



ELECTRIC 'PULSE' FISHING: WHY IT SHOULD BE BANNED

APRIL 2018

KEY FINDINGS & CONCLUSIONS

Most fishing nations in the world have banned electric fishing, and so has the EU. However, it has been authorising the use of electric current to capture wild animals through a derogation regime since 2006. Not only does this unethical way of fishing damage our natural world, but electric fishing also threatens the productivity of the ocean and directly destroys jobs in the fishing sector.

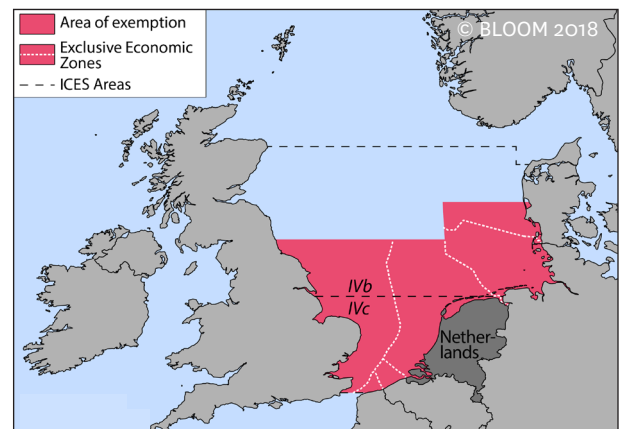
Below you will find a briefing on how a set of scandalous and untransparent public decisions came to be made and that have already had dire consequences for the sea and for livelihoods in small fishing businesses. Banning electric fishing has therefore become not only an environmental and socio-economic necessity but also a fundamental test of democracy. Can the European institutions be trusted to defend the general interest against the pressure exerted by private interest groups?

Europe prohibited electric fishing in 1998 to protect juvenile fish and the future of fishery resources but in 2006, under pressure from the Dutch fishing industry, the European Commission proposed, out of the blue and against scientific advice, to authorize the use of electric current to catch fish in the North Sea under a derogation regime. As a result, the Dutch trawl industry was able to claim millions of euro in public subsidies to equip vessels with electrodes. These super-efficient electric trawlers are not only jeopardizing the health of marine ecosystems but the livelihoods of thousands of sustainable fishers in the UK, France, Belgium, Germany, and the Netherlands.

Today, through the Technical Measures Regulation, European institutions have a chance to put right what looks now like a political, financial and social scandal. The European Commission and EU Members States have a moral duty to follow the European Parliament's enlightened position in favour of a full ban on electric fishing, as voted on 16 January 2018. The ban voted for by 402 to 232 votes would protect small-scale fishers from a grab of resources by industrial fishing lobbies. It would encourage the most environmentally-friendly fishing practices, protect jobs and regional economies, and demonstrate to citizens that decision-making in the EU is based on scientific, social and economic factors and not on the special pleading by powerful interest groups.

Illegal exemptions

- The first exemptions granted for the year 2007 went against the explicit advice from the Scientific, Technical and Economic Committee for Fisheries (STECF).
- These initial derogations benefited from yearly renewal under TACs & Quotas Regulations for 2008 and 2009.
- In 2013, the 1998 Regulation was amended to include the principle of exemptions in the law, allowing Member States to equip up to 5% of their beam trawl fleet with electrodes.
- In parallel, the Dutch government obtained from Council



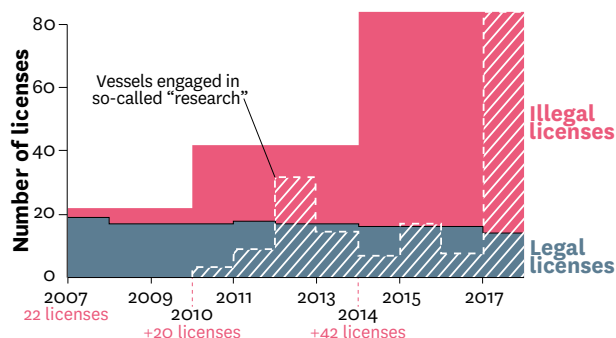
North Sea area where electric 'pulse' fishing exemptions can be granted.

that 20 additional licences be delivered in December 2010 under the guise of "scientific research".

- In 2013, the European Parliament rejected an increase in the number of electric trawlers. Nonetheless, in 2014, the European Commission ignored the Parliament's position and used a subterfuge to satisfy the Dutch lobby at all costs: 42 additional exemptions were thus granted to the Netherlands against scientific advice by STECF, yet again, as part of a "pilot project".
- As a result of these political manoeuvres, most current Dutch licences are illegal. If the Netherlands were to comply with the law, only 14 electric 'pulse' trawlers would be operating in 2018, instead of 84.

Under the guise of research

- In 2015, the International Council for the Exploration of the Sea (ICES) warned that the current number of vessels was a "commercial fishery [operating] under the guise of scientific research".
- Under pressure from revelations made during our campaign, Dutch scientists, fishers and government officials have finally admitted that the conversion of the Dutch fleet to electricity was commercially-driven.



- When summoned by media to provide explanations about licenses, Dutch Minister Carola Schouten recognized that no research had been conducted aboard vessels: "when it became clear [in 2014] that our scientific research on pulse fishing had not yet begun, the Commission approved a third round of exemptions".*

Scandalous subsidies

- Since August 2015, at least EUR 5.7 millions of public subsidies have been allocated to the development of the industrial electric fishing fleet in the Netherlands, including EUR 3.8 millions (67% of the total) from the European Maritime and Fisheries Fund (EMFF), **including for research that was never conducted.**
- Previous subsidies granted from 2007 to 2015 under the "European Fisheries Fund" (EFF) cannot be calculated because the Netherlands have not made the file available publicly despite legal obligations.
- Public funds have thus been used to equip illegal fishing vessels for a prohibited fishing method that is only authorized through a legally unfounded derogation regime resulting from scandalous political decisions, against scientific advice.
- Taxpayers money should be used to steer European fisheries to social and environmental sustainability, not to satisfy powerful industrial lobbies whose operations are leading small, family-owned businesses to bankruptcy and jeopardizing the socio-economic balance of the fishing sector.

