

# The Darwin Mounds

*Out of sight and still under  
threat*

A report by WWF

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# Introduction

Based on current knowledge, the Darwin Mounds are unique. They are a collection of sandy and cold-water coral mounds, located within the United Kingdom's 200nm offshore zone – and they are under immediate threat of destruction. They lie at a depth of some 1,000m about 185km north-west of Cape Wrath, the north-west tip of mainland Scotland. Part of an underwater landscape, the mounds are situated in the north-east corner of the Rockall Trough immediately to the south of the Wyville Thomson Ridge. They were officially discovered in 1998, and they have suffered damage since that time.

The Darwin Mounds comprise an underwater habitat that qualifies for designation and conservation as an offshore Special Area of Conservation (SAC). Following a UK High Court decision in 1999, the British government is reviewing offshore habitats with the aim of identifying a network of offshore SACs under the EU Habitats Directive. However, while there is little doubt that the Darwin Mounds should be conserved under the EU Habitats Directive, no action has yet been taken to save them.

A WWF 2002 report, co-written by one of the scientists who discovered the Darwin Mounds, used the area as a case study for Special areas of Conservation in the offshore environment (Gubbay et al. 2002) and identified clear management proposals for the area. Deep water trawling was identified as the principal activity likely to cause physical damage and is already known to have had some impact on coral thickets in parts of the Mounds. One of the management recommendations made in the report is a prohibition of bottom trawling in the area.

Addressing a WWF summit on the recovery of the seas in October 2001, Margaret Beckett, Secretary of State for Environment, Food and Rural Affairs, declared that the Darwin Mounds were a top priority on the list of offshore marine sites that need protection, and noted that the Government hoped to lay the necessary regulations by early 2002.

A year on from Mrs Beckett's commitment to protect this unique habitat no action has been taken to reduce the activities likely to destroy the Darwin Mounds. Not only has no action been taken to protect the Darwin Mounds, management measures for deep-water species have been agreed by the European Council of Ministers which are destined not to help the situation. Total Allowable Catch quotas (TACs) have been proposed for many of the deep water species found around the Mounds area despite scientific advice advising that TACs are not appropriate for the management of these species. This means that trawling for deep water fish species around the area of the Darwin Mounds will continue. WWF views this decision as totally non-precautionary and one which is likely to lead to the demise of those deep water fish species as well as potentially the area of the Darwin Mounds themselves.

WWF is calling for government action to introduce the conservation measures urgently required to protect the unique area of seabed and species represented by the Darwin Mounds. This report describes the biology of the Darwin Mounds, the threats facing them and what steps are required to effectively protect the area.

# 1 The Darwin Mounds

## **SITE DESCRIPTION**

The Darwin Mounds were “discovered” during the summer of 1998 in the course of a large-scale regional survey of the seabed by the Atlantic Frontier Environmental Network (AFEN). They have been revisited several times by the UK’s National Environmental Research Council (NERC) in order to undertake work funded by the Department of Trade and Industry. The area of the Darwin Mounds has been fully mapped with low-frequency sidescan sonar. The seabed has been extensively sampled and observed with various corers and photography/video systems.

The Mounds occur at around 1000m depth as a more or less continuous field in an arc-like form. The arc follows the local bathymetric contours for some 30km. There are hundreds of mounds in the field, which in total cover approximately 100 sq km. Individual mounds are typically circular in outline with a height of up to 5m and a diameter of approximately 100m. The mounds themselves appear to be sand volcanoes. Unique tail features – teardrop-shaped areas some hundreds of metres in length – can be found downstream (south-west) of most of the mounds.

## **BIOLOGY**

The Darwin Mounds support a substantial population of the deep-water coral *Lophelia pertusa*. The tails are characterised by very high abundances of giant one-celled animals (protozoans) called xenophyophores, *Syringammina fragilissima*. Individual xenophyophores can grow to more than 20cm and are often fragile. The corals, and probably the xenophyophores, provide a habitat for numerous associated species, including deep sea demersal fish.

The animals associated with the Darwin Mounds differ substantially from the surrounding seabed. There is a significant increase in biological density and diversity on the mounds. The coral colonies on the mounds vary from one to a few metres across. The number of colonies on any one mound ranges from a few to hundreds. *Lophelia pertusa* appears to be the dominant coral species. The dominant deep sea fish on and around the mounds are the cut-throat eel (*Synaphobranchus kaupii*) and the round-nosed grenadier (*Coryphaenoides rupestris*).

