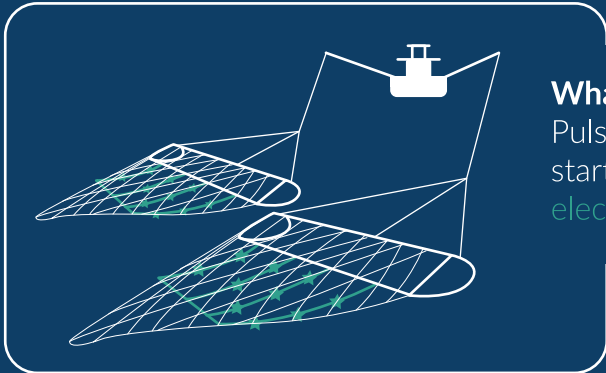


Pulse Fishing:

a reduction of fishing impact and fuel consumption



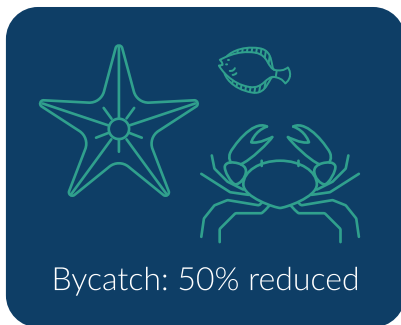
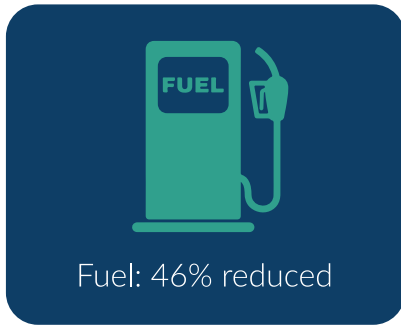
What is pulse fishing?

Pulse fishing is a bottom trawl fishery where the tickler chains to startle the fish from the sea bed have been replaced with weak **electric pulses** that make the fish leap into the fishing net.

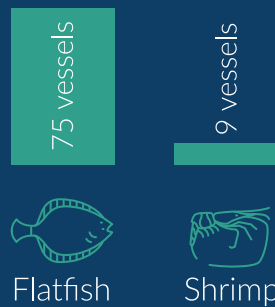
Development and use of the pulse gear

Pulse fishing was developed as an alternative to the beam trawl, with the aim to **reduce fishing impact** on the sea bed when catching flatfish.

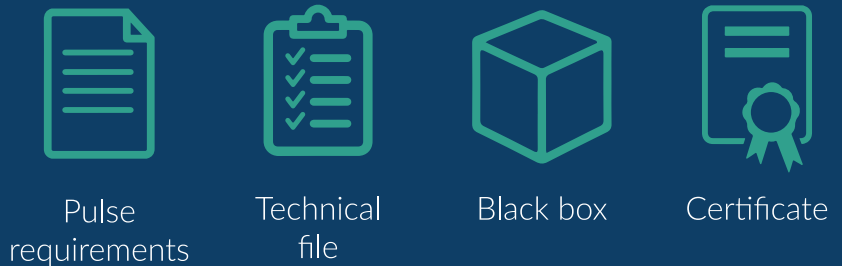
Environmental benefits



Target species



Control and Enforcement



Research – The most studied fishing gear



The impact on marine organisms

LONG TERM

The long term impact



The impact on the sea floor ecosystem

Pulse Fishing:

a reduction of fishing impact and fuel consumption

What is pulse fishing?

Pulse fishing is a bottom trawl fishery where the tickler chains to startle the fish from the sea bed have been replaced with weak electric pulses that make the fish leap into the fishing net.

Development and use of the pulse gear

Pulse fishing was developed as an alternative to the beam trawl fishery targeting sole, with the aim to reduce fishing impact on the sea bed when catching flatfish. In the Netherlands 84 derogations on the European prohibition on electric fishing have been granted on the basis of the following grounds:

- In every member state 5% of the fleet can make use of the pulse gear, this accounts for 22 Dutch vessels (article 31a of Regulation 850/1998);
- Another 20 derogations have been granted on the basis of article 43 of Regulation 850/1998, which stimulates scientific research;
- Another 42 derogations have been granted on the basis of article 14 of Regulation 1380/2013 to facilitate the implementation of the Landing Obligation.

