European Anti-Fraud Office (OLAF)
European Commission
1049 Brussels
Belgium

13 June 2018

Re. Serious irregularities in the use by the Netherlands of the European Fisheries Fund (EFF) and the European Maritime and Fisheries Fund (EMFF) in the development of electric 'pulse' fishing.

Dear Mr. Director-General,

We write to you today to report serious irregularities in the use by the Netherlands of two EU Structural Funds: the European Fisheries Fund (EFF) and the European Maritime and Fisheries Fund (EMFF). For the reasons outlined below, we suspect a case of fraud with substantial consequences on the EU budget, which we ask OLAF to investigate.

These irregularities involve public subsidies granted for the development of electric 'pulse' fishing, which is a technique developed by the Netherlands. Below, we provide you with a brief background note on the legal framework, which allowed the development of this technique, before focusing on the new elements that we would like to bring to your attention today.

On the basis of the findings developed below, we call on you to initiate an investigation on the use of the EFF and EMFF funds for the development of electric fishing in Europe.

Despite the non-compliance of the Dutch Government with the EU transparency requirements regarding the publication of financial data provided to the fishing sector between 2007 and 2014, there is evidence that Dutch electric vessels and research institutes were granted substantial amounts of undue public subsidies during that period. We have established thanks to the online publication of EMFF data that between August 2015 and October 2017 only, 5.7 million euros (of which 3.8 million euros correspond to the EU contribution) were allocated to the development of electric fishing, but there is no detailed information available for the period covering 2007–2014 (spanning the 'EFF'; European Fisheries Fund), i.e. when most, and possibly all vessels were equipped with electricity, because the Dutch government is failing to publish the file of public subsidies granted (for details, see 'additional information' at the end of this document).

We defy the legality of these financial transfers on three counts:

1) Electric fishing massively expanded under the guise of **scientific research that was never conducted**;

2) The EU regulations under which public subsidies were allocated explicitly state that **public monies should not lead to an increase in fishing effort**, which electric fishing does; and,

3) If commercial fishing activities occur during the conduct of scientific research, **any profit generated during the operation must be deducted from the aid granted**, which we suspect was not the case.

Legal background

The use of electric current to catch marine animals was banned in Europe in 1998 through Article 31 of Regulation (EC) 850/98 (**Annex 1**) along with other destructive fishing methods such as explosives or poison. But using electricity to fish was authorized at the end of 2006 as a 'transitional technical and control measure'[1] by a provision laid down in Regulation (EC) No 41/2007 fixing for 2007 the fishing opportunities and associated conditions for certain fish stocks and group of fish stocks (i.e. the 'TACs & quotas' Regulation; **Annex 2**). This authorization was only valid for the year 2007 and allowed — as a general provision — the use of electricity as a derogation of Article 31 (1) of Regulation (EC) No 850/98 for a maximum of 5% of each Member State's beam trawl fleet operating in the southern part of the North Sea (**Annex 3**).[2] Importantly, this decision was taken in direct contradiction with the advice of the Scientific, Technical and Economic Committee for Fisheries (STECF), which expressly advised the Commission *not* to allow any derogations (**Annex 4**).

At that time, although all Member States could have granted a number of derogations to practice electric fishing in the southern part of the North Sea, only the Netherlands seized this opportunity. The Dutch administration granted 22 licenses, which was already breaching the legal limit of 19 vessels, according to the EU vessel registry as of 1 January 2007 (**Annex 5**). The overall number of Dutch beam trawls having gradually decreased since 2007, 5% would now equate to 14 legal electric licenses.

These initial 22 licenses have unclear status. Although Regulation (EC) No 41/2007 does not specify any conditions associated to the exemptions, the Council provides explicit interpretation of the 'esprit de la loi' that accompanies these licenses: they were meant to be "*on an experimental basis*" (**Annex 6**).

The derogation regime created through the 'transitional technical and control measure' to allow the use of electric fishing in the southern part of the North Sea was renewed for the years 2008 and 2009 (Regulation (EC) No 40/2008 and Regulation (EC) No 43/2009, respectively; **Annexes 7** and **8**).

Through Regulation (EC) No 1288/2009 establishing transitional technical measures from 1 January 2010 to 30 June 2011, Council prolonged these 'transitional technical and control measures' until 30 June 2011 (**Annex 9**). Article 2 of Regulation (EU) No 579/2011 prolonged yet again these 'transitional technical measures' until 31 December 2012 (**Annex 10**). They eventually lost their 'transitional' nature through Regulation (EU) 227/2013 — which amended Regulation (EC) No 850/98 (**Annex 11**) and therefore allowed to no longer require an annual renewal of exemptions.

To expand the use of electric fishing beyond the legal limit of 5%, the Dutch obtained a further 62 derogations in 2010 and 2014 under the guise of 'scientific research' on one hand and scientific 'pilot projects' on the other:

- 20 additional derogations were granted in 2010 using Article 43 of Regulation (EC) 850/98, which stipulates that "*this Regulation shall not apply to fishing operations conducted solely for the purpose of scientific investigations*" (**Annex 1**);
- 42 additional derogations were granted again in 2014 using Article 14 of Regulation (EU) 1380/2013, i.e. to "*conduct pilot projects […] with the aim of fully exploring all practicable methods for the avoidance, minimisation and elimination of unwanted catches in a fishery*" (**Annex 12**).

In both instances, these increases in the number of derogations went yet again against the advice of the International Council for the Exploration of the Sea (ICES; **Annex 13**) and STECF (**Annex 14**).

Overall, 84 Dutch trawlers are currently listed as using electricity.

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[1] According to Article 1 of this Regulation, an associated condition is a condition under which fishing opportunities may be used (Article 1: "*This Regulation fixes fishing opportunities for the year 2007, and the associated conditions under which such fishing opportunities may be used*". Therefore, this 'transitional technical and control measure' is one of the associated conditions.

[2] For these 5% of beam trawlers that were granted a derogation to use electric current under Regulation No 41/2007, electric fishing thus considered as an ordinary commercial fishing activity.

1) Never-conducted scientific research

Out of 84 licenses, 62 were explicitly granted in order to conduct scientific research or pilot projects while 22 others were meant to be for 'experimental' purposes (see legal background for details). But access to information requests on electric fishing by an investigative Dutch journalist of the *Nederlandse Omroep Stichting* (NOS is part of the Netherlands Public Broadcasting system) revealed that only 7 vessels in 2015 and 17 vessels in 2016 were required to transmit data to a research body, while 84 Dutch vessels were licensed to fish with electricity (**Annex 15**). Moreover, this data transmission was done automatically via an onboard computer installed by the Wageningen University & Research Centre and appears to have roughly corresponded to reporting obligations, which are already mandatory in the European law. ("*Er wordt vanaf 2010 wel onderzoek gedaan, naar bijvangst bijvoorbeeld en naar de brandvlekjes die vissen voor de Belgische kust lijken te hebben*"). In fact, a representative of the Dutch electric fishing sector acknowledged on the BBC that the electric fishing fleet was not a scientific trial,[1] which was also confirmed by Dr. Adriaan Rijnsdorp from the Wageningen University & Research Centre and co-chair of the ICES working group on electric fishing (WGELECTRA): "*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*" (**Annex 16**).

Shortly after the NOS article was published, the European Commission summoned the Dutch government to justify the excessive number of derogations it had granted (**Annex 17**), to which Dutch Minister in charge of fisheries, Mrs Carola Schouten, abruptly replied that it was the Commission's fault if it had unilaterally decided to increase the number of derogations despite the absence of research activities (**Annex 18**).

These observations are supported by ICES, which warned in 2015 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*" (**Annex 19**). In 2013, ICES had already highlighted that: "*the WR40 […] was not followed up in a scientific project [and its] crew focuses on catch quantity (short return of investment) and less on catch selectivity*" (**Annex 20**).

Finally, a number of fraudulent incidents — in stark contradiction with any 'research' purposes — have been reported aboard electric 'pulse' trawlers, for example the use of nets with mesh below the legal size (**Annex 21**), large amounts of undersized fish, gutted and prepared to be marketed, which indicates the existence of an illegal market for juvenile fish (**Annex 22**) or illegal fishing in zones with seasonal closures (**Annex 23**).

2) EU public funds in breach of regulatory objectives

In the spirit of European regulations, 'pilot projects' should not be used in order to circumvent other rules. In particular, their implementation can not be used to disregard the rules governing investments on vessels. Article 6 of Regulation (EC) 1198/2006 stipulates that "*operations financed by the EFF shall not increase fishing effort*", and Article 11 of Regulation (EU) 508/2014 states that "*operations increasing the fishing capacity of a vessel or equipment increasing the ability of a vessel to find fish*" are not eligible to the EMFF. However, it is well known that the use of pulse trawls increases this ability, which was recognised by the European Commission as early as 2007. In his answer to a written question, Commissioner Borg stated that "*fishing with electricity […] can be extremely effective, (i.e. fish stocks can be rapidly depleted) and would therefore go against the aim of a long-term sustainable income for fishing communities*" (**Annex 24**). This position is in line with those expressed by numerous bodies (non-exhaustive list), such as:

- ICES, which stated that: "*the system appears to have a higher fishing efficiency for cod than the conventional gear and also has the potential to contribute to unaccounted mortality through fish encountering the gear but not being retained. Given that there is a need to further reduce fishing mortality*

[1] The interview is available at: www.youtube.com/watch?v=_7SjtpKofD8 (starts at 4'40).

on cod, widespread introduction of this system could potentially increase cod mortality rather than reduce it" (**Annex 25**).

- ICES also reported in 2018 that "*the higher catch efficiency of the pulse trawl for sole implies that the sole quota can be caught in less fishing time than with the tradition beam trawl*" (**Annex 26**).
- IMARES — the Dutch institute in charge of conducting the research on electric fishing — has also shown that, for the same fuel consumption, electric trawlers caught three times as much sole (i.e. the target species) as with regular beam trawls (**Annex 27**).
- In their assessment report for the MSC certification of the North Sea brown shrimp fishery, the certifier reported that "*[landing per unit of effort] values from individual vessels may increase over time due to 'technological creep' thus masking a stock decline. The most obvious change in efficiency would be due to the introduction of electric pulse fishing which can increase efficiency by 50%*" (**Annex 28**).
- Finally, scholars have also noted such an increase in peer-reviewed journals: "*the weekday effect found in sole lpue suggests that competition is related to the fishing activity of the Dutch trawler fleet. When Dutch trawlers fish from Monday to Thursday, sole landings of Belgian beam trawlers are lower, while the opposite occurs when the Dutch beam trawler activity drops from Friday to Sunday*" (**Annex 29**).

3) Deduction of profits

As evidenced above, we have solid indications that substantial public subsidies have been granted by means of the implementation of scientific pilot projects. Article 19 of Regulation (EC) No 498/2007 on the implementation of Regulation (EC) No 1198/2006 provides that "*3. Pilot projects shall not be of a directly commercial nature. Any profit generated during the implementation of a pilot project shall be deducted from the public aid granted to the operation*" (**Annex 30**). But, as demonstrated above, electric fishing was purely developed for commercial purposes. It therefore becomes crucially important to investigate whether subsidies perceived have been reimbursed or deducted from the profits generated during fishing operations.

From the numerous elements developed in this document, we have strong suspicion of potential fraud and thus formally request OLAF to investigate the case we bring to its attention. Full light must be shed on the unlawful use of European monies and the potentially associated misconduct of public staff.

Respectfully yours,

Claire Nouvian, Chair and Founder of BLOOM
Charles Clover, Executive Director of the Blue Marine Foundation
Ger de Ruiter, Director of C-LIFE
Alasdair Harris, Executive Director of Blue Ventures
Nils Höglund, Fisheries Policy Officer of the Coalition Clean Baltic
Howard Wood OBE, Chairman and Co-Founder of Community of Arran Seabed Trust (COAST)
Valérie Cabanes, Spokesperson of End Ecocide on Earth
Stéphane Pinto, Spokesperson of gillnetters of the "Hauts de France"
James White, Spokesperson of Fishermen United
Wolfgang Albrecht, First Chairman of the Fischereischutzverband Schleswig-Holstein
Andries Visser, Spokesperson of IJmuiden coastal fishers
Pádraic Fogerty, Campaign officer of the Irish Wildlife Trust
Daryl Godbold, Spokesperson of Leigh and Southend fishermen
Jeremy Percy, Director of the Low Impact Fishers of Europe (LIFE) platform
Paul Lines, Spokesperson of Lowestoft Fish Market Alliance
Andrew Craig, Spokesperson of Mersea Island Fishermen
Marie Toussaint, Chair of Notre affaire à tous
Nick Underdown, Spokesperson of Open Seas
Ken Kawahara, Spokesperson of the Plateforme de la Petite Pêche Artisanale
Tom Brown, Spokesperson of Thanet fishermen / Queenbourgh fishermen
Charles Millar, Executive Director of the Sustainable Inshore Fisheries Trust (SIFT)
Valeska Diemel, Germany Director of The Black Fish

Additional information

Despite the non-compliance of the Dutch Government with the EU transparency requirements regarding the publication of financial data provided to the fishing sector, there is evidence that Dutch electric vessels and research institutes were granted substantial amounts of undue public subsidies:

1. <u>The European Fisheries Fund (EFF)</u>

Articles 51 and 59 of Regulation (EC) No 1198/2006 set forth transparency requirements with regards to the beneficiaries of the EFF (**Annex 31**), which operated between 2007 and 2013 but was extended until 2016 by several Member States, including the Netherlands. Despite this legal obligation for each Member State to publish a finalized list of EFF beneficiaries on a dedicated website, the Netherlands has not complied with the law and has failed to make such a list available.

The absence of transparency of the Netherlands makes it impossible to quantify the amounts attributed to electric fishing through EFF subsidies. However, solid evidence indicates that the development of electric fishing in the Netherlands has benefited from significant subsidies under the EFF.

- *Acknowledgment of EFF funding in the literature (non-exhaustive list)*

  - Taal *et al.* (2014) Samenwerken aan een duurzame visserij in de Voordelta. LEI Wageningen UR.

  → On page 3: "*Het onderzoek is mede gefinancierd door het Europees Visserijfonds (EVF) binnen hetkader'Investering induurzame visserij'*" (**Annex 32**);
  - Baarssen *et al.* (2015) Verkenning Economische Impact Aanlandplicht Op Nederlandse Kottervloot.

  → On page 3: "*Dit project is geselecteerd inhet kader van het Nederlands OperationeelProgramma "Perspectief voor een duurzamevisserij" dat wordt mede gefinancierd uit hetEuropees Visserij Fonds (EVF)*" (**Annex 33**);
  - Turenhout *et al.* (2015) Energiebesparing En Rendementsverbeteringen Aan Boord van TX 36 (2.000 Pk-Kotter). LEI Wageningen UR.

  → On page 3: "*Hetonderzoek is medegefinancierd door het Europees Visserijfonds (EVF) binnen het kader:Investeringin duurzamevisserij*" (**Annex 34**);

Furthermore, in his MSc thesis published in 2015, Tim Haasnoot notes that: "*After 2003, the European Fisheries Fund (EFF) became a much more prominent tool from Brussels. Eventually, the budget at the fisheries department at the Ministry had grown to 140 million euros*". The author quotes an employee of the Dutch Ministry of Economic Affairs that he interviewed: "*That money had to be invested over a longer period of time, so then we started to make strategic plans, an innovation plan for the duration of seven years*", explaining that this "*meant that structural investments could be done in alternative fishing techniques, like the pulse trawl technique*". For example, the author later explains that "*a group of 15 fishing companies received a subsidy of a total of 420 000 euros for the further development of the electric pulse cables from the Ministry of Economic Affairs*" (**Annex 35**).

- *Acknowledgment of EFF funding on fishing companies' websites and in the professional press (non-exhaustive list)*

Dutch company Cornelis Vrolijk — which claims that "*the beam trawling lines have been replaced on all [their] vessels with the newly-developed pulse-fishing lines*" (**Annex 36**) — also acknowledges having received EFF funds to conduct research: "*this study was carried out on behalf of Jaczon BV [...]. The study was [...] co-financed by the European Fisheries Fund (EFF) as part of its Investing in Sustainable Fisheries programme*" (**Annex 37**).

A press article from Visserijnieuws dated 11 October 2014 also mentions that the owner of the ship WR-109 received a subsidy of 103 305 euros for an innovation project related to electric fishing (**Annex 38**).

- *Aggregated data published by the Organisation for Economic Co-operation and Development (OECD)*

In its 'Fisheries Support Estimate' database (www.oecd.org/agriculture/fse.htm), the OECD reports that 45 million euros of EEF monies were allocated to Axis 3, i.e. "*Innovation and better cooperation within the fisheries chain*" (**Annex 39**). Given that 'innovation' is synonymous of 'electric fishing' in all communications from the European Commission and electric fishing industry concerning this axis, we believe that a large part of that amount was indeed allocated to electric fishing.

2. European Maritime and Fisheries Fund (EMFF)

The EMFF was initiated in 2014 and — unlike for the EFF — the list of Dutch beneficiaries is publicly available on the Ministry of Economic Affairs' website.[2] The analysis of this file revealed that 5.7 million euros, of which 3.8 million euros correspond to the EU contribution, have been allocated to the development of electric fishing since August 1st 2015 (**Annex 40**).

[2] The Dutch EMFF file is available at: www.rvo.nl/sites/default/files/2017/05/20170430_Openbaarmaking_EFMZV_2_v1.csv.

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Annex 2: Regulation (EC) No 41/2007.
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Annex 4: STECF (2006) 23rd report of the Scientific, Technical and Economic Committee for Fisheries (second plenary meeting).
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Annex 13: ICES (2009) 1.5.6.3. — Answer to The Netherlands' request on electric pulse trawl. ICES Advice 2009, Book 1.
Annex 14: STECF (2012) 39th plenary meeting report of the Scientific, Technical and Economic Committee for Fisheries.
Annex 15: Nederland riep het verbod op pulsvissen over zichzelf af. Published in NOS on 25 March 2018.
Annex 16: Pulsvissen: lopend onderzoek genegeerd. Published in BioNieuws on 27 January 2018.
Annex 17: Brussel eist uitleg van Nederland over pulsvisonderzoek. Published in NOS on 27 March 2018.
Annex 18: schouten: brussel gaf zelf toestemming voor vergunningen pulsvisserij. Published on 27 March 2018.
Annex 19: ICES (2015) Second interim report of the working group on electrical trawling (WGELECTRA). IJmuiden, the Netherlands, 10-12 November 2015.
Annex 20: 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).
Annex 21: Un chalutier hollandais suspecté de fraude arraisonné au large. Published in *La Voix du Nord* on 16 February 2017.
Annex 22: Un nouveau chalutier néerlandais arraisonné pour pêche illégale. Published in *La Voix du Nord* on 14 March 2018.
Annex 23: Dutch firm and master fined with GBP 168,000 due to fisheries breaches. Published in *FIS* on 13 June 2017.
Annex 24: Parliamentary questions — 10 September 2007 — Answer given by Mr Borg on behalf of the Commission. E-4018/2007.
Annex 25: ICES (2016) Advice 2016, Book 1. Request from France for updated advice on the ecosystem effects of pulse trawl.
Annex 26: ICES (2018) Report of the Working Group on Electric Trawling (WGELECTRA). ICESCM2018/EOSG:10. IJmuiden, the Netherlands, 17-19 April 2018.
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Annex 38: Oesterkweek langs de afsluitdijk. Published in *Visserijnieuws* on 11 october 2014.
Annex 39: Dutch EFF data from the OECD database.
Annex 40: Dutch EMFF data from the Ministry of Economic Affairs' website.

Annex 1

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COUNCIL REGULATION (EC) No 850/98

of 30 March 1998

for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms

(OJ L 125, 27.4.1998, p. 1)

Amended by:

		Official Journal		
		No	page	date
►M1	Council Regulation (EC) No 308/1999 of 8 February 1999	L 38	6	12.2.1999
►M2	Council Regulation (EC) No 1459/1999 of 24 June 1999	L 168	1	3.7.1999
►M3	Council Regulation (EC) No 2723/1999 of 17 December 1999	L 328	9	22.12.1999
►M4	Council Regulation (EC) No 812/2000 of 17 April 2000	L 100	3	20.4.2000
►M5	Council Regulation (EC) No 1298/2000 of 8 June 2000	L 148	1	22.6.2000
►M6	Council Regulation (EC) No 724/2001 of 4 April 2001	L 102	16	12.4.2001
►M7	Council Regulation (EC) No 973/2001 of 14 May 2001	L 137	1	19.5.2001
►M8	Council Regulation (EC) No 602/2004 of 22 March 2004	L 97	30	1.4.2004
►M9	Council Regulation (EC) No 1568/2005 of 20 September 2005	L 252	2	28.9.2005
►M10	Council Regulation (EC) No 2166/2005 of 20 December 2005	L 345	5	28.12.2005

Corrected by:

►C1 Corrigendum, OJ L 318, 27.11.1998, p. 63 (850/98)

▼B

— and finally east to a point on the west coast of Denmark at latitude 56° N;

▼M1

(b) ICES Division Vb and ICES sub-area VI north of latitude 56°N.

▼B

Within the areas mentioned under (a) and (b), the keeping on board of any beam trawl of which the mesh size lies between 32 and 99 millimetres shall be prohibited, unless such a net is lashed and stowed in accordance with the provisions laid down in Article 20(1) of Regulation (EEC) No 2847/93.

3. Vessels shall be prohibited from using any demersal otter trawl, demersal pair trawl or Danish seine of which the mesh size lies between 80 and 99 millimetres within the geographical area set out in paragraph 2(a). Within this area, the keeping on board of any demersal otter trawl, demersal pair trawl or Danish seine of which the mesh size lies between 80 and 99 millimetres shall be prohibited, unless such a net is lashed and stowed in accordance with the provisions laid down in Article 20(1) of Regulation (EEC) No 2847/93.

▼M8

4. Vessels shall be prohibited from using any bottom trawl or similar towed nets operating in contact with the bottom of the sea in the area bounded by a line joining the following coordinates:

Latitude 59°54 N	Longitude 6°55 W
Latitude 59°47 N	Longitude 6°47 W
Latitude 59°37 N	Longitude 6°47 W
Latitude 59°37 N	Longitude 7°39 W
Latitude 59°45 N	Longitude 7°39 W
Latitude 59°54 N	Longitude 7°25 W.

▼M9

5. Vessels shall be prohibited from using any gillnet, entangling net or trammel net at depths greater than 200 metres and any bottom trawl or similar towed nets operating in contact with the bottom of the sea in the areas bounded by a line joining the following coordinates:

(a) area named 'Madeira and Canaries'

Latitude 27° 00′ N	longitude 19° 00′ W
Latitude 26° 00′ N	longitude 15° 00′ W
Latitude 29° 00′ N	longitude 13° 00′ W
Latitude 36° 00′ N	longitude 13° 00′ W
Latitude 36° 00′ N	longitude 19° 00′ W

(b) area named 'Azores'

Latitude 36° 00′ N	longitude 23° 00′ W
Latitude 39° 00′ N	longitude 23° 00′ W
Latitude 42° 00′ N	longitude 26° 00′ W
Latitude 42° 00′ N	longitude 31° 00′ W
Latitude 39° 00′ N	longitude 34° 00′ W
Latitude 36° 00′ N	longitude 34° 00′ W.

▼B

Article 31

Unconventional fishing methods

1. The catching of marine organisms using methods incorporating the use of explosives, poisonous or stupefying substances or electric current shall be prohibited.

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2. The sale, display or offer for sale of marine organisms caught using methods incorporating the use of any kind of projectile shall be prohibited.

Article 32

Restrictions on the use of automatic grading equipment

1. The carrying or use on board a fishing vessel of equipment which is capable of automatically grading by size or by sex herring or mackerel or horse mackerel shall be prohibited.

2. However, the carrying and use of such equipment shall be permitted provided that:

(a) the vessel does not simultaneously carry or use on board either towed gear of mesh size less than 70 millimetres or one or more purse seines or similar fishing gears;

or

(b) (i) the whole of the catch which may be lawfully retained on board is stored in a frozen state, the graded fish are frozen immediately after grading and no graded fish are returned to the sea except as required by Article 19;

and

(ii) the equipment is installed and located on the vessel in such a way as to ensure immediate freezing and not to allow the return of marine organisms to the sea.

3. Any vessel authorised to fish in the Baltic, Belts or Sound may carry automatic grading equipment in the Kattegat provided that a special fishing permit has been issued to that effect.

The special fishing permit shall define the species, areas, time periods and any other required conditions applicable to the use and carriage on board of the grading equipment.

▼M7

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Article 34

Restrictions on fishing activities in the 12-mile zone around the United Kingdom and Ireland

1. Vessels shall be prohibited from using any beam trawl inside the areas within 12 miles of the coasts of the United Kingdom and Ireland, measured from the baselines from which the territorial waters are measured.

2. However, vessels in any of the following categories are authorised to fish in the areas referred to in paragraph 1 using beam trawls:

(a) a vessel which entered into service before 1 January 1987, and whose engine power does not exceed 221 kW, and in the case of derated engines did not exceed 300 kW before derating;

(b) a vessel which entered into service after 31 December 1986 whose engine is not derated, whose engine power does not exceed 221 kW, and whose length overall does not exceed 24 metres;

(c) a vessel which had its engine replaced after 31 December 1986 with an engine which is not derated and whose power does not exceed 221 kW.

3. Notwithstanding paragraph 2, the use of any beam trawl of which the beam length, or of any beam trawls of which the aggregate beam length, measured as the sum of the length of each beam, is greater than nine metres or can be extended to a length greater than nine metres, shall be prohibited, except when operating with gear having a mesh size between 16 and 31 millimetres. The length of a beam shall be measured between its extremities including all attachments thereto.

▼M7

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TITLE VII

TECHNICAL PROVISIONS

Article 42

Processing operations

1. The carrying out on board a fishing vessel of any physical or chemical processing of fish to produce fish-meal, fish-oil, or similar products, or to tranship catches of fish for such purposes shall be prohibited. This prohibition shall not apply to the processing or transhipment of offal.

2. Paragraph 1 shall not apply to the production on board a fishing vessel of surimi and fish pulp.

Article 43

Scientific research

1. This Regulation shall not apply to fishing operations conducted solely for the purpose of scientific investigations which are carried out with the permission and under the authority of the Member State or Member States concerned, and of which the Commission and the Member State or Member States in whose waters the research is carried out have been informed in advance.

2. Marine organisms caught for the purposes specified in paragraph 1 may be sold, stored, displayed or offered for sale, provided that:

— they meet the standards laid down in Annex XII to this Regulation and the marketing standards adopted pursuant to Article 2 of Council Regulation (EEC) No 3759/92 of 17 December 1992 on the common organisation of the market in fishery and aquaculture products ([1]), or

— they are sold directly for purposes other than human consumption.

Article 44

Artificial restocking and transplantation

1. This Regulation shall not apply to fishing operations conducted solely for the purpose of artificial restocking or transplantation of marine organisms which are carried out with the permission and under the authority of the Member State or Member States concerned. Where the artificial restocking or transplantation is carried out in the waters of another Member State or Member States, the Commission and all the Member States concerned shall be informed in advance.

2. Marine organisms caught for the purposes specified in paragraph 1 of this Article, and subsequently returned alive to the sea, may be sold, stored, displayed or offered for sale, provided that the marketing standards adopted pursuant to Article 2 of Regulation (EEC) No 3759/92 are complied with.

TITLE VIII

FINAL PROVISIONS

Article 45

1. Where the conservation of stocks of marine organisms calls for immediate action, the Commission may, in addition to or by way of derogation from this Regulation, adopt any measures necessary in accordance with the procedure referred to in Article 48.

([1]) OJ L 388, 31.12.1992, p. 1. Regulation as last amended by Regulation (EC) No 3318/94 (OJ L 350, 31.12.1994, p. 15).

Annex 2

I

(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)

REGULATIONS

COUNCIL REGULATION (EC) No 41/2006

of 21 December 2006

fixing for 2007 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community,

Having regard to Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy ([1]), and in particular Article 20 thereof,

Having regard to Council Regulation (EC) No 847/96 of 6 May 1996 introducing additional conditions for year-to-year management of TACs and quotas ([2]), and in particular Article 2 thereof,

Having regard to Council Regulation (EC) No 423/2004 of 26 February 2004 establishing measures for the recovery of cod stocks ([3]), and in particular Articles 6 and 8 thereof,

Having regard to Council Regulation (EC) No 811/2004 of 21 April 2004 establishing measures for the recovery of the Northern hake stock ([4]), and in particular Article 5 thereof,

Having regard to Council Regulation (EC) No 2166/2005 of 20 December 2005 establishing measures for the recovery of the Southern hake and Norway lobster stocks in the Cantabrian Sea and Western Iberian peninsula ([5]), and in particular Articles 5 and 6 thereof,

Having regard to Council Regulation (EC) No 388/2006 of 23 February 2006 establishing a multiannual plan for the sustainable exploitation of the stock of sole in the Bay of Biscay ([6]), and in particular Article 4 thereof,

Having regard to the proposal from the Commission,

Whereas:

(1) Article 4 of Regulation (EC) No 2371/2002 requires the Council to adopt the measures necessary to ensure access to waters and resources and the sustainable pursuit of fishing activities, taking account of available scientific advice and, in particular, the report prepared by the Scientific, Technical and Economic Committee for Fisheries (STECF).

(2) Under Article 20 of Regulation (EC) No 2371/2002, it is incumbent upon the Council to establish the total allowable catches (TAC) by fishery or group of fisheries. Fishing opportunities should be allocated to Member States and third countries in accordance with the criteria laid down in Article 20 of that Regulation.

(3) In order to ensure effective management of the TACs and quotas, the specific conditions under which fishing operations occur should be established.

(4) The principles and certain procedures for fishery management need to be laid down at Community level, so that Member States can ensure the management of the vessels flying their flag.

(5) Article 3 of Regulation (EC) No 2371/2002 lays down definitions of relevance for the allocation of fishing opportunities.

([1]) OJ L 358, 31.12.2002, p. 59.
([2]) OJ L 115, 9.5.1996, p. 3.
([3]) OJ L 70, 9.3.2004, p. 8.
([4]) OJ L 150, 30.4.2004, p. 1. Corrected version in OJ L 185, 24.5.2004, p. 1.
([5]) OJ L 345, 28.12.2005, p. 5
([6]) OJ L 65, 7.3.2006, p. 1

1.13. *Full inspection*

1.13.1. The competent authorities of a Member State shall ensure that at least 15 % of the quantities of fish landed and at least 10 % of the landings of fish are subject to full inspections which shall include at least the following:

(a) monitoring of the weighing of the catch from the vessel, by species. In the case of vessels pumping catch ashore the weighing of the entire discharge from the vessels selected for inspection shall be monitored. In the case of freezer trawlers, all boxes shall be counted. A representative sample of boxes/pallets shall be weighed in order to arrive at an average weight for the boxes/pallets. Sampling of boxes shall also be undertaken according to an approved methodology in order to arrive at an average net weight for the fish (without packing, ice);

(b) in addition to the cross checks referred to in point 1.12 cross verification between the following:

(i) quantities by species recorded in the weighing logbook and the quantities by species recorded in the take-over declaration or the sales note;

(ii) the written declarations received by the competent authorities pursuant to point 1.7.1.(b) (i) and the written declarations held by the receiver of the fish pursuant to point 1.7.1 (b) (ii);

(iii) identity numbers of tankers that appear in the written declarations provided for in point 1.7.1 (b) (i) and the weighing logbooks;

(c) if the discharge is interrupted, permission shall be required before the discharge can recommence;

(d) verification that the vessel is empty of all fish, once the discharge has been completed.

1.14. *Documentation*

1.14.1. All inspection activities covered by point 1 shall be documented. Such documentation shall be kept for 3 years.

2. Fishing for herring in EC waters of ices zone IIa

It shall be prohibited to land or retain on board herring caught in EC waters of zone IIa in the periods 1 January to 28 February and 16 May to 31 December.

3. Technical conservation measures in the Skagerrak and in the Kattegat

By way of derogation from the provisions set out in Annex IV of Regulation (EC) No 850/98, the provisions in Appendix 1 to this Annex shall apply.

4. Electric fishing in ices zones IVc and IVb

4.1. By way of derogation from Article 31(1) of Regulation (EC) No 850/98 fishing with beam trawl using electrical pulse current shall be allowed in ICES zones IVc and IVb south of a rhumb line joined by the following points, which shall be measured according to the WGS84 coordinate system:

— a point on the east coast of the United Kingdom at latitude 55° N,

— then east to latitude 55° N, longitude 5° E,

— then north to latitude 56° N,

— and finally east to a point on the west coast of Denmark at latitude 56° N

4.2. The following measures shall apply in 2007:

(a) no more than 5 % of the beam trawler fleet by Member State shall be allowed to use the electric pulse trawl;

(b) the maximum electrical power in kW for each beam trawl shall be no more than the length in metre of the beam multiplied by 1,25;

(c) the effective voltage between the electrodes shall be no more than 15 V;

(d) the vessel shall be equipped with an automatic computer management system which records the maximum power used per beam and the effective voltage between electrodes for at least the last 100 tows. It shall be not possible for non authorized person to modify this automatic computer management system;

(e) It shall be prohibited to use one or more tickler chains in front of the footrope.

5. **Closure of an area for sandeel fisheries in ICES zone IV**

5.1. It shall be prohibited to land or retain on board sandeels caught within the geographical area bounded by the east coast of England and Scotland, and enclosed by sequentially joining with rhumb lines the following positions, which shall be measured according to the WGS84 coordinate system:

— the east coast of England at latitude 55°30'N,

— latitude 55°30'N, longitude 1°00'W,

— latitude 58°00'N, longitude 1°00'W,

— latitude 58°00'N, longitude °00'W,

— the east coast of Scotland at longitude 2°00'W.

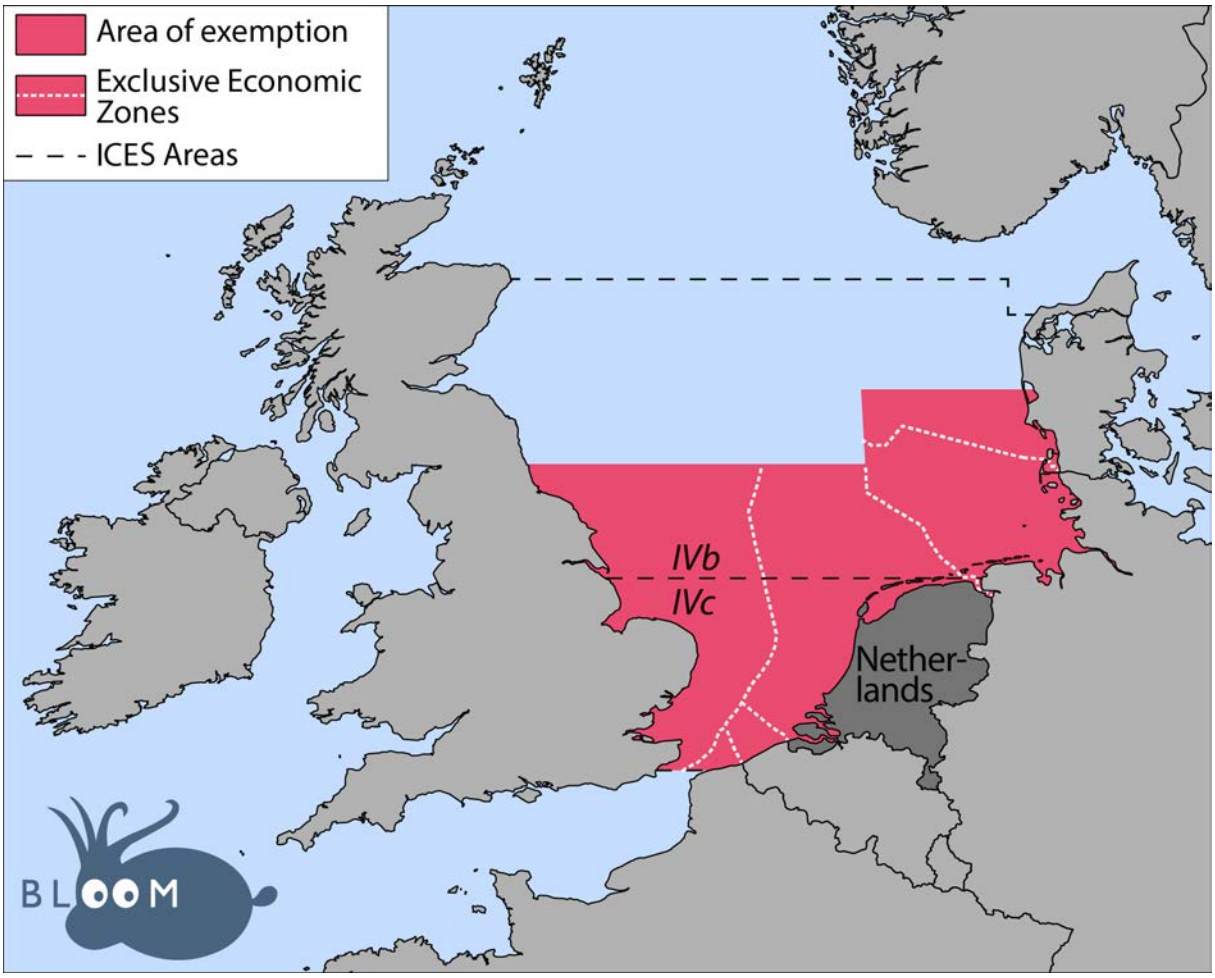
5.2. Fisheries for scientific investigation shall be allowed in order to monitor the sandeel stock in the area and the effects of the closure.

6. **Rockall Haddock box in ICES zone VI**

All fishing, except with longlines, shall be prohibited in the areas enclosed by sequentially joining with rhumb lines the following positions, which shall be measured according to the WGS84 coordinate system:

Point No	Latitude	Longitude
1	57°00'N	15°00'W
2	57°00'N	14°00'W
3	56°30'N	14°00'W
4	56°30'N	15°00'W

Annex 3



Area of exemption
Exclusive Economic Zones
ICES Areas
IVb
IVc
Nether-
lands
BLOOM

Annex 4

COMMISSION OF THE EUROPEAN COMMUNITIES

ADVANCED COPY pending SEC number

COMMISSION STAFF WORKING PAPER

23rd REPORT OF THE SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (Second Plenary Meeting)

Barza d'Ispra, 6-10 November 2006

This report does not necessarily reflect the view of the European Commission and in no way anticipates the Commission's future policy in this area

1) *Evaluate and comment as adequate this report and to highlight whether and how the results of this research may have a bearing on the STECF's advice on North Sea fish stocks*

STECF was unable to adequately address this request and has provided no response.

5.5 ELECTRIC PULSE TRAWLING

1) *STECF is requested to evaluate and comment on the ICES advice on pulse trawl electric fishing underlining the possible short and long-term biological and economic consequences of using this fishing method and, in particular, whether its use would be*
   i. *compatible with a sustainable exploitation of the target resources as well as with environmental conservation concerns (both no-target species and bottom communities), and*
   ii. *economically feasible from both a fisheries and an individual vessel perspective.*
2) *STECF is also requested to identify the conditions for a fishery monitoring system with a view to collect possible missing information.*

ICES was unable to draw definitive conclusions due to the equivocal nature of the data, in particular the catch at length for plaice and sole and direct trawl mortality estimates of benthic species. There is evidence that cod suffered from spinal damage due to exposure to the pulse, which is of major concern. This type of damage is regularly observed in freshwater species where this technology has been utilised for many decades.

STECF notes that in the "Invited overview: conclusions from a review of electrofishing and it harmful effects on fishing" (Review in Fish Biology and Fisheries 13: 445-453, 2003), a synthesis of literature on electrofishing and its harmful effects, it was concluded that spinal injuries and associated haemorrhages have been documented in over 50% of the cases.

ICES concluded that there are indications that the gear could inflict increased mortality on target and non-target species that contact the gear but are not retained. ICES also concluded that the pulse trawl has some preferable attributes compared to the standard beam trawl with tickler chains but that the potential for inflicting an increased unaccounted mortality on target and non-target species requires additional experiments before final conclusions could be drawn on the likely overall ecosystem effects of this gear.

STECF is of the opinion that although the use of electric pulse trawl fishing in open sea results in a reduction of fuel consumption and a reduction in swept area, there are a number of wider ecological issues that need to be resolved.

STECF notes that two data sets were available for determining the wider stock implications, one from research vessel trials and one from commercial trails. Both data sets providing different conclusions on a number of issues and hence in total remain inconclusive.

STECF notes that, while the removal of the tickler chains does reduce the mechanical stress exerted on the seabed (simply by reducing the cumulative removal of sediment), this does not involve an equivalent reduction in trawl path mortality. Research showed that there was a reduction in trawl path mortality for some species and an increase for others but the statistical significance for both was marginal. Using the pulse trawl, the reduction in catches of benthic invertebrates is high (51%) but the overall catch efficiency is less than 10% and for almost half the species encountered, less than 5%.

STECF also notes that from catch at length data for plaice and sole the research vessel trails showed a 16% reduction in plaice catches across all length classes; whilst the commercial trials showed no significant reduction in catches of plaice below MLS but a 35% reduction in catches above the MLS. By contrast, the research vessel data collected using the electrical pulse trawl showed that for sole the probability of capture increased with length and that higher catch rates were obtained for fish larger than ~25cm in length. Conversely, the commercial trials failed to show any significant length dependency for sole with a ~25% reduction in catches across all length classes.” It is therefore not possible to conclude that there was “a better selectivity for sole” as noted in the EU proposal in the Commission non-paper. However, selectivity for plaice seemed to be better. Similarly there was little evidence to suggest that the use of beam trawl, using pulse trawl resulted in “an improved catch quality”.

A major concern of STECF relates to the potential impact on vertebrate species. There is information to suggest that the stimulus being used may be capable of damaging (spinal breakage and internal haemorrhaging) fish species. A number of cod retained in the pulse gear were noted to have suffered from snapped spines - this was not observed in the standard gear. The frequency of the pulse is known to be above the threshold that induces tetanus and the induction of strong muscle stimulus is likely to be the cause of the spinal injuries and therefore STECF recommends that trawl in its current form should not be promoted at a commercial level.

Furthermore STECF is of the opinion that the pulse shape and frequency are the key components of the pulse and are responsible for such damage, yet no provision is made for controlling these parameters. The EU proposal (Commission non-paper) recommends a pulse voltage of 15 volt, however it is not clear what exactly is meant by this voltage. If it is the “average voltage” or a maximum value. Pulse amplitude, frequency and pulse duration should also be clearly specified. In addition, the non-uniform nature of the field and the pulse shape should be taken into consideration in defining the operational criteria. The information presented in the Commission non-paper is not sufficient to assess possible damage to fish. Therefore STECF recommends that the ‘precise 3D distribution of the field in the area of the electrodes needs to be described’, so that tank experiments can be conducted in order to evaluate the effect of fish position, orientation and length relative to the electrodes. STECF stresses that an evaluation of this information is needed before any derogation to use this method of fishing can be granted.

Taken into account in particular the unknown effect of pulse trawl fisheries on non target species and the potential impact on vertebrates and invertebrate species, STECF concludes that although the development of this technology should not be halted, there are a number of issues that need to be resolved before any derogation can be granted.

STECF was not in a position to evaluate the economically feasibility from both a fisheries and an individual vessel perspective.