The density and diversity of benthic invertebrates also increases on the mounds, with suspension feeders such as sponges and brisingiid starfish using the corals as perches, and large echiuran worms using the coral as a refuge. Other animals noted in the area include echinothuriid sea urchins (*Calveriosoma hystrix* and *Sperosoma grimaldii*), pencil sea urchins (*Cidaris cidaris*), sea stars, gastropods and hermit crabs (*Parapagurus pilosimanus*).

## **HUMAN IMPACTS**

### **Fishing**

The most recent study of the Darwin Mounds area has revealed what appears to be direct evidence of the destructive impact of commercial demersal trawling on the seabed. The destruction coincides with observed fishing activity in the region by French deep-water demersal trawlers. High frequency sidescan sonar observations carried out by Dr A Wheeler of Cork University show seabed lineations and scars, some of which track directly through the mounds. It is most likely that these marks correspond to the seabed scrapping action of a demersal trawl net and its trawl doors. Photographic observations carried out by Dr D Masson and Dr D Billett of Southampton Oceanographic Centre have revealed areas of smashed and fragmented coral in the mound field that may also correspond to the impact of trawling. The seabed impact of deep-water demersal trawling has been detected in a number of areas in the northern Rockall Trough to depths in excess of 1,000m.

Until this year all but one of the deep-sea fish stocks<sup>1</sup> found in the vicinity of the Darwin Mounds, such as the round-nose grenadier and orange roughy, had no management in place. There were proposals by the French in 2000, on behalf of their deep water fishing fleets, to have quotas set for all deepwater species. However scientists from the International Council for the Exploration of the Sea (ICES), have advised that based on current knowledge, quota management of deep-sea fish is totally inappropriate. Not enough is known of the size and regeneration of stocks to set quotas. Deep-sea fish live in a comparatively low energy environment, which is reflected in their slow rate of growth and reproduction. Sustainable exploitation rates will be very low. Scientists recommend a suite of management measures such as licensing, closed areas and gear restriction rather than quotas. More research is urgently required to determine an appropriate management system for deep-sea fish. Assessment and monitoring of the deep-sea fish in the Darwin Mounds SAC site could help build on the knowledge base and help ensure a sustainable exploitation of these species.

*Update:* In June 2002 a proposal was laid by the Commission to introduce TACs for a range of deep water species<sup>2</sup> from January 2003 and it is likely that this will be approved at the November Council of Ministers meeting. No area restrictions have been proposed to limit trawling over sensitive areas such as the Darwin Mounds and no further gear restrictions are proposed to date.

### **Oil and gas exploration**

Offshore mineral mining is another potential threat to sensitive offshore habitats such as the Darwin Mounds. The 19th Round of Offshore Oil and Gas Licensing, announced earlier this year, focused on the Atlantic Frontier to the north-west of Scotland. It took a cautious route and avoided licensing any blocks in the vicinity of the Darwin Mounds. While exploration is unlikely at present, no protection is in place to ensure that a licensing decision in respect of the Darwin Mounds is not agreed in the future.

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<sup>1</sup> Quotas are set for monkfish (also known as Angler fish), including those in ICES Area VI, in which the Darwin Mounds are located. There is an EU quota set for round-nose grenadier in the Iceland and Faroese waters that is mainly exploited by German vessels.

<sup>2</sup> Proposal for a Council Regulation establishing specific access requirements and associated conditions applicable to fishing for deep-sea stocks. COM(2002) 108 final 2002/0053 (CNS)

**Carbonate extraction**

Since there is currently no specific conservation protection in respect of the Darwin Mounds, they could potentially be exploited for other uses. Again, while unlikely at present, this exploitation could include the removal of carbonates supplied by the corals.

## 2 Implementing the Habitats Directive offshore: protecting the Darwin Mounds

The fundamental purpose of the EU Habitats Directive is to establish a network of SACs through European Union territory (see Appendix 1). The Habitats Directive also recognises that migratory species cannot be protected by a network of sites alone and may require non-site based general management of human activities for their conservation. There has been a lack of clarity for many years as to whether or not the Habitats Directive applies in the marine environment offshore.

On 5 November 1999, following legal action by Greenpeace, a UK High Court decision ruled that the Habitats Directive “applies to the UK Continental Shelf and to the superjacent waters up to a limit of 200 nautical miles from the baseline from which the territorial sea is measured”.

At least two habitats listed in Annex 1 of the Habitats Directive occur beyond 12nm offshore. These habitats are “reefs” and “submerged sandbanks” as defined by the Interpretation Manual of European Union Habitats (EUR15/2). Another habitat listed in the Habitats Directive is “submarine structures made by leaking gases”. Its definition could describe further offshore features (see Appendix II for the definitions).

