

# The Seafish Guide To **The Environmental Impacts of Towed Gear**



This is one of a series of guides in which Seafish explores topical issues affecting the UK seafood industry. This guide describes the different types of towed gear, the importance of trawling to the UK fishing fleet and managing the environment of trawling, especially beam trawling.



## A Definition

Towed gears, also known as active gears or mobile gears, are typified by trawls, but also include dredges. There are a variety of types of towed trawl gears in use and these vary greatly in size and design, dependent upon the topography of the sea bed, the size of the towing vessel, the depth of fishing and the habits of the target species.

The seabed is modified by trawling but the degree of change varies with local conditions and the type of trawling. Some skim just over the seabed, with minimal contact, others are designed to disturb animals that are buried in the first inch or so of the seabed. Trawling may take place over very fine, sandy ground or over rocky areas of seabed.

In the UK towed gears are used for targeting species that live on the sea bed of the continental shelf, such as cod, haddock, Dover sole, megrim, anglerfish and prawns.

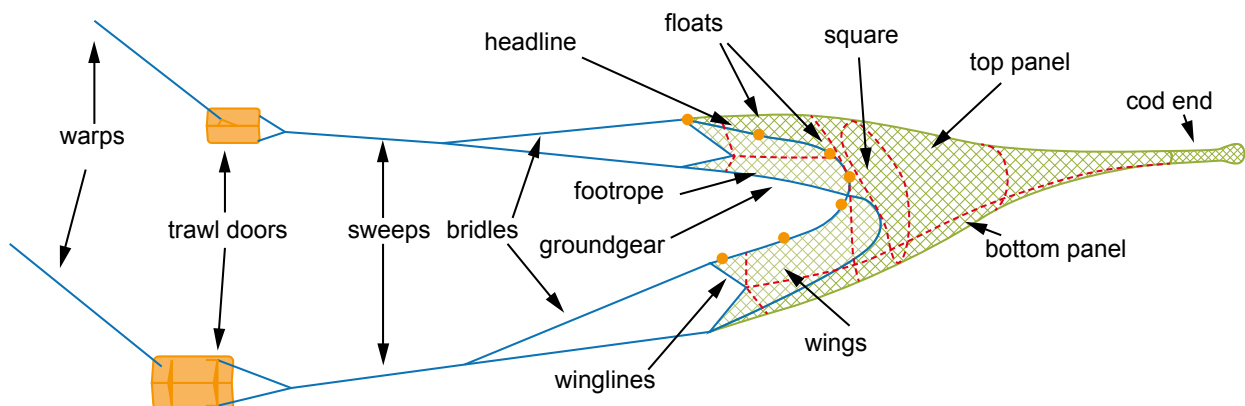
Bottom towed gears are the most common forms referred to but the different types of towed gear are:

- Beam trawl. The trawl is towed on the seabed in which the net is held open by a wood or steel beam.
- Bottom (also called demersal) trawls are a direct descendant of the original beam trawl. A basic trawl is made up from two shaped panels of netting laced together at each side to form an elongated funnel shaped bag.

The trawl is towed on the seabed, and it may be held open by a pair of otter boards (trawl doors). If towed by two vessels otter boards are not needed, and these are known as a pair trawl. Otter and pair trawls are usually much larger than beam trawls.

- Pair seine. Similar to a pair trawl but usually using longer lengths of warps/ropes laid on the sea bed.
- Twin-rig trawl. Method of towing two otter trawls side by side.
- Multi-rig trawl. Method of towing two or more otter trawls side by side.
- Anchor (Danish) seining and fly-dragging (Scottish) are methods of laying out a system of ropes and a trawl-like net which is then closed up by the operating vessel. Pair seining is similar but uses two boats and longer wires.
- Dredge. Rigid structure towed on the seabed usually for shellfish.

A typical bottom trawl showing warps and netting panels and other components is illustrated below. The illustration of the trawl shows that some parts will normally be in contact with the sea bed – particularly the otter boards, sweeps and ground gear. They will usually have some impacts on the non-target creatures in their path and on the physical structure of the sea bed. There is a lot more detail on each of these different fishing methods on the Seafish website.



