

Electric Pulse Fishing – A shocking Approach to Beam Trawling

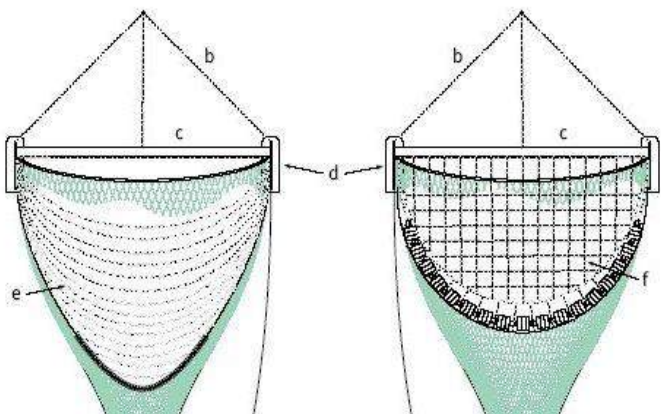
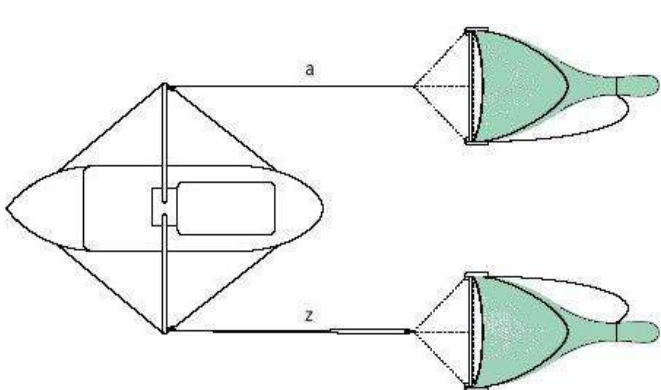


Jeremy Percy
Executive Director

Low Impact Fishers of Europe [LIFE]

Presentation Structure

- Traditional Beam trawling
 - Operation
 - Impacts
- Electric Pulse trawling
 - Operation
 - Impacts
 - Discussion



Beam Trawling – nothing new

- A petition was presented to Parliament in 1376 calling for the prohibition of a "subtlety contrived instrument called the *wondyrchoum*". This was an early beam trawl with a wooden beam, and consisted of a net 6 m (18 ft) long and 3 m (10 ft) wide.
- “of so small a mesh, no manner of fish, however small, entering within it can pass out and is compelled to remain therein and be taken...by means of which instrument the fishermen aforesaid take so great abundance of small fish aforesaid, that they know not what to do with them, but feed and fatten the pigs with them, to the great damage of the whole commons of the kingdom, and the destruction of the fisheries in like places, for which they pray remedy”
- Thus, already back in the Middle Ages, basic arguments about three of the most sensitive current issues surrounding trawling - the effect of trawling on the wider environment, the use of small mesh size, and of industrial fishing for animal feed - were already being raised

