and boats (including jet-skis)
- Marine litter, including nets, leading to entanglements

- Possible disturbance from potential renewable energy developments (in surrounding unprotected waters), causing noise pollution
- Water pollution, particularly presence of PCBs that can bio-accumulate

Further research and monitoring

Natural England have recommended the following actions, through their Site Improvement Plan (2014), for further research into the grey seal population, in order to develop our understanding of the colony and for future management:

- Investigate the impacts of human interference and disturbance to grey seals at Lundy.
- Investigate the degree to which marine pollution may affect grey seal populations which use Lundy.
- Continue to liaise with other seal-watching groups in south-west England in order to track individual seals and study their migratory behaviour
- Investigate the degree to which potential tidal and wind renewable energy production in the Bristol Channel could have a negative impact on grey seal and thus affect populations that use Lundy.

Key references

Clark, N.A. 1978. The composition and behavior of the grey seal colony of Lundy. *Annual Report of the Lundy Field Society* 28: 32-42.

Hook, O. 1963-4. Grey seals *Halichoerus grypus* at Lundy, Bristol Channel, 1954-57. *Annual Report of the Lundy Field Society* 16: 24-25.

MacDonald, R. 2013. *Atlantic grey seals* (Halichoerus grypus) *at Lundy, 2006-2013*. Report to Natural England.

Westcott, S. 2009. The status of grey seals (*Halichoerus grypus*) at Lundy, 2008-2009. Report to Natural England. [Online]. Available: http://www.lundymcz.org.uk/docs/Public/Research/2009%20Lundy%20Seals%20FINAL%20Report%20October%202009.pdf

Willcox, N. 1987. A review of grey seal (*Halichoerus grypus*) pupping on Lundy and some new observations. *Annual Report of the Lundy Field Society* 37: 32-34.

3.2.2 Scarlet and gold star coral *Balanophyllia regia*

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

Balanophyllia regia is a species of stony coral normally found within the shallow subtidal zone (down to about 25m). However at Lundy, colonies can also be found on the lowest zone of the rocky shore in a few locations (such as Devil's Kitchen and close to Gannets' Rock). This species is close to the northern limit of its range at Lundy, which extends southwards to south-west Europe and the Mediterranean.

Associated species

Devonshire cup corals *Caryophyllia smithi* are found amongst the colonies at the Devil's Kitchen.

Associated habitats

Scarlet and gold star corals are found in surge gullies, caves or underneath overhangs.

Conservation status

A nationally scarce species and near the northern limit of its range in south-west Britain (the furthest north to date is north Pembrokeshire). Its range extends southwards to Morocco and includes the Mediterranean. It is one of the five cup coral species found in British waters, all of which are present at Lundy. The population found on the lower shore at the Devil's Kitchen has been photographed since 1971 and is considered to be stable or increasing.

Lundy Management Forum Policy

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P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the population of scarlet and gold star corals in their present locations at Lundy, allowing for natural change

- Continue with the present monitoring programme at the Devil's Kitchen to maintain the long-term data set and gain further understanding of the population
- If possible, establish an effective method for determining growth rates of individuals
- Survey other intertidal sites to locate other colonies of scarlet and gold star corals

Current positive initiatives at Lundy

- Two populations in the Devil's Kitchen have been the focus of regular monitoring. One population has been surveyed since 1971. Other populations are recorded when found.

Key pressures at Lundy

- Changing sea temperatures
- Reduced funding for surveys
- Water pollution in the form of increased suspended sediment affecting feeding mechanisms
- Increased storminess leading to increased probability of loss or damage caused by scour and abrasion

Further research and monitoring

With *Balanophyllia regia* being close to its northern limit at Lundy, it is recommended, as part of Natural England's Site Improvement Plan (2014), to:

- Investigate potential changes to subtidal fauna and flora which may be expected under current climate change predictions.

Furthermore, the monitoring site at Devil's Kitchen should be assessed to establish whether a change in the abundance of individuals is occurring.

Key references

Fowler, S.L. & Pilley, G.M. 1992. *Report on the Lundy and Isles of Scilly marine monitoring programmes, 1984-1991*. The Nature Conservation Bureau Ltd. Unpublished report to English Nature, Peterborough.

MacDonald, R. 2016. *The presence and abundance of the scarlet and gold star coral* Balanophyllia regia *and Devonshire cup coral* Caryophyllia smithii *on Lundy: 1970 to 2015*. Unpublished report to Natural England.

3.2.3 Sunset cup coral *Leptopsammia pruvoti*

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation
Species of Principal Importance

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

The sunset cup coral is an eye-catching, stony coral which is predominantly solitary but can also be found in small colonies (several individuals with one attachment point). It is widespread across the western Mediterranean and is considered to be a rarity in British waters, with Lundy at the northerly limit of its range. Its presence at Lundy was first recorded in 1969, a first for Britain, and it has been the focus of conservation and study ever since. A photographic monitoring programme was established in 1984, the findings of which indicate that the population at Lundy has been in decline ever since. The precise cause of this decline is currently unknown although various hypotheses have been put forward. It would appear that recruitment in not keeping up with loss.

Associated species

At Lundy, sunset cup corals are typically surrounded by a silty turf of low-growing hydroids and bryozoans. A variety of encrusting sponges are also present, together with more unusual species, such as the rare southern cup coral *Caryophyllia inornata* and the rare Weymouth carpet coral *Hoplangia durotrix*.

Associated habitats

Sheltered steep sides gullies, under overhangs and in clefts of vertical bedrock and submerged sea caves.

Conservation status

The sunset cup coral is nationally rare: it has only been recorded at five locations in the UK, all in the south-west. The population at Lundy is the only one in the UK being regularly monitored.

Lundy Management Forum Policy

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boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Protect and maintain the colonies of sunset cup coral at Lundy

- Form a conservation volunteer dive group to undertake training to learn appropriate survey techniques
- Support volunteers to allow them to undertake regular surveys of a study population; and for the investigation of other subtidal areas around Lundy where new populations may be found

Current positive initiatives at Lundy

- The populations of sunset cup coral at Lundy have been monitored since 1984
- 100m anchor exclusion zone around the Knoll Pins helps to protect the population there
- The majority of individuals are found within the No Take Zone, where potting is not permitted.

Key pressures at Lundy

- Changing sea temperatures
- Water pollution in the form of increased suspended sediment affecting feeding mechanisms
- Breaches of anchor exclusion zone at the Knoll Pins

Further research and monitoring

Natural England's Site Improvement Plan for Lundy (2014) highlights an increase in sea temperature around Lundy and recommends that the implications of this are further investigated. It also recommends further research into the nationally rare sunset cup coral *Leptopsammia pruvoti* as its populations at Lundy have been declining since the 1980s and a significant level of uncertainty remains regarding the reasons for lack of recruitment and overall health of the population.

- Investigate potential changes to subtidal fauna and flora which may be expected under current climate change predictions.
- Investigate the health (and potentially the recruitment) of key benthic fauna such as sunset cup coral *Leptopsammia pruvoti.* Significant uncertainty remains regarding the reasons for lack of recruitment, decline in population size, overall population health and the degree of change which is occurring within the populations of several benthic species.

Key references

Fowler, S.L. & Pilley, G.M. 1992. *Report on the Lundy and Isles of Scilly marine monitoring programmes, 1984-1991*. The Nature Conservation Bureau Ltd. Unpublished report to English Nature, Peterborough.

Irving, R.A. *Leptopsammia pruvoti* at Lundy – teetering on the brink? *Porcupine Marine Natural History Society Newsletter* 15: 29-34.

Irving, R.A. & Hiscock, K. 2010. The status of the sunset cup coral *Leptopsammia pruvoti* at Lundy. *Journal of the Lundy Field Society* 2: 67-84.

3.2.4 Pink sea fan *Eunicella verrucosa*

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation
Species of Principal Importance (NERC Act, 2006)
Wildlife and Countryside Act 1981 (Schedule 5 listing, 1992)

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

The pink sea fan is a gorgonian coral which many might expect to find in warm, clear tropical waters. This species is distributed from the Mediterranean to the south-west of the British Isles, with Lundy close to its northerly limit (actually in south-west Wales). Pink sea fans are very slow growing (1cm per year on average) and long-lived (up to at least 50 years), making them susceptible to anthropogenic activities. During the 1960s, considerable numbers of pink sea fans were collected by divers from Lundy as souvenirs or to be sold as curios. This activity was one of the main reasons behind the establishment of the voluntary Marine Nature Reserve, due to the detrimental impacts collection was having on the sea fan population. In the early 2000s, the species was under threat once again, but this time by a bacterial disease. Recovery is still ongoing and, as reproduction appears to be an infrequent event, full recovery may take decades.

Associated species

Pink sea fans host the nationally scarce sea fan nudibranch *Tritonia nilsodhneri,* the nationally rare false cowrie *Simnia hiscocki* (only described in 2011) and the nationally rare anemone *Amphianthus dorhnii*. The last of these species has only been recorded once (in 1995) off Brazen Ward.

Associated habitats

Present all around the island (except for the south-east) in areas of bedrock or boulders with moderate or strong tidal steams.

Conservation status

Pink sea fans are considered to be uncommon within the UK as they are geographically restricted to the south-west extending as far north as north Pembrokeshire. They also occur off the south and west coasts of Ireland. Their range extends as far south as north-west Africa and the western Mediterranean Sea. It is currently listed as vulnerable on the IUCN Red List of Threatened Species. From a legal standpoint, this species is probably the most heavily protected marine invertebrate in UK waters.

Lundy Management Forum Policy

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P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain and support the recovery of colonies of pink sea fan at Lundy

- Create anchor exclusion zones (pink sea fan priority areas) at the Quarries, Gull Rock, Brazen Ward, Battery Point and Gannets' Rock to protect colonies
- Raise awareness of the pink sea fan, and those species associated with it, to support exclusion zones and encourage research
- Support research into the pink sea fan colonies at Lundy

Current positive initiatives at Lundy

- Collection of specimens is banned (as it is elsewhere)
- Annual surveys are carried out, when possible, by volunteer Seasearch divers
- 100m anchor exclusion zone around the Knoll Pins helps to protect the pink sea fans located on these pinnacles
- Prohibition of fishing activity within the No Take Zone and use of mobile fishing gear within 200m of reef habitats protects sea fans within the area

Key pressures at Lundy

- Damage through potting activity
- Damage and disturbance by anchoring and anchor drag (recreational vessels and ships)
- Entanglement and damage caused by angling equipment

Further research and monitoring

The pink sea fan *Eunicella verrucosa* is a characteristic species of circalittoral bedrock and boulder communities. In the early years of the current century, many sea fans at Lundy were affected by a necrotic disease that resulted in a dramatic decline in their overall condition, particularly when compared to other south-west populations. Currently, concerns centre on the slow recovery of the population and whether environmental changes and damage from anchoring may be adversely affecting its recovery. To assess these issues, Natural England's Site Improvement Plan for Lundy (2014) recommends further research to:

- Investigate the reasons for the apparently anomalous poor health of the pink sea fan *Eunicella verrucosa* and other species populations around Lundy. Research suggests disease (*Vibrio* bacteria) may be a problem and possibly that excessive nutrients may be implicated. Contaminant levels should be considered.

- Investigate potential changes to subtidal fauna and flora which may be expected under current climate change predictions.
- Investigate the effects of anchoring around the island to assess its impact on the pink sea fan *Eunicella verrucosa.*

Divers should be encouraged to report instances of detached sea fans being found, in order to understand better the frequency with which this may occur.

Key references

Hall-Spencer, J.M., Pike, J. & Munn, C.B. 2007. Diseases affect cold-water corals too: *Eunicella verrucosa* (Cnidaria: Gorgonacea) necrosis in SW England. *Diseases of Aquatic Organisms* 76: 87-97.

Hiscock, K. 1975. The marine fauna of Lundy: Coelenterata. *Annual Report of the Lundy Field Society* 25: 20-32.

Irving, R.A., Holt, R. & Moss, D. 1995. Selected reports from the Marine Conservation Society diving working party to Lundy, 3-10 June 1995. *Annual Report of the Lundy Field Society* 46: 54-65.

Lindsley-Leake, S. 2004. *Report on the associated fauna of* Eunicella verrucosa. Unpublished report to English Nature by the University of Plymouth.

Pikesley, S.K., Godley, B., Latham, H., Richardson, P.B., Robson, L.M., Solandt, J-L, Trundle, C., Wood, C. & Witt, M.J. 2016. Pink sea fans (*Eunicella verrucosa*) as indicators of the spatial efficacy of Marine Protected Areas in southwest UK coastal waters. *Marine Policy* 64: 38-45.

Wood, C. 2003. *Pink Sea Fan Survey, 2001/2*. Unpublished Marine Conservation Society report.

3.2.5 Axinellid sponges

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation
No Take Zone

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

The collective term 'axinellid sponges' refers to erect, branching sponges belonging to the family Axinellidae. It is particularly species of the genus *Axinella*, together with *Homaxinella subdola* (a suberitid sponge), that are of concern.

Large numbers of branching sponges (of various species) occur in the subtidal around Lundy. Most species are found off the sheltered east coast on silty boulders and bedrock from about 11-15m depth (BCD), particularly in the vicinity of Quarry Bay, Gull Rock and, to a lesser extent, Brazen Ward. As part of the NCC's marine monitoring programme from 1984 to 1990, individually identified sponges were re-photographed at Quarry Bay. The results of this monitoring showed the growth rates of individual sponges to be very slow (even with shrinkage being apparent in some years) and that some sponges were 'lost' after strong easterly gales in 1986. A later study found the density of all branching sponges in an area just south of Gull Rock (at 13-15m BCD) to average 21.1 individuals/10m^2. It is thought that, in the event of a disaster happening to individuals or to the population of branching sponges as a whole, recovery to current levels would be unlikely. This view is based on the absence of *A. dissimilis* and *H. subdola* from wrecks and other 'new' substrata: they do not seem to colonise readily.

Associated species

Axinella dissimilis – typically bright yellow in colour, consisting of thick branches approximately 1.5cm in diameter, arising from a thicker base and growing to about 25cm tall. The larger sponges in the photo above are of this species. Widespread and often common at locations all around Lundy. (Earlier studies have mistakenly recorded this species as *A. polypoides*).

Axinella infundibuliformis – pale cream/buff in colour. Variable in shape but usually cup-like with a short, thick stalk. Grows to about 8cm above the substratum. Only found off the east coast.

Axinella damicornis - bright yellow in colour. A small (typically up to 8cm tall) erect sponge with a short (hidden) stalk. The branches are compressed and 'webbed' together. Occurs at a few locations all around the island. Nationally scarce.

Stelligera stuposa – a dull-yellow coloured, erect-branching sponge which grows to 10cm tall. Several branches will make up a colony. Present all around the island but most frequently off the east coast.

Raspailia hispida – a yellow branching-erect sponge in which the branches rarely fuse. Individuals may grow to a height of 15cm. Present all around the island, though particularly off the east coast.

Raspailia ramosa – a chocolate brown coloured branching-erect sponge, growing to a height of about 15cm. Present all around the island, though particularly off the east coast.

Homaxinella subdola – a pale to brownish yellow branching-erect sponge which may grow to 15cm tall. Widespread at locations around Lundy, within the same habitat at *A. dissimilis*.

Haliclona oculata – a yellow branching-erect sponge that is probably fast-growing and may be short-lived. Only found occasionally off the south and east coasts of Lundy.

Adreus fascicularis – a pale yellow branching-erect sponge growing to 15cm tall that lives attached to rock under a covering of coarse sand. Only found off the south coast of Lundy. Nationally scarce.

Associated habitats

Circalittoral (deep) bedrock and boulders (below 10m depth BCD), affected by weak to moderate tidal streams.

Conservation status

The branches of many axinellid sponge species will tear and break off if bent more than 90°. They are therefore susceptible to being damaged by both shellfish pots (which may fall on top of them) or by anchors and their chains (which may rip them from their attachment sites). A number of the species listed above are nationally scarce (see Annexes Ai & Aii). If 'lost', they would be unlikely to recover.

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P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain and support the diversity and abundance of axinellid sponges at Lundy

- The anchor exclusion zones being proposed to help protect pink sea fans at the Quarries, Gull Rock, Brazen Ward, Battery Point and Gannets' Rock, will also help protect axinellid sponges, as they are found in similar situations
- Support research into axinellid sponges at Lundy

Current positive initiatives at Lundy

- 100m anchor exclusion zone around the Knoll Pins helps to protect the axinellid sponges located on these pinnacles
- Prohibition of fishing activity within the No Take Zone and the use of mobile fishing gear within 200m of reef habitats helps to protect axinellid sponges within the MPA

Key pressures at Lundy

- Damage through potting activity

- Damage and disturbance by anchoring and anchor drag (recreational vessels and ships)

Further research and monitoring

At present there are no plans to investigate Lundy's branching sponges further.

Key references

Fowler, S.L. & Laffoley, D. 1993. Stability in Mediterranean-Atlantic sessile epifaunal communities at the northern limits of their range. *Journal of Experimental Marine Biology and Ecology* 172: 109-127.

Fowler, S.L. & Pilley, G M. 1992. *Report on the Lundy and Isles of Scilly marine monitoring programmes, 1984-1991*. Unpublished report to English Nature, Peterborough, by The Nature Conservation Bureau Ltd.

Hiscock, K. (ed.) 1984. *Sublittoral monitoring at Lundy, July 28th – August 4th 1984*. Field Studies Council, Oil Pollution Research Unit, Pembroke. Unpublished report to the Nature Conservancy Council, Peterborough.

Hiscock, K., Stone, S.M.K. & George, J.D. 1983. The marine fauna of Lundy: Porifera. *Annual Report of the Lundy Field Society* 34: 16-35.

Irving, R.A. & Northen, K.O. 2004. *Report of the MCS Working Parties to Lundy, 1997-2001*. Unpublished report to English Nature (Devon).

3.2.6 Crawfish/spiny lobster *Palinurus elephas*

Key organisations:
Devon and Severn IFCA
Natural England

Protective measure(s):
Marine and Coastal Access Act 2009 – FOCI species of MCZ
Species of Principal Importance (NERC Act, 2006)
Wildlife and Countryside Act 1981

Key management documents:

Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

North Devon has an historic fishing community which for centuries has fished the waters around Lundy for a number of commercially valuable species including crawfish. During the 1960s and '70s, the crawfish population was overfished by both local fishermen and divers from which the population is only just beginning to show signs of recovery. Local fishermen were aware of the decline in numbers and had ceased taking crawfish from Lundy a number of years ago in order to allow the stocks to recover.

Associated habitats

Rocky reefs of the circalittoral zone.

