

The Rockall Trough/Channel - A Potential MPA

Location

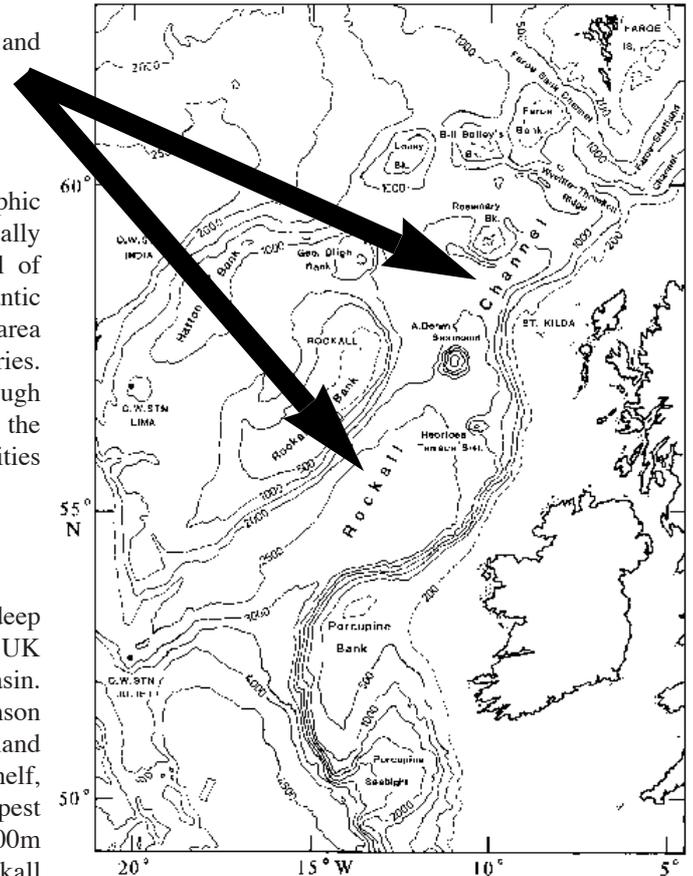
The Rockall Trough is located to the west of the UK and Irish continental shelf.

Potential Reasons for Selection

The Rockall Trough represents a distinct oceanographic feature. Research suggests that the Trough potentially contains a number of diverse ecosystems, typical of deepwater environments within the north-east Atlantic region. Human activities having an impact on the area include oil and gas exploration and deep water fisheries. A strategy for managing the potential Rockall Trough MPA would include identifying and improving the understanding of and impacts on species, communities and ecosystems located within the area.

Site Description / Physical Characteristics

The Rockall Trough/Channel/Basin, is a tongue of deep water extending north-eastwards into the UK continental margin from the North Atlantic Ocean basin. It is bounded to the north by the Wyville-Thomson Ridge, which separates it from the Faroe Shetland Channel, to the east by the UK/Irish continental shelf, and to the west by the Rockall Bank. At its deepest point, the floor of the Trough is approximately 3500m below sea level. The hydrography of the Rockall Trough is complex, featuring a series of currents that differ with location and depth.



Justification for the Potential Selection of the Rockall Trough/Channel as an Offshore Marine Protected Area

Two main water masses occupy the Trough. The upper extends from the surface down to approximately 1500m depth and is derived from the western Atlantic. The lower water below 1500m largely originates from the Labrador Sea. Water masses originating from other locations may also enter the Trough.

