MARINE RESEARCH NEWS

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Seismic activity can both increase and reduce catches

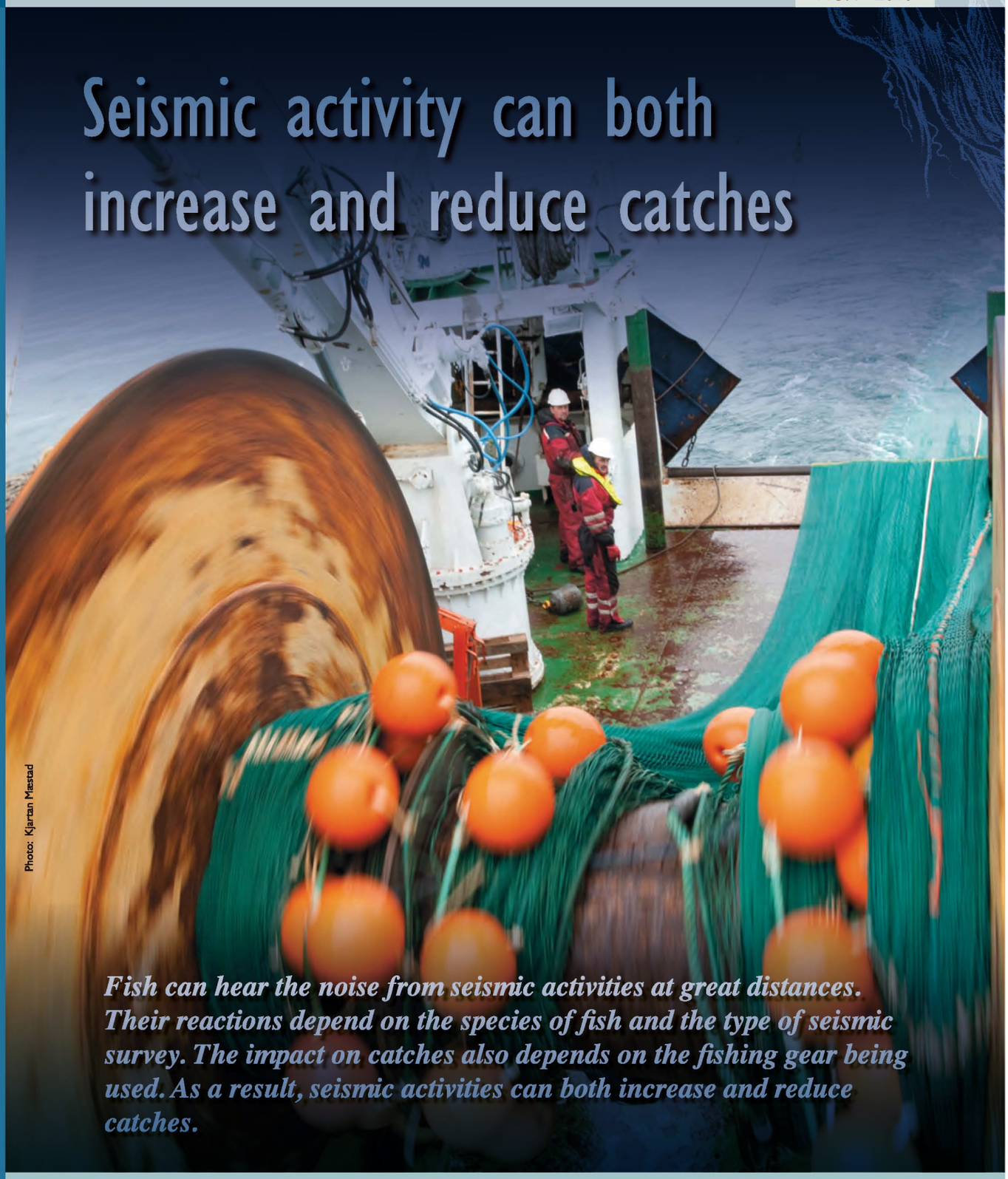

Photo: Kjartan Mæstad

Fish can hear the noise from seismic activities at great distances. Their reactions depend on the species of fish and the type of seismic survey. The impact on catches also depends on the fishing gear being used. As a result, seismic activities can both increase and reduce catches.