Conservation status

This species has a range that extends from Norway to Morocco and throughout the Mediterranean. Around the British Isles, crawfish are found around all western coasts, as far east as Dorset along the English Channel, and as far south on the east coast as the Firth of Tay in Scotland. The species is commercially exploited throughout its range and has declined by 30-50% over the past 27 years (three generation lengths). It is currently listed as vulnerable on the IUCN Red List of Threatened Species. The UK population is considered to be in decline across the whole of the south-west. However, the species is not currently listed as scarce or rare in the UK.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain and support recovery of the population of crawfish at Lundy

- Encourage divers to engage with the crawfish survey to gain a greater understanding of the population
- Inspire more local fishermen to become involved in the wider south-west crawfish survey
- Support research into the life history and ecology of crawfish

Current positive initiatives at Lundy

- Designated feature of Lundy's Marine Conservation Zone
- Taking of individuals from Lundy's Marine Conservation Zone is prohibited through a Devon and Severn IFCA byelaw
- Stocks at Lundy are being monitored by Devon and Severn IFCA to learn more about their ecology. This involves tagging or V-notching individuals.
- Divers are able to participate in a crawfish survey run by the island's Conservation Team

Key pressures at Lundy

- Illegal collection by divers
- Lack of understanding regarding their life history and ecology

Further research and monitoring

Expand the population monitoring research through increased engagement with the tagging project.

Key references

Goñi, R. 2014. *Palinurus elephas*. The IUCN Red List of Threatened Species 2014: e.T169975A1281221. http://dx.doi.org/10.2305/IUCN.uk.2014-1.RLTS.T169975A1281221.en

Hunter, E. 1999. Biology of the European spiny lobster *Palinurus elephas* (Fabricius, 1787) (Decapoda: Palinuridae). *Crustaceana* 72: 545-565.

3.2.7 Red band fish *Cepola macropthalma*

Key organisations:
Natural England
Marine Management Organisation

Protective measure(s):
N/A

Key management documents:
N/A

Overview

Red band fish live in burrows formed within a muddy-gravel seabed normally in depths of 70-200m. The population at Lundy is of interest as they are found at relatively shallow depths off the east coast, thereby representing an opportunity for the species to be studied. In the 1970s these fish were abundant at Lundy, with an estimate of the total population being around 14,000 individuals. However by the early 1980s, the population had crashed to just a few individuals and none were found during extensive searches from 1984-1986. In 1987 however, a small group of fifteen burrows (not all occupied by fish) was found in about 17m of water to the north-east of Quarry Beach. Small numbers of red band fish have been seen occasionally during most subsequent years, though it is thought the population remains very small.

Associated species

Burrows may be connected with those of certain burrowing crabs and shrimps.

Associated habitats

Muddy-gravel sediments.

Conservation status

Red Band Fish occur throughout the north-eastern Atlantic, from NW Africa and the Mediterranean as far north as the Orkney Islands. Within the British Isles they occur in the English Channel, around the south-west peninsula and up the west coast to Scotland. Whilst not uncommon, the species is most unusual in its shallow habitat at Lundy and in the history of its study. Note that, since the two reference papers listed here were published, its name has changed from *Cepola rubescens* to *C. macropthalma*.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable

boulder communities; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P7 To promote, encourage and report research which will help the achievement of objectives 1- 6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Establish monitoring for the presence and abundance of red band fish

- Raise awareness of this species at Lundy
- Encourage local dive groups to undertake regular surveys (once trained) of the population
- Develop a more informed understanding of its presence and abundance at Lundy

Current positive initiatives at Lundy

- The restrictions of the No Take Zone provide some protection to the habitat of the red band fish off the east coast

Key pressures at Lundy

- Habitat damage through anchoring and anchor drag (particularly of recreational vessels)
- Illegal angling within the No Take Zone

Further research and monitoring

The presence of this species within shallow waters presents a rare opportunity to study its behaviour, social structure and ecology. Therefore, any opportunities to do so should be taken.

Key references

Atkinson, R.J.A., Pullin, R.S.V. & Dipper, F.A. 1977. Studies of the red band fish *Cepola rubescens.* *Journal of Zoology* 182: 369-384.

Irving, R.A. 1989. Searches for the red band fish *Cepola rubescens* at Lundy 1984-1988. *Annual Report of the Lundy Field Society* 40: 53-59.

3.2.8 Basking shark *Cetorhinus maximus*

Key organisations:
Shark Trust
Marine Conservation Society
MARINElife

Protective measure(s):
Wildlife and Countryside Act 1981 (Schedule 5 listing, 1998)
Countryside and Rights of Way Act (CROW) 2000

Key management documents:
MARINElife survey reports

Overview

The basking shark is the second largest fish in the world, growing to a maximum length of 12m and weighing up to 4 tonnes. It has a particularly large mouth which is held wide open whilst the shark swims slowly through surface waters. Plankton is filtered from the water column by means of the gill rakers and every so often the mouth closes to allow the caught plankton to be swallowed. Basking sharks are found throughout the world but tend to favour temperate or sub-polar waters. They rely on their sense of smell to detect food and can filter around 1,500-2,000 cubic meters of water per hour. Little is known of their reproductive behaviour but it is thought they have a low fecundity. Life expectancy is about 50 years.

Basking sharks are usually recorded from the island each year (typically between May and July), often being sighted in the Landing Bay. The numbers seen in any one year vary considerably ranging from one to over thirty. Their distributional movements coincide with that of their planktivorous prey (particularly calanoid copepods).

Associated species

Basking sharks feed on plankton, including crustaceans (especially copepods), fish larvae and eggs, and invertebrate larvae, concentrated in the upper few metres of the water column.

Associated habitats

In summer basking sharks tend to be found in coastal waters, while in winter they are thought to travel offshore though remain on the continental shelf.

Conservation status

Basking shark numbers have declined considerably over the past 20-30 years and as a consequence, the NE Atlantic population of this species was listed in 2005 as being 'endangered' on the IUCN Red List. Historically they have been fished for their oil, liver, cartilage and fins. They are now the most widely protected and managed shark species in British and EU waters. In English waters, they are protected under Schedule 5 of the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way (CROW) Act 2000.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support basking sharks traversing Lundy's Marine Protected Area

- Raise awareness and promote good practice of sustainable marine wildlife watching through appropriate interpretation, media coverage and through maintaining strong links with local operators.
- Continue to work in collaboration with other charities and wildlife groups to raise awareness of visiting basking sharks to North Devon waters and the threats posed to them

Current positive initiatives at Lundy

- Collaboration between Lundy and UNESCO North Devon Biosphere Reserve for a local Wildlife Safari Operators Accreditation Scheme promoting responsible boat operations within North Devon
- Lundy's collaboration with MARINElife provides good opportunities to record sightings of basking sharks and to raise awareness with the general public
- Visitors to the island are encouraged to record sightings of basking sharks in the appropriate wildlife logbook in the Tavern. Such sightings, if verified, are then published in the Lundy Field Society's Annual Report

Key pressures at Lundy

- Increasing wildlife tourism operations and commercial boat traffic
- Marine litter, including nets, leading to entanglements

Further research and monitoring

There are no specific initiatives to study basking sharks at Lundy, largely due to the unpredictability of their appearances each year. However, tagging studies have been undertaken elsewhere in the south-west.

Key references

Fowler, S. L. 2005. *Cetorhinus maximus*. The IUCN Red List of Threatened Species 2005: e.T4292A10763893. http://dx.doi.org/10.2305/IUCN.UK.2005.RLTS.T4292A10763893.en.

MARINElife survey reports (2011 onwards). Sighting reports. [Online] Available: http://www.marinelife.org.uk/ilfracombe-or-bideford-lundy

Sims, D.W. 2008. Sieving a living: A review of the biology, ecology and conservation status of the plankton-feeding basking shark *Cetorhinus maximus*. *Advances in Marine Biology* 54: 171-220.

See also The Basking Shark Project run by the Shark Trust (www.sharktrust.org/en/basking_shark_the_project)

Lundy Field Society Annual Reports – available on-line at www.lundy.org.uk/publications/indintro.html

3.2.9 Common dolphin *Delphinus delphis*, harbour porpoise *Phocoena phocoena* and bottlenose dolphin *Tursiops truncatus.*

Common dolphins

Key organisations:
MARINElife
Whale and Dolphin Conservation Society

Protective measure(s):
Wildlife and Countryside Act 1981 (Schedule 5 listing, 1998)
Countryside and Rights of Way Act (CROW) 2000

Key management documents:
MARINElife survey reports

Overview

A variety of cetacean species have been recorded at Lundy. The most commonly seen around the island, and on the journey across from the mainland, are harbour porpoise *Phocoena phocoena* and common dolphin *Delphinus delphis*. Bottlenose dolphin *Tursiops truncatus* and Minke whale *Balaenoptera acutorostrata* are also occasionally spotted, mainly off the west coast. Other species such as Risso's dolphin *Grampus griseus* and long-finned pilot whale *Globicephala melas* are relatively rare, tend to be seasonal and may be linked to the movement of their main prey, cuttlefish. The most unusual cetacean record for Lundy in recent years was the stranding of a pygmy sperm whale *Kogia breviceps* on Ladies Beach in January 1997.

Whilst little is known about breeding, nurturing and feeding areas used by many cetaceans, it is understood that there is an important breeding area for harbour porpoise within the Bristol Channel approaches close to the island. Young porpoises and young dolphins are often seen within pods of small cetaceans moving around the island. [Note that there is currently (2016) a consultation in process regarding the designation of a very large SAC (Bristol Channel Approaches SAC) between north Cornwall and south Wales, with harbour porpoise as its sole feature. Lundy will be included within this SAC if it is designated].

Associated species

Many sightings of dolphins and porpoises coincide with large numbers of feeding gannets. Other species of cetacean have been recorded locally such as killer whales *Orcinus orca*.

Associated habitats

Coastal and deeper pelagic waters.

Conservation status

Common dolphins, harbour porpoises and bottlenose dolphins are widespread and abundant across their range. In the UK, common dolphin, harbour porpoise and minke whale are protected through their listing on Annex 5 of the Wildlife & Countryside Act 1981; and all three species are listed as

Species of Principal Importance. All of these species share common threats including reduced prey availability, incidental capture by fishing gear, increased pollution within coastal waters, habitat degradation and increased direct and indirect disturbance.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain or increase populations of species that are listed as 'designated taxa' (including those that qualify but are not yet listed), together with species that are of moderate to high sensitivity to pressures that occur around Lundy which result from human activities.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support cetaceans traversing Lundy's Marine Protected Area

- Raise awareness and promote good practice of sustainable marine wildlife watching through appropriate interpretation, media coverage and through maintaining strong links with local operators.
- Continue to work in collaboration with NGOs and wildlife groups to raise awareness of visiting cetaceans to North Devon waters and the threats posed to them

Current positive initiatives at Lundy

- Collaboration between Lundy and UNESCO North Devon Biosphere Reserve for a local Wildlife Safari Operators Accreditation Scheme promoting responsible boat operations within North Devon
- Research projects looking into the use of Lundy waters by cetaceans have provided some understanding of their movements around the island
- Lundy's collaboration with MARINElife has provided numerous opportunities to record sightings of these species (particularly on *Oldenburg* crossings to/from the mainland) and to raise awareness with the general public
- Visitors to the island are encouraged to record sightings of cetaceans in the appropriate wildlife logbook in the Tavern. Such sightings, if verified, are then published in the Lundy Field Society's Annual Report
- Data from two C-pods (passive acoustic monitoring detectors) have been collected for a number of years and used by students to investigate the use of Lundy waters by cetaceans

Key pressures at Lundy

- Increasing wildlife tourism operations
- Marine litter, including nets, leading to entanglements
- Potential disturbance from renewable energy developments (surrounding unprotected waters), particularly that of underwater noise

- Water pollution, particularly presence of PCBs that can bio-accumulate

Further research and monitoring

Two cetacean detector devices (C-pods) have been used in recent years to collect data on cetaceans using Lundy waters around the south end and east coast. This provides opportunities for universities to undertake further research into the species visiting Lundy and their movements around the island.

Key references

MARINElife survey reports (2011 onwards). Sighting reports. [Online] Available: http://www.marinelife.org.uk/ilfracombe-or-bideford-lundy

Mellor, J. 2014. *Understanding the habitat preferences of cetaceans and seabirds using the coastal waters of Lundy Island*. MSc dissertation for the University of Plymouth, Plymouth.

Squires, N., Hodgson Ball, K., Bennett, K., Votier, S. & Ingram, S. 2014. Using passive acoustics and shore-based surveys to investigate the occurrence of small odentocetes in nearshore waters around Lundy. *Journal of the Lundy Field Society* 4: 39-56.

Two bottlenose dolphins *Tursiops truncatus*

Three harbour porpoises *Phocoena phocoena*

3.2.10 Manx shearwater *Puffinus puffinus*

Key organisations:
RSPB
Natural England

Protective measure(s):
Site of Special Scientific Interest

Key management documents:
Natural England (2012) *Higher Level Stewardship*

Overview

Lundy's Manx shearwaters undertake extraordinary trans-equatorial migrations twice per year, spending the non-breeding season (approximately Oct–Feb) in the food-rich South Atlantic, off the coasts of Brazil, Uruguay and Argentina, before returning to the NE Atlantic, to breed during the northern summer (Mar–Sep). Being vulnerable to predators on land, they nest in underground burrows, come ashore only at night and generally occur well offshore during daylight hours, where they may form large feeding flocks or 'rafts' of resting birds. Adults forage both locally and much further afield from the island (>100 km would not be unusual) when rearing their single chick, depending on seasonal factors, such as food availability and weather. Along with other ground-nesting species, Manx shearwaters are particularly vulnerable to human-introduced predators such as rats, which readily take both eggs and chicks. Studies indicated that the formerly high density of rats on Lundy was preventing successful rearing of young shearwaters, meaning that the colony was small and not self-sustaining, being dependent for its survival on immigration of 'surplus' birds from other islands. In 2002, the Lundy Seabird Recovery project (a partnership between Natural England, RSPB, National Trust and Landmark Trust) began the eradication of the island's black and brown rat populations. Since Lundy's 'rat free' status was confirmed in 2004, the island's Manx shearwater population has responded rapidly, growing to approximately 3,500 pairs by 2013. There are strong indications from the annual ringing of chicks that numbers are continuing to rise. The four-yearly breeding seabird censuses, the next due in 2017, will continue to monitor the progress of Lundy's shearwaters.

Associated species

Herrings, sardines and sprats. Sometimes they share burrow systems with puffins.

Associated habitats

Steep slopes of remote rocky islands.

Conservation status

The UK's breeding Manx shearwaters are confined to islands off the west coasts of England, Wales and Scotland, with major colonies at Skomer, Skokholm and Rum. The last national seabird census in 2000 estimated the number of Manx shearwaters in the UK at around 300,000 pairs. These birds are classed as having an Amber conservation status in the UK (see Annex Ai) as their breeding range is restricted to a limited number of breeding sites.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support recovery of the Manx shearwater population at Lundy

- Ensure that Lundy remains rat-free through the implementation of the Rat Biosecurity Plan
- Support the ongoing Manx shearwater ringing project to learn more about the population
- Continue four-yearly burrow surveys to allow informed assessments of the population's status
- Encourage the consideration of a Special Protection Area (or post Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)
- Ensure that data collected through ringing surveys and GPS tracking are used to inform offshore developments within the wider Bristol Channel area which could impact foraging areas
- Raise awareness of the species through visitor engagement events and interpretative media
- Consider options for the protection of Manx shearwaters whilst at sea, within the boundaries of the Marine Protected Area

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004, allowing Lundy to be declared rat-free in 2006
- Thirty artificial Manx shearwater nestboxes were installed on the west coast of Lundy in 2016
- A group of Lundy Field Society bird ringers are running a long-term ringing study to monitor population trends and recruitment of Lundy-hatched chicks
- Full island seabird (including Manx shearwater) population censuses have been carried out every four to five years since 2001
- Four annual monitoring plots (established in 2014) are surveyed through a collaboration between RSPB and the island Warden to monitor population trends between major survey years
- Studies using GPS trackers have highlighted the migratory routes, breeding season foraging areas and wintering grounds used by the island's shearwater population (EGI and the University of Oxford)

- Rhododendron eradication works carried out either side of the breeding season to ensure that breeding colonies are not disturbed
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline to prevent disturbance
- The MPA Code of Conduct's 5kt speed restriction reduces disturbance to near-shore rafting birds

Key pressures at Lundy

- Vulnerable to any pollution, for example oil, on the surface of the water
- Disturbance whilst rafting on the sea by vessels and other watercraft, particularly jet-skis
- Sensitive to light pollution from larger vessels at anchor within the Landing Bay
- Breeding season coincides with peak tourist season which could increase disturbance and/or trampling of burrows
- No statutory protection when at sea
- Risk of rodent re-invasion

Further research and monitoring

Ongoing monitoring of the 30 artificial nestboxes located on the west coast of Lundy in support of the long-term population studies led by RSPB and the Lundy Field Society.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Booker, H. & Price, D. 2014. Manx shearwater recovery on Lundy: population and distribution change from 2001 to 2013. *Journal of the Lundy Field Society* 4: 105-116.

Freeman, R., Shoji, A., Fayet, A., Dean, B., Kirk, H., Perrins, C. & Guilford, T. 2012. Tracking the migration and foraging dynamics of Lundy's Manx shearwaters. *Annual Report of the Lundy Field Society* 62: 101-106.

3.2.11 Atlantic puffin *Fratercula arctica*

Key organisations:
Natural England
RSPB

Protective measure(s):
Site of Special Scientific Interest

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*

Overview

The puffin is one of the most numerous breeding seabirds in northern Europe. Although the largest colonies are found in Iceland and Norway, the British Isles hold about 10% of the world population. Lundy has long been famed for its puffins, and its name is widely believed to derive from 'puffin island' in old Norse. During the 19th century, Lundy's puffins and other breeding seabirds were exploited on an industrial scale for their meat, oil and plumage. The first published population estimate was of 3,500 birds in 1939, but numbers have declined considerably since, due mainly to predation of eggs and young by rats. The Lundy Seabird Recovery Project led to the complete eradication of rats from the island by 2006. At that time, the numbers of puffins seen at potential nesting sites had fallen to single digits. However, over the course of the last decade, the population has shown a slow but steady recovery, with puffins recolonizing the west coast of the island – a monitoring project in 2015 suggested that over 200 burrows were being used.

Associated species

Sandeels are the main prey species, though puffins will take other small fish when sandeel stocks are low. The steep sidelands used for nesting burrows bring puffins into close association with other breeding seabirds, principally auks, fulmars and gulls.

Associated habitats

Grassy slopes.

