

Looking for Lophelia

Murray Roberts and Susan Gass report how curiosity and fortuitous science helped uncover cold-water corals in UK waters.

Say 'coral reef' and you instantly think of tropical reefs in shallow waters, not the cold waters of the north-east Atlantic. But corals do grow in our seas. The commonest is *Lophelia pertusa*, which forms reef-like frameworks that can last for thousands of years and provide homes for many other animals.

Records of *Lophelia* in the Sea of the Hebrides go back to Victorian times when it was described from fisherman's reports. In the 1900s a fine specimen reached Glasgow University's Hunterian Museum from a long-line fisherman operating in the Minches. In the late 1960s a dredger turned up dead coral east of Mingulay, and John Wilson, a British cold-water coral expert, saw *Lophelia* colonies on a seabed ridge during pioneering manned submersible dives in 1970. In the last ten years many new reef areas have been discovered – some on the Norwegian continental shelf, forming chains

kilometres long. But it has also become clear that many reef areas are being damaged by fishing activities, especially bottom trawling.

In 1999 David Long, of the British Geological Survey (BGS), and I (Murray Roberts) began to wonder whether there were still live *Lophelia* reefs in the Minch.

We had found it –
there was a live
Lophelia reef in the
Sea of the Hebrides!

Through a NERC grant, we collated existing UK records, going back through museum collections and dusting off geological cores in the BGS storehouse. But our first real look only came in 2001.



JIM ROBERTS, SAMS

Engineers working to attach the multibeam transducer bracket to the Lough Foyle in the Garvel Dry Dock on the Clyde.

During a research cruise, the NERC vessel RRS *Discovery* was sheltering from autumn gales in the Minch, unable to do planned work. We persuaded the captain to sample the seabed in the calmer waters east of Mingulay, where we found dead coral rubble, a fragment of live *Lophelia*, and a diverse animal community. Echosounder results showed a pattern intriguingly like a reef area.

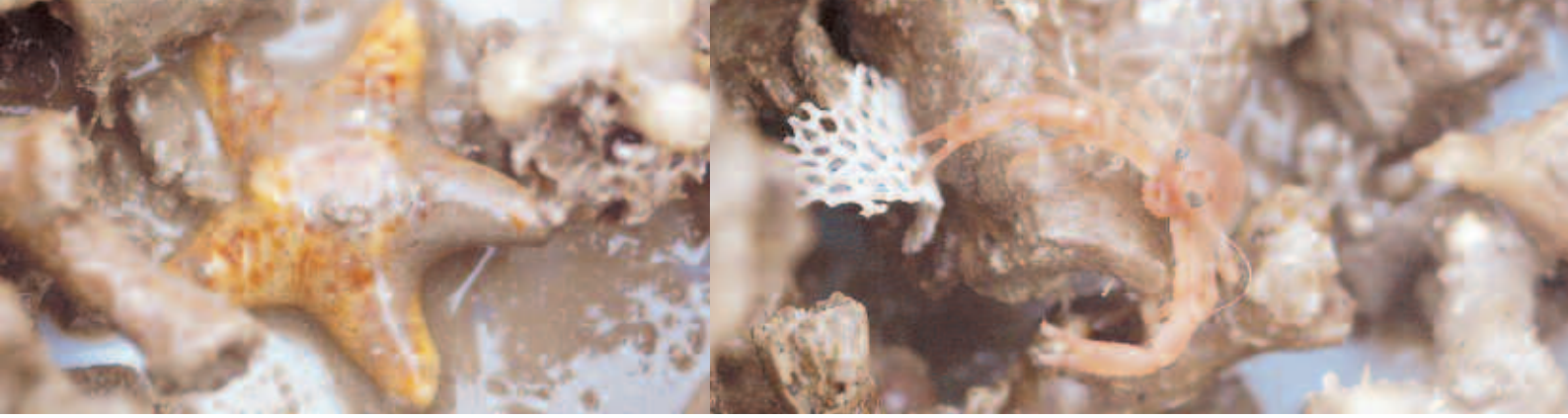
We had to wait until summer 2003 before we could take a closer look. The Scottish Association for Marine Science (SAMS), in partnership with the Department of Agriculture and Rural Development in Northern Ireland, the University of St Andrews and BGS began the Mapping INshore Coral Habitats (MINCH) project. In June 2003 the research vessel *Lough Foyle*, blessed with calm weather for a change, began multibeam echosounder surveys across our Mingulay study site. The acoustic surveys ran overnight. Before breakfast each day, everyone gathered to review the night's survey and pick areas to examine with video. The first survey clearly showed the seabed ridge John Wilson described in 1970. Next to this were a series of hummocks. They looked like the Norwegian *Lophelia* reefs, and were a top priority for the camera work.