BY SVEIN LØKKEBORG

The Institute of Marine Research has carried out two extensive studies of how seismic surveys affect catches in various fisheries. The studies found clear evidence that fish react to the sound of seismic air guns. Sound waves from seismic air guns are powerful, and have low frequencies that overlap with the range at which fish hear best. Fish are therefore able to hear the sound over great distances. How they react and how this affects fisheries, however, depends on the type of seismic survey, the species and the fishing gear being used.

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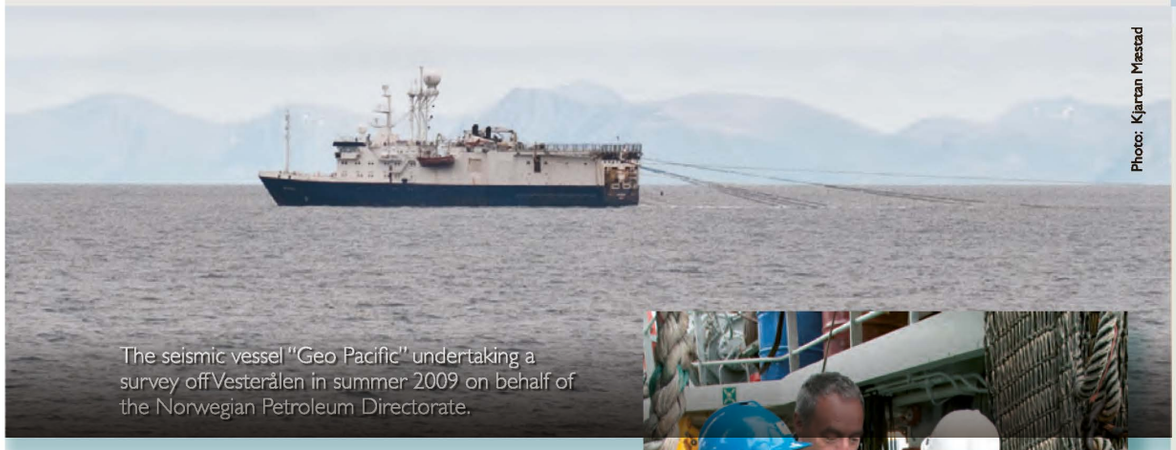

Photo: Kjartan Mæstad

The seismic vessel "Geo Pacific" undertaking a survey off Vesterålen in summer 2009 on behalf of the Norwegian Petroleum Directorate.

NORDKAPP BANK

The first study, which was carried out at Nordkapp Bank in 1992, found significant reductions in catches of cod and haddock for both longliners and trawlers. When the seismic air guns started shooting, catch rates fell by 70 percent in the three by ten nautical mile area where the seismic vessel was operating. Catch rates also fell up to eighteen nautical outside this area, and catches did not return to normal over a five-day period after the seismic shooting finished. The explanation given for the results was that the fish were scared out of the area.

VESTERÅLEN

In summer 2009, a new study was carried out in conjunction with the Norwegian Petroleum Directorate's seismic survey off Vesterålen. The seismic survey lasted from 29 June to 6 August, in an 8 by 46 nautical mile area. The Institute of Marine Research's study started 12 days before the seismic activities began, and continued 25 days after they had been concluded. We found clear increases in gillnet catches of Greenland halibut (132 %) and redfish (86 %), whilst longline catches of Greenland halibut fell (-16 %). Longline catches of haddock trended downwards when the seismic vessel approached the areas where the haddock lines were set. Gillnet catches of saithe also trended downwards, but the differences were not statistically significant. Our explanation for these results is that the fish became stressed and reacted to the sound of the seismic air guns by swimming more, which made Greenland halibut and redfish more likely to be caught in gillnets, whereas the saithe may to some extent have left the area. The fall in longline catch rates may be a result of stress making the fish less motivated to look for food, or of them partially leaving the area.

Photo: Kjartan Mæstad

Seismic activity can both increase and reduce catches, depending on the species and fishing gear.

CONTRASTING RESULTS

These two studies produced very different results. This can be explained by the fact that the seismic activities at Nordkapp Bank were concentrated in a much smaller area than the seismic survey off Vesterålen. The fish were therefore exposed to more intense and continuous sound (number of air gun shots by area and time), which probably led to many of the fish being scared away from the area. Off Vesterålen there was a long interval (around 15 hours) between each time the seismic vessel passed a given area, and the fish probably reacted by swimming more, but did not leave the area in any great numbers. Furthermore, behaviour patterns vary between species, and differences in responses to sound may also help to explain the results of the two studies.

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