Conservation status

Puffins are migratory, burrow-nesting seabirds that return to the island to breed each spring after spending the winter out at sea, mainly in the North Atlantic. Changes to food availability (at least partly climate-related), alongside a range of other pressures, have resulted in population declines and a reduction in breeding range. This has led to the species' conservation status being raised to Red in the UK (see Annex Ai), reflecting a global status of 'Vulnerable' in the 2015 IUCN Red List of Threatened Species. The most recent UK-wide population estimate, published in 2004, was 580,799

apparently occupied burrows. Although the Lundy colony remains small, it is one of the most southerly in Europe.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support recovery of the puffin population at Lundy

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Continue annual productivity monitoring and carry out whole island population counts
- Raise awareness of the recovery of the puffin through guided walks and other visitor events
- Encourage the consideration of a Special Protection Area (or post-Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species], or 1% of the UK population of any one species)
- Continue to restrict access to the cliffs and sidelands during the breeding season
- Consider options for the protection of puffins, whilst at sea, within the boundaries of the Marine Protected Area

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Disturbance to breeding sites has been reduced through climbing restrictions enforced from 31st March to the end of the breeding season (normally 31st July)
- MOD No Fly Zone for military aircraft in operation from March to October to reduce disturbance during the breeding season
- Full-island seabird population censuses have been carried out every four to five years since 1981, though the timing and methodology of this survey does not provide complete coverage of the island's breeding puffins
- Annual productivity monitoring is carried out to determine annual breeding success at monitored sites
- Since the island was declared rat-free in 2006, annual peak counts of puffins have increased from 5 to 250 birds (2015)
- The 2015 Puffin Monitoring Project (sponsored by the wine company Banrock Station through the National Trust) provided equipment and funding for more detailed monitoring of the main colony at Jenny's Cove. This suggested that the breeding population may be larger than previously believed
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline

- Dogs are not permitted on Lundy to avoid disturbance to wildlife
- When properly observed, the 5-knot speed restriction stipulated in the MPA Code of Conduct reduces disturbance to near-shore rafting birds
- The island's Rat Biosecurity Plan, aimed at preventing re-invasion by rodents, was updated in 2016

Key pressures at Lundy

- Disturbance on land by over-zealous birdwatchers/photographers and visitors venturing too low down the sidelands/cliff slopes, particularly given that the breeding season coincides with peak visitation
- Disturbance whilst rafting at sea by vessels and other watercraft, particularly jet-skis
- Risk of rodent re-invasion

Further research and monitoring

There is a need for periodic, dedicated survey work if the size of Lundy's overall breeding population is to be reliably estimated, future trends monitored and effectiveness of management measures assessed.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

3.2.12 Razorbill *Alca torda*

Key organisations:
Natural England
RSPB

Protective measure(s):
Site of Special Scientific Interest

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*

Overview

Razorbills return to Lundy each spring to breed in scattered cliff-side colonies from the South End, around Shutter Point, along the West Side north to Long Roost and down the East Side as far south as Gannets' Rock, then more thinly to the Quarry Beach area. They frequently nest higher up the cliffs than guillemots, using crevices between granite blocks and boulders, but in places can be found alongside colonies of both guillemots and puffins.

Associated species

Guillemots (with which razorbills will share ledges), puffins and kittiwakes. Prey consists of fish, especially herrings, sprats and sandeels.

Associated habitats

Open ledges and boulder-strewn areas at the junction of cliffs and sidelands.

Conservation status

The UK's breeding population was estimated at 187,000 birds in the last national seabird census (1998-2002). The species has an Amber conservation status (see Appendix A) following declines in breeding numbers nationally and a contraction in its range. At Lundy the population increased from a low of 761 individual birds in 1986 to 1,324 birds in 2013, the highest level since breeding seabird censuses began in 1981. The absence of rats is likely to have been contributory factor.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support the razorbill population at Lundy

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Continue to carry out whole-island breeding seabird censuses every four years
- Establish productivity monitoring for a colony of razorbills
- Encourage the consideration of a Special Protection Area (or post Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)
- Consider options for the protection of razorbills, whilst at sea, within the boundaries of the Marine Protected Area

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Disturbance to breeding sites has been reduced through climbing restrictions enforced from 31st March to the end of the breeding season (normally 31st July)
- MOD No Fly Zone for military aircraft in operation from April to October to reduce disturbance during the breeding season
- The razorbill population has increased following the success to date of the Seabird Recovery Project
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- Whole-island seabird population censuses have been carried out every four to five years since 1981
- Dogs are not permitted on Lundy, to avoid disturbance to wildlife
- When properly observed, the 5-knot speed restriction stipulated in the MPA Code of Conduct reduces disturbance to near-shore rafting birds
- The island's Rat Biosecurity Plan, aimed at preventing re-invasion by rodents, was updated in 2016

Key pressures at Lundy

- Disturbance at nest sites caused by vessels coming in too close to the cliffs
- Disturbance whilst rafting on the sea by vessels and other watercraft, particularly jet-skis
- Marine pollution
- Declining fish stocks
- Risk of rodent re-invasion

Further research and monitoring

No research is currently being considered for Lundy's razorbill population, other than the species' inclusion in the four- to five-yearly breeding seabird censuses.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

3.2.13 Common guillemot *Uria aalge*

Key organisations:
RSPB
Natural England

Protective measure(s):
Site of Special Scientific Interest

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*

Overview

Guillemots are dispersive rather than truly migratory seabirds. After the breeding season ends in July, birds from Lundy move into the Irish Sea and English Channel, the North Sea as far as southern Norway, and the Atlantic seaboard of France and Spain, south to Portugal. They start to visit the breeding ledges again as early as October, although autumn/winter attendance is significantly influenced by prevailing weather conditions. The main breeding colonies on Lundy are located primarily from Jenny's Cove northward along the west side, with smaller colonies scattered elsewhere around the island's coastline.

Associated species

Razorbills (with which guillemots will share ledges), puffins and kittiwakes. Prey consists of fish, mainly sandeels and sprats.

Associated habitats

Ledges on sheer cliffs or rocky outcrops.

Conservation status

The UK breeding population was estimated at some 950,000 pairs in the 1998-2002 national seabird census. However, the species has an Amber conservation status (see Annex Ai) following declines in breeding and wintering numbers nationally and a contraction in its breeding and wintering ranges. Against the national trend, Lundy's guillemots increased from 2,096 birds in 1986 to 4,114 birds in 2013 (the year of the last whole-island breeding census). Annual monitoring at one site (2007 to present) has shown that fledging success has varied between 0.7 and less than 0.3 (where a success rate of 1 = the fledging of one chick per adult pair).

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support the guillemot population

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Continue to carry out whole-island breeding seabird censuses every four years
- Continue productivity monitoring at the St Mark's Stone colony of guillemots
- Encourage the consideration of a Special Protection Area (or post Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)
- Consider options for the protection of guillemots, whilst at sea, within the boundaries of the Marine Protected Area

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Disturbance to breeding sites has been reduced through Climbing Restrictions enforced from 31st March to the end of the breeding season (normally 31st July)
- MOD No Fly Zone for military aircraft in operation from April to October to reduce disturbance during the breeding season
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- Whole-island seabird population censuses have been carried out every four to five years since 1981
- Annual productivity monitoring is carried out to determine annual breeding success at the monitoring site
- Population has increased since the start of the Seabird Recovery Project
- Dogs are not permitted on Lundy, to avoid opportunities for disturbance
- When properly observed, the 5kt speed restriction stipulated in the MPA Code of Conduct reduces disturbance to near-shore rafting birds
- The island's Rat Biosecurity Plan, aimed at preventing re-invasion by rodents, was updated in 2016

Key pressures at Lundy

- Disturbance at nest sites caused by vessels coming in too close to the cliffs
- Disturbance, whilst birds are rafting on the sea, by vessels and other watercraft, including jet-skis
- Marine pollution
- Increased storminess affecting nest sites close to sea level

- Declining fish stocks
- Risk of rodent re-invasion

Further research and monitoring

No research is currently being considered for Lundy's guillemot population, other than the species' inclusion in the four- to five-yearly breeding seabird censuses.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

3.2.14 Black-legged kittiwake *Rissa tridactyla*

Key organisations:
Natural England
RSPB

Protective measure(s):
Site of Special Scientific Interest

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*

Overview

Kittiwakes nest on the sheer cliffs of Lundy's west side, in three colonies between Jenny's Cove and Long Roost, though former breeding sites included Kittiwake Gully and Puffin Gully at the North End, and smaller colonies on Gannets' Rock and the seaward side of Shutter Rock in the south-westernmost corner of the island. After breeding is completed in August birds are usually absent from the cliffs, dispersing widely into the Atlantic – south to the Canary Islands, west to Newfoundland and north to Greenland – and not returning until the following February or March. Large numbers are sometimes seen off the island during the autumn and winter, especially after stormy weather, but these are likely to be birds from colonies elsewhere in Britain and Europe.

Associated species

Nearby colonies of breeding guillemots and razorbills. Feeds mainly on sandeels and other small shoaling fish, and marine invertebrates.

Associated habitats

Ledges on sheer cliffs.

Status

Kittiwake populations are declining across the UK, the main factors appearing to be linked to changes in the marine environment, most notably changing prey abundance. Between 1986 and 2013 the Lundy population fell from 718 to 127 pairs (measured in apparently occupied nests). The decline is likely due to factors outside the control of island-based management – for example increased storminess, which affects nest sites close to sea level, and reduced food availability, also climate-related in large part. The UK breeding population was estimated during the last national seabird census (1998-2002) at around 378,000 apparently occupied nests. The species' UK conservation status is Red (see Annex Ai) owing to declines in its breeding and wintering populations, and breeding and wintering ranges.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide a suitable environment to support the kittiwake population at Lundy

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Carry out annual surveys to assess numbers of apparently occupied nests
- Continue annual productivity monitoring of the Aztec Zawn colony of kittiwakes
- Use the story of the kittiwake's decline to raise awareness of the impacts of climate change on marine food chains and seabird populations
- Encourage the consideration of a Special Protection Area (or post-Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Disturbance to breeding sites has been reduced through Climbing Restrictions enforced from 31st March to the end of the breeding season (normally 31st July). However, as kittiwake breeding extends into August, these restrictions may need extending.
- MOD No Fly Zone for military aircraft in operation from April to October to reduce disturbance during the breeding season
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- Full island seabird population censuses have been carried out every four to five years since 1981
- Annual productivity monitoring is carried out to determine annual breeding success at the Aztec Zawn colony
- The MPA Code of Conduct's 5kt speed restriction reduces disturbance to near-shore rafting birds

Key pressures at Lundy

- Disturbance to nest sites caused by vessels approaching too close to cliffs
- Disturbance whilst rafting on the sea by vessels and other watercraft
- Marine pollution
- Increased storminess affecting nest sites close to sea level
- Breeding season coincides with peak tourist season

Further research and monitoring

No additional research is currently being considered for the kittiwake colonies at Lundy.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

3.2.15 Storm petrel *Hydrobates pelagicus*

Key organisations:
Natural England
RSPB

Protective measure(s):
N/A

Key management documents:
N/A

Overview

Storm petrels are highly pelagic, coming to land only when breeding, and then only under cover of darkness. They arrive at colonies in May, rear only a single chick annually, and depart for waters as far south as South Africa in autumn. Nesting mainly in the Northern Isles and islands along the west coast of the UK, the species was long suspected to be breeding on Lundy but evidence was inconclusive until a well-grown chick (pictured above) was discovered during a Manx shearwater survey in October 2014. Given the large amount of available habitat on Lundy, the island's status as a rat-free environment, and the strong tendency of Storm Petrels to return to their natal areas, there is considerable potential for Lundy to become an important breeding site for this species.

Associated species

Prey consists of small fish, plankton and crustaceans picked from the surface of the sea.

Associated habitats

Crevices between or under rocks, burrows in soil, less commonly holes in stone walls.

Conservation status

The UK population of storm petrels was estimated at some 25,700 (apparently occupied sites) during the 1998-2002 national seabird census. A survey by the RSPB during the summer of 2016 suggests a Lundy population in the region of 10-100 individuals. The species has an Amber conservation status (see Appendix A) following recent declines in breeding and wintering numbers nationally and a contraction in its breeding and wintering ranges.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide an environment to allow the storm petrel colony to increase

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Undertake a full island survey to determine the extent of the population on Lundy
- Carry out a colour-ringing project to learn more about the Lundy population
- Raise awareness of the species through visitor engagement events and interpretative media
- Encourage the consideration of a Special Protection Area (or post Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)
- Consider listing Storm Petrel as a specifically designated feature under Lundy's Site of Special Scientific Interest designation to ensure that the recognition and protection afforded by SSSI status is applied appropriately to this species
- Encourage the inclusion of storm petrels within the four- to five-yearly breeding seabird census on Lundy

Current positive initiatives at Lundy

- The Seabird Recovery Project, which took place between 2002 and 2004, allowing Lundy to be declared rat-free in 2006, has provided a more suitable environment for colonisation by storm petrels
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- The RSPB is investigating suitable monitoring approaches for storm petrels at Lundy
- The island's Rat Biosecurity Plan, aimed at preventing re-invasion by rodents, was updated in 2016

Key pressures at Lundy

- Current lack of knowledge of the storm petrel population and its extent at Lundy
- Disturbance whilst rafting on the sea by vessels and other watercraft, including jet-skis
- Marine pollution
- Risk of rodent re-invasion

Further research and monitoring

There is scope for a full island survey to determine the size and extent of the Lundy population.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Taylor, A. 2014. Storm petrel: first confirmed breeding record for Lundy and Devon. *Annual Report of the Lundy Field Society* 64: 66-68.

3.2.16 Shag *Phalacrocorax aristotelis*

Key organisations:
RSPB

Protective measure(s):
N/A

Key management documents:

N/A

Overview

Shags are resident on Lundy, though most vacate the island in the winter months, returning mainly from mid-February. Early breeders, eggs being laid on average towards the end of April, they nest mainly in narrow clefts or underneath large rocks on the lower sections of cliffs virtually all around the island, with the main concentrations along the West Side at Goat Island, near Pyramid Rock and St Mark's Stone, and on the East Side around Tibbett's Point and below the quarries. Outside the breeding season they gather in small flocks on rocky outcrops close to water, especially on Mouse Island, Great Shutter Rock and at North-West Point. Ringing returns have shown that the shags that leave the island for the winter months stay in the Bristol Channel, along the south coasts of Cornwall and Devon, and the north-west coast of France. Their name simply means tufted, a reference to the crest they exhibit in the breeding season.

Associated species

Fulmars and gulls, among which Shags nest singly or in loose groups. Cormorants, which formerly bred on Lundy but are now passage migrants and winter visitors. Fish, mostly by diving from the surface.

Associated habitats

Coastal, rocky areas with nest sites well above sea level mostly in crevices or under overhangs.

Conservation status

While on Lundy apparently occupied nest sites increased from a low of 29 in 1981 to 112 in 2013 (perhaps benefiting from the eradication of rats), numbers of breeding Shags across the UK declined by an estimated 41% in the period 2000-2013, with declines also in the species' winter range. This has led to the species' UK conservation status being classed as Red (see Annex Ai).

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide an environment to allow the shag population to increase

- Ensure that Lundy remains rat free through the implementation of the Rat Biosecurity Plan
- Encourage the consideration of a Special Protection Area (or post-Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds [all species] or 1% of the UK population of any one species)
- Undertake research into the breeding success of the shag population on Lundy
- Consider listing Shag as a specifically designated feature under Lundy's Site of Special Scientific Interest designation to ensure that the recognition and protection afforded by SSSI status is applied appropriately to this species
- Minimise disturbance at, and close to, nest sites and where birds are loafing on rocks

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Breeding success among shags on Lundy has increased since the Seabird Recovery Project
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- Disturbance to breeding sites has been reduced through climbing restrictions enforced from 31st March to the end of the breeding season (normally 31st July)
- MOD No Fly Zone for military aircraft in operation from April to October to reduce disturbance during the breeding season
- Full island seabird population censuses have been carried out every four to five years since 1981
- The MPA Code of Conduct's 5-knot restriction reduces disturbance to birds loafing on rocks

Key pressures at Lundy

- Marine pollution
- Sensitive to disturbance at nest sites

Further research and monitoring

Given the current success of shags on Lundy, continue to monitor breeding numbers via the four- to five-yearly seabird censuses, and react with a specific species survey if a downward trend in breeding success becomes apparent.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

Whitaker, B. 1956. Results of shag ringing, 1948-55. *Annual Report of the Lundy Field Society* 10: 38-39.

3.2.17 Other breeding seabirds: fulmar *Fulmaris glacialis*, lesser black-backed gull *Larus fuscus*, great black-backed gull *Larus marinus* and herring gull *Larus argentatus*

Fulmar

Key organisations:
RSPB

Protective measure(s):
N/A

Key management documents:
N/A

Overview

Nationally, each of these four species is considered to be of conservation concern due to declines in their populations and breeding success. On Lundy, lesser black-backed, great black-backed and herring gull numbers have all fluctuated since the seabird breeding censuses began in 1981. In recent years the populations of lesser black-backed and herring gulls have declined considerably, the former decreasing from a peak of 444 pairs in 2004 to 242 pairs in 2013, and the latter decreasing from a peak of 1,117 pairs in 1986 to just 428 pairs in 2013. The population of great black-backed gulls has averaged around 50 pairs since the peak of 58 pairs in 2004. Fulmar numbers on Lundy increased from 185 apparently occupied nests in 1986 to 209 in 2013.

Associated species

Gulls are omnivorous scavengers, taking mostly animal material. Fulmars feed on crustaceans, squid, fish, offal and carrion mostly taken from the surface.

Associated habitats

Lesser black-backed and herring gulls nest singly or in small, sometimes mixed groups or larger colonies on grassy slopes or in areas of scattered rocks and boulders. Great black-backed gulls nest singly, preferring rocky promontories. Fulmars breed on seacliffs and rocky islands (e.g. Gannets' Rock), nesting on ledges, occasionally under overhangs and typically in loose groups or larger colonies.

Conservation status

Great black-backed gulls, lesser black-backed gulls and fulmars have an Amber conservation status (see Appendix A) due to declines in their UK breeding population and in their range. The severe decline of the herring gull breeding population in the UK has led to this species being assigned a Red conservation status. Declines are considered to be the result of a variety of environmental factors including reductions in the availability of prey.