It is interesting to note that a recent WWF report, *Implementing the Habitats Directive Offshore - the North-east Atlantic*, identified that most of the “reef” sites within the 200nm limit of EU member states are found in Ireland (62 per cent) and Portugal/the Azores (18 per cent) (see Appendix I).

Much work needs to be undertaken throughout Europe to implement the Habitats Directive offshore and the UK Government is at the forefront of identifying SACs offshore. In the meantime the Darwin Mounds, highly fragile and vulnerable to physical disturbance, are being damaged. There is little doubt that the mounds will qualify as an offshore SAC because they represent what is probably unique “reef” habitat. However, it may take more than 12 months for work to be collated and presented to the European Commission on all the offshore sites in UK waters that will contribute to the SAC network. In the meantime it is not acceptable for the Darwin Mounds to be left unprotected.

The Darwin Mounds need to be protected against the full range of human activities including oil and gas exploration, carbonate extraction and deep-sea demersal trawling. Not only are the mounds a unique habitat supporting diverse wildlife communities, but they are also an important habitat for deep-sea demersal fish, providing food and possibly spawning and nursery grounds.

*Update:* October 2002 – to date no conservation measures have been introduced to protect the Darwin Mounds. A proposal to establish the site as a Special Area of Conservation has been drafted by the governments advisors, JNCC, but has not been submitted to the European Commission.



### 3 Next steps to conserve the Darwin Mounds

- While observations have indicated that it is probably trawling activity by EU vessels outside the UK, that have damaged the Darwin Mounds to date, action is required by the UK government. Fishing in EU waters is managed under the EU Common Fisheries Policy, but in order for the EU to take action, the UK government needs to identify the management action required for the Darwin Mounds and make a proposal to the European Commission Directorate General for Fisheries (DG Fish). The Commission will then draft a regulation under the Common Fisheries Policy's technical conservation measures. The regulation will need approval and adoption by the European Council.

*Update:* October 2002 - This is a measure that could have been undertaken independently of the SAC procedure but has not to date. There are no indications from the UK government that they are considering such action despite the fact that this is the only means of truly protecting the Darwin Mounds from the activity which most threatens it.

It is worth noting that in the ICES fishing area where the Darwin Mounds are situated (VI), preliminary figures from ICES state that landings of orange roughy and round-nose grenadier doubled between 2000 and 2001.

- Some of the activities that could potentially threaten the Darwin Mounds, such as offshore oil and gas development, are managed through sectoral regulation by the UK government. The recently announced 19th Round of Licensing for Oil and Gas Exploration in "blocks" adjacent to the Darwin Mounds avoided licensing in the immediate vicinity – but the "protection" offered by this decision is only relevant to the 19th Round. Nothing has so far been done to ensure protection against future licensing rounds, nor to ensure against cumulative impacts of the developments in adjacent blocks by a variety of different activities.

*Update:* WWF will be exploring with the industry the possibility of a permanent commitment to no oil and gas development in the area of the Darwin Mounds. Only through such a commitment will the area be guaranteed full protection.

- The Darwin Mounds were last surveyed in 2000 and we are unaware of the levels of damage which may have been inflicted on the site since. Funding must be prioritised to ensure that a further survey is undertaken.

## **RECOMMENDATIONS**

There are a number of key actions that need to be implemented as a matter of urgency if the Darwin Mounds are to be protected. WWF recommends that:

- the UK government immediately declares the Darwin Mounds a proposed SAC on the list of UK sites to be submitted to the EU for consideration;
- the government urgently develops and publishes a plan for the management needs of the Darwin Mounds;
- the government proposes management action for fisheries in the vicinity of the Darwin Mounds to the European Commission (DG Fish), with a view to proposals being adopted by the Council of Fisheries Ministers as a matter of urgency;
- that adequate finances be prioritised by the UK to allow a survey of the Darwin Mounds to assess the status of the area and extent of any further damage;
- the government recognises the urgent necessity for a UK-wide integrated marine policy with statutory backing to manage the marine environment in its entirety, including important features such as the Darwin Mounds.

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# Appendix I The EU Habitats Directive

## **THE HABITATS AND BIRDS DIRECTIVES**

The European Union's Habitats Directive<sup>3</sup>, in conjunction with the Birds Directive<sup>4</sup>, is the main legal tool of the EU for nature conservation. The Habitat Directive's fundamental purpose is to establish a network of protected sites through EU territory, the Natura 2000 network. The Natura 2000 network is a combination of Special Areas of Conservation under the Habitats Directive and Special Protection Areas for birds under the Birds Directive. The Habitats Directive also recognises that migratory species cannot be protected by the Natura 2000 network alone and may require non-site based, general management of human activities for their protection. The Natura 2000 network is designed to maintain or help maintain both the distribution and abundance of threatened or potentially threatened species and habitats, both terrestrial and marine.