5.6 MIXED FISHERIES

5.6.1 Background

STECF notes that the SGRST on mixed fisheries in 2006 (Lisbon, Portugal, 9-13 October) addressed various specific questions pertaining to a temporary change from a TAC dominated management regime to a pure fishing effort management regime in the Kattegat within a pilot project and related potential consequences. The specific terms of references were:

Priority 1:

1. *What is the current level of fishing effort (including boats <10m)?*
2. *What is the relation between nominal fishing effort and fishing mortality at present?*
3. *How has it evolved over the last decade taking into account technical creep?*
4. *How many days of fishing per month would correspond to the existing cod recovery objectives and TACs and quotas for demersal stocks applying to the whole fleet under a pure effort management regime?*
5. *What are the different options for an implementation scheme that will ensure cod recovery?*

Annex 5

LIST - Avanced Search - Fleet Register

Print page

Total vessel(s) found : 385 , with these searching parameters :

Country : NLD & Active at the 01/01/2007 & Main gear code : TBB

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
1	NLD	BEL001191970	MOD	2006-03-24	WR-27	VISAREND	WIERINGEN	66.00	22.55	220.00	PDPG
2	NLD	BEL001391987	MOD	2003-01-01	TX-50	DENEB	TEXEL	9.00	11.10	66.00	(nc)
3	NLD	BEL010821987	MOD	2004-11-25	WL-18	VRIJHEID	WESTDONGERADEEL	40.00	17.90	221.00	PIIW
4	NLD	BEL011101959	MOD	2004-04-07	ZK-67	DORUS	ULRUM-ZOUTKAMP	34.00	18.00	221.00	PCHO
5	NLD	BEL014271964	MOD	2003-10-04	TH-11	MARJON	THOLEN	69.00	22.31	220.00	(nc)
6	NLD	BEL014551964	MOD	2004-03-16	WL-23	MARLOUGER	WESTDONGERADEEL	34.00	18.56	221.00	PFAK
7	NLD	BEL030381986	MOD	2003-01-01	VD-6	BRIGITTA	EDAM-VOLENDAM	75.00	24.54	220.00	PDGY
8	NLD	BEL032071985	CHA	2004-10-15	ZK-65	HERCULES	ULRUM-ZOUTKAMP	78.00	23.77	221.00	PBBC
9	NLD	BEL034301957	MOD	2004-04-09	ZK-48	JETTIE MARTHA	ULRUM-ZOUTKAMP	51.00	19.75	206.00	PGZQ
10	NLD	BEL035541964	MOD	2004-04-27	YE-137	WILHELMINA	REIMERSWAAL-YERSEKE	41.00	19.05	221.00	(nc)
11	NLD	BEL040521984	MOD	2003-10-24	TX-27	NOVA CURA	TEXEL	106.00	23.90	221.00	PBEJ
12	NLD	BEL044021963	MOD	2005-01-01	LO-7	ZWERVER	ULRUM-LAUWERSOOG	97.00	23.78	221.00	PBBD
13	NLD	DEU200650219	MOD	2004-04-17	WL-33	WILLEM ANNE	WESTDONGERADEEL	58.00	20.25	221.00	PCSG
14	NLD	DEU401170101	MOD	2006-04-07	HD-36	VOLHARDING	DEN HELDER	167.00	23.97	221.00	PHBS
15	NLD	DEU401300101	MOD	2005-01-27	HA-17	JENNY	HARLINGEN	257.00	42.84	191.00	PCEC
16	NLD	DEU500450102	MOD	2004-05-05	HA-18	JANNIE	HARLINGEN	40.00	18.06	221.00	(nc)
17	NLD	FRA000322866	MOD	2006-12-01	SL-18	VERTROUWEN	GOEDEREEDE-STELLENDAM	11.00	12.00	206.00	PD4127
18	NLD	NLD000002681	CHA	2003-07-21	ZK-33	SOPHIA	ULRUM-ZOUTKAMP	1.00	3.40	4.00	(nc)
19	NLD	NLD185001063	MOD	2003-01-01	HD-25	ENNIE EN APPIE	DEN HELDER	2.00	5.15	18.00	(nc)
20	NLD	NLD185001102	MOD	2003-01-01	ZK-27	TRIENTJE	ULRUM-ZOUTKAMP	1.00	7.20	7.00	(nc)
21	NLD	NLD185001306	MOD	2003-01-01	UK-105	ANNA	URK	1.00	5.17	18.00	(nc)
22	NLD	NLD185001905	MOD	2005-01-01	ARM-6	PIETER	ARNEMUIDEN	1.00	3.96	7.00	(nc)
23	NLD	NLD185001906	MOD	2003-01-01	ARM-3	NOOITGEDACHT	ARNEMUIDEN	1.00	3.67	7.00	(nc)
24	NLD	NLD185001952	MOD	2003-01-01	TX-110	IMMETJE	TEXEL	1.00	4.10	134.00	(nc)
25	NLD	NLD185001966	MOD	2005-01-01	WR-331	DEO VOLENTE	WIERINGEN	1.00	3.95	11.00	(nc)
26	NLD	NLD185002146	MOD	2003-01-01	ARM-1	ALBATROS	ARNEMUIDEN	1.00	2.92	1.50	(nc)
27	NLD	NLD185002147	MOD	2003-01-01	ARM-8	ZEELEEUW	ARNEMUIDEN	1.00	2.92	3.70	(nc)
28	NLD	NLD185002148	MOD	2003-01-01	ARM-9	JAN VAN GENT	ARNEMUIDEN	1.00	3.45	3.70	(nc)
29	NLD	NLD185002177	MOD	2003-01-01	UK-256	HERMINA	URK	1.00	4.05	29.00	(nc)
30	NLD	NLD185002178	MOD	2003-01-01	UK-355	WYBRIGJE	URK	1.00	4.30	15.00	(nc)
31	NLD	NLD185002550	MOD	2003-06-20	OD-25	ELIZABETH	GOEDEREEDE-OUDDORP	3.00	8.70	51.00	(nc)
32	NLD	NLD189900729	MOD	2003-10-22	LO-17	LIQUENDA	ULRUM-LAUWERSOOG	48.00	22.04	221.00	PCFB
33	NLD	NLD189901069	MOD	2003-11-06	WR-79	SPEKULANT	WIERINGEN	11.00	11.40	92.00	PE4285
34	NLD	NLD190500461	MOD	2004-04-25	HA-62	WILLEM TJITSCHE	HARLINGEN	36.00	19.58	169.00	PF9943
35	NLD	NLD190800290	MOD	2004-11-05	TX-44	WADDENZEE	TEXEL	44.00	23.30	158.00	PH2614
36	NLD	NLD190801142	MOD	2003-09-15	BRU-45	JACOBA	BRUINISSE	45.00	23.88	132.00	(nc)
37	NLD	NLD190802113	MOD	2004-03-25	WL-3	LEONARDO	WESTDONGERADEEL	43.00	24.25	221.00	PE4434
38	NLD	NLD190900074	MOD	2004-01-13	WL-8	LUBBERT SR	WESTDONGERADEEL	86.00	23.92	221.00	PBAM
39	NLD	NLD191000315	MOD	2004-03-16	OL-37	INSULINDE	OOSTDONGERADEEL	42.00	20.54	220.00	PH3084
40	NLD	NLD191000444	CHA	2005-12-02	WL-25	ANTJE	WESTDONGERADEEL	30.00	19.80	162.00	PG2397
41	NLD	NLD191100480	MOD	2004-04-07	UQ-17	ATLANTIS	USQUERT	40.00	18.78	221.00	PD2660
42	NLD	NLD191100591	MOD	2003-09-30	UQ-21	LOUWINA	USQUERT	51.00	23.99	221.00	(nc)
43	NLD	NLD191100769	MOD	2004-04-25	WR-72	ALBERTA	WIERINGEN	40.00	21.09	188.00	PCKF
44	NLD	NLD191300467	MOD	2004-04-09	UQ-8	ZEEMEEUW	USQUERT	28.00	19.10	176.00	(nc)
45	NLD	NLD191700258	MOD	2003-09-22	OD-2	NEELTJE	GOEDEREEDE-OUDDORP	34.00	22.21	113.00	(nc)
46	NLD	NLD192100234	MOD	2003-11-10	LO-14	FETSKE	ULRUM-LAUWERSOOG	35.00	21.61	127.00	PH9712
47	NLD	NLD192100347	MOD	2006-10-06	TM-19	REIDERLAND	TERMUNTEN	34.00	23.02	221.00	(nc)
48	NLD	NLD192300472	MOD	2004-03-25	UQ-1	CONDOR	USQUERT	32.00	19.96	149.00	(nc)
49	NLD	NLD192300633	MOD	2003-09-30	ZK-46	ZEEMEEUW	ULRUM-ZOUTKAMP	29.00	21.36	100.00	(nc)
50	NLD	NLD192400497	MOD	2003-09-27	WL-4	HENDERIKA	WESTDONGERADEEL	34.00	21.48	221.00	(nc)
51	NLD	NLD192400512	MOD	2004-06-02	WL-15	MONTE TJERK	WESTDONGERADEEL	26.00	20.53	200.00	PJ4016
52	NLD	NLD192500576	MOD	2004-03-16	ZK-7	DE JAN	ULRUM-ZOUTKAMP	24.00	18.40	96.00	PF4059
53	NLD	NLD192600587	MOD	2004-03-25	ZK-11	HOOP OP ZEGEN	ULRUM-ZOUTKAMP	28.00	20.58	134.00	(nc)
54	NLD	NLD192700221	MOD	2004-05-11	LO-5	EELTJE JAN	ULRUM-LAUWERSOOG	22.00	18.76	125.00	PF4044
55	NLD	NLD192700490	MOD	2004-04-09	WL-2	ZEESTER	WESTDONGERADEEL	27.00	19.33	175.00	PI4027
56	NLD	NLD192700506	MOD	2004-05-24	HA-11	LIBRA	HARLINGEN	26.00	20.00	112.00	(nc)
57	NLD	NLD192800266	MOD	2003-11-10	HA-4	TINA	HARLINGEN	54.00	23.50	221.00	PC5428
58	NLD	NLD192800423	MOD	2004-05-12	HA-44	HOOP OP ZEGEN	HARLINGEN	44.00	23.38	158.00	PI8371
59	NLD	NLD192802117	MOD	2004-05-12	TX-35	ZEESTER	TEXEL	90.00	27.65	221.00	PD9086
60	NLD	NLD192900389	MOD	2006-06-12	HA-31	INNOVATIE	HARLINGEN	57.00	23.40	221.00	PD4046
61	NLD	NLD193000020	MOD	2004-04-20	UK-249	HOOP OP ZEGEN	URK	32.00	18.54	176.00	(nc)
62	NLD	NLD193000228	MOD	2003-10-06	LO-10	DE	ULRUM-	39.00	23.24	155.00	(nc)

Annex 5

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
63	NLD	NLD193400533	MOD	2003-01-01	WON-4	VOLHARDING IJFKE	LAUWERSOOG WONSERADEEL	11.00	13.26	131.00	(nc)
64	NLD	NLD193800309	MOD	2005-01-25	SL-22	NOOITGEDACHT	GOEDEREEDE-STELLENDAM	29.00	17.23	125.00	(nc)
65	NLD	NLD194100102	MOD	2003-01-01	FL-12	FL-12	FINTERWOLDE	1.00	4.90	6.00	(nc)
66	NLD	NLD194401879	MOD	2003-01-01	GO-77	MARIA	GOEDEREEDE	4.00	9.05	8.00	(nc)
67	NLD	NLD194600518	MOD	2004-12-23	ZK-37	ALDERT VAN THIJS	ULRUM-ZOUTKAMP	38.00	17.98	155.00	PCRZ
68	NLD	NLD194700424	MOD	2005-01-01	LO-6	ANJA	ULRUM-LAUWERSOOG	35.00	21.90	184.00	(nc)
69	NLD	NLD194800351	MOD	2006-02-24	WK-10	JOHANNA	WORKUM	24.00	17.66	134.00	PF4088
70	NLD	NLD194900766	MOD	2004-06-11	YE-6	ALBATROS	REIMERSWAAL-YERSEKE	44.00	19.00	220.00	PCQS
71	NLD	NLD195001498	MOD	2006-07-07	IJM-302	ZEEVALK	VELSEN-IJMUIDEN	3.00	9.27	58.00	(nc)
72	NLD	NLD195100689	MOD	2004-07-19	TS-7	SABINE	TERSCHELLING	28.00	19.86	158.00	PDQD
73	NLD	NLD195100812	MOD	2005-06-24	WR-111	BREEHORN	WIERINGEN	27.00	17.76	134.00	PEAM
74	NLD	NLD195300027	MOD	2004-05-10	UK-72	DINA CORNELIS	URK	40.00	20.50	220.00	PIDP
75	NLD	NLD195400969	MOD	2004-05-21	HD-5	ALBERTINA WILLEMINA	DEN HELDER	49.00	19.55	221.00	PCKE
76	NLD	NLD195500619	MOD	2003-10-22	HA-76	POOLSTER	HARLINGEN	56.00	22.99	220.00	PFCW
77	NLD	NLD195500639	MOD	2004-04-23	ZK-185	NOORDERLICHT	ULRUM-ZOUTKAMP	41.00	18.94	221.00	(nc)
78	NLD	NLD195700691	MOD	2003-10-03	ZK-40	MORGENSTER	ULRUM-ZOUTKAMP	78.00	23.63	221.00	PGAQ
79	NLD	NLD195800368	MOD	2004-04-23	TS-9	TRIX	TERSCHELLING	27.00	19.00	132.00	PIAZ
80	NLD	NLD195800596	MOD	2005-01-05	ZK-17	JOHANNES DIRK	ULRUM-ZOUTKAMP	33.00	17.74	221.00	PFMJ
81	NLD	NLD195800747	MOD	2004-12-03	WR-222	ANNA TATJANA	WIERINGEN	83.00	23.86	220.00	PCRL
82	NLD	NLD195801079	MOD	2003-01-01	UK-248	DAGERAAD	URK	18.00	15.00	85.00	(nc)
83	NLD	NLD195900278	MOD	2005-01-03	TS-10	HILLEGONDA	TERSCHELLING	22.00	17.20	132.00	PERT
84	NLD	NLD195900443	MOD	2004-04-07	ZK-8	HUNSINGO	ULRUM-ZOUTKAMP	39.00	19.75	221.00	(nc)
85	NLD	NLD196000130	MOD	2003-01-01	FL-7	FL-7	FINTERWOLDE	3.00	8.00	14.00	(nc)
86	NLD	NLD196000230	MOD	2005-02-18	OL-5	JACOB SENIOR	OOSTDONGERADEEL	39.00	20.19	220.00	PIBP
87	NLD	NLD196000270	MOD	2006-10-26	WR-134	DE TIJD	WIERINGEN	19.00	15.35	99.00	PD9962
88	NLD	NLD196000296	MOD	2004-05-15	HA-13	WOBBEGIEN	HARLINGEN	24.00	18.02	158.00	(nc)
89	NLD	NLD196000454	MOD	2005-01-01	SL-6	CORNELIA CHRISTINA	GOEDEREEDE-STELLENDAM	17.00	15.50	101.00	(nc)
90	NLD	NLD196000494	CHA	2004-01-09	ZK-68	ALBATROS	ULRUM-ZOUTKAMP	58.00	21.90	208.00	PEYX
91	NLD	NLD196000645	MOD	2003-01-01	ZK-16	NORDHAVET	ULRUM-ZOUTKAMP	11.00	12.31	77.00	(nc)
92	NLD	NLD196000755	MOD	2003-11-26	WR-98	ELSE JEANNETTE	WIERINGEN	75.00	23.70	221.00	PDWC
93	NLD	NLD196000768	MOD	2004-02-28	WR-71	MARRY-AN	WIERINGEN	40.00	19.08	220.00	PFVJ
94	NLD	NLD196000787	MOD	2004-04-07	WR-75	SANDRA PETRA	WIERINGEN	35.00	17.74	176.00	PHIG
95	NLD	NLD196000824	MOD	2003-09-24	WR-36	WILLEM STEFAN	WIERINGEN	39.00	21.25	221.00	PCLM
96	NLD	NLD196001855	MOD	2003-01-01	LO-4	RANA	ULRUM-LAUWERSOOG	13.00	13.50	88.00	(nc)
97	NLD	NLD196100018	MOD	2004-04-09	ZK-47	PIETER JOHANNES	ULRUM-ZOUTKAMP	33.00	18.36	165.00	PGAO
98	NLD	NLD196100376	MOD	2005-12-09	OL-3	BONNY	OOSTDONGERADEEL	40.00	18.33	174.00	PCMH
99	NLD	NLD196100590	MOD	2004-04-25	WON-77	WIETSKE	WONSERADEEL	27.00	19.05	162.00	PIRC
100	NLD	NLD196100679	MOD	2004-05-11	WL-20	PIETER KEES	WESTDONGERADEEL	34.00	18.14	153.00	PEKN

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Total vessel(s) found : 385 , with these searching parameters :

Country : NLD & Active at the 01/01/2007 & Main gear code : TBB

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
101	NLD	NLD196100809	MOD	2004-04-07	ZK-4	GENOAT	ULRUM-ZOUTKAMP	29.00	18.07	177.00	PGUJ
102	NLD	NLD196200324	MOD	2003-07-02	ZK-80	LINQUENDA	ULRUM-ZOUTKAMP	88.00	24.89	221.00	PDGI
103	NLD	NLD196200482	MOD	2003-01-01	WR-18	IN SOLIDUM	WIERINGEN	64.00	24.88	221.00	PFDA
104	NLD	NLD196200686	MOD	2006-07-13	WR-122	ANNE-NOËLLE	WIERINGEN	63.00	24.66	221.00	PFFQ
105	NLD	NLD196200744	MOD	2003-09-24	ZK-21	ANNA	ULRUM-ZOUTKAMP	46.00	21.96	221.00	PDEW
106	NLD	NLD196200805	MOD	2006-05-12	WR-88	FIDES MAREM	WIERINGEN	61.00	21.25	220.00	PGYN
107	NLD	NLD196201140	MOD	2005-01-01	TX-17	ADRIANA	TEXEL	4.00	8.60	51.00	PF2729
108	NLD	NLD196300034	MOD	2003-09-26	HD-147	WILHELMINA	DEN HELDER	53.00	21.10	221.00	PIPP
109	NLD	NLD196300331	MOD	2005-02-18	ZK-49	TWEE GEBROEDERS	ULRUM-ZOUTKAMP	60.00	21.06	220.00	PHXM
110	NLD	NLD196300615	MOD	2004-04-09	UK-23	PIETER SENIOR	URK	83.00	24.60	221.00	PDXH
111	NLD	NLD196300631	MOD	2005-01-01	ZK-23	ANSYL	ULRUM-ZOUTKAMP	43.00	21.72	188.00	PBFI
112	NLD	NLD196300652	MOD	2006-03-30	WR-291	ESTHER JENKE	WIERINGEN	57.00	21.06	220.00	PFMI
113	NLD	NLD196300697	MOD	2005-01-01	WR-129	GRIETJE HENDRIKA	WIERINGEN	87.00	24.30	221.00	PEKX
114	NLD	NLD196300716	MOD	2003-09-22	WR-160	BARENTSZ-ZEE	WIERINGEN	77.00	23.46	220.00	PCZG
115	NLD	NLD196400149	MOD	2003-01-01	VD-77	CORNELIA JOHANNES	EDAM-VOLENDAM	82.00	24.95	221.00	PGGP
116	NLD	NLD196400449	MOD	2003-09-24	ZK-92	JOSIENA LISA	ULRUM-ZOUTKAMP	72.00	22.90	221.00	PGTN
117	NLD	NLD196400474	MOD	2003-09-21	HA-75	ELIZABETH	HARLINGEN	54.00	21.06	221.00	PDWR
118	NLD	NLD196400548	MOD	2003-01-01	WR-112	ZWAANTJE	WIERINGEN	71.00	25.45	219.00	PIZE
119	NLD	NLD196400575	MOD	2004-04-01	ZK-5	ORA ET LABORA	ULRUM-ZOUTKAMP	38.00	19.03	169.00	PGOE
120	NLD	NLD196400735	MOD	2003-10-03	WR-174	ALEIDA	WIERINGEN	68.00	23.85	221.00	PCKC
121	NLD	NLD196400793	MOD	2003-01-01	YE-31	JOZIAS JANNETJE	REIMERSWAAL-YERSEKE	78.00	24.60	221.00	PFFU
122	NLD	NLD196500428	MOD	2003-01-01	WR-52	ASTRID CORNELIS	WIERINGEN	84.00	25.20	221.00	PDUG
123	NLD	NLD196600694	MOD	2004-03-25	OL-12	DRIE GEBROEDERS	OOSTDONGERADEEL	43.00	19.15	221.00	PDJQ
124	NLD	NLD196600791	MOD	2004-02-28	WR-77	ANANJAH CONZELO	WIERINGEN	41.00	20.68	188.00	PCQZ
125	NLD	NLD196700012	MOD	2004-04-23	BR-10	JOHANNA	OOSTBURG-BRESKEN	40.00	18.56	217.00	PFDQ
126	NLD	NLD196700023	MOD	2005-08-05	WR-230	GIDEON	WIERINGEN	63.00	22.50	221.00	PDOI
127	NLD	NLD196700024	MOD	2004-04-20	BR-29	EENDRACHT	OOSTBURG-BRESKEN	49.00	19.68	220.00	PDYB
128	NLD	NLD196700430	MOD	2004-03-25	HA-50	ZEEVALK	HARLINGEN	37.00	18.22	165.00	PIXY
129	NLD	NLD196700682	MOD	2003-01-01	UK-48	NOVA CURA	URK	140.00	28.60	368.00	PGKE
130	NLD	NLD196700808	MOD	2006-10-02	WR-89	GEJA ANJO	WIERINGEN	26.00	18.12	208.00	(nc)
131	NLD	NLD196800029	MOD	2005-01-01	UK-137	DEO VOLENTE	URK	62.00	21.58	221.00	PCEA
132	NLD	NLD196800184	MOD	2003-09-11	SCH-10	DRIE GEBROEDERS	DEN HAAG-SCHEVENINGEN	65.00	22.47	221.00	PDTG
133	NLD	NLD196800602	MOD	2003-09-22	WR-17	BONA SPES	WIERINGEN	72.00	22.47	221.00	PDEY
134	NLD	NLD196802152	MOD	2005-04-22	KW-37	MARE	KATWIJK	1.00	4.28	7.00	(nc)
135	NLD	NLD196900552	MOD	2003-09-24	ZK-12	PIETER DION	ULRUM-ZOUTKAMP	47.00	21.54	214.00	PDHV
136	NLD	NLD196900780	MOD	2003-03-28	WR-19	ESPADA	WIERINGEN	105.00	26.98	360.00	PDZM
137	NLD	NLD196900982	MOD	2003-08-28	WR-68	JAN CORNELIS	WIERINGEN	63.00	22.46	221.00	PEXR
138	NLD	NLD197000276	CHA	2004-09-17	HA-71	MARIA	HARLINGEN	8.00	10.00	74.00	PF3108
139	NLD	NLD197400195	MOD	2003-10-18	UK-274	MARRETJE JACOBA	URK	67.00	22.39	221.00	PFOW
140	NLD	NLD197400904	MOD	2003-01-01	UK-88	WILMA	URK	292.00	39.83	1324.00	PIQN
141	NLD	NLD197401918	MOD	2003-10-24	VLI-24	CLASINA	VLISSINGEN	7.00	12.15	89.00	PF2880
142	NLD	NLD197500210	MOD	2003-01-01	UK-307	JACOBA	URK	270.00	37.10	1103.00	PEYP
143	NLD	NLD197500866	MOD	2003-01-01	UK-176	VERWACHTING	URK	212.00	33.62	736.00	PIGF
144	NLD	NLD197600509	MOD	2004-03-16	WL-10	ELSKE	WESTDONGERADEEL	22.00	19.09	132.00	PD9990
145	NLD	NLD197601084	MOD	2006-01-12	WR-53	GRIETJE	WIERINGEN	1.00	4.78	15.00	(nc)
146	NLD	NLD197700375	MOD	2004-06-05	TX-10	EMMIE	TEXEL	171.00	41.11	221.00	PF3481
147	NLD	NLD197801062	MOD	2003-01-01	HD-20	MARJA	DEN HELDER	2.00	6.15	18.00	(nc)
148	NLD	NLD197900093	MOD	2003-08-01	GO-29	JAN MARIA	GOEDEREEDE	80.00	23.22	221.00	PEZI
149	NLD	NLD197900574	MOD	2004-04-26	LO-15	JOHANNES POST	ULRUM-LAUWERSOOG	25.00	18.20	175.00	(nc)
150	NLD	NLD197900647	MOD	2003-01-01	GO-56	SOLA GRATIA	GOEDEREEDE	366.00	41.20	1467.00	PHVN
151	NLD	NLD197901002	MOD	2005-11-11	UK-168	LIMANDA	URK	245.00	35.67	1103.00	PFOZ
152	NLD	NLD197901767	MOD	2005-01-01	HD-111	ARAMIS II	DEN HELDER	4.00	8.85	75.00	(nc)
153	NLD	NLD198000075	MOD	2003-10-03	YE-76	TOBBER	REIMERSWAAL-YERSEKE	92.00	23.85	221.00	PHAU
154	NLD	NLD198000111	MOD	2006-01-06	GO-27	NOORDZEE	GOEDEREEDE	239.00	34.18	1048.00	PDNX
155	NLD	NLD198000393	MOD	2003-01-01	SL-3	MARTHA LENA	GOEDEREEDE-STELLENDAM	213.00	30.55	1035.00	PFWT
156	NLD	NLD198000446	MOD	2004-12-28	UK-244	JURIE SJOERD	URK	51.00	17.60	220.00	PIWE
157	NLD	NLD198000725	MOD	2003-01-01	GO-24	POOLSTER	GOEDEREEDE	377.00	40.00	1471.00	PDJU
158	NLD	NLD198000872	MOD	2003-01-01	UK-177	CORNELIS EVERT	URK	184.00	30.05	662.00	PDLD
159	NLD	NLD198000932	MOD	2003-01-01	UK-202	MATTHEUS	URK	299.00	36.51	1323.00	PFWX

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	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
160	NLD	NLD198000991	MOD	2003-01-01	GO-37	VERTROUWEN	GOEDEREEDE	373.00	40.00	1469.00	PIGE
161	NLD	NLD198001111	MOD	2003-01-01	ZK-29	PATRICIA	ULRUM-ZOUTKAMP	1.00	4.82	8.00	(nc)
162	NLD	NLD198001911	MOD	2003-01-01	BR-58	DENNIS	OOSTBURG-BRESKEN	1.00	5.10	8.00	(nc)
163	NLD	NLD198100026	MOD	2003-01-01	WR-7	JOHANNA	WIERINGEN	106.00	24.45	221.00	PFDU
164	NLD	NLD198100181	MOD	2003-11-10	OD-3	ADRIANNE	GOEDEREEDE-OUDDORP	88.00	23.85	221.00	PFWH
165	NLD	NLD198100422	MOD	2004-09-14	TH-6	JOHANNA CORNELIA	THOLEN	88.00	23.95	221.00	PFDD
166	NLD	NLD198100522	MOD	2003-10-31	OD-8	EBEN HAEZER	GOEDEREEDE-OUDDORP	338.00	40.55	1471.00	PDUI
167	NLD	NLD198100545	MOD	2003-01-01	WR-244	MARGRETHA HENDRIKA	WIERINGEN	113.00	24.45	221.00	PEYY
168	NLD	NLD198100830	MOD	2005-01-01	UK-162	RIEKELT BRANDS	URK	406.00	39.94	1470.00	PHAT
169	NLD	NLD198100912	MOD	2003-01-01	UK-20	PETRA	URK	372.00	40.00	1471.00	PHSX
170	NLD	NLD198100990	MOD	2003-01-01	UK-237	GRIETJE BOS	URK	419.00	39.13	1467.00	PEKJ
171	NLD	NLD198200016	MOD	2003-01-01	WR-21	JENTE	WIERINGEN	86.00	23.92	221.00	PGUX
172	NLD	NLD198200283	MOD	2003-10-24	WL-28	JAN HARMEN	WESTDONGERADEEL	75.00	21.70	221.00	PHYT
173	NLD	NLD198200558	MOD	2004-06-25	UK-19	MARJA NETTY	URK	331.00	39.55	1471.00	PFVC
174	NLD	NLD198200578	MOD	2003-11-17	ZK-9	DRIE GEBROEDERS	ULRUM-ZOUTKAMP	40.00	21.00	162.00	BNEI
175	NLD	NLD198200726	MOD	2003-01-01	VLI-26	MARIA	VLISSINGEN	454.00	40.20	1471.00	PFVF
176	NLD	NLD198200749	MOD	2005-12-08	UK-67	SOLA GRATIA	URK	411.00	43.09	1469.00	PHQU
177	NLD	NLD198200942	MOD	2003-01-01	UK-217	JUDITH	URK	319.00	38.23	1452.00	PFFM
178	NLD	NLD198200958	MOD	2006-05-15	UK-226	PRINS WILLEM	URK	452.00	40.82	1470.00	PGVV
179	NLD	NLD198201138	MOD	2006-07-05	SCH-16	CORNELIA	DEN HAAG-SCHEVENINGEN	11.00	9.85	59.00	PD5303
180	NLD	NLD198201302	MOD	2003-01-01	TX-46	COMEDIANT	TEXEL	1.00	5.00	30.00	(nc)
181	NLD	NLD198300028	MOD	2006-08-11	BR-43	MARIA	OOSTBURG-BRESKEN	454.00	40.20	1471.00	PFTF
182	NLD	NLD198300317	MOD	2003-01-01	HD-70	HANNY	DEN HELDER	350.00	40.29	1320.00	PEZM
183	NLD	NLD198300352	MOD	2004-04-23	TS-2	SVEN	TERSCHELLING	29.00	18.64	155.00	(nc)
184	NLD	NLD198300580	MOD	2003-10-03	YE-63	KIEK UUT	REIMERSWAAL-YERSEKE	53.00	20.55	220.00	PGSD
185	NLD	NLD198300593	MOD	2004-05-19	ZK-14	TAMME SR	ULRUM-ZOUTKAMP	60.00	19.98	221.00	PHWT
186	NLD	NLD198300822	MOD	2003-01-01	UK-87	MARIA	URK	346.00	40.40	1467.00	PFUI
187	NLD	NLD198300871	MOD	2003-01-01	UK-190	HOOP OP ZEGEN	URK	86.00	24.12	221.00	PCEB
188	NLD	NLD198400140	MOD	2003-10-01	GO-58	JAKORIWI	GOEDEREEDE	78.00	22.37	221.00	PEZC
189	NLD	NLD198400160	CHA	2006-03-03	ST-1	JELLE SJOERD	STAVEREN	32.00	18.10	111.00	PI4078
190	NLD	NLD198400205	MOD	2004-12-03	HD-80	FREEK EN JANNY	DEN HELDER	363.00	41.08	1471.00	PEEK
191	NLD	NLD198400288	MOD	2006-12-05	TX-41	BROEDERTROUW	TEXEL	114.00	24.44	221.00	PEGK
192	NLD	NLD198400384	MOD	2005-06-16	ARM-4	JOZINA	ARNEMUIDEN	454.00	40.20	1471.00	PDLZ
193	NLD	NLD198400504	MOD	2003-09-05	HD-16	OP HOOP VAN ZEGEN	DEN HELDER	81.00	23.95	220.00	PGNS
194	NLD	NLD198400589	MOD	2003-11-10	HA-43	SILVERPIT	HARLINGEN	68.00	23.20	221.00	PIPF
195	NLD	NLD198400611	MOD	2005-07-08	TX-5	ARIE SENIOR	TEXEL	363.00	41.08	1471.00	PCTD
196	NLD	NLD198400643	MOD	2005-08-22	ZK-54	GOEDE VERWACHTING	ULRUM-ZOUTKAMP	34.00	17.88	138.00	(nc)
197	NLD	NLD198400764	MOD	2004-03-16	WR-54	CORNELIS-NAN	WIERINGEN	49.00	19.00	221.00	PDJG
198	NLD	NLD198400797	MOD	2005-01-01	WR-81	HUIBERTJE	WIERINGEN	16.00	14.05	180.00	PD4226
199	NLD	NLD198400968	MOD	2005-12-02	UK-53	MAARTEN POST	URK	103.00	23.75	221.00	PGSY
200	NLD	NLD198402088	MOD	2005-01-01	HD-51	PESCADOR	DEN HELDER	7.00	9.90	51.00	PEAF

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Total vessel(s) found : 385 , with these searching parameters :

Country : NLD & Active at the 01/01/2007 & Main gear code : TBB

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
201	NLD	NLD198500048	MOD	2006-08-30	ARM-44	NEELTJE JANNETJE	ARNEMUIDEN	542.00	45.54	1471.00	PGFT
202	NLD	NLD198500146	MOD	2006-08-04	TX-29	HELENA ELIZABETH	TEXEL	348.00	40.40	1471.00	PEPO
203	NLD	NLD198500189	MOD	2003-08-24	KG-9	PIETERNELLA	KORTGENE	100.00	23.01	221.00	PGTD
204	NLD	NLD198500400	MOD	2005-06-10	VD-18	SAMENWERKING	EDAM-VOLENDAM	77.00	22.37	221.00	PHHJ
205	NLD	NLD198500414	MOD	2003-12-05	TH-5	ADRIANA MAATJE	THOLEN	83.00	22.97	221.00	PCDG
206	NLD	NLD198500526	MOD	2003-04-28	OD-7	ADRIANUS	GOEDEREEDE-OUDDORP	91.00	24.45	221.00	PHEQ
207	NLD	NLD198500597	MOD	2004-03-27	WR-212	RIKJELLE	WIERINGEN	62.00	19.45	208.00	PDNF
208	NLD	NLD198500780	MOD	2005-03-04	YE-139	ELIZABETH	REIMERSWAAL-YERSEKE	115.00	25.09	221.00	PDXB
209	NLD	NLD198500893	MOD	2005-01-01	WR-20	ELISABETH	WIERINGEN	113.00	24.44	221.00	PFJY
210	NLD	NLD198500986	MOD	2003-11-18	OD-5	CLARA JACOBA	GOEDEREEDE-OUDDORP	105.00	23.94	221.00	PDPX
211	NLD	NLD198502215	MOD	2003-10-03	WR-108	STELLA MARIS	WIERINGEN	83.00	22.97	221.00	PEBX
212	NLD	NLD198600010	MOD	2003-11-10	GO-33	IMMANUEL	GOEDEREEDE	86.00	22.30	221.00	PDNI
213	NLD	NLD198600031	MOD	2006-07-11	IJM-8	RONY	VELSEN-IJMUIDEN	75.00	23.50	221.00	PFFE
214	NLD	NLD198600095	MOD	2005-10-12	UK-44	MORGENSTER	URK	558.00	45.68	2630.00	PGAU
215	NLD	NLD198600120	MOD	2005-09-26	OD-12	THE MILLERS	GOEDEREEDE-OUDDORP	48.00	19.57	221.00	PDQZ
216	NLD	NLD198600295	MOD	2006-03-31	GO-32	ENDURANCE	GOEDEREEDE	112.00	25.00	221.00	PDQJ
217	NLD	NLD198600314	MOD	2003-06-17	HD-222	LIDA SUZANNA	DEN HELDER	112.00	25.00	221.00	PEPZ
218	NLD	NLD198600627	MOD	2004-06-25	UK-33	WILLEMPJE HOEKSTRA	URK	426.00	40.73	1750.00	PIPL
219	NLD	NLD198600989	MOD	2006-10-06	TH-43	MARIA	THOLEN	381.00	39.38	1471.00	PFTW
220	NLD	NLD198700003	MOD	2003-01-01	ARM-7	JAN SENIOR	ARNEMUIDEN	560.00	45.68	2820.00	PFBT
221	NLD	NLD198700011	MOD	2003-01-01	ARM-17	JACOMINA BLAZINA	ARNEMUIDEN	555.00	43.70	2210.00	PEYG
222	NLD	NLD198700088	MOD	2005-01-01	GO-7	JACOB	GOEDEREEDE	305.00	35.79	1449.00	PDMG
223	NLD	NLD198700139	MOD	2003-10-29	GO-57	JOHANNA MARIA	GOEDEREEDE	88.00	23.92	221.00	PDFS
224	NLD	NLD198700158	MOD	2003-01-01	HD-21	JACOB SENIOR	DEN HELDER	465.00	40.20	1765.00	PEYF
225	NLD	NLD198700164	MOD	2003-01-01	GO-28	OP HOOP VAN ZEGEN	GOEDEREEDE	469.00	40.20	2169.00	PFVU
226	NLD	NLD198700225	MOD	2006-03-30	WR-29	LAURINA ARIETTA	WIERINGEN	83.00	22.97	221.00	PIZO
227	NLD	NLD198700241	MOD	2004-03-25	LO-20	ZWARTE AREND	ULRUM-LAUWERSOOG	54.00	19.60	188.00	PIZQ
228	NLD	NLD198700281	MOD	2003-10-31	OD-6	ZELDEN RUST	GOEDEREEDE-OUDDORP	291.00	37.99	1471.00	PIXX
229	NLD	NLD198700337	MOD	2004-04-06	UQ-15	ROBERT KLAAS	USQUERT	38.00	19.81	221.00	(nc)
230	NLD	NLD198700501	MOD	2004-05-19	IJM-31	MERON III	VELSEN-IJMUIDEN	62.00	20.34	221.00	(nc)
231	NLD	NLD198700547	MOD	2003-01-01	VLI-27	ROSALIA CLASINA	VLISSINGEN	558.00	45.68	2820.00	PHDT
232	NLD	NLD198700579	MOD	2003-01-01	UK-45	JACOB WILLEMINA	URK	462.00	40.20	2133.00	PDCV
233	NLD	NLD198700629	MOD	2003-01-01	WR-23	DE VROUW GEERTRUIDA	WIERINGEN	108.00	24.69	221.00	PDPO
234	NLD	NLD198700778	MOD	2005-07-22	HD-64	LIA-JAN	DEN HELDER	106.00	24.73	221.00	PFSB
235	NLD	NLD198700935	MOD	2003-01-01	UK-104	NEELTJE	URK	499.00	45.02	2398.00	PGEK
236	NLD	NLD198701004	MOD	2003-01-01	UK-167	DEO JUVANTE	URK	527.00	43.97	1739.00	PDPP
237	NLD	NLD198701074	MOD	2003-01-01	KW-88	PELIKAAN	KATWIJK	560.00	45.68	2820.00	PGRY
238	NLD	NLD198702076	MOD	2003-01-01	GO-25	ELIZABETH	GOEDEREEDE	1.00	5.20	29.00	(nc)
239	NLD	NLD198800009	MOD	2003-01-01	ARM-15	DE VROUW JANNETJE	ARNEMUIDEN	573.00	45.56	2574.00	PDRE
240	NLD	NLD198800017	MOD	2003-01-01	VLI-25	CINDY	VLISSINGEN	463.00	40.20	2426.00	PGGM
241	NLD	NLD198800086	MOD	2003-11-18	GO-20	MARIA	GOEDEREEDE	405.00	39.45	1471.00	PFTX
242	NLD	NLD198800186	MOD	2003-10-01	KW-72	TINA ADRIANA	KATWIJK	89.00	23.54	221.00	PEVK
243	NLD	NLD198800269	MOD	2003-01-01	ARM-14	GRIETJE GEERTRUIDA	ARNEMUIDEN	552.00	43.70	2205.00	PDWQ
244	NLD	NLD198800277	MOD	2006-10-06	HA-8	STORMVOGEL	HARLINGEN	50.00	20.20	183.00	PHUX
245	NLD	NLD198800356	MOD	2004-04-25	TS-1	ALINA	TERSCHELLING	56.00	18.99	183.00	PI9112
246	NLD	NLD198800426	MOD	2004-03-15	UK-1	ALBERT	URK	503.00	42.70	1839.00	PCIB
247	NLD	NLD198800457	MOD	2004-03-17	HA-61	HILLIE	HARLINGEN	63.00	20.15	221.00	(nc)
248	NLD	NLD198800495	MOD	2004-02-28	WON-21	JURJENNA	WONSERADEEL	45.00	19.64	155.00	PIWW
249	NLD	NLD198800511	MOD	2003-01-01	UK-52	PETER	URK	466.00	40.28	2206.00	PFAP
250	NLD	NLD198800567	MOD	2005-01-01	WR-40	JOGINA	WIERINGEN	63.00	20.25	221.00	PEZH
251	NLD	NLD198800733	MOD	2003-01-01	UK-61	VERTROUWEN	URK	408.00	40.20	1471.00	PIGD
252	NLD	NLD198800816	MOD	2003-01-01	UK-156	HERMINA	URK	499.00	45.02	2398.00	PERL
253	NLD	NLD198801013	MOD	2005-02-03	GO-59	ALBATROS	GOEDEREEDE	47.00	19.53	221.00	PFEO
254	NLD	NLD198900067	MOD	2005-11-11	UK-292	EBEN HAEZER	URK	405.00	39.06	1471.00	PDUK
255	NLD	NLD198900070	MOD	2003-05-14	GO-23	CORNELIS JANNETJE	GOEDEREEDE	366.00	39.00	1471.00	PHQL

Annex 5

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
256	NLD	NLD198900256	MOD	2003-01-01	OD-17	BUIS	GOEDEREEDE-OUDDORP	402.00	39.06	1471.00	PFSI
257	NLD	NLD198900417	MOD	2004-06-30	HA-41	ANTJE	HARLINGEN	50.00	20.20	213.00	PCMP
258	NLD	NLD198900701	MOD	2005-09-20	TX-25	EVERDINA	TEXEL	55.00	20.03	221.00	PEAH
259	NLD	NLD198901022	MOD	2005-10-24	UK-68	VROUW MARRETJE	URK	412.00	39.53	1471.00	PEYE
260	NLD	NLD198901028	MOD	2003-01-01	UK-133	AALTJE JACOBA	URK	435.00	40.73	1471.00	PCAO
261	NLD	NLD198901093	MOD	2006-01-06	UQ-18	MARLENA	USQUERT	55.00	23.95	221.00	PG6514
262	NLD	NLD198901099	MOD	2003-10-09	WR-57	JACOBA	WIERINGEN	73.00	23.85	220.00	PEYI
263	NLD	NLD198901909	MOD	2003-01-20	ARM-23	VOLHARDING	ARNEMUIDEN	1.00	4.57	11.00	(nc)
264	NLD	NLD198902151	MOD	2003-01-01	KW-116	WILMA	KATWIJK	1.00	4.30	7.00	(nc)
265	NLD	NLD199001042	MOD	2003-01-01	GO-44	QUO VADIS	GOEDEREEDE	367.00	39.02	1471.00	PGXN
266	NLD	NLD199001055	MOD	2004-05-07	HD-65	HARMTJE PIETER	DEN HELDER	156.00	24.00	221.00	PENI
267	NLD	NLD199001058	MOD	2003-01-01	UK-383	HARMEN POST	URK	446.00	41.78	1471.00	PEME
268	NLD	NLD199001065	MOD	2003-09-13	TH-10	DIRKJE	THOLEN	86.00	23.97	221.00	PDQX
269	NLD	NLD199001075	MOD	2005-02-25	UK-2	ADRIAANTJE	URK	498.00	42.45	1471.00	PDHR
270	NLD	NLD199001077	MOD	2004-03-10	KW-45	ANNA HENDRIKA	KATWIJK	489.00	42.00	1471.00	PDXZ
271	NLD	NLD199001078	MOD	2005-04-08	WL-22	GERDA	WESTDONGERADEEL	43.00	21.23	174.00	PCRG
272	NLD	NLD199001086	MOD	2005-03-31	ST-20	AUKE SENIOR	STAVEREN	46.00	21.99	184.00	(nc)
273	NLD	NLD199001094	MOD	2003-01-01	OD-50	BRAMME'IE	GOEDEREEDE-OUDDORP	151.00	24.00	221.00	PFJT
274	NLD	NLD199001109	MOD	2003-11-10	WON-24	ELISABETH	WONSERADEEL	92.00	22.06	221.00	PDXJ
275	NLD	NLD199001110	MOD	2003-01-01	ZK-28	SASKIA	ULRUM-ZOUTKAMP	1.00	5.60	10.00	(nc)
276	NLD	NLD199001134	MOD	2003-08-01	GO-18	ZEEAREND	GOEDEREEDE	121.00	23.13	221.00	PIWA
277	NLD	NLD199001204	MOD	2004-04-22	UK-143	ANDRIES DE VRIES	URK	419.00	40.11	1471.00	PHZU
278	NLD	NLD199001485	MOD	2005-08-12	UK-163	ORION	URK	78.00	22.85	221.00	PFDO
279	NLD	NLD199001982	MOD	2003-01-01	KW-25	ZEEAREND	KATWIJK	1.00	5.55	35.00	(nc)
280	NLD	NLD199101413	MOD	2003-01-01	UK-47	IEDE KORNELIS	URK	436.00	40.92	1471.00	PEVQ
281	NLD	NLD199101571	MOD	2005-01-01	TX-1	CORNELIA	TEXEL	422.00	40.11	1468.00	PDKS
282	NLD	NLD199101572	MOD	2003-01-01	UK-172	SURSUM CORDA	URK	458.00	41.35	1471.00	PHVB
283	NLD	NLD199101623	MOD	2003-08-01	GO-1	CATHARINA	GOEDEREEDE	160.00	23.97	221.00	PDIT
284	NLD	NLD199101723	MOD	2005-01-01	YE-52	ADRIANA	REIMERSWAAL-YERSEKE	160.00	23.97	221.00	PIYW
285	NLD	NLD199201617	MOD	2003-01-01	UK-284	CORNELIS ZEEMAN	URK	462.00	41.80	1471.00	PDLI
286	NLD	NLD199201655	MOD	2003-09-24	ZK-87	KLAZINA	ULRUM-ZOUTKAMP	151.00	23.88	221.00	PFKD
287	NLD	NLD199201667	MOD	2003-04-02	WR-213	TINI SIMONE	WIERINGEN	78.00	22.72	221.00	PHZA
288	NLD	NLD199201673	MOD	2003-01-01	UK-34	KOBUS JR	URK	458.00	41.35	1471.00	PFKP
289	NLD	NLD199201675	MOD	2003-01-01	TX-14	GRIETJE	TEXEL	449.00	40.90	1471.00	PEKM
290	NLD	NLD199201697	MOD	2006-06-02	TX-33	MAARTEN CORNELIS	TEXEL	455.00	42.81	1471.00	PGSZ
291	NLD	NLD199201710	MOD	2003-01-01	SL-42	JAN CORNELIS III	GOEDEREEDE-STELLENDAM	475.00	41.99	1467.00	PCRJ
292	NLD	NLD199201712	MOD	2006-03-06	VLI-28	MICHAEL - NICKY	VLISSINGEN	138.00	23.94	221.00	PDER
293	NLD	NLD199201721	MOD	2006-04-17	ARM-18	JORIS SENIOR	ARNEMUIDEN	572.00	45.98	1471.00	PFBR
294	NLD	NLD199201722	MOD	2003-01-01	UK-246	CONCORDIA	URK	443.00	40.36	1246.00	PDLQ
295	NLD	NLD199201724	MOD	2004-01-27	HD-7	ZES GEBROEDERS	DEN HELDER	547.00	42.87	1470.00	PIYG
296	NLD	NLD199201750	MOD	2003-01-01	HD-29	MORGENSTER	DEN HELDER	546.00	43.99	1471.00	PGAP
297	NLD	NLD199201765	MOD	2003-01-01	GO-4	GEORGE JOHANNES KLAZINA	GOEDEREEDE	417.00	40.11	1467.00	PEHL
298	NLD	NLD199201770	MOD	2003-01-01	GO-48	CORNELIS SENIOR	GOEDEREEDE	418.00	40.14	1467.00	PDMY
299	NLD	NLD199201803	MOD	2005-01-01	UK-195	AALTJE JAN	URK	489.00	41.99	1467.00	PCAR
300	NLD	NLD199201864	MOD	2005-01-01	LO-3	BORNRIF	ULRUM-LAUWERSOOG	10.00	10.22	97.00	(nc)

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Annex 5

LIST - Avanced Search - Fleet Register

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Data provided by M.S.at 01/03/2018. Build of 04/04/2018.

Total vessel(s) found : 385 , with these searching parameters :

Country : NLD & Active at the 01/01/2007 & Main gear code : TBB

	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
301	NLD	NLD199201935	MOD	2003-01-01	ZK-1	HUNZE	ULRUM-ZOUTKAMP	1.00	6.92	18.00	(nc)
302	NLD	NLD199202000	MOD	2003-01-01	TH-46	BUTEO BUTEO	THOLEN	6.00	12.60	5.00	(nc)
303	NLD	NLD199301725	MOD	2003-08-18	TX-94	AVONTUUR	TEXEL	424.00	40.00	1471.00	PCWO
304	NLD	NLD199301756	MOD	2004-01-20	HA-106	RESEDA	HARLINGEN	150.00	23.96	221.00	PHAD
305	NLD	NLD199301771	MOD	2003-01-01	UK-227	ORANJE NASSAU	URK	458.00	40.90	1471.00	PGOI
306	NLD	NLD199301795	MOD	2003-01-01	TX-68	VERTROUWEN	TEXEL	438.00	41.15	1471.00	PIFT
307	NLD	NLD199301821	MOD	2003-01-01	UK-197	NOORDERLICHT	URK	460.00	40.90	1465.00	PGHQ
308	NLD	NLD199301827	MOD	2003-11-10	WR-130	JOHANNA II	WIERINGEN	53.00	22.25	221.00	(nc)
309	NLD	NLD199301848	MOD	2005-01-01	UK-243	JAN VAN DEN BERG	URK	471.00	42.00	1467.00	PFBA
310	NLD	NLD199301885	MOD	2003-01-01	ARM-22	KLAAS ADRIANA	ARNEMUIDEN	549.00	43.99	1467.00	PFJO
311	NLD	NLD199301890	MOD	2003-01-01	UK-95	AART MAASKANT	URK	501.00	42.36	1467.00	PCAX
312	NLD	NLD199301897	MOD	2004-04-07	UQ-6	DINA	USQUERT	32.00	18.44	154.00	(nc)
313	NLD	NLD199301981	MOD	2005-09-30	SCH-40	ROSANNE	DEN HAAG-SCHEVENINGEN	5.00	9.33	98.00	(nc)
314	NLD	NLD199401844	MOD	2003-01-01	LE-63	MARTIN MICHIEL	LEMSTERLAND-LEMMER	552.00	44.14	1467.00	PFWS
315	NLD	NLD199401853	MOD	2003-01-01	LE-62	ALIDA NATASCHA	LEMSTERLAND-LEMMER	552.00	44.14	1467.00	PCGP
316	NLD	NLD199401869	MOD	2003-01-01	HD-22	NOORDERHAAKS	DEN HELDER	560.00	44.03	1470.00	PGKO
317	NLD	NLD199401870	MOD	2003-01-01	UK-382	JANSSIEN	URK	466.00	41.80	1471.00	PEZW
318	NLD	NLD199401895	MOD	2003-01-01	HD-4	HENDRIK PETRONELLA	DEN HELDER	493.00	42.90	1471.00	PEQU
319	NLD	NLD199401924	MOD	2003-01-01	ARM-21	CORNELIS MARIJS	ARNEMUIDEN	1.00	4.65	18.00	(nc)
320	NLD	NLD199402001	MOD	2003-10-07	TS-6	ARYANNE	TERSCHELLING	96.00	21.95	221.00	PCBA
321	NLD	NLD199501910	MOD	2005-01-01	ARM-25	DEO VOLENTE	ARNEMUIDEN	130.00	23.93	221.00	PDPH
322	NLD	NLD199501939	MOD	2003-09-03	LO-8	TRIJNTJE	ULRUM-LAUWERSOOG	56.00	22.06	221.00	PIBJ
323	NLD	NLD199501957	MOD	2005-01-01	SCH-65	QUO VADIS	DEN HAAG-SCHEVENINGEN	130.00	23.93	221.00	PGXM
324	NLD	NLD199602034	MOD	2005-01-01	KW-49	LEENDERT JUNIOR	KATWIJK	502.00	42.36	1467.00	PCCV
325	NLD	NLD199602081	MOD	2004-05-04	WON-43	VAYA CON DIOS	WONSERADEEL	54.00	20.41	221.00	PDBI
326	NLD	NLD199702073	MOD	2003-08-26	YE-138	MAATJE HELENA	REIMERSWAAL-YERSEKE	147.00	23.99	221.00	PDAU
327	NLD	NLD199702084	MOD	2003-01-01	KW-34	ROSEMARIE	KATWIJK	503.00	42.36	1471.00	PEAV
328	NLD	NLD199702109	MOD	2003-08-26	VLI-7	EBEN HAEZER	VLISSINGEN	151.00	23.98	221.00	PFTL
329	NLD	NLD199802133	CHA	2006-12-14	HA-2	PESCADOR	HARLINGEN	20.00	16.90	192.00	PD2410
330	NLD	NLD199802170	MOD	2003-01-01	UK-184	JOSEPHINA MARIA	URK	510.00	42.46	1467.00	PEAS
331	NLD	NLD199802200	MOD	2005-01-01	UK-153	LUB SENIOR	URK	508.00	42.40	1471.00	PCFI
332	NLD	NLD199802312	MOD	2005-01-01	ARM-26	JOHANNA	ARNEMUIDEN	1.00	4.65	22.00	(nc)
333	NLD	NLD199802553	MOD	2003-01-01	SL-13	ZEEWOLF	GOEDEREEDE-STELLENDAM	4.00	7.95	42.00	(nc)
334	NLD	NLD199902545	MOD	2005-10-04	TX-3	BIEM-JAN	TEXEL	494.00	42.21	1471.00	PCGA
335	NLD	NLD199902556	MOD	2003-11-10	GO-55	ZUIDERKRUIS	GOEDEREEDE	159.00	23.99	221.00	PDBR
336	NLD	NLD199902559	MOD	2003-01-01	GO-31	MORGENSTER	GOEDEREEDE	494.00	42.35	1471.00	PCHQ
337	NLD	NLD199902567	MOD	2005-01-01	TX-38	BRANDING IV	TEXEL	494.00	42.21	1469.00	PEGB
338	NLD	NLD199902603	MOD	2003-01-01	TX-43	BIEM VAN DER VIS	TEXEL	494.00	42.21	1467.00	PFBS
339	NLD	NLD199902648	MOD	2004-03-16	ZK-18	LIBERTY	ULRUM-ZOUTKAMP	33.00	18.80	138.00	(nc)
340	NLD	NLD199902692	CHA	2003-12-16	ZK-66	VERTROUWEN	ULRUM-ZOUTKAMP	1.00	4.20	7.00	(nc)
341	NLD	NLD200002578	MOD	2005-01-01	ST-21	ANNIGJE GEESJE	STAVEREN	41.00	19.99	202.00	(nc)
342	NLD	NLD200002579	MOD	2003-01-01	TX-36	JAN VAN TOON	TEXEL	494.00	42.35	1471.00	PEDH
343	NLD	NLD200002596	MOD	2003-01-01	GO-8	EBEN HAEZER	GOEDEREEDE	448.00	40.72	1471.00	PECI
344	NLD	NLD200002598	MOD	2004-03-27	WR-109	BAUKJE ELISABETH	WIERINGEN	70.00	19.99	220.00	(nc)
345	NLD	NLD200002602	MOD	2003-10-02	ZK-44	VIER GEBROEDERS	ULRUM-ZOUTKAMP	97.00	22.50	221.00	(nc)
346	NLD	NLD200002604	MOD	2005-06-24	ZK-2	VERTROUWEN	ULRUM-ZOUTKAMP	70.00	19.99	221.00	PBAT
347	NLD	NLD200002606	MOD	2003-09-01	TX-45	BEREND-CORNELIS	TEXEL	151.00	23.97	221.00	(nc)
348	NLD	NLD200002607	MOD	2003-09-01	UK-186	GERRIT SR	URK	150.00	23.97	221.00	(nc)
349	NLD	NLD200002609	MOD	2003-10-26	OD-9	GEERTUIDA	GOEDEREEDE-OUDDORP	152.00	23.97	221.00	PFDL
350	NLD	NLD200002610	MOD	2003-11-12	SCH-18	BOEIER	DEN HAAG-SCHEVENINGEN	151.00	23.97	221.00	PFBM
351	NLD	NLD200002611	MOD	2003-09-01	KW-5	LEENDERT DE MOL	KATWIJK	152.00	23.97	221.00	(nc)

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	Country	CFR	Event Code	Event Date	Ext. Marking	Vessel Name	Port Name	Gt Tonnage	LOA	Main Power	Ircs
352	NLD	NLD200002612	MOD	2003-08-29	TX-48	SOLEA	TEXEL	151.00	23.97	221.00	PBDY
353	NLD	NLD200002614	MOD	2005-01-01	WR-181	GERRITJE	WIERINGEN	75.00	23.73	221.00	PBBP
354	NLD	NLD200002617	MOD	2003-11-13	UK-287	MAARTEN FETSKE	URK	78.00	21.15	221.00	PFCY
355	NLD	NLD200002621	MOD	2003-10-31	UK-56	NOOIT GEDACHT	URK	78.00	21.15	220.00	PBCL
356	NLD	NLD200002627	MOD	2005-01-01	OD-1	MAARTEN JACOB	GOEDEREEDE-OUDDORP	496.00	42.37	1470.00	PBDF
357	NLD	NLD200002638	MOD	2003-10-01	HD-3	NIEUWEDIEP	DEN HELDER	161.00	23.99	221.00	(nc)
358	NLD	NLD200102629	MOD	2005-01-01	WR-242	AQUARIUS	WIERINGEN	70.00	19.99	221.00	(nc)
359	NLD	NLD200102630	MOD	2003-10-24	WR-3	NOORDSTER	WIERINGEN	75.00	22.05	220.00	PBEK
360	NLD	NLD200102631	MOD	2003-10-29	WR-50	CONCORDIA	WIERINGEN	75.00	22.25	220.00	PBEE
361	NLD	NLD200102633	MOD	2005-01-01	TX-34	SOLA GRATIA	TEXEL	151.00	23.97	220.00	PBFH
362	NLD	NLD200102639	MOD	2005-01-01	WR-389	BONA FIDE	WIERINGEN	82.00	22.70	220.00	PBIE
363	NLD	NLD200102643	MOD	2005-01-10	LO-9	AALTJE	ULRUM-LAUWERSOOG	19.00	14.99	112.00	(nc)
364	NLD	NLD200102653	MOD	2003-10-10	ZK-26	RIENK ALBERT	ULRUM-ZOUTKAMP	78.00	21.15	221.00	(nc)
365	NLD	NLD200202640	MOD	2003-01-01	GO-26	AREND-JAN	GOEDEREEDE	496.00	42.37	1470.00	PBGF
366	NLD	NLD200202646	MOD	2003-01-01	GO-9	ONDERNEMING	GOEDEREEDE	471.00	41.59	1470.00	PBHD
367	NLD	NLD200202647	MOD	2003-09-26	WR-12	WADDENZEE	WIERINGEN	73.00	23.73	221.00	PBGL
368	NLD	NLD200202649	MOD	2003-09-25	WR-106	CELESTE KARLIJN	WIERINGEN	73.00	23.40	221.00	PBCU
369	NLD	NLD200202651	MOD	2003-01-01	GO-38	DE VERTROUWEN	GOEDEREEDE	499.00	42.37	1470.00	PBIN
370	NLD	NLD200202652	MOD	2003-09-25	ZK-43	BORNRIF	ULRUM-ZOUTKAMP	83.00	21.77	221.00	PBIL
371	NLD	NLD200202656	MOD	2003-11-17	ZK-13	BEREND CORNELIS	ULRUM-ZOUTKAMP	89.00	23.60	221.00	PIPD
372	NLD	NLD200202677	MOD	2005-11-18	TX-24	HELIOMARE	TEXEL	45.00	18.80	149.00	(nc)
373	NLD	NLD200302657	MOD	2005-10-18	HD-30	SIMON SENIOR	DEN HELDER	161.00	23.99	221.00	PBIV
374	NLD	NLD200302661	MOD	2003-10-04	BR-7	RES NOVA	OOSTBURG-BRESKEN	69.00	19.96	221.00	PBKX
375	NLD	NLD200302676	MOD	2004-07-09	HD-42	ELISABETH	DEN HELDER	94.00	23.95	221.00	PBKG
376	NLD	NLD200302679	MOD	2005-06-28	WR-22	EVA-LIN	WIERINGEN	77.00	22.15	220.00	PBIS
377	NLD	NLD200302680	MOD	2003-10-22	GO-5	ORA ET LABORA	GOEDEREEDE	499.00	42.37	1471.00	PBKQ
378	NLD	NLD200302687	MOD	2005-01-01	BR-39	ELENA	OOSTBURG-BRESKEN	67.00	19.99	188.00	PDVE
379	NLD	NLD200302691	MOD	2003-12-21	ARM-20	GEERTRUID ADRIANA	ARNEMUIDEN	499.00	42.37	1471.00	PBLR
380	NLD	NLD200302694	MOD	2004-02-06	UK-64	MATTANJA	URK	418.00	39.67	1471.00	PBKE
381	NLD	NLD200302695	MOD	2004-05-07	TX-19	ELISABETH CHRISTINA	TEXEL	503.00	42.58	1471.00	PDXY
382	NLD	NLD200402698	MOD	2004-07-01	GO-14	VROUW GRIETJE	GOEDEREEDE	441.00	40.72	1471.00	PHBH
383	NLD	NLD200402702	MOD	2006-05-15	BR-14	CORNELIA	OOSTBURG-BRESKEN	484.00	41.05	1470.00	PHBW
384	NLD	NLD200602662	CST	2006-01-10	GO-22	JAN-CORNELIS	GOEDEREEDE	484.00	41.05	1471.00	PHAG
385	NLD	NLD200602669	MOD	2006-04-04	KW-145	CATHARINA	KATWIJK	491.00	41.25	1470.00	PHEZ

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Annex 6

**COUNCIL OF
THE EUROPEAN UNION**

EN

C/06/354

16325/06 (Presse 354)

PRESS RELEASE

2774th Council Meeting

Agriculture and Fisheries

Brussels, 19 to 21 December 2006

President **Mr Juha KORKEAOJA**
Minister for Agriculture and Forestry of Finland

P R E S S

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Due to good results from recovery plans in the cases of northern hake and sole in Biscay, there will be an increase of 20% and 12% respectively.