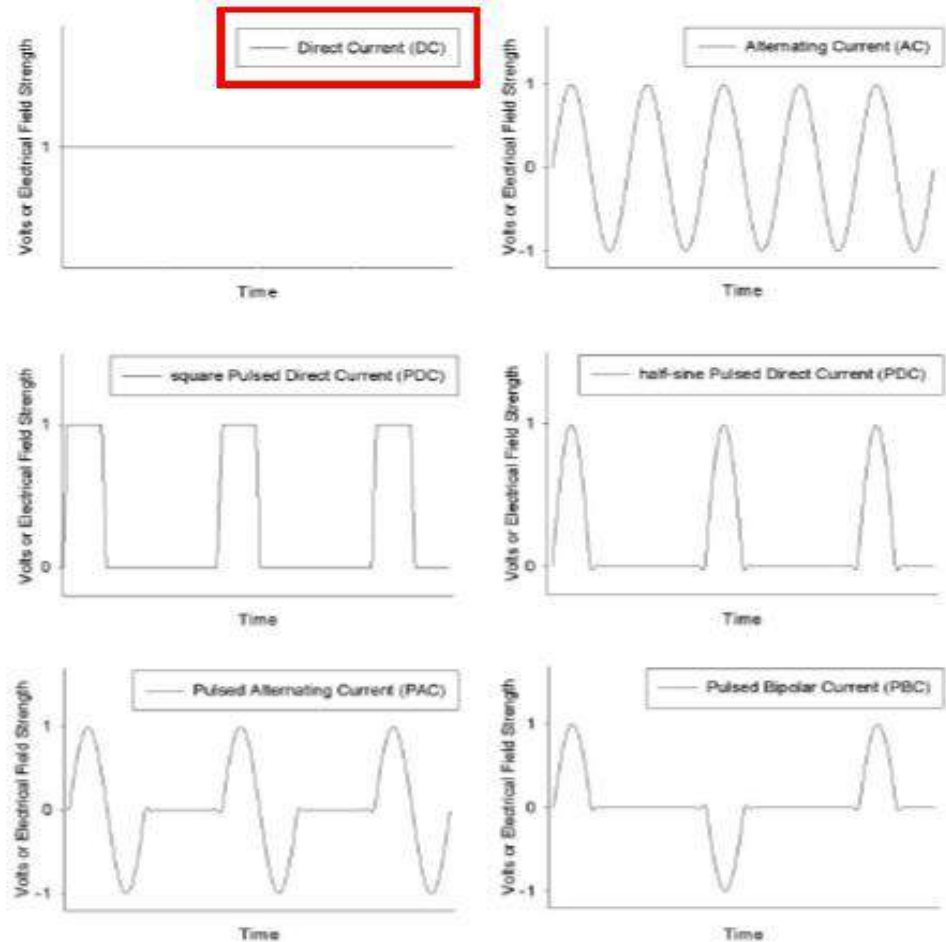
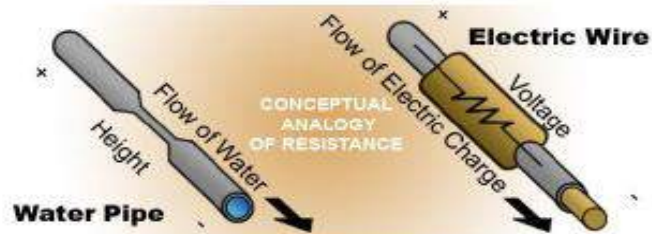
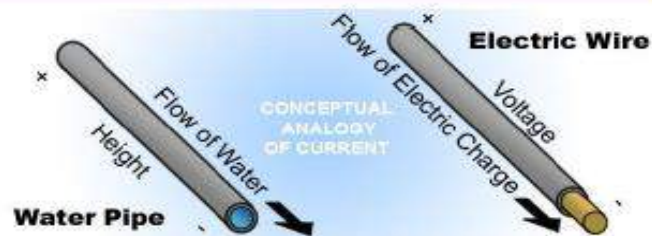
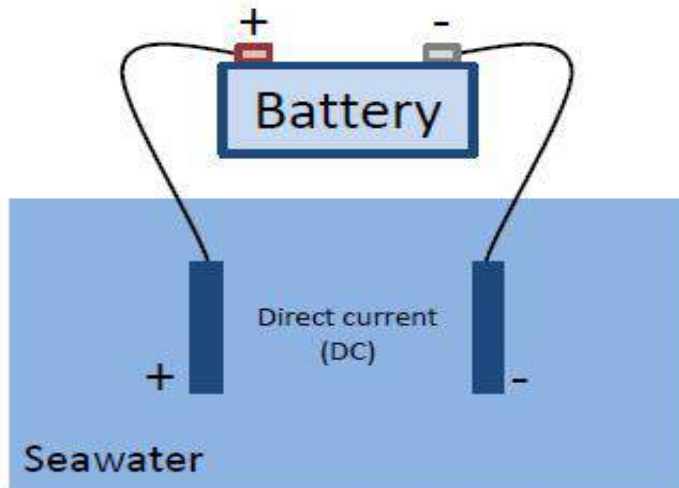
Beam Trawling – Issues:

- Benthic Impacts
- Changes in benthic communities
- By Catch
- Discard rate
- Carbon footprint
 - Fuel use per kg landed fish: 2.13 euro
 - Fuel cost as percentage of revenues; 52%
 - Fuel use per day at sea: 7,311 L
 - Net Profit 2013: beamtrawl -1.4 mln. Euro
 - [ref: Mike Turenhout NL]