Excitement grew on board as the cameras were lowered. The ship drifted across the survey area and the seabed habitats changed from soft burrowed sediments, to areas with fireworks sea anemones and small stones colonised by colourful crinoids (feather stars), then we

Sonar equipment controls and displays on board the Lough Foyle.



G SAUNDERS, SAMS



Small star fish and a juvenile squat lobster found in coral rubble.

JM Roberts, SAMS

saw larger rocks, some supporting fan-shaped sponges. A little while later, coral rubble came into view – it became denser and soon included scattered live coral colonies. Shortly afterwards the cameras flew across large white coral heads. We had found it, there was a live *Lophelia* reef in the Sea of the Hebrides, just as the early reports and fisherman’s observations had suggested.

Buoyed up, we completed survey work at the other stations, running video surveys and taking seabed samples. Grab samples showed that dead coral rubble

supports a wonderfully diverse community of sponges, seamats (bryozoans), anemones, bristle worms, crustaceans – the list goes on. The reefs are hot-spots of biodiversity but we don’t understand the ecological relationships between species and how species change from area to area. Some of the coral skeleton samples are 4000 years old. Their chemistry could tell us about seawater temperatures back in time – helping build a picture of climate change. We’re planning more surveys, and later, a live seafloor observatory, monitoring the reef

and sending both data and video back to the laboratory and across the internet. So perhaps armchair tourists will soon be visiting coral reefs in Scotland!

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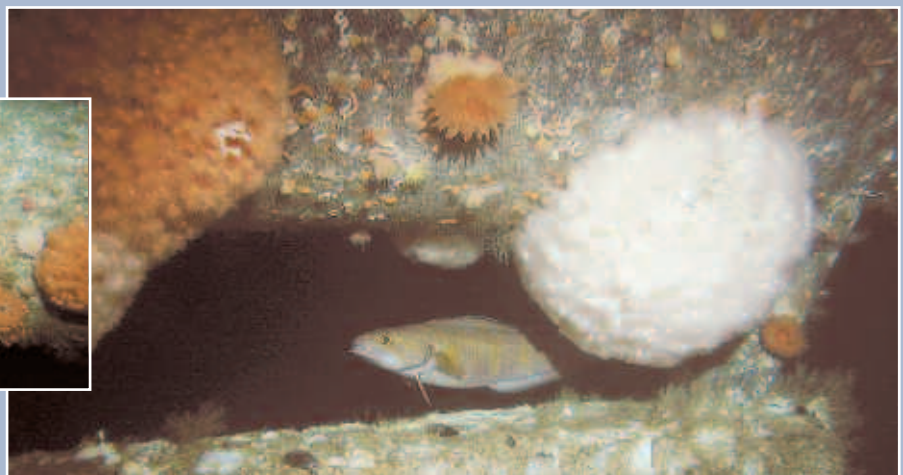
rigged?

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When decommissioning the infamous Brent Spar oil rig in 1999, surprised workers spotted *Lophelia pertusa* colonies on the structure. No-one had found this cold-water coral living in the North Sea before, and no-one expected it would turn up on oil rigs. But the discovery wasn’t a one off. More turned up in the Beryl oil field. And delving into the video libraries the oil and gas companies collect during their maintenance surveys, I’ve found *Lophelia* on 13 more platforms. But they are only between approximately 50 to 130m down. When I checked the currents running in and out of the North Sea and looked into temperature and salinity data, it became clear why. Some of the seawater between these depths actually comes from the North Atlantic. As water flows

northwards, west of Scotland, some diverges into the North Sea bringing water temperatures and salt levels that are right for *Lophelia*, and probably carrying *Lophelia* larvae from the coral’s natural habitats west of Scotland and Ireland. Coral larvae need a hard surface where they can settle, creating a strong attachment point for a new colony. Most of the North Sea seabed is unsuitable,

but the oil and gas platforms provided the missing ingredient. Finding *Lophelia* growing in great numbers on oil and gas platforms also raises many questions. How much drill mud is it exposed to and what levels are damaging? As rigs support *Lophelia*, a species threatened by fishing activities elsewhere, should old rigs be left in place rather than being decommissioned?



Both pictures: Lundin Britain Ltd