Other reductions concern skate, ray and ling, whereas TACs for megrims, anglerfish in VIII and IX, turbot, lemon sole, dab and flounder in North Sea and EC waters of the Norwegian Sea, and witch remain at the level of 2006.

The regulation will also include special provisions for landing or transhipping of frozen fish caught by third-country fishing vessels in the NEAFC (North-East Atlantic Fisheries Commission) area to be applied as from 1 May 2007.

Electric fishing in Central and Southern North Sea. Fishing vessels operating in zones IVb and IVc will be authorised to use electricity for fishing on an experimental basis and under strict conditions.

Statements to be entered into the minutes of the Council have been made by the Council, the Commission and individual delegations concerning: fishing opportunities under the new fisheries agreement with Greenland; the enhanced data pilot scheme in the Irish Sea and the blue whiting stock.

The Council already agreed on updating TACs and quotas for 2007 in the Baltic Sea last October, and those related to deep-sea species in November. The Commission set out new guiding principles concerning proposals on TACs in a policy statement presented on 15 September.

Indicative figures on 2007 TACs and quotas are reproduced here below. The complete and definitive figures will be published in the Official Journal of the EU.

Annex 7

►B

COUNCIL REGULATION (EC) No 40/2008

of 16 January 2008

fixing for 2008 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

(OJ L 19, 23.1.2008, p. 1)

Amended by:

		Official Journal		
		No	page	date
►M1	Commission Regulation (EC) No 541/2008 of 16 June 2008	L 157	23	17.6.2008
►M2	Commission Regulation (EC) No 641/2008 of 4 July 2008	L 178	17	5.7.2008
►M3	Commission Regulation (EC) No 697/2008 of 23 July 2008	L 195	9	24.7.2008
►M4	Council Regulation (EC) No 718/2008 of 24 July 2008	L 198	8	26.7.2008

Corrected by:

►C1 Corrigendum, OJ L 176, 4.7.2008, p. 25 (40/2008)

▼B

ANNEX III

TRANSITIONAL TECHNICAL AND CONTROL MEASURES

Part A

North Atlantic including the North Sea, Skagerrak and Kattegat

1. **Fishing for Herring in EC waters of ICES zone IIa**

It shall be prohibited to land or retain on board herring caught in EC waters of zone IIa in the periods 1 January to 28 February and 16 May to 31 December.

2. **Technical conservation measures in the Skagerrak and in the Kattegat**

By way of derogation from the provisions set out in Annex IV of Regulation (EC) No 850/98, the provisions in Appendix 1 to this Annex shall apply.

3. **Electric fishing in ices zones IVc and IVb**

3.1. By way of derogation from Article 31(1) of Regulation (EC) No 850/98 fishing with beam trawl using electrical pulse current shall be allowed in ICES zones IVc and IVb south of a rhumb line joined by the following points, which shall be measured according to the WGS84 coordinate system:

— a point on the east coast of the United Kingdom at latitude 55° N,

— then east to latitude 55° N, longitude 5° E,

— then north to latitude 56° N,

— and finally east to a point on the west coast of Denmark at latitude 56° N.

3.2. The following measures shall apply in 2008:

(a) no more than 5 % of the beam trawler fleet by Member State shall be allowed to use the electric pulse trawl;

(b) the maximum electrical power in kW for each beam trawl shall be no more than the length in metre of the beam multiplied by 1,25;

(c) the effective voltage between the electrodes shall be no more than 15V;

(d) the vessel shall be equipped with an automatic computer management system which records the maximum power used per beam and the effective voltage between electrodes for at least the last 100 tows. It shall be not possible for non authorized person to modify this automatic computer management system;

(e) It shall be prohibited to use one or more tickler chains in front of the footrope.

4. **Closure of an area for sandeel fisheries in ices zone IV**

4.1. It shall be prohibited to land or retain on board sandeels caught within the geographical area bounded by the east coast of England and Scotland, and enclosed by sequentially joining with rhumb lines the following positions, which shall be measured according to the WGS84 coordinate system:

— the east coast of England at latitude 55°30′N,

— latitude 55°30′N, longitude 1°00′W,

— latitude 58°00′N, longitude 1°00′W,

— latitude 58°00′N, longitude 2°00′W,

— the east coast of Scotland at longitude 2°00′W.

4.2. Fisheries for scientific investigation shall be allowed in order to monitor the sandeel stock in the area and the effects of the closure.

I

(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)

REGULATIONS

COUNCIL REGULATION (EC) No 43/2009

of 16 January 2009

fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community,

Having regard to Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy ([1]), and in particular Article 20 thereof,

Having regard to Council Regulation (EC) No 847/96 of 6 May 1996 introducing additional conditions for year-to-year management of TACs and quotas ([2]), and in particular Article 2 thereof,

Having regard to Council Regulation (EC) No 811/2004 of 21 April 2004 establishing measures for the recovery of the Northern hake stock ([3]), and in particular Article 5 thereof,

Having regard to Council Regulation (EC) No 2166/2005 of 20 December 2005 establishing measures for the recovery of the Southern hake and Norway lobster stocks in the Cantabrian Sea and Western Iberian peninsula ([4]) and in particular Articles 4 and 8 thereof,

Having regard to Council Regulation (EC) No 388/2006 of 23 February 2006 establishing a multiannual plan for the sustainable exploitation of the stock of sole in the Bay of Biscay ([5]), and in particular Article 4 thereof,

Having regard to Council Regulation (EC) No 509/2007 of 7 May 2007 establishing a multiannual plan for the sustainable exploitation of the stock of sole in the Western Channel ([6]), and in particular Articles 3 and 5 thereof,

Having regard to Council Regulation (EC) No 676/2007 of 11 June 2007 establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea ([7]), and in particular Articles 6 and 9 thereof,

Having regard to Council Regulation (EC) No 1300/2008 of 18 December 2008 establishing a multiannual plan for the stock of herring distributed to the West of Scotland and the fisheries exploiting that stock ([8]), and in particular Article 4 thereof,

Having regard to Council Regulation (EC) No 1342/2008 of 18 December 2008 establishing a long-term plan for cod stocks and the fisheries exploiting those stocks ([9]), and in particular Articles 7, 8, 9 and 12 thereof,

Having regard to the proposal from the Commission,

Whereas:

(1) Article 4 of Regulation (EC) No 2371/2002 requires the Council to adopt the measures necessary to ensure access to waters and resources and the sustainable pursuit of fishing activities taking account of available scientific advice and, in particular, the report prepared by the Scientific, Technical and Economic Committee for Fisheries (STECF).

([1]) OJ L 358, 31.12.2002, p. 59.
([2]) OJ L 115, 9.5.1996, p. 3.
([3]) OJ L 150, 30.4.2004, p. 1.
([4]) OJ L 345, 28.12.2005, p. 5.
([5]) OJ L 65, 7.3.2006, p. 1.
([6]) OJ L 122, 11.5.2007, p. 7.
([7]) OJ L 157, 19.6.2007, p. 1.
([8]) OJ L 344, 20.12.2008, p. 6.
([9]) OJ L 348, 24.12.2008, p. 20.

ANNEX III

TRANSITIONAL TECHNICAL AND CONTROL MEASURES

Part A

North Atlantic including the North Sea, Skagerrak and Kattegat

1. **Fishing for Herring in EC waters of ICES zone IIa**

It shall be prohibited to land or retain on board herring caught in EC waters of zone IIa in the periods 1 January to 28 February and 16 May to 31 December.

2. **Technical conservation measures in the Skagerrak and in the Kattegat**

By way of derogation from the provisions set out in Annex IV of Regulation (EC) No 850/98, the provisions in Appendix 1 to this Annex shall apply.

3. **Electric fishing in ices zones IVc and IVb**

3.1. By way of derogation from Article 31(1) of Regulation (EC) No 850/98 fishing with beam trawl using electrical pulse current shall be allowed in ICES zones IVc and IVb south of a rhumb line joined by the following points, which shall be measured according to the WGS84 coordinate system:

— a point on the east coast of the United Kingdom at latitude 55° N,

— then east to latitude 55° N, longitude 5° E,

— then north to latitude 56° N,

— and finally east to a point on the west coast of Denmark at latitude 56° N.

3.2. The following measures shall apply in 2009:

(a) no more than 5 % of the beam trawler fleet by Member State shall be allowed to use the electric pulse trawl;

(b) the maximum electrical power in kW for each beam trawl shall be no more than the length in metre of the beam multiplied by 1,25;

(c) the effective voltage between the electrodes shall be no more than 15 V;

(d) the vessel shall be equipped with an automatic computer management system which records the maximum power used per beam and the effective voltage between electrodes for at least the last 100 tows. It shall be not possible for non authorised person to modify this automatic computer management system;

(e) it shall be prohibited to use one or more tickler chains in front of the footrope.

4. **Closure of an area for sandeel fisheries in ices zone IV**

4.1. It shall be prohibited to land or retain on board sandeels caught within the geographical area bounded by the east coast of England and Scotland, and enclosed by sequentially joining with rhumb lines the following positions, which shall be measured according to the WGS84 coordinate system:

— the east coast of England at latitude 55°30'N,

— latitude 55°30'N, longitude 1°00'W,

— latitude 58°00'N, longitude 1°00'W,

— latitude 58°00'N, longitude 2°00'W,

— the east coast of Scotland at longitude 2°00'W.

Annex 9

COUNCIL REGULATION (EC) No 1288/2009

of 27 November 2009

establishing transitional technical measures from 1 January 2010 to 30 June 2011

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 37 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament [1],

Having regard to the opinion of the European Economic and Social Committee [2],

Whereas:

(1) Council Regulation (EC) No 850/98 of 30 March 1998 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms [3] lays down certain technical measures for the conservation of fishery resources.

(2) Annex III to Council Regulation (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and for Community vessels, in waters where catch limitations are required [4] establishes technical measures until 31 December 2009.

(3) On 4 June 2008, the Commission made a proposal for a Council Regulation concerning the conservation of fisheries resources through technical measures, intended to replace Regulation (EC) No 850/98 and to provide for permanent measures on the transitional technical measures currently laid down in Annex III to Regulation (EC) No 43/2009.

(4) Considering that the proposed Council Regulation will not be adopted before the date on which the measures provided for in Annex III to Regulation (EC) No 43/2009 cease to apply, it is necessary for the reasons of legal certainty as well as of maintaining the proper conservation and management of marine resources to provide for the continuation of those measures for a transitional period of 18 months.

(5) With a view to further reducing unwanted catches, the prohibition of high grading as provided for in point 5b of Annex III to Regulation (EC) No 43/2009 should be extended to all ICES zones.

(6) The measures transposing into Community law the recommendations established by the Northeast Atlantic Fisheries Commission (NEAFC) should be amended in order to ensure compliance with the recommendations applicable in 2010.

(7) Considering that the measures laid down in Annex III to Regulation (EC) No 43/2009 cease to apply as from 1 January 2010, this Regulation should be applicable as from that date,

HAS ADOPTED THIS REGULATION:

Article 1

Transitional technical measures

1. Points 1, 2, 3 (including 3.1-3.2), 4 (including 4.1-4.2), 5, 5b (including 5b.1-5b.2), 6 (including 6.1-6.8), 7 (including 7.1-7.5), 8 (including 8.1-8.3), 9 (including 9.1-9.12), 9a (including 9a.1-9a.9), 12 (including 12.1-12.2), 15 (including 15.1-15.9), 16, 17, 18, 20 and 24 of Annex III and the Appendices to Annex III to Regulation (EC) No 43/2009 shall apply until 30 June 2011.

2. For the purposes of paragraph 1:

(a) (i) in point 6, point 6.8 second paragraph, points 9.3, 9.6 and 9.8, the year '2009' shall be replaced by '2010';

(ii) in point 3.2, point 6.7 first paragraph, point 6.8 first paragraph and point 18, the words 'in 2009' shall be replaced by 'from 1 January 2010 to 30 June 2011';

(1) Opinion of 22 April 2009 (not yet published in the Official Journal).
(2) OJ C 218, 11.9.2009, p. 43.
(3) OJ L 125, 27.4.1998, p. 1.
(4) OJ L 22, 26.1.2009, p. 1.

(iii) in points 6.2, 7.1 and 8.1, the year '2009' shall be deleted;

(iv) in point 6.1, the words '31 December 2009' shall be replaced by '30 June 2011';

(v) in point 6.7, the second paragraph shall be replaced by the following:

'Member States concerned shall submit to the Commission a preliminary report on the total amount of catches and discards of vessels subject to the observer programme of 2010 no later than 30 June 2010, while regarding the observer programme of 2011 Member States shall submit the preliminary report to the Commission no later than 30 June 2011. A final report concerning 2010 shall be submitted by 1 February 2011 at the latest.';

(b) in point 5b, the words 'in the North Sea and Skagerrak' shall be replaced by 'all ICES zones';

(c) point 6.3 shall be replaced by the following:

'6.3. By way of derogation from points 6.1 and 6.2, it shall be permitted to conduct fishing activities using inshore static nets fixed with stakes, scallop dredges, mussel dredges, handlines, mechanised jigging, draft nets and beach seines, pots and creels within the specified areas and time periods, provided that:

(i) no fishing gear other than inshore static nets fixed with stakes, scallop dredges, mussel dredges, handlines, mechanised jigging, pots and creels are carried on board or deployed; and

(ii) no fish other than mackerel, pollack, salmon, shellfish and crustacea are retained on board, landed or brought ashore.';

(d) in point 6, the following point shall be added:

'6.9. Member States may introduce more restrictive measures including closed areas in order to apply Article 13(2)(c) of Regulation (EC) No 1342/2008 in respect of its own flag vessels.';

(e) in point 7, in the title the words 'in Zone VIa' shall be deleted and the following point shall be added:

'7.6. During the period from 15 February to 15 April both in the year of 2010 as well as that of 2011, it shall be prohibited to use bottom trawls, longlines and gillnets within an area enclosed by sequentially joining with rhumb lines the following coordinates:

Point No	Latitude	Longitude
1	60° 58′76 N	27° 27′32 W
2	60° 56′02 N	27° 31′16 W
3	60° 59′76 N	27° 43′48 W
4	61° 03′00 N	27° 39′41 W';

(f) in point 15, the coordinates for the Hatton Bank and the Logachev Mound shall read as follows:

'Hatton Bank:

Point No	Latitude	Longitude
1	59° 26′ N	014° 30′ W
2	59° 12′ N	015° 08′ W
3	59° 01′ N	017° 00′ W
4	58° 50′ N	017° 38′ W
5	58° 30′ N	017° 52′ W
6	58° 30′ N	018° 22′ W
7	58° 03′ N	018° 22′ W
8	58° 03′ N	017° 30′ W
9	57° 55′ N	017° 30′ W
10	57° 45′ N	019° 15′ W
11	58° 11,15′ N	018° 57,51′ W
12	58° 11,57′ N	019° 11,97′ W
13	58° 27,75′ N	019° 11,65′ W
14	58° 39,09′ N	019° 14,28′ W
15	58° 38,11′ N	019° 01,29′ W
16	58° 53,14′ N	018° 43,54′ W
17	59° 00,29′ N	018° 01,31′ W
18	59° 08,01′ N	017° 49,31′ W

Point No	Latitude	Longitude
19	59° 08,75′ N	018° 01,47′ W
20	59° 15,16′ N	018° 01,56′ W
21	59° 24,17′ N	017° 31,22′ W
22	59° 21,77′ N	017° 15,36′ W
23	59° 26,91′ N	017° 01,66′ W
24	59° 42,69′ N	016° 45,96′ W
25	59° 20,97′ N	015° 44,75 W
26	59° 21′ N	015° 40′ W
27	59° 26′ N	014° 30′ W

Logachev Mound:

Point No	Latitude	Longitude
1	55° 17′ N	016° 10′ W
2	55° 34′ N	015° 07′ W
3	55° 50′ N	015° 15′ W
4	55° 33′ N	016° 16′ W
5	55° 17′ N	016° 10′ W’;

(g) in point 15, the following point shall be added:

‘15.10. Where, in the course of fishing operations in new and existing bottom fishing areas within the NEAFC Regulatory Area, the quantity of live coral or live sponge caught per gear set exceeds 60 kg of live coral and/or 800 kg of live sponge, the vessel shall inform its flag State, cease fishing and move at least 2 nautical miles away from the position that the evidence suggests is closest to the exact location where this catch was made.’;

(h) in point 24 (a), the words ‘15 August to 15 November 2009’ shall be replaced by ‘15 August to 30 November 2010’.

Article 2

Entry into force

This Regulation shall enter into force on the seventh day following its publication in the *Official Journal of the European Union*.

It shall apply from 1 January 2010 to 30 June 2011.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 27 November 2009.

For the Council

The President

C. BILDT

I

(Legislative acts)

REGULATIONS

REGULATION (EU) No 579/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 8 June 2011

amending Council Regulation (EC) No 850/98 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms and Council Regulation (EC) No 1288/2009 establishing transitional technical measures from 1 January 2010 to 30 June 2011

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 43(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee [1],

Acting in accordance with the ordinary legislative procedure [2],

Whereas:

(1) Council Regulation (EC) No 1288/2009 [3] provides for the continuation of temporary technical measures previously covered by Annex III to Council Regulation (EC) No 43/2009 [4], thereby allowing those measures to continue to apply until the adoption of permanent measures.

(2) In view of the forthcoming reform of the common fisheries policy (CFP) and its relevance for the content and scope of new permanent technical measures, it is appropriate to delay the adoption of such measures until a new legislative framework is in place.

(3) In order to maintain the proper conservation and management of marine resources, and given that it can reasonably be expected that a new legislative framework will apply as from 1 January 2013, the technical measures currently in force should continue to apply until that date.

(4) Consequently, since the temporary technical measures laid down in Regulation (EC) No 1288/2009 will cease to apply from 1 July 2011, that Regulation should be amended to extend their validity until 31 December 2012.

(5) Fishing quotas for Boarfish (Caproidae) were established for the first time under Council Regulation (EU) No 57/2011 [5]. It is therefore appropriate to clarify that boarfish may be targeted using towed nets with a mesh size range of 32 to 54 millimetres. Consequently, Annexes I and II to Council Regulation (EC) No 850/98 [6] should be amended accordingly,

HAVE ADOPTED THIS REGULATION:

Article 1

Regulation (EC) No 850/98 is hereby amended as follows:

(1) in Annex I, in the table, the following entry is inserted:

‘“Boarfish (Caproidae)”, with a mesh size range of 32 to 54 mm and a minimum percentage of target species of 90/60.’;

(1) OJ C 84, 17.3.2011, p. 47.
(2) Position of the European Parliament of 6 April 2011 (not yet published in the Official Journal) and decision of the Council of 17 May 2011.
(3) OJ L 347, 24.12.2009, p. 6.
(4) Council Regulation (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required (OJ L 22, 26.1.2009, p. 1).
(5) Council Regulation (EU) No 57/2011 of 18 January 2011 fixing for 2011 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in certain non-EU waters (OJ L 24, 27.1.2011, p. 1).
(6) OJ L 125, 27.4.1998, p. 1.

L 165/2 EN Official Journal of the European Union 24.6.2011

(2) in Annex II, in the table, the following entry is inserted:

'"Boarfish (Caproidae)", with a mesh size range of 32 to 54 mm and a minimum percentage of target species of 90 %.'.

Article 2

Regulation (EC) No 1288/2009 is hereby amended as follows:

(1) Article 1 is amended as follows:

(a) in paragraph 1, the words '30 June 2011' are replaced by the words '31 December 2012';

(b) paragraph 2 is amended as follows:

(i) point (a) is amended as follows:

— in point (i), the words 'point 6.8 second paragraph' are deleted,

— in point (ii), the words 'from 1 January 2010 to 30 June 2011' are replaced by the words 'from 1 January 2010 to 31 December 2012',

— in point (iv), the words '30 June 2011' are replaced by the words '31 December 2012',

— in point (v), the second subparagraph is replaced by the following:

'Member States concerned shall submit to the Commission a preliminary report on the total amount of catches and discards of vessels subject to the observer programme no later that 30 June of the year in which the programme is implemented. The final report for the calendar year concerned shall be submitted no later that 1 February of the year following that calendar year.',

— the following point (vi) is added:

'(vi) point 6.8, second paragraph, is replaced by the following:

"Member States concerned shall submit the results of the trials and experiments to the Commission no later than 30 September of the year in which these are carried out." ';

(ii) in point (e), the words 'both in the year 2010 as well as that of 2011' are deleted;

(iii) in point (h), the year '2010' is deleted;

(2) in Article 2, the words '30 June 2011' are replaced by the words '31 December 2012'.

Article 3

This Regulation shall enter into force on the seventh day following its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Strasbourg, 8 June 2011.

For the European Parliament	For the Council
The President	*The President*
J. BUZEK	GYŐRI E.

I

(Legislative acts)

REGULATIONS

REGULATION (EU) No 227/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 March 2013

amending Council Regulation (EC) No 850/98 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms and Council Regulation (EC) No 1434/98 specifying conditions under which herring may be landed for industrial purposes other than direct human consumption

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 43(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee [1],

Acting in accordance with the ordinary legislative procedure [2],

Whereas:

(1) Council Regulation (EC) No 1288/2009 of 27 November 2009 establishing transitional technical measures from 1 January 2010 to 30 June 2011 [3] and Regulation (EU) No 579/2011 of the European Parliament and of the Council of 8 June 2011 amending Council Regulation (EC) No 850/98 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms and Council Regulation (EC) No 1288/2009 establishing transitional technical measures from 1 January 2010 to 30 June 2011 [4] provide for the continuation of certain technical measures established in Council Regulation (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required [5] on a transitional basis until 31 December 2012.

(2) A new technical conservation measures framework is awaited pending the reform of the Common Fisheries Policy (CFP). The unlikelihood that such a new framework will be in place by the end of 2012 justifies the extension of the application of those transitional technical measures.

(3) In order to ensure the continuation of proper conservation and management of marine biological resources, Council Regulation (EC) No 850/98 [6] should be updated by incorporating the transitional technical measures into it.

(4) In order to ensure the continuation of proper conservation and management of marine biological resources in the Black Sea, minimum landing and mesh sizes for the turbot fishery as previously established in Union law should be incorporated into Regulation (EC) No 850/98.

(5) The prohibition of highgrading in all ICES areas should be maintained in order to reduce the discarding of quota species.

(6) On the basis of consultations held in 2009 between the Union, Norway and the Faroe Islands, with a view to reducing unwanted catches, a prohibition on the releasing or slipping of certain species, as well as a requirement to move fishing grounds when 10 % of the catch contains undersized fish, should be introduced,.

(1) OJ C 351, 15.11.2012, p. 83.
(2) Position of the European Parliament of 6 February 2013 (not yet published in the Official Journal) and decision of the Council of 25 February 2013.
(3) OJ L 347, 24.12.2009, p. 6.
(4) OJ L 165, 24.6.2011, p. 1.
(5) OJ L 22, 26.1.2009, p. 1.
(6) OJ L 125, 27.4.1998, p. 1.

(14) the following article is inserted:

‘*Article 31a*

Electric fishing in ICES divisions IVc and IVb

1. By way of derogation from Article 31, fishing with beam trawl using electrical pulse current shall be allowed in ICES divisions IVc and IVb south of a rhumb line joined by the following points, which shall be measured according to the WGS84 coordinate system:

— a point on the east coast of the United Kingdom at latitude 55° N,

— then east to latitude 55° N, longitude 5° E,

— then north to latitude 56° N,

— and finally east to a point on the west coast of Denmark at latitude 56° N.

2. Electrical pulse fishing shall be allowed only when:

(a) no more than 5 % of the beam trawler fleet per Member State use the electric pulse trawl;

(b) the maximum electrical power in kW for each beam trawl is no more than the length in metres of the beam multiplied by 1,25;

(c) the effective voltage between the electrodes is no more than 15 V;

(d) the vessel is equipped with an automatic computer management system which records the maximum power used per beam and the effective voltage between electrodes for at least the last 100 tows. It is not possible for non-authorised personnel to modify this automatic computer management system;

(e) it is prohibited to use one or more tickler chains in front of the footrope.’;

(15) the following article is inserted:

‘*Article 32a*

Catch handling and discharge restrictions on pelagic vessels

1. The maximum space between bars in the water separator on board pelagic fishing vessels targeting mackerel, herring and horse mackerel operating in the NEAFC Convention Area as defined in Article 3(2) of Regulation (EU) No 1236/2010 shall be 10 millimetres.

The bars shall be welded in place. If holes are used in the water separator instead of bars, the maximum diameter of the holes shall not exceed 10 millimetres. Holes in the chutes before the water separator shall not exceed 15 millimetres in diameter.

2. Pelagic vessels operating in the NEAFC Convention Area shall be prohibited from discharging fish under their water line from buffer tanks or Refrigerated seawater (RSW) tanks.

3. Drawings related to the catch handling and discharge capabilities of pelagic vessels targeting mackerel, herring and horse mackerel in the NEAFC Convention Area which are certified by the competent authorities of the flag Member States, as well as any modifications thereto, shall be sent by the master of the vessel to the competent fisheries authorities of the flag Member State. The competent authorities of the flag Member State of the vessels shall carry out periodic verifications of the accuracy of the drawings submitted. Copies shall be carried on board the vessel at all times.’;

(16) the following articles are inserted:

‘*Article 34a*

Technical conservation measures in the Irish Sea

1. From 14 February to 30 April, it shall be prohibited to use any demersal trawl, seine or similar towed net, any gillnet, trammel net, entangling net or similar static net or any fishing gear incorporating hooks within that part of ICES division VIIa enclosed by:

— the east coast of Ireland and the east coast of Northern Ireland, and

— straight lines sequentially joining the following geographical coordinates:

— a point on the east coast of the Ards peninsula in Northern Ireland at 54°30′ N,

— 54°30′ N, 04°50′ W,

— 53°15′ N, 04°50′ W,

— a point on the east coast of Ireland at 53°15′ N.

2. By way of derogation from paragraph 1, within the area and time period referred to in that paragraph:

(a) the use of demersal otter trawls shall be permitted, provided that no other type of fishing gear is retained on board and that such nets:

— are of the mesh size ranges 70-79 millimetres or 80-99 millimetres,

Annex 12

REGULATION (EU) No 1380/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 11 December 2013

on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 43(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee [1],

Having regard to the opinion of the Committee of the Regions [2],

Acting in accordance with the ordinary legislative procedure [3],

Whereas:

(1) Council Regulation (EC) No 2371/2002 [4] established a Community system for the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy (CFP).

(2) The scope of the CFP includes the conservation of marine biological resources and the management of fisheries targeting them. In addition, it includes, in relation to market measures and financial measures in support of its objectives, fresh water biological resources and aquaculture activities, as well as the processing and marketing of fishery and aquaculture products, where such activities take place on the territory of Member States or in Union waters, including by fishing vessels flying the flag of, and registered in, third countries, by Union fishing vessels, or by nationals of Member States, without prejudice to the primary responsibility of the flag State, bearing in mind the provisions of Article 117 of the United Nations Convention on the Law of the Sea of 10 December 1982 [5] (UNCLOS).

(3) Recreational fisheries can have a significant impact on fish resources and Member States should, therefore, ensure that they are conducted in a manner that is compatible with the objectives of the CFP.

(4) The CFP should ensure that fishing and aquaculture activities contribute to long-term environmental, economic, and social sustainability. It should include rules that aim to ensure the traceability, security and quality of products marketed in the Union. Furthermore, the CFP should contribute to increased productivity, to a fair standard of living for the fisheries sector including small-scale fisheries, and to stable markets, and it should ensure the availability of food supplies and that they reach consumers at reasonable prices. The CFP should contribute to the Europe 2020 Strategy for smart, sustainable and inclusive growth, and should help to achieve the objectives set out therein.

(5) The Union is a contracting party to UNCLOS [6] and, pursuant to Council Decision 98/414/EC [7], to the United Nations Agreement on the implementation of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks of 4 December 1995 [8] (UN Fish Stocks Agreement) and, pursuant to Council Decision 96/428/EC [9], to the Agreement to

(1) OJ C 181, 21.6.2012, p. 183.
(2) OJ C 225, 27.7.2012, p. 20.
(3) Position of the European Parliament of 6 February 2013 (not yet published in the Official Journal) and position of the Council at first reading of 17 October 2013 (not yet published in the Official Journal). Position of the European Parliament of 9 December 2013 (not yet published in the Official Journal).
(4) Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy (OJ L 358, 31.12.2002, p. 59).
(5) The United Nations Convention on the Law of the Sea and of the Agreement on the implementation of Part XI thereof (OJ L 179, 23.6.1998, p. 3).
(6) Council Decision 98/392/EC of 23 March 1998 concerning the conclusion by the European Community of the United Nations Convention of 10 December 1982 on the Law of the Sea and the Agreement of 28 July 1994 relating to the implementation of Part XI thereof (OJ L 179, 23.6.1998, p. 1).
(7) Council Decision 98/414/EC of 8 June 1998 on the ratification by the European Community of the Agreement for the implementing of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling stocks and highly migratory fish stocks (OJ L 189, 3.7.1998, p. 14).
(8) Agreement on the implementation of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks (OJ L 189, 3.7.1998, p. 16).
(9) Council Decision 96/428/EC of 25 June 1996 on acceptance by the Community of the Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas (OJ L 177, 16.7.1996, p. 24).

4. By way of derogation from paragraph 3, in the absence of a joint recommendation referred to in paragraph 3, in cases of urgency, the Commission shall adopt the measures. The measures to be adopted in a case of urgency shall be limited to those in the absence of which the achievement of the objectives associated with the establishment of the conservation measures in accordance with the Directives referred to in paragraph 1 and the Member State's intentions, is in jeopardy.

5. The measures referred to in paragraph 4 shall apply for a maximum period of 12 months which may be extended for a maximum period of 12 months where the conditions provided for in that paragraph continue to exist.

6. The Commission shall facilitate cooperation between the Member State concerned and the other Member States having a direct management interest in the fishery in the process of implementation and enforcement of the measures adopted under paragraphs 2, 3 and 4.

Article 12

Commission measures in case of a serious threat to marine biological resources

1. On duly justified imperative grounds of urgency relating to a serious threat to the conservation of marine biological resources or to the marine ecosystem based on evidence, the Commission, at the reasoned request of a Member State or on its own initiative, may, in order to alleviate that threat, adopt immediately applicable implementing acts applicable for a maximum period of six months in accordance with the procedure referred to in Article 47(3).

2. The Member State shall communicate the request referred to in paragraph 1 simultaneously to the Commission, to other Member States and to the Advisory Councils concerned. The other Member States and the Advisory Councils may submit their written comments within seven working days of the receipt of the notification. The Commission shall take a decision within 15 working days of the receipt of the request referred to in paragraph 1.

3. Before expiry of the initial period of application of immediately applicable implementing acts referred to in paragraph 1, the Commission may, where the conditions under paragraph 1 are complied with, adopt immediately applicable implementing acts extending the application of such emergency measure for a maximum period of six months with immediate effect. Those implementing acts shall be adopted in accordance with the procedure referred to in Article 47(3).

Article 13

Member State emergency measures

1. On the basis of evidence of a serious threat to the conservation of marine biological resources or to the marine ecosystem relating to fishing activities in waters falling under the sovereignty or jurisdiction of a Member State that require immediate action, that Member State may adopt emergency measures to alleviate the threat. Such measures shall be compatible with the objectives set out in Article 2 and no less stringent than those provided for in Union law. Such measures shall apply for a maximum period of three months.

2. Where emergency measures to be adopted by a Member State are liable to affect fishing vessels of other Member States, such measures shall be adopted only after consulting the Commission, the relevant Member States and the relevant Advisory Councils on a draft of the measures accompanied by an explanatory memorandum. The consulting Member State may set a reasonable deadline for the consultation which shall, however, not be shorter than one month.

3. Where the Commission considers that a measure adopted under this Article does not comply with the conditions set out in paragraph 1, it may, subject to providing relevant reasons, request that the Member State concerned amend or repeal that measure.

Article 14

Avoidance and minimisation of unwanted catches

1. In order to facilitate the introduction of the obligation to land all catches in the respective fishery in accordance with Article 15 ("the landing obligation"), Member States may conduct pilot projects, based on the best available scientific advice and taking into account the opinions of the relevant Advisory Councils, with the aim of fully exploring all practicable methods for the avoidance, minimisation and elimination of unwanted catches in a fishery.

2. Member States may produce a "discard atlas" showing the level of discards in each of the fisheries which are covered by Article 15(1).

Article 15

Landing obligation

1. All catches of species which are subject to catch limits and, in the Mediterranean, also catches of species which are subject to minimum sizes as defined in Annex III to Regulation (EC) No 1967/2006, caught during fishing activities in Union waters or by Union fishing vessels outside Union waters in waters not subject to third countries' sovereignty or jurisdiction, in the fisheries and geographical areas listed below shall be brought and retained on board the fishing vessels, recorded, landed and counted against the quotas where applicable, except when used as live bait, in accordance with the following time-frames:

(a) From 1 January 2015 at the latest:

— small pelagic fisheries (i.e. fisheries for mackerel, herring, horse mackerel, blue whiting, boarfish, anchovy, argentine, sardine, sprat);

— large pelagic fisheries (i.e. fisheries for bluefin tuna, swordfish, albacore tuna, bigeye tuna, blue and white marlin);

1.5.6.3 Answer to The Netherlands' request on Electric Pulse Trawl

Request

The Netherlands requested ICES to review experimental results aimed at advancing knowledge of the ecosystem effects of electric pulse trawls. Limited use of these trawls has been granted to The Netherlands via an EC derogation.

In response to the request, ICES arranged for the experimental results to be reviewed by appropriate experts.

Response

Based on the expert reviews, ICES concludes that:

1. The experiments are a valuable further step to evaluate the ecosystem effects of fishing with pulse trawls.
2. Laboratory experiments on elasmobranches, benthic invertebrates, and cod to test the effects of electric pulses were generally well designed and interpreted correctly. However, the experimental results have some weaknesses as discussed below.
3. The experiments indicate minimal effects on elasmobranches and benthic invertebrates.
4. Electric pulses resulted in vertebral injuries and death of some cod which were in close proximity (<20 cm) to the conductor emitting the electric pulses. There is inconclusive evidence that the capture efficiency of cod by pulse trawls is higher than for conventional beam trawls (see attached review by Norman Graham). Widespread use of the pulse trawl has the potential to increase fishing mortality on cod as a result of injuries caused by electric pulses (and possibly higher capture efficiency) but further research is needed to draw firm conclusions.
5. While the results of laboratory experiments are informative, many factors could result in different effects during actual fishing operations. In particular, specifications contained in the derogation for the pulse trawl allow a wider range of electric pulse characteristics than were tested in the experiments. Therefore, pulse trawls permitted under the EC derogation may generate substantially different effects than those observed in the experiments.
6. This advice is narrowly based on the review of three reports provided by The Netherlands. Concerns and uncertainties raised in the advice may be addressed by further research, refinement of the derogation, and monitoring the fishing operations and performance of vessels using pulse trawls.

Background

In March 2006, ICES received a request from The European Commission to provide scientific advice relating to the use of beam trawls equipped with the capability to generate an electric pulse aimed at stimulating flatfish to enhance their vulnerability to the gear. ICES was specifically asked to give advice on the ecosystem effects of allowing electric pulse trawling on a commercial scale.

The request was considered by an *ad hoc* subgroup of the ICES-FAO Working Group on Fish Technology and Fish Behaviour (WGFTFB) in April 2006 (ICES, 2006). Based on the groups report, ICES gave advice in May 2006 which is summarized as follows:

- *"The available information shows that the pulse trawl gear could cause a reduction in catch rate (kg/hr) of undersized sole, compared to standard beam trawls. Catch rates of marketable sole above the minimum landing size from research vessel trials were higher but commercial trials suggested lower catch rates. Plaice catch rates also decreased for all size classes. No firm conclusions could be drawn for other species but there was a tendency for lower catch rates"*
- *"Because of the lighter gear and the lower towing speed, there is a considerable reduction in fuel consumption and the swept area per hour is lower".*
- *The gear seems to reduce catches of benthic invertebrates and lower trawl path mortality of some in-fauna species.*
- *There are indications that the gear could inflict increased mortality on target and non-target species that contact the gear but are not retained.*
- *The pulse trawl gear has some preferable properties compared to the standard beam trawl with tickler chains but the potential for inflicting an increased unaccounted mortality on target and non-target species requires additional experiments before final conclusions can be drawn on the likely overall ecosystem effects of this gear".*

ICES therefore made recommendations on additional data needed:

- *"Further tank experiments are needed to determine whether injury is being caused to fish escaping from the pulse trawl gear. The experiments need to be conducted on a range of target and non-target fish species that are typically encountered by the beam trawl gear and with different length classes. In these trials it should be ensured that the exposure matches the situation in situ during a passage of the pulse beam trawl. Fish should be subjected to both external and internal examination after exposure".*
- *"If the pulse trawl were to be introduced into the commercial fishery, there would be a need to closely monitor the fishery with a focus on the technological development and bycatch properties".*

The Report of the WGFTFB Ad hoc Group specifically mentioned potential spinal damage to cod exposed to electrical stimulation, potential effects on invertebrates and possible disruption of the electric sensory systems of elasmobranches. Subsequently, the European Commission granted The Netherlands a derogation for 5% of the fleet to use the pulse trawl on a restricted basis provided attempts were made to address the concerns expressed by ICES. This derogation has been granted every year since 2007.

The Netherlands (specifically IMARES) has studied the effect of the electric pulse trawl during the period 2007-2009 to fill these gaps in knowledge through a series of tank experiments on elasmobranches, invertebrates and cod. The experimental species were subjected to electrical stimuli believe to be representative of *in situ* fishing conditions. The findings from these experiments are given in three reports:

1. The effect of pulse stimulation on biota – Research in relation to ICES advice – Progress report on the effects to cod (De Haan *et al*., 2009a).
2. The effects of pulse stimulation on biota – Research in relation to ICES advice – Effects on dogfish (De Haan *et al*., 2009b).
3. The effect of pulse stimulation on marine biota – Research in relation to ICES advice – Progress report on the effects on benthic invertebrates (Van Marlen *et al*., 2009)

In consultation with the European Commission, in September 2009 The Netherlands requested ICES to review the reports and to provide updated advice on the ecosystem effects of the pulse trawl.

The reports were independently reviewed by a group of experts in the fields of electric fishing techniques, fishing gear technology, benthic ecology, unaccounted mortality and fish survival experimentation. The reviewers were specifically requested to consider the questions raised by ICES in the 2006 advice and whether the additional experiments had successfully addressed these issues. Documentation on the reviews is contained in Annex 1.

The following is a summary of issue raised by the reviews that ICES considers worthwhile to highlight:

1. The work carried out by IMARES as a response to the ICES advice on pulse trawling is notable for the high quality of the experiments. Detailed measurements of electric field parameters both in natural environment and during the experiments are noteworthy. A particular attention was given to the control groups of animals which were subjected to the same manipulations as the test groups but not electrically exposed to minimize the influence of transfer and handling. An additional positive point of the study is the use of an electric pulse simulator with pulse characteristics similar to the commercial Verburg pulse system. The numbers of fish both in the test and control samples were adequate. The presentation of the mortality results (as proportions), as well as the occurrence of spinal injuries in cod, along with their associated binomial confidence intervals (at 95%, say) (using "Statxact" for example) is informative. Moreover, at the same time a simple power analysis could be performed indicating the necessary sample size for future experiments (based on the deviance in these preliminary results).

2. With respect to benthic invertebrates, the results clearly show a low level of impact on the complete range of species tested. These species are considered representative of those encountered in the beam trawl fisheries. Based on all known literature on the expected mortalities of such species from traditional tickler chain beam trawls, it is therefore reasonable to assume that the impact of a pulse trawl with a pulse configuration corresponding to the experimental pulses on benthic invertebrates is less by a higher order of magnitude. It is important, however, that for the gear to be used with low impact that the existing prohibition on the addition of tickler chains in front of the electrode arrangements contained in the EU derogation should be maintained. Otherwise, tickler chains will cause additional ecosystem impact.

3. The experiments carried out on elasmobranches show only a very limited effect on the species tested and it is unlikely the pulse trawl system will have a major impact on elsamobranch species. It was shown that general well-being of exposed dogfish was good in that they produced eggs and exhibited no aberrant feeding behaviour.

4. The results show that the system is capable of inflicting vertebral damage leading to mortality of cod that were in close proximity (<20 cm) of the conductors. Also, inconclusive evidence suggest that the system may have a higher fishing efficiency for cod than the conventional gear (See attached review by Norman Graham of De Haan D., van Marlen B., Kristiansen T.S., Fosseidengen J.E., 2009a in Annex 1), but further research is needed to address this question and reduce cod mortality.

5. The derogation for use of the pulse trawl in Council Regulation (EC) No 43/2009 defines the voltage (V) and current power(KW =V*A) that can be used. However, it is not altogether clear from the reports how representative the experimental set up is with respect to the limits set within the derogation. The author's note that the tank tests were conducted "*with pulse characteristics equivalent to the nominal menu settings….which represent the* ***average*** *settings of the pulse properties….*" They then go on to note that these can be varied by +/- 20%. This raises concerns that the full range of settings were not tested and it is unclear what the impact of the 'maximum' setting could be.

6. ICES previously advised that the effects across different length classes encountered by the fishery should be considered. This issue has only been partially addressed as the experiments on cod were conducted on a narrow range of fish (41–55cm). Fish length has been shown to be important in terms of reaction and the results can not be extrapolated beyond the length groups tested. The effects on small fish and larger fish can only be estimated based on previous experimentation and in this respect the authors refer to the work by Stewart (1975), which showed lower effects for smaller fish. Based on all known literature, large fish are expected to be more negatively affected (e.g., more vertebral damage) (Snyder, 2003). The relative impact on the catchability of larger fish is unclear.

7. Due to commercial confidentiality, details on the pulse frequency, pulse shape, pulse duration, voltage/power of the pulse trawl are not widely available which hinders review of the potential impact of the system on target and non-target species. All of these factors are important as discussed by Snyder (2003).

8. It is also noted that the specifications in the derogation granted by the EC are not specific enough to assure that the results of the experiments discussed in this advice are applicable to all of the pulse trawls allowed under the derogation.

Source of information

De Haan D., van Marlen B., Kristiansen T.S., Fosseidengen J.E., 2009a. The effect of pulse stimulation on biota- Research in relation to ICES advice – Progress report on the effects to cod. IMARES Report Number C098/08. 9th October 2009. 25p.

De Haan D., Van Marlen B., Kristiansen T.S., Fosseidengen J.E., 2009b. The effect of pulse stimulation on biota- Research in relation to ICES advice – Effects on dogfish. IMARES Report Number C105/09. 16th October 2009. 32p.

ICES. 2006. Report of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB), 3–7 April 2006, Izmir, Turkey. ICES CM 2006/FTC:06, Ref. ACFM. 180 pp.

Stewart, P. A. M., 1975. Catch selectivity by electrical fishing systems. J. Cons. int. Explor. Mer, 36(2): 106–109.

Snyder, D.E., 2003. Electrofishing and its harmful effects on fish, Information and Technology Report USGS/BRD/ITR -2003-002: US Government Printing Office, Denver, CO, 149p.

Van Marlen, B., De Haan D., Van Gool, A., Burggraaf D., 2009. The effect of pulse stimulation on biota- Research in relation to ICES advice – Progress report on the effects to benthic invertebrates. IMARES Report Number C103/09. 21st October 2009. 53p.

ANNEX 1

Review of test experiments in relation of practical using Dutch pulse trawl system
(notes from Russian sub-group)

Researches carried out by IMARES in cooperation with the Institute of Marine Research as a response to the ICES advice on pulse trawling are notable for high quality of the experiments. Optimum conditions were provided for catching fish and benthic invertebrates, their transfer to the laboratory, subsequent keeping in circulating sea water and feeding. Detailed measurements of electric field parameters both in natural environment and during the experiments are also noteworthy. A particular attention was given to the control groups of animals which were subjected to the same manipulations as the test groups but not electrically exposed to minimize the influence of transfer and handling. An additional positive point of the study is the use of the electric pulse simulator with pulse characteristics similar to the commercial Verburg pulse system. The numbers of fish both in the test and control samples were adequate.

The researches tried to approximate test conditions to the real conditions *in situ* as much as possible. However, this conformity was not perfect yet. It seems to be somewhat inconsistent that individual fish were exposed to the electric stimulus only four times instead of six exposures which would be expected during the passage of 6 consecutive conductors along the stationary fish in a full-scale system. In this respect, the experimental impact appears to be milder compared to the worst possible case in the natural environment. At the same time, a simulated electric stimulus was switched on and off sharply, while in the full-scale there will be rather smooth increase and decay of the field strength. Thus, in the given respect, the experimental influence may be considered as a stronger impact. As a result, some uncertainty arises in the interpretation of the obtained data. Therefore, it would be probably better to use more realistic model stimuli, i.e. 6 gradually changing exposures instead of 4 sharp ones. Another possible variant is to use an array of 6 conductors (in this case the cage with a test fish moves at the required speed above the electrode system).

However, the major problem is rather a yawning gap between the obtained experimental data and a real situation during the trawling. Indeed, experiments with cod have shown that in the “near field” range serious spinal injuries and some disturbances in food behaviour are possible. However, we do not know exactly what share of fish would be subjected to such strong influence during the trawling; it is unclear what percentage of these fish will get in a trawl, which at worst would have a negative effect on their appearance and quality. And above all, what happens with those fish that contact the gear but are not retained?

For example, in the rivers, where electrofishing is regularly carried out, a significant share of morphologically abnormal fish is caught every year as a result of previous spinal injuries (McMichael, 1993). Also it is known that repeated influence of the electrofishing gear causes more spinal injuries than single-pass electric fishing (Ainslie *et al*., 1998). Therefore, it seems necessary to investigate fish behaviour in the real pulse trawl using multiple underwater video cameras located in the different parts of the gear. This may give a clear view of fish leaving the trawl, immobilized specimens remaining on the bottom and retained fish. Such studies should be attended by a large-scale X-ray photography of the caught fish. We believe these measures will make it possible to build a bridge between the laboratory and field data.