## The Importance Of Trawling

### History

The first reference to bottom trawling dates back to a petition in 1376 to Edward III, complaining of the “subtlety contrived instrument called the wondychroun”. This used a wooden beam to hold the mouth of the net open. At that time, sailing boats could only tow relatively small trawls. The introduction of new technologies (such as mechanical propulsion, hydraulics, onboard freezing and fish finding equipment) led to greater industrialisation and huge increases in fishing effort through the 20th century.

### The UK fishing fleet

Trawling with a towed gear is an integral part of fishing both in the UK and around the world. It is an efficient form of fishing because it herds fish together during capture – by contrast hooks and traps rely on fish coming to them and then snaring them in some way.

### Vessel length<sup>1</sup>

- Larger vessels represent a very significant sector of the UK fishing fleet.
- Almost 80% of the UK fleet is made up of vessels of 10 metres and under in length, but these vessels only account for 8% of the fleet’s capacity and a third of the fleet’s power.
- Whilst vessels over 18 metres in length account for just 8% of the total number, they accounted for 79% of total capacity, 47% of total power and 89% of all landings of demersal species by the UK fleet in 2012.
- And vessels over 24 metres in length account for 69% of the quantity of landings by the UK fleet in 2012. At the end of 2012, these vessels constituted just 4% of the UK fleet by number, yet their landings of pelagic species formed 96% of the annual total for the UK fleet.

### Gear type<sup>1</sup>

- 88% of fish landed by UK vessels in 2012 was captured using mobile gears. These include beam trawls, demersal trawls and seines, purse seines and dredges.
- The large majority of demersal and pelagic fish landed by UK vessels in 2012 were captured using demersal trawls and seines. This broad category includes otter, nephrops, shrimp and pair trawls, and all demersal seines.
- For shellfish, dredges were used to capture 33% of the shellfish landed by the UK fleet; the remainder were chiefly caught using pots and traps (32%) and demersal trawls and seines (28%).

Because trawling is so integral to the UK fishing industry it must be utilised in a responsible manner. Responsible bottom trawling requires a clear understanding of the nature of the seabed and the likely impact of the trawl method. This type of fishing must be properly managed and should not be used in areas where it will adversely affect important marine habitats (such as deep sea corals) or areas previously untouched by fishing.

## Key Facts

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The use of towed fishing gear for trawling the seabed, started in the Middle Ages and is a very efficient method of fishing

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The seabed has been subject to trawling, including beam trawling and its descendants, for centuries, and yet the marine ecosystems continue to produce the same species in commercial quantities

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The extent of seabed impact depends on local conditions and the type of trawl

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## Fishing And Biodiversity

*“The majority of UK seabed is composed of various sediments resilient to trawl disturbance and subject to modification by natural physical processes. As we improve fishing technology, there is ample opportunity for recovery to occur.”* Professor Michel Kaiser, Professor of Marine Conservation Ecology, Bangor University

The seabed has been subject to trawling for centuries, and yet the marine ecosystems continue to produce the same species in commercial quantities. Just as with many other human activities, the impact of trawling has affected the environmental status of the European continental shelf. The seabed is no longer pristine but, in its ‘modified’ state, it still provides us with fish to eat.

Whilst trawling is a very successful method of fishing, irresponsible use can result in ecological damage, and so it has attracted negative criticism. Whilst it is true that the seabed can be modified by bottom trawling methods, the impact on biodiversity will be minimal if the area trawled is sandy or gravelly – the seabed will quickly return to its original state through the natural action of waves and tides. Although inappropriate use of bottom towed gears can certainly be destructive, the vast majority of effort is in areas which have been trawled for many years, or where the seabed substrate is mobile. In such conditions environmental factors such as wave or tidal action may have a more pronounced effect than beam trawling and the seabed will return quickly to its original state. Much bottom trawling for flatfish in the North Sea is under these conditions. Similarly trawling in an area which has already been extensively harvested will have minimal further long-term impact.

Trawlers have explored virtually the entire continental shelf, with the most profitable trawling grounds fished for many years to differing degrees of intensity. A lot of grounds are fished many times each year, and year

after year. Fishermen have their favourite tows because they still produce good catches of fish. Historically the seabed may have been impacted substantially, but target species of fish are still found on these fishing grounds.