Unacceptable impacts

- Electric trawls remain bottom trawls, i.e. high-impact fishing gear that is dragged along the bottom and damages marine habitats.
- Additionally, the electric current used by 'pulse' trawlers jeopardizes the integrity and future of marine ecosystems by impacting both the hatching of eggs and survival of juveniles.
- Electric trawls are utterly non-selective: 50 to 70% of the

catch are discarded. In comparison, gillnetters targeting the same species in the same area discard around 6% of their catch.

- The electric current causes such violent, uncontrolled convulsions in fish and experiments show that 39 to 70% of large cod are left with a fractured spine and internal bleeding after the shock.
- Survival rates measured for several discarded species were very low, especially for undersized specimens.
- The use of electricity in salt-water results in the production of harmful chemicals such as bleach.

A false claim

- Saying that electric trawling is good for the climate is blatantly false: electric trawlers only catch 450 grams of fish per litre of fuel consumed, which is virtually the same ratio as regular beam trawlers (420 grams of fish per litre).
- In contrast, artisanal gillnetters targeting the same species in the same area catch up to 3 kilos of fish per litre of fuel.

A direct social threat

- Artisanal fishers from all over Europe stand united against electric fishing because it directly jeopardises their livelihoods in the North Sea and elsewhere, should it be permitted in other European waters.
- Even in the Netherlands, many fishers including shrimp trawlers find the courage to speak up against electric fishing.
- Because using electric current threatens ocean productivity and a whole fishing sector, electric fishing has been banned in many countries around the world.
- China, which used it in the 90s, banned it in 2000 because of its serious harmful effects on biodiversity.

The development of electric fishing contradicts Europe's own principles of applying the precautionary approach and ecosystem-based management and ensuring equitable access to marine resources to all fishers as laid out in the Common Fisheries Policy (CFP) as well as going against the EU's international commitments to end overfishing and destructive fishing practices.

Fishing in the EU should, according to the CFP, be conducted according to the highest environmental and social standards (habitat impact, selectivity, catch to fuel ratio, employment, etc.), and fishing opportunities should be allocated according to these guiding principles and objective criteria, as required under Article 17 of the CFP.

* Schouten: Brussel gaf zelf toestemming voor vergunningen pulsvisserij. 27 March 2018. Available at: <https://nos.nl/artikel/2224621-schouten-brussel-gaf-zelf-toestemming-voor-vergunningen-pulsvisserij.html>

ELECTRIC 'PULSE' FISHING: WHY IT SHOULD BE BANNED

Europe is faced with a 'Frankenstein' case, i.e. a problem we have created entirely for ourselves: electric 'pulse' fishing'. Electric fishing, which is forbidden in most fishing nations in the world, including China, was also banned in the EU until the European Commission and the Council, at the end of 2006, made a questionable decision to authorize the use of electric current to catch fish and to grant unjustified exemptions. The allocation of derogations went against scientific advice, but it satisfied the private interests of the Dutch industrial beam trawl fleet.

The use of electricity in the wild has serious environmental and socio-economic consequences: not only is the seabed impacted by huge industrial nets, but the surrounding marine life is now electrocuted and harmed.

Europe needs to fix the problems it has generated. The survival of the small-scale fishing sector requires that European institutions definitively ban this destructive fishing technique. On 16 January 2018, the European Parliament overwhelmingly voted in favor of a full ban on electric fishing. Both Commission and Council must now follow suit.

Electric fishing is a technological trick that allows trawlers to catch valuable fish such as sole more efficiently and therefore to radically increase the profits of an otherwise loss-making fleet.

Under the guise of "experimental fishing", a whole fleet in the Netherlands has been converted to a fishing method that is banned in Europe (and elsewhere in the world). Several millions of euro of public money have been allocated to equipping Dutch vessels with electric 'pulse' trawls, with the complicity of public authorities.

Reducing costs in a situation of chronic overexploitation and fragile economic balance is a seductive argument to convince European fishers to equip their vessels with electrodes. Unfortunately, this fishing method is so effective that above all, it threatens to accelerate the exhaustion of marine resources and ruin the fishing sector in the short to medium term.

Accepting electric fishing is an admission of failure: that there are no longer enough fish for fishers to fill their nets without recourse to increasingly sophisticated and effective technology. There is an urgent need to understand the risk associated with the mermaid's song of industrial fishers,

and to say no to the desertification of the ocean, the disappearance of small-scale fishing and the collapse of a whole economic sector.

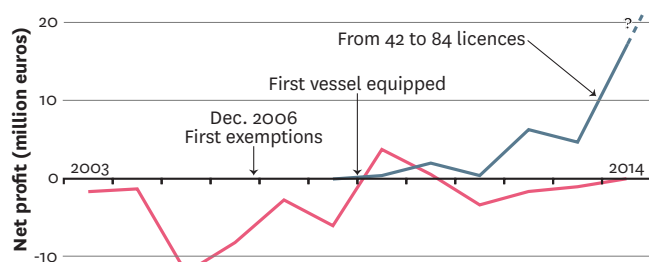


Juvenile plaice and high bycatch rate (in the background) from an electric trawler in the North Sea.

AN ILLEGITIMATE BUT LEGAL CONSTRUCT

The economic model of the beam trawl fleet is extremely vulnerable because of its structural dependency on fuel. Rather than questioning an inevitably doomed fishing method because of its unacceptable environmental impact and excessive fuel consumption, the Dutch have stubbornly pursued high-impact fishing methods instead of converting to more sustainable gears.

By allowing 84 licences for a prohibited fishing practice, European institutions have caved in to lobbying from the Dutch government and fishing industry, whose trawl fleet was teetering on the edge of bankruptcy in the 2000s due to fuel prices.¹



Net profits of the Dutch regular beam trawl fleet (in pink) and electric 'pulse' trawl fleet (in blue), from 2003 to 2014. Modified from Turenhout *et al.* (2016).