Concerning the influence of electric current on the elasmobranch fish, it should be emphasized that these fish possess a high-sensitive electro-receptive system which helps them in orientation and searching for their food. Whether this delicate perceptive system suffers from a strong electric field generated by the pulse trawl? The experiments carried out give no clear answer to this question. It was shown that general well-being of exposed dogfish was rather good; they produced eggs and exhibited no aberrant feeding behaviour. However, 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 elasmobranches exposed to a strong electric field. As the nearest analogue of such tests the classical experiments by Dijkgraaf and Kalmijn (1966), could be mentioned. In these tests, the rays (*Ray clavata*) displayed a steady conditioned reflex in response to electric signals of their food organisms (i.e. flatfish *Pleuronectes platessa*) which were reproduced by the electrodes masked with a substrate.

As regards to invertebrates, it was clearly demonstrated that the effects of the pulse stimulation on the mortality and food intake of these animals can be described as low and the effects of pulse beam trawling are probably smaller as compared to the effects of a conventional beam trawl. At the same time, authors did not estimate the influence of the pulse stimulus on the reproductive system of the invertebrates. Meanwhile, such influence is quite possible. For example, the Lithuanian researchers (Rachounas, 1977) observed that electric field can change the type of reproduction in daphnia (bisexual type changed into parthenogenesis). Besides, electric stimulus accelerated hatching of the larvae and reduced life-span and growth rate of the daphnia in subsequent generations.

Thus, a great deal of research work was carried out. However, many questions still remain unacknowledged. Nowadays, only cod is investigated among the non-target fish species. Other species, such as dab, turbot and whiting are not studied yet. The possible influence of a pulse trawl upon the electroperceptive system of elasmobranch fish is also unclear. Another problem is the action of electric current on the reproductive processes in the invertebrates. The possible effects of the pulse trawling on smaller fish remain unknown and require further attention.

One of the main problems is to link the data of laboratory experiments and field trials, which particularly can be solved through the analysis of video recordings from the underwater video cameras and accumulation of more reliable statistics on the commercial and experimental catches. *In our opinion, the available data are insufficient to recommend the large-scale commercial use of the pulse trawl in fisheries. As a whole, additional tests (both laboratory and field) are needed*.

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Dijkgraaf S., Kalmijn A.J. Versuche zur biologischen Bedeutung der Lorenzinischen Ampullen bei den Elasmobranchien // Ztschr. vergl. Physiol. 1966. Bd.53. S.187-194.

Rachounas L. Reproduction of daphnia, freshwater shrimp and brine shrimp // Post effects of the electric fields upon the water animals. Vilnus: Mokslas, 1977. P. 81-86. (In Russian)

Annex 13

A Critique of:- "The effect of pulse trawl stimulation on biota – Research in relation to ICES advice – Progress report on the effects to cod. By D. de Haan *et al* (2009)".

Mike Breen.

This critique will consider the methods used in the assessment of survival and injury described in the above paper and consider the validity of the discussion and conclusions drawn from the experimental results, as requested by the ICES Working Group on Fish Behaviour and Fishing Technology (WGFTFB).

<u>1) Captivity Controls</u>
Using a captive population to monitor the effects of any potentially fatal stressor is always at risk of over-estimating the true mortality, unless it can be demonstrated that captivity itself does not kill the subject and, ideally, does not stress the subject. This was a major criticism of an earlier survival experiment for this project.

In this experiment, a simple control has been used to assess captivity effects: where control subjects were held in almost identical conditions to the experimental subjects, but without exposure to the experimental effects. Moreover, these control specimens demonstrated no observable mortality within the monitoring period (14 days). However, their feeding behaviour appears to have been disrupted post-treatment, which was explained by the authors as possibly being due their extended exposure to the holding tank in comparison to the treatment groups.

<u>Conclusion:</u> Well controlled experiment, demonstrating no observable fatal captivity effects. However, the treatment of specimens may have induced a stress response sufficient to disrupt feeding behaviour post-treatment. This is not an alarming observation, as feeding inhibition is a well established response to handling stressors in many species.

<u>2) Pulse Characteristics</u>
I have limited experience in the physics of electrical fields in water, so I will not formally criticise this component of the experimental design. However, I do have questions as a "lay person" that I would like considered:

- i) Why were "nominal" settings for pulse properties used, as opposed to the theoretical maxima that could be seen during commercial operations? An impact assessment should really consider the worst case scenario.
- ii) Only two pairs of electrodes were used in this laboratory based study, as opposed to six pairs used on the full scale gear. I appreciate this is likely to be due to size constraints within the laboratory tank. But does the difference mean this experiment will under-estimate the likely effects of the full scale gear? The ethical limitations placed on this experiment (ie. four pulses, as opposed to six) would suggest this is true.
- iii) The expose to the four electrical pulses lasted "on average 3 minutes". However, *in situ* a fish could experience six pulses in only two seconds. Does this also lessen the potential impact of this experiment, in comparison to those experienced on the full scale gear?
- iv) Are there any anticipated salinity effects (experiment conducted at $32.95^{o}/_{oo}$) due to differences in conductivity?
- v) Are there any anticipated temperature effects (experiment conducted at $8.2^{o}C$)? ie. In the S. North Sea, where warmer temperatures are experienced, could any damaging effects be more pronounced? The contraction speed of the swimming muscles in the tail will certainly be faster (Özbilgin and Wardle, 2002).

<u>3) Behavioural Observations – during treatment</u>
Although the behaviour of individual specimens was recorded on video during treatment, there is only a limited description of this in the results. I am particularly interested in the ability of the fish to "swim" or at least be propelled by the electrically induced rigor of its tail muscles; the observations from the preliminary study suggests they could. My concern is that the electrically induced rigor in the fishes' swimming musculature may be sufficient to propel an injured fish the short distance required to avoid capture.

<u>Action:</u> provide a more detailed summary of the behavioural response of individual specimens during the treatment. In particular, despite their restraints, indicate / discuss the potential for individual specimens to "swim" and hence avoid capture by the gear.

<u>4) Post Mortem Injury Assessment</u>
The post mortem examination for potential injuries was limited to the swimming musculature and associated vertebrae. Although this precludes the potential for identifying other injuries, as a preliminary study it appears to have been a well targeted and thoroughly conducted investigation of the most likely site of traumatic injury. I was disappointed to see that not all fish were systematically examined for spinal/muscle injuries (as suggested by table 2(?)). While injuries in the Control and Far Field groups were unlikely, it is feasible that musculo-skeletal injuries could have occurred during the transfer and restraint of specimens in the experiment.

5) Presentation of Mortality & Injury Results

The presentation of the mortality and injury results is confusing and contradictory. Other than detailing when after treatment each fatality occurred, I see no benefit in differentiating between the "immediate" and "delayed" mortalities.

The injury results are confusing and seemingly contradictory, that is:

- Results para 4, line 2 & 3: 5/16 had tail haemorrhage & 4/16 had bone fractures;
- Results para 4, line 5: 9/20 had injuries;
- Results table 2(?): 5/(16 or 20?) had injuries; and
- Discussion para 3, line 2: 9/16 fish showed spinal injury.

Action: Please simplify the presentation of these simple results:

i) avoid differentiating between "immediate" and "delayed" mortalities;
ii) detail (in hours or days) when fatalities occurred after treatment; and
iii) present as simple proportions (with binomial confidence intervals – see below).

6) Statistical Analysis

There has been no formal statistical analysis of the mortality or injury results. However, it could certainly be argued that the experimental design presented here is simple enough, and the results sufficiently clear, not to warrant any formal analysis. Moreover, the relatively small sample sizes would mean that little significance could be place in the conclusions from any between-group comparative analyses.

Suggested Actions: presentation of the mortality results (as proportions), as well as the occurrence of spinal injuries, along with their associated binomial confidence intervals (at 95%, say)(using "Statxact" for eg.) would be informative. Moreover, at the same time a simple power analysis could be performed indicating the necessary sample size for future experiments (based on the deviance in these preliminary results).

Concluding remarks

This experiment has clearly demonstrated that cod (size 0.41–0.55 m) can be detrimentally affected (with severe musculo-skeletal injuries) when exposed, at close range (0.1 m), to the electrical pulses emitted by this prototype gear. Moreover, these injuries have the potential to induce a substantial mortality, in what is generally perceived to be a robust species (Ingolfsson *et al.*, 2007).

Without a more thorough understanding of the behaviour, and ultimate fate, of cod (& potentially other gadoid species) immediately ahead of the electrified beam trawl, it is impossible to extrapolate the relative impact upon the exposed population. It is uncertain what proportion of the population encountering the electrified beam trawl would pass sufficiently close to be injured by the electrical impulses. In the discussion it was argued that any fish close enough to the electrodes to be injured, would be unlike to escape the gear and therefore could be landed with the catch (accepting the injuries may reduce the value). However, it is also feasible that the electrically induced rigor in the fishes' swimming musculature may be sufficient to propel an injured fish the short distance required to avoid capture.

The results from this experiment suggest that the use of this prototype gear may lead to an increased and unaccountable mortality in any population of cod (& potentially other gadoid species) exposed to it. Careful consideration should therefore be given to assessing and mitigating for this impact before this gear is introduced into a commercial fishery.

References

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Annex 13

Review by Norman Graham

Background

In December 2005, ICES received a request from The European Commission to provide scientific advice and evaluation of the following three points relating to the use of beam trawls capable of delivering electrical stimulus for the capture of flatfish species.

a) What change in fishing mortality could be expected following the adoption of such gear in the commercial fishery, assuming unchanged effort measured in KW-days at sea?

b) What effect would such a widespread introduction have in terms of (i) the mixture of species caught; (ii) the size of fish caught?

c) What, if any, effects would such introduction have on non-target species in the marine ecosystems where this gear was deployed?

This was considered by an *ad hoc* sub-group of WGFTFB in April 2006 (ICES, 2006). In response to point (c) of the request, ICES (2006) made the following observations:

> "Research in the freshwater environment has demonstrated that if excessive stimulus is applied, electric fishing is damaging (Snyder, 2003). It can lead to mortality from stress, haemorrhaging, respiratory failure and spinal damage. Often mortality does not occur for some days after exposure to the electric field. The extent depends on exposure duration, pulse frequency, pulse shape (critical), pulse duration, voltage/power, conductivity, size and species of fish/other organisms and proximity to the pulse source. All of these factors must be considered when evaluating the effect of this gear on the ecosystem.
>
> There are indications from the literature provided for this evaluation, that physical damage to fish may also occur in the marine environment also, which could result in negative effects on both target and non-target species that contact the gear but are not retained.
>
> Stralen (2006) notes that cod have been observed with spinal damage (snapped). Such observations were only noted in cod retained in the experimental (pulse) trawl and not in the conventional (control) gears.
>
> This is a somewhat worrying observation as it may indicate that the pulse being used is excessive and fish are being damaged in a similar manner to the observations made in the freshwater environment. This is likely to be attributed to extreme muscle contraction caused by the pulse system. It is important to ascertain the extent of this problem and also to assess if this occurs with other species (target and non-target).
>
> The expert group concludes that more experimentation (aquarium trials) is needed in order to assess if any negative effects (caused by excessive stimulus) are occurring. Data is required for a range of fish species (and length classes) that typically encounter beam trawls. Such experiments have not been conducted to date."

In response to the latter paragraph, IMARES has conducted further work to ascertain whether the earlier observations by Stralen (2006) and other national work.

Methodology

Due to commercial confidentiality, the requirement that data on the pulse frequency, pulse shape (critical), pulse duration, voltage/power is still not available which hinders the delivery of a full review of the potential impacts that the system may have on target and non-target species. Notwithstanding, the further work on cod presented does provide additional information as to the potential impact and the authors are commended for this.

The author's note that tank tests were conducted "*with pulse characteristics equivalent to the nominal menu settings….which represent the* ***average*** *settings of the pulse properties*", they then go on to note that these can be varied by +/- 20%. This raises concerns as the full range of settings were not tested and it is unclear what the impact of the 'maximum' setting could be. There are indications from the text that the upper end of the settings could be detrimental as one fish died from vertebral injury. It is important to note that subsequent tests were conducted with a 15% reduction in pulse amplitude. The earlier ICES response (ICES, 2006) recommended that test be conducted with a range of fish lengths typically encountered by the beam trawl. The experiments were conducted on a narrow range of fish (41-55cm) and as fish length is important in terms of reaction (a stronger response is noted with larger fish) the results can not be extrapolated beyond the length groups tested. It is also worth noting that only 4 exposures were applied, when in practice this would be 6 under normal conditions. Therefore the tank tests can not be considered fully representative of commercial conditions. ICES (2006) note:

> "These need to be conducted on a range of fish species that are typically encountered by the beam trawl gear, and with different length classes, both above and below MLS. In these trials it should be ensured that the exposure of the fish matches the situation *in situ* during the passage of the pulse beam trawl."

There is insufficient information presented and there are also indications in the text (4 v 6 exposures) that the latter comments above have not been fully dealt with and the narrow size range of fish and species reported fail to adequately consider the first point above. Furthermore, ICES (2006) note:

> "The orientation of the fish relative to the uniform field used in the tank experiments needs to be varied, as this can significantly affect the stimulus applied to the fish. The intensity of the field should also be varied up to the maximum field strength delivered by the electrodes given the non-uniform nature of the field. The precise 3D distribution of the field in the area of the electrodes needs to be described. Data from these experiments can then be used to help determine the effect of fish position, orientation and length relative to the electrodes under commercial conditions. The fish should be subject to both internal and external examination post exposure."

It is unclear from the work presented whether the orientation of the fish was considered, nor is it clear that the full range of field strength setting were tested. In summary, it is not possible to ascertain whether the laboratory experiments were comparable with the system under commercial conditions.

Results

The work presented demonstrates that the observations of vertebral damage observed by Stralen (2006) are a direct result of electrical pulse stimulus. The results show that 25% of the fish subjected to the 'near field' conditions were injured and 20% of this test group died. The authors note that such close proximity could be experienced under commercial conditions as cod tend to enter the net in a low position, and that "*vertebral injuries may be higher in this condition*". It is also worth noting that catch comparison data contrasting CPUE (kg/hr) between the conventional and pulse system show that the efficient of the pulse system is 228% higher than conventional gear (although with a lower towing speed). It is possible that this increase in efficiency is caused by a reduction in the escape response of cod (via disorientation) and therefore the pulse system could represent a significant increase in cod catches through technological development and could contribute a significant source of unaccounted fishing mortality if the system causes damage to fish not retained by the gear.

Conclusions

The results show that the system is capable of inflicting vertebral damage leading to mortality of cod. If the system resulted in the same levels of cod mortality as conventional gear, this only raises ethical animal welfare issues and this need to be contrasted to the possible positive benefits of the system i.e. absence of tickler chains and associated reductions in habitat and benthic invertebrate mortality. However, the system appears to have a higher fishing efficiency for cod than the conventional gear and also has the potential to contribute to unaccounted mortality through fish encountering the gear but not being retained. Given that there is a need to further reduce fishing mortality on cod, widespread introduction of this system could potentially increase cod mortality rather than reduce it. As a result, this reviewer considers that the introduction of this type of fishing equipment should not be permitted.

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Annex 14

European Commission

JRC SCIENTIFIC AND POLICY REPORTS

39th PLENARY MEETING REPORT OF THE SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (PLEN-12-01)

PLENARY MEETING,
16-20 April 2012, Brussels

Edited by John Casey & Hendrik Doerner

2012

Report EUR 25303 EN

Joint Research Centre

Given that there were so few cod caught during the trials it is not possible to assess the benefits to cod stocks of using this gear modification in the Irish Sea as a whole.

Closed area

For haddock and whiting in the closed area, the split square mesh panel trawl will only be as selective as the inclined separator trawl if the population of these species comprises predominately fish < 20 cm. Otherwise the inclined separator panel trawl will be more selective.

Again given that there were so few cod caught during the trials it is not possible to assess the benefits to cod stocks of using the split square mesh panel trawl in the closed area. It should be noted that the inclined separator reduced catches of cod above MLS by ~75%. It is highly unlikely that the split square mesh panel will achieve such reductions.

STECF notes an important point in the report on the trawls used during the sea trials. It is not clear from Briggs (2010) whether the codend of the split square mesh panel trawl had a lifting bag. This is an important point as the absence of the lifting bag could increase the L50 of the gear by approximately 2 – 3 cm for haddock and whiting. Hence, given the length distribution of the populations fished, it is possible that the improved selective performance of the split square mesh panel trawl is attributable to their being no lifting bag on the 80mm codend.

STECF conclusions

STECF notes that the trials demonstrate that the proposed gear should lead to a large reduction in the discarding of haddock and whiting < 20 cm.

Given that there were few cod caught during the trials it is not possible for STECF to assess the benefits to cod stocks of using this gear modification.

STECF notes, however, that if large cod (~ > 45 cm) are among the population fished they are unlikely to be able to escape through the 120mm square mesh panel and in which case it is unlikely that the 1.5 and 5% targets would be met.

STECF considers that it is highly unlikely that the split square mesh panel will achieve the same selectivity for cod than the inclined separator panel.

6. Request from the Dutch Authorities on the use of the Pulse Trawl in ICES Area IVc and IVb

Background

In March 2006, the Commission requested ICES to evaluate the use of an electric "pulse-trawl" to target plaice and sole in the beam trawl fishery in the North Sea.

ICES were requested to give advice on the ecosystem effects of a potential derogation to Regulation (EC) No 850/98 to allow the use of the pulse trawl on a commercial basis.

Following its assessment ICES advised that while there were many positive aspects of the pulse trawl, there were several issues primarily relating to the potential for inflicting increased unaccounted mortality on target and non-target species that needed to be addressed before final conclusions could be drawn on the likely ecosystem effects of this gear. Following the 2006 advice, the Commission subsequently granted Member States a derogation for 5% of the fleet to use the pulse trawl on a restricted basis provided attempts were made to address the concerns expressed by ICES. This derogation has been renewed annually since 2007.

In consultation with the Commission and the Dutch Ministry, in 2009 ICES was asked to update this advice on the ecosystem effects of the pulse trawl. This assessment concentrated on a number of experiments that had been carried out in the Netherlands since the earlier ICES assessment. While the advice was largely positive, issues regarding the methodology used in the experiments were raised, principally that the experiments carried out may not representative of commercial fishing conditions. Since this assessment further research has been carried out and reviewed by an ICES Study Group (SGELECTRA) set up to consider all aspects of electrical trawling.

It is also now apparent that within the Netherlands, driven primarily by the cost of fuel, there is now demand to use the pulse trawl and the number of vessels applying to fish under the 5% derogation exceeds the number of licences available. The Dutch authorities have made several requests to the Commission to allow them to increase the number of vessels allowed to fish or even remove the derogation altogether.

Terms of Reference

In the light of available information, STECF is requested to give its opinion on whether the concerns expressed by ICES in 2006 and 2009 regarding the ecosystem and other effects (in particular control and enforcement issues) of this gear have been adequately answered. If so STECF are asked to comment on the potential ecosystem effects and impacts on catches, and where possible on the fishing mortality, of target and non-target species resulting from an increase in the number of vessels allowed to use the gear (currently restricted to 5% of the fleet) or the current derogation being removed totally. STECF is further asked to comment on whether the current provisions contained in paragraph 3.2 of Annex III of Regulation 43/2009 are sufficient and appropriate to control the use of the gear and prevent the use of harmful electrical pulses.

Species concerned: Sole (*Solea solea*), Plaice (*Pleuronectes platessa)*, Cod (*Gadus morhua)*, Benthic species **Gears concerned:** Beam Trawls

STECF response

STECF observations

Since 2006, there has been a considerable amount of useful work undertaken to address the several concerns raised by ICES in 2006 and 2009 on the pulse trawl. In addition, an ICES study group on Electric Trawling SGELECTRA (ICES, 2011) reviewed progress in this field. Their findings are relevant to this particular request to STECF. There are also new research Dutch reports recently available contain additional useful data on pulse trawl technology.

The work has addressed the concerns relating to elasmobranchs and benthic organisms assuming that the effects would be similar for all species within these groups. ACOM (2009) concluded that the laboratory experiments on elasmobranchs, benthic invertebrates to test the effects of electric pulses were generally well designed and interpreted correctly and that those experiments indicate minimal effects on elasmobranchs and benthic invertebrates.

While the work undertaken has highlighted that the impact of the plulse trawl on the mortality of large cod remains unknown and is undesirable, bycatches of cod in the tested gear are low and conversely, the pulse trawl offers a number of significant biological, ecological and economic benefits, such as reduction of fuel consumption, decrease in fishing mortality on the target species and reduced impact on habitats.

Pulse trawl technology appears to have many potential positive benefits if used in a responsible manner. The technology and its future face the risk of reputational damage and widespread opposition if environmentally harmful designs reach market. Effective legislation and enforcement of this technology will be critical in this respect. The review of the development of pulse trawling shows highly variable differences in catch efficiency between pulse and conventional gears. In some cases, particularly with older high voltage (>2000v) systems, catch rates of commercial species were at least 50% greater than conventional gears. However, the more recent (lower voltage systems) show the catch efficiency of a pulse beam trawl is significantly less than conventional beam trawls. Given the characteristics of the current system (technical characteristics of the pulse beam trawl), the extension of number of vessels using the electric pulse systems could significantly reduce fishing mortality of target and non-target species including benthic organisms. This is under the assumption that there is no corresponding increase in unaccounted (avoidance) mortality.

Defining an adequate regulatory, control and enforcement systems represents a critical barrier for expanding the use of pulse systems in general. Widespread introduction of inefficiently regulated pulse systems could potentially result in considerable ecological damage. While the current systems under development appear to have positive impacts, the current regulatory framework is insufficient to prevent the introduction of potentially damaging systems despite adhering to current regulatory limits.

Given the complexity and interactions between pulse characteristics, using a prescriptive legislative approach will result in highly complex and technical regulations, which will also prevent further development of the system. An alternative results-based approach may be more appropriate and will reverse the burden of proof from the legislators. It is envisaged that a range of pre agreed ecological indicators based on both field and aquarium studies should be developed and used to benchmark any system being proposed for commercial implementation. STECF agrees that the certification system under development by the Dutch, could provide a basis for an appropriate regulatory framework.

STECF conclusions

STECF concludes that most ecological concerns raised by ICES have been adequately addressed. One ecological issue remains (possible avoidance mortality of cod), but this cannot be quantified at present.

STECF concludes that provided that the current characteristics and the use of the gear remain unchanged, an increase in the proportion of the beam trawl fleet allowed to use the gear in the southern North Sea will reduce catches and fishing mortality for both target an non-target species including benthic organisms.

STECF concludes that the critical barrier for lifting the derogation is control and enforcement and that the current provisions on the characteristics of the pulse trawl are not sufficient and not appropriate to prevent unregulated and harmful pulse trawl practices / technologies to be used.

STECF concludes that a results based approach will be suitable to tackle the problem of control and enforcement and that the certification system under development by the Dutch could provide a basis for an appropriate regulatory framework.

STECF recommendations

STECF recommend that the control and enforcement issues are resolved before the proportion of the beam trawl fleet using pulse trawls is increased.

STECF recommend that any extension of the fishing area should be considered only after an impact assessment on the effects of the pulse trawl on the ecosystem, in particular when species not subject to a prior impact study, such as *Nephrops*, could be encountered by the gear.

STECF recommend that any application of pulse technology in other gear types should be considered only after an impact assessment on the effects of the new pulse gear on the ecosystem, in particular when species not subject to a prior impact study.

Annex 15

Nederland riep het verbod op pulsvissen over zichzelf af

ZO 25 MAART, 09:08 AANGEPAST ZO 25 MAART, 15:59 BUITENLAND, ECONOMIE

GESCHREVEN DOOR

Thomas Spekschoor
correspondent Europa

Nederland heeft grootschalig pulsvisonderzoek jarenlang voor zich uitgeschoven. Met de belofte dat schepen uitsluitend zouden worden gebruikt voor wetenschappelijk onderzoek, regelde de Nederlandse regering vanaf 2010 tientallen extra pulsvisvergunningen in Brussel. Het was een truc om de vergunningen binnen te halen en er commercieel mee te vissen. In de praktijk visten veel van de schepen jarenlang zonder dat er een wetenschapper aan boord kwam. Dat blijkt uit onderzoek van de NOS.

Nederland sneed zichzelf daarmee uiteindelijk in de vingers. Het Europees Parlement stemde in januari voor een totaalverbod op pulsvissen, tot woede van Nederlandse vissers en de Nederlandse regering. Minister Schouten wees erop dat het wetenschappelijk onderzoek naar pulsvissen nog niet is afgerond en dat de stemming te vroeg kwam. Maar dat onderzoek had al lang af kunnen zijn als Nederland op tijd was begonnen.

> **Achteraf gezien had het onderzoek eerder moeten beginnen.**
>
> — Pim Visser, directeur VisNed

"Als we in 2010 de sloot geld hadden gekregen die we nu hebben om kennis te ontwikkelen, dan waren we veel verder geweest," zegt Adriaan Rijnsdorp, Nederlands belangrijkste pulsviswetenschapper.

"Achteraf gezien had het onderzoek eerder moeten beginnen," erkent ook Pim Visser, directeur van vissersorganisatie VisNed. "Dan hadden we vooruit kunnen kijken en niet hoeven repareren, zoals nu."

Pas sinds 1 januari 2017 hebben alle Nederlandse pulsvisschepen een computer van Wageningen Marine Research aan boord die alle relevante wetenschappelijke gegevens verzamelt. Dat is zeven jaar na het aanvragen van de extra vergunningen voor wetenschappelijk onderzoek.

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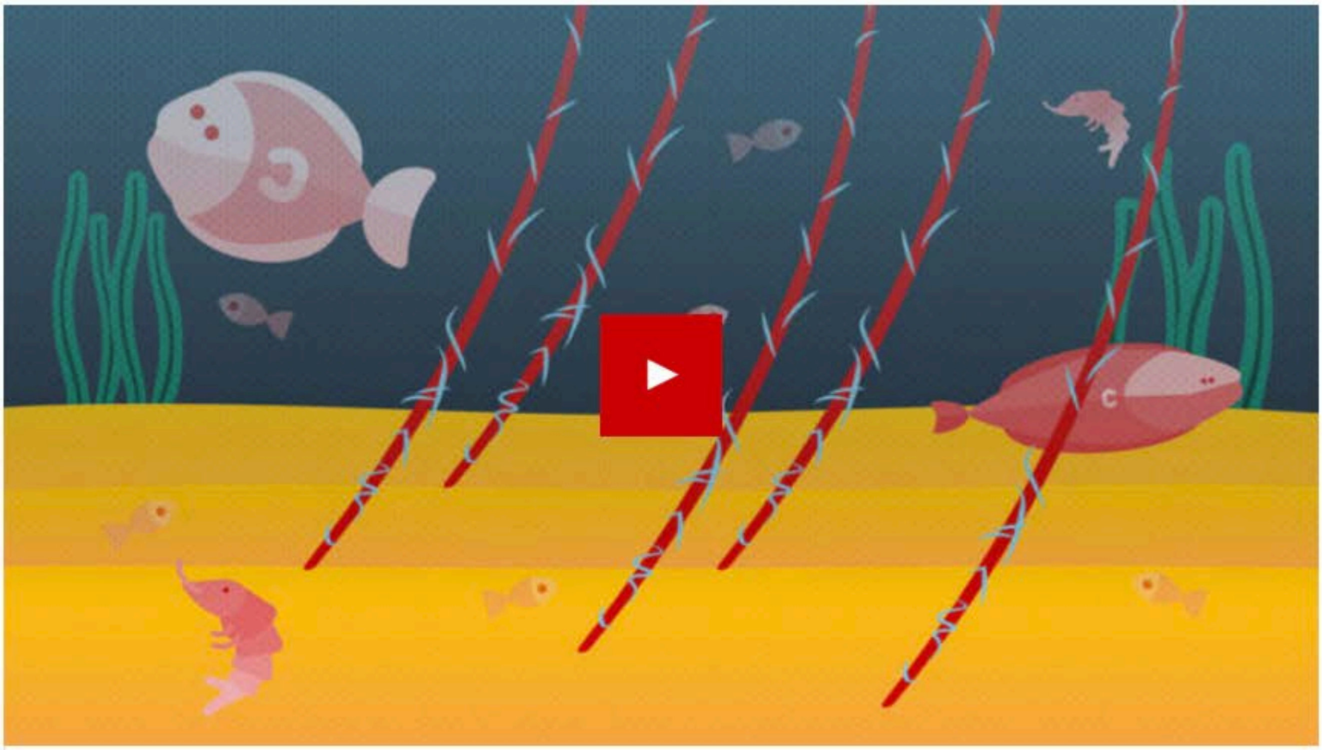
Tot die tijd waren er wel onderzoeken op individuele schepen, maar niet een groot alomvattend onderzoek. Wetenschappers konden van de andere schepen alleen de beperkte gegevens inzien die alle schepen, puls of geen puls, bij de Europese Commissie in moeten leveren.

Hoe zit het ook alweer met pulsvissen? In de video hieronder leggen we het uit:



Uitleg: wat is pulsvissen?

De Nederlandse jacht op extra pulsvisvergunningen begint in 2010. De Nederlandse bodemvisserij is dan verdeeld in twee kampen: 22 schepen halen volop vis binnen met de nieuwe pulsvistechniek, waarmee ze ook nog eens veel brandstof besparen. Alle andere bodemvissers moeten zich behelpen met de ouderwetsere boomkortechniek. Bedrijven dreigen failliet te gaan door hoge brandstofprijzen en lage visprijzen. Ze schreeuwen allemaal om één oplossing: laat ons ook pulsvissen.

Annex 15

Nederlandse sluipweggetjes

Officieel mag dat niet van de EU. Vissen met elektriciteit is verboden, omdat niet duidelijk is wat de effecten van de techniek zijn. Ieder land mag wel 5 procent van zijn vloot laten experimenteren met puls, voor Nederland komt dat neer op 22 schepen. Maar staatssecretaris Bleker vindt een sluipweggetje. Volgens een EU-regel kan hij twintig schepen een pulsvisvergunning geven als het 'uitsluitend voor wetenschappelijk onderzoek' is. De Europese Commissie gaat schriftelijk akkoord. De NOS heeft de brief waarin dat wordt bevestigd opgevraagd, maar die is volgens het ministerie vertrouwelijk.

Staatssecretaris Dijksma herhaalt de truc van Bleker in 2014 door nog eens 42 extra vergunningen aan te vragen. Ook dit keer belooft Nederland groot wetenschappelijk onderzoek. Dijksma: "Een uitgebreid monitorings- en onderzoeksprogramma is van belang om met steun van andere lidstaten het pulstuig algemeen toegelaten te krijgen."

> **Ik zou nooit hebben gevraagd om 84 schepen.**
>
> — Adriaan Rijnsdorp, pulsviswetenschapper

Maar zo snel en handig als Nederland is met het aanvragen van vergunningen voor vissers, zo traag komt het verzamelen van wetenschappelijke data op gang. Nederland heeft helemaal geen plan klaar liggen om op al die schepen wetenschappelijk onderzoek te doen. Er moesten vissers uit de brand geholpen worden, wetenschappelijk onderzoek was van secundair belang. Of zoals pulsvisonderzoeker Rijnsdorp het zegt: "Het onderzoek is altijd volgend geweest op het aantal schepen dat op zee zat en we hebben ons onderzoek daar altijd aan aangepast."

Bovendien, zegt hij, is er geen wetenschappelijke reden om met 84 schepen te vissen. "Ik zou nooit hebben gevraagd om 84 schepen. Voor de meeste wetenschappelijke vragen heb je helemaal niet zoveel schepen nodig." Die stelling wordt door andere Nederlandse en buitenlandse pulsviswetenschappers bevestigd.

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De NOS spitte alle openbare pulsvisonderzoeken tussen 2010 en 2017 door. Daarin zijn lang niet alle schepen die een pulsvisvergunning hebben terug te vinden. Tot en met 2016 gebruikte Nederland maar een beperkt aantal schepen voor wetenschappelijk onderzoek, terwijl een groot deel van de vergunningen juist om die reden was aangevraagd.

Veel vergunningen, weinig onderzoeksschepen

JAAR	AANTAL VERGUNNINGEN	SCHEPEN IN ONDERZOEK
2010	22	4
2011	42	9
2012	42	32
2013	42	14
2014	42	7
2015	84	17
2016	84	8
2017	84	84

Er wordt vanaf 2010 wel onderzoek gedaan, naar bijvangst bijvoorbeeld en naar de brandvlekjes die vissen voor de Belgische kust lijken te hebben. Maar daarbij worden nooit alle pulsvisschepen gebruikt en het onderzoek is vooral gericht op het wegnemen van specifieke zorgen in het buitenland.

Die methode werkt niet, omdat de critici van pulsvissen zich niet makkelijk laten overtuigen. Zij vrezen dat pulsvissen de zee verandert in een kerkhof. VisNed-directeur Pim Visser: "Ieder onderzoek riep bij hen weer vijf nieuwe vragen op. En dat houdt niet op."

Daarvoor is wel een oplossing, maar die kost meer geld. Adriaan Rijnsdorp: "Om antwoord te kunnen geven op alle vragen moet je eigenlijk veel fundamenteler onderzoek doen. Politici wilden snelle antwoorden op heel praktische vragen die opkwamen. Het was moeilijk ze ervan te overtuigen grote investeringen te doen voor fundamenteler onderzoek."

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Pas als in 2015 de internationale kritiek op de Nederlandse pulsvissers toeneemt, komt het geld voor het fundamentele onderzoek vrij. Het goedkopere onderzoek dat tot die tijd wordt gedaan blijkt niet afdoende om iedereen te overtuigen. Goedkoop blijkt duurkoop, want vanaf 2017 worden alsnog alle pulsvisschepen betrokken bij het onderzoek.

2018: Nederland moet antwoorden schuldig blijven

Het onderzoek is achteraf te laat opgestart, geven betrokkenen nu toe. "Wij hebben altijd gedacht dat het Europees Parlement pas in 2019 besluiten zou nemen over pulsvissen," verzucht Adriaan Rijnsdorp twee maanden na de stemming in het Europees Parlement. "Dan was ons onderzoek af geweest."

De avond voor die stemming in januari zit Rijnsdorp in het parlement tegenover Europarlementariërs. Ze stellen allerlei kritische vragen en Rijnsdorp moet het antwoord op een deel van die vragen schuldig blijven, omdat het grootschalige onderzoek nog niet af is. De volgende dag stemmen de Europarlementariërs voor het totaalverbod.

Minister Schouten gebruikt het nog niet afgeronde onderzoek als argument om het pulsvissen nu niet stop te zetten. "Laten we deze discussie voeren op basis van feiten," zegt ze in januari bij een ministerraad. "Het onderzoek loopt nog. We willen heel graag dat we de uiteindelijke keuze of we wel of niet doorgaan met puls ook baseren op de resultaten van het onderzoek."

Maar dat onderzoek had al lang klaar kunnen zijn, als Nederland z'n wetenschappers direct in 2010 of in de eerste jaren daarna aan het werk had gezet. Er is vier jaar nodig om het onderzoek af te ronden. Vanaf 2014 hadden de resultaten er dus kunnen liggen.

Nu sneed Nederland zichzelf in de vingers. "Als we twee, drie jaar eerder waren begonnen, hadden we duidelijke antwoorden kunnen geven op de vragen. Dan hadden we veel sterker gestaan in het Europees Parlement," zegt wetenschapper Rijnsdorp.

Annex 15

> **Wat Japan doet met de walvisvaart, doet Nederland met het pulsvissen.**
>
> — Yannick Jadot, Franse Europarlementariër

Het is de vraag of Nederland nu nog de ruimte krijgt om het grote pulsvisonderzoek af te maken. Een ruime meerderheid in het Europees Parlement wil een totaalverbod op pulsvissen. Dat er nog onderzoek moet worden afgemaakt, maakt daar weinig indruk.

"Wat Japan doet met de walvisvaart, doet Nederland met het pulsvissen," vindt de groene Europarlementariër Yannick Jadot, één van de drijvende krachten achter het voorgestelde pulsvisverbod. "Onder de vlag van de wetenschap, blijven ze commercieel vissen. Er zijn 84 pulsvergunningen afgegeven. Het merendeel van die vergunningen heeft geen enkel wetenschappelijk resultaat opgeleverd. De enige beslissing die Europa kan nemen is het intrekken van die vergunningen. Ze zijn illegaal."

De NOS sprak met meerdere internationale pulsviswetenschappers en zij zijn het over één ding eens: pulsvissen is veel duurzamer dan boomkorvissen. Het is terecht dat Nederland het pulsvissen promoot, vinden ze, maar de regering heeft veel te snel veel te veel vissers een vergunning gegeven. Er was geen enkele wetenschappelijke reden om dat te doen en politiek was het erg onhandig.

Weet je meer over de Nederlandse pulsvisvergunningen: mail thomas.spekschoor@nos.nl

En wil je meer weten over Europa van binnenuit en van buitenaf? Schrijf je dan hier in voor de wekelijkse nieuwsbrief Brussel Inside, waarin de Europa-correspondenten van de NOS scherpe opinies, hardnekkige geruchten en meeslepende reportages hebben verzameld. De nieuwsbrief verschijnt iedere zondagochtend.

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Inschattingsfout

Rijnsdorp: "We hebben ons gewoon onvoldoende gerealiseerd hoeveel zorgen er waren bij anderen over het gebruik van elektriciteit, omdat het voor ons zo duidelijk was wat de voordelen waren."

Het is een dure inschattingsfout. In Brussel spreken de Commissie, de Raad en het Europees Parlement de komende maanden met elkaar over de toekomst van pulsvissen. Nederland kan er niet veel meer doen dan de schade beperken, na de stemming in het Europees Parlement en een eerder negatief besluit van de raad van visserijministers. De kans dat Nederlandse pulsvissers hun vergunningen in moeten leveren is levensgroot. Het wetenschaps-argument is in Brussel wel uitgewerkt.

Reactie minister Schouten

Minister Schouten van Landbouw en Visserij wijst erop dat er de afgelopen jaren wel degelijk veel onderzoeken zijn gedaan en dat ook het fundamentele onderzoek inmiddels is opgestart. "Misschien dat er wat winst te boeken was geweest, dat het iets sneller had kunnen gaan, maar tegelijkertijd zijn we hier nu echt mee bezig. Dat wil ik wel benadrukken: we hebben onderzoek toegezegd en dat zijn we nu ook aan het doen."

Volgens haar is het de vraag of het Europees Parlement met dit soort onderzoek te overtuigen was geweest. "Die Franse Europarlementariërs konden alle vragen stellen aan de onderzoeker, die wilde ook alles uitleggen. Ik had nou niet de indruk dat daar ook naar geluisterd werd."

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MENS & MAATSCHAPPIJ

Door *Arno van t Hoog*

Pulsvissen: lopend onderzoek genegeerd

27 JANUARY 2018 | 10.00 UUR

Vissen met elektrisch vistuig is uitgegroeid tot een exclusief Nederlandse aangelegenheid. Foto: Nederlands Visbureau

Onderzoekers die druk bezig zijn met de ecologische effecten van elektrisch vissen voelen zich gepasseerd door de recente negatieve stemming over pulsvisserij in het Europarlement. De vraag is of hun rapporten in 2019 nog serieus worden bekeken.

Heel even voelde hij teleurstelling, zegt Justin Tiano, promovendus bij het NIOZ in Yerseke, toen halverwege januari het Europees Parlement besloot dat pulsvisserij in 2019 in de ban wordt gedaan. 'Ik dacht: als ze het gaan verbieden, wat is dan nog het nut van mijn onderzoek? Nu hoop ik dat er de komende jaren vanuit het beleid belangstelling blijft voor nieuwe onderzoeksresultaten, en dat ik daarmee een verschil kan maken. Het is in ieder geval interessant om deze discussie mee te maken; iedereen wil meer weten over het onderwerp en mijn onderzoek.'

Tiano is nog niet heel lang bezig met zijn promotie op ecosysteemeffecten van elektrisch vissen, een onderzoek dat onderdeel is van het project Impact Assessment Pulstrawl Fishery (IAPF). Hij kijkt vooral naar effecten van elektrisch vissen op het bodemleven, zoals schelpdieren en wormen, die een belangrijke rol spelen bij bio-irrigatie: het watertransport in de bovenste bodemlaag. Daarmee zijn zulke organismen van invloed op basale processen zoals zuurstofbeschikbaarheid en opname en afgifte van stikstof en fosfaat. De vraag is of die processen en daarmee primaire productie veranderen nadat er een pulskor is gepasseerd.

LAATSTE NIEUWS

09 JUNE

Fishy sex

08 JUNE

Vlinderbloemigen herstarten droog tropenbos

06 JUNE

Bedreigde lieveheersbeestjes zijn niet kansloos

05 JUNE

Sterker uit de strijd

04 JUNE

Hoge CO2 verlaagt voedingswaarde rijst

HUIDIGE NUMMER

REDACTIE

Gert van Maanen

DARWIN
FOSSIEL
EI

Maartje Kouwen

DIERGEDRAG
MESTKEVER
VISSERIJ

Steijn van Schie

HUMANE BIOLOGIE
MARIENE BIOLOGIE
ZEENAAKTSLAK

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Animatie van pulsvissen met een SumWing, een door HFK Engineering en Texelse vissers ontwikkeld vistuig.

Kotters die elektrisch vissen zijn voorzien van een kor met meterslange strengen met elektroden die pulsen afgeven. Vissen die op de bodem leven – vooral tong – worden daardoor opgeschrikt, verkrampen tijdelijk en belanden in het net. Bijvangst en dieselverbruik van het elektrisch vistuig liggen tientallen procenten lager dan bij de gewone boomkorvisserij, maar critici van de pulsvisserij wijzen erop dat veel vragen over dierenwelzijn en ecosysteemeffecten nog onbeantwoord zijn. De vraag is wat het effect is op andere organismen die niet worden opgevist, want de pulsen dringen ook door in de waterige bovenlaag van de zeebodem. Tiano's onderzoek moet zulke kennishiaten opvullen.
Tiano heeft deze zomer een eerste onderzoekscampagne op zee achter de rug. In het spoor van een pulskor en een boomkor liet hij *benthic landers* neer, een soort meetrobots die allerlei bepalingen doen in het water boven de bodem. Datzelfde soort onderzoek deed hij ook aan boorkernen aan boord van onderzoeksschip R.V. Pelagia. Uiteindelijk moet dat een vergelijking opleveren van de effecten van de pulskor en de traditionele boomkor die vis opschrikt met stalen wekkerkettingen.

Vergunningen
De resultaten van Tiano's papers worden met ander puls-onderzoek ingebracht bij de ICES Working Group on Electrical Trawling, de experts die advies uitbrengen aan de Europese Commissie over de toekomst van de pulsvisserij. Daarover moeten de Europese Commissie en de Europese visserijministers in 2019 een besluit nemen, want in dat jaar lopen de voorlopige vergunningen af, waarmee 84 Nederlandse kotters elektrisch vissen. De beslissing van het Europees Parlement heeft de volgorde van wetenschappelijk onderzoek, beleidsadvies en politieke besluitvorming lelijk doorkruist, zegt Adriaan Rijnsdorp, IAPF-projectleider en onderzoeker bij Wageningen Marine Research. 'We zijn nu ongeveer halverwege het project.' Hij had graag gezien dat de oorspronkelijke planning was gevolgd. 'ICES geeft antwoord op de vraag hoe duurzaam deze methode is, in vergelijking met de boomkorvisserij. Dat advies zou gebruikt worden om in 2019 de vergunningen voor pulsvisserij te evalueren. Daar werkten wij naartoe. Het debat in het Europarlement kwam te vroeg; het staat haaks op de logica van hoe het de afgelopen jaren is gegaan.'

> ***"Het debat in het Europarlement kwam te vroeg; het staat haaks op de logica van hoe het de afgelopen jaren is gegaan"***

Rijnsdorp had niet verwacht dat een felle campagne van maatschappelijke organisaties zo'n succes zou hebben in Brussel. Vooral BLOOM association en Low Impact Fishers of Europe (LIFE) wisten effectief twijfel te zaaien over de gevolgen van pulsvisserij. Er werden horrorbeelden opgeroepen over elektrocutie, beschadigde vis en lege zeeën, en tegelijkertijd werd er gepleit voor kleinschalige visserij met lijnen en staand wand. Die geluiden vielen in goede aarde bij visserijnaties die al jaren argwanend toekijken hoe Nederland de pulstechniek stimuleert, door met allerlei uitzonderingen extra Europese vergunningen te regelen. Rijnsdorp: 'We weten dat er in Europa veel politieke weerstand is tegen deze vorm van visserij. Nederland heeft de voorbije jaren z'n hand overspeeld met het uitbreiden van het aantal tijdelijke vergunningen. Het leek iets experimenteels,

TIP DE REDACTIE

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maar visserijonderzoekers hebben nooit een voorstel geschreven voor een onderzoeksprogramma waarvoor 84 kotters nodig zijn. Nederland heeft inmiddels in contact met andere landen aangegeven dat er een economisch motief was, om de platvissector in moeilijkheden te helpen. Vissen met de puls is gewoon rendabeler.'

Kritiek

Los van economie zijn in onderzoekskringen de gedachten over pulsvisserij de voorbije jaren niet veranderd, zegt Rijnsdorp. 'Er zijn grote verwachtingen dat deze techniek uiteindelijk veel duurzamer is en veel minder negatieve effecten heeft dan de boomkorvisserij met wekkerkettingen. Er is al best veel onderzoek gedaan, maar dat is in het huidige politieke klimaat volstrekt onvoldoende om alle vragen en kritiek te beantwoorden. Er zijn niet veel neveneffecten te zien, maar dat is op zich niet voldoende, want je kunt altijd nieuwe vragen verzinnen, die nog niet zijn onderzocht. Je kunt niet alle soorten onderzoeken die met een pulskor in aanraking komen, dus je moet een mechanistische benadering ontwikkelen. Met zo'n model kun je voorspellingen doen over soorten die je niet hebt onderzocht. Waarom vind je bijvoorbeeld bij de ene vissoort breuken in de ruggengraat en bij de andere soort niet?'

Foto van platvissen met beschadigingen die actievoerders aanvoeren als 'bewijs' dat elektrisch vissen schadelijk is, terwijl de foto afkomstig is van een bericht van het Belgische visserijinstituut ILVO dat hiervoor juist geen bewijzen zijn.

Monstername aan boord van pulskotters heeft laten zien dat sommige vissen door de elektrische puls zoveel kramp krijgen, dat hun ruggengraat breekt. Vooral rondvis als kabeljauw en wijting zijn daar gevoelig voor en de percentages liggen tussen de 2 en 10 procent. Andere soorten als zeebaars hebben hier geen last van. Verder lijkt het formaat van de vis een rol te spelen, kleine kabeljauw ontwikkelt bijvoorbeeld geen fracturen. Het ontstaan van breuken is een beetje een ongrijpbaar en variabel verschijnsel, waar het IAFP-project meer zicht op wil krijgen met proeven in aquaria. Verder wordt er gekeken naar het effect van de puls op haaien, roggen en ongewervelden.

Rijnsdorp: 'De publieke perceptie is dat de puls desastreus is voor de dieren die eraan zijn blootgesteld. Dat is niet het geval, met uitzondering van een percentage van de kabeljauw. Breuken en bloeduitstortingen zijn een dierenwelzijnsprobleem. Maar dat heeft de visserij sowieso. Denk maar aan vis die door een traditionele boomkor met wekkerkettingen wordt gevangen en 2 uur over de zeebodem wordt gesleept met andere vis, schelpen en krabben. Als je zulke vis een week na vangst in leven houdt zie je veel bloeduitstortingen en beschadigingen. Vis gevangen met de puls wordt niet geraakt door wekkerkettingen, heeft veel minder beschadigingen en heeft een grotere overlevingskans.'

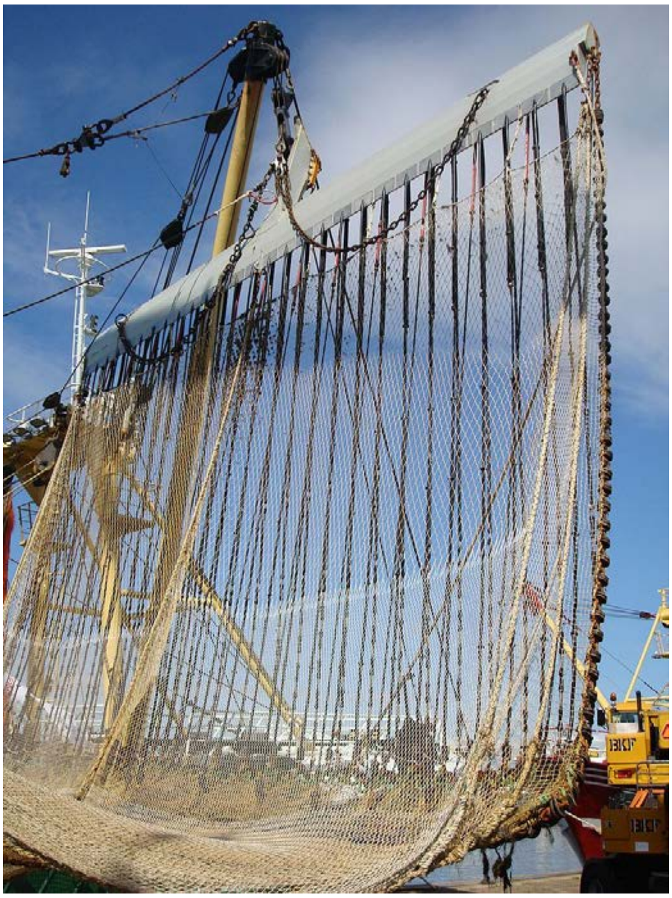
> ***"Breuken en bloeduitstortingen zijn een dierenwelzijnsprobleem. Maar dat heeft de visserij sowieso"***

Rijnsdorp verwacht daarom dat pulsvisserij voor de bulk van de vangst beter scoort op het vlak van dierenwelzijn en overleving. 'Je moet die gegevens altijd vergelijken met andere vistechnieken. Organisaties als Bloom zijn tegen sleepnetvisserij. Ze pleiten voor kleinschalige visserij met staande netten, maar daar kun je het tongquotum nooit mee opvissen en je krijgt problemen met de bijvangst van bruinvissen en andere zeezoogdieren. Elk vistuig heeft neveneffecten; dat realisme moet je wel bewaken.' De Nederlandse platvissector leeft na het besluit tussen hoop en vrees. Er zijn miljoenen geinvesteerd in een elektrisch vistuig met leningen en stimuleringsregelingen. Aanschaf van een pulskor en aanpassingen op het schip kosten tussen 300.000 à 400.000 euro en dat zou een daadwerkelijk verbod op de puls in 2019 een flinke strop maken. De vraag is of onderzoek en lobbywerk van de Nederlandse overheid het tij de komende maanden nog kan keren.

