Lundy No-take Zone – Questions & answers

What and where is Lundy?

Lundy is an island in the Bristol Channel 11 miles from the coast of North Devon. The island is about three and-a-half miles long and about half a mile wide, with its long axis lying approximately north-south. It is formed from a single, flat-topped granite outcrop that rises abruptly from the sea. Lundy has imposing cliffs on all sides, these are especially dramatic on the west coast of the island. Lundy's highest point is at around 130m above sea-level. The name 'Lundy' was derived from the Norse for 'Puffin Island'.

Why is Lundy special for marine life?

Lundy's geology and location make it a unique place. It is the only significant rock outcrop in an area where the seabed is mainly comprised of mud and sand. As such, it provides essential habitat for many kinds of sub-tidal marine life that can't live anywhere else in the vicinity.

Best known of these are Lundy's diverse and prolific assemblages of filter-feeding animals, such as sponges, anemones, and a variety of corals (both stony and soft). These mainly occur on rock surfaces below 15-20 m. In water shallower than this, rock surfaces are brightly lit and dominated by seaweed. Filter-feeding animals are especially prolific on the sub-tidal reefs around Lundy because it is situated in the midst of the productive and tide-swept waters of the Bristol Channel. The currents that flow past Lundy provide a rich and constant supply of food particles in the form of tiny plants and animals called plankton.

Another interesting aspect of Lundy's location is that it sits at the boundary between cold Boreal and warm temperate biogeographic provinces. This means that it is one of the few places around the UK where northern and southern species occur together. For instance, it is one of the only places where you can find all of the UK's five species of shallow-water stony coral.

A further level of environmental complexity is provided by the island itself. Although Lundy is within the Bristol Channel it still experiences the full brunt of Atlantic weather systems that send powerful winds and waves sweeping in from the west. Because of Lundy's shape and orientation it is a very effective breakwater, so the east coast is generally much less wave-exposed than the west coast. This environmental difference produces differences in the types of plants and animals that live on these coasts.

The same marine productivity that makes Lundy a good place for filter feeding animals also attracts a wealth of other marine life, from invertebrates like crabs, lobsters and scallops, to fishes like pollock, wrasse and seasonal visitors such as sunfish and basking sharks. Lundy is also a breeding site for nationally-important populations of grey seals and a variety of seabirds, including razorbills, guillemots, kittiwakes and manx shearwaters.

What are Lundy's conservation designations?

Lundy has long been recognised as an important place for wildlife. The majority of Lundy is designated as a Site of Special Scientific Interest (SSSI). In 1986, the shore and seas around Lundy were designated as Britain's first Marine Nature Reserve (MNR). More recently, the international importance of Lundy was acknowledged in its designation as a Special Area of Conservation (SAC), under the European Union's Habitats Directive. Lundy's rocky marine habitats and the species they support are the main reason for its designation as an SAC.

What is a no-take zone?

An NTZ is a form of Marine Protected Area (MPA) where fishing and other activities that result in the killing or remove marine life are prohibited. NTZs are primarily directed at commercial fishing, but they also apply to recreational activities like sea-angling, spear-fishing, or other forms of harvesting like Scuba diving for scallops. In some popular places, recreational fishing can be as big a threat to marine life as commercial fishing. In some circumstances NTZ may be set-up and regulated by voluntary agreement among the people who use an area and have an interest in its protection. In other places, as at Lundy, NTZ are mandated by law and enforced by Fisheries Authorities. NTZ form part of the existing suite of statutory and voluntary Maritime Protected Areas (Sites of Special Scientific Interest, Marine Nature Reserves, Special Protection Areas and Special Areas of Conservation) that are in essence, sustainable multi-use sites. These are areas where uses and activities continue unless proof can be given of significant risk or detrimental effects to particular habitats and species.

Where is the Lundy NTZ?

The NTZ at Lundy spans 3.6 km, three quarters, of the the east coast of Lundy. The northern boundary of the NTZ is at 51o 12.04' N in line with North East Point. The southern boundary is south at 51o 10.07' N in line with the promontory known as the Sugarloaf. The eastern boundary is at 004o 39.00' W. At the northern end of the NTZ the eastern boundary is 1.4 km offshore, at the southern end it is around 0.8 km. The total area of the NTZ is four square kilometres.

What is its legal status?

Lundy is a the UK's only statutory NTZ. It is protected by law, in this case a bylaw from Devon Sea Fisheries Committee, which came into effect in 2003. There are other NTZ in UK waters, but they are not statutory.

What marine habitats and species are protected by the Lundy NTZ?

The Lundy NTZ includes both rocky and sedimentary habitats. Apart from a few isolated outcrops such as the Knoll Pins (a popular dive site) rocky habitats only extend approximately 50m from the shore.

What are the main activities that have been excluded from the NTZ?

