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News Release

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Deep sea coral in North Atlantic faces threat from climate change

North Atlantic coral populations – key to supporting a variety of sea life – are under threat from climate change, a study suggests.

Changes to winter weather conditions could threaten the long-term survival of coral in the region, upsetting fragile ecosystems that support an array of marine species, researchers say.

Corals allow diverse forms of marine life to thrive by building reef structures that provide protection from predators and safe spaces to reproduce.

The team focused on a species of cold-water coral – known as *Lophelia pertusa* – which grows in deep waters, creating elaborate reefs that are hotspots of biodiversity. These populations are maintained by tiny, fragile coral larvae that drift and swim on ocean currents, travelling hundreds of miles between reefs where they attach and begin to grow.

Researchers at the University of Edinburgh used computer models to simulate the migration of larvae across vast stretches of ocean. They did so to predict the effect weather changes could have on the long-term survival of *Lophelia pertusa* populations in the North Atlantic.

They found that a shift in average winter conditions in western Europe – one of the predicted impacts of climate change – could threaten coral populations. Ocean currents – affected by changing wind patterns – could drive larvae away from key sites in a new network of marine areas established to help safeguard coral populations, researchers say.

The team found Scotland's network of Marine Protected Areas – or MPAs – appears to be weakly connected, making it vulnerable to the effects of climate change. A coral population on Rosemary Bank seamount, an undersea mountain off Scotland's west coast, is key to maintaining the network.

Corals also thrive on oil and gas platforms in the North Sea and west of Shetland, which may help to bridge a gap in the MPA network between populations in the Atlantic and along the coast of Norway, the team says.

The study is published in the journal *Royal Society Open Science*. It was carried out in collaboration with Heriot-Watt University through a Daphne Jackson fellowship and as part of the ATLAS project, funded by the European Union's Horizon 2020 research and innovation programme.

Dr Alan Fox, of the University of Edinburgh's School of GeoSciences, who conducted the analysis, said: "We can't track larvae in the ocean, but what we know about their behaviour allows us to simulate their epic journeys, predicting which populations are connected and which are isolated. In less well connected coral networks, populations become isolated and cannot support each other, making survival and recovery from damage more difficult."

Professor Murray Roberts, of the University of Edinburgh's School of GeoSciences and co-ordinator of the ATLAS project, said: "Scotland's seabed plays a unique role as a stepping stone for deep-sea Atlantic species. By teaming up with researchers in Canada and the US, we will expand this work right across the Atlantic Ocean."

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Further information

Alan D. Fox, Lea-Anne Henry, David W. Corne, and J. Murray Roberts. 2016. Sensitivity of marine protected area network connectivity to atmospheric variability. *R. Soc. open sci*. 3: 160494. http://dx.doi.org/10.1098/rsos.160494

The Daphne Jackson Trust enables men and women to return to the scientific and research world of work following a career break of two years or more by providing flexible and part time retraining fellowship schemes, held in conjunction with host organisations around the UK i.e. academic and research institutes. See www.daphnejackson.org.

The ATLAS project is the largest integrated study of deep Atlantic ecosystems ever undertaken. Led by the University of Edinburgh, ATLAS brings together 25 partners across 12 countries. This four-year project launched in May 2016. Please see www.eu-atlas.org.

Investigation of the importance of North Sea oil and gas platforms to the wider North Sea ecosystem, the biological communities that inhabit these massive hard man-made structures, and the effects of decommissioning is continuing through the ANChor project led by the University of Edinburgh. ANChor is funded by the INSITE programme, www.insitenorthsea.org.

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