Kader:
Alleen in Europa

Wie de afstudeerscriptie van marien bioloog Tim Haasnoot uit 2015 leest, realiseert zich hoezeer Nederland moederziel alleen is komen te staan in Europa. Terwijl Nederlandse vissers en overheid na 2004 uitgebreid ervaring opdeden en gegevens verzamelden, vergaten ze vanaf het begin sceptische collega's en organisaties uit andere landen bij de ontwikkeling te betrekken. Die sociale kant van visserij-innovatie is minstens zo belangrijk als wetenschappelijk onderzoek, concludeert Haasnoot, tegenwoordig werkzaam voor ProSea, een organisatie die kennis helpt verspreiden in de sector en het visserijonderwijs.

Haasnoot beschrijft aan de hand van interviews hoe de pulsvisserij zich in Nederland sinds 1970 heeft ontwikkeld. Alle landen konden gebruikmaken van een Europese regeling die toestaat dat 5 procent van de vloot met elektrisch vistuig mag experimenteren, maar alleen Nederland heeft daar gebruik van gemaakt. Pulsvisserij is tot een exclusief Nederlandse techniek uitgegroeid, ondanks dat Frankrijk, Duitsland en Engeland er in de jaren zeventig ook onderzoek naar deden.



Een pulstuig met de elektrodes in de sleeprichting, die de platvissen opschrikken van de bodem zodat die in het net terecht komt. Foto: Inger Wilms.

Haasnoot: 'De Nederlandse vloot is gespecialiseerd in platvis, met name tong, en daarvoor leent de puls zich bij uitstek. Andere lidstaten hebben een veel kleiner platvisquotum en dus weinig reden om over te schakelen. Sommige Belgische

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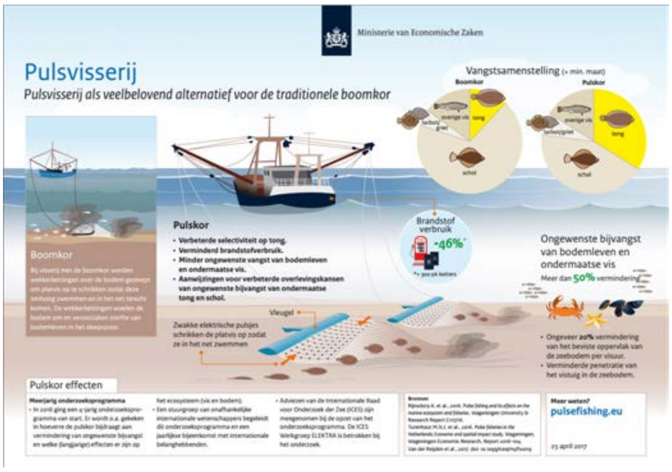
vissers hebben wel belangstelling, maar ze krijgen geen lening omdat ze onvoldoende platvisquotum hebben. De bank vindt het risico te groot. Buiten Nederland zijn er daardoor geen andere lidstaten die direct belang hebben in de pulsvisserij.' Het besluit van het Europees Parlement verbaast hem dus niet, maar toch is het totaal niet logisch, zegt Haasnoot. 'Als je het totale onderzoek naar pulsvisserij bekijkt en vergelijkt met de boomkor, zie je dat men in de wetenschappelijke wereld al jaren voorzichtig positief is. Vooral de langetermijneffecten zijn nog onbekend. Men is in het Parlement aan die feiten voorbij gegaan. De wetenschap is genegeerd; het is een beslissing op basis van emoties en andere belangen.'

Bondgenoten

Dat werpt z'n schaduw vooruit naar nieuwe politieke discussies over pulsvisserij. Nederland heeft als enige een belang en geen bondgenoten, op zes Belgische vissers na die de techniek experimenteel gebruiken in de garnalenvisserij. Haasnoot: 'Dat is het probleem waar je tegenaan loopt. Je kunt van alles onderzoeken, maar als buiten Nederland niemand er belangstelling voor heeft en andere landen wetenschappelijk onderzoek zien als een manier om de pulsvloot te beschermen, dan wordt het heel lastig. Als je kijkt wat er onlangs aan wetenschappelijk onderzoek terzijde is geschoven, dan vraag ik me af of meer data echt een andere discussie gaat opleveren. Het probleem zit niet in de hoeveelheid kennis, maar de acceptatie door andere lidstaten en vissers.'



Informatieblad over pulsvisserij die de Nederlandse overheid (in vier talen) uitbracht.

Campagnebeeld van non-profitorganisatie BLOOM tegen pulsvissen.

Zie ook:

Visserij anno toen en nu (*Bionieuws* 19, 21 november 2015)
'Verduurzaming gaat hooguit in stapjes' (*Bionieuws* 19, 21 november 2015)
Heeft pulsvissen de toekomst? (*Resource*, 11 mei 2017)

Dit bericht verscheen in *Bionieuws* 2 van 27 januari 2018.

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Brussel eist uitleg van Nederland over pulsvisonderzoek

DI 27 MAART, 13:35 AANGEPAST DI 27 MAART, 18:27 BINNENLAND, BUITENLAND

Pulsvisserij ANP

Annex 17

De Europese Commissie wil uitleg van Nederland over het verstrekken van pulsvisvergunningen. Een groot deel van die vergunningen werd verstrekt voor wetenschappelijk onderzoek, maar jarenlang deed een groot deel van de beoogde schepen niet aan dat onderzoek mee, bleek afgelopen zondag uit onderzoek van de NOS.

GESCHREVEN DOOR

Thomas Spekschoor
correspondent Europa

De Europese Commissie wil weten of alle regels zijn gevolgd bij het afgeven van de vergunningen. Nederland vroeg de vergunningen in 2010 en 2014 aan in Brussel en beloofde deze uitsluitend voor wetenschappelijk onderzoek te gebruiken. Volgens de Commissie gaat Nederland zelf over het uitvoeren daarvan, maar moet het wel aantonen dat daadwerkelijk onderzoek is uitgevoerd.

Stroomstootjes

Minister Schouten zei zondag tegen de NOS dat het wetenschappelijk onderzoek misschien wat eerder had kunnen worden opgestart, maar dat Nederland er inmiddels wel volop mee bezig is. Het is de vraag of ze daarmee weg komt. De Europese Commissie wil niet alleen van Nederland weten of alle schepen nu meedoen aan pulsvisonderzoeken, maar ook of dat in het verleden zo geweest is.

In 2019 lopen veel pulsvisvergunningen af. Om die te houden, moet Nederland ze opnieuw aanvragen bij de Europese Commissie.

Het Europees Parlement stemde afgelopen januari voor een verbod op pulsvissen. Bij die vistechniek worden met kleine stroomstootjes vissen uit de bodem gelokt, zodat ze de netten in zwemmen. Nederland zegt dat de vistechniek vele malen milieuvriendelijker is dan de oude boomkortechniek, maar volgens het Europees Parlement zitten er grote gevaren aan het gebruik van stroom in de zee. Zo zou alle zeeleven worden uitgeroeid.

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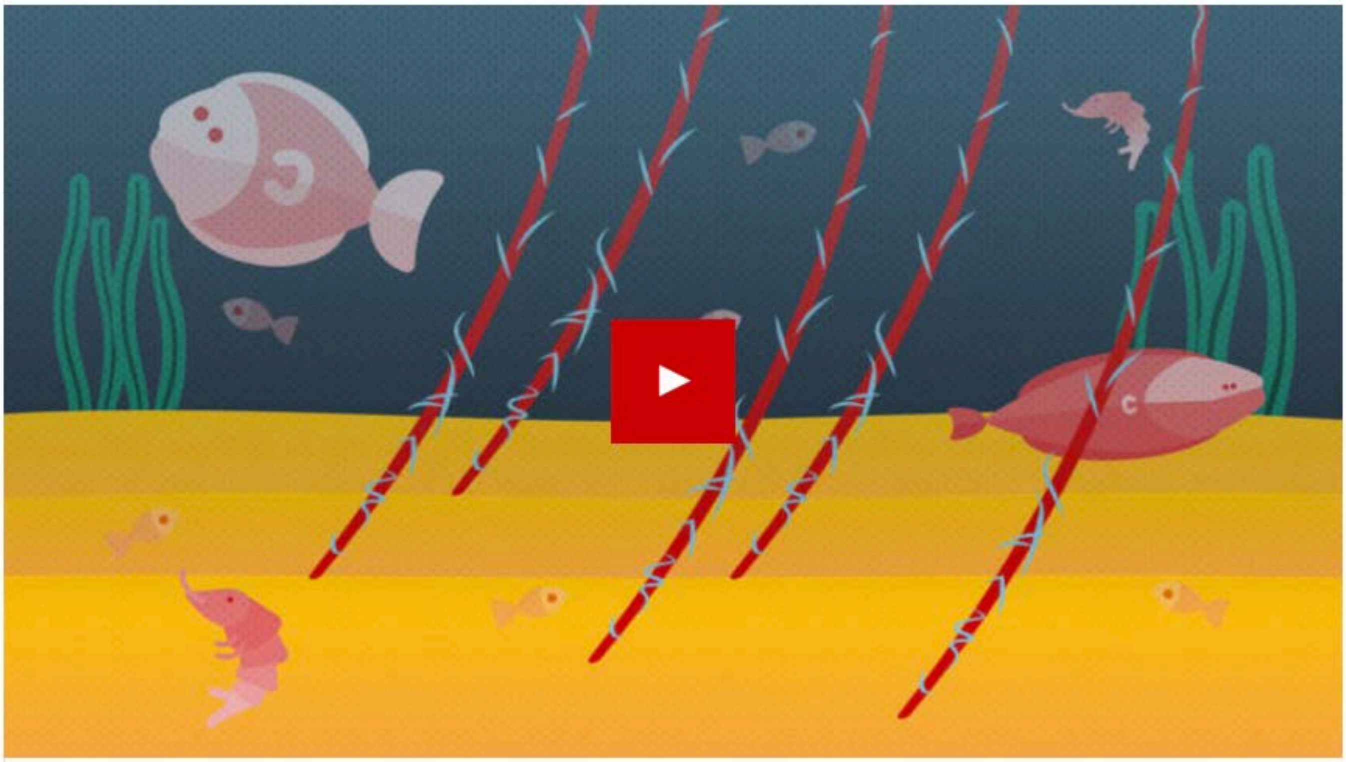

Uitleg: wat is pulsvissen?

Minister Schouten probeert een pulsvisverbod nog tegen te houden door te overleggen met andere EU-landen en de Europese Commissie. Daarbij gebruikt ze het wetenschappelijk onderzoek juist als argument om pulsvissen niet te verbieden. Ze zegt dat een verbod ertoe zou leiden dat het onderzoek nooit afgemaakt kan worden.

Gevraagd naar een reactie verwijst het ministerie door naar het Kamerdebat van vandaag met minister Schouten.

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Schouten: Brussel gaf zelf toestemming voor vergunningen pulsvisserij

DI 27 MAART, 18:20 POLITIEK

HOLLANDSE HOOGTE

Annex 18

De Europese Commissie in Brussel heeft Nederland zelf toestemming gegeven om vissers een pulsvisvergunning te geven, zegt minister Schouten van Visserij. "Ook toen duidelijk was dat ons wetenschappelijk onderzoek naar pulsvisserij nog niet op gang was, gaf de commissie toestemming voor een derde ronde vissersboten", zegt Schouten in de Tweede Kamer.

De minister reageert op een vraag om opheldering van de Europese Commissie. Die wil weten of het klopt dat Nederlandse schepen die een pulsvisvergunning kregen om mee te werken aan wetenschappelijk onderzoek, dat in de praktijk niet deden. Dat bleek afgelopen zondag uit onderzoek van de NOS.

Schouten zegt dat het wetenschappelijk onderzoek inderdaad wel wat sneller opgepakt had kunnen worden. Maar ze ontkent dat de vergunningen zijn verstrekt om Nederlandse vissers te bevoordelen onder het mom van wetenschappelijk onderzoek. Inmiddels doen alle 84 schepen met een vergunning mee aan het wetenschappelijk onderzoek.

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Zo veel mogelijk

GroenLinks-Kamerlid Kröger vraagt zich af of de 84 verstrekte vergunningen echt nodig zijn voor het onderzoek naar de eventuele schadelijkheid van pulsvisserij. Schouten zegt dat ze dat niet weet, maar dat ook de druk van een meerderheid van de Tweede Kamer heeft meegespeeld bij het verstrekken van zo veel mogelijk vergunningen.

De PVV is bang dat het aangekondigde "charmeoffensief" van minister Schouten, om een verbod op pulsvisserij tegen te houden, weinig zoden aan de dijk zal zetten. "Ik heb in Brussel rondgelopen en geleerd dat andere manieren beter werken om je doel te bereiken", zegt Kamerlid Matlener. "Powerplay is beter, leg dit dossier neer bij de premier."

Schouten denkt niet dat dat helpt. "Als het had geholpen als ik meer met mijn vuist op tafel had geslagen, dan had ik dat gedaan", zegt zij. Ze probeert de andere lidstaten met argumenten te overtuigen zodat het totaalverbod op pulsvissen van tafel gaat. Hoe lang dat gaat duren kan de minister niet zeggen.

Fransen

Vooral de Fransen zien de Nederlandse pulsvissers als grote concurrent. De Franse president Macron zei woensdag nog bij zijn bezoek aan premier Rutte nog altijd achter het besluit van het Europees Parlement te staan. "We weten wat de schade is aan de visstand. Ik geloof dat het een goede keuze is geweest."

Het Europees Parlement stemde in januari voor een totaalverbod op pulsvissen, tot woede en verrassing van Nederlandse vissers en de Nederlandse regering.

Wat is pulsvissen?

Scholvissers op de Noordzee gebruikten altijd de boomkortechniek. Daarbij werd met zware kettingen de zeebodem omgewoeld om bodemvissen naar boven te laten zwemmen. De laatste jaren zijn veel Nederlandse vissers overgestapt op pulsvissen, waarbij de vis met stroomschokjes wordt opgeschrikt. Voordeel: minder brandstofverbruik, minder bijvangst en minder schade aan de zeebodem. Nadeel: de gevolgen voor de vissen en de visstand zijn nog nauwelijks bekend.

Het Nederlandse wetenschappelijk onderzoek met de 84 vissersboten moet eind 2019 klaar zijn. Voor die tijd komt de Universiteit Wageningen met nieuw eigen onderzoek.

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ICES WGELECTRA REPORT 2015

STEERING GROUP ON INTEGRATED ECOSYSTEM OBSERVATION AND MONITORING

ICES CM 2015/SSGIEOM:29

REF. ACOM AND SCICOM

Second Interim Report of the Working Group on Electrical Trawling (WGELECTRA)

10–12 November 2015

IJmuiden, the Netherlands

The issue of comparing startle and cramp pulse responses has not been addressed. It seems to be accepted that the startle response works well for species such as shrimp but, for sole, the cramp response is more effective. It is unclear whether any research will be carried out under the Pule Trawl Impact Assessment referred to in the WGELECTRA report.

One of the main potential benefits of the pulse trawl compared to conventional beam trawls is the likely reduction in the impacts on the seabed. However, it is still unclear whether the impact between a conventional beam trawl fitted with a pulse system and a standard conventional beam trawl is any different.

This has been consistently highlighted but it is not clear what groundgears are currently being used with the pulse trawl and how they compare with the conventional tickler chain arrangement. Without this information it is difficult with any degree of certainty to compare the two gears in terms of physical impacts. It is also not clear what work is planned on reducing the seabed impact of the pulse trawl through the use of lighter groundgears and how this relates to the current gear configurations used.

While WGELCTRA (2015) notes that penetration of pulse trawls is less than conventional trawls, it is not clear by how much or whether such reductions are sufficient to result in a significant difference in epi-faunal mortality.

As noted above, the critical issue of pulse characteristics still remains largely unresolved and therefore the review group considers that further work on the determination of critical pulse characteristics is still needed with a view to defining standardized pulse characteristics.

6) **ICES considers that the available data are insufficient to recommend the large-scale use of the electric pulse trawl in fisheries. Consideration could be given to experimental increases, beyond 5% in the beam trawler fleet, in selected areas to further investigate the outstanding issues mentioned above.**

The review group consider that the Issuing 84 licences to support the previous scientific advice is not in the spirit of the previous advice and that such a level of expansion is not justified from a scientific perspective. This level of scientific derogations amounts to around 35% of the entire Dutch beam trawl fleet greater than 18m in overall length (based on STECF data[5]), which potentially could use the pulse trawl to target flatfish. 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.

7) **ICES recognizes that conventional beam trawling has significant and well demonstrated negative ecosystem impacts, and if properly understood and adequately controlled, electric pulse stimulation may offer a more ecologically benign alternative.**

This conclusion remains valid and many of issues around the likely ecosystem impacts have been the subject of extensive research and assessment. The advice provided in 2012 considers that electric pulse stimulation may offer a more ecologically benign alternative". The Review group consider it that this should be viewed in the context that

5 Scientific, Technical and Economic Committee for Fisheries (STECF) – The 2015 Annual Economic Report on the EU Fishing Fleet (STECF-15-07). 2015. Publications Office of the European Union, Luxembourg, EUR 27428 EN, JRC 97371, 434 pp.

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ICES SGELECTRA REPORT 2013

SCICOM Steering Group on Ecosystem Surveys Science and Technology

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Report of the Study Group on Electrical Trawling (SGELECTRA)

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Ostend, Belgium

at reducing bycatch of relatively large fish of all species, but less so at reducing 0 group plaice and sole, which make up a large fraction of the bycatch. Because of these drawbacks alternative measures are needed.

The "HOVERCRAN", a modified shrimp beam trawl, aims at stricter selectivity and reduced seabed contact. The fundamental idea is to replace the heavy bobbin rope with 12 lightweight electrodes, in order to use electrical pulsation as a stimulation alternative. Prior research by ILVO showed that the use of a specific electric field close to the seabed induces a startle response in shrimp, meanwhile not affecting most of the other benthic species. The elevated footrope lets non-target species escape underneath the trawl and collects the shrimp that jumps up into the water column. Herein lays the selective fishing potential of this alternative technique.

Currently several prototypes of the gear have been or are being tested on different commercial shrimp vessels. Meanwhile the optimal *Crangon* pulse is pretty well defined, there seems to be no need to vary pulse settings. Only two prototype Marelec™ generators with minor differences have been used on the vessels. The basic trawl concept, an elevated groundrope without bobbin rope was first tested on O191 in a scientific setup (2008 – 2011). Recently customized versions are being used in commercial circumstances on TX25, HA31, WR40 and SD33 (with Marelec systems), and TH10 (with the DELMECO system). Together with the Dutch sector a lot of flume tank research was done to facilitate bobbin rope design in relation to pulse fishing. Currently all vessels work with different bobbin rope designs and as a consequence all these ships have different outcome in relation to catch efficiency, discard reduction and reduction of seabed contact.

A combined gear with a classical round bobbin rope (36 bobbins) and 12 lightweight electrodes was experimentally tested on TX25. Logically no discard reduction was observed. However, commercial catch increase unexpectedly rose to 50%. Pulse amplitude was found to be optimal at 90% of the maximum generator output. In other words, increase of the pulse generator output (higher energy output) beyond a certain threshold did not lead to higher shrimp catches. No conclusive explanation for this was found. It is plausible that very efficient shrimp stimulation at higher amplitudes leads to the escape of shrimp out of the gear. Commercial gears on TX25 had 10 bobbins in a straight configuration (square net design) with significant spacing in between bobbins, resulting in less discards (50% less small plaice), but increase in shrimp catch compared with traditional gear with 36 bobbins. This was tested in a one-week comparison with the two gears fished simultaneously.

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. Accordingly the preferred bobbin rope was constructed rather heavily. Bobbin ropes with dumbbell-shaped bobbins were produced in Poland in a way that spacing between bobbins was filled up as much as possible. Nevertheless the reduced number of bobbins used in the new bobbin ropes (*i.e.* 24) is still a considerable step forward compared to the old (traditional) round bobbin rope with 36 bobbins.

The HA31 followed a different approach with a very lightweight bobbin rope, with 11 bobbins connected by a steel wire, with a total 95 kg weight on the rope (see picture below). Bottom contact is estimated to be very low (a reduction of 75% compared to the conventional setup). Catch comparison with a conventional gear showed a commercial catch increase of 23% and 67% less discards in volume, with both gears

Annex 21

DUNKERQUE

Un chalutier hollandais suspecté de fraude arraisonné au large

Un bateau hollandais pratiquant la pêche électrique a été contrôlé au large de Dunkerque. Il utilisait un maillage interdit et avait pêché de la sole n'ayant pas la taille commerciale. Dérouté vers Boulogne, le navire fait l'objet d'une saisie conservatoire en attendant la décision du juge.

Romain Douchin | 16/02/2017

Stéphane Pinto, représentant CFDT des fileyeurs boulonnais, pointe du doigt le tango hollandais qui pratique la pêche électrique.

Le Boeier, un bateau hollandais pratiquant le chalutage à perche au moyen de tangons, a été arraisonné au large de Dunkerque mercredi. Il pêchait la sole avec un chalut électrique, technique décriée par les Français mais autorisée par les autorités néerlandaises et l'Union européenne (*lire ci-dessous*). C'est le *Thémis*, le plus gros bâtiment des Affaires maritimes, affecté à la police des pêches en Manche, qui l'a contrôlé. « *Une infraction a été relevée concernant le maillage utilisé pour la sole, le diamètre était trop petit* », explique Arnaud Périard, chef d'unité encadrement et contrôle des activités maritimes à Boulogne.

Annex 21

La vente de la pêche, soit 15 000 €, a été saisie

Le navire a été dérouté pour des raisons pratiques vers le port de Boulogne où il est à quai, avec interdiction d'en bouger. « *Le bateau fait l'objet d'une saisie conservatoire,* poursuit le chef d'unité des Affaires maritimes. *Un juge du tribunal de Boulogne a été prévenu il y a trois jours pour confirmer la saisie ou libérer le navire, vraisemblablement sous réserve de paiement d'une caution qui peut se monter à 20 000 €.* »

« C'est inadmissible. Avec un chalut électrique, ce bateau multiplie par deux ou trois sa capacité de pêche comparé à nous. »

Un contrôle a été effectué sur la cargaison, « *des investigations supplémentaires doivent être menées* ». Il y a une suspicion d'infraction sur une centaine de kilos de soles sous-taille. En attendant les conclusions, la marchandise ayant la taille commerciale a été vendue et le produit de la vente, autour de 15 000 €, saisi.

« *C'est inadmissible*, dénonce Stéphane Pinto, représentant CFDT des fileyeurs. *Il pêche avec un maillage interdit, du 80 mm, quand nous on utilise du 92 ou 93 mm. Avec un chalut électrique, ce bateau multiplie par deux ou trois sa capacité de pêche comparé à nous avec nos engins traditionnels. Et tout cela est approuvé par la commission européenne. On nous a dit que la pêche électrique était en expérimentation chez les Hollandais mais ça fait longtemps que ce stade est dépassé car toute leur flottille pratique cette pêche. Ce bateau doit être sanctionné sévèrement, qu'on lui interdise l'accès à nos zones de pêche pendant plusieurs mois. Quand il pêche de la sole sous-taille et qu'il la cible, quelle quantité de juvéniles rejette-t-il ? Qu'en est-il des nourriceries et des alevins ?* »

Les Affaires maritimes ont accru leur contrôle des bateaux pratiquant la pêche électrique dans la zone au large de Dunkerque (4C). Récemment, *l'Armoise*, la vedette basée à Boulogne, a contrôlé un autre chalutier en infraction.

C'est quoi la pêche électrique?

Le chalut au fond de la mer est équipé d'électrodes. Elles envoient une impulsion électrique qui paralyse la sole et la fait sursauter. Le poisson décolle, il n'y a plus qu'à le cueillir dans le filet. Mais il est abîmé : le dos des poissons est éclaté, la chair à vif.

La pêche électrique est interdite par un règlement européen datant de 1998, mais en 2006, les Pays-Bas y ont fait introduire la possibilité de pêcher au chalut électrique à titre expérimental. On se souvient qu'ils étaient venus en 2014 rencontrer Frédéric Cuvillier, alors ministre de la Pêche, pour avancer leurs arguments : les chaluts électriques sont moins lourds que les chaluts classiques et abîmeraient moins les fonds, le navire consommerait moins de fioul et serait donc plus écologique. Pour les Français, il s'agit « *d'un engin très pêchant qui met en péril la ressource* ».

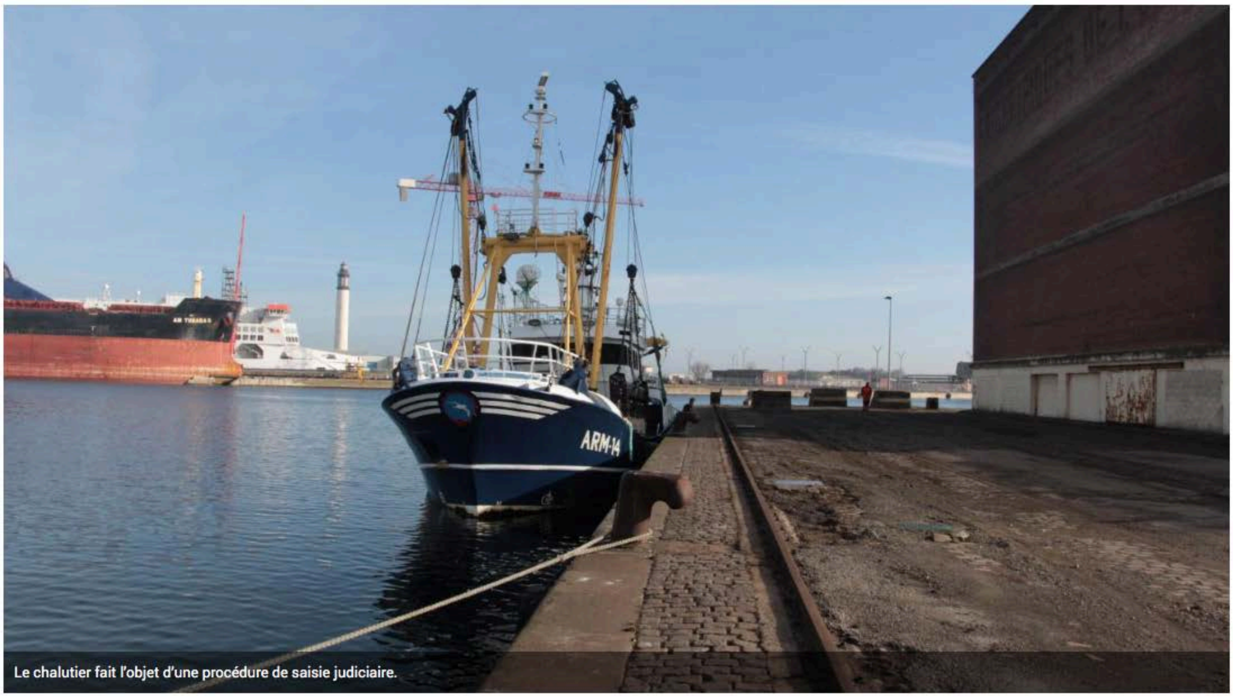
Annex 22

LA VOIX DU NORD

Un nouveau chalutier néerlandais arraisonné pour pêche illégale

Un chalutier néerlandais a été dérouté ce mardi au port de Dunkerque, pris en infraction par les Affaires maritimes. Il lui est reproché les mêmes pratiques illégales que le « Jacob Cornelis », dont le procès s'est tenu le même jour.

Alexis Constant | 14/03/2018



Le chalutier fait l'objet d'une procédure de saisie judiciaire.

Annex 22

Alors que se tenait ce mardi le procès du patron-pêcheur du *Jacob Cornelis* pour des infractions à la législation sur la pêche, dans le même temps, les Affaires maritimes arraisonnaient son sister-ship, le *Grietje Geertruida*, au large de Dunkerque, pour **les mêmes infractions**.

Le chalutier qui pratiquait la pêche électrique ce mardi dans les eaux dunkerquoises – cela ne constitue pas une infraction, même si cette pêche dérogatoire est vivement contestée – a été contrôlé avec un maillage de filet non-conforme.

Procédure de saisie judiciaire

Il a été acheminé au Môle 3, par la vedette *Themis* des Affaires maritimes. **La pêche a été immédiatement saisie**, soit 1,7 tonne de poissons dont 800 kilos de soles, pour une valeur avoisinant les 15 000 €.

Le fruit de la saisie sera vendu à la criée au profit de l'État. Par ailleurs, comme à chaque infraction constatée, le navire fait l'objet d'une procédure de saisie judiciaire. Le parquet de Dunkerque a été alerté et il devrait mandater le juge des libertés et de la détention pour **demander l'immobilisation du bateau** à défaut du paiement d'une caution.

En général, les cautions sont fixées entre 15 000 € et 20 000 €. La justice dispose de 72 heures pour mener à bien cette procédure. Le patron-pêcheur néerlandais **encourt une amende délictuelle de 22 500 €.**

Annex 22

«Il faut que Bruxelles se rende compte de ce qu'il se passe»

Les fileyeurs du littoral suivent l'affaire avec attention. Depuis plusieurs mois, ils militent contre l'interdiction de la pêche électrique utilisée par les chalutiers néerlandais. Pour eux, cette nouvelle affaire enfonce le clou.

« *Il faut que Bruxelles se rende compte de ce qu'il se passe* », peste leur représentant, Stéphane Pinto. Le 19 mars, la commission, le conseil et le parlement européens se réuniront pour décider de l'avenir de cette technique très controversée. En attendant, les fileyeurs ne décolèrent pas.

« *Nous, on pêche avec des maillages de 90 millimètres et eux, en plus d'utiliser la pêche électrique, se permettent de pêcher avec des maillages inférieurs à la limite légale, c'est une honte* », s'emporte le fileyeur. **Il espère que cette nouvelle saisie pèsera dans la balance** dans leur lutte contre la pêche électrique.

V. H. -M.

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Trawler Margriet LT36. (Photo: Gov.UK)

Dutch firm and master fined with GBP 168,000 due to fisheries breaches

UNITED KINGDOM
Tuesday, June 13, 2017, 23:50 (GMT + 9)

A Dutch firm and a vessel master have pleaded guilty to conservation offences in a case brought by Marine Management Organisation (MMO) and have been imposed fines amounting to GBP 168,000.

North Tyneside Magistrates Court documents reveal that the firm Kafish B.V., which owns the United Kingdom registered trawler *Margriet LT36* and its master, Dutch national Peter Kuyt, pleaded guilty to 13 breaches of the Sea Fish (Conservation) Act 1967 and the Fisheries Act 1981.

The court heard that during two separate investigations carried out by the MMO, vessel monitoring system data and logbook entries identified that the vessel had committed numerous offences between 2016 and 2017.

The first investigation showed that in 2016 the vessel had, on three occasions committed offences of fishing within a seasonal closure area and on one occasion fishing in a real time closure area.

The second investigation revealed that in 2017 a further eight offences of fishing within a seasonal closure area and another offence of failing to keep an accurate logbook were committed between January and March.

"The court in this case has sent a clear message that these were serious offences which were aggravated by the fact that the offences were repeated on numerous occasions," an MMO spokesperson pointed out.

The size of the fines imposed by the court in this case shows both the scale of damage to the marine environment caused by offences of this nature and the profits made by the perpetrators of these crimes.

"The MMO will always take appropriate enforcement action including pursuing and bringing prosecutions to court to protect the long term viability of the marine environment for future generations," the organisation spokesperson concluded.

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Tale documento non è disponibile nella sua lingua e le viene proposto in un'altra lingua tra quelle disponibili nella barra delle lingue.

Parliamentary questions

10 September 2007

E-4018/2007

Answer given by Mr Borg on behalf of the Commission

According to Article 31 of Council Regulation (EC) No 850/98 of 30 March 1998 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms(1), fishing with electricity, along with explosives and stupefying substances, is prohibited. The main reason for this is that these methods can be extremely effective, (i.e. fish stocks can be rapidly depleted) and would therefore go against the aim of a long-term sustainable income for fishing communities. There can furthermore be adverse impacts on the ecosystem and benthic communities, as some species which are located close to the trawl but which are not caught can be strongly affected by the electric current.

Regulation (EC) No 850/98 does not, however, apply to scientific research and consequently no derogation is required to use electrical current for scientific purposes.

The Commission is aware that under specific conditions and for certain fisheries the use of electricity could present some advantages in comparison with other gears such as bottom trawls. For that reason, a derogation on the use of a pulse trawl instead of the classical heavy beam trawls was granted in 2006. This derogation was introduced after receiving advice from the International Council for the Exploration of the Sea (ICES) and Scientific, Technical and Economic Committee for Fisheries (STECF). Because of possible adverse impacts, the derogation concerns only the the south of the North Sea. The derogation is also limited in durationto only one year as also in fishing effort since it applies to a limited number of vessels.

With the exception of scientific research, the intention of the Commission is to maintain the general ban on electro-fishing. However, due to possible positive effects on the environment, the Commission is open to study specific derogations for electrical fishing methods where these replace more harmful gears. Derogations will be proposed only after receiving scientific advice on the impact of such derogations and will be used only for specific fisheries in certain well defined areas.

(1) OJ L 125, 27.4.1998.

OJ C 191, 29/07/2008

1.5.6.1 **Special request, November 2012**

ECOREGION **General advice**
SUBJECT **Request from France to review the work of SGELECTRA and to provide an updated advice on electric pulse trawl**

Request

France requested ICES to review the work of SGELECTRA and to provide an updated advice on the ecosystem effects of pulse trawl, and especially on the amount of injury and mortality for targeted and non-targeted species that contact the gear but are not retained.

Response

Based on the expert reviews, ICES concludes that:

1. Current scientific knowledge indicates that the introduction of electric pulse systems could significantly reduce fishing mortality of target and non-target species, including benthic organisms, assuming there is no corresponding increase in unaccounted (avoidance) mortality.

2. Recent developments have resulted in pulse trawl systems requiring less power and new trawl designs that reduce the pressure on the seabed. However, operational issues such as the determination of critical pulse characteristics (power, shape, frequency, etc.) to determine maximum acceptable thresholds, still remain unresolved.

3. Questions remain regarding delayed mortality, long-term population effects, and sub-lethal and reproductive effects on target and not-target species. ICES notes that in freshwater fish, the effects from electric trawls are generally sub-lethal. However, no information is available on whether the effects in freshwater are transferable to the marine environment. Further work on marine effects is needed to resolve these issues.

4. It is unclear whether the current legislative framework is sufficient to avoid the deployment of systems that are potentially harmful. While the systems currently under development do not appear to have major negative impacts, ICES considers that the existing regulatory framework is not sufficient to prevent the introduction of potentially damaging systems. Guidelines and procedures for Control and Enforcement are being formulated by a Dutch project group and should be of help in preventing potential damage.

5. Many of these issues will be addressed in the future research proposed by SGELECTRA, and ICES supports these proposals. ICES furthermore supports research into the potential use of the startle pulse as an alternative to the currently used cramp pulse response, as well as research into lighter trawls with the net raised off the bottom and gears with no bobbins or tickler chains disturbing the seabed. The determination of critical pulse characteristics also requires further investigation.

6. ICES considers that the available data are insufficient to recommend the large-scale use of the electric pulse trawl in fisheries. Consideration could be given to experimental increases, beyond 5% in the beam trawler fleet, in selected areas to further investigate the outstanding issues mentioned above.

7. ICES recognises that conventional beam trawling has significant and well demonstrated negative ecosystem impacts, and if properly understood and adequately controlled, electric pulse stimulation may offer a more ecologically benign alternative.

Background

Since the advice provided by ICES in 2009 a Workshop to Assess the Ecosystem Effects of Electric Pulse Trawls (ICES, 2010) has been convened in 2010 and a Study Group on Electrical Trawling (SGELECTRA) met in 2011 and 2012 (ICES, 2011, 2012). SGELECTRA (ICES, 2012) provides an update and a synthesis of recent work undertaken in the area of electrical fishing. Research has focussed on the use of electrical stimulation systems for beam trawl fisheries for plaice and sole, beam trawl fisheries targeting brown shrimp (*Crangon crangon*), and to a very small extent for a fishery on razor clams (*Ensis* spp.). Considerable work has also been carried out on spinal damage to cod from pulse trawling.

SGELECTRA (ICES, 2012) reports in particular on:

- the results of catch comparison trials between pulse systems, trawl designs, and conventional beam trawls;
- an overview of the findings from tank experiments aimed at assessing the impact of various pulse settings on cod;
- proposed areas of future research.

Below is a summary of the issues raised by reviewers and highlighted by ICES.

1 Catch efficiency

The experimental design discussed by SGELECTRA (ICES, 2012) is sufficient to provide a broad overview of the catch efficiency at a trip or fleet level, but insufficient to provide adequate length-dependent differences between the pulse systems tested and conventional beam trawling because of the different towing speeds used by the different systems. Both pulse systems tested retained less target and non-target species than conventional beam trawls and the amount of discards was also reduced. Results of other research programmes also indicate reductions in both landings and discards and it is concluded that pulse trawls do offer a reduction in fishing mortality, provided that the decrease in catch is not neutralized by a corresponding increase in unaccounted (avoidance) mortality.

The systems presented in the SGELECTRA offer an alternative stimulus method for beam trawls fitted with tickler chains only. Tickler chains are normally deployed on finer substrate and it is unclear if pulse systems are a viable alternative to the chain mats used in rougher substrate.

For shrimp fisheries, it has been demonstrated that a combination of conventional gear with bobbins, but equipped with 12 electrodes, resulted in increased catches of up to 54% when compared to conventional gear without pulses. Catch efficiency is dependent on the number of bobbins and power setting. Increasing the power does not always result in increased catch.

2 Unaccounted avoidance mortality

There is clear evidence from various field, aquarium, and post-mortem studies that the electrical fields generated by the pulse trawls can cause vertebral injuries in large cod. This may happen if cod is in close proximity (10 cm) to the electrodes in a fixed position. Further away from the electrodes (e.g. 40 cm) vertebral injuries did not occur. The pulse characteristics contributing to this impact on cod have not been identified, except that research showed that with higher pulse frequencies (180 Hz) spinal damage did not occur (De Haan *et al*., 2011). The results suggest that the ability of the pulse trawl to catch cod is lower than the conventional gear and that a higher proportion of the cod encountering the pulse trawl may evade capture. It is unclear whether some of these fish are fatally exposed in the process (unaccounted avoidance mortality) and if so, what proportion are killed in this way. Vertebral injuries may only be of concern if they result in unaccounted mortality, i.e. if the cod that are not retained die. It is concluded that further work on this aspect is needed and that this would be aided considerably by a better understanding of specific effects of the pulse characteristics and their interrelationship. The reviews appended below discuss this in more detail and provide evidence from studies on freshwater fishes that while these are affected by electric trawls, the effects are generally not lethal.

In contrast to vertebral injuries in large cod there is no evidence to suggest that targeted plaice and sole caught in the pulse trawls suffer spinal damage.

3 Non-target fish and benthic species

Work has demonstrated general reductions in catch rates of non-target species similar to what has been shown for plaice and sole. Other studies have shown that the catch rate of invertebrates in pulse trawls varies considerably, from less than 5 to 10%, but also that catch rates for some species can be several times larger than by conventional beam trawl.

It is unclear at what level unaccounted avoidance mortality is associated with the conventional tickler beam trawls. It would, however, be fair to assume that the removal of the tickler chains and replacement with a pulse system will have a significant and positive effect, both in terms of reducing the catch of non-target benthos and also in terms of the likely reduction in avoidance mortality.

For elasmobranch fishes, the reviewers raise a particular concern regarding possible effects of strong electric fields generated by the gear upon the highly sensitive electrosensory system of sharks and rays that help them in orientation and food seeking. Research is underway to address this issue.

4 Effects on population level

Although limited information exists for effects on marine species, evidence shows that variation in power, voltage, pulse shape, duration, and frequency of the electric field can modify the incidence and degree of impact on fish. Repeated electrofishing of freshwater systems can result in higher incidences of morphological abnormalities resulting from previous spinal injuries, and such injuries can affect the growth of juveniles and the general body condition in the population. Surprisingly, despite the high incidence of spinal traumas, the abundance of studied salmonids remained stable or even increased, indicating the absence of serious harmful effects at the population level. Freshwater studies have indicated that effects, such as hemorrhages, spinal injuries, and mortality of different species vary greatly and that electrofishing may be harmless for some species and extremely dangerous for others. Whether the effects observed in freshwater are transferable to the marine environment is unknown.

5 Legal regulation of pulse trawls

EU legislation on pulse trawls regulates power and voltage, but there are indications that the pulse shape, duration, and frequency are also of importance. This implies that regulating power and voltage alone may not be sufficient to ensure that negative impacts do not increase when the pulse trawl systems are further developed and used. A Dutch project developed draft guidelines and procedures for control and enforcement in pulse trawl fishery, and new limits for various pulse characteristics and a certification scheme were suggested.

6 Further work

There are still a number of unknown issues related to pulse trawls. These include the question of how different pulse characteristics interact and impact on fish. In Belgium a low energy system that stimulates a startle reaction rather than a cramp response are under investigation for both brown shrimp and sole. Another issue is the unaccounted (avoidance) mortality, which is not fully understood. These issues require further research.

Sources

ICES. 2009. Answer to the Netherlands' request on Electric Pulse Trawl. *In* Report of the ICES Advisory Committee, 2009. ICES Advice, 2009. Book 1, pp. 157–165.

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Haan, D. de, Fosseidengen, J. E., Fjelldal, P. G., and Burggraaf, D. 2011. The effect electric pulse stimulation to juvenile cod and cod of commercial landing size. *In* IMARES Report C141/11, p. 44.

Annex(es)

Review 1: A review of SGELECTRA scientific activities (based on the 2010–2012 reports)
Review 2: Potential Ecosystem Impacts of Pulse Trawls. Review of SGELECTRA (2012)

Please note that the reviews in the annexes are supplied for information purposes only. They represent the views of the reviewers, but not necessarily the views of ICES.

Review 1

A review of SGELECTRA scientific activities (based on the 2010–2012 reports)

For the last three years, SGELECTRA has carried out a bulk of research and analytic work. Particularly, the contribution of the IMARES specialists is noteworthy for their large-scale laboratory and field studies conducted in reply to ICES advices. Now these studies that were initially focused on flatfish fishery are well supplemented with the recent data by the experts from Belgium and Germany where the shrimp trawling is being developed, as well as with valuable experience of the researchers from Lithuania and other countries. The new data on spontaneous razor clam fishery in Scotland that could be channeled to safe and controlled forms is also of considerable interest. Every year we learn more and more about the pros and cons of pulse trawling compared to conventional beam-trawl fishery. Currently, numerous advantages of pulse beam-trawling are substantiated, including a significant decrease in discards of undersized target fish, non-target species and benthic invertebrates, as well as less fuel consumption and fished area. An important step was a marked reduction in electric power of the fishing gear relative to heavily-powered regimes used in earlier systems. With the present operation mode, all the listed advantages of the pulse trawl are revealed against the background of its decreased catchability as compared to the conventional gear. However, the difference between the catches of the two gears is much less than the difference between their bycatches. Therefore a possible negative effect of pulse trawling on marine ecosystems is believed to be less severe than that of the tickler chain fishing which is fairly criticized for its negative impact on bottom habitats. In this connection a minor remark could be made regarding the way of data presentation in the last SGELECTRA report. It seems reasonable to provide additional information on the total percentages of discarded organisms (benthos, undersized target fish and non-target fish) in the catches of pulse trawl and conventional gear, along with length and weight means for marketable fish and discards. These simple indices would facilitate selectivity comparisons between the two gears in future reports.

Despite the great deal of research work, some issues, including the points raised in the earlier ICES advices, still remain unclear. One of the vital concerns is the fate of fish exposed to electric current. Currently, the data obtained by IMARES regards only the captured fish and shows that the target objects (plaice and sole) are robust enough to electric pulses. For these species, no spinal damages were reported that are the major concern to ecologists and fishermen today. At the same time, such traumas were found in cod. Previous field studies by the IMARES with the use of X-ray analysis revealed spinal injuries in two out of 25 cod individuals captured by the pulse trawl (i.e. in 10% of fish). Additional data on the injury occurrence in the landings and discards of cod was obtained during the field trials of 2011. These values were as low as 7.4% for TX36 (two fish out of 27 examined) and 11.1% for TX68 (two of 18 fish). In comparison with many electrofishing systems operating in fresh waters, these values appear to be low enough. In freshwater electrofishing, the share of the damaged individuals varies from several percent to 53–67%, depending on species and size of fish, shape, frequency and strength of electric current, and also on water conductivity (Sharber and Carothers, 1988; Snyder, 2003a, b). It is extremely important that vertebral fractures were observed in large cod individuals but not in small fish (12–16 cm), which raises their survival chance. Meanwhile, the damage of marketable fish is not a serious problem (at worst, it would have a negative effect on their appearance and market price).

Fish that were not retained

A problem of great concern is the fate of fish that were exposed to electric field of the gear but not retained. At present, the data obtained by IMARES and the participants of SGELECTRA cannot address this issue. The available information on this problem in the world literature is also extremely poor and mainly regards freshwater electrofishing systems.

Field surveys. For example, during the visual observations on the Gorki reservoir (Russia, the Volga river) no dead fish were seen behind the pair pulse trawl ELU-6M (Izvekov and Aslanov, 2000; Izvekov, 2001). These observations were conducted onboard a plastic boat that was towed over the trawl cod-end. The emerged stunt fish (mostly sabrefish, bleak and medium-sized asp) occurred seldom (approximately 4 fish per hour). Their number and weight accounted for 2.6% and 2.8% of the total catch, respectively. These fish were dip-netted and placed into a plastic tank onboard where they shortly recovered their swimming performance (from several seconds to 5–7 minutes).

Earlier, similar results were obtained on the Rybinsk reservoir (Russia, the Volga river) for the bottom trawl electrified with 50 Hz alternating current (Shentyakova *et al.*, 1970). In addition to visual monitoring of the water surface behind the electric trawl, immediately after its towing, a series of trawlings were performed using a conventional bottom trawl to find the dead and damaged fish that were not retained. During these control trawlings, no dead or damaged fish were collected in the near-bottom water layers. All fish caught behind the electric trawl appeared alive and visually did not differ from the fish captured by conventional gear at the adjacent sites. When released into the cages, all fish from the experimental and control trawlings (bream, zope, burbot and sheatfish) actively moved into deep water, except for the ruff (Shentyakova *et al.*, 1970).

The above observations could indirectly evidence the relatively low rate of serious deviations in the swimming capacity of fish that were not retained by the electric trawl, even using the alternating current that usually has a more severe effect on fish (see Snyder, 2003a, b) compared to pulse stimuli used in flatfish fishing. However, there remains a possibility of hidden damages and electrofishing-induced changes in fish behavior, which may affect their further survival.

Behavioural effects of electrofishing. While the acute effects of electrofishing, such as mortality and injury, are actively studied, little is known about its indirect behavioural effects. Experiments with bluegill *Lepomis macrochirus* have shown that electroshock causes a decrease in feeding intensity (up to 12 h) and only a short-term increase in its susceptibility to predation (up to 10 min) (Wahl *et al.*, 2007). However it is known that predators often follow the trawls, and are ready to consume the fish escaping through the codend meshes (Broadhurst, 1998; Svane, 2005). Therefore, even short-term changes in defensive reactions (predator detection, avoidance, schooling or shelter seeking) can essentially reduce the survival chances for the escapees (Ryer *et al.*, 2004; Suuronen, 2005; Suuronen and Erickson, 2010). In laboratory experiments, the trawl-stressed walleye pollock were more likely consumed by the predators than fish of a control group (Ryer, 2002). Even to a greater extent this may refer to fish escaping from the electric trawl, due to the negative impact of electric field added to all the adverse factors of conventional trawl fishing. Therefore, the numbers of fish that escape pulse trawls, their mortality and injuries rates, changes in behavior and vulnerability to predation are a great concern to be addressed in future studies.

Linking laboratory and field trials. When studying possible harmful effects of electric fields on fish under laboratory conditions, one of the acute problems is the yawning gap between the experimental data obtained and the actual situation in the wild. The IMARES experiments with cod have shown that in a close proximity to the electrodes, serious spinal injuries and some disturbances in feeding behaviour may occur, mainly in large specimens. However, we do not know exactly what share of fish would be subjected to such a strong impact during the sea trawling; it is also unclear what percentage of them would not be retained and how it could influence the overall fishing mortality.

Therefore, it is desirable to track the fish behavior in the operating range of a real pulse trawl. For instance, this could be done with the use of multiple underwater video cameras located in different parts of the gear. Today this method is fairly widespread in the marine trawl-fishery investigations (Piasente *et al.*, 2004). As for electrofishing, this may give us a clear view of fish approaching the electrodes and the specimens escaping under the footrope or through the codend meshes. These observations could also provide a rough estimate of the number of immobilized specimens remaining at the bottom. Comparison of the video-based escape rates with the total catch values would help in determining catchability and overall fishing mortality of the gear. Video records of the flatfish reactions to the moving shrimp electrotrawl were presented by the Belgian researches at the WKPULSE-2010 workshop, which proves the feasibility of such an approach. Another method is direct observation by divers. This method was successfully used in the Scottish experiments with a 3-m electrified beam trawl to investigate the behavioural responses of flatfish (Stewart, 1978).

Also, there exist some methods of sampling the escapees to determine their species, number and survival rates, e.g. using a codend cover, tag and recapture methods, electronic tags, acoustic telemetry etc. Though each method has its pluses and minuses (Breen *et al.*, 2002; Suuronen, 2005; Suuronen and Erickson, 2010) all of them appear to be valuable when studying the escape mortality of electrofishing gears in the wild. We believe the above methodologies will make it possible to build a bridge between the laboratory and field data. Equally important would be to compare the long-term changes in population characteristics for the fish that inhabit electrofishing areas and control areas where only conventional gear is used.

Possible population-level effects of electric fishing

Target fishes. It should be kept in mind that most electrofishing effects were studied at the organism level, while the population-level studies are at their dawn (Kocovsky *et al.*, 1997; Ainslie *et al.*, 1998; Nordwall, 1999; Carline, 2001). The long-term monitoring of populations that experience regular impact of electric fishing gears is of special interest. Currently, such data is scanty and available only for freshwater fish species. For example, in the rivers where electrofishing is regularly carried out, each year many fish are recaptured with morphological abnormalities resulting from previous spinal injuries (McMichael, 1993). Repeated action of electrofishing gears is known to cause more spinal damages than single-pass electric fishing (Ainslie *et al.*, 1998). Pond experiments have shown that such electrofishing-induced injuries can affect the growth of juvenile fish proportionally to the damage severity (Dalbey *et al.*, 1996). Extrapolation of the experimental data suggests approximately 3% or less decrease in mean population growth when 20% or less of the population is electrofished (Ainslie *et al.*, 1998). Also, electrofishing may lead to a subsequent decrease in body condition of recaptured fish (Thompson *et al.*, 1997). And finally, electric fishing can provoke short-term emigration of fish from their home sites (Nordwall, 1999; Young and Schmetterling, 2004), including the spawning grounds (Siepker *et al.*, 2006), which can negatively affect the recruitment.