Plankton and Pelagic Fauna

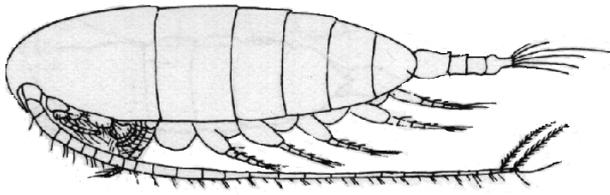
The Rockall Trough is understood to be characterised by low zooplankton stocks in winter, coupled in the spring with higher rates of population increase, compared to the adjacent shelf. This is manifested as a pronounced spring bloom of phytoplankton (usually occurring in mid to late April), followed by a period of nearly five months of relative stability of stocks of both phyto- and zooplankton. The nekton of the Rockall Trough area is characterised by euphausiid crustaceans (commonly referred to as krill) and fish occurring in surface waters, while mysid and decapod crustaceans live at greater depths. Some of the deeper living species have been observed to regularly migrate toward surface layers to feed. The Rockall Trough has also been observed to contain benthopelagic fauna – a component of the pelagic fauna that lives relatively close to the ocean floor. These often occur in higher densities than the pelagic fauna in the overlying water column. Such organisms have been shown to form a significant proportion of the diet of demersal (bottom dwelling) fish living in the Rockall Trough.

Research has suggested that current patterns within the Rockall Trough are likely to result in plankton and other pelagic fauna being 'exported' to adjacent oceanic regions. Advection of oceanic organisms to the

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Norwegian Fjords and the Norwegian Basin, from the Rockall Trough, has been documented on several occasions.



Calanus finmarchicus

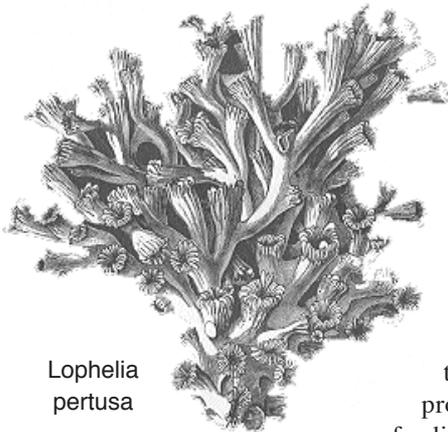
Benthos

Observations of benthos of the Rockall Trough have been undertaken since the 19th century. Most recently, work has been carried out by organisations such as the Scottish Marine Biological Association, amongst others. Despite ongoing investigative work, limitations mean that data collected predominantly relate to ‘megafauna’ – i.e. those epifaunal organisms readily seen in seabed photographs. Of these, Echinodermata (starfish, sea-urchins, etc.) have been observed as being particularly abundant. To date some 131 species of echinoderms have been identified within the area of the Rockall Trough, including:

Crinoidea	Feather stars	4 species
Asteroidea	Sea stars	40 species
Ophiuroidea	Brittle stars	36 species
Echinoidea	Sea urchins	18 species
Holothuroidea	Sea cucumbers	33 species

In general terms, the composition of the megafauna within the Trough appears to be dependent on physical characteristics, such as depth and current speed, and on the presence or absence of colonies

of the deepwater, ahermatypic corals *Lophelia pertusa* and *Madrepora oculata*.



Lophelia pertusa

These coral species usually occur at a depth between 200m and 700m, where it is likely that the steady current associated with the upper slope of the Rockall Trough provides suitable feeding conditions for them. *Lophelia pertusa* has

been recorded in scattered localities within the area of the Trough. *Madrepora oculata* appears to be confined to more restricted localities and deeper areas. While limited information currently exists on the community structure of

Lophelia colonies within the Rockall area, recent research of the *Lophelia* colonies of the Faroe islands has been undertaken. Colonies located around the Faroe Islands have indicated an association of a highly diverse and rich, yet facultative, fauna of some 298 species living on or in the coral.

In areas of the Trough subjected to high current energy, such as the Wyville-Thomson Ridge and the Anton Dohrn Seamount, filter-feeding species such as the barnacle *Bathylasma hirsutum* and the brachiopods *Dallina sepijera* and *Macandrevia cranium* are conspicuous. Below depths of approximately 700m on the Hebrides-Donegal slope of the Trough, the megafauna is relatively rich. The most characteristic species of this zone is the sea urchin *Echinus acutus norvegicus*.

Other characteristic species include the decapod crustaceans *Nematocarcinus ensifer*, *Pontophilus norvegicus*, *Geryon tridens*, and *Nephropsis atlantica*, the brittle star *Ophiocten gracilis* and the echinothuriid urchin *Calveriosoma hystrix*.