Lundy Management Forum Policy

P3 To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Provide an environment to allow these breeding populations to be maintained

- Ensure that Lundy remains rat-free through the island's Rat Biosecurity Plan
- Stimulate interest in productivity monitoring and other research by volunteers and/or students
- Encourage the consideration of a Special Protection Area (or post-Brexit counterpart) designation based on the whole island seabird colony (threshold of 20,000 seabirds of all species)
- Consider listing these species under the Site of Special Scientific Interest designation to provide a level of protection
- Consider listing herring, lesser black-backed and great black-backed gulls and fulmar as specifically designated features under Lundy's Site of Special Scientific Interest designation to ensure that the recognition and protection afforded by SSSI status is applied appropriately to these species

Current positive initiatives at Lundy

- The Seabird Recovery Project took place between 2002 and 2004 allowing Lundy to be declared rat-free in 2006
- Disturbance to breeding sites has been reduced through Climbing Restrictions enforced from 31st March to the end of the breeding season (normally 31st July)
- MOD No Fly Zone for military aircraft in operation from April to October to reduce disturbance during the breeding season
- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators about considerate use of the Marine Protected Area and wider North Devon coastline
- Full island seabird breeding censuses are carried out every four to five years
- Dogs are not permitted on Lundy, to avoid disturbance to wildlife
- When properly observed, the 5-knot speed restriction stipulated in the MPA Code of Conduct reduces disturbance to near-shore rafting birds
- Studies into the behaviour of gull species have been and continue to be conducted by students from the University of Exeter

Key pressures at Lundy

- Lack of understanding regarding issues affecting these species
- Lack of protection through designations
- Disturbance whilst rafting at sea by vessels and other watercraft, particularly jet-skis

- Marine pollution
- Breeding season coincides with peak tourist season, increasing chances of disturbance, especially of herring and lesser black-backed gulls that nest (or formerly nested) on some of the more accessible sidelands
- Risk of rodent re-invasion

Further research and monitoring

Dedicated survey work would be advantageous in the case of species where continuing declines in breeding numbers are indicated by the four- to-five-yearly breeding seabird censuses.

Key references

Appleton, D., Booker, H., Bullock, D., Cordrey, L. & Sampson, B. 2006. The Seabird Recovery Project: Lundy Island. *Atlantic Seabirds* 8: 51-59.

Price, D., Slader, P. & Booker, H. 2013. Breeding cliff-nesting seabirds 2013. *Annual Report of the Lundy Field Society* 63: 85-92.

3.3 SPECIES OF INTEREST

3.3.1 European/common lobster *Homarus gammarus*

Key organisations:
Devon and Severn IFCA
Marine Management Organisation

Protective measure(s):
Devon and Severn IFCA Byelaws

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

The lobster fishery at Lundy has provided for local fishermen and islanders for many years. Stocks appear to be stable, with the population within the No Take Zone showing a considerable level of recovery that has led to a spill-over of individuals into the surrounding waters. Lobsters within the No Take Zone are able to grow older and as such show signs of old age, including scars from defending their territories and procuring suitable mates.

Associated species

European lobsters are known to compete with edible crabs for space and resources. Whilst they are mostly opportunistic scavengers they also prey on molluscs, crustaceans and polychaetes.

Associated habitats

Kelp forest, circalittoral bedrock and stable boulder habitats.

Conservation status

Overall stock levels in the south-west are classed as moderate by Cefas, with exploitation of females close to the Maximum Sustainable Yield (MSY) and slightly above the target MSY for males.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of Species of Principal Importance and those considered to be threatened with decline and sensitive to pressures from human activities at Lundy.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the population of lobster and its distribution around Lundy

- Encourage and support sustainable fishing practices
- Raise awareness of Devon and Severn IFCA permitting byelaws
- Continue lobster tagging research, where funding allows
- Inspire local fishermen to engage with the lobster tagging project by undertaking tagging of v-notched females

Current positive initiatives at Lundy

- The No Take Zone (established in 2003) provides an area of refuge for lobsters to allow recovery of the stock
- The No Take Zone saw a notable (seven fold) increase in the population of lobster in its first four years of existence
- Recreational diving and potting byelaws aim to control recreational collection
- Voluntary v-notching of berried females to allow them to breed for a number of years before collection
- Research into the lobster population of the No Take Zone through tagging has been ongoing for a number of years
- Devon and Severn IFCA have prohibited the landing of berried hens (females carrying eggs)

Key pressures at Lundy

- Regular harvesting
- Ghost fishing by abandoned pots
- Unlicensed and unmonitored catch by recreational divers - D&SIFCA permitting byelaw (2015) currently allows for a diver with an in-date permit to take up to two lobsters per day from all areas of the MPA apart from the No Take Zone, for his/her own consumption only

Further research and monitoring

No further research projects are currently being considered.

Key references

Hoskin, M.G., Coleman, R.C., Harris, R. & Hiscock, K. 2004. *Pilot work to refine sampling protocols for monitoring the Lundy Island fisheries no-take zone*. Unpublished report to English Nature, DEFRA and WWF-UK.

Hoskin, M.G., Coleman, R.A. & von Carlshausen, E. 2009. *Ecological effects of the Lundy No-Take Zone: the first five years (2003-2007)*. Unpublished report to Natural England, DEFRA and WWF-UK.

Hoskin, M.G., Coleman, R.A., von Carlshausen, E. & Davis, C.M. 2011. Variable population responses by large decapod crustaceans to the establishment of a temperate marine no-take zone. *Canadian Journal of Fisheries and Aquatic Sciences* 68(2): 185-200.

Wootton, E.C., Woolmer, A.P., Vogan, C.L., Pope, E.C., Hamilton, K.M. *et al*. 2013. Increased disease calls for a cost-benefits review of marine reserves. PLoS ONE 8(6). Available from: http://jounals.plos.org/plosone/article?id=10.1371/journal.pone.0051615. [This paper has a highly misleading title and in fact documents the increase in lobster numbers within the NTZ at Lundy].

3.3.2 Edible/brown crab *Cancer pagurus*

Key organisations:
Devon and Severn IFCA
Marine Management Organisation

Protective measure(s):
Devon and Severn IFCA Byelaws

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

The edible crab is found throughout the NE Atlantic, from Norway to Morocco. It is usually found on mixed coarse grounds, mud and sand from the shallow sublittoral to depths of about 100 metres. Edible crabs tend to hide buried in the substrate during the day and will forage at night. They may roam up to 50m from their hideouts. The population of edible crab at Lundy has been fished by local fishermen and islanders for many years. With current levels of potting continuing, stocks appear to be stable. The population within the No Take Zone showed an initial decline during the first five years due to competition with lobsters. However, there does not appear to have been any lasting effect on the overall population.

Associated species

While being an opportunistic scavenger, the edible crab will actively seek out crustaceans and molluscs as prey.

Associated habitats

Kelp forest, circalittoral bedrock and stable boulder habitats. It is frequently found inhabiting cracks and holes in rocks but occasionally also in open areas. Smaller specimens may be found under rocks on the shore, particularly the Devil's Kitchen.

Conservation status

The status of female stocks is good, with exploitation levels around the south-west considered by Cefas to be moderate. Recent changes to the minimum landing size will allow females to spawn more than once prior to capture. The very low landings for males presents a significant problem for assessment of exploitation levels and stock size.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp

forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of Species of Principal Importance and those considered to be threatened with decline and sensitive to pressures from human activities at Lundy.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain the population of edible crab and its distribution around Lundy

- Encourage and support sustainable fishing practices
- Raise awareness of Devon and Severn IFCA permitting byelaws

Current positive initiatives at Lundy

- The No Take Zone provides an area of refuge for edible crabs to allow recovery of the stock
- Recreational diving and potting byelaws aim to reduce recreational collection
- Devon and Severn IFCA have increased the landing size required for females and males, thereby allowing them to breed for longer

Key pressures at Lundy

- Regular harvesting
- Ghost fishing by abandoned pots
- Potential for disturbance of nursery habitats (rocky shore communities)
- Unlicensed and unmonitored catch by recreational divers - D&SIFCA permitting byelaw (2015) currently allows for a diver with an in-date permit to take up to three crabs (edible or spider) per day from all areas of the MPA apart from the No Take Zone, for his/her own consumption only

Further research and monitoring

There are currently no further research projects being considered.

Key references

Hoskin, M.G., Coleman, R.C., Harris, R. & Hiscock, K. 2004. *Pilot work to refine sampling protocols for monitoring the Lundy Island fisheries no-take zone*. Unpublished eport to English Nature, DEFRA and WWF-UK.

Hoskin, M.G., Coleman, R.A. & von Carlshausen, E. 2009. *Ecological effects of the Lundy No-Take Zone: the first five years (2003-2007)*. Unpublished report to Natural England, DEFRA and WWF-UK.

Hoskin, M.G., Coleman, R.A., von Carlshausen, E. & Davis, C.M. 2011. Variable population responses by large decapod crustaceans to the establishment of a temperate marine no-take zone. *Canadian Journal of Fisheries and Aquatic Sciences* 68(2): 185-200.

3.3.3 King scallop *Pecten maximus*

Key organisations:
Devon and Severn IFCA
Marine Management Organisation

Protective measure(s):
Devon and Severn IFCA Byelaws

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Within the confines of the MPA, scallops tend to be found on shelly sand areas of seabed off the island's east coast. The population forms a resource that has only recently been accessed by local fishermen and islanders. Fishing methods that use mobile gear (dredges) to access these stocks can damage and disturb the seabed communities where scallops are found and have devastated seabed areas in the past. Indeed, this was one of the main reasons for proposing the establishment of the voluntary MNR in 1971. Disappointingly, some such activity has occurred within the No Take Zone since it was established, although the area is now colonized by rich communities in what may have been previously disturbed sediments.

Associated species

Preyed upon by large crustaceans and starfish.

Associated habitats

Subtidal sandbanks, muddy gravel.

Conservation status

Since 2009, scallops have been the most valuable fishery to England, with a first sale value of £28.1 million in 2012 (Bell *et al*., 2014). No formal assessment of stocks in the Bristol Channel area has been carried out, although in recent years Cefas have been operating a stock assessment project called the Red Bag Scheme to provide data on the age of scallops being landed at English and Welsh ports (see Bell *et al*., 2014 for further information).

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of Species of Principal

Importance and those considered to be threatened with decline and sensitive to pressures from human activities at Lundy.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain and enhance the population of scallops and its distribution around Lundy

- Encourage and support sustainable fishing practices
- Raise awareness of Devon and Severn IFCA permitting byelaws

Current positive initiatives at Lundy

- Recreational diving and potting byelaws aim to reduce recreational collection
- The No Take Zone covers some of their habitat providing further protection from trawling activity
- Scalloping operations are limited within the majority of the Marine Conservation Zone

Key pressures at Lundy

- Accidental or deliberate breaches of regulations and byelaws by commercial fishing vessels
- Habitat disturbance by anchoring and anchor drag (recreational vessels and ships)
- Unlicensed and unmonitored catch by recreational divers - D&SIFCA permitting byelaw (2015) currently allows for a diver with an in-date permit to take up to fifteen scallops per day from all areas of the MPA apart from the No Take Zone, for his/her own consumption only

Further research and monitoring

No further research is currently being considered.

Key references

Hoskin, M.G., Coleman, R.C., Harris, R. & Hiscock, K. 2004. *Pilot work to refine sampling protocols for monitoring the Lundy Island fisheries no-take zone*. Unpublished report to English Nature, DEFRA and WWF-UK.

Hoskin, M.G., Coleman, R.A. & von Carlshausen, E. 2009. *Ecological effects of the Lundy No-Take Zone: the first five years (2003-2007)*. Unpublished report to Natural England, DEFRA and WWF-UK.

3.4 NON-NATIVE/INVASIVE SPECIES

3.4.1 Wireweed *Sargassum muticum*

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

Wireweed (formerly known as japweed) is a non-native species originally from Japanese and Chinese waters. It is able to colonize areas quickly due to its rapid growth rate and can displace native species by successfully competing for resources such as space and light. Wireweed was first discovered at Lundy in 1999 within a rockpool in the Landing Bay and has since spread along the east coast and elsewhere around the island. Likely sources of its introduction are from a plant attached to a vessel visiting the island, or via rafts of detached plants (often seen in the Landing Bay) that float over to Lundy.

Associated species

Other marine algae which this species may displace.

Associated habitats

Rockpools and kelp forests.

Conservation status

Currently, there appear to be no adverse impacts upon the algal communities at Lundy, although no specific studies to investigate potential impacts have been undertaken.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of Species of Principal Importance and those considered to be threatened with decline and sensitive to pressures from human activities at Lundy.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Monitor the spread of wireweed around the island

- Stimulate interest to monitor the extent of wireweed around Lundy by volunteers
- Maintain an interest in current research into the species and ways to mitigate its spread

Current positive initiatives at Lundy

- Individual plants are being removed from one area that is being voluntarily monitored, to assess the impacts of annual removal
- Rockpool community monitoring provides information on the changes in the presence and abundance of this species

Key pressures at Lundy

- Inadequate implementation of management scheme due to a lack of funding
- Impossible to prevent encroachment of this species within the Marine Protected Area

Further research and monitoring

The rocky shores around Lundy's south-east coast are already colonised by wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*. However the impact of both species intertidally does not appear to be as detrimental as was first feared. As significant uncertainty remains as to their impact, Natural England's Site Improvement Plan for Lundy (2014) recommends the following research:

- Investigate the degree of threat posed by invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata* which have already colonized; other species may be expected i.e. the Japanese kelp wakame *Undaria pinnatifida*.
- If there is found to be an issue with the invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*, investigate options to control these species reliably.

Footnote: various other non-native algae and invertebrate animals occur on the shores and in the subtidal at Lundy – see also section 3.1.1a).

Key references

MacDonald, R. 2013. *Report on the species composition of the rockpool communities of the Devil's Kitchen, Lundy: 1984-2013.* Unpublished report to Natural England.

Olabarria, C., Rodil, I.F., Incera, M. & Troncoso, J.S. 2009. Limited impact of *Sargassum muticum* on native algal assemblages from rocky intertidal shores. *Marine Environmental Research* 67: 153-158.

Reach, I. 2001. The occurrence of the non-native brown alga *Sargassum muticum* and the red alga *Asparagopsis armata* at Lundy. *Annual Report of the Lundy Field Society* 51: 113-115.

White, L.F. & Shurin, J.B. 2011. Density dependent effects of an exotic marine macroalga on native community diversity. *Journal of Experimental Marine Biology and Ecology* 405: 111-119.

3.4.2 Harpoon weed *Asparagopsis armata*

Key organisations:
Natural England

Protective measure(s):
Special Area of Conservation

Key management documents:
English Nature (2000) *Lundy EMS - Regulation 33 advice package*
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

Harpoon weed is named after its harpoon-shaped hooked fronds that provide a mechanism for this species to attach itself to other species. Lundy was the first site in the UK where this species was recorded in 1949, although this record was for the '*Falkenbergia*' (tetrasporophyte) stage of its lifecycle. It had probably arrived via mainland Europe or Ireland, although the species originates in the southern hemisphere (Australia/New Zealand). Interestingly, this species has mostly been present at the island in its harpoon weed (gametophyte) form since the early 2000s, and it is now a dominant feature of parts of the Landing Bay. Its introduction was most likely via a detached plant carried over via a vessel.

Associated species

Any alga to which it is able to attach (typically various bushy, red algal species).

Associated habitats

Rockpools and kelp forests.

Conservation status

Currently no adverse impacts have been noted upon the algal communities at Lundy, although no specific studies have investigated potential impacts.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; to maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; to maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; to maintain or increase populations of Species of Principal Importance and those considered to be threatened with decline and sensitive to pressures from human activities at Lundy.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Monitor the spread of harpoon weed

- Stimulate interest to monitor the extent of harpoon weed and the presence of the '*Falkenbergia'* stage around Lundy by volunteers
- Maintain an interest in current research into the species and ways to mitigate its spread

Current positive initiatives at Lundy

- Rockpool community monitoring provides information on changes to the presence and abundance of this species

Key pressures at Lundy

- Inadequate implementation of management scheme due to a lack of funding
- Impossible to prevent encroachment of this species within the Marine Protected Area

Further research and monitoring

The rocky shores around Lundy's south-east coast are already colonised by wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*, although the impact of both species intertidally does not appear to be as detrimental as was first feared. As significant uncertainty remains as to their impact, Natural England's Site Improvement Plan for Lundy (2014) recommends the following research:

- Investigate the degree of threat posed by invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata* which have already colonized; other species may be expected i.e. Devil's tongue Grateloupia turuturu and the Japanese kelp wakame *Undaria pinnatifida*.
- If there is found to be an issue with invasive non-native marine species wireweed *Sargassum muticum* and harpoon weed *Asparagopsis armata*, investigate options to control these species reliably.

Footnote: various other non-native algae and invertebrate animals occur on the shores and in the subtidal at Lundy – see also section 3.1.1a).

Further reading

Harvey, C.C. & Drew, K.M. 1949. Occurrence of *Falkenbergia* on the English coast. *Nature* 164: 542-543.

MacDonald, R. 2013. *Report on the species composition of the rockpool communities of the Devil's Kitchen, Lundy: 1984-2013.* Unpublished report to Natural England.

Reach, I. 2001. The occurrence of the non-native brown alga *Sargassum muticum* and the red alga *Asparagopsis armata* at Lundy. *Annual Report of the Lundy Field Society* 51: 113-115.

4.1 PROTECTED WRECK SITES

4.1.1 Gull Rock

Key organisations:
Historic England
The Lundy Company (licence holder)
Devon and Severn IFCA

Protective measure(s):
Protection of Wrecks Act 1973

Key documents:
Wessex Archaeology (2009) *Gull Rock Designated Site Assessment*

Overview

Very little is known about this site which consists of a scatter of objects from the 15th and 16th centuries, mainly of ordnance (iron guns and stone shot). There is no structure above the seabed but there is the possibility of one beneath. However, it is possible the artefacts may have been jettisoned from a vessel for some unknown reason. Based on the type of finds, it is believed that the site may be associated with a rare early Tudor warship. This makes the Gull Rock wreck of historical and archaeological significance, particularly when considering the technological implications of the change from 'clinker' to 'carvel' shipbuilding around this time. The site lies on a silty seabed at the base of a bedrock slope and it is possible that more of the wreck may be preserved beneath the seabed.

The site was first encountered in 1968 but it was not until 1983 that a pre-disturbance survey was carried out. Soon afterwards, four 6-inch stone cannonballs were raised from the site for identification purposes and these now reside in Greenock Museum near Glasgow. In 1989 the site was assessed as being of national importance by the Archaeological Diving Unit from St Andrews University and it was designated a protected wreck site shortly afterwards.

Associated species

Bedrock with dense turf of erect bryozoans and hydroids, a variety of sponges, red sea fingers *Alcyonium glomeratum*, pink sea fan *Eunicella verrucosa* and assorted sea squirts.

