Does trawling damage the ecosystem?

When fishing gears are towed over the seabed they are bound to kill animals and damage habitats. CEFAS research on the environmental effects of fishing describes these effects and asks whether they matter. Such research is a relatively new field of scientific endeavour, but a better understanding of trawling effects is essential given concerns that have been raised by the Intermediate Ministerial Meeting (IMM), the Oslo-Paris Commission (OSPAR) and conservation groups such as the Marine Conservation Society (MCS). The Common Fisheries Policy also requires that the environmental impacts of fishing should be controlled and that there should be an acceptable balance between economic needs of the industry and the protection of the environment.

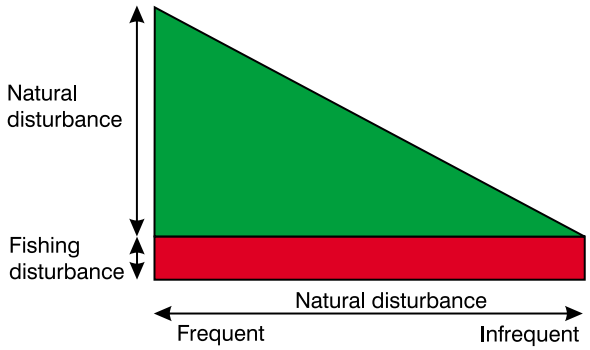

Figure 1. *The effects of trawling depend on the balance between fishing and natural disturbance. As trawling accounts for a greater proportion of total disturbance, the effects of trawling will be greater.*

The preliminary results of studies on trawling effects suggest that sand and gravel seabeds in shallow water can be quite resilient to the effects of towed gears. The sandy seabeds of the southern North Sea, for example, are continually disturbed by tides and wave action, and most of the animals living there are already adapted to cope with disturbance. The habitats most affected by trawling are usually in deeper water, where wave and tide action are slight. Here, the effects of fishing disturbance have a proportionally greater effect, because many of the sea-bed animals are slow growing and not adapted to disturbance. Trawling has the greatest effect on habitats formed of living organisms, such as maerl beds and coral reefs. These are altered for many years or decades if fished with towed gears. In general terms, fishing disturbance matters more when it accounts for a greater proportion of the total disturbance to the seabed (Figure 1).

Fishing disturbance is very patchy and, even in heavily fished seas, large areas may not be disturbed at all. This means that figures describing the average proportion of the seabed affected by trawling can be very misleading. For example, while small areas of the North Sea are probably swept by trawls tens of times each year, much larger areas are virtually unfished (Figure 2). Our ability to describe the patchiness of fishing effort will improve as more accurate information on the location of fishing vessels, such as that provided by satellite monitoring, becomes available.

The species most at risk from the direct and indirect effects of fishing are characterised by late maturity, large body size and low rates of population growth. Species least at risk have high population recovery rates and can withstand contact with fishing gears.

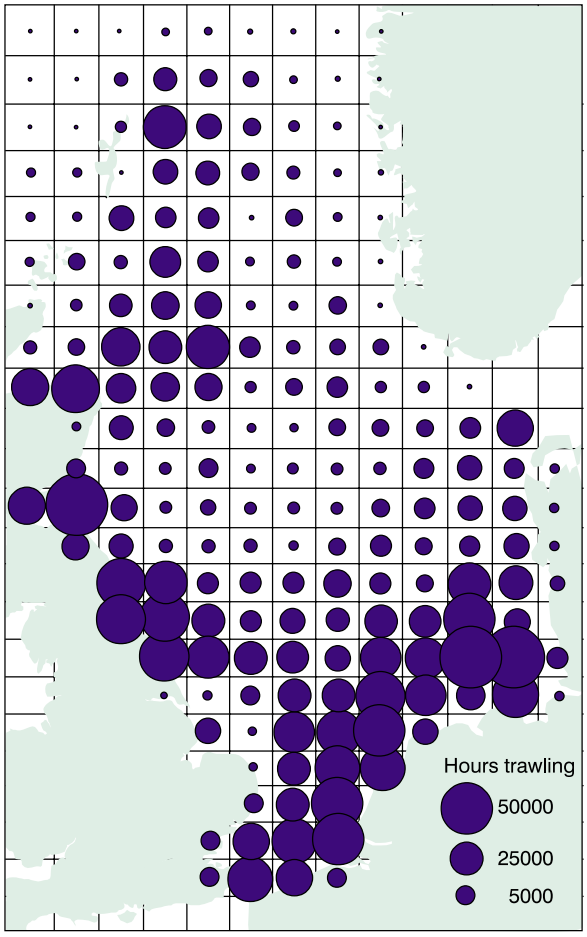

Figure 2. Trawling effort in the North Sea is very patchy. International beam and otter trawling effort for 1995 shows that some areas in the southern North Sea are very heavily fished while areas of the central North Sea are rarely visited.

For this reason, both fishing and natural disturbance favour communities of fast growing short lived species. These species, such as small worms and shellfish, may actually be more productive, and hence provide more fish-food, than slow growers (Figure 3). Current research aims to describe this effect in more detail. Some evidence suggests that the growth rates of plaice and sole may have increased following changes in the productivity of the southern North Sea.

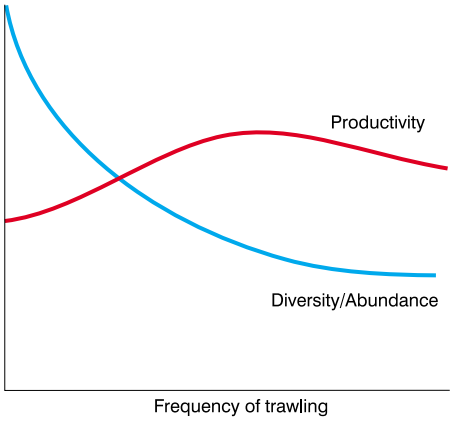

Figure 3. Trawling and natural disturbance can cause the abundance and diversity of sea-bed fauna to decline, but productivity may increase. This plot shows general links between the frequency of trawling and diversity, abundance and productivity.

In general terms our preliminary research shows that trawling, like other human activities, can have undesirable impacts on some environments. Managers have to balance the costs of fishing impacts against the benefits from the food, income and employment that fishing provides.

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