



ELECTRIC 'PULSE' FISHING — SUPPOSEDLY RESEARCH-DRIVEN BUT, IN FACT, COMMERCIALY-DRIVEN

HISTORICAL BACKGROUND

Despite a negative advice of the Scientific, Technical and Economic Committee for Fisheries (STECF) in 2006,¹ the European Commission and Council have authorized granting exemptions to use electric current — a practice prohibited since 1998² — in the southern part of the North Sea since late 2006³ for the sole purpose of advancing science.

Twenty-two licenses were initially granted to The Netherlands, but under intense pressure from an increasing number of Dutch fishers interested in the technique, the Dutch government obtained two increases in the number of licenses: 20 additional licenses were first granted in 2010 as a means of furthering experimentation,⁴ and then another 42 licenses were granted in 2014 to implement a "pilot project" as part of the European-wide discard ban.⁵ In both cases, these increases were given against very cautious scientific advice from both STECF and the International Council for the Exploration of the Sea (ICES):

- In 2009, ICES experts wrote that *"in [their] opinion, the available data [were] insufficient to recommend the large-scale commercial use of the pulse trawl in fisheries. As a whole, additional tests (both laboratory and field) [were] needed"*;⁶
- In 2012 and following a Request from the Dutch Authorities on the use of the Pulse Trawl in ICES Area IVc and IVb, STECF *"recommend[ed] that the control and enforcement issues [be] resolved before the proportion of the beam trawl fleet using pulse trawls [was] increased"*.⁷

VESSELS INVOLVED IN RESEARCH

Although all vessels should be involved in research, we found that only 33 boats have participated to experiments at least once according to a review of articles/reports published on the electric fishing portal <http://pulsefishing.eu>. Details are given in the table below.

¹ STECF (2006) 23rd report of the Scientific, Technical and Economic Committee for Fisheries (second plenary meeting), Barza d'Ispra, November 6-10 2006. Commission Staff Working Paper. 99 p. Its conclusion was that *"although the development of this technology should not [have] be[en] halted, there [were] a number of issues that [should have] need[ed] to be resolved before any derogation c[ould have] be[en] granted"*. These issues concerned *"the unknown effect of pulse trawl fisheries on non target species and the potential impact on vertebrates and invertebrate species"*.

² Council Regulation (EC) No 850/98.

³ Council Regulation (EC) No 41/2007.

⁴ Under the guise of Article 43 of Council Regulation (EC) No 850/98.

⁵ Under the guise of Article 14 of Regulation (EU) No 1380/2013.

⁶ ICES (2009) 1.5.6.3. — Answer to The Netherlands' request on electric pulse trawl. ICES Advice 2009, Book 1, International Council for the Exploration of the Sea (ICES), Copenhagen (Denmark). 9 p. Available at:

www.ices.dk/sites/pub/Publication%20Reports/Advice/2012/Special%20Requests/France_pulse_trawl.pdf.

⁷ STECF (2012) 39th plenary meeting report of the Scientific, Technical and Economic Committee for Fisheries, Plenary meeting April 16–20 2012, Brussels — Study. Scientific, Technical and Economic Committee for Fisheries (STECF). 109 p.



It should be noted that most of them carried out self-sampling, i.e. fishers weighted their bycatch themselves for example, with scientific observers being generally absent for such measurements.

EXISTING CRITICISMS

In 2013, ICES mentioned that certain vessels had never participated to any kind of research and were purely commercially-driven: "*The WR40 switched to electric fishing (Marelec system) in spring 2012. This vessel was not followed up in a scientific project. The makeover was completely financed by the company itself apart from any project subsidy. As a consequence crew focuses on catch quantity (short return of investment) and less on catch selectivity*".⁸

In 2015, ICES stated that "*the issuing of 84 licenses to carry out further scientific data collection is not in the spirit of the previous advice and that such a level of expansion is not justified from a scientific perspective. [...] This is well in excess of the 5% limit included in the current legislation. At this level this is essentially permitting a commercial fishery under the guise of scientific research*".⁹

Furthermore, many experiments published in either reports or peer-reviewed papers have also been (or are) subject to criticism. For example:

- With regards to the experiments carried out by, e.g., Depestele *et al.* (2014)¹⁰ on post-release survival rates, Uhlmann *et al.* (2016) observed that "*these conditions may be considered mild compared with 120 min trawls [...] and >5 t catch weights [...] that are typical for the majority of the beam-trawl fleet in the North Sea*".¹¹
- Regarding the impact on the seabed, observation timeframes differ between regular beam trawls and electric 'pulse' trawl. While researchers observed the impacts of the former within 12–44 hours, they made measurements between 55–107 hours for the latter;¹²
- An experiment on the impact of electricity on the feeding behavior of sharks concluded that there was none,¹³ although the individuals (of lesser spotted dogfish, a species that is extremely resistant) were fed in such a way that it was impossible to measure such an impact.¹⁴ Another experiment, which used the same species and a very similar protocol also reached the same conclusion, although individuals were only subjected to a single electrical shock.¹⁵
- ... (non-exhaustive list; not the purpose of this note).

⁸ ICES (2013) Report of the Study Group on Electrical Trawling (SGELECTRA). ICES CM 2013/SSGESST:13, International Council for the Exploration of the Sea (ICES), Copenhagen (Denmark). Available at:

<http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGESST/2013/SGELECTRA2013.pdf>.

⁹ ICES (2015) Second interim report of the working group on electrical trawling (WGELECTRA). IJmuiden, The Netherlands, 10-12 November 2015 Copenhagen (Denmark). Available at:

<http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGESST/2015/WGELECTRA%202015.pdf>.