About 75 Dutch vessels with a pulse derogation use the pulse gear to target flatfish, predominantly sole (*Solea solea*). About 9 Dutch vessels have a pulse derogation which permits them to participate in a research project to develop the pulse gear for the brown shrimp (*Crangon crangon*) fishery. Most of the stocks in the North Sea that have been assessed, including sole, are exploited at or below Maximum Sustainable Yield (ICES, 2017). The Dutch fishery on brown shrimp has recently been recommended for MSC-certification and is currently in the final stage of the certification process.

The environmental benefits of the transition from beam trawl to pulse trawl (2008 – 2017)

- The bycatch of benthic fauna and undersized fish has been reduced with more than 50% (Rijnsdorp et.al., 2016);
- The seafloor area swept per fishing hour has been reduced by about 20% due to the lower speed required when fishing with the pulse gear in comparison to the beam trawl (Rijnsdorp et.al, 2016);
- The penetration of the gear in the seafloor is reduced (Rijnsdorp et.al, 2016);
- The total fuel consumption by fishing vessels of >300 hp has been reduced by 46% (Turenhout et.al., 2016);
- The survival of undersized sole and plaice has been increased (Van der Reijden et.al., 2017).

Control and Enforcement

The Working Group Pulse Control and Enforcement, including representatives from the Dutch fishing industry, the Dutch Ministry of Economic Affairs, Dutch control authorities, the North sea Foundation and the suppliers of the pulse technique, has been improving the system of control and enforcement for pulse fishing including the following elements:

- *Pulse requirements*: Since December 2016 the 84 Dutch pulse derogations include an attachment on the technical requirements. This paragraph outlines the permitted parameters and restrictions of the pulse gear.
- *Technical file*: Since January 2017 every pulse vessel has a file on board describing the characteristics of the particular pulse gear that is used on this vessel. With this file, control and enforcement authorities can check that the gear is not manipulated with, deviating from the original permitted settings.
- *Technical limitation to pulse gear*: the permitted pulse gear includes a technical restriction which makes it impossible for the user to increase the output power above the legally permitted values.
- *Black box*: all the pulse gears include a black box that registers the use of the system. Control and enforcement authorities can access these data to check that skippers do not deviate from the allowed use of the pulse system.
- *Certification of pulse modules*: pulse modules have to be certified to prove that the modules do not have the possibility to generate power above the permitted level.
- *Standardization procedure*: the Dutch fishing industry, the Dutch ministry and control authorities and the suppliers of the pulse technique participate in a NEN-normalisation procedure in order to come to an agreement on a standardised pulse technique.

Research – The most studied fishing gear

- Various experiments assessing the impact of the pulse technique on among others shrimps, round fish, flat fish, catsharks and the sea floor have been conducted.
- Multi-annual research projects are carried out by the Dutch fishing industry in cooperation with research institutes to improve selectivity of the gear and to improve survival of unwanted bycatch.
- In order to develop a framework to systematically assess the long term impact of the pulse gear, a multi-annual research programme (2016 - 2019) has been commissioned by the Dutch Ministry of Economic Affairs.
- This so called Pulse Trawl Impact Assessment Project is supervised by a committee consisting of a group of international scientists and the ICES working Group WG Elektra is involved.
- The research questions of this project have been established on the basis of international stakeholder consultations. As a result, the main focus of the research project include:
 - the impact of the pulse technique on the sea floor ecosystem;
 - the impact of the pulse technique on all marine organisms;
 - and the long term impact on the North Sea ecosystem of the Dutch transition from the beam trawl to the pulse trawl.
- All Dutch vessels with a pulse derogation provide data for this research project through detailed registration of their catches.

More information

- www.pulsefishing.eu
- www.wur.nl/en/Dossiers/file/Pulse-fishing.htm

References

ICES, 2017. 9.2 Greater North Sea Ecoregion – Fisheries Overview. DOI: 10.17895/ices.pub.3116. | Rijnsdorp A. et al., 2016. Pulse fishing and its effects on the marine ecosystem and fisheries. Wageningen University & Research Report C117/16. | Turenhout M.N.J. et al., 2016. Pulse fisheries in the Netherlands; Economic and spatial impact study. Wageningen, Wageningen Economic Research, Report 2016-104. | Van der Reijden et al., 2017. Survival of undersized plaice (*Pleuronectes platessa*), sole (*Solea solea*), and dab (*Limanda limanda*) in North Sea pulse-trawl fisheries. ICES Journal of Marine Science 74(6): 1672 – 1680.