A scandalous initial decision

Despite the proven destructiveness of electric fishing, the European Commission proposed in late 2006 and against the advice of the Scientific Technical and Economic Committee for Fisheries (STECF),² to authorize exemptions to use electric current — a practice prohibited since 1998³ — in the southern part of the North Sea.⁴ The Commission's proposal was swiftly adopted by Council in December 2006. Through sleight of hand, this authorization to practice a prohibited fishing method came as a legislative rider through the 'Total Allowable Catches (TACs) & quotas' Regulation, i.e. the text that allocates fishing opportunities to each Member State on a yearly basis. This covert trick was renewed in 2007⁵ and 2008,⁶ for the years 2008 and 2009 respectively. As a result, the Netherlands used the exemption regime tailor-made for them to grant 22 licences to domestic trawlers.

Further tricks

In 2008, the European Commission released a legislative proposal to "simplify the Technical Measures Regulation",⁷ which was adopted by Council in 2009 just days before the Lisbon Treaty came into force and imposed co-decision with the Parliament thereafter: EC Regulation 1288/2009 allowed electric fishing to continue until 20 June 2011 under the name of "transitional technical measures". These were prolonged until the end of 2012 thanks to EU Regulation 579/2011, which was voted through the support of the European Parliament.

It was only in 2013 that the 1998 Regulation was amended to include this principle of exemptions in the law, thus allowing Member States to equip up to 5% of their beam trawl fleets with electrodes without requiring yearly exemptions.⁸

However, the 5% exemption was only sufficient to convert a small proportion of the commercial fleet of Dutch trawlers to electricity. The Dutch government succeeded through opaque manoeuvres to obtain from Council that 20 additional licences be delivered in December 2010,⁹ in blatant infraction with the law and bringing the total amount of licences to 42.¹⁰ Yet again, 42 licences were still not sufficient to satisfy all Dutch fishers, so the Government sought other justifications to obtain licences despite the Dutch beam trawl fleet having already converted 10% of its vessels, i.e. over twice the legal threshold.

In 2014, Dutch lobbying on the European Commission proved efficient: the European Maritime and Fisheries Fund's (EMFF) legislative proposal included the possibility to increase the legal threshold of electric trawlers through to the modernization of fleets. Fortunately, this detrimental measure was identified and removed by the Parliament's EMFF rapporteur, French MEP Alain Cadec.¹¹ Defeated by the Parliament's decision, the Netherlands negotiated directly with the Commission and Council a way to circumvent the Parliament's decision and obtained 42 additional derogations, under the guise of a supposedly "pilot project" on bycatch mitigation.¹²

¹ Turenhout *et al.* (2016) Pulse fisheries in the Netherlands — Economic and spatial impact study. Report 2016-104, Wageningen University & Research, Wageningen (The Netherlands). 32 p.

² 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 "there [were] a number of issues that need[ed] to be resolved before any derogation c[ould] be granted".

These issues concerned "the unknown effect of pulse trawl fisheries on non target species and the potential impact on vertebrates and invertebrate species".

³ Council Regulation (EC) No 850/98.

⁴ Council Regulation (EC) No 41/2007.

⁵ Council Regulation (EC) No 40/2008.

⁶ Council Regulation (EC) No 43/2009.

⁷ European Commission (2008) Proposal for a Council regulation concerning the conservation of fisheries resources through technical measures. COM(2008) 324

final. 2008/0112 (CNS). 25 p.

⁸ Council Regulation (EC) No 850/98 amended by Regulation (EU) No 227/2013.

⁹ Haasnoot *et al.* (2016) Fishing gear transitions: lessons from the Dutch flatfish pulse trawl. ICES Journal of Marine Science 73(4): 1235-1243.

¹⁰ The justification of the Council's decision nor the legislative act are nowhere to be found.

¹¹ Haasnoot *et al.* (2016) *Op. cit.*

¹² Article 14 of Regulation (EU) No 1380/2013.

Most licences are illegal

If the Netherlands were to comply with the legal limit set by the 2013 Technical Measures Regulation, there would be 14 Dutch electric 'pulse' trawl licences in 2018 and not 84.¹³ According to Dutch institute IMARES, soles caught by electric trawlers in 2014 accounted for 92% of all soles caught by Dutch beam trawlers.¹⁴

In October 2017, BLOOM filed a complaint to the European Commission against the Netherlands, for the illegal and unjustified allocation of exemptions.¹⁵ The Commission had not responded to this complaint as of 15 April 2018.

Unlawful public subsidies for a destructive fishing method

Since August 2015 only, at least EUR5.7 millions of public subsidies have been allocated to the development of the industrial electric 'pulse' fishing fleet in the Netherlands (either for equipment or research), including EUR 3.8 millions (67% of the total) from the EMFF.¹⁶ These public subsidies have been abusively granted to a "destructive fishing gear" for 'research', 'innovation' and 'better practices'.

Despite a legal obligation, the Netherlands have not uploaded the file on public subsidies allocated from 2007 to 2013 (but paid until 2016) under the "European Fisheries Fund" (EFF). It is the only country in the top-18 Member States (representing 97% of funds) that fails to disclose this crucial financial information. For this reason, it is impossible to calculate the total amount of subsidies allocated to electric 'pulse' fishing since the introduction of exemptions. However, the Organisation for Economic Co-operation and Development (OECD) subsidies database indicates that EUR 45 millions were allocated to 'Innovation and better cooperation within the fisheries chain' (i.e. likely in part to electric fishing) by the Netherlands under the EFF from 2008 to 2016.¹⁷

The "scientific whaling" shame of Europe

In 2015, the International Council for the Exploration of the Sea (ICES) stated that *"the issuing of 84 licences 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"*.¹⁸

The massive increase in exemptions since 2012 is attributed first to experimentation,¹⁹ and second to the implementation of a "pilot project".²⁰ Under the pretext of scientific research, a destructive fishing method is authorized against the recurrent advice of scientists. European institutions are therefore supporting a fishing practice that is as questionable as "scientific whaling". Even Dutch scientists now publicly question the logic of the Dutch fleet, which clearly pursued profitability over sustainability.²¹

Unsurprisingly, little quality research has been produced since the first exemptions were granted at the end of 2006 (notwithstanding the fact that "experimental research" had already been carried out since the 1970s).²² Overall, less than 40% of electric trawlers had provided researchers with data (mostly resulting from self-sampling and weak or absent scientific protocol) at least once.²³ In 2013, ICES highlighted that: *"the WR40 switched to electric fishing [...] in spring 2012. This vessel was not followed up in a scientific project [and its] crew focuses on catch quantity (short return of investment) and less on catch selectivity"*.²⁴

European Institutions and Member States need to stop using public funds for ecologically and socially harmful fishing practices. Public decision-making has to be consistent with the objectives of the Common Fisheries Policy and must show greater vision, courage and ambition for the future of European fisheries.