## **WWF POSITION ON THE HABITATS AND BIRDS DIRECTIVES**

WWF strongly supports the Habitats Directive and is working to ensure that the sites selected for Natura 2000 are adequate to achieve the aims of the Directive.

WWF believes this is important nature conservation legislation in Europe because:

- the Directive represents a real attempt to conserve Europe's biodiversity based on sound scientific evidence. The sites will not just be a collection of national or regional parks designated for a variety of reasons;
- the sites to be designated under the Directive are intended to protect a representative sample of Europe's threatened or potentially threatened habitats and species – as listed in the Annexes of the Directives; and
- the Directive does not seek to rule out economic activities in Natura 2000 areas but aims to promote sustainable activity in support of conservation objectives for these areas.

## **THE NATURA 2000 SITE SELECTION PROCESS**

The Natura 2000 site selection process is a shared responsibility between EU member states and the European Commission, with member states proposing habitats and species to be listed in the Habitats Directive. The lists are subject to assessment and negotiation between the Commission and the member states, who decide that if more than 60 per cent of the total national area of the habitat is encompassed by nominated Natura 2000 sites, then these are considered in principle to be sufficiently represented; those below a coverage of 20 per cent are considered in principle insufficiently represented. Representation of habitats between 20 per cent and 60 per cent are discussed and evaluated during a seminar process and an agreement reached.

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<sup>3</sup> Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.

<sup>4</sup> Council Directive 79/409/EEC on the conservation of wild birds.

## **THE MARINE ENVIRONMENT OFFSHORE**

There has been a lack of clarity for many years as to whether the Habitats Directive applies in the marine environment offshore (out to the 200nm Exclusive Economic Zone [EEZ] or other national fishing/continental shelf limit if the member state has not declared an EEZ under the United Nations Law of the Sea). The geographical coverage of the Habitats Directive in EU waters was referred to by the Commission in document COM (1999) 363 final Communication from the Commission to the Council and the European Parliament “Fisheries Management and Nature Conservation in the Marine Environment” (p10), in which the following statement is made:

*“The provisions of the “Habitats” Directive automatically apply to marine habitats and marine species located in territorial waters (maximum 12 miles). However, if a member state exerts its sovereign rights in an exclusive economic zone of 200 nautical miles (for example, the granting of an operating licence for a drilling platform), it thereby considers itself competent to enforce national laws in that area, and consequently the Commission considers in this case that the “Habitats” Directive also applies, in that Community legislation is an integral part of national legislation”.*

At least two habitats occurring beyond 12nm offshore are listed in Annex 1 of the Habitats Directive. These habitats are “reefs” (Natura 2000 Code 1170) and “submerged sandbanks” (Natura 2000 Code 1110) as defined by the Interpretation Manual of European Union Habitats (EUR15/2). Another habitat listed in the Directive is “sub-marine structures made by leaking gases” (Natura 2000 Code 1180). Its definition could describe further offshore features. It is also of note that several offshore marine species, including the harbour porpoise and the bottlenose dolphin, are listed in the Habitats Directive for potential site selection. Bird species listed in the Birds Directive may also qualify.

At the first round of seminars in 1999, to review the sufficiency of site proposals from member states on a national level, only Denmark proposed sites beyond 12nm offshore. On 5 November 1999, following legal action by Greenpeace, a UK High Court decision ruled that the Habitats Directive “applies to the UK Continental Shelf and to the superjacent waters up to a limit of 200 nautical miles from the baseline from which the territorial sea is measured”.

The legal situation for meeting the requirements of the Natura 2000 network is particularly complex and/or uncertain. While some activities such as oil and gas exploration are regulated nationally, fishing is under the competence of the Common Fisheries Policy at a European Union level, and shipping at a global level by the International Maritime Organisation. Several member states have not legally declared a 200nm Exclusive Economic Zone under the United Nations Law of the Sea. National claims over the seabed of the continental shelf and fishing limits in superjacent waters vary considerably between member states.

