NEWS

Advice explainer: ecological and environmental effects of pulse trawling

We explore some of the key points in the advice published today on the impact of electric pulse trawls compared to traditional beam trawls in the exploitation of North Sea sole.

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What does the advice say?

The advice, issued in response to a request from the Netherlands, compares the effects of electrical pulse trawls and traditional beam trawls on the ecosystem when fishing the total allowable catch (TAC) of sole in the North Sea. It concludes that pulse trawling has fewer environmental and ecological effects than beam trawls.

How are there fewer effects?

Traditional beam trawling involves towing a net held open by a large beam over the seabed. Tickler chains are attached to the beam to disturb the flatfish. In pulse trawling, these chains are replaced by strings of electrodes which produce an electrical field.

While both pulse and beam trawls can be used to harvest sole sustainably, the former do not penetrate as deeply into seabed sediments, resulting in a lesser effect on the organisms living there (benthos). Pulse trawling also produces a smaller footprint – seabed area fished at least once annually – which equates to a reduced affected area.

As no additional mortality on benthic invertebrates from pulse electricity has been found, the impact of such trawling on ecosystem structure and functioning is expected to be lower. Gradual impacts over time from repetitive pulse trawling are unlikely.

Pulse trawling probably causes a lower rate of injury through fish colliding with gear, although there is some impact from its electrical field (explained later).

How is pulse trawling changing in this sea area?

Flatfish fisheries in the southern North Sea are mixed fisheries. The main target species, sole, is taken along with plaice as well as brill, turbot, flounder, and dab. Conversion from traditional beam to pulse fishing has occurred in many vessels progressively since 2009. Over this period, fishing mortality has reduced and stock biomass has increased for these flatfish.

The shift in fishing method has resulted in a change in distribution of the fishery. Pulse trawling has increased in areas such as off the Thames estuary and the Belgian coast but decreased in others. This change is related to lighter gear, which can be used on softer grounds than the beam trawls.

How does this affect the catch?
The transition to pulse trawl has changed the composition of species caught, with a relative higher catch of sole and lower catch of plaice. This higher catch efficiency for sole with a pulse trawl means the same amount of sole can be caught in less time or fishing effort. Discard rates differ between the two types of gear, with pulse trawling accounting for a lower flatfish discard rate. There is no evidence of additional mortality in younger life stages of flatfish that are in contact with the pulse trawl but not retained in it.

Does pulse trawling injure the fish and other organisms?
Organisms can suffer injuries through collision with both pulse and traditional beam gear, but the rate of fish being injured in this way is likely lower with pulse trawls due to their fewer mechanical parts and slower tow speed.

Marine organisms detect and respond in various ways to electrical pulse. Cod suffer a relatively high rate of injuries – including spinal fractures and haemorrhages – from the electricity. The largest impact is on medium-sized cod, with a lower impact on small and large cod. Most of the cod injured by the pulse are retained by the gear and killed, and relatively few injured cod escape the trawl. There are also relatively few cod in the southern North Sea, and the shift to pulse trawl has not significantly added to the overall mortality of the North Sea stock. Whiting also suffer injuries, although flatfish (sole, plaice, and dab), sea bass, and small-spotted catshark do not.

There is some evidence showing that invertebrates in the trawl track show no detectable effects of electrical stimulation from the trawl, which signals that those outside the trawl track are unlikely to be impacted. There is no current information on how the electrical pulse affects species at early life history stages. However, due to other ecological factors, such effects would probably not have consequences at a population level.