¹³ As indicated by the European fleet register (<http://ec.europa.eu/fisheries/fleet>), there were 338 beam trawlers (main or secondary gear) as of February 2018. However, Dutch researchers reported an overall fleet of 280 vessels eligible to exemptions, hence the 14 possible ones quoted in the text. See van Oostenbrugge et al. (2018) Economic aspects of electric pulse fishing. Wageningen Economic Research, Wageningen (Netherlands). 4 p.

¹⁴ Landings of Dutch pulse trawl vessels in 2014. Available at: <http://cvo-visserij.nl/wp-content/uploads/2015/06/IMARES-2015-Landings-in-the-pulse-fishery-for-2014-CVO-website.pdf>.

¹⁵ Our complaint is available at: <http://www.bloomassociation.org/wp-content/uploads/2017/11/>

[Plainte-pe%CC%82che-e%CC%81lectrique-1.pdf](http://www.bloomassociation.org/wp-content/uploads/2017/11/Plainte-pe%CC%82che-e%CC%81lectrique-1.pdf).

¹⁶ Data from the European Maritime and Fisheries Fund (EMFF) for the 2015-2020 period. Available at: www.rvo.nl/sites/default/files/2017/05/20170430_Openbaarmaking_EFMZV_2_v1.csv.

¹⁷ The dataset for the Netherlands can be downloaded at: <http://stats.oecd.org/wbos/fileview2.aspx?IDFile=bb4641c1-cb8c-4104-8bea-10e568a5d160>.

¹⁸ ICES (2015) Second interim report of the working group on electrical trawling (WGELECTRA). IJmuiden, the Netherlands, 10-12 November 2015 Copenhagen (Denmark).

¹⁹ Article 43 of Council Regulation (EC) No 850/98.

²⁰ Article 14 of Regulation (EU) No 1380/2013.

²¹ Adriaan Rijnsdorp from Wageningen UR: "The

Netherlands have gone beyond the legal framework in recent years by expanding the number of temporary permits. It seemed experimental, but researchers have never written a proposal for a research program that required 84 vessels [...] Fishing with electric 'pulse' trawlers is just more profitable". See van t Hoog (2018) Pulsvisseren: lopen onderzoek genegeerd. BioNieuws, edition of January 27 2018.

²² Haasnoot et al. (2016) *Ibid*.

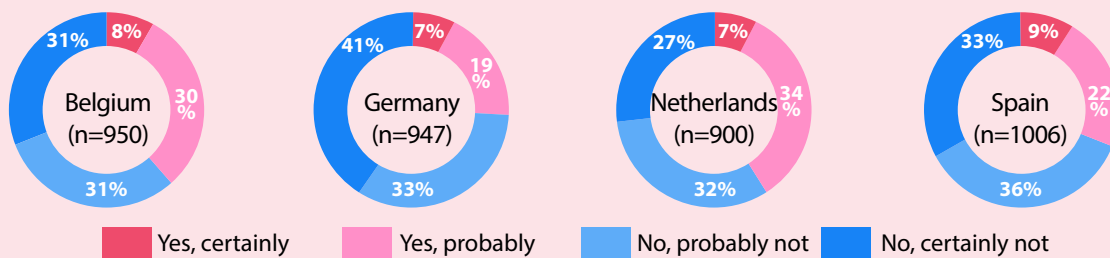
²³ www.bloomassociation.org/wp-content/uploads/2018/02/vessels-and-research.pdf

²⁴ 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).

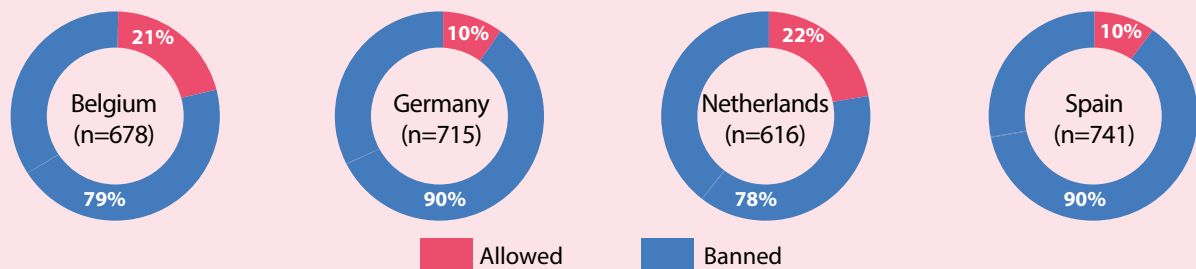
WHAT DO CITIZENS THINK?

BLOOM commissioned Kantar Public to survey citizens from four EU Member States, namely Belgium, Germany, the Netherlands, and Spain. In January 2018, results showed that citizens by and large supported a ban on electric fishing, including in the Netherlands and Belgium.

Would you be willing to buy or eat fish that have been caught using this technique?



Do you think electric fishing should be allowed or banned in Europe? (excluding people with no opinion)



A fishing method in total contradiction with our international commitments...

As part of the Sustainable Development Goals adopted by the United Nations General Assembly in 2015, Europe committed to "end overfishing" and "destructive fishing practices" by 2020 (SDG 14.4).^{*} The development and public funding of electric 'pulse' fishing is in total contradiction with these objectives.

...and with our regulatory objectives

The basic regulation of the Common Fisheries Policy adopted in 2013^{**} set an objective for the European Union to restore fish stocks and end overfishing by 2020 at the latest.