Population studies on three salmonid and one catostomid species (Kocovsky *et al.*, 1997) have shown that after 6–8 years of annual three-pass removal electrofishing, the rates of visible spinal injuries varied from 3.5 to 12.3% at different locations. In contrast, no damages were found at control sites that had not been previously electrofished. The actual injury rates seem to be even higher because in 44% of X-rayed fish with no externally evident damages, previous injuries were seen. During the observation period, the abundance of longnose sucker *Catostomus catostomus* significantly decreased. Surprisingly, despite the high incidence of spinal traumas, the abundance of studied salmonids remained stable or even increased, indicating the absence of serious harmful effects at the population level. Similar data was obtained during the population studies of brown trout *Salmo trutta* (Carline, 2001). In spite of the high spinal injury rates (38–44%), the influence of high-frequency pulse electrofishing on most population characteristics was insignificant.

Regarding pulse fishing for flatfish, now it is hard to predict possible population-level effects. Apparently, these effects could be estimated only with the lapse of time, when analyzing the population statistics for the fish dwelling in the areas exposed to full-scale electrofishing and in the areas where fish are captured by the conventional gear. Long-term variations in population characteristics in the electrofished areas would also be very informative.

Non-target fishes. It should also be stressed that previous investigations of electrofishing-induced injuries were concentrated on commercially valuable fishes, while little attention was paid to cohabiting small non-target species. In a special study (Miranda and Kidwell, 2010) with non-target fishes (cyprinids, ictalurids and percids), the incidence of hemorrhages averaged 2% (from 0 to 20% for various species), the incidence of spinal injuries averaged 6% (0–30%), and mortality averaged 16% (0–90%). The considerable data spread implies that electrofishing may be harmless for some species and extremely dangerous for others.

In this respect, various non-target species mentioned in the ICES advice are investigated to different extent. According to the latest data by IMARES, whiting hardly seems to suffer any spinal fractures, while dab and turbot remain poorly studied.

Conclusion

Thus, extensive information on the influence of pulse electrofishing on marine organisms has been collected during the recent years. At the same time, some issues related to the ecological safety of pulse trawling remain obscure. Hence, further laboratory and field studies are needed on the effect of repeated stimulation; delayed mortality; long-term effects of the pulse trawling on the electrofished populations; influence on the reproductive success of fishes, their reproductive system and early development; direct and indirect escape mortality; effects on a variety of non-target species. Field studies should be accompanied by X-ray photography of the captured fish (to reveal possible vertebral damages) and their dissection (to count haemorrhage rates in muscles). A particular concern is possible effects of strong electric fields generated by the gear upon the high-sensitive electrosensory systems of elasmobranch fishes (sharks and rays) that help them in orientation and food seeking.

For the near future, SGELECTRA plans a series of urgent studies. Of special importance is the idea to search for a new startle pulse equally suitable for shrimp and flatfish electrofishing. No less promising is the attempt to find low frequency pulses that force sole to jump out of the sediments. Both hypotheses are planned to be tested in Maarten Soetaert’s PhD-Thesis. We also hail the development of lighter trawls with the net raised off the bottom, the future gears with no bobbins or tickler chains disturbing the seabed.

Currently, the available data still seems insufficient to recommend the large-scale commercial use of the pulse trawl in fisheries. However, considering the reduced discards and landings of the electrified trawl in its present configuration, ICES may view the question of a partial increase in the proportion of beam trawlers allowed to use the pulse gear in the southern North Sea (as long as its electric parameters and operation mode remain the same). Another solution may be full-scale electric fishing allowed for several years within some limited areas in order to follow the electrofishing-induced changes in marine biota as compared to similar areas fished by conventional gear.

As a whole, the work of the SGELECTRA participants for the last years deserves appreciation. Most concerns expressed by ICES were adequately addressed in the course of well-designed and thoroughly conducted experiments and field trials. Some insufficiently explored issues are planned for the near future. These plans should be approved, amplifying them with studies of the fate of fish escaping the gear.

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Review 2:

Potential Ecosystem Impacts of Pulse Trawls - Review of SGELECTRA (2012)

Introduction

SGELECTRA (ICES, 2012) provides a synthesis of recent work undertaken in the area of electrical fishing. Research has focussed on the use of electrical stimulation systems for beam trawl fisheries for plaice and sole and for beam trawl fisheries targeting brown shrimp (*Crangon crangon*) and a fishery for razor clams (*Ensis* spp.). With respect to beam trawl fisheries SGELECTRA (ICES, 2012) reports mainly on the results of catch comparison trials, brief overview of the findings from tank experiments aimed at assessing the impact of various pulse setting on cod (a review of each is given below and based on the report commissioned by the EC in Spring 2012 which was written by this author). SGELECTRA (ICES, 2012) also reports on proposed areas of future research. These will undoubtedly provide further and important understanding of the impact of electrical pulse simulation in particular the determination of critical pulse characteristics (power, shape, frequency etc) to determine maximum acceptable thresholds, which is currently lacking.

Much of the following text is taken from an EU commissioned study which was prepared by the author of this review. It is noted that SGELECTRA (ICES, 2012) reviewed this study and raised a number of important points for further consideration. The specific points have been considered in the text below.

1 Impact on commercial species

Detailed analysis of catch comparison results from van Marlen (2011 & SGELECTRA 2012)

Catch comparison work undertaken by van Marlen (2011) reported in SGELECTRA (ICES, 2012) tested two pulse system (TX68 and TX36) on two separate commercial vessels. The two systems differed not only in terms of the pulse characteristics (see Table 1.1.1) but also in trawl design. The TX36 system was attached to a new concept for beam trawls, the SumWing, a hydrodynamic design which generates lift during towing to minimise sea bed impact (thus drag) which is also being tested as a replacement to the conventional beam and shoe arrangement. The TX68 system is more akin to the tradition beam trawl, where the pulse system only replaces the conventional tickler array. The catches from the two systems were contrasted with those from a conventional beam trawler (GO4). From the spatial and temporal data presented the experiments were not conducted using the parallel haul technique (Anon., 1996), but fished independently of the other vessels in approximately the same area and time. This approach is sufficient to provide a broad overview of the likely gross effects at a trip or fleet level, but insufficient to provide adequate length dependent differences between the three systems. It is acknowledged that given the different towing speed used by the systems the application of the parallel haul technique would be difficult to apply in practice.

Table 1.1.1 Comparison of the two pulse systems (van Marlen *et al.*, 2011).

	TX68	TX36
Power (kW)	5.5	7
Voltage	50	45
Frequency (Hz)	40	45
Duration (µs)	220	380
Nr electrodes	25	28

Catch and landings rates based on a variety of sources are presented by van Marlen *et al.* (2011). LPUE derived from auction data (Table 1.1.2), CPUE data of landings and discard data raised to trip levels (Table 1.1.3) and CPUE estimates derived from sampled hauls only (Table 1.1.4).

Table 1.1.2 Summary of LPUE by species based on auction data.

ship	GO4	TX36	TX68	TX36/GO4	TX68/GO4	TX36/TX68
species	kg/h	kg/h	kg/h	%	%	%
PLE	34.9	24.7	25.2	70.8%	72.1%	98.2%
SOL	17.6	14.8	15.4	84.4%	87.4%	96.6%
DAB	3.4	2.5	4.6	73.9%	135.4%	54.6%
TUR	3.6	3.1	2.8	85.3%	78.4%	108.9%
BLL	2.0	2.1	2.0	103.7%	99.8%	103.9%
COD	1.8	0.8	0.3	42.3%	19.2%	220.8%
WHG	2.7	0.1	1.3	3.2%	47.0%	6.9%
NEP	0.0	0.0	0.0	n/a	n/a	n/a
VAR	24.1	10.4	11.0	43.2%	45.6%	94.6%
Landings (sum)	90.1	58.4	62.5	64.9%	69.4%	93.4%

It is clear from this and the differences in LPUE (Table 1.1.2) and CPUE (Table 1.1.3) that both pulse systems retained considerably less target and non-target species. Landings (Table 1.1.2) and catch (Table 1.1.3) of commercial species (plaice and sole) show marked declines. For the landings of plaice and sole, landings for the TX36 system, landings were 70.8% and 84.4% respectively of that of the vessel equipped with the conventional beam trawl. For the TX68 system, plaice and sole catches were 72.1% and 87.4% respectively of the conventional vessel.

Table 1.1.3 Landings and discards of target species raised to total trip duration. From van Marlen *et al.* (2011).

ship	species	total fishing time (min)	measured (kg)	landings (kg)	landings (kg/h)	landings (#/h)	discards (kg/h)	discards (#/h)	perc_n	perc_w
GO4	Cod	4410				0.4				
GO4	Dab	4410					56.6	1052.0		
GO4	Plaice	4410	287.0	2565.0	34.9	101.7	106.8	1443.9	93	75
GO4	Sole	4410	292.5	1291.0	17.6	72.3	2.8	41.2	36	14
GO4	Whiting	4410					9.9	111.8		
TX36	Cod	4775					0.0	0.1		
TX36	Dab	4775					16.3	290.2		
TX36	Plaice	4775	202.8	1965.0	24.7	71.3	49.6	624.7	90	67
TX36	Sole	4775	188.0	1180.0	14.8	61.4	1.0	10.8	15	6
TX36	Whiting	4775					1.1	14.8		
TX68	Cod	4900					0.2	1.0		
TX68	Dab	4900					24.7	459.9		
TX68	Plaice	4900	112.0	2054.0	25.2	72.3	61.2	833.0	92	71
TX68	Sole	4900	123.0	1254.0	15.4	56.1	1.7	18.7	25	10

For plaice and sole discards, for the TX36 system, these were 46.4% and 35.7% respectively of that of the vessel equipped with the conventional beam trawl. For the TX68 system, plaice and sole catches were 57.3% and 60.7% respectively of the conventional vessel.

Table 1.1.4 Summary of mean CPUE over sampled hauls expressed in numbers and kilogram per hour for both landings and discards for the three vessels using a GLM to test of significance. From van Marlen *et al.* (2011).

Ship				GO4			TX36			TX68		TX36/GO4	TX68/GO4	TX36/TX68	GLM_output		
Variable	species	cat	n	Mean	Stdev	n	Mean	Stdev	n	Mean	Stdev	%	%	%	Diff TX36 vs. GO4	Diff TX68 vs. GO4	Diff TX36 vs. TX68
n_hl_hr	PLE	lan	33	129.7	85.6	27	59.3	44.3	20	65.0	60.0	45.7%	50.1%	91.1%	s	s	ns
w_hl_hr			33	35.9	22.6	27	15.7	13.0	20	16.3	15.3	43.7%	45.4%	96.3%	s	s	ns
n_hl_hr	PLE	dis	33	1502.2	707.2	33	615.7	311.7	33	827.6	340.6	41.0%	55.1%	74.4%	s	s	ns
w_hl_hr			33	111.1	57.4	33	48.9	25.9	33	60.9	25.9	44.0%	54.8%	80.4%	s	s	ns
n_hl_hr	SOL	lan	33	74.1	27.4	18	52.4	15.7	18	41.4	20.4	70.7%	55.9%	126.5%	ns	s	ns
w_hl_hr			33	18.9	6.6	18	15.0	3.7	18	10.9	5.7	79.4%	57.8%	137.2%	ns	s	ns
n_hl_hr	SOL	dis	31	45.6	46.4	27	13.2	10.8	22	28.2	17.1	29.0%	61.9%	46.8%	s	ns	s
w_hl_hr			31	3.1	3.6	27	1.2	0.9	22	2.6	1.5	39.8%	84.5%	47.1%	s	ns	s
n_hl_hr	DAB	lan	23	66.8	40.7	29	32.4	17.9	25	21.9	14.3	48.5%	32.8%	147.8%	s	s	ns
w_hl_hr			23	9.7	5.8	29	4.7	2.8	25	3.1	2.1	49.2%	32.2%	152.6%	s	s	ns
n_hl_hr	DAB	dis	33	1094.6	556.4	33	287.7	152.2	33	450.7	227.6	26.3%	41.2%	63.8%	s	s	s
w_hl_hr			33	58.9	33.4	33	16.2	8.1	33	24.1	13.2	27.5%	40.9%	67.1%	s	s	s
n_hl_hr	BLL	dis	1	24.0	.	6	10.6	6.5	2	9.7	0.5	44.4%	40.5%	109.6%	ns	ns	ns
w_hl_hr			1	4.8	.	6	1.3	0.8	2	1.0	0.2	27.9%	20.5%	136.2%	ns	ns	ns
n_hl_hr	TUR	dis	1	32.0	.	5	7.7	3.0	2	12.0	0.9	24.2%	37.6%	64.3%	s	ns	ns
w_hl_hr			1	5.8	.	5	1.5	0.7	2	1.7	0.3	26.0%	30.1%	86.5%	s	ns	ns
n_hl_hr	WHG	lan	14	51.1	22.6	8	12.9	10.7	7	22.7	16.5	25.2%	44.4%	56.7%	s	s	ns
w_hl_hr			14	8.7	4.2	8	2.0	1.6	7	3.6	2.5	23.2%	41.4%	56.0%	s	s	ns
n_hl_hr	WHG	dis	24	159.9	82.3	15	33.3	27.1	28	93.0	105.9	20.8%	58.1%	35.8%	s	s	s
w_hl_hr			24	14.1	7.8	15	2.5	2.0	28	6.7	7.8	18.0%	47.6%	37.9%	s	s	ns
n_hl_hr	COD	lan	5	4.7	6.6	13	1.0	0.5	10	0.8	0.3	21.7%	17.6%	123.5%	ns	ns	ns
w_hl_hr			5	12.6	13.3	13	2.8	1.9	10	1.8	0.8	21.9%	14.4%	152.1%	s	s	ns
n_hl_hr	COD	dis	0	n/a	n/a	4	0.6	0.0	2	17.5	15.4			3.7%	ns	ns	ns
w_hl_hr			0	n/a	n/a	4	0.1	0.1	2	2.7	2.9			4.6%	ns	ns	ns

However, there appears to be some disagreement between the LPUE estimates derived from landings and raised trip CPUE data and with the modelled CPUE estimates derived from sampled data. It is unclear why or indeed how these differences occur, particularly contrasting the raised and sampled only estimates, but the authors note that sampling levels did not produce reliable results in all cases, particularly for more rarely caught species such as turbot and brill. Therefore care should be taken not to over interpret the results shown in Tables 1.1.2 and 1.1.4. For example, using the LPUE estimate from the auction data (Table 1.1.2), plaice landings associated with the pulse system are ~70% that of the conventional vessel, whereas the modelled estimates (Table 1.1.4) indicate that plaice LPUE of the pulse trawl is 45% that of the conventional vessel. It is not possible to reconcile these differences.

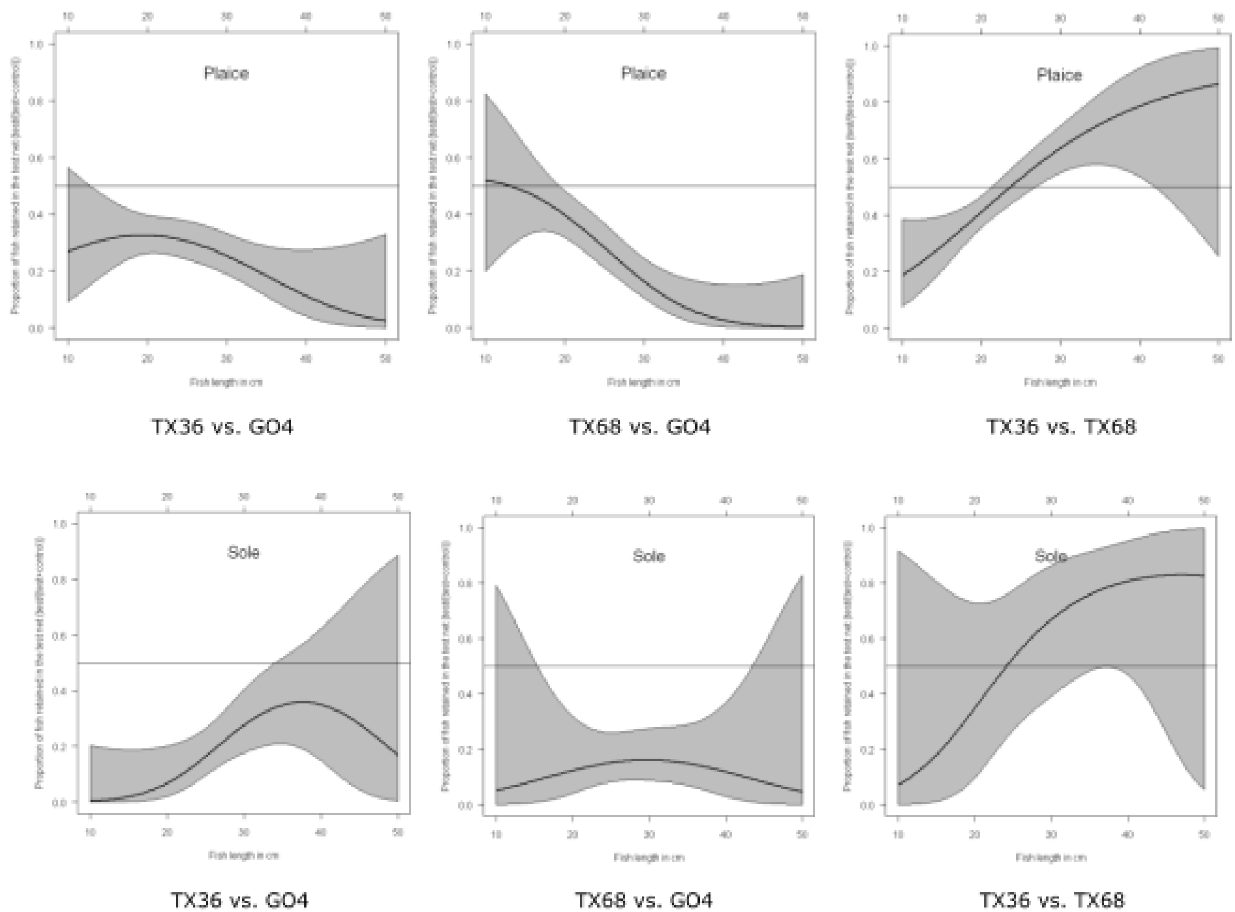

Figure 1.1 Comparison of catches at length of plaice and sole comparing the proportion of fish retained in the test net (test/test+control) from the TX36 (test) and GO4 (control); TX68 (test) and GO4 (control) and a comparison between the two pulse systems TX36 (test) and TX68 (control). From van Marlen *et al.* (2011).

Van Marlen *et al.* (2011) also presents a comparison of catches at length for both plaice and sole. The authors note that the analysis presented in Figure 1.1 should be interpreted more in terms of giving a trend than providing absolute comparative data due to low sampling levels, highlighted by the wide confidence intervals. Due to the uncertainties in the length estimates (and lack of numerical data) and the somewhat variable results presented in Tables 1.1.2–1.1.4, it is not possible to provide a forecast as to the likely impact that the wider introduction that such systems would have on stock development. Secondly, the systems presented offer an alternative stimulus method for beam trawls fitted with tickler chains, normally deployed on finer substrate and are not proposed as an alternative to the chain mat matrix used in rougher substrate. It is unclear what degree of uptake could be expected or how much transfer would occur between chain mat beam trawls to tickler chains.

SGELECTRA (ICES, 2012) also reports on a research programme which has quantified the likely stock impacts of five commercial species (cod, haddock, whiting, plaice and sole). The results are broadly in agreement with the earlier studies presented above and indicate reductions in both landings and discards of all five species under the catchability assumptions made.

Given the levels of reductions in both landings and discards, it can be concluded that the impacts would be positive in reducing the fishing mortality associated with the tickler beam trawl fleet, provided the introduction of the system does not introduce higher levels of avoidance (unaccounted) mortality.

Impact on Cod

There is clear evidence from various field, aquarium and post-mortem studies that the electrical fields generated by the pulse trawls can cause vertebral injuries in large cod. This effect is demonstrated in the recent study (de Hann *et al.,* 2011). The pulse characteristics from three commercial pulse systems were evaluated. Pulse frequency, power, shape and width were adjusted as well as orientation relative to the electrode (0^{o} and 90^{o} degrees). Vertebral injuries were observed in 50–70% of the cod. The work demonstrates that even with constant power levels, other variables of the pulse (shape, frequency etc) can significantly affect the impact on organisms and it therefore difficult to disentangle and identify the key parameters and their thresholds. A multi-variate analysis of the results from de Hann *et al.* (2011) could potentially help identify the critical elements and their interactions.

However, vertebral injury may only be a concern if it results in significant unaccounted mortality i.e. cod (or other organisms) contacting the gear die and are not retained (avoidance mortality). If all of the large cod affected by the pulse are caught in beam trawls they would be destined to die anyway (i.e. from suffocation and barotrauma on deck) and would form a legitimate component of the catch for subsequent landing (assuming quota etc. is available). There may be a market quality issue as cod with vertebral injuries may exhibit internal bleeding which can discolour the flesh and potentially affect its market value.

The catch comparison study reported on by van Marlen *et al.* (2011) reports cod catches (above MLS) in the pulse trawls of around 20–40% of those obtained with the traditional tickler chain beam trawl. However, some uncertainty on cod still remains. The swept area of the pulse trawls amounts to around 80% of a comparable traditional tickler chain beam trawl and can be explained by the slower towing speed of the pulse trawls and reduced swept area. As such, it would not be unreasonable to expect that cod (>MLS) catches in the pulse trawl to be around 80% of the amount caught in the traditional beam trawl. However, cod catches (>MLS) were recorded to be 20–40% of the amount caught in the traditional tickler chain beam trawl. This suggests that cod catchability of the pulse trawl is lower than the conventional gear and a higher proportion of the cod encountering the pulse trawl may be evading capture. It is unclear whether some of these fish are fatally exposed in the process (avoidance mortality) and if so what proportion are killed in this way. It should also be noted that low levels of cod catches were encountered in the catch comparison trials. The statistical comparison of cod catches is not wholly persuasive that the differences observed are significant. It is recognised that field experiments are always problematic when a species of interest are caught at low levels, however further comparative data on cod catches would help to provide more clarity on this particular concern raised by ICES in 2009.

Impact on non-target fish and benthic species

Beam trawling is associated with high by-catch rates of both non-target fish and benthic species. The work presented by van Marlen *et al.* (2011) demonstrates overall reductions in catches of non-target species similar to the levels shown for plaice and sole (Table 1.3.1).

Table 1.3.1 CPUE estimates in numbers per hour raised to total trip duration for non-target fish species for the three vessel with the percentage ratio of catch rates for the pulse gear relative to the conventional beam trawl. From van Marlen *et al.* (2011).

Species	Name (EN)	#/h GO4	#/h TX36	#/h TX68	TX36/GO4	TX68/GO4
Pomatoschistus sp.		1.9	2.56	1.08	137.1%	57.9%
Callionymus lyra	Dragonet	25.2	9.77	50.16	38.8%	199.0%
Hyperoplus lanceolatus	Greater sand-eel	11.1	5.95	3.65	53.5%	32.8%
Clupea harengus	Herring	0.0	0.22	0.00		
Agonus cataphractus	Hooknose	3.3	5.22	4.50	158.2%	136.4%
Trachurus trachurus	Horse mackerel	19.9	1.60	2.53	8.0%	12.7%
Echiichthys vipera	Lesser weever	17.8	3.93	21.02	22.1%	118.2%
Cyclopterus lumpus	Lumpsucker	0.3	0.00	0.26	0.0%	78.9%
Callionymus reticulatus	Reticulated dragonet	0.0	6.47	0.00		
Arnoglossus laterna	Scaldfish	35.1	27.99	20.54	79.6%	58.4%
Taurulus bubalis	Sea scorpion	1.8	0.00	0.00	0.0%	0.0%
Buglossidium luteum	Solenette	55.5	49.00	39.52	88.2%	71.2%
Sprattus sprattus	Sprat	1.6	0.00	0.00	0.0%	0.0%
Trisopterus luscus	bib	0.0	0.00	0.37		
		173.50	**112.69**	**143.63**	**65.0%**	**82.8%**

Table 1.3.2 CPUE estimates in numbers per hour raised to total trip duration for non-target benthic species for the three vessel with the percentage ratio of catch rates for the pulse gear relative to the conventional beam trawl. From van Marlen *et al.* (2011).

Species	Name (EN)	#/h GO4	#/h TX36	#/h TX68	TX36/GO4	TX68/GO4
Ammodytes sp.		15.0	9.61	5.28	64.1%	35.2%
Anthozoa		3.1	0.87	0.37	27.7%	11.8%
Asterias rubens	common star fish	1321.4	683.67	837.32	51.7%	63.4%
Buccinum undatum		3.0	0.00	0.00	0.0%	0.0%
Cancer pagurus		2.3	0.73	0.76	31.6%	33.3%
Corystes cassivelaunus		37.9	58.37	18.38	153.8%	48.4%
Echinidae		5.9	0.00	0.00	0.0%	0.0%
Echinocardium cordatum	sea potato	4.7	89.71	287.26	1893.5%	6063.0%
Ensis sp.		4.5	1.49	0.45	32.7%	9.8%
Hyas coarctatus		0.9	0.29	0.00	33.9%	0.0%
Laevicardium crassum		0.0	0.29	0.00		
Liocarcinus depurator		21.9	10.06	12.91	46.0%	59.1%
Liocarcinus holsatus	swimming crab	1483.7	952.24	1115.83	64.2%	75.2%
Liocarcinus marmoreus		0.0	11.98	11.80		
Loligo sp.		1.9	7.14	0.22	375.3%	11.7%
Loligo subulata		0.0	0.00	0.63		
Necora puber		2.0	0.00	2.98	0.0%	147.4%
Ophiura ophiura	brittle star	1802.3	1538.56	164.99	85.4%	9.2%
Pagurus bernhardus	hermit crab	208.4	369.46	54.96	177.3%	26.4%
Psammechinus miliaris		0.0	5.37	5.62		
Spatangus purpureus		5.6	0.00	0.00	0.0%	0.0%
Spisula sp.		1.5	0.00	0.00	0.0%	0.0%
Myoxocephalus scorpius	Bull-rout	31.4	14.74	28.09	47.0%	89.5%
Mytilus edulis	Common mussel	0.7	0.00	1.49	0.0%	225.4%
Crangon crangon	Common shrimp	14.2	29.15	7.07	205.6%	49.9%
		4972.35	**3783.72**	**2556.41**	**76.1%**	**51.4%**

Lindeboom and de Groot (1998) estimate that for a 12 m beam trawl, fitted with tickler chains, the catch efficiency for invertebrates is less than 10% and for almost half the species encountered much less than 5%. Despite this, the catch of invertebrates can be several times larger than the catch of target species.

It is unclear what the level of avoidance mortality is associated with the conventional tickler bream trawls but it would be fair to assume that the removal of the tickler chains and replacement with a pulse system will have significant and positive effect, firstly in terms of reducing the catch of non-target benthos and also in terms of the likely reduction in avoidance mortality.

Issues surrounding control

The current EU Legislation on Pulse trawls stipulates the following criteria:

3.2. The following measures shall apply in 2009:

a) no more than 5 % of the beam trawler fleet by Member State shall be allowed to use the electric pulse trawl;
b) the maximum electrical power in kW for each beam trawl shall be no more than the length in meter of the beam multiplied by 1,25;
c) the effective voltage between the electrodes shall be no more than 15 V;
d) the vessel shall be equipped with an automatic computer management system which records the maximum power used per beam and the effective voltage between electrodes for at least the last 100 tows. It shall be not possible for non authorised person to modify this automatic computer management system;
e) it shall be prohibited to use one or more tickler chains in front of the footrope.

There are a number of pulse characteristics other than power (article 3.2(b) annex III, EC regulation 42/2009) and voltage (article 3.2(c) annex III, EC regulation 42/2009) that can contribute to the potential negative impacts on organisms, particularly fish. Pulse shape, duration and frequency also contribute to the potential impact e.g. Sharber and Carothers (1988) note that one quarter sine waves resulted in a more significant increase in the incidence of vertebral damage (67% damage rate) compared to 44% for other wave forms. De Hann *et al.* (2011) notes the degree of vertebral damage decreased with increasing pulse frequency. Data presented by de Hann *et al.* (2011) indicates that there is also some degree of inter-dependency between pulse characteristics.

The ICES study group SGELECTRA (ICES, 2011) has acknowledged the need for more clear workable and enforceable limits to be identified, other than the existing two parameters described in the existing EU legislation (3.2 annex III, EC regulation 42/2009) i.e. power per unit of length and maximum voltage. SGELECTRA (ICES, 2011) note that these two will not be sufficient to ensure that fishing efficiency or negative impact with pulse trawls will not increase in future through technical adaptations of the systems. In recognition of the need to identify the impact and relationships between pulse characteristics, further work is scheduled to be reported by SGELECTRA in June 2012. The Dutch National Working Group on Control and Enforcement is also due to produce its recommendations on parameters which can be used for control and enforcement by around June 2012.

It is evident that in its current form, the existing EU derogation allows a range of pulse equipment to be developed for testing under normal fishing conditions. However, the absence of control on other pulse characteristics means that it is possible to deploy electric fishing techniques with negative ecological consequences within the specification in the current derogation. Yu *et al.* (2007) notes that the ability of operators to increase the power output and improper setting of pulse characteristics resulted in injury to both shrimp and other marine life in the eastern China Sea. The authors further note that the desire to increase catching efficiency of the pulse system effectively led to a system that developed into a killing apparatus rather than the intended stimulus device.

It is necessary to expand the current understanding of electric trawling in general with the aim to determine further and appropriate threshold levels. However, it may be necessary to maintain broad regulatory limits so as to allow engineers to develop and optimise their pulse trawl designs. Due to the potential benefits of reduced fuel consumption, swept area and reduced catch rates while maintaining profit levels, there is a need to facilitate technical advancement in the field of pulse trawl technology while avoiding unnecessarily complex and potentially stifling technical legislation, while simultaneously servicing conservation, environmental and fisheries management requirements. This need becomes more acute as industry demands for such technology exceeds the current EU 5% limitations (as has become the case now). Future developments should continue to undertake extensive ecological impact assessments. As requests to expand the user base of the pulse trawl technology beyond the current 5% derogation limit are considered, new legislation will need to be drafted.

Even with a broader understanding of all pulse characteristics, it will be difficult to define effective and detailed technical legislation needed to ensure safe and responsible environmental practice. Such prescriptive legislation will need to encapsulate all the critical technical parameters, thresholds, pulse fields parameters and equipment specifications for a range of pulse trawls. Such legislation will be technically very complex and will require a matrix of pulse characteristics benchmarked against a range of specified ecological indicators. Defining appropriate thresholds will require extensive field and laboratory testing to explore and quantify the impacts of the critical pulse characteristics and selection threshold boundaries.

The Netherlands and Belgium have paralleled technical developments with aquarium and field studies to assess the potential impacts of the pulse systems under development. Regulating a system based on agreed impact thresholds (results based) rather than prescribing highly technical specifications may offer a more tractable approach. Different manufacturers of pulse trawls targeting flatfish are already developing systems with differing pulse fields, and varying effects in the field. We note also that Belgian researchers are at an advanced stage in the development of a low frequency and low energy pulse trawl for use in the brown shrimp (*Crangon crangon*) fisheries. More systems with a variety of pulse field characteristics could develop in the future as knowledge improves making prescriptive legislation more complex.

SGELECTRA (ICES, 2012) further explores the issue of control and enforcement and a Draft procedure for control and enforcement is provided in annex 6 of the report. Clearly, there has been substantial work undertaken by the control authorities with input from scientists and manufacturers. The basis of the control is only to permit the use of pre-certified systems that meet a range of technical specifications and criteria.

Conclusions

Understanding of the various systems available has increased significantly over the past few years with much focus on quantifying the impact on non-target species, both fish and invertebrates and assessing the impact on catch rates of commercial species, including extensive studies where such systems have been used under commercial conditions for extended periods. It appears that despite the reductions in marketable catch of plaice and sole, the use of these systems are still economically attractive due to reductions in fuel costs due to slower towing speeds and reduced drag. SGELECTRA (ICES, 2012) recognises that there are still a number of unknowns relating to these systems and that a better understanding of how the various pulse characteristics interact and impact on fish is required. PhD studies currently ongoing in Belgium aim to address a number of these issues. SGELECTRA (ICES, 2012) note that there are four basic responses: startle (fright) reaction, followed by cramp, forced swimming and electro-taxis and that understanding of what pulse characteristics and thresholds correspond to these responses is required. Work underway in Belgium is aiming to develop low energy systems that stimulate startle reactions that are sufficient to result in the capture of sole. There are still a number of outstanding issues relating to the use of electrical stimulation systems. It is unclear whether the current legislative framework is sufficient to avoid the deployment of systems that are potentially harmful. While the current systems under development do not appear to have major negative impacts, the current regulatory framework is insufficient to prevent the introduction of potentially damaging systems despite adhering to current regulatory limits. Given the complexity and interactions between pulse characteristics, using a prescriptive legislative approach will result in highly complex and technical regulations. The introduction of electric pulse systems could significantly reduce fishing mortality of target and non-target species including benthic organisms assuming that there is no corresponding increase in unaccounted (avoidance) mortality. The impact on animals that come into contact with the gear but are not retained (this can be either active or passive) is not fully understood, commercial field trials show lower CPUE than conventional beam trawls, this can be due to the lower towing speed (lower swept area) and/or the catchability of the gear is lower e.g. animals contact the gear but are not retained. While the numbers of cod caught in the commercial field trials are low, the CPUE is lower than would have been expected just from the reduction in swept area suggesting that there is an increase in overall avoidance, whether these fish are injured (as demonstrated in tank experiments) or not is unknown. It can be concluded that further work on this aspect is needed and that this would be aided considerably by a better understanding of specific effects of the pulse characteristics and their inter-relationship. Notwithstanding the above, it is also recognised that conventional beam trawling has significant and well demonstrated negative ecosystem impacts, and if properly understood and adequately controlled, electric pulse stimulation may offer a more ecologically benign alternative.

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Annex 26

ICES REPORT WGELECTRA 2018

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of pulse effort into areas with historical fishing effort from other fisheries, it is likely that there will be competition issues in these regions.

6.11 Discussion

The transition from traditional beam trawls to pulse trawls in the sole fishery has considerably improved the selectivity of the fishery. The landings efficiency for sole has increased by about 30%; assuming the effect on landed and discarded components of the catch has been the same, and the catch sorting process has remained constant, then this can be described as a 30% increase in catch efficiency. The landings efficiency for plaice has decreased by about 40%, this can be viewed as a 40% reduction in plaice catch efficiency assuming the discard rate and catch sorting has been constant. The change in species selectivity is likely due to the difference in the cramp response between fish species. The pulse stimulus causes a cramp response that immobilises the fish, but only sole will bend in a U-shape which not only immobilises the fish but makes it also more accessible to the gear. The lower catch efficiency of the pulse trawl for plaice and other fish species is partly due to the lower towing speed (-22%), although it is also lower per unit swept area, suggesting that some of the immobilised fish will pass underneath the ground rope and will not be caught.

The higher catch efficiency of the pulse trawl for sole implies that the sole quota can be caught in less fishing time than with the tradition beam trawl. Indeed the proportion of fishing effort with the pulse trawl fleet decreased by 9% between 2009 and 2017, while the fleet's share of the Dutch quota increased by 27%.

The higher catch efficiency for sole does not necessarily imply an increased risk of overexploitation because the sole fishery will be constrained by the sole quota. As the landing efficiency for other species is lower, one would expect that fishers will deploy the more efficient traditional beam trawl or twin trawl to target other species such as plaice, *Nephrops* or shrimps. Indeed, pulse licence holders did not all deploy the pulse trawl throughout the year but temporarily switched to other gear, such as large meshed traditional beam trawl or otter (twin) trawl, to target plaice, shrimp trawls to target shrimp, or otter (twin) trawl to target *Nephrops*.

The available evidence on the size selectivity of the pulse trawl is inconclusive. The available comparative fishing experiments do not support the conclusion of van Marlen *et al*. (2014) that pulse trawls are less efficient in catching undersized sole and plaice. Nevertheless, we expect that the pulse trawl will catch less discards per unit of sole than the traditional beam trawl because of the difference in species selectivity. This inference is supported by the results of the discard monitoring. The discard monitoring results, however, cannot be considered to provide definitive proof as the difference in the discard catch rate between commercial trips will not only be affected by differences in selectivity but also by differences in the abundance and species composition on the fishing grounds.

The analysis of the distribution patterns of the traditional beam trawl and the pulse trawl revealed that pulse trawl fishing has increased locally, such as in areas off the Thames estuary and along the Belgium coast. The change in spatial distribution is related to the lighter weight of the pulse trawl which can be used on softer grounds than the traditional beam trawl. The change in distribution, and the subsequent increase in fishing intensity in areas where beam trawling was rare, may have resulted in an increased competition with other fishers. This increased competition is supported by the analysis of the catch rate in the Belgium beam trawl fleet fishing in the western part of the southern North Sea.

Ecological impact of pulse trawling

The electric current released by the pulse can affect all the fauna that come into contact with it; but these effects differ according to conditions and species.
The way in which fish, sharks, and benthos respond to pulse trawling varies from one species to another.
The following effects have been studied in laboratories and/or at sea:

Seabed disturbance – the pulse trawl is lighter than the traditional beam trawl, so it does not penetrate as deeply into the seabed. In addition, as the fishing speed of pulse trawlers is slower, the trawled distance per hour is shorter and the overall fished surface is smaller.

Benthos – laboratory testing revealed that pulse trawling has only minor effects on the mortality of different benthic species. This may well explain why the direct morality rates for remaining benthos are lower after pulse trawling than after traditional beam trawling. Laboratory tests did, however, show that sandworms, crabs, and clams have reduced chances of survival after contact with an electric field similar to the one used in pulse trawling.

Cod with vertebral fractures – cod with vertebral fractures are not uncommon in pulse trawling. Laboratory tests also showed that the risk of vertebral fractures in adult cod is greater in pulse trawling.

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Pictures: Wouter Jan Strietman, Kees Taal, Floor Quirijns and ILVO.

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Sharks and rays – very few effects have been ascertained so far for sharks and rays. A laboratory study indicated that cat sharks suffered no injuries from pulse trawling.
Possible effects on the electric sense of sharks and rays are currently being explored.

Survival chances of plaice and sole discards – tests at sea have shown that pulse trawlers inflict less injury on the caught fish than traditional beam trawlers. The superior quality of the fish caught by pulse trawling might enhance the survival chances of plaice and sole. This theory is, however, still to be researched.

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Pulse trawl

WAGENINGEN UR
For quality of life

Kenniskringen Visserij

Background

Since 2009, more and more Dutch fishers have been switching from traditional beam trawling to pulse trawling. Beam trawling works by dragging tickler chains across the seabed to startle the fish and make them leap into the net. The most commonly used pulse trawling techniques are *pulskor* (pulse trawl) and *pulswing* (pulse wing). Both are based on a system which emits short electric pulses on a part of the seabed. This makes the muscles of the fish contract, whereupon the fish detach from the seabed and land in the net. The energy requirements for pulse trawling are lower than for traditional beam trawling, because the equipment is lighter, the speed is slower, and resistance is weaker since there is less contact with the seabed. Less fuel is needed to operate the equipment, making the entire process more economical.

Pulse trawling, a relatively new technology, is raising many questions about sustainability and economic feasibility, and has led to a large body of research in recent decades. This factsheet summarises the latest information on catches, discards, ecosystem effects, and economic viability in relation to the use of pulse trawling in flatfish fishing.

Policy and dispensations

So far (as at 2014), the use of electricity for fishing has been banned in the EU (EU Regulation 850/98). Since 2007, however, 5% of the beam trawl fleet of all Member States has had temporary dispensation in the southern North Sea. Accordingly, a few Dutch fishers have been using pulse technology since 2009. A part of the Dutch flatfish fleet currently have a dispensation; 42 vessels in 2013. The Dutch flatfish sector was granted dispensation for another 42 vessels in 2014. Sector representatives do not expect all these dispensations granted in 2014 to be used, given that the heavy investments involved in making the necessary adaptations to the vessels must first be shown to be financially feasible. Moreover, adequate sole quotas are needed, as larger quantities of sole are caught in pulse trawling. The sole quotas for the Netherlands are too low at present to allow all flatfish vessels to fish sole with pulse technology.

Pulse trawling compared with beam trawling

In 2012, fishing with pulse technique delivered better net results than fishing with the traditional beam trawl technique (Table 1): a net profit of 11 euros was realised for every 100 euros earned from pulse trawling, whereas a net loss of 7 euros was sustained for every 100 euros earned from beam trawling. The difference is explained by the fact that the total costs are lower for pulse trawling: though the costs of investment (depreciations) and equipment, and, above all, the catch-based pay for the crew were higher, the fuel costs were much lower, making for a better overall result.

Table 1. Index figures for beam and pulse trawling in terms of revenues, costs, and net result for 2012. Fishing with beam trawl technique makes a loss of 7 euros on every 100 euros earned, whereas fishing with pulse trawl technique makes a profit of 11 euros.

	Beam	Pulse
Revenues	100	100
Costs	107	89
Net result	-7	11

Source: Taal *et al.*, 2013

Beam trawl.

Pulse trawl.

In 2012, fuel consumption was, on average, 45% lower in pulse trawling than in beam trawling. This is probably because in pulse trawling, the fishing speed is usually one nautical mile per hour slower, and the equipment is lighter, causing less disturbance on the seabed.

In 2012, the net profit from pulse trawling was, on average, 578 euros per day-at-sea greater than from traditional beam trawling. Lower levels of fuel consumption resulting in lower fuel costs per day, plus the relatively higher yield in sole are largely responsible for this result.

Unwanted by-catch is lower for pulse trawling than for beam trawling (Table 2). Fewer undersized plaice are caught per hour and numbers of discarded benthos are lower.

Composition of the catch for pulse trawling

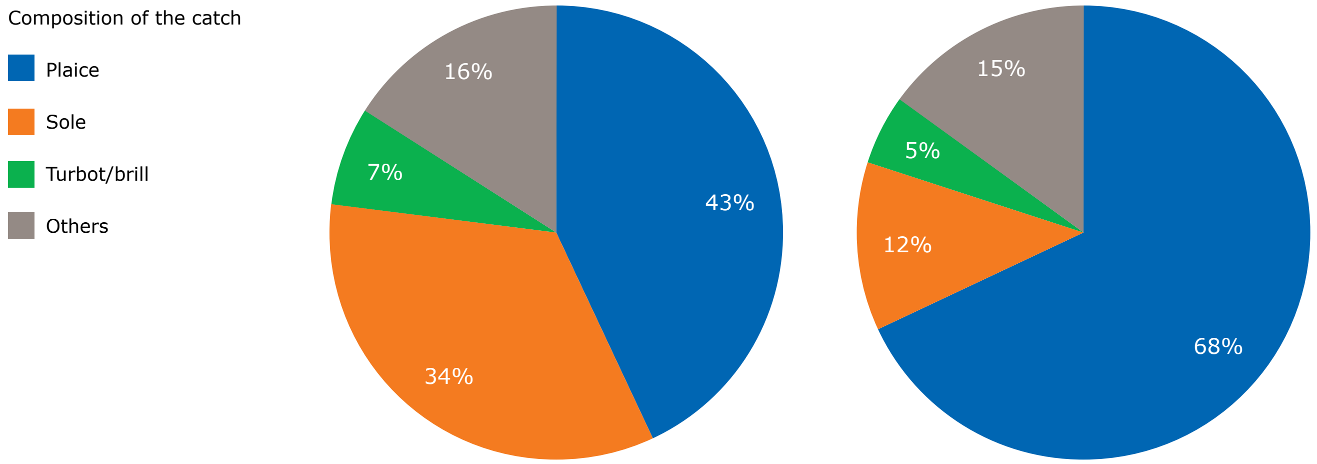
Fewer fish are caught with pulse trawling than with beam trawling (Table 2). The composition of the catch varies widely. The greatest difference is in the proportion of sole to plaice: in pulse trawling, sole accounts for 34% of the landings compared with 12% in beam trawling. Pulse technology therefore seems to be particularly suited to catching sole.

In 2012, 25 pulse trawlers, guided by IMARES, took samples of the composition of their catch for a year. Many differences emerged between vessels, seasons, and areas. According to the average scenario, 31% of the catch consists of landings, 10% of undersized plaice and sole, 7% of miscellaneous fish discards, 18% of benthos, and 34% of dead and inanimate material.

Table 2. Pulse technology compared with beam technology, 1,500 - 2,000 Hp. Figures are averages for 2012.

	Pulse trawling	Beam trawling with chains
Fishing speed	5.5 nautical miles/hour	6.5 nautical miles/hour
Fuel consumption	4,100 litres/day-at-sea	7,400 litres/day-at-sea
	2.21 litres diesel/kg fish	2.36 litres diesel/kg fish
Landings	1,900 kg fish/day-at-sea	3,100 kg fish/day-at-sea
Returns on fish	2.17 euros/litre diesel	1.23 euros/litre diesel

Composition of the catch

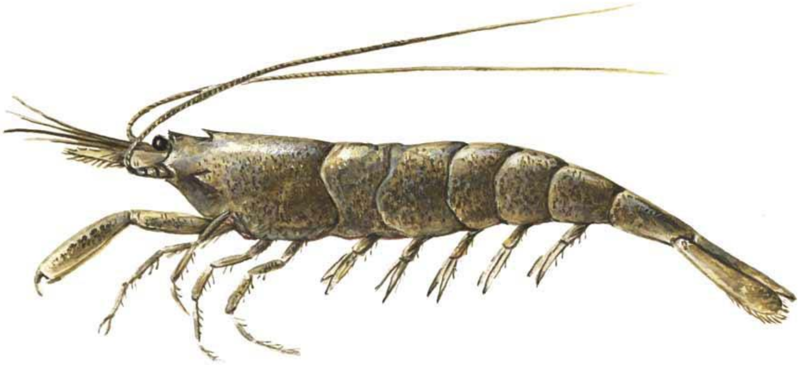


	Pulse trawling	Beam trawling with chains
Discards	Around 50% (63 kg/hour) of the total plaice catch and 12% (5 kg/hour) of the total sole catch is thrown back into the sea. Less benthos is caught and discarded in pulse fishing than in beam fishing with tickler chains. For example, there was a sixfold reduction in starfish and a twofold reduction in crabs.	Around 50% (87 kg/hour) of the total plaice catch and 17% (6 kg/hour) of the total sole catch is discarded. More benthos is caught and thrown back into the sea in beam fishing with tickler chains than in pulse fishing.

Sources:
Quirijns *et al.*, 2013, information on fishing speed (average of 2 ships for pulse trawling, 1 for beam trawling);
Rasenberg *et al.*, 2013, information on discards (average of 19 ships (>300 hp) for pulse trawling, 9 for beam trawling);
Taal *et al.*, 2013, information on fuel consumption, landings, profit, and catch composition (average of 15 ships for pulse trawling and 10 for beam trawling across the whole of 2012).

MSC SUSTAINABLE FISHERIES CERTIFICATION

North Sea Brown Shrimp



Peer Review Draft Report

January 2017

Prepared For: **German Brown Shrimp Steering Group GbR; Danish Fishermen Producers' Organisation; Coöperatieve Visserij Organisatie (CVO)**

Prepared By: Acoura Marine Ltd

Authors: Julian Addison, Gudrun Gaudian, Paul Knapman

Model simulations by Temming et al. suggested that the planned reduction in hours at sea to 72 that is triggered by a fall below the first reference point may not be sufficient to recover cohort egg production to that of a normal year (the aim of such a reduction in effort) and recommended a reduction in hours of 30%. Currently the Dutch fleet is restricted to 108 hours per week because of the weekend closure, so reduction in permitted hours fishing to 72 hours per week would represent a reduction of over 30%. The Temming et al. study also noted that (as with all fisheries) LPUE values from individual vessels may increase over time due to “technological creep” thus masking a stock decline. The most obvious change in efficiency would be due to the introduction of electric pulse fishing which can increase efficiency by 50%, but this gear is currently prohibited in the shrimp fishery. The study recommends maintaining an inventory of the fleet which is regularly updated to identify any changes in fishing gear which could increase efficiency, and therefore LPUE reference points could be revised if necessary. The best solution to avoiding uncertainties due to technological creep would be to use a standardised reference fleet or survey for the monitoring of LPUE.

In summary, the study of Temming et al. identified the main uncertainties within the application of the HCRs, and the system that was finally implemented takes into account those main uncertainties. In addition, a study by Steenbergen et al. (2015) concluded that the HCRs should achieve their objectives but noted that reductions in fishing effort results inevitably in higher densities of shrimp and hence individuals will start to compete for food. In consequence, individuals may grow more slowly, take longer to reach commercial size and remain vulnerable to discarding for a longer time, and Steenbergen et al. warned that large within year reductions in fishing effort may have unexpected effects on the size composition of shrimps including discard rates. Despite the detailed investigations into performance of the HCRs, there were still some concerns raised by stakeholders during the site visit that not all uncertainties had been taken into account during the setting of LPUE reference points and the consequent HCRs.

Firstly, the threshold level for triggering the HCRs was reduced from 75% to 70% of the LPUE reference values. This occurred because the implementation of the new HCRs coincided with the increase in mesh size to 22mm which is expected to lead to a lower catch rate of marketable sized shrimps initially (see analysis by Günther, Hufnagl & Temming, 2016) and hence it was necessary to reduce the threshold level at which the HCR would be triggered. In addition, the Temming et al. (2013) review had advised that the threshold levels should not be set too high such that the HCRs were triggered in years when there was a strong cohort of recruits, and recommended that threshold levels should be set below 75%.

Secondly, there was some concern expressed about the suitability of using 2002 and 2007 as reference years for setting the LPUE reference points. Originally the reference levels were going to be set based on the 1990 LPUE levels as this was the lowest LPUE observed in the time series and the stock had demonstrably recovered from that level within two years. However, there was a lack of reliable and standardized monthly LPUE data for 1990 (Clients, pers. comm.) and so more recent reliable data were used from a relatively poor year (2002) and a relatively good year (2007). As the LPUE in both these years was substantially above that observed earlier in the times series (Figure 8), the reference LPUE levels were considered to be highly precautionary.