## Impact on the seabed

Concerns about the impacts of beam trawls and dredges are often based on the assertion that they are very damaging to the seabed and wreck one area then move to another. The reality is that each of these methods is only used on specific types of seabed.

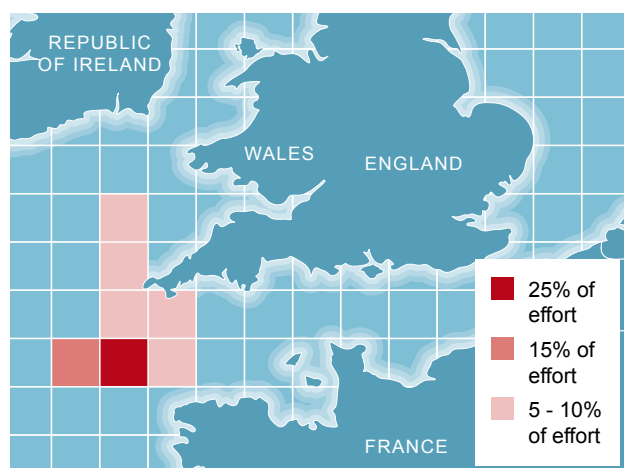
For example beam trawling is limited to very specific areas of the sea bed: it has its place – and generally stays in its place. Beam trawling is only suitable for certain species on very particular types of ground. The most favoured grounds are those where the highest concentrations of soles are found – particularly Dover sole. This is on fine, mainly sandy ground often with some stones. They are also areas of high energy – ground swells and tidal currents commonly impact upon the seabed in a similar way to bottom trawls.

Ray Holborn in *Overfishing: What Everyone Needs to Know* published in April 2012 looks at the trawling impacts on the ecosystem and how long the ecosystem takes to recover from trawling. He concludes that gears such as trawlers do modify the sea floor, but they do not destroy it, particularly if it is sandy or muddy. Globally, where trawlers are used, zones remains quite productive if the effort is adapted, it is just as likely that a storm will disturb the habitat, and that reconstruction can sometimes be very quick.

**“The extreme claim that trawls catch all marine life and kill all habitats is certainly not true for most of the ocean that is trawled.”**  
Ray Hilborn

## Concentrated effort

Take the example of the beam trawler fleet in south west England. The map illustrates the relative proportion of effort that is applied in each of the 'statistical rectangles'. This shows very clearly that effort is concentrated on a very few rectangles and this pattern is repeated year after year with a degree of effort rotation. This same fleet has also been involved in Project 50% which has seen average discard reductions of around 52%<sup>2</sup>.



## Managing environmental impact

The Barents Sea cod stock<sup>3</sup>, which is Marine Stewardship Council certified<sup>4</sup>, is one of the most important cod stocks in the world and has excellent examples of extremely well-managed, but intensively-fished, trawl fisheries. According to ICES the stock biomass is at an all-time high. A reduction in fishing mortality in recent years is largely a result of the implementation of the harvest control rule and the absence of IUU fishing. In addition to quotas, fisheries are regulated by minimum mesh size limitations, a minimum catching size, a maximum bycatch of undersized fish, maximum bycatch of non-target species, closure of areas with high densities of juveniles, other seasonal and area restrictions, and sorting grids are mandatory. A real-time closure system is in force aimed at protecting juvenile fish, and fishing is prohibited in areas where the number of undersized cod, haddock, and saithe has been observed to exceed 15%.

## The process of change

The fishing industry has shrunk over the last twenty years or so. Now the UK fleet continues to adapt to changing circumstances:

- Fleet reduction. The number of registered UK fishing vessels has fallen by 26% since 1996. Capacity (GT) and power (kW) have decreased by 27% and 24% respectively over the same period. As well as an underlying downward trend in the size of the fleet associated with reduced fishing opportunities, UK fisheries administrations have operated decommissioning exercises in 2001-2002, 2003, 2007 and 2008-2009. The same decline is true of the whole EU fishing fleet.
- Fuel price rises have significantly increased the cost of fishing, particularly by trawl. This creates a strong incentive to adopt less energy-intensive fishing methods. Where towed gear is concerned energy use is a very rough indicator of environmental impact.
- The targeting of fishing effort and improved selectivity to reduce discard levels are a key focus of the current reform of the Common Fisheries Policy.
- Other stakeholders are increasing the pressure to value the marine environment more than just for fishing. This adds to the momentum for change, particularly in terms of creating areas of special interest and marine conservation zones (or marine protected areas). These may not necessarily exclude all fishing but might limit use of towed gears.
- Supermarket retailers are becoming more influential in driving improved practice and sustainability in the fishing industry, often with incentives for change. This drives change as fisherman respond – like any entrepreneurs – to meet the needs of the market.