¹⁰ Depestele *et al.* (2014) Short-term survival of discarded target fish and non-target invertebrate species in the "eurocutter" beam trawl fishery of the southern North Sea. Fisheries Research 154: 82–92.

¹¹ Uhlmann *et al.* (2016) Injury, reflex impairment, and survival of beam-trawled flatfish. ICES Journal of Marine Science 73(4): 1244-1254.

¹² Depestele *et al.* (2016) Measuring and assessing the physical impact of beam trawling. ICES Journal of Marine Science 73(suppl_1): i15-i26.

¹³ de Haan *et al.* (2009) The effects of pulse stimulation on biota — Research in relation to ICES advice — Effects on dogfish. Report number C105/09 Institute for Marine Resources and Ecosystem Studies (IMARES), IJmuiden (The Netherlands). 32 p.

¹⁴ "*These dogfish offered sardine as a food under quite simple foraging conditions, where the sharks could find the food items without any electro-receptors. Ideally, special experiments are needed to show that electroperceptive system still works in elasmobranchs exposed to a strong electric field*". ICES Advice 2009, Book 1, p4. Disponible à :

www.ices.dk/sites/pub/Publication%20Reports/Advice/2009/Special%20Requests/Netherlands%20Pulse%20Trawl.pdf

¹⁵ Desender *et al.* (2017) Pulse trawling: evaluating its impact on prey detection by small-spotted catshark (*Scyliorhinus canicula*). Journal of Experimental Marine Biology and Ecology 486: 336–343.



LIST OF VESSELS "INVOLVED" IN RESEARCH

Vessel	Research periods			
	Publication 1	Publication 2	Publication 3	Publication 4
GO31	From 17/11/2014 to 21/11/2014 From 6/04/2015 to 10/04/2015 From 20/04/2015 to 24/04/2015 From 6/07/2015 to 10/07/2015 ^a			
GO23	From 17/11/2014 to 21/11/2014 From 6/04/2015 to 10/04/2015 From 20/04/2015 to 24/04/2015 From 6/07/2015 to 10/07/2015 ^a	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b		
TH10	2008 and 2010 ^c			
TX68	2008 and 2010 ^c	Week from 5/05/2011 ^d	From 8/05/2011 to 13/05/2011 ^e	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b
TX19	2008 and 2010 ^c	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b		
OD17	2008 and 2010 ^c	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b		
TX36	From 8/05/2011 to 13/05/2011 ^e	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b		
UK153 (sold)	Measures of parameters on board ^f			
TX43	2016 ^g			
ARM7, ARM25, ARM33, ARM44, GO37, HD3, HD22, KW88, OD1, SCH45, SL42, TH6, TX1, TX3, TX38, UK1, UK87, UK95, UK246	From December 2011 to February 2013 578 self-sampling with 25 trawls ^b 10 independant observers joined the vessels for 10 trips in 2012			
1 unknown vessel	June 2014 ^h			
SCH18	12, 13 et 17 June 2013 ⁱ			
SD33 (Germany;	13 to 24 August 2012 ^j			



currently DOR8)

R/V Simon Stevin	November 2014 December 2014 February 2015 ^k
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R/V Belgica	22 to 26 November 1999 ^l	November 2014 December 2014 February 2015 ^k
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^a 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.

^b Rasenberg *et al.* (2013) Monitoring catches in the pulse fishery. C122/13, IMARES, Institute for Marine Resources & Ecosystem Studies. 59 p.

^c de Haan *et al.* (2016) Pulse trawl fishing: characteristics of the electrical stimulation and the effect on behaviour and injuries of Atlantic cod (*Gadus morhua*). *ICES Journal of Marine Science* 73(6): 1557-1569.

^d de Haan *et al.* (2011) The effect of electric pulse stimulation to juvenile cod and cod of commercial landing size. C141/11, IMARES, Institute for Marine Resources & Ecosystem Studies. 44p.

^e van Marlen *et al.* (2011) Catch comparison of pulse trawls vessels and a tickler chain beam trawler. C122b/11, IMARES, IJmuiden (The Netherlands). 67p.

^f van Marlen *et al.* (2007) The effect of pulse stimulation on biota — Research in relation to ICES advice — Progress report with preliminary results. Report number C098/07, Institute for Marine Resources and Ecosystem Studies (IMARES), IJmuiden (The Netherlands). 24p.

^g Rijnsdorp *et al.* (2016) Pulse fishing and its effects on the marine ecosystem and fisheries — An update of the scientific knowledge. Report number C117/16, Wageningen UR, IJmuiden (The Netherlands). 30 p.

^h Uhlmann *et al.* (2016) Injury, reflex impairment, and survival of beam-trawled flatfish. *ICES Journal of Marine Science* 73(4): 1244-1254.

ⁱ Teal *et al.* (2014) Effects of beam and pulse trawling on the benthic ecosystem. Report number C098/14, Institute for Marine Resources and Ecosystem Studies (IMARES), IJmuiden (The Netherlands). 53p.

^j Kratzer (2012) Pulse beam trawling vs. traditional beam trawling in German shrimp fishery: a comparative study. MSc thesis, University of Universität Rostock, Rostock (Germany). x + 114p.

^k Soetaert *et al.* (2016) Reducing bycatch in beam trawls and electrotrawls with (electrified) benthos release panels. *ICES Journal of Marine Science* 73(9): 2370-2379.

^l Polet *et al.* (2005) On electrical fishing for brown shrimp (*Crangon crangon*): II. Sea trials. *Fisheries Research* 72(1): 13-27.