Associated habitats

Circalittoral bedrock abutting a plain of muddy shell gravel and sand.

Conservation status

The Gull Rock wreck site is considered to be of national archaeological significance due to the rarity of the objects discovered there. Designation under the Protection of Wrecks Act (1973) took place in 1989. However, recent surveys have shown the site to have deteriorated significantly since

designation, particularly as a result of illegal (unlicensed) diving and looting. For instance, there now remains just one of the fifteen stone cannonballs *in situ* and a breach loading gun has been removed.

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Protect the historical and natural features of conservation concern at the Gull Rock wreck site

- Survey the known site and the surrounding area to establish extent of the wreck
- Establish regular monitoring through collaborations with licensed dive groups and establish a Flickr group to which monitoring images could be uploaded

Current positive initiatives at Lundy

- Diving the wreck requires a licence which is administered by Historic England on behalf of the Department for Culture, Media and Sport
- Archaeological protection zone established at the wreck site - no anchoring or fishing allowed within a 100m radius around 51° 11.11'N, 04° 39.41'W.
- The site is located within the No Take Zone.

Key pressures at Lundy

- Lack of knowledge on the archaeological features of the wreck and the stability of the site
- Imprecise site location could mean that parts of the wreck are outside of the anchor exclusion zone
- Unauthorised access to the site
- Inadequate implementation of management scheme due to a lack of funding

Further research and monitoring

Historic England has suggested the following opportunities:

- Historical background and archival searches
- Regular site risk assessments in line with Historic England's Protected Wreck Sites at Risk Handbook

Key references

Daykin-Iliopoulous, P. & Cousins, T. 2013. *Gull Rock Wreck Site Survey Report.* Unpublished report by the Bournemouth Underwater Marine Archaeological Diving Society to the BSAC Jubilee Trust and MAST. [Online] Available: http://www.thisismast.org/downloads/Lundy-Report.pdf

Heath, J. 1993. Marine archaeologal fieldwork 1993: a pre-disturbance survey of the Gull Rock site. *Annual Report of the Lundy Field Society* 44: 52-55.

Irving, R.A., Holt, R. & Moss, D. 1995. Selected reports from the Marine Conservation Society's diving working party to Lundy, 3-10 June 1995. *Annual Report of the Lundy Field Society* 46: 54-65.

Wessex Archaeology. 2009. *Designated Site Assessment: Gull Rock, off Lundy Island, North Devon*. Archaeological Report to English Heritage, Portsmouth. [Online] Available: https://content.historicengland.org.uk/content/docs/listing/gullrockarchaeologicalreport2008.pdf

4.1.2 *Iona II*

Key organisations:
Historic England
The Lundy Company (licence holder)
Devon and Severn IFCA

Protective measure(s):
Protection of Wrecks Act 1973

Key documents:
Wessex Archaeology (2009) *Gull Rock Designated Site Assessment*

Overview

The *Iona II* was a luxurious paddle steamer built in 1863 by J & G Thomson Ltd at Govan, near Glasgow. She had been designed to ferry cargo and passengers around the Clyde basin but was sold less than a year later to a Confederate agent of the Southern States of America, to act as a blockade-runner during the American Civil War (1861-1865). However, the *Iona II* never reached America as at the start of her voyage across the Atlantic, she sank off the east coast of Lundy in February 1864.

The shipwreck was discovered in 1976, lying in about 20m of water approximately a mile off Tibbett's Point. The wreck sits upright on the seabed and it is thought that a large amount of the hull may survive buried in the seabed. The bow and stern sections of the vessel now lie mostly flush with the seabed although the boilers and paddle wheel crankshaft amidships stand approximately 1.5m above the seabed.

A new dive trail was created for the wreck site in 2013 by Wessex Archaeology (commissioned by Historic England). A booklet printed on waterproof paper informs the diver of artefacts they may come across on the wreck or the surrounding seabed. Divers are encouraged to take photographs from certain vantage points and upload them onto a website, thereby assisting with monitoring the condition of the wreck.

Associated species

As a 'living wreck' many different species can be found associated with it including oaten pipe hydroids, jewel anemones, bib, conger eels and nationally scarce pink sea fans.

Associated habitats

The wreck acts as an artificial reef creating a number of features that are available to be colonized by various species, all of which are of interest.

Conservation status

The wreck is of national importance due to its historical significance as a blockade-runner during the American Civil War. Designation under the Protection of Wrecks Act (1973) took place in 1989. In the

past, the wreck remains have been damaged by illegal diving, fishing activities and from anchors of dive boats trying to moor on the nearby wreck of the MV *Robert*. The condition of the wreck in 2008 was considered to be similar to that reported in 2004, with some slight deterioration of the more fragile elements of the site (Wessex Archaeology, 2009).

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Protect the historical and natural features of the *Iona II* wreck site

- Promote the *Iona II* Dive Trail and encourage underwater photographers to engage with monitoring of the wreck
- Use the monitoring information collected through the trail to inform future management
- Continue to support monitoring carried out by licensed dive groups

Current positive initiatives at Lundy

- Award winning Dive Trail (accompanied by web pages on the MPA website) opened in 2014 to promote monitoring of the historical and natural features of the wreck by visiting divers
- Diving the wreck requires a licence which is administered by Historic England on behalf of the Department for Culture, Media and Sport
- Corporate licence held by The Lundy Company under which dive boat skippers are able to join as 'additional licensees'
- Archaeological protection zone established at the wreck site - no anchoring or fishing allowed within a 50m radius around 51° 11.03'N, 04° 38.78'W

Key pressures at Lundy

- Unauthorised access by divers
- Illegal trawling activity
- Accidental damage by inexperienced divers

Further research and monitoring

Historic England has suggested the following:

- Historical background and archival searches
- Regular site risk assessments in line with Historic England's Protected Wreck Sites at Risk Handbook

Key references

Information on the history of the *Iona II* and the associated Dive Trail is available on the Lundy website: www.landmarktrust.org.uk/lundyisland/iona-ii-dive-trail

Historic England. 2015. *Protected Wreck Site: Iona II.* [Online] Available: https://historicengland.org.uk/listing/what-is-designation/protected-wreck-sites/wreck/iona-ii/

Irving, R.A., Holt, R. & Moss, D. 1995. Selected reports from the Marine Conservation Society's diving working party to Lundy, 3-10 June 1995. *Annual Report of the Lundy Field Society* 46: 54-65.

Wessex Archaeology. 2009. *Iona II (off Lundy Island, N. Devon). Designated Site Assessment: Archaeological Report*. Unpublished report to English Heritage, Eastney, Hampshire.

4.2 SCHEDULED MONUMENTS (COASTAL)

4.2.1 Brazen Ward

Key organisations:
Historic England
Natural England
National Trust
The Landmark Trust

Protective measure(s):
Ancient Monuments and Archaeological Areas Act 1979

Key documents:
Historic England (2015) *Heritage at Risk South West Register*
Natural England (2013) *Higher Level Stewardship Agreement for Lundy*

Overview

The 16th or 17th century gun battery at Brazen Ward was first scheduled in 1970. It remains largely intact. However, there has been some localised erosion due to its position on the end of a short rocky promontory on the east coast. The purpose of the battery was to prevent any landings in the area. The site is made up of two main structures with a possible powder store and stronghold with gun embrasure to the north and a small guardhouse built into the cliff to the south. The formation of the structures suggests that a single cannon was located close to the powder store and that the parapets to the east were most likely for muskets rather than acting as a platform for a cannon. This structure forms part of a series of coastal defences designed to defend the island.

Associated species

The rocky shore directly beneath the ruins is one of the main grey seal haul out sites and has an intertidal community of interest (part of the Special Area of Conservation intertidal biotope monitoring scheme).

Associated habitats

Maritime grassland.

Conservation status

Scheduled Monuments receive management to ensure that they are passed on to future generations in the same state as they are on the day that they were protected, with as little change as possible. Monuments designated as such are considered to be of national importance. According to Historic England's Heritage at Risk (2015) the site is considered to be at risk due to its vulnerability to coastal erosion. Its condition is assessed as being generally unsatisfactory with major localised problems with a declining trend.

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled Monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Preserve and promote Lundy's historic features

- Conserve, where practicable, the Civil War battery ruins at Brazen Ward
- Encourage learned groups to monitor Scheduled Monuments on Lundy
- Stimulate interest in Lundy's historic features through improved interpretation

Current positive initiatives at Lundy

- A collaborative venture between the National Trust, Lundy Field Society and the island authorities intends to produce a new archaeology guide in the near future
- Consolidation works are planned to conserve the site
- A volunteer Scheduled Monuments monitoring scheme is being developed with the Lundy Field Society

Key pressures at Lundy

- Deterioration in the condition of the site due to environmental factors
- Regular access by visitors and islanders for recreation leading to increased erosion

Further research and monitoring

Establish a full archaeological survey (& excavation?) with a local university to gain a full understanding of the site and its artefacts.

Key references

Gardner, K. 1972. The archaeology of Lundy – a field guide. Landmark Trust.

Historic England (2015) *Gun battery at Brazen Ward, Lundy.* [Online] Available: http://historicengland.org.uk/listing/the-list/list-entry/1016030

4.2.2 Upper and Lower Mangonel platforms

Key organisations:
Historic England
Natural England
National Trust
The Landmark Trust

Protective measure(s):
Ancient Monuments and Archaeological Areas Act 1979

Key documents:
Historic England (2015) *Heritage at Risk South West Register*
Natural England (2013) *Higher Level Stewardship Agreement for Lundy*

Overview

Listed as coastal defence platforms above Jenny's Cove, these two monuments were originally scheduled in 1970 and both overlook the most sheltered place to land on the west coast, known as the Pyramid, and the path leading from it to the top of the island. The upper (northern) platform measures 8m by 5.5m and is built back against a natural outcrop and has revetment walls of drystone on the north and west sides. The lower (southern) platform lies 50m to the south-west of the upper platform. It is square in shape (6m by 6m) and has the northern side built up with drystone granite walling and smaller walls on the south and west sides. It is believed the platforms may originally have been the location of one of William de Marisco's mangonels (13th century) and later musketeers, rather than canons, during the civil war. These structures form part of a series of coastal defences designed to defend the island.

Associated species

Sites are located within Jenny's Cove and are surrounded by seabird colonies but not inhabited by any.

Associated habitats

Maritime grassland.

Conservation status

Scheduled Monuments receive management to ensure that they are passed on to future generations in the same state as they are on the day that they were protected, with as little change as possible. Monuments designated as such are considered to be of national importance. No current condition status is given in Historic England's Heritage at Risk (2015) register.

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled Monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Preserve and promote Lundy's historic features

- Conserve, where practicable, the coastal defence platforms at Jenny's Cove
- Encourage learned groups to monitor Scheduled Monuments on Lundy
- Stimulate interest in Lundy's historic features through improved interpretation

Current positive initiatives at Lundy

- A collaborative venture between the National Trust, Lundy Field Society and the island authorities intends to produce a new archaeology guide in the near future
- A volunteer Scheduled Monuments monitoring scheme is being developed with the Lundy Field Society

Key pressures at Lundy

- Lack of awareness of existence of platforms leading to pressure from visitor access, particularly the upper platform

Further research and monitoring

No further research or monitoring is currently being considered.

Key References

Gardner, K. 1972. The archaeology of Lundy – a field guide. Landmark Trust.

Historic England (2015) *The northern of two coastal defence platforms above Jenny's Cove, Lundy* [Online] Available: http://historicengland.org.uk/listing/the-list/list-entry/1016032

Historic England (2015) *The southern of two coastal defence platforms above Jenny's Cove, Lundy* [Online] Available: http://historicengland.org.uk/listing/the-list/list-entry/1016033

4.2.3 The Quarries

Key organisations:
Historic England
Natural England
National Trust
The Landmark Trust

Protective measure(s):
Ancient Monuments and Archaeological Areas Act 1979

Key documents:
Historic England (2015) *Heritage at Risk South West Register*
Natural England (2013) *Higher Level Stewardship Agreement for Lundy*

Overview

The Quarries are located on the east sidelands and were operational commercially from 1863 to 1868 for the extraction of granite. The Quarries consists of five cliffside workings with spoil heaps, a terrace revetted by massive stone walls, a floor for a narrow-gauge horse-drawn railway (tracks are still visible), a dressing floor, two inclines to carry the machinery to lift and lower the stone from the workings to the landing beach, two buildings for stabling and storage, and a time hut for the staff to clock in and out of work.

Associated species

A colony of Manx shearwaters resides in the maritime grassland above the platform ruins.

Associated habitats

Maritime grassland, small scrub/woodland species

Conservation status

Scheduled Monuments receive management to ensure that they are passed on to future generations in the same state as they are on the day that they were protected, with as little change as possible. Monuments designated as such are considered to be of national importance. The Quarries at Lundy are considered to be an outstanding example of its class.

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled Monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Preserve and promote Lundy's historic features

- Conserve, where practicable, the quarry site and associated ruins
- Encourage learned groups to monitor Scheduled Monuments on Lundy
- Stimulate interest in Lundy's historic features through improved interpretation

Current positive initiatives at Lundy

- A collaborative venture between the National Trust, Lundy Field Society and the island authorities intends to produce a new archaeology guide in the near future
- A volunteer Scheduled Monuments monitoring scheme is being developed with the Lundy Field Society

Key pressures at Lundy

- Deterioration in the condition of the site due to environmental factors

Further research and monitoring

No further research or monitoring is currently being considered.

Key references

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Langham, AF. 1963-64. Lundy quarry railways. *Annual Report of the Lundy Field Society* 16: 26-28.

Ternstrom, M. 2005. Granite: a failed enterprise on Lundy 1864-1868. *Transactions of the Devonshire Association*, 137: 193-220.

Rothwell, P. 1999. The quarry complex on Lundy: some notes, observations and speculations. *Annual Report of the Lundy Field Society* 50: 70-93.

Rothwell, P & Ternstrom, M. 2008. *The Lundy Granite Company: An Industrial Adventure*. Westwell Publishing.

5.1 WATER QUALITY

Key organisations:
Natural England
Environment Agency

Protective measure(s):
Special Area of Conservation
Water Framework Directive

Key documents:
Natural England (2015)
Conservation Advice Package

Overview

Water quality is a measure of turbidity, nutrient levels, contaminant levels and pH. The water quality of the sea around Lundy is dependent upon many different variables that are influenced by natural forces such as the strong tidal cycle (up to 9m tidal range) and human impacts including discharges from boats and from the island. There are also aspects of water quality that permeate the seawater over a much wider area than just the MPA, such as nutrient levels (especially from agricultural run-off) and levels of contaminants. Gradual increases in sea water temperature over time (decades) are likely to play an important part in determining the extension/contraction of the ranges of various species. In addition, unexpected events, such as the rapid deterioration in health of Lundy's sea fans in the early 2000s, may well be influenced by high levels of nutrients whilst poor reproduction and recruitment of seabed species may be influenced by fluctuations in the availability of food (which is not related to water quality).

Associated species

All species.

Associated habitats

All habitats, particularly the rocky shore below Millcombe Valley where the island's waste water discharges.

Status

The Environment Agency does not undertake regular mandatory testing of water quality around Lundy due to the difficulty of obtaining reliable and representative readings. However, the island's Warden has been collecting sea temperature data at two sites: the jetty (shallow water) since 1998 and the MV *Robert* (deeper water) since 1997. Although the data do not form a continuous set over this period, they still provide a valuable insight into the fluctuations in sea temperature, particularly from season to season. Measuring the maximum depth limits of kelp and red foliose algae at the Knoll Pins (initially by means of an 'algal limits transect') was first undertaken in 1985 and has now

been subsumed into the SAC's subtidal reef monitoring programme. The purpose of the study was to provide some form of assessing integrated water clarity over a long period of time.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; To maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; To maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; To maintain or increase populations of Species of Principal Importance and nationally rare and/or scarce species, especially those listed in the IUCN Red list.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

Long-term aim and objective(s)

Maintain water quality which supports a healthy ecosystem and recreational activities

- Continue to support the collection of sea temperature data
- Stimulate interest in research into the movement of sediment plumes around the Bristol Channel and Lundy
- Research possible environmentally sensitive alternatives to septic tanks and French drain systems

Current positive initiatives at Lundy

- Sea temperature data have been collected at the MV *Robert* and at the jetty, since 1997

Key pressures at Lundy

- Increasing pressure on visitor infrastructure
- Increased recreational boats may result in an increase in direct sewage and ballast discharge

Further research and monitoring

- Continue to collect sea temperature data, ensure monitors are downloaded and replaced regularly. Long-term reliable datasets are extremely valuable!
- Continue to record the deepest depth of algae as a surrogate for overall turbidity levels
- Undertake measurements of contaminants in organisms and sediments
- Encourage [Bristol] Channel-wide surveys of nutrients and contaminants. [Measurements of contaminant levels in sediments and organisms may reflect the character of overlying water and be compared to other areas of coast to see if Lundy is more or less contaminated than other areas. Channel-wide sampling of nutrient levels on one cruise occasion could indicate whether Lundy is part of a gradient of nutrification and where it lies along the spectrum from what would be expected to be high nutrient levels in the upper Bristol Channel to very low levels in the open Atlantic]

Key references

Cole, S., Codling, I.D., Parr, W. & Zabel, T. 1999. Guidelines for managing water quality impacts within UK European marine sites [On-line]. *UK Marine SACs Project*. [Cited 26/01/16]. Available from: http://www.ukmarinesac.org.uk/pdfs/water_quality.pdf

Hiscock, K. 1986. *Marine biological monitoring at Lundy, July 27th to August 3rd, 1985*. Field Studies Council, Oil Pollution Research Unit, Pembroke. Unpublished report to the Nature Conservancy Council, Peterborough.

Hiscock, K. & Dymond, J.N. 1974. Sea water temperatures, 1972-1973. *Annual Report of the Lundy Field Society* 24: 40.

Irving, R.A. & Northern, K.O. 2004. *Report of the MCS Working Parties to Lundy, 1997-2001*. Unpublished report to English Nature (Exeter).

Jones, G.B. 1974. The occurrence of some trace metals in organisms collected from Lundy. *Annual Report of the Lundy Field Society* 25: 49-52.

Jones, G.B., Matharu, H.S. & Jones, R.E.H. 1973. Heavy metals in organisms and sediments from the east coast of Lundy. *Annual Report of the Lundy Field Society* 24: 36-39.

Willcox, N.A. 1988. Sea water temperatures, 1986 and 1987. *Annual Report of the Lundy Field Society* 38: 48-49.

Before the late 1990s, run-off from the island after heavy rainfall, could lead to a large sediment load in shallow waters. [Photograph taken from a postcard from the late 1980s]. Such events have been far less likely to occur since the concreting of the Beach Road.

