

Status of the Darwin Mounds after 8 years of protection

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In August 2003, an area of small cold-water coral mounds in the N Rockall Trough was closed for all bottom fishing activities under an emergency measure of the EU Common Fisheries Policy. The Darwin Mounds had been discovered 5 years before when they were spotted as small elliptical features, up to 75m across and 5m high, on 30kHz sidescan sonar data (Bett, 2001). Groundtruthing with cameras and high-resolution sidescan sonar in the following years confirmed that the mounds were covered by cold-water corals (Masson et al., 2003). Unfortunately, the groundtruthing also revealed extensive damage by deep-sea trawling (Wheeler et al., 2005). It was those observations that resulted in the emergency measures, and eventually in the permanent closure in March 2004. By now the area has also been designated as the first UK deep-water Special Area of Conservation.

Since the initial surveys in 1998-2000, however, no further scientific work had taken place in the area, and it was unknown what effect the closure had had on the cold-water coral communities. Furthermore, studies of Vessel Monitoring System data (VMS) from the area indicated an increase in potential trawling activity in the period right up to the closure (Davies et al., 2007). With this in mind, cruise JC060 was carried out in the area in spring 2011. It was aimed at habitat mapping work for the assessment of anthropogenic impacts on a number of benthic habitats, especially the effect of bottom trawling on cold-water coral reefs. The tools used included the Autonomous Underwater Vehicle (AUV) Autosub6000, equipped with an EdgeTech dual frequency sidescan sonar (120 and 400kHz) and chirp profiler, an EM2000 multibeam system and a monochrome stills camera. Groundtruthing was carried out with a commercial inspection class ROV and box- and mega-cores.

Preliminary analysis of the AUV sidescan sonar mosaics and comparison with the data from 2000 shows that the closure seems reasonably well respected: the number and density of trawl marks has decreased drastically. Overall, the sidescan records show that very little has changed, also in terms of mound morphologies and (live) coral cover. Initial interpretations of video and photographic data point in a similar direction: especially in the E Darwin Mounds very little live coral was found, while in the W Darwin Mounds there were more live colonies. No evidence was recorded for recolonisation, although some colonies were observed that had been knocked over but continued to grow. These observations will also be supported by a time-series analysis of the macrofauna from on- and off-mound locations and megacores collected both inside and outside the protected area.

Overall, although the closure of the Darwin Mounds seems fairly well respected, it would appear that coral cover has not yet made a visible recovery. On the other hand, even if, especially in the E Darwin Mounds, the mounds are mainly covered by dead coral, they are reefs nonetheless, and form an important structural habitat in this area otherwise dominated by mobile sediment. Continued monitoring over the longer term is necessary to fully understand the recovery of cold-water coral reefs, and to evaluate the impact of fishery closures.