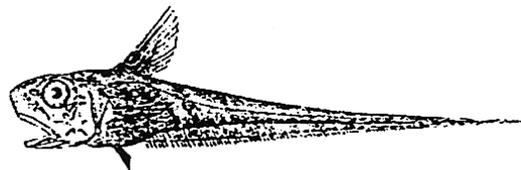
In the area of the Trough to the west of the Hebrides, at a depth range of 1400m to 2000-2500m, a change in substrate results in a change in predominant species. The fauna is dominated by echinoderms with a few characteristic species such as *Echinus alexandri*, *Psilaster patagiatus* and *Plinthaster denatus*. The floor of the northern part of the Rockall Trough slopes gently, from about 2000m in the north to about 2500m in the south. In this general area the bottom-current energy increases, and growths of the arborescent gorgonian *Acanella arbuscula* are found. The gorgonian provides a ‘perch’ for such fauna as the brittlestar *Ophiacantha bidentata*.



Brittle star

Fish

Until the early seventies little information was available on the fish populations of the Rockall Trough. After this time, apparent exploitation of the demersal fish of the upper slopes has led to considerable advances in the knowledge of both demersal and, to a lesser degree, pelagic species. A list of species encountered in the Trough, predominantly at depths between 2200 and 2900 metres, is given below.



Rajidae – skates or rays

Raja (Amblyraja) sp.

Raja (Rajella) bigelowi – Biglow's ray

Bathyraja pallida – Pale ray

Alepocephalidae – smoothheads, slickheads

Alepocephalus agassizi – Agassiz' smoothhead

Alepocephalus bairdii – Baird's smoothhead

Synodontidae – lizardfish

Bathysaurus agassizi

Bathysaurus mollis

Synaphobranchidae – arrowtooth eels

Synaphobranchus kaupi – Kaup's arrowtooth eel

Histobranchus bathybius

Halosauridae

Halosauropsis macrochir

Notacanthidae – spiny eels

Polyacanthonotus rissoanus – smallmouth spiny eel

Polyacanthonotus africanus

Macrouridae – grenadiers, rat tails

Coryphaenoides guentheri – Gunther's grenadier

Nematonurus armatus – armed grenadier

Chalinura brevibarbis – shortbeard grenadier

Chalinura leptolepis

Chalinura mediterranea – Mediterranean grenadier

Lionurus carapinus

Moridae

Anitomora rostrata – blue hake

Zoarcidae

Lycodes atlanticus

Lycodes

Ophidiidae - Cuskeels

Spectrunculus grandis

Bythitidae

Cataeyx laticeps

Liparidae – sea snails

Paraliparis bathybius

potentially be akin to those observed in areas of the European continental shelf already subject to such exploitation. Recent proposals to dispose of redundant offshore installations, such as the Brent Spar oil platform, in deep water areas are also a potential impact on the Rockall Trough.

Text prepared by Chris Berry and Sarah Jones

References/Further Reading

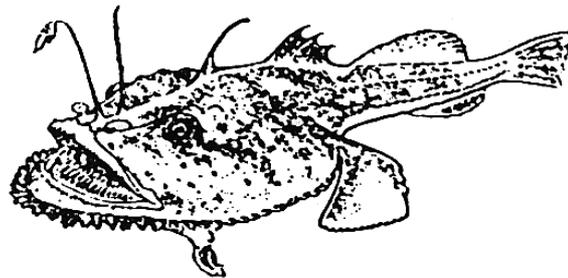
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**Existing / Proposed Protection**

There is currently no specific existing or proposed environmental protection legislation relating to the site.

Likely Management Issues

The main issues likely to affect the area of the Rockall Trough are related to the potential exploitation of fish stocks and hydrocarbon resources within the area. As traditional fish stocks on the continental shelf either approach or exceed sustainable levels of exploitation, attention is likely to turn to 'deep' water fish populations, as observed elsewhere in the world. Within the UK, licensing of 'frontier' areas of the Atlantic for hydrocarbon exploitation is already well advanced, including some areas on the periphery of the Rockall Trough. Associated impacts will