## **WWF'S POSITION ON IMPLEMENTING THE HABITATS AND BIRDS DIRECTIVES OFFSHORE**

- As the European Union and/or its member states have competence over human activities on the seabed and superjacent waters out to the limit of the European EEZ (or other national fishing limits/continental shelf limits), WWF supports the application of the Habitats Directive (and Birds Directive) offshore;
- The Natura 2000 network offshore will have benefits for sustainable and integrated marine management;
- The marine habitats and species in the Habitats Directive do not, however, appropriately represent the full range of habitats and species we believe should be listed to meet conservation objectives. The lists of habitats and species are based on a marine classification system for southern European habitats (CORINE system of classification). This classification system does not, for example, cover many offshore habitats. WWF is also publishing the *Offshore Directory* that gives further information of marine features offshore<sup>5</sup>. While some of the marine features detailed in the Directory are covered by habitats and species listed in the Habitats Directive and Birds Directive for site designation, many are not. It is quite clear that there needs to be a review of the lists of marine habitats and species if a representative network of Natura 2000 sites offshore is to be achieved.

### **THE WWF REPORT "IMPLEMENTING THE HABITATS DIRECTIVE OFFSHORE: NATURA 2000 SITES FOR REEFS AND SUBMERGED SANDBANKS"**

As a contribution to the implementation of the Habitats Directive offshore, WWF has commissioned scientific experts from Southampton Oceanographic Centre (UK) to give their opinion of the scientific definitions of "reefs" and "sandbanks" as defined by the Interpretation Manual of European Union Habitats. From this opinion, (and within the constraints of time and data availability) they will identify sandbanks and reefs throughout EU and adjacent waters (ignoring legal boundaries) and gaps in information.

The definition of "reefs" is broad. It includes both geophysical and biological information and can be applied to a variety of reef structures. These include coral reefs (such as reefs of the coldwater coral *Lophelia pertusa*), seamounts and raised rocky platforms.

The European Submerged Sandbanks Database (ESSB) was developed to provide the inventory of submerged sandbanks for this project.

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<sup>5</sup> *The Offshore Directory* was initially compiled for WWF by Dr Susan Gubbay in 1999 and includes offshore features such as hydrothermal vents, xenophyophores, ocean fronts, pock marks and deep sea fish as well as seabirds, sea mounts, carbonate mounds and coldwater corals. Further information is being added to the Directory, including chapters on "sponge fields" and "muddy habitats", for publication in autumn 2001.

The overall inventories of reefs and submerged sandbanks are illustrated in five volumes as follows:

Volume I	Introduction and Rationale
Volume II	The North-east Atlantic
Volume III	The Mediterranean
Volume IV	The reefs inventory
Volume V	The European Submerged Sandbanks Database

These volumes include national inventories of reefs and submerged sandbank sites with respect to 200nm offshore limits (not necessarily national competence over human activities). National claims over the seabed of the continental shelf and fishing limits in superjacent waters vary considerably between member states. The national inventories therefore require the input of further legal information with respect to boundaries and competence over activities such as fishing, mineral exploitation and aggregate extraction.

The “reef” and “submerged sandbank” sites identified in these volumes are not WWF proposals for the Natura 2000 network. This ecological study identifies those sites that are described by the definition of “reefs” (Natura 2000 Code 1170) and “submerged sandbanks” (Natura 2000 Code 1110) in accordance with the Interpretation Manual of European Union Habitats Directive, and/or require further information on their habitat characteristics.

It is interesting to note that in the North-east Atlantic, most of the 90 “reef” sites in the reefs inventory within the 200nm limit of EU member states are found in Ireland (62 per cent) and Portugal/the Azores (18 per cent). In all, 58 per cent of the 361 “submerged sandbanks” in the ESSB are concentrated around the UK.

# Appendix II Definitions of sandbanks, reefs and submarine structures in the Interpretation Manual of European Union Habitats (EUR 15/2)

## **NATURA 2000 CODE 1110**

### **Sandbanks which are slightly covered by seawater at all times**

Sublittoral sandbanks, permanently submerged. Water depth is seldom more than 20m below Chart Datum. Non-vegetated sandbanks or sandbanks with vegetation belonging to the *Zosteretum marinae* and *Cymodoceion nodosae*.

## **NATURA 2000 CODE 1170**

### **Reefs**

Rocky substrates and biogenic concretions, which arise from the seafloor in the sublittoral zone, may extend into the littoral zone. These reefs generally support a zonation of benthic communities of algae and animals species including concretions, encrustations and corallogenic concretions.

## **NATURA 2000 CODE 1180**

### **Sub-marine structures made by leaking gases**

Spectacular sub-marine complex structures consist of rocks, pavements and pillars up to four metres high. These formations are due to the aggregation of sandstone by carbonate cement resulting from microbial oxidation of gas emissions, mainly methane. The methane most probably originated from microbial decomposition of fossil plant materials. The formations are interspersed with gas vents that intermittently release gas. These formations shelter a highly diverse ecosystem with brightly coloured species.