Thirdly, during the site visit various stakeholders noted that a single LPUE reference point was used to cover the whole fishery including vessels from the Netherlands, Germany and Denmark, and that it would be more appropriate that variation in national fleets should be taken into account in setting reference points. However analysis by Temming et al. (2013) showed that heterogeneity amongst the individual fleets of the Netherlands, Germany and Denmark is greater than that between the national fleets. An analysis presented by Günther

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ICES Journal of Marine Science

ICES International Council for the Exploration of the Sea
CIEM Conseil International pour l'Exploration de la Mer

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Original Article

Competitive interactions between two fishing fleets in the North Sea

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We examine whether the landing rates of Belgian beam trawlers in the Southern Bight of the North Sea were affected through competitive interactions with the Dutch beam trawler fleet and whether the development of a pulse trawler fleet has altered competitive interactions between both fleets. Effects of competition were investigated through a natural experiment based on the different weekly exploitation patterns of both fleets. Logbook data were used to fit a generalized additive mixed model for the daily landing rates of the target species sole (*Solea solea*) and plaice (*Pleuronectes platessa*). Results showed that landing rates of sole by the Belgian beam trawlers (>221 kW) from 2006 to 2013 were lower during weekdays than during weekends when the Dutch trawler fleet is in harbour, while no such an effect was found for plaice. After the development of a pulse trawler fleet in 2011, the negative weekday effect in the sole landing rates was much more pronounced in 2012 and 2013. This increased loss of efficiency during weekdays, as a result of increased competition with the Dutch trawler fleet, coincided with a reallocation of fishing effort by the Belgian beam trawler fleet.

Keywords: fleet dynamics, interference competition, landings per unit effort, pulse trawling.

Introduction

Commercial fishers constantly innovate to remain economically competitive and to increase the value of their catch, reduce operational costs, aid navigation, and improve safety at sea (Valdemarsen, 2001; Eigaard *et al.*, 2014). Such innovations may occur suddenly, as was observed when beam trawls were introduced in the Dutch flatfish fishery in the early 1960s. In <10 years, the demersal fishery changed from an otter trawl fishery to a beam trawl fishery (Rijnsdorp *et al.*, 2008). The innovations often cause an increase in the catchabilities of fish species and could arguably be one of the main reasons that many of the world's fisheries are suffering from declining resources (Eigaard *et al.*, 2014).

The social and economic dynamics of uptake of new technologies are complex (Eigaard, 2009), and we often observe that the speed of uptake is heterogeneous in fisheries. In the transition period, where some parts of fishing fleets adopt new technologies while others remain unchanged, the competitive dynamics among fleets change. This change can cause knock-on effects in the fishery, such as changes in fishing effort allocation.

In the North Sea, we have observed a sudden change in fishing technology in one of the major demersal fisheries: the Dutch demersal flatfish fishery. As a result of the increased pressure on the beam trawler fishery (Soetaert *et al.*, 2015), the EU in 2009 allowed the use of the pulse trawl gear for part of the beam trawlers active in the North Sea (EU, 2009). The major difference is that heavy tickler chains are substituted by electrodes producing electric stimuli. This results in a weight reduction and decline in fuel usage of ca. 50% compared with beam trawling (van Marlen *et al.*, 2014). Until 2013, the transition to pulse trawling occurred mainly in the Dutch beam trawler fleet.

The development of a pulse trawler fleet is expected to alter fishing tactics in the Dutch trawler fleet (Batsleer *et al.*, 2016), potentially resulting in increased spatial overlap with the beam trawler fleet of neighbouring Belgium. In this paper, we examine the occurrence of competition between both fleets and whether this changed since the development of the Dutch pulse trawler fleet. We also study how the change in competitive interactions has altered fishing behaviour in the Belgium fleet as a knock-on effect of the changes in the Dutch fleet.

Competitive interactions affect the relationship between fish abundance and catch per unit effort (cpue) and thus the allocation of fishing effort (Gillis and Peterman, 1998; Gillis, 2003; Poos and Rijnsdorp, 2007; Girardin *et al.*, 2015). Competition among fishing vessels is a result of (i) direct interactions among fishing vessels (interference competition), e.g. through increased risk of net-loss or inducing a change in fish behaviour and/or (ii) through local depletion of the resource (exploitation competition). Knowledge about the mechanistic processes causing interference competition and about the fine-scale dynamics in fish abundance is required to distinguish interference competition from exploitation competition. However, interference competition results typically in a direct and negative response in catch rates towards an increase in vessel density, while we expect exploitation competition to result in a gradual response in catch rates to changes in vessel density.

Empirical research to quantify the effects of competition on catch rates is difficult because of practical constraints. First, biotic factors affecting the distribution of fish species are difficult to control when carrying out field experiments (Abrahams and Healey, 1993). Second, setting up experiments with fishing vessels is hampered by high financial costs. To our knowledge, only one experiment was conducted in which vessel density was directly manipulated (Abrahams and Healey, 1993). In this study, increased vessel density in the British Columbia salmon troll fleet had negative, positive, and no effect on catch rates, depending on the fish species. In studies by Rijnsdorp *et al.* (2000a) and Poos and Rijnsdorp (2007), competitive interactions among Dutch beam trawlers were quantified based on "experimental" periods with (i) low vessel density during a week of "prayer" and (ii) high vessel density due to a temporal area closure.

To study the competitive interactions between the Belgium and Dutch fleets, we use a cultural difference between the fleets as a natural experiment. While Dutch vessels tend to stay in port over the weekend, Belgium vessels fish irrespective of the weekday. This weekly, cyclic change in vessel density puts us in a unique position to analyse the effects of competition between both fleets.

By assessing the effects of competitive interactions among fishing fleets as a result of different uptake speed of fisheries technologies and the adaptive response of fishers, this paper aims to gain more insights into the underlying mechanisms of fleet dynamics. This may reduce the uncertainty generated through unintended behaviour of fishers and increase the effectiveness of fisheries management in achieving its ecological and socio-economic goals.

Material and methods

Development of the flatfish fishery in the Southern Bight

During the study period (2006–2013), the flatfish fishery in the Southern Bight targeted a wide range of demersal fish species, with sole (*Solea solea*) and plaice (*Pleuronectes platessa*) being the dominant species landed (Rijnsdorp *et al.*, 1998). The fishery is dominated by beam trawlers fishing under the Belgian or Dutch flag. Because the nominal value of sole (10 € kg^{-1}) is ca. 7.5-fold higher than the nominal value of plaice (1.3 € kg^{-1}), sole accounts for >60% of the landed value of the Belgian beam trawl fishery in the Southern Bight. Hence, sole is the main target species in terms of revenue.

Before 2011, Dutch beam trawlers were generally equipped with chains in the net opening penetrating the seabed (Creutzberg *et al.*, 1987; Eigaard *et al.*, 2015). Depending on seabed characteristics, two configurations of chains were used: (i) V-shaped tickler chains or (ii) chain mats (Fonteyne and Polet, 1995; Eigaard *et al.*, 2015). V-shaped tickler chains are used on fishing grounds with smooth surfaces, such as sandy sediments (Rijnsdorp *et al.*, 2008). On rough fishing grounds, a matrix design of the tickler chains called chain mats is used. While most Dutch beam trawlers traditionally used the V-shaped tickler chain configuration, the Belgian beam trawlers typically used chain mats (Fonteyne and Polet, 1995; Rijnsdorp *et al.*, 2008). Hence, rocky fishing grounds were mainly exploited by Belgian beam trawlers, whereas smooth fishing grounds were mainly trawled by Dutch vessels. Consequently, Belgian and Dutch beam trawl fleets were spatially segregated (Figure 1). Vessels from other countries were less numerous and mainly exploited other fishing grounds; therefore, they are not taken into account in this study.

In pulse trawls, the mechanic stimulus of fish by chains is replaced by electric stimuli of electrodes rigged in the net opening (Soetaert *et al.*, 2015). These electrodes cause muscle contractions in fish, decreasing their ability to swim away or dive under the net opening. The relatively light design of the pulse trawl allows operation on a wider range of sediments (Rasenberg *et al.*, 2013). Additionally, catch composition of pulse trawlers differs compared with beam trawling (van Marlen *et al.*, 2014). The change in catch composition affects the relative profitability of the various fishing grounds because of the mixed nature of the flatfish fishery where different fish species are caught simultaneously. As a result, the development of the commercial Dutch pulse trawler fleet caused a reallocation of fishing effort (Batsleer *et al.*, 2016).

Data

In this study, we focus on the Belgian beam trawler segment with engine powers >221 kW. These vessels are obliged to fish outside the 12-mile coastal zone. More than 80% of the fishing effort by the Belgian study fleet in the Southern Bight was concentrated in four ICES statistical rectangles (1° longitude × 0.5° latitude, ca. 30 × 30 nautical miles): 32F1, 32F2, 33F2, 34F2 (Figure 1). Other statistical rectangles were incidentally fished, but not retained for analysis.

Mandatory logbook data for 2006–2013 were used for statistical analysis. In these logbooks, fishers report fishing activity daily by specifying fishing location (by ICES statistical rectangle), fishing gear, mesh size, and estimated weight of landings by species. In addition, vessel information (reference number, length, motor engine, and gross tonnage) was available for analysis. No data on discarding were available. Hence, the analysis is restricted to the landings per unit effort (lpue), which is the portion of the daily catch commercialized. Logbook records for the Belgium fleet (>221 kW) fishing in the study area are summarized in Table 1. Fine-scale spatial distribution of the Dutch and Belgium fleet is obtained using the VMS data (Hintzen *et al.*, 2012).

Analysis of competition in a natural experiment

Competition was analysed using the different weekly exploitation patterns of Belgian and Dutch fishers. Dutch fishers typically make fishing trips of 4 d duration starting on Monday morning and ending on Thursday (Rijnsdorp *et al.*, 2000a). Consequently, fishing activity by the Dutch beam trawlers is much lower from Friday until Sunday (Table 2). In contrast, the Belgian beam trawlers

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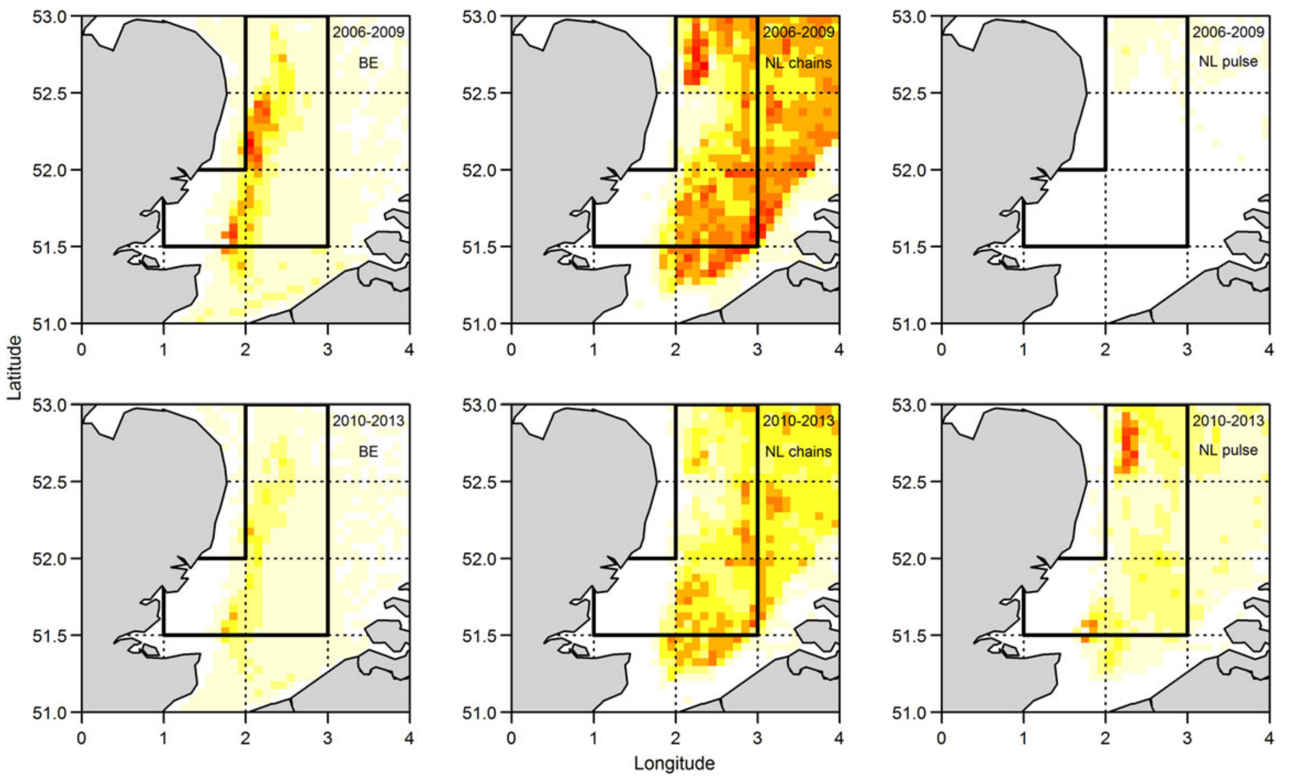

Figure 1. Spatial distribution of fishing effort of the Belgian beam trawlers (>221 kW) (left panels), Dutch beam trawlers with tickler chains (middle panels), and Dutch pulse trawlers (right panels) in the Southern Bight during the period 2006–2009 and 2010–2013, as recorded by satellite-based vessel monitoring systems (VMS). The four ICES statistical rectangles comprising the study area are enclosed by the black frame. This figure is available in black and white in print and in colour at *ICES Journal of Marine Science* online.

Table 1. Annual number of fishing trips and summary statistics of the dataset used for analysis grouped by year and weekday or weekend. The number of logbook events and different vessels that were active in the study area, the average engine power (kW), and daily landings (kg) of sole and plaice. In total, there are 5063 logbook events recorded during weekdays and 3767 recorded during weekends.

			Weekdays (n = 5 063)				Weekends (n = 3 767)			
Year	No. of vessels	No. of trips	Logbook events	Engine power	Sole landings	Plaice landings	Logbook events	Engine power	Sole landings	Plaice landings
2006	48	341	880	810	247	220	688	806	266	229
2007	42	236	566	775	302	264	437	774	315	246
2008	46	335	966	877	363	249	741	878	395	268
2009	41	370	1 056	910	335	311	773	907	335	269
2010	30	280	801	899	358	523	519	885	363	481
2011	27	150	352	868	390	484	248	858	373	587
2012	23	91	181	859	300	450	131	824	349	485
2013	21	101	261	780	427	650	230	779	503	621

Table 2. Daily distribution of the effort (time present) in the study area (expressed as percentages) based on the logbooks of the Belgian and Dutch beam trawler fleet (engine power >221 kW).

	Belgium							The Netherlands						
Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2006	14	14	13	14	15	16	15	19	24	24	23	7	1	1
2007	13	15	14	14	14	16	14	19	25	25	23	6	1	1
2008	14	14	14	14	14	16	15	20	24	25	23	6	1	1
2009	15	15	15	14	13	15	14	20	25	24	23	5	1	1
2010	14	16	16	14	13	13	13	20	25	24	22	6	1	1
2011	14	14	15	15	15	15	12	21	24	24	22	6	2	1
2012	16	16	13	11	13	17	14	22	25	24	19	6	2	2
2013	12	11	12	14	16	19	16	21	24	24	20	7	3	2

have no fixed weekly exploitation patterns. Most fishing trips have a duration of 8–10 d, and fishing effort is spread equally throughout the week.

As a result of these different weekly fishing patterns, the probability of a Belgian fishing vessel encountering other vessels is much higher Monday–Thursday than Friday–Sunday. Consequently, effects of competition should be higher during weekdays than weekends.

Competition was examined by analysing the daily landing rates (lpue) of the target species sole and plaice. To investigate both linear and non-linear relationships between the landing rates per unit effort (kg) and the explanatory variables, a generalized additive mixed model (GAMM) was fitted. The vessel reference number was included as a random effect (μ) to correct for vessel effects. Such vessel effects include skipper effects and physical characteristics of vessels that are not recorded in the data. The temporal patterns of the dependent variables were compared in different regression models. The null model [Equation (1)] includes the annual and seasonal temporal trends, a vessels' engine power, and an intra-trip effect:

$$\log(\text{lpue}) = \beta_0 + \beta_{1_i}\text{year} + \beta_2\log(\text{engine power}) + f(\text{month})_{\text{rect}} + f(\textit{tripday}) + \varepsilon + \mu. \quad (1)$$

The model is fitted to both species separately. In the null model, β_0 represents the intercept. A categorical variable (year) was used to capture the annual variation in landing rates. The first year of the analysis, 2006, was the reference year and is included in the intercept. Therefore, β_{1_i} represents the year effect of each year i ($i \in 2007, \ldots, 2013$) relative to 2006. The coefficient β_2 is the slope of the log-linear relationship between engine power (log(engine power)) of a vessel and landing rates (Rijnsdorp *et al*., 2000a). The intra-annual variation caused by seasonal migration of adult sole and plaice (Rijnsdorp *et al*., 1998) was captured by a seasonal term of the catch month for each ICES statistical rectangle [$f(\text{month})_{\text{rect}}$]. This term is smoothed to the data using regression splines (Wood, 2004). Because a seasonal trend is assumed, cyclic cubic splines were used to avoid discontinuity at the endpoints (Wood, 2006). To examine intra-trip variation in the landing rates, a tripday effect was included. This variable represents the number of days left before the end of the trip; hence, the day of arrival in a harbour is 0. Since there is no *a priori* knowledge about the underlying pattern, the intra-trip variation was included as a non-parametric effect and smoothed to the data. To allow overdispersion and 0 catches, a logarithmic link function between the linear predictor and the mean was specified with a negative binomial distribution of the error term (ε).

To investigate the reduction in landings during weekdays resulting from competition, the null model was extended to include a weekday effect without [Equation (2)] and with [Equation (3)] interaction with the annual effect:

$$\log(\text{lpue}) = \textit{null model} + \beta_4 \text{ weekday}, \quad (2)$$

$$\log(\text{lpue}) = \textit{null model} + \beta_{4_i} \text{ weekday} \times \text{year}. \quad (3)$$

In the first model [Equation (2)], a categorical weekday effect (weekday) was added to the null model. The weekday variable was assigned a value of 0 for weekdays (Monday–Thursday) and a value of 1 for weekends (Friday–Sunday). Therefore, β_4 represents the effect of the weekend compared with weekdays. In the second model [Equation (3)], the categorical weekday effect is included as an interaction term with the categorical year variable (weekday × year). Hence, β_{4_i} represents the change in the dependent variable in weekends relative to weekdays for each year i ($i \in 2007, \ldots, 2013$) of the study period.

Finally, to gain insight in the type of competition, we analysed whether landing rates during weekdays and weekends showed a negative or positive slope, which could indicate the occurrence of competition through local depletion of fish stocks (exploitation competition):

$$\log(\text{lpue}) = \text{null model} + \beta_{5_j}\text{day} \times \text{weekday}. \quad (4)$$

Therefore, the null model was extended with an interaction term between the numeric day effect (day) (Monday = 1, ..., Sunday = 7) and the categorical weekday effect (weekday) [Equation (4)]. Hence, the coefficient of β_{5_j} represents the slope of the landing rates during weekdays and weekends.

The open-source software platform R (version 3.1.3; R Core Team, 2015) was used for analyses. Logbook data were used and processed following the workflow as described in the *vmstools* R-package (Hintzen *et al*., 2012) and time–date conversions were carried out with the *lubridate* R-package (Grolemund and Wickham, 2011). The R-package *mgcv* was used to fit the GAMM models (Wood, 2004).

Results

During the study period, the number of Belgian beam trawlers participating in the flatfish fishery in the Southern Bight declined, and the fishery reallocated fishing effort. This resulted in a decline in fishing effort in the Southern Bight (Figure 2). The number of vessels showed a decline during the study period (Table 1). Fishing effort allocation was characterized by a more complex pattern. After an increase in 2008 and 2009, fishing effort in the Southern Bight strongly decreased. The steepest decline occurred from 2010 to 2012, when a reduction of 76% was observed. In 2013, fishing effort increased again. Nevertheless, fishing effort allocation in the Southern Bight in 2013 was still more than 50% lower than in 2006–2010.

Apart from spatial effort reallocation, a shift occurred in the weekly exploitation patterns of the Belgian beam trawlers fishing in the Southern Bight. Most vessels land their fish in a Belgian harbour the day before the auction to sell their landings. Auctions

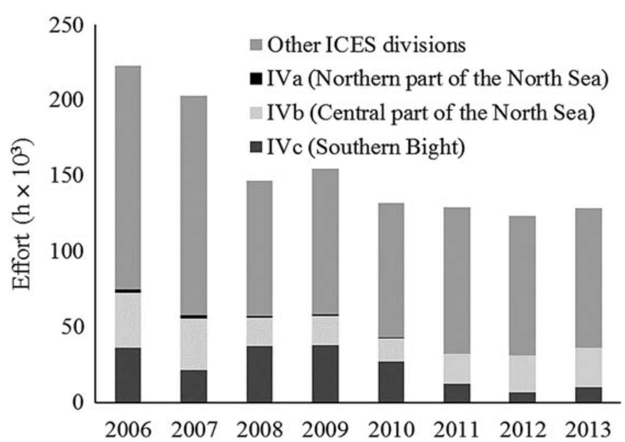

Figure 2. Fishing effort allocation per ICES Division of the Belgian beam trawler fleet (>221 kW).

occur weekly on Monday, Wednesday, and Friday; hence, most fishing trips end on Sunday, Tuesday, and Thursday (Table 3). During 2006–2011, >50% of the fishing trips of the study fleet ended on Tuesday or Thursday, while less trips ended on Sunday, except in 2007. In contrast, a shift occurred in 2012 and 2013, with a larger proportion of trips ending at the end of the weekend on Sunday or just after the weekend on Monday.

All parametric effects of the null model were significant at the 0.05 level for both sole and plaice (Table 4). There was a positive log-linear relationship with vessel engine power, indicating that more powerful vessels have higher landing rates. Similar intra-trip patterns were found in the landing rates of both species (Figure 3). At the start of a trip, lpue values for both species show increasing trends with wide confidence interval bounds. Between 10 and 3 d before the end of a trip, landing rates are rather stable and decline again towards the end of the trip. The slopes of the increase and decrease at, respectively, the start and end of a trip are steeper for sole lpue than for plaice lpue. Seasonal variation in sole lpue differed between ICES statistical rectangle 32F1 and the other ICES statistical rectangles of the study area (Figure 4). The seasonal pattern in rectangle 32F1 was characterized by two peaks, one in spring and one in autumn, while sole lpue in the other rectangles had a single peak in autumn. In contrast, the seasonal variation in plaice lpue showed similar patterns in each of the four ICES statistical rectangles of analysis, with low values in spring and a strong increase in summer, after which the landing rate of plaice remained equal until the end of the year (Figure 5).

Table 3. Weekly distribution of Belgian beam trawlers (<221 kW) (expressed as percentages) embarking in a Belgian harbour after a fishing trip in the Southern Bight (source: logbook data).

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2006	6	29	5	24	6	10	20
2007	3	28	6	25	1	7	30
2008	3	32	3	27	4	7	24
2009	3	30	4	24	7	8	25
2010	2	28	3	31	7	8	21
2011	3	31	2	30	7	7	21
2012	5	21	7	25	4	4	33
2013	15	19	5	25	4	4	29

The null models were extended with a weekday effect with (weekday × year) and without (weekday) interaction with the year effect. A weekday effect was found significant (t-value = 2.33; p-value = 0.02) in sole lpue during 2006–2013. Landing rates of sole ($\beta = 0.036$; s.e. = 0.016) were 4% higher from Friday to Sunday compared with weekdays (Monday–Thursday). In contrast, no overall weekday effect was found at the 0.05 level in the landing rates of plaice.

Including the weekday effect as interaction effect with the year effect resulted in significant (p-value < 0.05) weekday effects in the landing rates of sole in 2008 and 2013 (Figure 6). In 2006 (t-value = 1.85; p-value = 0.07) and 2012 (t-value = 1.84; p-value = 0.07), weekday effects showed a similar trend. In all of these years, the effect was positive, indicating that sole landings were depressed during weekdays. In 2006 and 2008, daily sole landings were, respectively, 7% ($\beta = 0.068$; s.e. = 0.037) and 9% ($\beta = 0.085$; s.e. = 0.036) lower during weekdays compared with weekends, whereas in 2012 (16%) ($\beta = 0.149$; s.e. = 0.081) and 2013 (13%) ($\beta = 0.125$; s.e. = 0.063), the magnitude of the weekday effect was considerably higher. The landing rates of plaice were only characterized by a positive weekend effect in 2011 (t-value = 1.803; p-value = 0.07) during which plaice landings were ca. 19% higher in weekends (Friday–Sunday).

Analysis of landing rates during weekdays and weekends showed a negative trend in lpue for sole during weekdays, whereas no pattern was found in the landing rates of plaice during weekdays. During Monday–Thursday, landing rates of sole declined with 4% ($\beta = -0.014$; s.e. = 0.006; t-value = −2.345; p-value = 0.02). The landing rates of both species during weekends did not show a decreasing or increasing trend.

Discussion

Patterns in lpue of sole and plaice

The landing rates of the target species sole and plaice of Belgian beam trawlers using chain mats are positively related to a vessel's engine power, similar to other trawl fisheries (Rijnsdorp *et al.*,

Table 4. Estimated coefficients (β) and standard error (s.e.), and t-value (right side of F/t-value columns) of the parametric effects and ANOVA output, with the degrees of freedom (d.f.) and F-value (left side of F/t-value columns) per variable of the null model of sole and plaice lpue.

	lpue sole				lpue plaice			
Parameter	β (s.e.)	d.f.	F/t-value	p-value	β (s.e.)	d.f.	F/t-value	p-value
Intercept	2.09 (0.82)	–	2.55	0.01	0.16 (1.32)	–	0.13	0.90
Year	–	7	20.7	<0.01	–	7	55.2	<0.01
2006	–	–	–	–	–	–	–	–
2007	0.17 (0.03)	–	5.70	<0.01	0.17 (0.05)	–	3.22	<0.01
2008	0.20 (0.03)	–	7.34	<0.01	0.08 (0.05)	–	1.81	0.07
2009	0.13 (0.03)	–	4.85	<0.01	0.21 (0.04)	–	4.70	<0.01
2010	0.19 (0.03)	–	6.43	<0.01	0.61 (0.05)	–	12.61	<0.01
2011	0.24 (0.04)	–	6.63	<0.01	0.77 (0.06)	–	13.17	<0.01
2012	0.12 (0.05)	–	2.57	0.01	0.60 (0.08)	–	7.91	<0.01
2013	0.46 (0.05)	–	10.95	<0.01	0.84 (0.07)	–	12.34	<0.01
log(engine power)	0.48 (0.12)	1	4.03	<0.01	0.77 (0.19)	1	3.94	<0.01
f(tripday)	–	3.92	97.9	<0.01	–	3.58	22.1	<0.01
$f(\text{month})_{32F1}$	–	2.90	11.2	<0.01	–	2.96	153.6	<0.01
$f(\text{month})_{32F2}$	–	0.76	0.4	0.22	–	2.96	113.3	<0.01
$f(\text{month})_{33F2}$	–	2.63	26.0	<0.01	–	2.98	115.8	<0.01
$f(\text{month})_{34F2}$	–	2.41	16.7	<0.01	–	2.90	28.2	<0.01

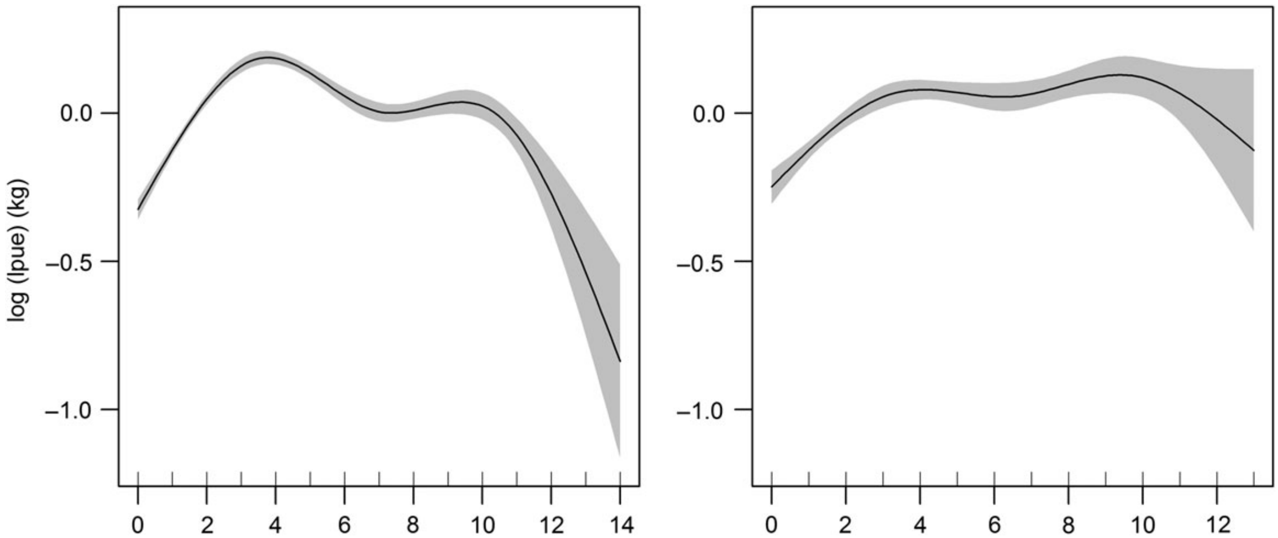

Figure 3. Plot of the non-parametric intra-trip effect [f(tripday)] of the null model. The x-axis represents the number of days before the end of the trip, while the y-axis is the marginal response in sole lpue (left panel) and plaice lpue (right panel). The grey shade represents the 95% confidence interval.

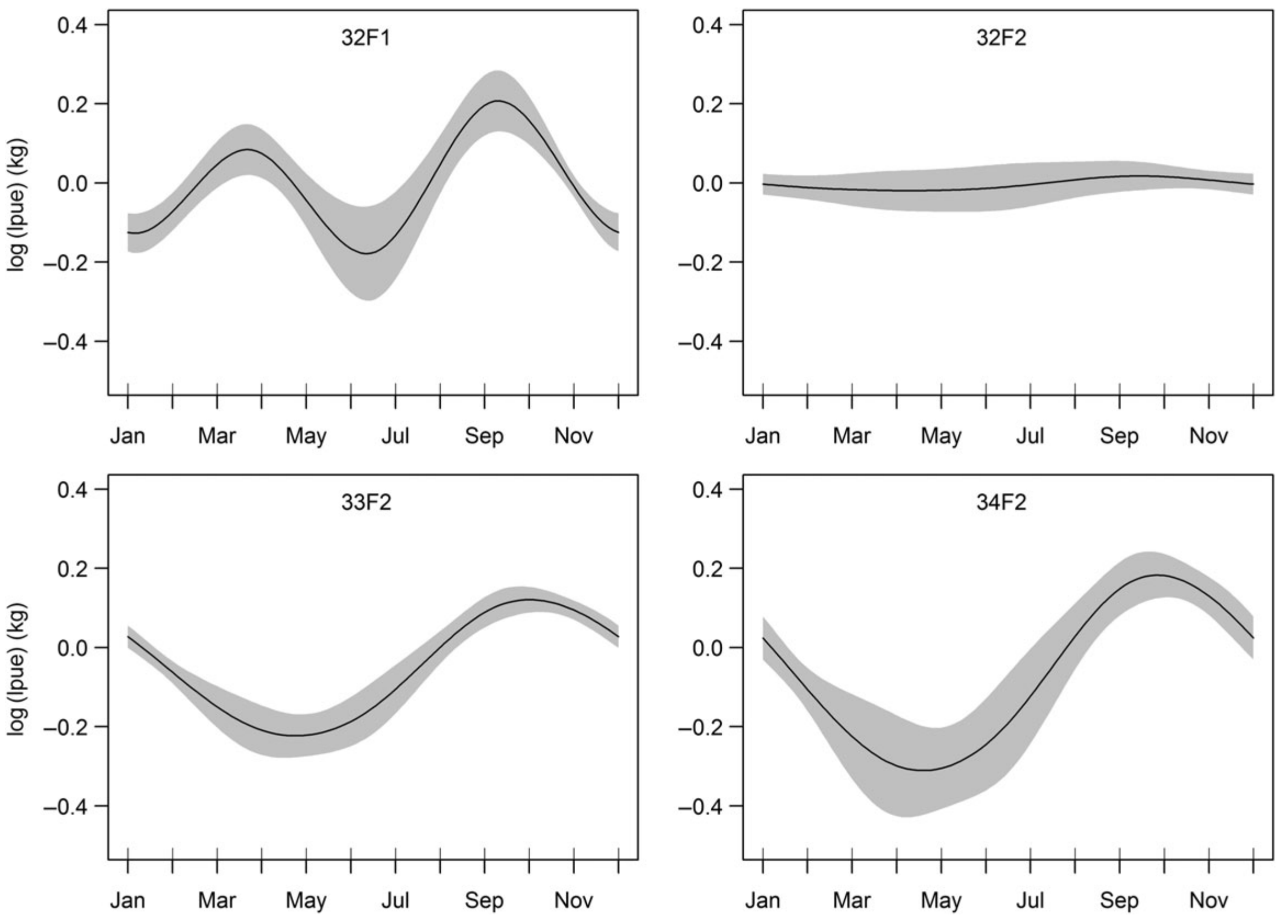

Figure 4. Plot of the non-parametric seasonal effect [f(month)rect] of the null model of sole lpue. The grey shade represents the 95% confidence interval.

2000a; Eigaard and Munch-Petersen, 2010). More powerful vessels are able to tow faster and use heavier fishing gear with more chains in the net-opening, and the increased penetration depth of the fishing gear results in higher catchability.

The null model reveals a strong effect of tripday on catch rate showing similar patterns with the exploitation dynamics found in the Dutch beam trawler fishery (Rijnsdorp *et al.*, 2000b, 2011). Following Rijnsdorp *et al.* (2000b), we hypothesize that at the

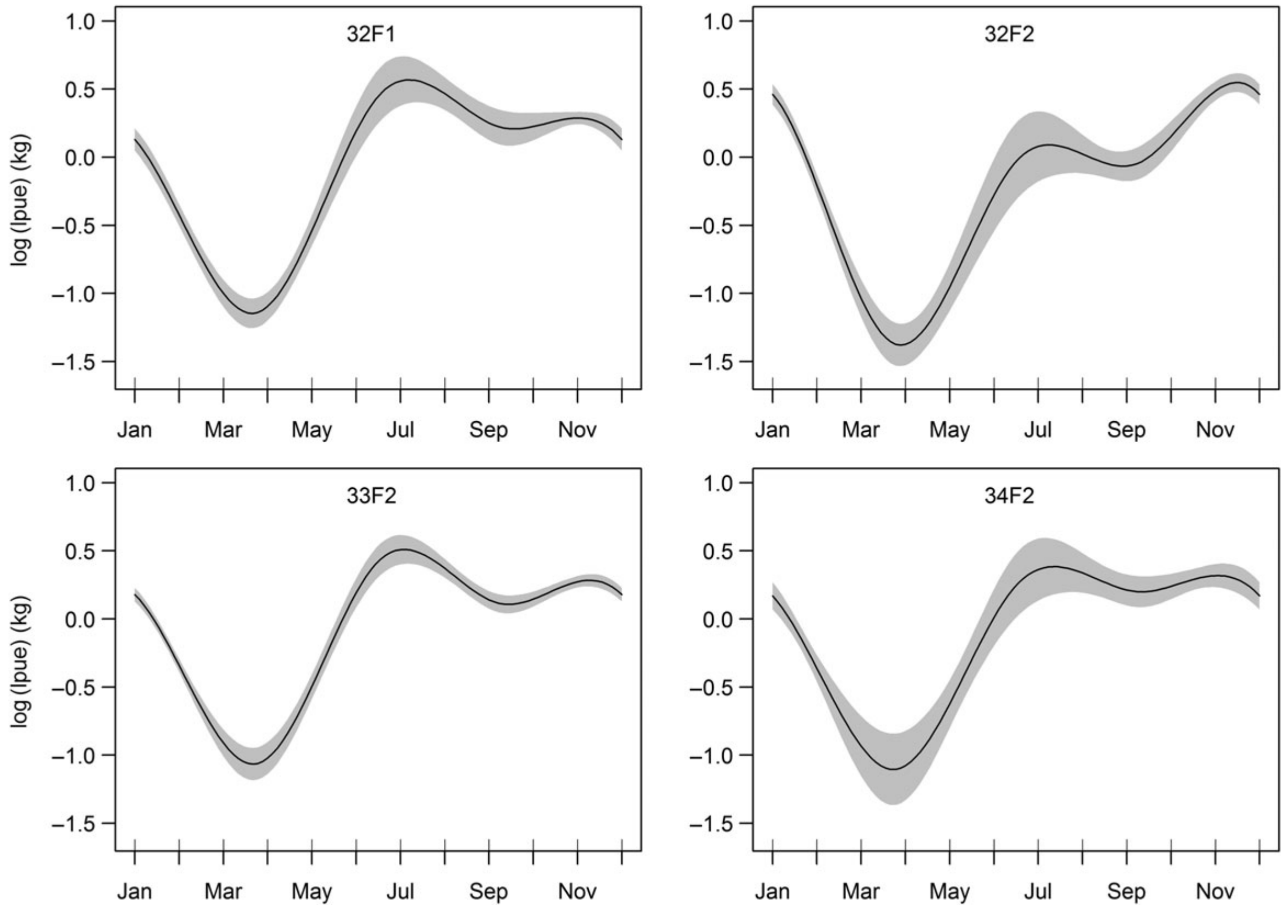

Figure 5. Plot of the non-parametric seasonal effect [f(month)rect] of the null model of plaice lpue. The grey shade represents the 95% confidence interval.

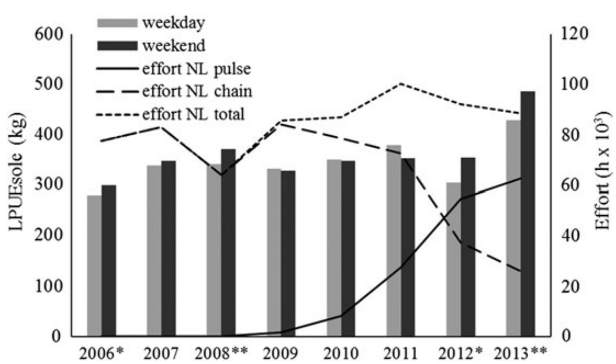

Figure 6. Bar plot of the fitted values [Equation (3)] of sole lpue in weekdays and weekends (engine power = 900 kW; month = January; ICES rectangle = 32F1; tripday = 3). Years with a difference between landing rates in weekdays and weekends are indicated with * (p-value < 0.1) and ** (p-value < 0.05). Line plot of the annual effort of the Dutch beam trawler fleet (pulse, chain, and total trawler fleet).

beginning of a trip, skippers search for local high densities of fish, which explains the increasing trend in lpue. Once skippers have located local hotspots of fish, an exploitation phase follows, during which lpue is high. At the end of a trip, lpue tends to decrease again, which may be a consequence of a local depletion of the resources.

Seasonal patterns in sole and plaice lpue are related to the spawning–feeding migrations of both species. Sole migrate in spring to spawning grounds in shallow coastal waters (Rijnsdorp *et al.*, 1992). One of these spawning grounds, the Thames estuary, is partially located within our study area (ICES rectangle 32F1), which explains the occurrence of a peak in sole lpue in April in this ICES rectangle. In autumn, sole leaves the coastal areas and migrates to warmer, offshore waters, coinciding with a peak in sole landing rates in October. Compared with sole, the migration of plaice to and from spawning areas occurs over longer distances, resulting in stronger seasonal variation in landing rates (Poos and Rijnsdorp, 2007). Mature plaice migrate between spawning grounds in the south in winter and feeding grounds in the north in summer and autumn (Houghton and Harding, 1976). This migratory behaviour of plaice does not correspond to the high landing rates of plaice observed in summer. A possible explanation for the strong increase in plaice lpue in July is the allocation of the national quota which is distributed several times a year to individual vessels. Until June, Belgian beam trawlers have a limited plaice quota in the North Sea. In July, quota is redistributed, whereby the individual plaice quota strongly increases. We hypothesize that this affects the targeting and discard behaviour, which, in turn, affects the observed seasonal lpue levels.

Competition

The weekday effect found in sole lpue suggests that competition is related to the fishing activity of the Dutch trawler fleet. When

Dutch trawlers fish from Monday to Thursday, sole landings of Belgian beam trawlers are lower, while the opposite occurs when the Dutch beam trawler activity drops from Friday to Sunday. Since we did not examine the underlying mechanisms, there is no unequivocal explanation for the occurrence of this weekday effect. Nevertheless, the direct and reversible response of landing rates to a change in fishing activity of the Dutch beam trawlers suggests the occurrence of interference competition. However, the decreasing trend from Monday to Thursday in the landing rates of sole, which was also found in the Dutch beam trawler fleet (Rijnsdorp *et al.*, 2000b), suggests that local depletion of the sole fishing grounds occurs as well (exploitative competition).

Inspection of the interaction effect of weekday and year did not suggest a clear relationship between the development of the Dutch pulse fleet and the reduction in lpue during weekdays in the Belgian fleet. This could be the result of several confounding effects that were not tested. Interannual variation in the distribution of sole and plaice may alter the exploitation dynamics of both fleets and their spatial overlap and thus competitive interactions between the different years of analysis. Additionally, changes in external factors such as fuel prices may affect fishing tactics and spatial interactions between fishing vessels. Poos *et al.* (2012) showed that Dutch beam trawlers fished closer to harbours in response to high fuel prices in 2008. Additionally, the number of vessels participating in the fishery may have affected the level of competition between both fleets. Despite the development of the pulse trawl fleet in 2009, no weekday effects were observed in 2009–2011. During these years, nominal fishing effort of the pulse trawler fleet was much smaller (Figure 6); moreover, fishers learned about optimal use of fishing gear and characteristics of new fishing grounds, which may explain the absence of the weekday effect (Rasenberg *et al.*, 2013).

Landing rates of plaice were not characterized by a weekday effect over the entire study period. This suggests no clear relationship between landing rates of plaice and exploitation patterns of the Dutch beam trawlers nor with the development of the pulse trawler fleet.

Differences in the response of catchability of different fish species to vessel density were also found in the experiment of Abrahams and Healey (1993). Additional research about the underlying mechanistic processes of interference competition, e.g. through experiments with tagged fish species, potentially provides insights about the observed differences in the response of sole and plaice catchability to vessel density.

Since sole is the most important species, in terms of revenue in this fishery, the absence of a weekday effect in plaice lpue may be related to the fleet's targeting behaviour for sole. Another possible suggestion is that pulse trawlers catch less plaice than beam trawlers (van Marlen *et al.*, 2014), owing to a different response to the pulses (Breen *et al.*, 2011). This different response of both species might induce a different level of interference competition and might explain why plaice lpue is not affected by a change in vessel density.

The design of our study did not allow us to quantify the relationship between vessel density and interference competition. Despite this limitation, the relative decline in revenue per unit effort (rpue) towards an increase in fishing effort during weekdays measured in our study is similar to the decline in rpue found in studies by Rijnsdorp *et al.* (2000a) and Poos and Rijnsdorp (2007). In those studies, rpue, based on landings of the target species sole and plaice, for a vessel with engine power of 2000 HP (ca. 1491 kW) dropped by, respectively, 10 and 14% when vessel density increased. In our study, in which sole accounts for 67% of the total landed value, rpue declined by 11% (2012) and 9% (2013) for a vessel of 1200 kW. Despite the different set up in the vessel density experiment in all of these studies, a similar response in revenue rates in response to a change of vessel density was measured.

Spatio-temporal effort allocation of the Belgian beam trawlers

Fishing effort allocation in the Belgian beam trawler fleet (>221 kW) in the Southern Bight showed strong variation during the study period. The high effort allocation in the Southern Bight in 2008 and 2009 is strongly related to the fuel price crisis at the end of 2008. Fishers adapted their fishing strategies by reallocating fishing effort closer to harbours to reduce steaming costs (Poos *et al.*, 2012; Bastardie *et al.*, 2013). After the fuel price crisis, fishing effort in the Southern Bight declined again. The Belgian beam trawlers reallocated fishing effort to grounds outside the North Sea and in the central part of the North Sea (ICES Division IVb). Effort reduction in the Southern Bight occurred simultaneously with the development of the Dutch pulse trawlers in 2011. We hypothesize that increased competition between both fleets was an important driver of this effort reallocation.

Apart from spatial effort reallocation, a shift occurred in the weekly exploitation patterns of the Belgian beam trawlers. Since sole lpue was reduced during weekdays in 2012 and 2013, a larger proportion of the fishing trips in the Southern Bight ended on Sunday and Monday, while the share of fishing trips ending on Friday and Saturday decreased. This shift can be understood from the viewpoint of increased competition: the drop in sole lpue through increased interference competition on Monday would force more fishers to leave fishing grounds in the Southern Bight and return to the harbour on Monday, while ending fishing trips on Friday or Saturday would be less likely due to the higher landing rates of sole on weekends, creating an incentive to continue fishing.

Management implications

Competitive differences may have important consequences for both the short- and long-term dynamics of the beam trawler fleet in the North Sea. The occurrence of spatial segregation as a result of different competitive abilities of fishing vessels was observed in the Dutch beam trawler fleet and the French demersal fleet. In studies by Rijnsdorp *et al.* (2000a), Poos *et al.* (2010), and Girardin *et al.* (2015), the occurrence of segregation among vessels was shown, with higher prevalence of more powerful vessels on the best fishing grounds. In contrast, less powerful vessels lost efficiency in the presence of stronger vessels and were more prevalent on poorer fishing grounds (Rijnsdorp *et al.*, 2000a, b). Because no Belgian trawlers used the pulse during the study period, we could not analyse competitive differences between beam and pulse trawlers.

This study provides an example of how different uptake of new technologies in fisheries can affect the performance of a fleet through changes in lpue as a result of competitive interactions. Disregarding this may lead to misinterpretation of cpue trends and bias stock estimates. Additionally, different adaptation speed of fishing fleets towards new technologies can force fishers to adapt fishing strategies and undermine effective fisheries management when not expected.

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(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)

REGULATIONS

COMMISSION REGULATION (EC) No 498/2007

of 26 March 2007

laying down detailed rules for the implementation of Council Regulation (EC) No 1198/2006 on the European Fisheries Fund

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Regulation (EC) No 1198/2006 of 27 July 2006 on the European Fisheries Fund [1], and in particular Article 102 thereof,

Whereas:

(1) Regulation (EC) No 1198/2006 (the basic Regulation) replaces Council Regulations (EC) No 1263/1999 [2] and (EC) No 2792/1999 [3] taking into account new developments in the field of fisheries, fisheries areas and inland fishing. It is therefore appropriate to lay down detailed rules for implementing the basic Regulation.

(2) Detailed rules should be laid down for the presentation of operational programmes. In order to facilitate the establishment of the operational programmes and their examination and approval by the Commission, common rules should be laid down for the structure and content of such programmes, based in particular on the requirements set out in Article 20 of the basic Regulation.

(3) As regards support for measures for the adaptation of the Community fishing fleet, the Member States should present in their operational programmes the methods for the calculation of premiums.

(4) As regards the possibility provided for under Article 25(4) of the basic Regulation to achieve the reduction of engine power by a group of vessels, the conditions for this possibility should be specified.

(5) Certain terms used with special reference to aquaculture and the processing and marketing of fisheries and aquaculture products, should be defined to ensure that they are uniformly understood.

(6) As regards support for productive investments in aquaculture and investments in processing and marketing, the Member States should explain in their operational programmes how they will ensure that priority is given to micro and small enterprises.

(7) As regards support for animal heath measures, detailed conditions should be laid down to ensure compliance with the Council Directive 2006/88/EC of 24 October 2006 on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals [4].

(8) As regards support for measure of common interest, the eligible expenditure should be defined.

(9) As regards the fisheries areas referred to in Article 43 of the basic Regulation, the conditions for their selection should be specified.

(1) OJ L 223, 15.8.2006, p. 1.
(2) OJ L 161, 26.6.1999, p. 54.
(3) OJ L 337, 30.12.1999, p. 10. Regulation as last amended by Regulation (EC) No 485/2005 (OJ L 81, 30.3.2005, p. 1).
(4) OJ L 328, 24.11.2006, p. 14.

2. Support provided for in point (n) of the first paragraph of Article 37 of the basic Regulation may be granted for:

(a) the creation of producer organisations in order to facilitate the setting up and administrative operation of producer's organisation recognised under Council Regulation (EC) No 104/2000 [1] after 1 January 2007;

(b) the implementation of plans of producer organisations that have been specifically recognised under Article 12 of Regulation (EC) No 104/2000 in order to facilitate the implementation of their plans to improve the quality of their products;

or

(c) the restructuring of producers' organisations in order to increase their efficiency in line with market requirements.

3. The support referred to in paragraph 2(b) of this Article shall be degressive over three years following the date of the specific recognition under Article 12 of Regulation (EC) No 104/2000.

Article 16

Measures intended to protect and develop aquatic fauna and flora

1. Support provided for in point (a) of the first subparagraph of Article 38(2) of the basic Regulation shall concern measures for the construction and installation of artificial reefs or other facilities made up of long lasting elements.

Support may cover work preliminary to installation, including studies, components, signalling, transport and the assembly of the facilities and scientific monitoring.

2. Support provided for in Article 38(2) of the basic Regulation shall not cover fish aggregating devices.

3. Support provided for in point (c) of the first subparagraph of Article 38(2) of the basic Regulation may cover the expenditure on the necessary conservation measures for sites belonging to the Nature 2000 European Ecological Network. Support may cover the preparation of management plans, strategies and schemes, infrastructure including depreciation and equipment for reserves, training and education for the employees of reserves as well as relevant studies.

4. Support provided for in point (c) of the first subparagraph of Article 38(2) of the basic Regulation shall not cover compensation for rights foregone, loss of income and salaries of employees.

5. For the purposes of second subparagraph of Article 38(2) of the basic Regulation, 'direct restocking' shall mean the activity of releasing live aquatic organisms, whether the animals are produced in hatcheries or fished elsewhere.