The Common Fisheries Policy was designed to "give all European fishing fleets equal access to EU waters and fishing grounds and [to] allow fishermen to compete fairly". The European Commission insists that "the CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that [...] its goal is to [...] ensure a fair standard of living for fishing communities".^{***} Finally, it also recognizes that "although it is important to maximize catches, there must be limits. We need to make sure that fishing practices do not harm the ability of fish populations to reproduce" and that as "the impact of fishing on the fragile marine environment is not fully understood [...] the CFP adopts a cautious approach which recognizes the impact of human activity on all components of the ecosystem".

In light of the information summarized in this document, electric fishing clearly cannot be the future of European fisheries.

^{*} United Nations (2015) Sustainable Development Goals — Goal 14: conserve and sustainably use the oceans, seas and marine resources. Available at: www.un.org/sustainabledevelopment/oceans.

^{**} Regulation (EU) No 1380/2013.

^{***} https://ec.europa.eu/fisheries/cfp_en

10 THINGS TO KNOW ABOUT ELECTRIC FISHING

Electric 'pulse' fishing is marginally less bad than beam trawling, which is one of the worst fishing practices. That does not make electric fishing sustainable in any way.

1 Electric does not "leave the bottom untouched"

Electric trawls remain bottom trawls that are dragged along the seabed and impact marine habitats. On small experimental trawls (4.4 m wide), electrodes still penetrate 5 mm into the sediment while the trawl shoe reaches 6 cm into the seafloor.²⁵ However, commercial trawls generally reach a width of 12 meters,²⁶ so their physical impact is probably much higher.

What is more, the scientific protocol that was used to assess these physical impacts is questionable. Instead of measuring the impact right after the passage of the trawler as should have been done (shallow, highly dynamic waters), Dutch scientists assessed the impact of regular beam trawls 12 to 44 hours after their passage and 55 to 107 hours for electric trawlers, thus creating data which do not match rigorous scientific standards and cannot even be compared within the same study!

2 Electric fishing is not selective

For 100kg of fish caught, electric trawlers discard 50–70kg (including plaice, dab and soles).^{27,28} In comparison, gillnetters discard only around 6kg of fish per 100kg of fish caught.²⁹

Survival rates measured for several discarded species were very low, especially for undersized specimens: 15% for plaice, 29% for sole, and 16% for dab.³⁰ However, scientists recognized that the conditions in which they conducted the experiment were "mild compared with [parameters] that are typical for the majority of the beam-trawl fleet in the North Sea".³¹ During commercial activities, survival rates are therefore probably even lower.



© BLOOM 2017
Catch of an electric trawl in the North Sea, with a high bycatch rate (crabs, seastars, juveniles etc.)

3 Electric fishing is NOT fuel-efficient

The Dutch fishing industry has emphasized that electric trawling allows fuel consumption to be reduced by half.³² The argument of a "positive impact on the climate"³³ is probably the most shocking of all. An electric trawler consumes 2.21 litres of fuel per kilo of fish caught, whereas a beam trawler consumes 2.36 l/kg.³⁴ The reason electric trawlers consume less fuel *in volume* per year is because they manage to catch their sole quota much faster with the efficiency of the gear.

The three main arguments of i) lower impact, ii) better selectivity and iii) fuel-efficiency are thus only valid (and not always) when compared to beam trawls but not in relation to good fishing practices.

Asking a legislator to choose between electric fishing and beam trawling is like being asked to choose between plague and cholera: on one hand, beam trawls have an unacceptable impact on habitats and go against all European sustainability objectives; on the other, electric fishing still causes (only marginally less) physical destruction of habitats and also threatens the integrity of marine ecosystems and the livelihood of other fishers.

Neither electric fishing nor beam trawling are a viable or acceptable option for Europe.

²⁵ Depestele et al. (2016) Measuring and assessing the physical impact of beam trawling. ICES Journal of Marine Science 73(suppl_1): i15-i26.

²⁶ Haasnoot et al. (2016) *Ibid.*

²⁷ Cappell et al. (2016) MSC sustainable fisheries certification — Off-site surveillance visit — CVO pulse sole and plaice fishery — Public comment draft report. Edinburgh (UK): Acoura Marine Ltd.

²⁸ Baarsen et al. (2015) Verkenning economische impact aanlandplicht op Nederlandse kottervloot. Flynt & LEI Wageningen UR. 69 p.

²⁹ Kelleher (2005) Discards in the world's marine

fisheries: an update. Rome (Italy): Food and Agriculture Organization of the United Nations (FAO).

³⁰ 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. High bycatch and low survival rates can be guessed from this video taken aboard F/V TX-19: www.facebook.com/frank.wezelman/videos/1435434289877260.

³¹ Uhlmann et al. (2016) Injury, reflex impairment, and survival of beam-trawled flatfish. ICES Journal of Marine Science 73(4): 1244-1254.

³² See e.g. the infographic produced by the Dutch Ministry of Economic Affairs: www.pulsefishing.eu/binaries/pulsefishing/documents/leaflets/2017/04/25/infographic-pulse-fishing/Infographic+Pulse+Fishing_170425.pdf.

³³ See e.g. the "Care for the climate" website: <https://spark.adobe.com/page/LTf3vpqJpgwzf/>

³⁴ Factsheet pulse fishing 204. Available at: www.pulsefishing.eu/binaries/pulsefishing/documents/leaflets/2014/07/15/factsheet-pulse-fishing-2014/140715+-+KnowledgeNetwork_Factsheet_Pulsvisserij_UK_Website.pdf.