5.2 POLLUTION AND MARINE LITTER

Key organisations:
Maritime Coastguard Agency
Devon County Council
Environment Agency
The Landmark Trust

Protective measure(s):
N/A

Key management documents:
Oil Pollution Contingency Plan

Overview

Marine litter and pollution is becoming an area of increasing concern and is receiving more media attention than ever, particularly regarding its impact on species such as marine turtles and seals. Lundy receives large amounts of floating marine litter, particularly after easterly winds which push such materials ashore onto accessible beaches, such as the Landing Bay. Pollution from oil and other substances is relatively rare. However the threat of a major pollution incident is always present due to the hazardous nature of the island and the volume of marine traffic in the area. The last pollution incident occurred in 1996 when oil from the Sea Empress spill in Pembrokeshire reached the shores of Lundy.

Affected species and habitats

Intertidal habitats, communities and species are at greatest risk from marine pollution and litter.

Conservation status

Marine litter and pollution is an international problem.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Ensure that the island remains as free from pollution and marine litter as is practicable

- Undertake regular beach cleans with volunteers
- Review methods of fuel transfer
- Raise awareness of marine litter and pollution, and its impact upon marine communities and species such as grey seals
- An agreed Oil Pollution Contingency Plan is in place

Current positive initiatives at Lundy

- Regular beach cleans carried out by volunteer working parties and the Conservation Team
- Local boat operators encouraged to remove marine litter whenever practicable
- Re-fuelling of vessels within Marine Protected Area is discouraged

Key pressures at Lundy

- Continuous (if irregular) supply of sea-borne litter onto shores, particularly from commercial fishing vessels
- Discarded tackle from recreational angling
- Irregular training for pollution management
- Pollution risk from transfer of fuel from MS *Oldenburg* into island bowsers
- Seals and seabirds become entangled within discarded nets and plastics

Further research and monitoring

No further research or monitoring is currently being considered.

Key references

Devon County Council. 2008. Coastal Pollution Plan, June 2008. Available for download at: http://www.devon.gov.uk/coastal_pollution_plan_june_2008.pdf

Marine Management Organisation. 2016. Marine Pollution Contingency Plan. (Latest update 18 May 2016). Available for download at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/523789/Marine_Pollution_Contingency_Plan_May_2016.pdf

6. PROMOTING LUNDY'S MARINE PROTECTED AREA

6.1 EDUCATIONAL ACCESS

Key organisations:
The Landmark Trust
Natural England
National Trust

Protective measure(s):
N/A

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*

Overview

Lundy's natural and historic resources provide a unique opportunity for various educational establishments to learn about the island's environment. The opportunity to immerse themselves within their local environment is invaluable to local school children. The island currently provides free outreach talks and Warden-led activities on the island, along with heavily discounted sailing tickets. Observing the environment is a key skill taught to these young explorers and this is also encouraged in older students through collaborations with an increasing number of colleges and universities.

The importance of Lundy's natural and historic resources is internationally recognised. Raising awareness of these with local students is invaluable as it provides them with a sense of ownership and enhances the future protection of the island. Currently around 11 schools visit each year, bringing around 400 children to the island during the sailing season.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Continue to support and enhance educational access at Lundy

- Continue to develop Lundy's educational access programme and resources
- Inspire educational visits through the development of a teacher engagement programme for outdoor activities
- Maintain relevant websites

Current positive initiatives at Lundy

- Outreach talks are available for school groups provided by volunteers
- On-island Warden-led activities are available for all educational and special interest groups
- New educational resources are being developed and currently include a Lundy Adventure Journal
- Reduced price tickets are available for school groups to encourage access to the island
- Plans to restore/redevelop St Helen's Church as the 'St Helen's Centre' include the incorporation of display and lecture areas and basic laboratory facilities

Key pressures at Lundy

- Lack of facilities for educational groups on wet-weather days

Further research and monitoring

Educational access by school groups is monitored through the island's Higher Level Stewardship Agreement with Natural England. However those groups that do not receive a Warden-led activity are excluded from this.

Key references

Fowler, S.L. 1993. *Interpretive Review of the Lundy Marine Nature Reserve*. Unpublished report to English Nature, Peterborough, by the Nature Conservation Bureau Ltd., Newbury. 57pp.

6.2 RESEARCH

Storm petrel survey using infrared cameras

Key organisations:
The Landmark Trust
Natural England
Historic England
Devon and Severn IFCA
RSPB & LFS

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest
Protection of Wrecks Act 1973
Ancient Monuments and Archaeological Areas Act 1979

Key management documents:
Natural England (2012) *Higher Level Stewardship Agreement*
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

The island's wealth of historic and natural features provides researchers with a wide range of subjects to study. Many formal and informal researchers visit the island each year, with a good proportion of those studying the island as part of a university or college course returning to the island to undertake studies of a more individual and personal interest. Each research project provides a further insight into the island allowing increased engagement, not only for the researcher, but also for general visitors.

Researchers of all ages come to Lundy to investigate areas in which they specialize and this has been encouraged since Martin Coles Harman first established The Lundy Field Society in 1946. People from all backgrounds and interests undertake projects on the island with support from the island Warden, who also undertakes a number of more formal research projects on behalf of Lundy Management Forum members. The Lundy Field Society Annual Reports and (since 2008) the Society's Journal provide an invaluable historical resource of research incorporating all aspects of the island's terrestrial and marine ecology, archaeology and geology, as well as a means for publishing current and future scientific studies.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems

Long-term aim and objective(s)

Continue to support and enhance research into the island's historic and natural resources

- Inspire and support individual and co-ordinated research initiatives
- Continue to support and mediate active research
- Maintain relevant websites

- Identify and seek support to undertake research projects that will inform management relevant to marine species and habitats

Current positive initiatives at Lundy

- Long-standing tradition of research into Lundy's natural and historical resources through the work of the Lundy Field Society, who also provide small grants to support further research
- The Lundy Field Society maintains a natural history logbook in the Tavern which is an invaluable source of information about what wildlife is currently being seen on and around the island. The logbook is available for visitors to make their own entries
- Research partnerships have been established with a number of universities and colleges to support research needs of the island
- Research Proposal Forms allow an understanding of research projects and support researchers through the necessary legislative process (where applicable)
- Our understanding of the island's resources is being developed each year through new and ongoing research projects. This information is then used to inform management and make it more effective.
- Reports and papers on research at Lundy are easily accessed online through the island's website and that of the Lundy Field Society. A library is also maintained on the island by the Lundy Field Society for their members.
- Plans for the restoration/redevelopment of St Helen's Church as the 'St Helen's Centre' include the incorporation of basic laboratory facilities

Key pressures at Lundy

- Pressure on the island Warden resource may impact level of support provided to researchers affecting future studies
- Lack of facilities for researchers
- Difficulties accessing funding for research

Further research and monitoring

There are numerous research projects underway (and that are proposed/initiated from time-to-time) on and around the island. These are monitored, and regulated, through the Research Proposal scheme which is run by the Warden.

Key references

This plan identifies areas of research that would inform management of activities that may affect marine features.

There are numerous papers and reports on aspects of marine natural history, almost entirely published by the Lundy Field Society, which should be referred to when any new research work is being planned.

6.3 VISITOR ENGAGEMENT

Key organisations:
The Landmark Trust

Protective measure(s):
N/A

Key management documents:
N/A

Overview

The demand for visitor engagement is increasing as visitors become more informed about their environment, creating a thirst for further knowledge. Guided walks and visitor talks are held throughout the year, more than once a week, to engage with new stayers and day trippers. During the summer season the very popular Snorkel Safaris take place generally more than once a week when the tides are appropriate (2-4m depth). Rockpool Rambles are put on around every two weeks on a low spring tide to allow plenty of time to explore the low shore.

Associated species

Those within rocky shore and kelp forest communities, seabirds and grey seals.

Associated habitats

The marine areas within which engagement of visitors takes place include the rocky shore, kelp forests and the shallow seabed in the Landing Bay, around Rat Island or in the Devil's Kitchen.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Promote sustainable tourism through engagement activities

- Continue to develop and co-ordinate annual events programme with the support of volunteers
- Work in collaboration with other charities and organisations to enhance the events programme
- Inspire volunteers to become members of a Lundy guide team
- Encourage a better understanding of Lundy's marine and terrestrial features
- Maintain an updated Lundy website
- Maintain an engaging and updated suite of leaflets and interpretation

- Ensure the impact of events on the natural and historical environment are considered and mitigated, where necessary
- Raise awareness of the island's rat-free status to support and promote the island's seabird recovery projects and others around the UK

Current positive initiatives at Lundy

- The Lundy website and that of the Lundy Field Society provide visitors with a wealth of information about the island and the MPA
- The bookshelves in the Tavern and the libraries in the holiday properties hold a range of identification guides and books that will help the visitor to appreciate what they may see during their stay
- Leaflets and other informative materials are available for purchase in the island's shop
- An annual visitor events programme delivers a range of activities to engage visitors of all ages
- The beach building visitor centre introduces visitors to the island and to the Marine Protected Area
- Equipment for snorkeling (as part of organized snorkel safaris) is available to visitors
- Members of the Lundy Field Society assist and lead events to support the Warden
- MARINElife Wildlife Officers are on board MS *Oldenburg* every Saturday throughout the summer season to inform visitors about marine wildlife and the island

Key pressures at Lundy

- Lack of funding affects the amount of engagement available
- Increased storminess of weather conditions limits some activities

Further research and monitoring

No research is currently being undertaken on the rates or impacts of visitor engagement on the island. The amount of visitor engagement provided through the island's Warden is monitored throughout the year to gauge the levels of demand and to inform management.

Key references

Fowler, S.L. 1993. *Interpretive Review of the Lundy Marine Nature Reserve*. Unpublished report to English Nature, Peterborough, by the Nature Conservation Bureau Ltd., Newbury. 57pp.

"*Lundy – an Island to Treasure*". 2001. Promotional 13 min. video for Lundy's Marine Nature Reserve, produced on behalf of English Nature and shown on board the MS *Oldenburg* during crossings to Lundy. Produced by Sea-Scope and filmed by Sue Daly.

6.4 MEDIA

Key organisations:
The Landmark Trust/ The Lundy Company
National Trust

Protective measure(s):
N/A

Key management documents:
N/A

Overview

Lundy's status as a hub for both natural and historical features attracts considerable media attention. TV programmes have focused on the seabird colonies, grey seal colony, Scheduled Monuments and the work of The Landmark Trust. Newspaper articles pick up on the latest news and incorporate the work being carried out on Lundy such as the recovery of the puffin population, which received considerable coverage after the news broke of the increase in status of the puffin on the IUCN Red List. Permission from the Warden/island manager is required before any media-related filming takes place on or around the island.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Seek and engage opportunities for raising public awareness of Lundy and the MPA

- Develop and maintain strong media links
- Maintain good relationships with local media
- Promote Lundy as a destination for sustainable tourism
- Ensure methods used to film are sensitive to the wildlife present at that time of year

Current positive initiatives at Lundy

- Two monthly articles are produced for local media: Letter from Lundy, Lundy Boarding
- Active social media pages engage wider audiences with the island and its wildlife
- Strong links have been developed with major broadcasters and presenters

Key pressures at Lundy

- Increasing use of drones for filming could impact wildlife on and around the island
- Lack of funding affecting Warden availability for those opportunities covering the natural environment

Further research and monitoring

There are no recommendations for research into the frequency of media or its impact upon the island and its economy. However media coverage is actively monitored and all on-island media must be approved via The Lundy Company.

Key references

7.1 ANGLING

Key organisations:
Devon and Severn IFCA
Marine Management Organisation

Protective measure(s):
Devon and Severn IFCA byelaw
Marine and Coastal Access Act 2009

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Sea angling is a favourite activity for many who take their holidays at the British coast. At Lundy, angling is most actively undertaken around the jetty area by staying visitors. However, there are also a number of fishing charters who visit the island that focus mostly on the west coast and on wreck sites. Many charters operate a catch-and-release policy or restrict the number of fish taken, to promote sustainability. Some islanders catch limited numbers of fish as a sustainable food resource. There are some concerns regarding the lack of environmental responsibility taken by some anglers who remove animals from the shore to use as bait and leave angling-related waste in the marine environment.

Targeted species

Bass, pollack, mackerel, cod, wrasse, small-spotted catshark (dogfish) and tope (a Species of Principal Importance). The first three species are those most commonly taken to be consumed.

Associated habitats

All habitats including wrecks, sand and rocky reefs.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Promote sustainable fishing practices at Lundy

- Update the angling section in the MPA's Code of Conduct as and when necessary
- Maintain strong relationships with local fishing charters and recreational anglers
- Provide interpretation to inform recreational anglers

- Promote the use of environmentally sensitive alternatives to live bait
- Stimulate interest in recording species and numbers caught

Current positive initiatives at Lundy

- The UK's first No Take Zone has been successfully established off the east coast
- The MPA's Zoning Scheme is actively promoted
- Minimum fish sizes are displayed in the Beach building and a ruler is attached to the jetty
- Limited numbers of Lundy caught fish can be sold in the Tavern restaurant on occasions to promote awareness and the sustainable use of resources
- EU regulations to protect bass stocks are enforced locally on both recreational and commercial fishermen

Key pressures at Lundy

- Breaches of the Zoning Scheme
- Species targeted and quantities taken are unrecorded
- Over-exploitation of some stocks e.g. bass
- This activity is currently unregulated although there is an angling section in the Code of Conduct
- Absence of enforcement agencies

Further research and monitoring

There is currently very little data available on the fish species present and their stocks around the island. Therefore, any research into this area, including the voluntary recording of catches, would assist with management of the fisheries in the future.

Key references

7.2 WATER SPORTS (INCLUDING SCUBA DIVING AND SWIMMING)

Key organisations:
The Landmark Trust
Natural England
Historic England

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest
Marine and Coastal Access Act 2009
Devon and Severn IFCA Byelaws

Key management documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws
Natural England (2015) *Conservation Advice Package*

Overview

The waters around Lundy have been actively explored since the 1960s when scuba diving became popular. Since then, scuba diving and other water sports have been increasing in popularity with many now available to the majority, despite the potentially dangerous conditions that occur around the island.

Associated species

All species found in the subtidal zone, particularly pink sea fans, cup corals, jewel anemones, grey seals, European lobster, scallops, crawfish and edible crabs.

Associated habitats

Kelp forests, circalittoral reef, wrecks.

Status

The present trend is for increasing use of the Marine Protected Area for recreational water sports, particularly for diving and snorkeling. Lundy is one of the best places in the UK for people to experience the spectacular marine life that the UK temperate waters have to offer.

Lundy Management Forum Policy

P2 To maintain the extent and quality of important archaeological sites i.e. Protected Wrecks and Scheduled monuments directly on the coast, and promote the conservation of these features through an integrated approach with the conservation of natural features.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance the understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Promote sustainable recreational use of the Marine Protected Area

- Stimulate interest in recording species seen
- Encourage visitors to behave in a considerate and environmentally sensitive manner
- Promote the 2015 D&SIFCA byelaws to conserve fish and shellfish stocks
- Promote engagement by divers with monitoring opportunities such as the crawfish survey
- Raise awareness of the importance of responsible diving practices such as good buoyancy and not touching marine organisms

Current positive initiatives at Lundy

- The spectacular marine environment is celebrated each year through the Splash In! underwater photography competition
- Dive charters operate safe and sustainable dive practices ensuring that divers abide by the island's codes of conduct
- *Iona II* Dive Trail established in 2014 to engage divers with the Historic Wreck and its marine life
- An LFS Logbook is available in the Tavern for recording unusual marine wildlife sightings, providing an opportunity to see what others have recorded. Plans are afoot (2017) to set up a Facebook page for divers to post underwater photographs of species.
- The Lundy Marine Protected Area Advisory Group provides a forum for concerns to be raised and brought to the attention of the Lundy Management Forum
- Local dive charters and dive clubs use the Marine Protected Area in a sustainable way and promote this to other users

Key pressures at Lundy

- Breaches to the MPA's Code of Conduct and irresponsible dive practices
- Disturbance of marine wildlife
- Disturbance to historic wreck sites
- Unlicensed taking of shellfish
- Inadequate implementation of management scheme due to a lack of funding

Further research and monitoring

Concerns regarding human impacts on the wildlife of Lundy have led to the following being recommended by Natural England in their Site Improvement Plan for Lundy (2014):

- Investigate the impacts of human interference and disturbance to grey seals (when under water) at Lundy

Key references

7.3 WATER CRAFT (INCLUDING BOATS, KAYAKS AND JET-SKIS)

Key organisations:
The Landmark Trust
Natural England

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest

Key management documents:
Natural England (2014) *Site Improvement Plan: Lundy*

Overview

Over the years, Lundy's remote location has helped to protect it from unsustainable use. However, new insurance regulations and increased interest in sea-going vessels have provided an increased opportunity for many more users to visit the island independently. The promotion of Lundy as a haven for wildlife is attracting more visitors, which has led to concerns regarding the behaviour of independent water craft owners who may not be aware of the sensitivity of Lundy's marine environment. In recent years, some have brought dogs to the island and there have been a few incidences of water craft exceding the 5kt speed limit around the island.

Associated species

Seabirds, seals and intertidal species.

Associated habitats

Kelp forests and rocky shore.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Encourage sustainable and considerate use of the Marine Protected Area

- Raise awareness of ways of using the Marine Protected Area in a considerate manner for the benefit of all users and wildlife
- Stimulate interest in users to become observers and record marine life sightings

Current positive initiatives at Lundy

- Moorings available at Gannets' Bay, Brazen Ward and in the Landing Bay.
- 5kt speed restriction introduced in 2014 has been well received

- Lundy and North Devon Biosphere Accreditation Scheme training has informed local boat operators of considerate use of the Marine Protected Area and wider North Devon coastline
- The Lundy Marine Protected Area Advisory Group provides a forum for concerns to be raised and brought to the attention of the Lundy Management Forum

Key pressures at Lundy

- Habitat disturbance and destruction caused by anchoring and anchor drag (recreational vessels and ships)
- Military marine vessels visit the island occasionally (Natural England permission required prior to land due to Special Area of Conservation)
- Inadequate implementation of management scheme due to a lack of funding
- Pollution risk from re-fuelling and from recreational boat discharges
- All watercraft have the potential to disturb wildlife particularly nesting/rafting seabirds and resting/hauled-out seals

Further research and monitoring

Due to concerns regarding human impacts, the following have been recommended in Natural England's Site Improvement Plan for Lundy (2014):

- Investigate the impacts of human interference and disturbance to grey seals at Lundy
- Look at the effects of recreational anchoring around the island, in particular its possible impact on the pink sea fan *Eunicella verrucosa*

Key References

The Landing Bay on a calm summer's day with numerous small craft at anchor

8.1 TOURISM

Key organisations:
The Landmark Trust
Natural England

Protective measure(s):
Special Area of Conservation
Site of Special Scientific Interest

Key management documents:
N/A

Overview

Currently 17,000-20,000 visitors come to Lundy each year, either as day-trippers or stayers using the 23 self-catering properties on the island. There is a delicate balance between visitor numbers and conservation as both are closely linked. Lundy's economy relies on the island being a tourist destination, as does that of the North Devon coastline, particularly at Ilfracombe and Bideford from where the island's cargo ship MS *Oldenburg* sails.