The main excluded commercial activity is potting for crabs and lobsters. Outside the NTZ Lundy is still heavily potted, mainly from May to August. A limited amount of scallop dredging and beam-trawling used to occur over the sand banks in the eastern section of the NTZ. Before the NTZ, the east coast of Lundy was popular for sea angling, mainly from boats because of the inaccessibility of the shoreline. There was also a good deal of scallop harvesting by scuba divers, with several North Devon clubs regularly visiting the area solely for that purpose. In recent years, this probably had a greater impact on Lundy's scallop population that commercial dredging, particularly in areas close to shore.

Are there any other NTZ in the UK?

Yes. There is a voluntary NTZ at St Agnes, Cornwall, which aims to improve the sustainability of lobster and crab stocks in the local area. Voluntary no-take zones rely on fishermen's honesty and understanding of the delicate balance of biodiversity.

Do other countries have NTZ?

Yes, Australia and New Zealand lead the world in the designation of networks of marine protected areas and no-take zones. There are also marine protected areas in the US and Canada as well as many developing countries, such as Indonesia, the Caribbean and the Philippines. There are a number of areas closed to fishing in Europe, namely in Italy, Spain and France.

What are the predicted benefits of the Lundy NTZ?

1) Environmental benefits

NTZ can protect rare, vulnerable or common marine habitats and species and help return to a more natural ecosystem, preserving our marine environment for future generations.

Different types of fishing affect the marine environment to different degrees. Some types, like dredging, cause incidental damage directly to the seabed, trawling accidentally catches animals such as dolphins, birds and other non-target species.

Economically viable forms of fishing generally affect the environment simply by removing large numbers of a particular species from a habitat and changing the natural balance. NTZs are a simple way of reducing these impacts, rather like we have National Parks, Nature Reserves and Sites of Special Scientific Interest on land. Some fish are rare or long-lived and slow to reach sexual maturity eg. angler fish, skate and rays. They are particularly vulnerable to exploitation either as by-catch or through normal fishing activities. NTZ can act as a refuge for these rare or vulnerable species.

2) Fishing industry benefits

No-take zones represent a mechanism for fishermen to be part of local fisheries management and, it is hoped, improve the long-term viability of their industry. In an uncertain industry, NTZ can provide insurance against management failures and stock collapses. NTZ allow fish to grow bigger and more numerous in and around the area and

enhance catches close to reserves due to ‘spill over’ of adults into the adjacent fishing grounds.

In the famous Leigh Marine Reserve in New Zealand, lobster densities have continually increased by about 7 per cent a year in the no-take zone since it was designated in 1977. By 1993 they were on average, eight times more dense than populations outside the reserve. In the Tonga Island Marine Reserve, scientists have found nearly four times as many spiny lobsters than at nearby fished sites. NTZ can act as a nursery for juveniles, with increased production of eggs and larvae and export of these to fishing grounds. Bigger fish have more babies and spawn more frequently than small ones. For example a single 10kg red snapper produces more than 20 times as many eggs at a single spawning than ten 1kg snapper.

Some animals, especially those that are attached to the bottom or that have limited power of movement (like oysters or clams), can only reproduce successfully when part of dense populations. If beds are too far apart, fewer offspring are produced. NTZ can also be easier to enforce than other method of fishery management.

3) Benefits to other industries including tourism

There can be social and economic benefits in the form of educational possibilities, tourism and recreation both on land and under water and businesses dependant on a healthy marine environment and scientific research. NTZ around the world have shown that there can be significant benefits to the local economy through protecting an area. In many cases, the designation of a NTZ results in recovery of spectacular marine life and more and larger fish and shellfish, which results in more visitors wishing to go snorkelling or diving, bird watching, take glass-bottomed boat trips, wildlife tours, etc. They also protect underwater archaeology, such as wrecks.

Why monitor the Lundy NTZ?

It is important to determine whether it is producing the intended environmental benefits. Marine biological systems are extremely complicated and it is hard to predict how they might respond to changes in human activity, or whether they’ll respond at all. While evidence from other parts of the world shows that NTZs can provide significant benefits for biodiversity and fisheries, this doesn’t guarantee that the same benefits will occur at Lundy. The success of an NTZ depends on many factors including its location, its size, the level of compliance and, most importantly, the biology of the species that live there. These factors may produce circumstances in which an NTZ has no discernible effects. Following the success of no-take zones elsewhere in the world, several influential groups have suggested that the UK should have many more no-take zones. How these plans develop will be heavily influenced by the monitoring results from the Lundy project.

What is being monitored in the Lundy NTZ?

There are three separate studies within the monitoring programme for the Lundy NTZ. They are of:

1. crabs and lobsters, including the lobster (Homarus gammarus), the brown crab (Cancer pagurus), the spider crab (Maja squinado) and the velvet crab (Necora puber).
2. scallops (Pecten maximus)
3. animal assemblages on sub-tidal rocky reefs (known as rock epifauna). There is a checklist of 21 species from five phyla: This includes Porifera (sponges), cnidarians (corals & anemones), bryozoan, echinoderms (e.g. starfish & sea urchins) and ascidians (sea squirts).