4 Electric fishing was prohibited for good reasons

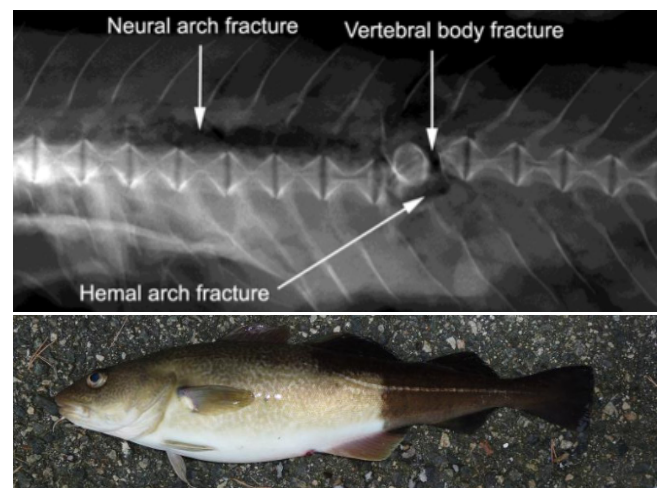
Electric fishing has been prohibited in Europe since 1998, alongside other destructive fishing methods "including the use of explosives, poisonous or stupefying substances", for the "conservation of fishery resources through [...] the protection of juveniles [...]".³⁵

China, which used electric fishing in the 90s to catch shrimp, banned it in 2000³⁶ because of its serious harmful effects for biodiversity.³⁷ Hong Kong had already banned it in 1999³⁸ because of its damaging consequences:³⁹ "Electric fishing harms or even kills most fish, including fish fry and other marine life. Such methods of fishing have a long-term deleterious effect on fisheries resources and the marine ecosystem".

In Vietnam, "electric impulses and toxics to exploit aquatic resources is an act of exterminating the resources, damaging the ecology and polluting the habitat of aquatic resources",⁴⁰ and electric fishing was banned there in 1996.⁴¹ Brazil, the United States and Uruguay have also banned electric fishing to "prevent habitat degradation".⁴² The list of countries that have banned electric fishing is long, as seen on the map below.

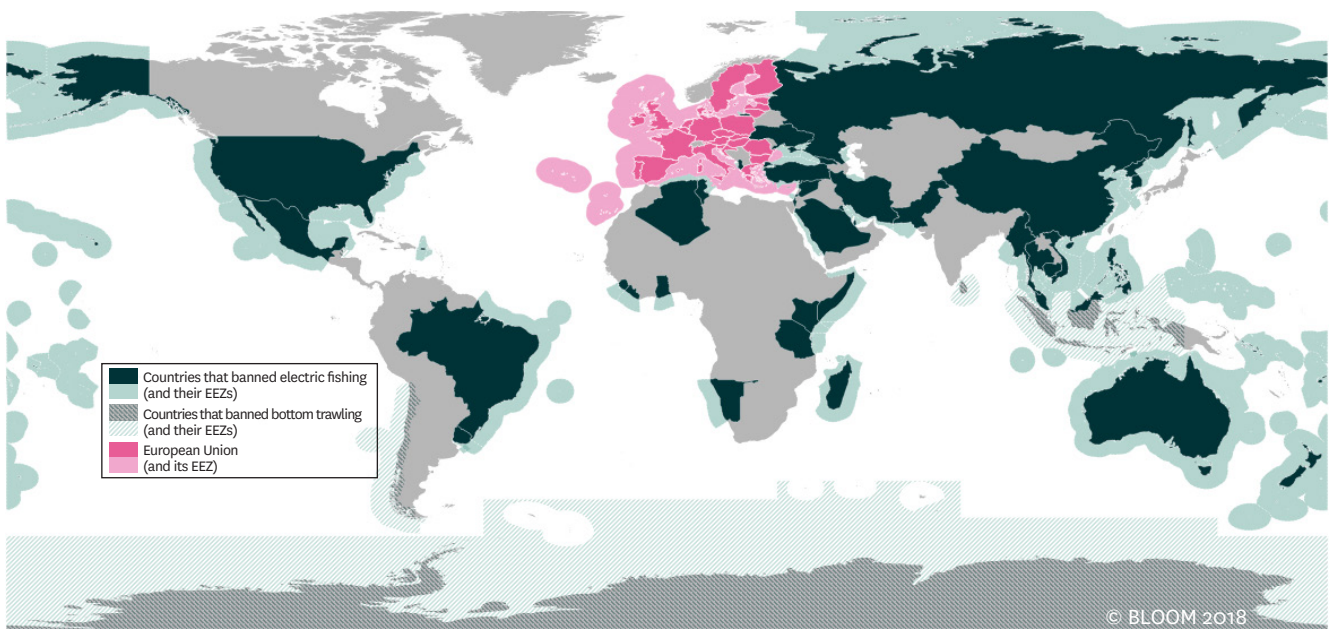
5 Electric currents are not "weak"

The electric current used, a 'pulsed bipolar current', is identical in nature to that used by Tasers® (electroshock weapons).⁴³ This type of current causes **such violent, uncontrolled convulsions that 39 to 70% of large cod are left with a fractured spine and internal bleeding after the shock.**^{44,45}



Top picture: radioscropy showing a cod with a broken spine after an electric shock.

Bottom picture: blacktail pattern indicating vertebral injury.⁴⁵



World map showing countries that banned electric fishing (green) as well as Europe (pink), which is about to mainstream its use.

³⁵ Council Regulation (EC) No 850/98.

³⁶ Article 30 of the Fisheries Law of the People's Republic of China of January 20, 1986, amended on October 31, 2000. Available at: www.npc.gov.cn/englishnpc/Law/2007-12/12/content_1383934.htm.

³⁷ Yu (2007) The rise and fall of electrical beam trawling for shrimp in the East China Sea: technology, fishery, and conservation implications. *ICES Journal of Marine Science*, 64(8): 1592–1597.

³⁸ Fisheries Protection (Specification of Apparatus) Notice, Cap. 171B, regulation 4A. Available at: www.legislation.gov.hk/hk/cap171B/en?po=1&p1=1.

³⁹ Legislative Council brief, fisheries protection ordinance (Chapter 171). Available at: www.legco.gov.hk/yr98-99/english/bc/bill_o4/general/o4_brf.pdf.

⁴⁰ Directive N°1/1998/CT-TTg of January 2, 1998 to strictly ban the use of explosives, electric impulses and toxics to exploit aquatic resources. Available at: <http://extwprlegis1.fao.org/docs/pdf/vie14284.pdf>.