Species of interest

Those of particular interest include dolphins, seabirds and grey seals.

Habitats of interest

All those accessible on Lundy, both above and beneath the waves.

Lundy Management Forum Policy

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P5 To optimize the interpretation and education potential of Lundy to island visitors and users.

P6 To encourage informed and sympathetic recreational use.

Long-term aim and objective(s)

Encourage sustainable tourism to promote nature conservation and sustainable use of the environment

- Promote recycling
- Use low energy, environmentally sensitive products, goods and services whenever possible
- Promote Lundy as a destination for sustainable tourism
- Stimulate interest in visitors to engage them with their environment and raise awareness of key issues

- Raise awareness of the Lundy's rat-free status to promote and support the island's seabird recovery project and those in the rest of the UK

Activities undertaken

Many including birdwatching, climbing, scrambling, diving, snorkeling, swimming, kayaking, paddle-boarding and wildlife sea-safaris.

Current positive initiatives at Lundy

- Visitor events focused on engaging visitors (i.e. the general public) with their environment, making them aware of current conservation initiatives and issues
- Interpretative media are available to visitors in the form of displays, leaflets and books that describe marine life and conservation
- The Lundy Marine Protected Area Advisory Group provides a forum for concerns to be raised and brought to the attention of the Lundy Management Forum
- A sustainable recycling and waste management system has been established

Key pressures at Lundy

- Anchoring and anchor drag causes damage to habitats
- Increased visitor pressure on wildlife communities (terrestrial and marine)
- Increased risk of rat incursion with cruise ships and passenger/cargo vessels
- Increased risk of pollution through cargo handling and fuel transfer
- Increased pressure on island infrastructure

Further research and monitoring

There are no recommendations for research or formal monitoring of tourism at Lundy.

Key references

Marine life mural on display in the Beach Building

8.2 FISHERIES

Key organisations:
Devon and Severn IFCA
Marine Management Organisation

Protective measure(s):
Devon and Severn IFCA Byelaws
Marine and Coastal Access Act 2009

Key documents:
Devon and Severn IFCA Byelaw Booklet and Permitting Byelaws

Overview

Fishing has been a way of life for the coastal communities of North Devon for centuries. Lundy has been used as a model site to show how commercial fishing activities and marine conservation interests can work together. Historically, the waters around the island have been used as a shellfish fishery for European lobster, crawfish, edible crab and scallop. Low intensity fishing has traditionally been practised by islanders for recreational purposes and as an occasional food source. However, there is no maximum limit to the number of commercial pots (set by islanders and non-islanders alike) that can be set within the MPA.

All fishing activities around Lundy are overseen by the Devon and Severn Inshore Fisheries and Conservation Authority (D&SIFCA). Landing sizes for shellfish within the D&SIFCA District are currently (2017): lobster (>90mm carapace length); crawfish (>110mm carapace length); edible crab (>140mm for females; >160mm for males); and scallop (>100mm across broadest part of shell.

Conservation status

Nationally, Lundy is recognised as a 'flagship' site due to its history of conservation management schemes, particularly as it has been a first for many of its designations. It is worth taking note that the No Take Zone was established on nature conservation grounds in order to protect epifaunal species and not to provide a haven for shellfish species of commercial importance.

Associated habitats

All those outside of the No Take Zone.

Lundy Management Forum Policy

P1 To sustain and, where possible, enhance the character and range of natural habitats, communities and species within the MPA; To maintain the subtidal sandbanks, sea caves and grey seals within the Lundy SAC in favourable condition, taking account of natural change; To maintain the reefs within the Lundy SAC in favourable condition, taking account of natural change, with particular reference to rocky shores, kelp forests, vertical and overhanging circalittoral rock communities, and, circalittoral bedrock and stable boulder communities; To maintain or increase populations of Species of Principal Importance and nationally rare and/or scarce species, especially those listed in the IUCN Red list.

P4 To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.

P7 To promote, encourage and report research which will help the achievement of objectives 1-6 and advance understanding of marine and terrestrial ecosystems.

Long-term aim and objective(s)

Maintain sustainable use of Lundy's fisheries

- Maintain strong, positive relationships with local commercial fishermen
- Encourage environmentally sensitive fishing practices
- Undertake regular counts of pots set within the MPA in order to monitor fishing pressure

Current positive initiatives at Lundy

- The UK's first No Take Zone was successfully established off the east coast in 2003
- The Lundy MPA Zoning Scheme is actively promoted
- Angling and potting are the only permitted fishing activities within most of the MPA
- Spear fishing is prohibited throughout the MPA; trawling and netting are prohibited within most of the MPA; mobile benthic gear is not permitted to be used within 200m of reef habitats
- The taking of crawfish (spiny lobster) from the MPA is prohibited
- Research has been undertaken on the recovery of shellfish stocks within the No Take Zone
- Local fishermen are helping to assess the local crawfish population on behalf of Devon and Severn IFCA
- The Warden is able to pass on observations of any suspected fishing-related infringements directly to the Devon and Severn IFCA's enforcement team
- The Lundy MPA Advisory Group provides a forum for fishing-related concerns to be raised and brought to the attention of the Lundy Management Forum

Key pressures at Lundy

- Accidental or deliberate breaches of regulations and byelaws
- Absence of enforcement authorities
- Disturbance and damage to reef features through anchors, ropes and pots
- Potential to disturb ecological interactions by removal of predator species
- Fragility of funding to support research

Further research and monitoring

Opportunities for further research and monitoring of fisheries around Lundy are being considered by Devon and Severn IFCA.

Key references

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9. Glossary of terms and abbreviations used in the text

Bottom towed gear	Includes beam trawls, bottom otter trawls, bottom pair trawls and dredges. Bottom towed fishing gears are one of the most effective ways of catching fish and shellfish. However, their use can be harmful to the marine environment in two ways: firstly, the act of dragging heavy equipment over the seafloor can result in the destruction of the seabed habitat; and secondly, poor selectivity in these gears means that animals other than the fish being targeted may also be caught.
Demersal mobile gear	Demersal fishing takes place on or just above the sea floor for species which live mainly close to the bottom. The principle method of demersal fishing is by trawl (a type of mobile fishing gear). Within the Lundy MPA, the NE corner is designated by Devon & Severn IFCA as being a No Access Area to Demersal Mobile Gear (from 1st January 2014).
'Designated taxa'	Those species which qualify as Species of Conservation Interest or as Species of Principal Importance, or species which are nationally scarce or nationally rare.
FoCI	Features of Conservation Interest. Includes both Species and Habitats which are particularly threatened, rare or declining. A term created in 2010 specifically to focus the process used to identify Marine Conservation Zones in England and Wales. [See also HoPI and SoPI].
HoPI	Habitat of Principal Importance. Separate lists of these habitats have been drawn up by the UK's devolved administrations, in line with provisions set out in the Countryside and Rights of Way Act (2000), section 74. In England, the list (consisting of 56 habitats) is a requirement under the 'duty to conserve biodiversity' placed on public authorities under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. When included with Species of Principal Importance, these are collectively known as Features of Principal Importance (FoCI). [See also Annex 1]
Introduced (species)	This term includes non-established introductions ('aliens') and established non-native species, but excludes hybrid taxa derived from introductions ('derivatives').
IUCN	International Union for the Conservation of Nature. Amongst other matters, responsible for publishing the Red List of Threatened Species and Habitats.
MCZ	Marine Conservation Zone. A form of marine protected area within English and Welsh waters, designated under the Marine and Coastal Access Act (2009), with the aim of protecting nationally important rare or threatened habitats and species. By the end of 2016, there were 50 MCZs in English seas, with a further (final) tranche expected by the end of 2018. The Marine

	and Coastal Access Act (2009) provided for any existing MNR to be treated as an MCZ after 12 January 2010, so the MNR at Lundy then automatically became the Lundy MCZ.
MNR	Marine Nature Reserve. Lundy's MNR was designated in November 1986 under the Wildlife & Countryside Act (1981) and was the first MNR in the UK. It remained England's only MNR until the designation of the MCZ in 2010, which effectively replaced it.
MPA	Marine Protected Area. An 'umbrella' term for a protected area that includes some area of marine landscape or biodiversity, typically of particular importance. In the case of Lundy, the MPA encompasses various conservation designations, such as MCZ, SAC, NTZ and SSSI.
Nationally rare marine species	For marine conservation purposes is a species known to occur in 0.5% or less (eight or fewer) 10x10km squares containing sea within the three mile limit of territorial seas for Great Britain. [See also Annex 1].
Nationally scarce marine species	For marine conservation purposes, a species known to occur in 0.5-3.5% (nine to 55) of the 10x10km squares containing sea within the three mile limit of territorial seas for Great Britain. [See also Annex 1].
Non-native (species)	A species which has been introduced directly or indirectly by human agency (deliberate or otherwise) to an area where is has not occurred in recent times (about 5,000 years BP) and which is separate from and lies outside its natural geographical range. The species has become established in the wild and has self-maintaining populations. (Similar terms include 'alien species', 'introduced species', 'recent colonist', 'reintroduction' and 'translocation').
NTZ	No Take Zone. A No Take Zone is an area set aside by law where no extractive activity is allowed. An extractive activity is any action that removes or extracts any resource. In the case of Lundy, this was the first NTZ to be designated in the UK (in 2003) for nature conservation purposes. The NTZ was developed and agreed with local interest groups and was implemented through a fisheries byelaw (under Devon Sea Fisheries Committee powers).
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic, or OSPAR Convention, is the current legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic. It combines and updates the 1972 Oslo Convention on dumping waste at sea and the 1974 Paris Convention on land-based sources of marine pollution. Work carried out under the Convention is managed by the OSPAR Commission, which is made up of representatives of the Governments of 15 signatory nations.
Priority Marine Habitats/Species	A list of UK BAP priority species and habitats was originally created between 1995 and 1999. The list has been superceded by lists of SoPI and HoPI. See also 'UK BAP' entry.

Protected Wreck Site	The Protection of Wrecks Act (1973) allows the Government (through their agency Historic England) to designate a wreck to prevent uncontrolled interference. Designated sites are identified as being likely to contain the remains of a vessel or its contents, which are of historical, artistic or archaeological importance. There are currently 52 wrecks designated under the Act in England. At Lundy there are two Protected Wreck Sites: the Iona II (shipwreck) and the Gull Rock site (artefacts only).
SAC	Special Area of Conservation. An EU-wide protected site which in Lundy's case was designated on 1 April 2005 under the EC Habitats Directive (92/43/EEC), although it was originally proposed for site selection in 1996. The Lundy SAC covers an area of 3068.98ha and overlaps with the island's SSSI. The Lundy SAC has four qualifying features: Reefs; Submerged or partially submerged sea caves; Sandbanks which are slightly covered by sea water all the time; and Grey Seal *Halichoerus grypus*.
SoCC	Species of Conservation Concern. This unofficial category has been invented for the purposes of this Management Plan only and may include species covered by various protective measures.
SoPI	Species of Principal Importance. Separate lists of these species have been drawn up by the UK's devolved administrations, in line with provisions set out in the Countryside and Rights of Way Act (2000), section 74. In England, the list (consisting of 943 species) is a requirement under the 'duty to conserve biodiversity' placed on public authorities under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. When included with Habitats of Principal Importance, these are collectively known as Features of Principal Importance (FoCI). [See also Annex 1]
SSSI	Site of Special Scientific Interest. A legally recognised conservation designation denoting a protected area in Great Britain, which may be of biological, geological or physiographic importance. The Lundy SSSI was first notified in 1976 under the National Parks and Access to the Countryside Act 1949 and renotified in 1987 under Section 28 of the Wildlife & Countryside Act 1981. It covers 345ha of the island (the village and farm are excluded) and extends to low water mark (mean low water of spring tides) all around the island. However, the island's marine biological importance is not a designated feature of the SSSI. The notification states: "The intertidal area is small, but it is an integral part of a marine nature reserve of great interest surrounding the island".
UK BAP	UK Biodiversity Action Plan(s). May refer to either a particular priority habitat or a priority species. The full list contains 1150 species and 65 habitats (terrestrial & marine). The original lists of UK BAP Priority species and habitats were created between 1995 and 1999 and were subsequently updated in 2007. Following devolution and the creation of country-level biodiversity strategies, the UK BAP has now been superseded by the 'UK Post-2010 Biodiversity Framework' (published in 2012). BAP species and

habitats are now known as ‘Species of Principal Importance (SoPI)’ and ‘Habitats of Principle Importance (HoPI)’. There are many species at Lundy that are scarce or rare or threatened that are not listed within this species category

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Further information:

For further about the organisations represented on the Lundy Management Forum please see the following links:

- The Landmark Trust: http://www.landmarktrust.org.uk/about-us/
- National Trust: http://www.nationaltrust.org.uk/about-us
- Natural England: https://www.gov.uk/government/organisations/natural-england/about
- Environment Agency: https://www.gov.uk/government/organisations/environment-agency/about
- Devon and Severn IFCA: http://www.devonandsevernifca.gov.uk/
- Marine Management Organisation: https://www.gov.uk/government/organisations/marine-management-organisation/about
- Historic England: https://www.historicengland.org.uk/about/
- RSPB: https://ww2.rspb.org.uk/whatwedo/
- Lundy Field Society: https://www.lundy.org.uk

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10.5 Environmental Quality

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ANNEX AI – Conservation terms and how they relate to species included in this plan

Species name	Common name	Protected species		Species of Principal Importance	Species of Conservation Interest	Nationally rare species	Nationally scarce species	Recognised as a non-native species	Notes
		Wildlife & Countryside Act 1981	Conservation of Habitats & Species Regulations 2010 (EU Habitats Directive)	Section 41, Natural Environment & Rural Communities (NERC) Act 2006	Threatened, rare or declining species identified for MCZ identification purposes	NBN Gateway	NBN Gateway		
Seaweeds									
Antithamnionella spirographidis	a red alga							✓	
Asparagopsis armata	harpoon weed							✓	
Bonnemaisonia hamifera	hook weed							✓	
Colpomenia peregrine	oyster thief							✓	
Grateloupia turuturu	Devil's tongue weed							✓	
Sargassum muticum	wireweed							✓	
Invertebrates									
Aiptasia mutabilis	trumpet anemone						✓		
Austrominius modestus	Australasian barnacle							✓	
Axinella damicornis	a branching sponge						✓		
Balanophyllia regia	scarlet and gold star cup coral						✓		
Eunicella verrucosa	pink sea fan	✓		✓	✓				Nationally 'uncommon'
Haliclystus auricula	kaleidoscope jellyfish			✓	✓				
Leptopsammia pruvoti	sunset cup coral			✓		✓			
Lucernariopsis campanulata	a stalked jellyfish			✓	✓				
Nucella lapillus	dogwhelk				✓				
Palinurus elephas	European spiny lobster			✓	✓				
Parazoanthus anguicomus	white cluster anemone						✓		

Species name	Common name	Protected species		Species of Principal Importance	Species of Conservation Interest	Nationally rare species	Nationally scarce species	Recognised as a non-native species	Notes
Tritonia nilsodhneri	sea fan nudibranch			✓			✓		
Fishes									
Cetorhinus maximus	basking shark	✓		✓	✓				
Galeorhinus galeus	tope (shark)			✓	✓				
Prionace glauca	blue shark				✓				
Raja clavata	thornback ray				✓				
Raja undulata	undulate ray				✓				
Anguilla anguilla	common eel			✓	✓				
Balistes capriscus	grey triggerfish								Marine species of interes Lundy, as a 'vagrant'.
Lophius piscatorius	angler fish				✓				
Merlangius merlangus	whiting				✓				
Molva molva	ling				✓				
Pleuronectes platessa	plaice			✓	✓				
Scomber scombrus	(Atlantic) mackerel			✓	✓				
Solea solea	sole			✓	✓				
Marine mammals									
Balaenoptera acutorostrat	minke whale	✓		✓					
Delphinus delphis	short-beaked common dolphin	✓	✓	✓					
Globicephala melas	long-finned pilot whale	✓		✓	✓				
Grampus griseus	Risso's dolphin	✓		✓	✓				
Halichoerus grypus	grey seal		✓						Conservation of Seals Act
Phocoena platessa	harbour porpoise	✓	✓	✓	✓				
Tursiops truncatus	bottlenose dolphin	✓	✓	✓	✓				

Species name	Common name	Protected species		Species of Principal Importance	Species of Conservation Interest	UK Birds of Conservation Concern (4)- 2015 (3 categories)	IUCN Red Data List category	Notes
		Wildlife & Countryside Act 1981	Conservation of Habitats & Species Regulations 2010 (EU Habitats Directive)	Section 41, Natural Environment & Rural Communities (NERC) Act 2006	Threatened, rare or declining species identified for MCZ identification purposes	Red – the highest conservation priority, with species needing urgent action. Globally threatened species. Amber – on European Red List as Critically Endangered, Endangered or Vulnerable. Green – complete or near-complete recovery		
Seabirds								
Puffinus puffinus	Manx shearwater					Amber	Least concern	
Fratercula arctica	Atlantic puffin					Red	Vulnerable	
Alca torda	razorbill					Amber	Near-threatened	
Uria aalgae	common guillemot				✓	Amber	Least concern	
Rissa tridactyla	(black-legged) kittiwake				✓	Red	Least concern	
Hydrobates pelagicus	European storm petrel					Amber	Least concern	
Phalocrocorax aristotelis	shag					Red	Least concern	Continuing d in UK breedi populations
Larus fuscus	lesser black-backed gull					Amber	Least concern	
Larus marinus	great black-backed gull					Amber	Least concern	
Larus argentatus	herring gull					Red	Least concern	
Fulmarus glacialis	fulmar					Amber	Least concern	
Haematopus ostralegus	oystercatcher					Amber	Near-threatened	

ANNEX AII

Additional seabed species of conservation concern (that are present at Lundy but for which full descriptions have not been prepared)