## Key Facts

In 2012 there were 6,406 registered vessels in the UK fleet, of these 1,374 were over 10 metres



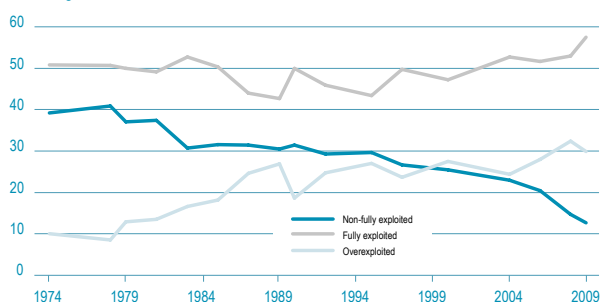
## The Need For Seafood

As acknowledged by Government advice fish is good for us and is also an essential source of nutrition for many millions of people around the world.

Fish is a valuable protein source. Global production of fish (wild and farmed) was about 148 million tonnes in 2010, of which 128 million tonnes was for human food. Overall global capture fisheries production continues to remain stable at about 90 million tonnes. The global population is increasing and, in order to maintain at least the current level of per-capita consumption of aquatic foods, the world will require an additional 23 million tonnes by 2020<sup>5</sup>.

Our marine ecosystems have remained remarkably productive over the last century or so, despite well publicised problems with overfishing in some areas. There is now a much better understanding of what we're doing and how fishing impacts on the environment.

Percentage of stocks assessed



## Key Facts

88% of fish landed by UK vessels in 2012 was captured using mobile gears

## Other Seafish Guides

There are a number of other Seafish Guides in this series, covering different aspects of responsible fisheries and sustainability. For more details and the most up to date information consult our website at [www.seafish.org/responsible-sourcing](http://www.seafish.org/responsible-sourcing)

There is also a series of responsible sourcing guides outlining the individual stock status of the 38 main species of fish consumed in the UK (about 300 stocks).

## References

- [www.marinemangement.org.uk/fisheries/statistics/annual.htm](http://www.marinemangement.org.uk/fisheries/statistics/annual.htm)
- [www.cefas.defra.gov.uk/our-science/fisheries-information/discards-and-fishing-gear-technology/project-50.aspx](http://www.cefas.defra.gov.uk/our-science/fisheries-information/discards-and-fishing-gear-technology/project-50.aspx)
- [www.ices.dk/committe/acom/comwork/report/2012/2012/Cod-arct.pdf](http://www.ices.dk/committe/acom/comwork/report/2012/2012/Cod-arct.pdf)
- [www.msc.org/track-a-fishery/changes-to-our-fisheries-pages/certified/north-east-atlantic/barents-sea-cod-and-haddock/barents-sea-cod-and-haddock](http://www.msc.org/track-a-fishery/changes-to-our-fisheries-pages/certified/north-east-atlantic/barents-sea-cod-and-haddock/barents-sea-cod-and-haddock)
- [www.fao.org/docrep/016/i2727e/i2727e00.htm](http://www.fao.org/docrep/016/i2727e/i2727e00.htm)

## Other sources

[www.seafish.org/media/Publications/UKFishing\\_PastPresentFuture.pdf](http://www.seafish.org/media/Publications/UKFishing_PastPresentFuture.pdf)

## About Seafish

Seafish was founded in 1981 by an Act of Parliament and aims to support all sectors of the seafood industry for a sustainable, profitable future. It is the only pan-industry body offering services to all parts of the industry, from the start of the supply chain at catching and aquaculture; through processing, importers, exporters and distributors of seafood right through to restaurants and retailers.

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