⁴¹ Brzeski (1996) Shocking fishing. Available at: www.icsf.net/images/samudra/pdf/english/issue_15/149_arto1.pdf.

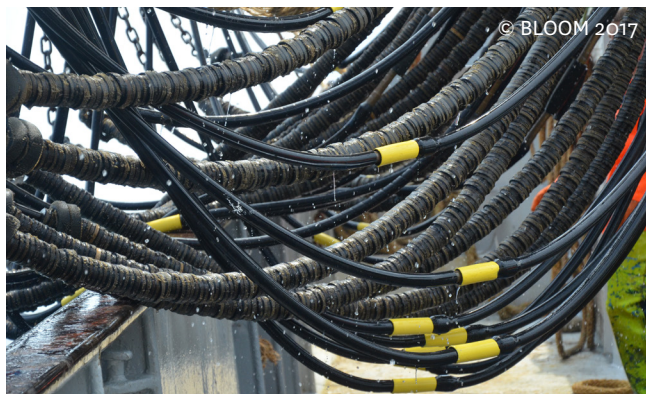
⁴² United Nations (2006) *Oceans and the Law of the Sea*. A/61/154. Available at: www.un.org/depts/los/general_assembly/documents/impact_of_fishing.pdf.

⁴³ Dermengiu et al. (2008) Electroshock weapons: physiologic and pathologic effects — literature review. *Romanian Journal of Legal Medicine* 16(3): 187–193.

⁴⁴ de Haan et al. (2011) The effect of electric pulse stimulation to juvenile cod and cod of commercial landing size. *IMARES Report C141/11*. Available at: www.wur.nl/en/Publication-details.htm?publicationId=publication-way-343137383633.

⁴⁵ 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.

And this is just the tip of the iceberg, because many effects of the electric current remain unquantified (e.g. on juvenile growth, fish reproduction, plankton or electro-sensitive species such as rays and sharks).



Focus on cables on an electric 'pulse' trawl.

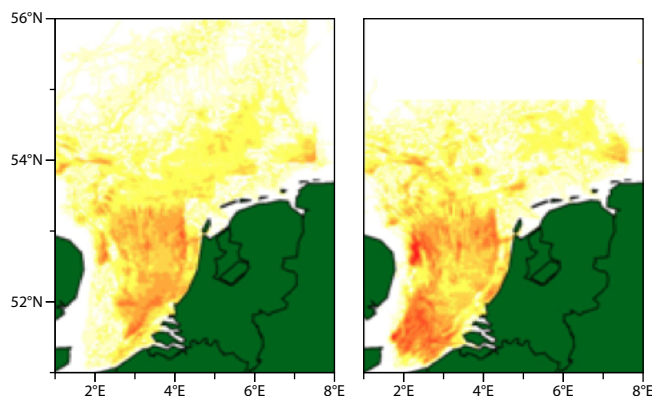
6 Electric fishing threatens other fishers

The Dutch research conducted so far has essentially focused on the economic performance of vessels, but **electric fishing poses a systemic problem of unprecedented severity: its extreme efficacy inexorably empties the ocean.**

Other fishers, including small-scale and recreational fishers denounce a fishing method that turns European waters into a "graveyard" and a "garbage dump".⁴⁶ Even Dutch scientists report such dramatic impacts. Dr. Adriaan Rijnsdorp from the university of Wageningen and co-chair of the ICES working group on electric fishing (WGELECTRA) acknowledged that: "If you start [taking seabed samples] right away, you will only find dead animals so we take samples two days later".⁴⁷

Even in the Netherlands, shrimp fishers voice concerns about electric fishing and claim that they "do not catch any shrimp for weeks where flatfish fishers have used their pulse".⁴⁸

Furthermore, data show that as a result of the transition towards electric fishing, former 'regular' beam trawlers have displaced their fishing effort towards the southern part of the North Sea.⁴⁹ Since electric 'pulse' trawls are lighter than conventional beam trawls, they can also operate in coastal areas that were previously inaccessible to them. However, these areas are often reproduction zones or nurseries for numerous marine species, and where mostly low-impact, small-scale fisheries were previously operating.



Distribution of fishing effort for 'regular' (left) and electric 'pulse' trawlers in the North Sea.⁵⁰

This unfair and unreasonable competition rings the death knell for many small-scale fishers. Bled dry, French fishers are forced to redeploy their fishing effort in the Channel to be able to keep fishing. They denounce an irresponsible fishing method with dangerous consequences for the whole ecosystem and the economic balance of the sector. British fishers from Eastern England are equally angry at the expansion of electric fishing. According to them, "going beyond 12 nautical miles is a waste of time. It's a graveyard". It is the same story in Belgium and the Netherlands: electric fishing directly threatens the viability of other forms of fishing.⁵⁰

7 Electric fishing impacts both eggs and juveniles

There is currently little knowledge about the impact of electric current on the development of eggs and larvae. A single study looked at the impacts of electric current on eggs and larvae, but the experiment only tested 'unipolar' current, which is used for shrimp trawling and is less negative than the 'bipolar' current used for flatfish. **Even with the least damaging parameters, researchers found that the hatching rate was reduced and that the survival rate was reduced for two of the four larval stages.**⁵¹

No other peer-reviewed study has been published to date on the impact of *bipolar* pulsed current, i.e. the one used by the Dutch to target flatfish (which is the case for most equipped vessels).

Furthermore, ICES stresses that it "is uncertain whether the pulse trawl has a better size selectivity", i.e. a reduced bycatch of undersized fish.⁵² This is worrisome for the survival of juveniles, especially given that electric trawlers can operate in essential fish habitats such as Natura 2000 areas and in zones that acted as refuges when they were out of the reach of beam trawlers.

⁴⁶ A summary of their accounts is available at: <http://bloomassociation.org/en/our-actions/our-themes/electric-pulse-fishing/impact-on-fishers>.

⁴⁷ Brouwers (2018) De schrik, kramp en shock van de gepulste vis. NRC.nl, edition of January 26 2018.