Species that qualify as rare, scarce, in decline or threatened with decline (i.e. generally ones that are of high or moderate sensitivity to human activities) are identified as 'designated taxa' by the Joint Nature Conservation Committee and/or as Nationally Important Marine Features using criteria developed in 2002. Those species, excluding ones already mentioned in separate detailed sections, are listed below and their presence should be taken into account in management actions. Often, they are a component part of particular habitats and protecting those habitats will protect the species. They are species that particular attention should be paid to in survey and monitoring to assess their status. They are or include the species that were listed as of 'scientific interest' in Table 3 of the 2001 management plan. The seabed species are:

Species	Common name	Status*	Notes
Aglaophenia kirchenpaueri	a hydroid	NS	
Aiptasia mutabilis	trumpet anemone	NS	
Alcyonium glomeratum	red sea fingers	-	
Alcyonium hibernicum	pink sea fingers	NS	Referred to in earlier reports as *Parerythropodium coralloides*
Asterina phylactica	small cushion star	-	
Carpomitra costata	tassel weed: a brown seaweed	NS	
Caryophyllia inornata	southern cup coral	NS	
Dromia personata	sponge crab	NS	
Greilada elegans	blue spot seaslug		This sea slug was once frequent at Lundy but has not been seen anywhere in Britain since the mid/late 1980s but re-appearance is expected at some time
Haliclystus auricula	a stalked jellyfish	NS	SoPI & SoCI
Halcampoides purpureus	night anemone	NR	Burrows in sand/gravel, only emerging at night
Hoplangia durotrix	Weymouth carpet coral	NR	
Lucernariopsis campanulata	a stalked jellyfish	-	SoPI & SoCI
Mesacmaea mitchellii	policeman anemone	NS	
Padina pavonica	peacock's tail	NS	No longer occurs at Lundy. SoPI & SoCI
Parazoanthus anguicomus	white cluster anemone	NS	
Parazoanthus axinellae	yellow cluster anemone	-	
Schmitzia hiscockiana	lobed jelly weed: a red seaweed		These two species of *Smitzia* were once frequent on tide-swept cobble habitats at Lund but have not been seen anywhere in Britain since the mid/late 1980s - re-appearance is expected at some time
Schmitzia neopolitana	stringy jelly weed: a red seaweed		
Simnia hiscocki	sea fan false cowrie	(NR)	Currently ranks as 'nationally rare'. First described in 2011 and so is not yet on the rare species lists
Tethyspira spinosa	a sponge	NS	
Thia scutellata	a nut crab	NS	
Tritonia nilsodhneri	sea fan nudibranch	NS	
Zanardinia prototypus	penny weed: a brown seaweed	NS	Once frequent at Lundy and re-appearance is expected at some time

*Status: NR = Nationally rare; NS = Nationally scarce [see Glossary for definitions]

There are also historical and serendipitous records of the seaweed *Atractophora hypnoides*, seahorses and the sea fan anemone *Amphianthus dohrnii* that are not included as relevant to management plans.

ANNEX B – Lundy's MPA Code of Conduct

THE ZONING SCHEME AND NO TAKE ZONE APPLY TO EVERYONE. THESE ARE STRICTLY ENFORCED AND MUCH OF THE CODE OF CONDUCT IS UNDERPINNED BY LAW[1]. THIS CODE IS FOR EVERYONE WHO VISITS LUNDY TO ENSURE THAT THE MARINE LIFE IS PROTECTED FOR FUTURE GENERATIONS. PLEASE LOOK AFTER IT!

General – Applies to all visitors

- Do not disturb or remove any plant or animal within the MCZ & SSSI[2]
- Lundy is now a rat-free island. To keep it that way, please take ALL rubbish home with you – especially perishables and check your boats and bags for rats before arriving.
- Report all interesting or unusual sightings of marine wildlife or any archaeological finds to the Warden.
- Keep away from seals and their pups from 1st September to 30th November during the breeding season.
- NO marine life is to be removed from the No Take Zone

Rockpooling

- Please try to leave everything as you find it, always return rocks and seaweed as they were, these provide shelter, food and homes for wildlife.
- Do not collect animals or plants in buckets or use nets
- Surveys and scientific monitoring may require a consent (consult with Warden)

Diving and snorkelling

- Control buoyancy to avoid contact with marine life; be aware of the environment around you especially when taking photographs
- Try not to leave air bubbles in caves or overhangs
- Do not remove any items off any wrecks or any associated material on the seabed
- Gull Rock Wreck & Iona II are designated wreck sites: diving these without a licence is illegal [3]
- We do NOT encourage the taking of shellfish outside of the No Take Zone (NTZ). Should you wish to collect any shellfish, please be aware that new take limits have been in place since March 2015[4]. Please speak to the Warden to discuss our recommended take limits and for further information. Many charter boats operate a no take policy: the skipper's decision is final.
- Do not remove crawfish (spiny lobsters) from the reserve
- Spearfishing is not permitted anywhere [1]

Boating (all kinds - kayaks to charter boats)

- Keep to a distance of 100 m from nesting seabirds sites from 1st March to 1st August. Reduce speed to less than 5kts when 100m from seabird cliffs and rafting birds [5].
- Reduce speed to less than 5kts when 100m from basking sharks, seals and cetaceans (whales, dolphins and porpoises)[5] Do not change your course to approach them directly, let them come to you.
- Use an WiSe accredited operator when chartering[6]
- Use the visitors' mooring buoys as shown on the Zoning Scheme in Gannets' Bay, Brazen Ward and the Landing Bay.
- Avoid anchoring; if it is necessary, then anchor in less sensitive habitats such as the sandy seabed in the Landing Bay.

- Do not anchor or use shot lines within 100m of Knoll Pins
- Do not deploy any mooring. A licence is required for permanent moorings and permission for a temporary mooring is required from the Warden
- The speed limit in the Landing Bay is 5kts
- Do not place any pots in the Landing Bay - they will be removed.

Sea angling

- No fishing is allowed within the No Take Zone
- Catch and release all fish if not going to be used
- Release all wrasse species, tope, red band fish, bull huss and conger eels where they are caught.
- Use barbless hooks
- Avoid using a gaff
- Fish above the reef when fishing in reef areas, do not fish on the bottom to avoid entanglement
- Only retain sufficient fish for personal consumption and return all unwanted catch to the sea unharmed.
- Do not collect any bait from the intertidal area
- Fishing of any type is not permitted within the area of a designated wreck site
- Follow the National Federation of Sea Anglers (NFSA) 'Conservation Code for Sea Anglers' and abide by the 'Recommended Retention Size Limits'

For enquiries of further information contact the Warden on (01237) 431 831 or email warden@lundyisland.co.uk

Footnotes

[1]Please refer to http://www.devonandsevernifca.gov.uk/ for a full list of the byelaws connected with Lundy and the NTZ

[2]This does not apply to fish and shellfish as long as the rest of the COC is adhered to

[3]Licences for access are granted by Department for Culture, Media and Sport and administered by English Heritage

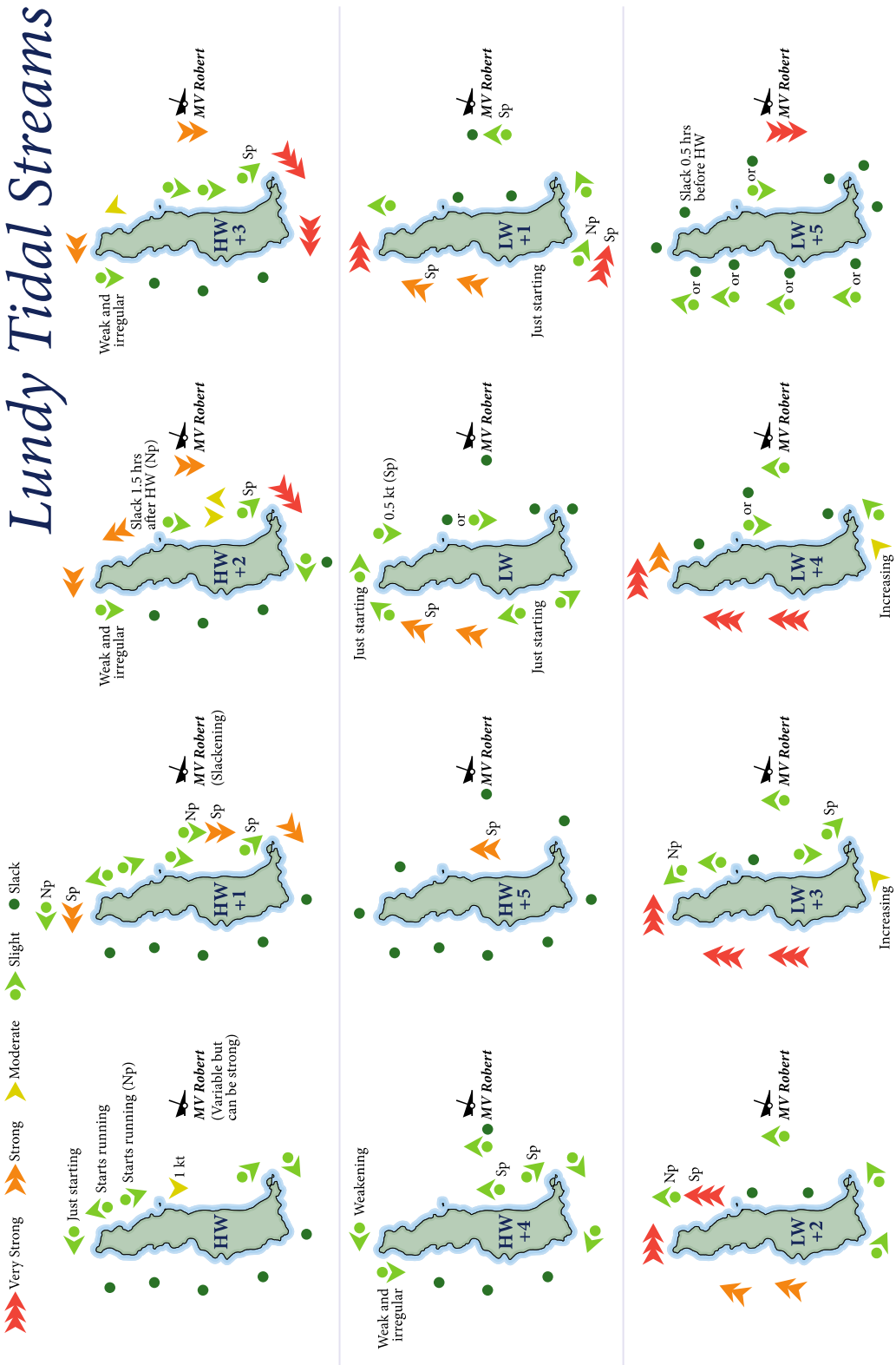
[4]All must be over the Minimum Landings Sizes (MLS) in Devon, it is illegal to remove berried or 'v' notched lobsters

[5]It is illegal to disturb or harass these animals

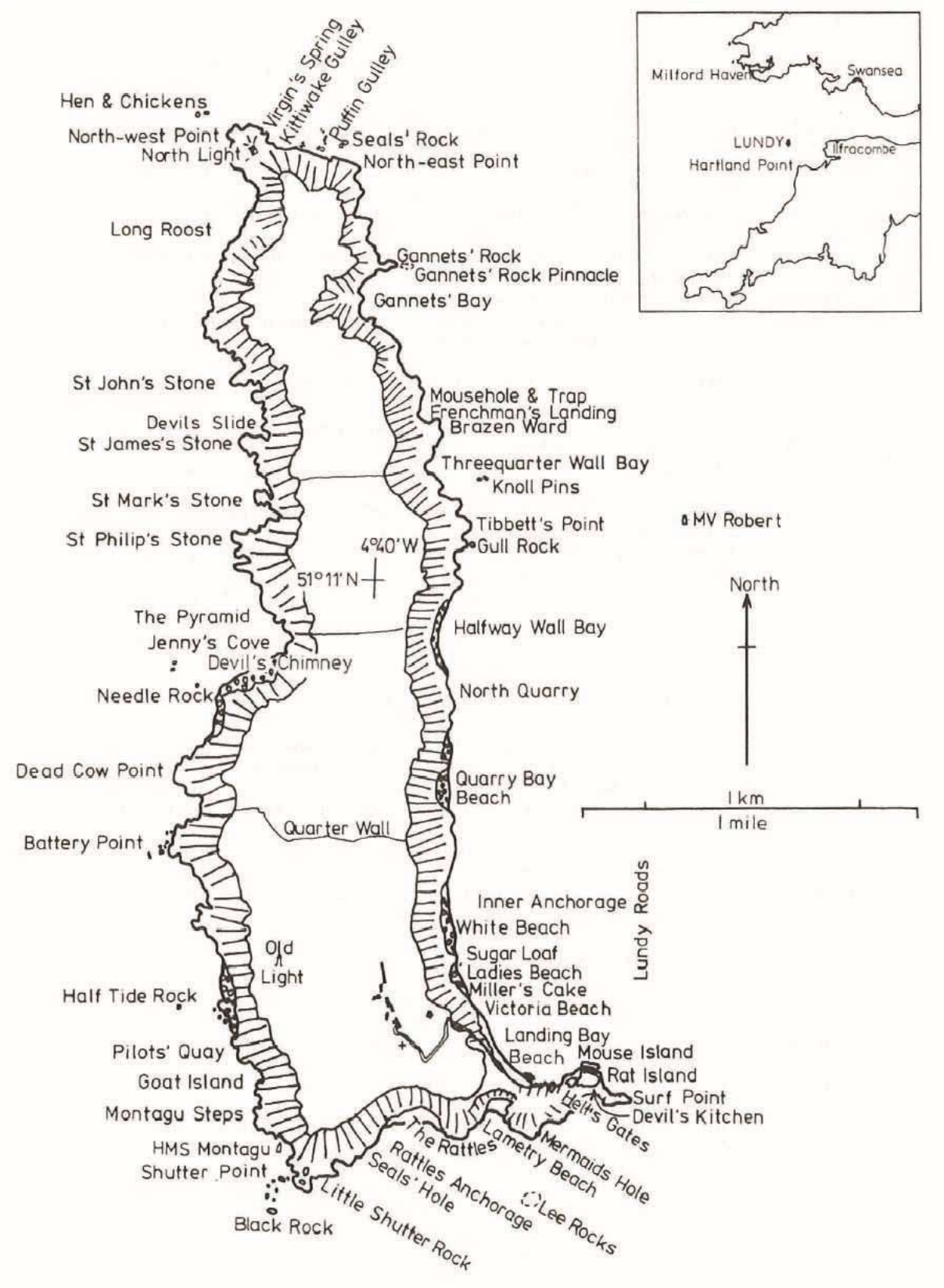
[6]Refer to WiSe: www.wisescheme.org

ANNEX C – Lundy's Tidal Streams

[Available at: http://www.lundymcz.org.uk/docs/public/1024S25Lundy%20Tidal%20Streams.pdf]



ANNEX D – Map of Lundy (showing named coastal features)



Photographic credits

Front cover: Seal pup - Jonathan Aird; Puffins at Jenny's Cove - Shelley Southon; Pink sea fan - Mike Deaton.

Summary: Lundy Cabbage – Nigel Dalby; Seal at Brazen Ward – Mike Deaton.

Introduction: Aerial view of Lundy – Kate West; West coast view – Keith Hiscock; East coast view – Keith Hiscock.

Natural Environment: Seabed map – Maritime and Coastguard Agency; Rockpools of the Devil's Kitchen – Keith Hiscock; Kelp forest – Mike Deaton. Vertical rock face with sunset cup corals – Keith Hiscock; Marine reef scene – Mike Deaton; Branching sponges – Keith Hiscock; Red sea fingers and sea fans – Keith Hiscock; Muddy gravel – Robert Irving; Needle's eye cave – Keith Hiscock; Atlantic grey seal: Hello there! – Jo Crewdson; Grey seal pup – Robert Irving; *Balanophyllia regia* – Keith Hiscock; *Leptopsammia pruvoti* – Keith Hiscock; Pink sea fan – Mike Deaton; Crawfish – Maggs Ashton; Red band fish – Robert Irving; Basking shark – Stuart Philpot; Common dolphins – Rick Morris; Common dolphin & calf – Leigh Hanks; Harbour porpoises – Rick Morris; Manx shearwater – Stuart Leavy; Puffins – Shelley Southon; Razorbills – Shaun Barnes; Guillemots – Derren Fox; Kittiwakes – Andy Hay; Storm Petrel chick – Tony Taylor; Shags – unknown; Fulmar – Nicola Saunders; European lobster – Natural England; Edible crab – Paul Kay; King scallop – Keith Hiscock; *Sargassum muticum* – Keith Hiscock; *Asparagopsis armata* – Keith Hiscock.

Historic Environment: Gull Rock: Broken wrought – John Heath/Historic England. Iona II – Mike Deaton. Brazen Ward – Petra Pulkus. Upper and lower Mangonel platforms – Rebecca MacDonald. The Quarries – unknown.

Environmental quality: Landing Bay – Hartmut Strobel. Pollution and marine litter: Entangled juvenile on Rat Island – Jonathan Aird.

Promoting Lundy's Marine Protected Reserve: School visit – Simon Dell; Storm petrel survey – Rebecca MacDonald; Snorkel safari – unknown; Countryfile 2013 – Derek Green.

Enjoying the Marine Protected Area: Angler – unknown; Diver – Mike Deaton; Kayaker at Lundy – Stuart Leavy. Boats in the Landing Bay – Andrew Cleave; Living and working at Lundy: Round the island – Nigel Dalby; Beach Building display – Robert Irving; Lobster pots – Jennifer Ellis.

Back page: Aerial view of Lundy – Kate West

Owned by the National Trust, Lundy is financed, administered and managed by the Landmark Trust. Lundy's wealth of natural and man-made resources makes it a place of international significance. The island's diverse terrestrial and marine habitats are home to rare species of birds, insects, marine life and plants, as well as being an important site for archaeology. Lundy attracts many thousands of visitors each year who come to experience its many unspoilt and unique qualities.

Information

Lundy Warden
Lundy, Bristol Channel
North Devon EX39 2LY
T: 01237 431831
E: warden@lundyisland.co.uk
www.lundymcz.org.uk
www.lundyisland.co.uk

Natural England
Stirling House
Dix's Field
Exeter EX1 1QA
T: 0300 060 3900
www.naturalengland.org.uk

The Landmark Trust Manages Lundy with the advice and support of the following partners:

National Trust

Historic England

NATURAL ENGLAND

Environment Agency

rspb giving nature a home

Devon & Severn IFCA Inshore Fisheries and Conservation Authority

LUNDY FIELD SOCIETY for the study and conservation of a unique island

Marine Management Organisation