Article 17

Landing sites

Where support is given for investments to restructure landing sites and to improve the conditions for fish landed by coastal fishers in existing landing sites, as provided for in the second subparagraph of Article 39(1) of the basic Regulation, Member States shall ensure compliance with the relevant sanitary rules and the enforcement of control measures in those landing sites.

Article 18

Development of new markets and promotional campaigns

1. Support provided for promotional measures, as provided for in Article 40(3)(a), (d), (e) and (g) of the basic Regulation, may cover in particular:

(a) the costs of advertising agencies and other service providers involved in the preparation and implementation of promotional campaigns;

(b) the purchase or hire of advertising space and the creation of slogans and labels for the duration of promotional campaigns;

(c) expenditure on publishing and external staff, required for the campaigns;

(d) the organisation of and participation in trade fairs and exhibitions.

2. As regards products protected under Council Regulation (EC) No 510/2006 [2], support may be granted for their promotion only from the date on which the name has been entered in the register as provided for in Article 7 of that Regulation.

Article 19

Pilot projects

1. No support shall be granted under Article 41 of the basic Regulation for exploratory fishing.

2. Where support is given for a pilot project, as provided for in Article 41 of the basic Regulation, the managing authority shall ensure that the pilot project includes adequate scientific follow up and that an adequate qualitative assessment of the technical reports referred to in Article 41(3) of that Regulation is made.

3. Pilot projects shall not be of a directly commercial nature. Any profit generated during the implementation of a pilot project shall be deducted from the public aid granted to the operation.

(1) OJ L 17, 21.1.2000, p. 22.

(2) OJ L 93, 31.3.2006, p. 12.

4. Where the total costs of a pilot project exceed EUR 1 million, the managing authority shall, prior to its approval, require an assessment by an independent scientific body.

Article 20

Modification for reassignment of fishing vessels

Support, as provided for in Article 42 of the basic Regulation, may be granted for the modification of a fishing vessel after its reassignment only if that vessel has been deleted permanently from the fishing fleet register and, where appropriate, the fishing licence associated with it has been permanently cancelled.

SECTION 4

Priority axis 4: Sustainable development of fisheries areas

Article 21

Objectives and measures

The support granted under Article 43 of the basic Regulation shall be for:

(a) implementing local development strategies as referred to in Article 45(2) of the basic Regulation and Article 24 of this Regulation with a view to achieving the objectives referred to in Article 43(2)(a), (b) and (c) of the basic Regulation and through the eligible measures provided for in Article 44(1)(a) to (g), (i) and (j) and Article 44(2) and (3) of that Regulation;

(b) implementing inter-regional and trans-national cooperation among the groups in fisheries areas as referred to in Article 44(1)(h) of the basic Regulation, mainly through networking and disseminating best practices with a view to achieving the objective referred to in Article 43(2)(d) of that Regulation.

Article 22

Geographical application of Priority axis 4

1. The operational programme shall specify the procedures and the criteria for selecting the fisheries areas. Member States shall decide how they will apply Articles 43(3) and (4) of the basic Regulation.

2. The fisheries areas selected do not necessarily have to coincide with a national administrative area or with zones established for the purposes of eligibility under the objectives of the Structural Funds.

Article 23

Procedures and criteria for selecting the groups

1. A group, as referred to in Article 45(1) of the basic Regulation, shall be composed in such a way that it is able to draw up and implement a development strategy in the area concerned.

The relevance and effectiveness of the partnership shall be assessed on the basis its composition, as well as its transparency and clarity in the allocation of tasks and responsibilities.

The capacity of the partners to carry out the tasks assigned to them and the effectiveness and decision-making shall be guaranteed.

The partnership shall comprise, including at the decision-making level, representatives of the fisheries sector and of other relevant local socio-economic sectors.

2. The administrative capacity of the group shall be considered adequate where the group:

(a) either selects from the partnership, one partner as the administrative leader who will guarantee the satisfactory operation of the partnership;

or

(b) comes together in a legally constituted common structure, the formal constitution of which guarantees the satisfactory operation of the partnership.

3. If the group is entrusted with the administration of public funds, its financial capacity shall be assessed:

(a) with regard to paragraph 2(a), in terms of the ability of the administrative leader to administer the funds;

(b) with regard to paragraph 2(b), in terms of the ability of the common structure to administer the funds.

4. The groups for the implementation of local development strategies shall be selected no later than four years from the date of the approval of the operational programme. Longer time limits may be granted where the managing authority organises more than one selection procedure for the groups.

5. The operational programme shall specify:

(a) the procedures and the criteria for selecting the groups, as well as the number of groups that the Member State intends to select; the selection criteria referred to in Article 45 of the basic Regulation and in this Article shall constitute a minimum and may be supplemented by specific national criteria; the procedures shall be transparent, provide adequate publicity and ensure competition where applicable, between the groups putting forward local development strategies;

15.8.2006 EN Official Journal of the European Union L 223/1

I

(Acts whose publication is obligatory)

COUNCIL REGULATION (EC) No 1198/2006

of 27 July 2006

on the European Fisheries Fund

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Articles 36 and 37 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament [1],

Having regard to the opinion of the European Economic and Social Committee [2],

Having regard to the opinion of the Committee of the Regions [3],

Whereas:

(1) The development of the Community fishing fleet must be regulated in particular according to decisions that the Council and the Commission are called upon to take by virtue of Chapter II of Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy [4].

(2) The objective of the common fisheries policy should be to provide for sustainable exploitation of living aquatic resources and of aquaculture in the context of sustainable development, taking account of environmental, economic and social aspects in a balanced manner.

(3) The scope of the common fisheries policy extends to the conservation, management and exploitation of living aquatic resources and aquaculture, as well as to the processing and marketing of fisheries and aquaculture products in so far as those activities are practised on the territory of Member States, in Community waters or by Community fishing vessels or nationals of Member States.

(4) Under Article 33(2) of the Treaty, account must be taken of the particular nature of the activity which results from the social structure of the sector and from structural and natural disparities between the various regions involved in fishing activities.

(5) The sustainable development component of the common fisheries policy has been integrated into the rules governing the Structural Funds since 1993. Its implementation should be pursued in the context of sustainable development by means of the European Fisheries Fund (hereinafter EFF).

(6) Since the principal objective of this Regulation, namely to further the common fisheries policy, cannot be sufficiently achieved by the Member States given the structural problems encountered in the development of the fisheries sector and the limits on the financial resources of the Member States in an enlarged Union, and can therefore be better achieved at Community level by providing multi-annual financing focused on the relevant priorities, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Regulation does not go beyond what is necessary to achieve this objective.

(7) The common fisheries policy and therefore the EFF must incorporate the Community's priorities for sustainable development as defined in the conclusions of the Lisbon European Council of 23 and 24 March 2000 and the Gothenburg European Council of 15 and 16 June 2001.

(8) Programming should ensure coordination of the EFF with other funds geared to sustainable development and with the Structural Funds and other Community funds.

(9) The activity of the EFF and the operations it helps to finance should be compatible with other Community policies and comply with all Community legislation.

(1) Opinion delivered on 6 July 2005 (not yet published in the Official Journal).
(2) OJ C 267, 27.10.2005, p. 50. Opinion delivered following non-compulsory consultation.
(3) OJ C 164, 5.7.2005, p. 31. Opinion delivered following non-compulsory consultation.
(4) OJ L 358, 31.12.2002, p. 59.

3. Interim evaluations shall be organised under the responsibility of the Member States and on the initiative of the managing authorities in consultation with the Commission in accordance with the evaluation methods and standards to be defined in accordance with the procedure provided for in Article 47(5). Interim evaluations are forwarded to the Monitoring Committee of the operational programme and to the Commission.

Article 50

Ex post evaluation

1. *Ex post* evaluation shall examine the degree of utilisation of resources, the effectiveness and efficiency of the operational programme and its impact in relation to the objectives set out in Article 4 and the guiding principles set out in Article 19. It shall identify the factors which contributed to the success or failure of the implementation of the operational programme, including from the point of view of sustainability, and best practice.

2. The *ex post* evaluation shall be performed at the initiative and under the responsibility of the Commission in consultation with the Member State and the managing authority, which shall collect the information necessary for its implementation.

3. The *ex post* evaluation shall be completed not later than 31 December 2015.

CHAPTER II

Information and publicity

Article 51

Information and publicity

1. The Member States shall provide information on and publicise the operational programme and operations and the Community contribution. The information shall be addressed to the general public. It shall aim to highlight the role of the Community and ensure the transparency of assistance from the EFF.

2. The managing authority for the operational programme shall be responsible for its publicity as follows:

(a) it shall inform potential beneficiaries, organisations involved in the fisheries sector, professional organisations, economic and social partners, bodies involved in promoting gender equality and non-governmental organisations concerned, including environmental organisations, of the possibilities offered by the programme and the rules and methods governing access to financing;

(b) it shall inform the beneficiaries of the amount of the Community contribution;

(c) it shall inform the general public about the role played by the Community in the operational programme and the results thereof.

3. The Member States shall notify the Commission each year of the initiatives undertaken for the purpose of this Article in the framework of the annual and final reports on implementation referred to in Article 67.

TITLE VI

FINANCIAL CONTRIBUTION FROM THE EFF

CHAPTER I

Contribution from the EFF

Article 52

Public aid intensity

The maximum intensity of public aid is set out in the Table in Annex II.

Article 53

Contribution from the EFF

1. The Commission's decision adopting an operational programme shall fix the maximum rate and the maximum amount of the contribution from the EFF separately for the Convergence and the Non-Convergence objective for each priority axis.

2. The contribution from the EFF shall be calculated in relation to the total public expenditure.

3. The contribution from the EFF shall be established per priority axis. The contribution from the EFF shall be subject to the following ceilings:

(a) 75 % of the total public expenditure co-financed by the EFF in regions eligible under the Convergence objective, subject to paragraphs 7, 8 and 9.

(b) 50 % of the total public expenditure co-financed in regions not eligible under the Convergence objective, subject to paragraphs 7, 8 and 9.

Notwithstanding this, Member States may apply in the operational programme a uniform rate by region at the level of measures.

2. The measures laid down in points (e) and (f) shall be proportionate to the total amount of public expenditure allocated to the operational programme concerned.

Article 58

Designation of authorities

1. For the operational programme the Member State shall designate the following:

(a) a managing authority to manage the operational programme;

(b) a certifying authority to certify statements of expenditure and applications for payment before they are sent to the Commission;

(c) an audit authority, functionally independent of the managing authority and the certifying authority, responsible for verifying the effective functioning of the management and control system.

2. The Member State may designate one or more intermediate bodies to carry out some or all of the tasks of the managing or certifying authority under the responsibility of that authority.

3. The Member State shall lay down rules governing its relations with the authorities referred to in paragraph 1 and their relations with the Commission.

4. Subject to Article 57(1)(b), some or all of the authorities referred to in paragraph 1 may be part of the same body.

Article 59

Functions of the managing authority

The managing authority of an operational programme shall be responsible for managing and implementing the operational programme in accordance with the principle of sound financial management and, in particular, for:

(a) ensuring that operations are selected for funding in accordance with the criteria applicable to the operational programme and that they comply with applicable Community and national rules, for the whole of their implementation period;

(b) verifying that the co-financed products and services are delivered and that the expenditure declared by the beneficiaries has actually been incurred and complies with Community and national rules; verifications on-the-spot of individual operations may be carried out on a sample basis in accordance with the detailed rules to be adopted by the Commission in accordance with the procedure referred to in Article 101(3);

(c) ensuring that there is a system for recording and storing in computerised form accounting records of each operation under the operational programme and that the data on implementation necessary for financial management, monitoring, verifications, audits and evaluation is collected;

(d) ensuring that beneficiaries and other bodies involved in the implementation of operations maintain either a separate accounting system or an adequate accounting code for all transactions relating to the operation without prejudice to national accounting rules;

(e) ensuring that the evaluations of operational programmes referred to in Articles 48 and 49 are carried out in accordance with Article 47;

(f) setting up procedures to ensure that all documents regarding expenditure and audits required to ensure an adequate audit trail are held in accordance with the requirements of Article 87;

(g) ensuring that the certifying authority and the audit authority receive all necessary information on the procedures and verifications carried out in relation to expenditure for the purpose of certification and audit respectively;

(h) guiding the work of the monitoring committee and providing it with the documents required to permit the quality of the implementation of the operational programme to be monitored in the light of its specific goals;

(i) drawing up and, after approval by the monitoring committee, submitting to the Commission the annual and final reports on implementation;

(j) ensuring compliance with the information and publicity requirements laid down in Article 51.

To explore the potential of nature to improve the quality of life

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Vertouwelijk
REPORT
LEI VR2014-045

LEI Wageningen UR is een onafhankelijk, internationaal toonaangevend, sociaaleconomisch onderzoeksinstituut. De unieke data, modellen en kennis van het LEI bieden opdrachtgevers op vernieuwende wijze inzichten en integrale adviezen bij beleid en besluitvorming, en dragen uiteindelijk bij aan een duurzamere wereld. Het LEI maakt deel uit van Wageningen UR (University & Research centre). Daarbinnen vormt het samen met het Departement Maatschappijwetenschappen van Wageningen University en het Wageningen UR Centre for Development Innovation van de Social Sciences Group.

De missie van Wageningen UR (University & Research centre) is 'To explore the potential of nature to improve the quality of life'. Binnen Wageningen UR bundelen 9 gespecialiseerde onderzoeksinstituten van stichting DLO en Wageningen University hun krachten om bij te dragen aan de oplossing van belangrijke vragen in het domein van gezonde voeding en leefomgeving. Met ongeveer 30 vestigingen, 6.500 medewerkers en 10.000 studenten behoort Wageningen UR wereldwijd tot de aansprekende kennisinstellingen binnen haar domein. De integrale benadering van de vraagstukken en de samenwerking tussen verschillende disciplines vormen het hart van de unieke Wageningen aanpak.

Annex 32

Samenwerken aan een duurzame visserij in de Voordelta

ARM 25, ARM 33, ARM 46, TH 6 en YE 138, economische uitkomsten en analyses pulsvisserij

Kees Taal, Mike Turenhout en Arie Klok

VERTROUWELIJK

LEI WAGENINGEN UR

Ministerie van Economische Zaken

Annex 32

Samenwerken aan een duurzame visserij in de Voordelta

ARM 25, ARM 33, ARM 46, TH 6 en YE 138, economische uitkomsten en analyses pulsvisserij

Kees Taal, Mike Turenhout en Arie Klok

Dit onderzoek is uitgevoerd door LEI Wageningen UR in opdracht van en gefinancierd door het ministerie van Economische Zaken. Het onderzoek is mede gefinancierd door het Europees Visserijfonds (EVF) binnen het kader 'Investering in duurzame visserij'.

LEI Wageningen UR
Wageningen, december 2014

VERTROUWELIJK
RAPPORT
LEI VR2014-045

LEI WAGENINGEN UR

Ministerie van Economische Zaken

Annex 33

Verkenning economische impact aanlandplicht op Nederlandse kottervloot

Europees Visserij Fonds: 'Investeren in een duurzame visserij'. Dit project is geselecteerd in het kader van het Nederlands Operationeel Programma "Perspectief voor een duurzame visserij" dat wordt mede gefinancierd uit het Europees Visserij Fonds (EVF).

Flynth adviseurs en accountants

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LEI Wageningen UR

M.N.J. Turenhout MSc

Drs. F.C. Buisman

1-12-2015

To explore the potential of nature to improve the quality of life

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Vertrouwelijk
NOTA
LEI VR2015-008

LEI Wageningen UR is een onafhankelijk, internationaal toonaangevend, sociaaleconomisch onderzoeksinstituut. De unieke data, modellen en kennis van het LEI bieden opdrachtgevers op vernieuwende wijze inzichten en integrale adviezen bij beleid en besluitvorming, en dragen uiteindelijk bij aan een duurzamere wereld. Het LEI maakt deel uit van Wageningen UR (University & Research centre). Daarbinnen vormt het samen met het Departement Maatschappijwetenschappen van Wageningen University en het Wageningen UR Centre for Development Innovation van de Social Sciences Group.

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Brandstofbesparing 75%

Energiebesparing en rendementsverbeteringen aan boord van TX 36 (2.000 pk-kotter)

M.N.J. Turenhout, C. Taal, A.J. Klok

LEI WAGENINGEN UR

Annex 34

Brandstofbesparing 75%

Energiebesparing en rendementsverbeteringen aan boord van TX 36 (2.000 pk-kotter)

M.N.J. Turenhout, C. Taal, A.J. Klok

Opdrachtgevers zijn Vis Vis BV, Jaap van der Vis en HFK Engineering en Harmen Klein Woolthuis

Dit onderzoek is uitgevoerd en gefinancierd in opdracht van het ministerie van Economische Zaken. Het onderzoek is medegefinancierd door het Europees Visserijfonds (EVF) binnen het kader: Investering in duurzame visserij.

LEI Wageningen UR
Wageningen, april 2015

NOTA
LEI 2015-008

Annex 35

Lessons learned from the transition towards an innovative fishing technique

A case study on the introduction of the pulse trawl technique in the Dutch flatfish fishery

MSc Thesis report

Name: Tim Haasnoot

Reg.nr.: 900822295100

Study handbook code thesis: ENP-80436

January 2015

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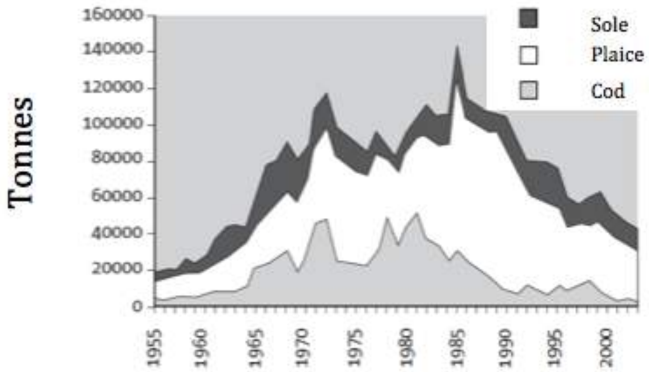

Figure 10. History of the total landings of Sole, Plaice and Cod in the Netherlands: All three landed fish species showed declining trends in the 90's and early 2000s (Task Force Duurzame Noordzeevisserij, 2006).

In the late nineties, the fishing industry became involved in the transition process of the pulse trawl technique through the Federation of Fishing Associations[3] (FFA), which represented a part of the fishing industry (Marlen, van, et al., 2014). Both the Ministry and the fisheries organisation acknowledged that the pulse trawl technique of Verburg-Holland B.V. worked (Berge, van den & Bruijn, 2000a). In order to continue the research on the development of the pulse trawl technique, financial investments were required. The fishing sector was only interested in investing when Verburg-Holland B.V. would develop a pulse trawl with a width of 12m, since these were used in the beam trawl fisheries (Berge, van den & Bruijn, 2000a). Although the fishing sector had already made investments in the pulse trawl project in the year 2000, many did not feel the need to invest in an alternative fishing technique for the beam trawl. They were sceptical about the pulse trawl and did not agree with the criticism on the beam trawl (Berge, van den & Bruijn, 2000a). However, according to the chair of the FFA, further research was necessary to solve the bycatch problems and to decrease fuel consumption (Berge, van den & Bruijn, 2000b). To continue research on the pulse trawl, an experimental license for research had to be arranged by the Ministry. Receiving such an experimental license was possible, but finding ways on legalizing the use of electricity during fishing practices would only be investigated by the Ministry after more research had been done on the pulse trawl technique (Berge, van den & Bruijn, 2000a).

More and more fishermen had trouble with keeping their heads above the water due to rising fuel prices, lower catches (see figure 10) and decreasing quota (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2006). Meanwhile, the European Commission announced that more money should be invested in sustainable fishing techniques and innovations and increased the budget that was available to invest in sustainability-linked innovations (European Commission, 2004). Before 2003, the Ministry made money available for innovations on an ad hoc basis, usually for research on the pulse trawl (Tweede Kamer der Staten-Generaal, 2008). This money came from the 'Diesel fund[4]' (Employee of the Ministry of Economic Affairs 2, 2014). After 2003 the European Fisheries Fund (EFF) became a much more prominent tool from Brussels. Eventually, the budget at the fisheries department at the Ministry had grown to 140 million euro (Employee of the Ministry of Economic Affairs 2, 2014). According to Employee of the

---

[3] The Federation of Fishing Associations, which was also known as the 'Federatie van visserijverenigingen' in Dutch. Nowadays this fishing association is called 'VisNed'.
[4] A fund of the Dutch Ministry for investments in sustainable fisheries (Stralen, van, 2005).

Ministry of Economic Affairs 2 (2014), "That money had to be invested over a longer period of time, so then we started to make strategic plans, an innovation plan for the duration of seven years". It meant that structural investments could be done in alternative fishing techniques, like the pulse trawl technique. The major happenings for this phase are shown in figure 11.

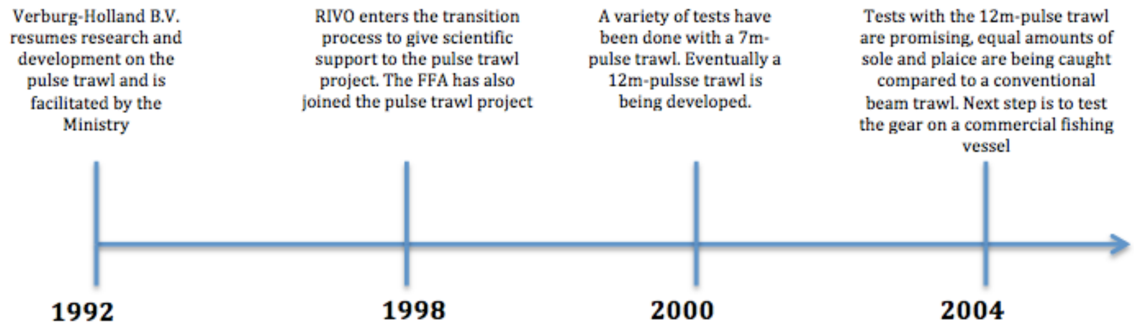

Figure 11. Timeline 1992-2004: *A timeline presenting the most important happenings in the phase of inventing a pulse system.*

<u>Pilot project on a commercial vessel</u>
Developments at the niche level made clear that the pulse trawl technique was ready to be tested on a commercial vessel. Now that the Ministry had made money available to invest in research on the pulse trawl technique and received permission of the European Commission to test the pulse trawl, it was important to find a fisherman that was willing to test this technique in practice. The LEI was asked to select a flatfish cutter that could be approached for the pilot project. When the LEI researcher (2014) was asked how they selected a suitable candidate, he said, "In consultation with the representatives of the fishing industry we decided to approach the UK153 around 2002/2003. The reasons for selecting the UK153 were that they owned a considerable amount of quota on sole, it was a modern cutter, the owner was a serious entrepreneur and he had a certain standing within the fishing industry". Financial arrangements were made between the Ministry and the ship-owner of the UK153 and a Verburg-Holland system was placed aboard the UK153 in 2004.

In 2005, the Ministry started the steering group pulse fishing, which consisted of the Ministry and the representatives of the fishing industry, being the FFA and the Dutch Fishermen's Federation[5] (DFF). This steering group supervised and guided the pilot project. IMARES and LEI acted as advisors for this group and provided information on the pilot project during meetings of the steering group pulse fishing (LEI researcher, 2014). NGO's were not included in the steering group, but they followed the pilot project of the pulse trawl technique with great interest. World Wildlife Fund (WWF) and the North Sea Foundation supported research on alternative fishing techniques for the beam trawl (NGO employee, 2014). However, Greenpeace also criticized the pulse trawl pilot project, because according to them the pulse trawl was just a little step in the right direction. Greenpeace criticized the pulse trawl technique, because the nets were still damaging the seabed, it still caught unwanted bycatch and therefore they considered it an unsustainable fishing method (Greenpeace, 2005). WWF and the North Sea Foundation were also concerned about the lack of environmental impact studies. The NGO employee (2014) stated that, "In the beginning of the pilot project, we had indicated that research should not solely focus on what was caught in the fishing nets,

[5] The Dutch Fishermen's Federation, which is also known as the 'Nederlandse Vissersbond' in Dutch.

Although the wider introduction of the pulse trawl technique had come to a hold due to reaching the maximum number of experimental licenses, the pulse trawl technique continued to develop itself. A group of 15 fishing companies received a subsidy of a total of 420.000 euros for the further development of the pulse cables from the Ministry of Economic Affairs (Visserijnieuws l, 2013). They hoped to develop a stronger cable, which is better protected against short-circuiting and fibrates less. For the fishermen it should result in a cheaper, more reliable cable that requires less maintenance costs (Visserijnieuws l, 2013).

Research on effect studies of the pulse trawl technique also continued to be performed. Remarkable results were presented by ILVO about their effect study on cod, which they had performed at the start of 2013 in Norway. In contrast to the study performed by IMARES, ILVO found hardly any spinal injuries on cods exposed to electric pulses although a similar set-up was used (Visserijnieuws n, 2013). In a reaction to these results, IMARES and ILVO repeated this research again in October 2013. Again different results were found (ILVO researcher, 2014). According to ILVO researcher (2014), “It is not that we lack knowledge on the pulse, but we actually lack knowledge on the cod”. This quote and these results suggest that explaining these differences in research results is difficult and it confirms the complexity of the effect studies on the pulse trawl technique.

After many discussions at the European level (see chapter 5.3), the EC had granted the Netherlands 42 additional experimental licenses. Now a total of 84 vessels were allowed to use the pulse trawl technique. Meanwhile, the pulse trawl technique continued to develop. The pulse technique is being tested in combination with a twin rigging fishing gear and in combination with a seewing (Visserijnieuws q, 2013)(Visserijnieuws r, 2014). The government of the United Kingdom granted an experimental license for the duration of six months for the pilot with the seewing in combination with the pulse trawl technique (Visserijnieuws r, 2014). Delmeco also sees opportunities for improving their pulse system. Delmeco wants to switch to a floating rig in order to get rid of the shoes of their system (Technological company 1, 2014). They are also thinking of an energy supply system underwater, which could replace the power cable (Technological company 1, 2014). HFK considers their system to be almost fully developed at this moment. Technological company 2 (2014) stated that, “You never know what is possible in the future, but we have already achieved so much that the investments and returns become less interesting”.

All these developments around the pulse trawl technique are good from an innovative perspective; however, these developments also impede the control and enforcement. Both niche and regime actors and institutions are divided about the extent to which freedom for innovation is permitted. Some want to sharpen the current limits further as is stated by IMARES researcher (2014), while others want maximum room for innovation as stated by Fisherman 2 (2014). According to Employee of the Ministry of Economic Affairs 3 (2014) the purpose of the innovation is important in this regard, because the pilot project aims to test the pulse trawl technique as a more selective fishing technique in order to facilitate the landing obligation. Already before the latest expansion to 84 experimental licenses, this dichotomy about either limiting or broadening the regulatory limits was mentioned in the report of ICES (2012):

Annex 36

Fleet

Innovation

Craftsmanship

Carbon Footprint

A catch of the highest quality

In 2010 Cornelis Vrolijk did away with the traditional method of beam trawling to catch sole and plaice. The beam trawling lines have been replaced on all our vessels with the newly-developed pulse-fishing lines, in combination with a sumwing.

The pulse-fishing lines have many benefits. There is much less contact with the seabed, so hardly any sand and stones get into the net. As a consequence there is less damage to the catch. And the quality of the fish is better. Moreover, less contact with the seabed means a significant fuel saving.

Another fishing technique is the fly-shoot method. In this method the fish is surrounded on the seabed by two long lines. The net, which rolls over the seabed, is on the end of the lines. The lines are gently turned inwards, stirring up dust clouds on the seabed, which lures the fish into the net. In this way there is relatively little seabed disturbance from the net, and the fish can be hauled on board the vessel quickly.

Home About us Sustainability Products Fleet News

The environmental impact of wild caught North Sea plaice and cod is similar to that of imported farmed fish such as salmon, tilapia and pangasius. This is the conclusion reached by LEI in a study published in January 2012. The environmental impact of plaice and cod is likely to have improved in leaps and bounds since then, however, following the introduction of technological innovations such as the PulsWing on our trawlers.

The results of the life cycle analysis (LCA) performed by LEI show that there is no significant difference between the energy use and climate change-inducing greenhouse gas emissions of plaice and cod fishing on the one hand and salmon, tilapia and pangasius on the other. The eutrophication potential of wild caught fish is much lower than that of the species of farmed fish studied.

Although plaice and cod fishing is more energy-intensive than meat production, its contribution to greenhouse gas production is similar to that of pork. This is because meat production is associated with emissions of other greenhouse gases besides CO_2, such as methane. Fish scores better than beef, but chicken scores slightly better than fish.

This LEI study paints a picture of the environmental impact of the Dutch fisheries sector. Much can be done to improve the score of North Sea fish given the potential for further fuel savings in the fisheries sector. Considerable improvements can also be made by implementing more innovative fisheries projects.

This study was carried out on behalf of Jaczon BV. The joint applicants of the project are W.G. den Heijer and Zn B.V., United Fish Auctions N.V. and Stichting de Noordzee. The study was carried out and financed on behalf of the Ministry of Economic Affairs, Agriculture and Innovation as part of the VIP 2011 programme. It was co-financed by the European Fisheries Fund (EFF) as part of its Investing in Sustainable Fisheries programme.

Environmental performance of wild-caught North Sea whitefish.

Annex 38

3D-tekening van de puls-Jackwing-Pro, het zwevende tuig waarmee de WR 109 zonder kabels op garnalen gaat pulsvissen.

Steun voor pulsvissen zonder kabel

Oesterkweek langs de Afsluitdijk 11-10-2014

DEN OEVER – Jan Simon de Haan (WR 109) en Dries Wiersma (WR 16) krijgen financiële steun voor innovatieprojecten, respectievelijk: Garnalenpulsvisserij zonder kabel en oesters kweken langs de Afsluitdijk.

In totaal gaat het om een subsidiebedrag van 185.000 euro. Pulsvissen zonder kabel krijgt 103.305 euro. Oesters langs de Afsluitdijk krijgt 80.650 euro. De helft komt uit het Europees Visserijfonds, de andere helft van de subsidie van de provincie Noord-Holland.

Sinds 2007 is bijna 1,4 miljoen euro Europese subsidie in Noord-Holland aan visgerelateerde projecten verleend, wat nog eens verdubbeld is met publiek geld van provincie en gemeenten. De huidige twee projecten zijn de laatste projecten die binnen de huidige regeling subsidie krijgen.

Annex 38

3D-tekening van de puls-Jackwing-Pro, het zwevende tuig waarmee de WR 109 zonder kabels op garnalen gaat pulsvissen. - Foto: C. Hameeteman

Voor de garnalenkotter WR 109 van...Wieringer Dries Wiersma (WR 16) is altijd op zoek naar kleinschalige, duurzame visserijactiviteiten. En naar alternatieven voor de veelgeplaagde palingvisserij. Hij vist al op paling, spiering, wolhandkrab, harder, zeebaars en zandkrabbetjes. Zou oesterkweek op de Waddenzee niet wat zijn?

Wiersma vist met fuiken langs de Afsluitdijk. Het idee is om in de vakken de ruimte tussen de fuiken te gebruiken bij het oesterkweekexperiment. Wiersma schetst: „De palen komen vier meter uit elkaar. Daartussen hangen we mandjes met oesterbroed, zoals ze dat in Frankrijk en Australië bijvoorbeeld ook al doen. Daar moeten platte oesters van hoogwaardige kwaliteit uitgroeien. We beginnen met een proefopstelling, om te kijken wat de invloed van het weer is in deze omgeving met veel stroming en wind."

Annex 38

De projectgroep is deze week voor het eerst bij elkaar gekomen. Mede-aanvrager en projectbegeleider is Ronald de Vos. Hij is naast schelpdierconsultant zelf ook oesterkweker (op het land), onder het merk Renart Boulon. De Vos ziet wel potentie in oesterkweek langs de Afsluitdijk. „Oesters worden in Nederland gekweekt op de bodem, in de Zeeuwse Delta. Het wat brakke water langs de Afsluitdijk is volgens mij goed voor oesters, die graag een beetje zoet water hebben af en toe", aldus De Vos.

Een uitdaging voor de experimenteerders vormen de 'ruwe' omstandigheden langs de dijk. „Het eerste deel van het project gaat dan ook over de technische zaken. Hoe houden de opstellingen zich? Hoe moeten we de mandjes precies ophangen? In het tweede deel onderzoeken we het biologische aspect, op basis van oesterbroed dat in de Waddenzee wordt verzameld."

Het project heeft een looptijd van twee jaar. Het subsidiebedrag van 80.650 euro is volgens De Vos bij lange na niet kostendekkend. Beide aanvragers steken er dus zelf ook veel geld in.

Annex 39

DATA

Netherlands
Fisheries Support Estimate (FSE)
Units of Local Currency: EUR

		START YEAR	END YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016
FSE	**FISHERIES SUPPORT ESTIMATE - TOTAL**	-	-	**123 611 622**	**95 975 861**	**98 418 456**	**88 615 483**	**84 149 689**	**89 035 243**	**94 046 075**	**86 004 448**	**97 343 959**
FSE NON	**FISHERIES SUPPORT ESTIMATE - Non Budgetary**	-	-	**95 957 295**	**93 799 594**	**95 082 800**	**84 504 773**	**72 588 623**	**72 231 778**	**72 098 775**	**70 000 000**	**70 000 000**
TIFN	0. TRANSFERS TO INDIVIDUAL FISHERS - Non Budgetary	-	-	**95 957 295**	**93 799 594**	**95 082 800**	**84 504 773**	**72 588 623**	**72 231 778**	**72 098 775**	**70 000 000**	**70 000 000**
MPS	0.A. Market price support	-	-									
FTC	0.B. Fuel tax concessions	-	-	95 957 295	93 799 594	95 082 800	84 504 773	72 588 623	72 231 778	72 098 775	70 000 000	70 000 000
FTC NLD1	*Fuel tax concessions*			*95 957 295*	*93 799 594*	*95 082 800*	*84 504 773*	*72 588 623*	*72 231 778*	*72 098 775*	*70 000 000*	*70 000 000*
FSE BUD	**FISHERIES SUPPORT ESTIMATE - Budgetary**	-	-	**27 654 327**	**2 176 267**	**3 335 656**	**4 110 710**	**11 561 066**	**16 803 465**	**21 947 300**	**16 004 448**	**27 343 959**
TIFB	I. TRANSFERS TO INDIVIDUAL FISHERS - Budgetary	-	-	27 654 327	13 315	380 255	0	332 476	65 410	5 038 055	185 638	2 162 778
IFINP	I.A. Transfers based on input use	-	-	0	13 315	380 255	0	332 476	65 410	5 038 055	185 638	2 162 778
IFINP VAR	I.A.1. Transfers based on variable input use	-	-									
IFINP FIX	I.A.2. Transfers based on fixed capital formation	-	-	0	13 315	380 255	0	332 476	65 410	5 038 055	185 638	2 162 778
IFINP FIX V	I.A.2.1. Support to vessel construction/purchase	-	-									
IFINP FIX M	I.A.2.2. Support to modernisation	-	-	0	13 315	380 255	0	332 476	65 410	5 038 055	185 638	2 162 778
IFINP FIX M NLD1	*EFF axis1 art 25: Investments on board of shrimp fishing vessels and selectivity*	*2008*	*2016*	*0*	*13 315*	*380 255*	*0*	*332 476*	*65 410*	*5 038 055*	*185 638*	*2 162 778*
IFINP FIX O	I.A.2.3. Support to other fixed costs	-	-									
IFINC	I.B. Transfers based on fishers income	-	-									
IFINC INS	I.B.1. Income support	-	-									
IFINC SIF	I.B.2. Special insurance system for fishers	-	-									
IFRPC	I.C. Transfers based on the reduction of productive capacity	-	-	27 654 327								
IFRPC NLD1	*EFF axis1 art 23: Public aid for permanent cessation of fishing activities*		*2008*	*27 654 327*								
IFMSC	I.D. Miscellaneous transfers to fishers	-	-									
GSSE	II. GENERAL SERVICE SUPPORT ESTIMATE	-	-	0	2 162 952	2 955 401	4 110 710	11 228 590	16 738 055	16 909 245	15 818 810	25 181 181
GSACC	II.A. Access to other countries' waters	-	-									
GSINF	II.B. Provision of infrastructure	-	-									
GSINF CAP	II.B.1. Capital expenditures	-	-									
GSINF ACC	II.B.2. Subsidized access to infrastructure	-	-									
GSMKG	II.C. Marketing and promotion	-	-									
GSCOM	II.D. Support to fishing communities	-	-	0	0	0	0	1 490 979	1 682 329	1 749 698	1 272 581	3 695 922
GSCOM NLD1	*EFF-axis4 art 45: Sustainable development of fishing communities*	*2008*	*2016*	*0*	*0*	*0*	*0*	*1 490 979*	*1 682 329*	*1 749 698*	*1 272 581*	*3 695 922*
GSEDU	II.E. Education and training	-	-									
GSRND	II.F. Research and development	-	-	0	307 292	1 203 036	1 985 957	3 359 770	8 287 272	7 744 290	7 546 229	14 485 259
GSRND NLD1	*EFF axis3: Innovation and better cooperation within the fisheries chain*	*2008*	*2016*	*0*	*307 292*	*1 203 036*	*1 985 957*	*3 359 770*	*8 287 272*	*7 744 290*	*7 546 229*	*14 485 259*
GSMNG	II.G. Management of resources	-	-	0	1 855 660	1 649 904	1 623 966	6 279 396	6 768 454	7 329 238	7 000 000	7 000 000
GSMNG EXP	II.G.1. Management expenditures	-	-									
GSMNG STK	II.G.2. Stock enhancement programs	-	-									
GSMNG ENF	II.G.3. Enforcement expenditures	-	-		1 855 660	1 649 904	1 623 966	6 279 396	6 768 454	7 329 238	7 000 000	7 000 000
GSMNG ENF NLD1	*Enforcement expenditures (Netherlands)*				*1 855 660*	*1 649 904*	*1 623 966*	*6 279 396*	*6 768 454*	*7 329 238*	*7 000 000*	*7 000 000*
GSMSC	II.H. Miscellaneous transfers to general services	-	-	0	0	102 461	500 787	98 445	0	86 019	0	0
GSMSC NLD1	*EFF axis5: Miscellaneous*	*2008*	*2016*	*0*	*0*	*102 461*	*500 787*	*98 445*	*0*	*86 019*	*0*	*0*
FCRC	III. COST RECOVERY CHARGES	-	-									
FCRRE	III.A. Cost Recovery Charges, for resource access rights	-	-									
FCRIN	III.B. Cost Recovery Charges, for infrastructure access	-	-									
FCRMG	III.C. Cost Recovery Charges, for management, research and enforcement	-	-									
FCROT	III.D. Cost Recovery Charges, Other	-	-									

Annex 40

Openbaarmaking EFMZV

Datum van de laatste bijwerking van de lijst van concrete acties: 31-12-2017

Europese Unie, Europees Fonds voor Maritieme Zaken en Visserij

ID nummer	Naam van de begunstigde	Community Fleet Registry identificatienummer	Naam van de concrete actie	Samenvatting van de concrete actie	Begindatum van de concrete actie	Einddatum van de concrete actie	Datum subsidie-vaststellingen	Totale subsidiabele uitgaven	Bedrag van de bijdrage van de Unie	Postcode van de concrete actie	Land	Vermelding van de betrokken Unieprioriteit	Resultaat, link naar website	Openstelling
16280000029	Coöp. Producen	n.v.t.	Dutch Seaf	Het project `Dut	20161216	20191231		645 879,71	245 291,61	8320 AC	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
16280000018	Varia Vis B.V. ,	n.v.t.	Waardevol	Verdere verbeteri	20161214	20191231		596 342,28	226 328,36	8320 AC	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
16280000030	Stichting Neder	n.v.t.	Afzetbevord	Het is een project	20170101	20191231		600 140,00	337 578,75	2583 DM	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
16280000031	Stichting Neder	n.v.t.	Afzetbevord	Het gaat om pror	20170101	20200517		611 100,00	343 743,75	2583 DM	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
16280000020	Stichting Neder	n.v.t.	Versterken	De consumptie va	20170101	20200515		535 000,00	300 937,50	2583 DM	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
16280000038	Holland Diamon	n.v.t.	ValFish to F	Visverwerker Holla	20170216	20191231		636 362,36	248 752,89	8321 MB	NL	UP5	n.v.t.	Afzetbevorderingsprojecten
17437000017	Seaweed Harves	n.v.t.	Zeewier inn	Aanvrager wil daa	20170901	20200831		963 238,83	361 214,55	4321 TD	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2017
17437000021	Coöperatieve Fr	n.v.t.	Innovatief I	Door een mondial	20170714	20200713		990 344,61	370 613,45	3012 CA	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2017
17437000001	Palingkwekerij K	n.v.t.	EELRICf2 V	Het doel van dit p	20170715	20191231		1 018 576,84	375 000,00	5571 XC	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2017
17437000007	Albatros Techn	n.v.t.	Nereus	Heerema Fabricat	20170713	20190331		1 701 739,67	375 000,00	3336 LH	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2017
17437000012	Kingfish Zeelan	n.v.t.	YELLOWTA	Het doel van dit p	20170901	20200831		566 578,56	212 466,96	4485 PA	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2017
16741000056	Roem van Yerse	n.v.t.	Oesterbroe	Het project is er	20170101	20191231		930 040,80	348 765,30	4401 KZ	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2016
16741000021	Bru 40 B.V.	n.v.t.	Innovatie e	Het project richt	20160701	20200123		970 538,00	363 951,75	4311 CV	NL	UP2	nog niet be	Innovatieprojecten aquacultuur 2016
15982000049	Coöperatie Kott	NLD198900	Overleving	Overleving platvis	20160301	20190331		842 019,00	450 000,00	8321 RV	NL	UP1	nog niet be	Innovatie Aanlandplicht Overlevingskans
15982000057	Redersverenigir	NLD198400	Real Fish E	Verdere verbeteri	20160601	20190518		797 428,05	448 553,25	2719 EK	NL	UP1	nog niet be	Innovatie Aanlandplicht Selectiviteit
15982000055	Nederlandse Vis	NLD200002	Netinnovat	De selectiviteit in	20160401	20181201		789 687,00	444 198,93	8300 AB	NL	UP1	nog niet be	Innovatie Aanlandplicht Selectiviteit
15982000056	Coöperatie Kott	NLD199602	Best Practi	Het project breng	20160301	20190331		560 661,56	313 502,25	8321 RV	NL	UP1	nog niet be	Innovatie Aanlandplicht Selectiviteit
17363000007	Nederlandse Vis	NLD201513	Ontwikkelin	Bij dit project is h	20170516	20191231		719 384,75	404 653,92	8300 AB	NL	UP1	nog niet be	Innovatieprojecten duurzame visserij
17341000007	ANONIEM	NLD198700	Aanschaf e	Aanschaf eerste v	20170817	20180622		325 000,00	56 250,00	8715 HW	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2017
17341000014	ANONIEM	NLD200200	Aanschaf e	Aanschaf eerste v	20170818	20171217		100 000,00	18 750,00	1777 DV	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2017
16361000012	ANONIEM	NLD199001	Aanschaf e	Aanschaf eerste v	20161228	20171128		750 000,00	56 250,00	9141 VK	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2016
16361000010	ANONIEM	NLD199001	Aanschaf e	Aanschaf eerste v	20161014	20171128		575 000,00	56 250,00	9744 DK	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2016
16361000007	ANONIEM	NLD200302	Aanschaf e	Aanschaf eerste v	20160629	20170129	20170418	890 500,00	56 250,00	1794 AV	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2016
16361000006	ANONIEM	NLD198901	Aanschaf e	Aanschaf eerste v	20160118	20161014	20170418	364 895,00	56 250,00	1771 MJ	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2016
15821000018	ANONIEM	NLD198700	Aanschaf e	Aanschaf eerste v	20151218	20161006	20170413	107 500,00	20 156,25	1777 MN	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2015
15821000019	ANONIEM	NLD198700	Aanschaf e	Aanschaf eerste v	20151218	20161010	20170413	107 500,00	20 156,25	1601 KC	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2015
15821000014	ANONIEM	NLD198800	Aanschaf e	Aanschaf eerste v	20151208	20161209	20170530	0	0	1779 EE	NL	UP1	n.v.t.	Investeringsregeling Jonge Vissers 2015
17648000012	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20170831	20181231		5 900,00	3 318,75	1779 GT	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000006	Coöp. Produc.or	n.v.t.	Productie-	Voorbereiding var	20170810	20181231		5 900,00	3 318,75	1780 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000008	Producentenorg	n.v.t.	Productie-	Voorbereiding var	20170824	20180731		5 900,00	3 318,75	4400 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000009	Redersverenigir	n.v.t.	Productie-	Voorbereiding var	20170828	20181231		5 900,00	3 318,75	2719 EK	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000011	Int. Garnalen P	n.v.t.	Productie-	Voorbereiding var	20170829	20181231		5 900,00	3 318,75	9885 TC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000010	Coöp. Producen	n.v.t.	Productie-	Voorbereiding var	20170828	20181231		5 900,00	3 318,75	8320 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000013	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20170831	20181231		5 900,00	3 318,75	4400 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000001	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20170801	20181231		5 900,00	3 318,75	1792 AE	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000003	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20170807	20181231		5 900,00	3 318,75	8300 AB	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017
17648000004	Coöp. Prod.org.	n.v.t.	Productie-	Voorbereiding var	20170807	20181231		5 900,00	3 318,75	8305 BK	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2017

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16181000006	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20160908	20170106	20170615	5 900,00	3 318,75	1792 AE	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000015	Coöp. Prod.org.	n.v.t.	Productie-	Voorbereiding var	20160913	20170331	20170615	5 900,00	3 318,75	8305 BK	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000018	Redersvereniging	n.v.t.	Productie-	Voorbereiding var	20160915	20170223	20170615	5 900,00	3 318,75	2719 EK	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000023	Int. Garnalen P	n.v.t.	Productie-	Voorbereiding var	20160916	20170106	20170629	5 900,00	3 318,75	9885 TC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000026	Coöp. Producen	n.v.t.	Productie-	Voorbereiding var	20160916	20170203	20170615	5 900,00	3 318,75	4401 LD	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000011	Coöp. Producen	n.v.t.	Productie-	Voorbereiding var	20160908	20170106	20170615	5 900,00	3 318,75	8320 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000020	Coöp. Produc.or	n.v.t.	Productie-	Voorbereiding var	20160914	20170106	20170615	5 900,00	3 318,75	1780 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000003	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20160913	20170106	20170616	5 900,00	3 318,75	8300 AB	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
16181000014	Coöperatieve Pr	n.v.t.	Productie-	Voorbereiding var	20160912	20170106	20170615	5 900,00	3 318,75	4400 AC	NL	UP5	n.v.t.	Productie- en afzetprogramma's voor producentenorganisaties 2016	
17424000020	Stichting Trans	n.v.t.	Op weg naa	Beroepsvissers vi	20171001	20200430		464 811,52	348 608,64	6813 KL	NL	UP1	n.v.t.	Samenwerkingsprojecten wetenschap en visserij 2017	
17424000023	Stichting Prose	n.v.t.	Kennissyst	Er is veel kennis c	20171201	20201201		506 739,34	380 054,50	3511 LG	NL	UP1	n.v.t.	Samenwerkingsprojecten wetenschap en visserij 2017	
17424000025	Good Fish Foun	n.v.t.	Een toekom	In dit project wor	20170613	20190612		310 887,62	233 165,71	3901 EH	NL	UP1	n.v.t.	Samenwerkingsprojecten wetenschap en visserij 2017	
16269000022	Ministerie van I	n.v.t.	Measureme	Dit project betref	20170701	20191231		280 000,00	210 000,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000003	Ministerie van E	n.v.t.	Datacollect	Het verzamelen v	20170101	20191231		16 000 000,00	12 800 000,00	2594 AC	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000015	Ministerie van E	n.v.t.	TransVIR2I	Het volgens de U	20160801	20181231		3 382 200,00	3 043 980,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000016	Ministerie van I	n.v.t.	Monitoring	Het ontwikkelen v	20180101	20190915		160 000,00	120 000,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000017	Ministerie van E	n.v.t.	Onderzoek	De effecten van d	20170701	20190801		1 000 000,00	750 000,00	2592 AL	NL	UP1	n.v.t.	Overheidsopdrachten	
16269000019	Ministerie van E	n.v.t.	TransVIR2I	Het versterken va	20160701	20190701		3 167 000,00	2 850 300,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000002	Ministerie van E	n.v.t.	Datacollect	Het verzamelen v	20140101	20161231		16 000 000,00	12 800 000,00	2594 AC	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000013	Ministerie van E	n.v.t.	TransVIR2I	Het versterken va	20160901	20170707		345 000,00	310 500,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000014	Ministerie van E	n.v.t.	TransVIR2I	Het versterken va	20160101	20160630		60 000,00	54 000,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000007	Ministerie van I	n.v.t.	Studies on	Het project heeft	20170223	20171115		100 000,00	75 000,00	4401 NT	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000012	Ministerie van E	n.v.t.	Expertisece	Het project heeft	20160301	20160701		80 000,00	72 000,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000008	Ministerie van I	n.v.t.	School-edu	Het project heeft	20170619	20170901		550 000,00	412 500,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000009	Ministerie van I	n.v.t.	Developme	Het project heeft	20151001	20180630		280 000,00	210 000,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000010	Ministerie van I	n.v.t.	Implement	Het project heeft	20161120	20181201		1 200 000,00	900 000,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000011	Ministerie van E	n.v.t.	Verbeteren	Het project heeft	20150101	20171231		2 660 000,00	2 394 000,00	2592 AL	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000006	Ministerie van E	n.v.t.	Project Doc	Het doorontwikke	20140101	20171231		4 454 000,00	4 008 600,00	2594 AC	NL	UP3	n.v.t.	Overheidsopdrachten	
16269000021	Ministerie van I	n.v.t.	Two studies	Studie naar behe	20160616	20171121		60 000,00	45 000,00	2597 JG	NL	UP6	n.v.t.	Overheidsopdrachten	
16269000005	Ministerie van E	n.v.t.	Verlenging	Vissers onderstel	20160101	20161231		700 000,00	525 000,00	2594 AC	NL	UP1	n.v.t.	Overheidsopdrachten	
16269000004	Ministerie van E	n.v.t.	Uitzet glas-	Het uitzetten van	20150929	20161231		375 000,00	281 250,00	2594 AC	NL	UP1	n.v.t.	Overheidsopdrachten	
16269000018	Ministerie van E	nog niet be	Impact Ass	Uitvoeren van eer	20160101	20200601		2 500 000,00	1 875 000,00	2595 AL	NL	UP1	n.v.t.	Overheidsopdrachten	