⁴⁸ Matthijs van der Ploeg, Chairman of the Shrimp fishermen association. In: Hakkenes (2018) Niet alle

Nederlandse vissers zijn rouwig om het EU-verbod op pulsvissen. Trouw, edition of January 19 2018.

⁴⁹ ICES (2017) Final report of the working group on electrical trawling, January 17-19 2017, IJmuiden (the Netherlands). WGELECTRA 2016 Report — ICES SSGIEM Committee — ICES CM 2017/SSGIEM:20. 36 p.

⁵⁰ LIFE platform (2017) Testimonies about the

development of fisheries catches in the southern North Sea. Available at: <http://lifeplatform.eu/wp-content/uploads/2017/09/Testimonies.pdf>.

⁵¹ Desender et al. (2017) Impact of pulsed direct current on embryos, larvae, and young juveniles of Atlantic cod and its implications for electrotrawling of brown shrimp. Marine and Coastal Fisheries 9(1): 330-340.

8 A destructive technological race

Shrimp fishers from Belgium and Germany may be tempted by electric trawling but must bear in mind that although unipolar currents are less harmful than bipolar ones, such a technological race will result in an increased fishing effort and thus aggravate the already established overexploitation of common shrimp.⁵³ Shrimp fisheries also often occur in essential fish habitats and thus result in high juvenile bycatch due to their low selectivity (small mesh size).^{54,55} Therefore, their negative effects can only be exacerbated.

The German Thünen Institute stated on its website that electric trawling "may" be a viable alternative, but we emphasize that such a position was solely based on i) reduced fuel consumption and ii) lower impact on habitats, as well as iii) potential decreased bycatch, once again *only in comparison with one of the most high-impact fishing gears there is: beam trawling*. Therefore, similarly to research carried out by the university of Wageningen, effects on the whole marine ecosystem and ripple down effects on fishing communities are not accounted for.⁵⁶

9 The use of electricity in saltwater forms harmful compounds

Electric fishing involves introducing energy in the ecosystem, which, in the EU, is defined as "pollution" according to the Directive 2006/11.⁵⁷

Additionally, the electrolysis of saltwater also results in the formation of harmful chemical compounds such as chlorine and caustic soda, as well as metallic compounds.⁵⁸ This issue has not been investigated yet, but surely deserves proper attention.

10 Uncontrollable electric parameters, fraudulent practices

Finally, as things currently stand, it is impossible to check any of the electric parameters used on fishing vessels. ICES considers that "*the existing regulatory framework is not sufficient to prevent the introduction of potentially damaging systems*".⁵⁹

Moreover, a number of fraudulent incidents have been reported aboard electric 'pulse' trawlers, for example the use of nets with mesh below the legal size,⁶⁰ large amounts of undersized fish (but gutted and prepared to be marketed)⁶¹ or illegal fishing in zones with seasonal closures.⁶² It is not just ecosystems that are put under strain by electric fishing: the situation has become explosive between European professionals, and between fishers and the authorities. Following the discovery of an infraction, three inspectors were even dragged through the water in the nets of an electric 'pulse' trawler⁶³ (the crew members were accused of attempted murder).⁶⁴

⁵² ICES (2017) *Ibid.* (Final report of the working group on electrical trawling).

⁵³ ICES (2014) Request from Germany and the Netherlands on the potential need for a management of brown shrimp (*Crangon crangon*) in the North Sea. ICES Advice 2014, Book 6 — North Sea — 6.2.3.4 — Special request, Advice October 2014. 10 p.

⁵⁴ Kelleher (2005) *Ibid.*

⁵⁵ Harrington *et al.* (2005) Wasted fishery resources: discarded by-catch in the USA. *Fish and Fisheries* 6(4): 350-361.

⁵⁶ See their public position at: www.thuenen.de/en/of/projects/fisheries-and-survey-technology/pulse-trawl-for-shrimp-fishery.

⁵⁷ Directive 2006/11/EC of the European Parliament and of the Council of 15 February 2006 on pollution caused

by certain dangerous substances discharged into the aquatic environment of the Community. *Official Journal L* 64: 52-59. In the European Union, "*pollution*" means the discharge by man, directly or indirectly, of substances or energy into the aquatic environment, the results of which are such as to cause [...] harm to living resources and to aquatic ecosystems [...]"

⁵⁸ Kurt and Bittner (2006) Sodium hydroxide. In Ullmann's encyclopedia of industrial chemistry. Wiley-VCH Verlag.

⁵⁹ ICES (2016) Advice 2016, Book 1. Request from France for updated advice on the ecosystem effects of pulse trawl.

⁶⁰ Un chalutier hollandais suspecté de fraude arraisonné au large. Available at: www.lavoixdunord.fr/119637/article/2017-02-16/un-chalutier-hollandais-suspecte-de-fraude-arraisonne-au-large.

⁶¹ Un nouveau chalutier néerlandais arraisonné pour

pêche illégale. Available at: www.lavoixdunord.fr/334948/article/2018-03-14/un-nouveau-chalutier-neerlandais-arraisonne-pour-peche-illegale.

⁶² Dutch firm and master fined with GBP 168,000 due to fisheries breaches. Available at: www.fis.com/fis/worldnews/worldnews.asp?monthyear=6-2017&day=13&id=92219&l=e&country=&special=&ndb=1&df=0.

⁶³ Kotter brengt NVWA-inspecteurs in gevaar: bemanning aangehouden door politie. Available at: www.nvwa.nl/nieuws-en-media/nieuws/2017/08/30/kotter-brengt-nvwa-inspecteurs-in-gevaar-bemanning-aangehouden-door-politie.

⁶⁴ Eigenaar viskotter: Inspecteurs NVWA brachten zichzelf in gevaar. Available at: <https://www.omroepzeeland.nl/nieuws/100516/Eigenaar-viskotter-Inspecteurs-NVWA-brachten-zichzelf-in-gevaar>.



Electric 'pulse' fishing is not 'innovative', it is destructive! It will lead to the fast demise of European fisheries. Derogations are unjustified and mostly illegal. Electric fishing has been banned in Europe since 1998 and should remain so.

Stop electric 'pulse' fishing in Europe!