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Integrated assessment tracks fisheries' conservation success

A recent study suggests that a single integrative assessment of marine fisheries can be used to monitor progress against several different marine environmental policies. It used a relative ecological risk model to demonstrate how closing marine protected sites to trawlers and reducing trawling to maximum sustainable yield (MSY) levels would allow fisheries to meet the ecological objectives of both the Marine Strategy Framework Directive and the Habitats Directive.

Fishing and other coastal/marine-based industrial activities can cause damage to the seabed and the plant and animal communities living there. The EU has introduced a number of conservation policies, including the Marine Strategy Framework Directive[1] and the EU Habitat Directive[2], which protect these communities. As a result, fishery managers, conservationists and policy-makers need tools that can assess the success of management strategies against the objectives of these policies.

The research, conducted by German researchers, aimed to demonstrate that a relative ecological risk model could meet this need. The model they used calculated a 'disturbance indicator' to reveal how much damage was being caused to animal populations by fishing trawlers using the German part of the North Sea as a case study. A disturbance indicator value greater than '1' suggests that an area's ecology is in good condition. The model also calculated the 'downside risk', or threats, to an ecosystem as well as the 'upside risk', or opportunities, it faced. The researchers used this model to test the impact of five different categories of fishing gear on eleven benthic (seafloor-dwelling) communities in four different scenarios: the 'status quo' scenario, i.e. no change since 2006 distribution of fishing efforts, the closure of marine protected sites for large and small beam trawlers targeting flatfish to meet the Habitat Directives requirements, a fishing effort reduction scenario to meet requirements from the MSY limit for plaice, and a combination of effort reduction plus area closures.

The results suggest that the area likely to have sustainable benthic communities was relatively small in the first status quo scenario, but it increased in scenarios where trawling effort was reduced or marine protected sites closed.

Upside risk values showed that only one of the 11 communities studied in the status quo scenario was likely to reach the required ecological condition. When trawling was prohibited in marine protected sites, this increased to four communities, and improvement was seen in two more communities when MSY limits were introduced. Finally, by combining closures with MSY limits, eight of the 11 areas showed an improvement.

Finally, downside risk values were used to identify the main environmental pressures on the communities being studied. It showed that large beam trawlers were an important risk in all of the areas studied.

The researchers also noted that ecological risk models could also be used to assess other ecosystems where the required parameters could be identified.

1. See: http://ec.europa.eu/environment/water/marine/index_en.htm
2. See: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

Source: Fock, H.O., Kloppmann, M., & Stelzenmüller, V. (2011). Linking marine fisheries to environmental objectives: a case study on seafloor integrity under European maritime policies. *Environmental Science & Policy.* 14(3): 289-300.

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