Scientists have assessed the impact of carbon dioxide (CO2) leakage on onshore and offshore ecosystems using field experiments, modelling and observations of natural CO2 emissions.

Geological carbon capture and storage (CCS) is seen as an essential part of reducing emissions of greenhouse gases to mitigate the effects of climate change. However, little information on the environmental impact of a CO2 leak from a CCS site was available.

The objective of the EU-funded 'Research into impacts and safety in CO2 storage (RISCS)' (RISCS) project was to conduct fundamental research that could shape
frameworks for the safe management of CO2 storage sites. The project studied the potential impact of a CO2 leak on both marine and terrestrial ecosystems.

In Italy, the Netherlands, Norway and the United Kingdom, marine scientists examined the effect of CO2 exposure on individual species (like shrimp and crabs) and communities, including microorganisms. They also examined the recovery potential of marine sediments after CO2 exposure and studied the effects of natural CO2.

Norway and the United Kingdom were host to onshore experiments that assessed the impact of CO2 on oats, wheat, barley and oilseed rape. Grass/clover cover, pasture plots and groundwater were also investigated, the latter at natural CO2 sites in Greece, France and Italy.

Other work involved numerical modelling of the movement of CO2 onshore through the soil and its effect on plants. Marine modelling focused on the dispersion of CO2 in the water column by tides and the sensitivity of different species to CO2.

The key results obtained during the study have been compiled into a guide to potential impacts of leakage from CO2 storage. This provides a sound basis for the selection of appropriate CO2 storage sites and safety measures. It will also allow site operators and regulators to assess the potential impacts of leaks on near-surface ecosystems.

Generally speaking, the project found that the environmental impact of a gas leak is likely to be limited, unless an isolated habitat is affected, but will depend on the location, size, timing and duration of the leak. RISCS also showed that there is a need for good monitoring data to help recognise a CCS leakage event.

**Keywords**

Carbon capture and storage, environmental impact, carbon leak, CO2 storage, ecosystems

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### Project Information

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