Notable species include branching sponges (e.g. Axinella spp., Raspalia spp), pink sea fan (Eunicella verrucosa), ross coral (Pentapora fascialis), dead men's fingers (Alcyonium digitatum), trumpet anemone (Aiptasia mutablis).

For crabs, lobsters and scallops the issues are their abundance and the sizes of individuals. It is hoped that over time that these species will become bigger and more numerous inside the no-take zone.

For rock epifauna, the issue of interest is the abundance of each species and the diversity of species.

How is the monitoring of the Lundy NTZ being done?

Crabs and lobsters are sampled using the same types of baited traps, known as pots, that commercial fishermen use. To test the effect of the NTZ on crabs and lobsters, experimental potting is done within the NTZ and in four other control sites that are environmentally similar, but have ongoing fishing.

Two of these control sites are 'near controls' at Lundy, but outside the NTZ. The other two are 'far controls', one on the North Devon coast near Hartland Point and one near Solva, Pembrokeshire. Each site is potted daily for five consecutive days using eight 'strings' of pots with ten pots per string. The same type of pots and bait (salted mackerel) are used in all sites. All crabs and lobsters are counted and measured for size before being returned to where they were caught.

Scallops and rock epifauna are sampled underwater by scientists using Scuba gear. Although it would have been desirable, budgetary constraints made it impossible to have 'far controls' in the monitoring studies for scallops and rock epifauna. Thus all sampling locations for this part of the study are around Lundy. The monitoring study for scallops has eight locations within the NTZ and eight control locations outside. The different sampling locations lie on either side of the eastern boundary of the Lundy NTZ. In each location, divers count and measure scallops in four quadrats, each 10m long and 3m wide. Scallops are measured where they are found and replaced straight away. Divers record their data underwater on special waterproof paper that can be written on with a pencil.

Rock epifauna are monitored in a similar way to scallops, using scuba divers who record their data underwater. For the epifauna study, monitoring takes place at two locations within the NTZ and two control locations outside. Within each location, divers count epifauna in 12 random quadrats in each six different sites. The quadrat size for counting epifauna is much smaller than that for scallops, only 75 x 75 cm. Because the NTZ occupies most of the east coast of Lundy, the only option was to have the control sites for this study on the west coast. As explained previously, west and east coasts of Lundy are quite different in terms of wave-exposure. This could have complicated the comparison between NTZ and control data, but fortunately, at the depth where sampling is being done (less than 20 m), rocky habitats on both coasts share many of the same species.

Comparisons between the NTZ and control sites are an essential part of the monitoring programme. This is related to the high levels of natural variability shown by many marine species, both from place-to-place and time-to-time. If data was only collected from the NTZ, it would be impossible to tell whether the changes seen there were an effect of the NTZ or whether they were just natural changes that occurred regardless of the NTZ. If, however, the changes seen in the NTZ are large and very different to the changes in control sites, then an effect of the NTZ can be reliably concluded.

How long will the Lundy NTZ be monitored?

If the NTZ at Lundy does benefit marine habitats and species, its likely to take several years for these effects to appear. The monitoring is planned to run for at least five years, possibly six, subject to funding.

It could take several years for the effects of the Lundy NTZ to emerge because of the ways that marine species live and reproduce. For many of the species monitored, particularly those whose adults live permanently attached to the seabed, abundance can only increase in the NTZ through the arrival of new juveniles. Even where adults can move, it is still likely that population increases in the NTZ will be more due to juveniles than immigrant adults.

Juveniles of marine organisms are generally much more given to disperse than adults. In general, they are also extremely small, usually microscopic. In most cases, this is because they spend the first period of their life floating in plankton. While growth can be rapid after settlement, for most of the monitored species, it would still take new individuals two to three years to reach a size where they were large enough to appear in the monitoring.

Who is doing the monitoring of the Lundy NTZ?

The principal scientist and project manager is Dr Miles Hoskin of Coastal & Marine Environmental Research (CMER), based in Falmouth, Cornwall. The project team includes Dr Ross Coleman, (ex University of Plymouth) now at the University of Sydney and Dr Keith Hiscock of the Marine Biological Association of the UK, in Plymouth. The diving team for the project is mainly comprised of marine biology students from the University of Plymouth who train as professional scientific divers as part of the degree course.

What about ownership and funding?

The project was developed by English Nature, the Government's statutory advisor on nature conservation in England. English Nature also provides the core-funding for the project and supervises work through its Devon Team. English Nature's funding is matched by an equal sum from the Department of the Environment, Food and Rural Affairs, which draws funds from the Financial Instrument for Fisheries Guidance (FIFG), which is an 'Objective Two' funding stream from the European Union.