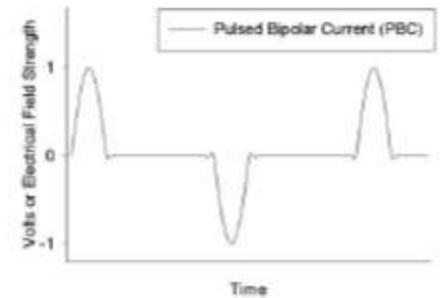
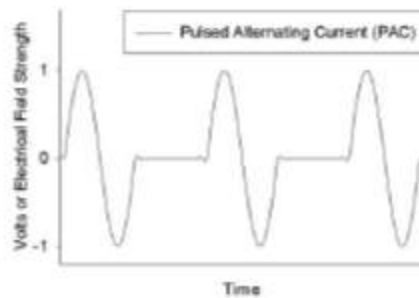
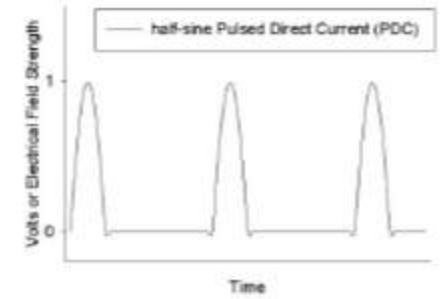
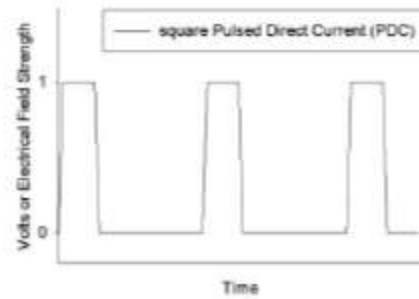
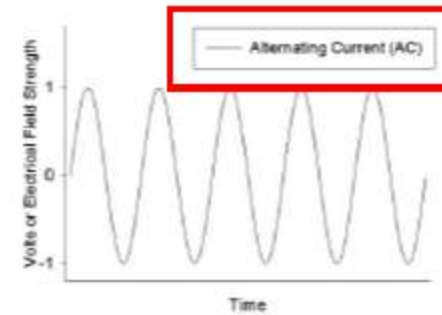
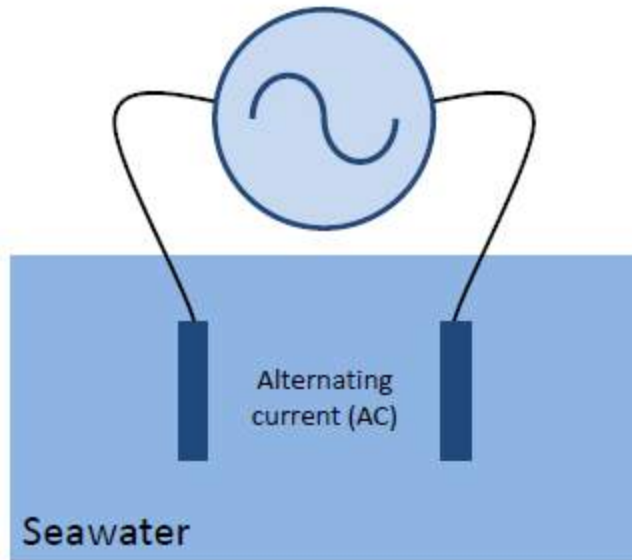
Pulse Trawling

With thanks to Bart Verschueren for the following technical slides:

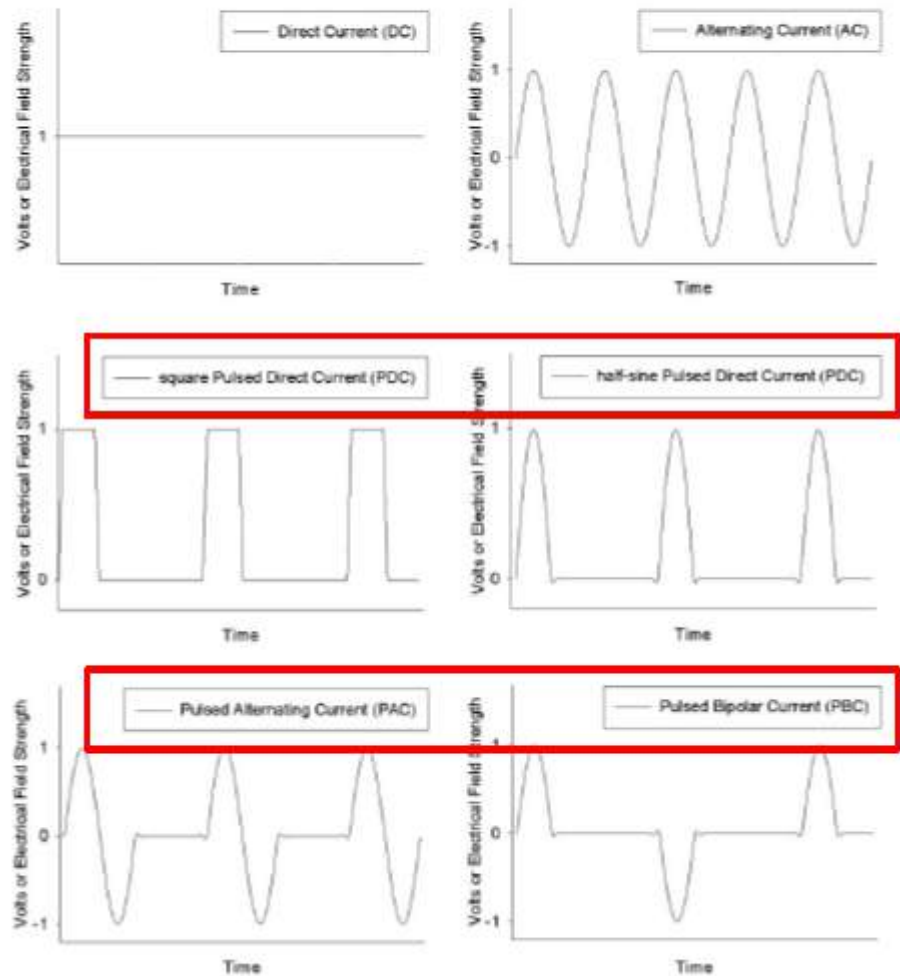
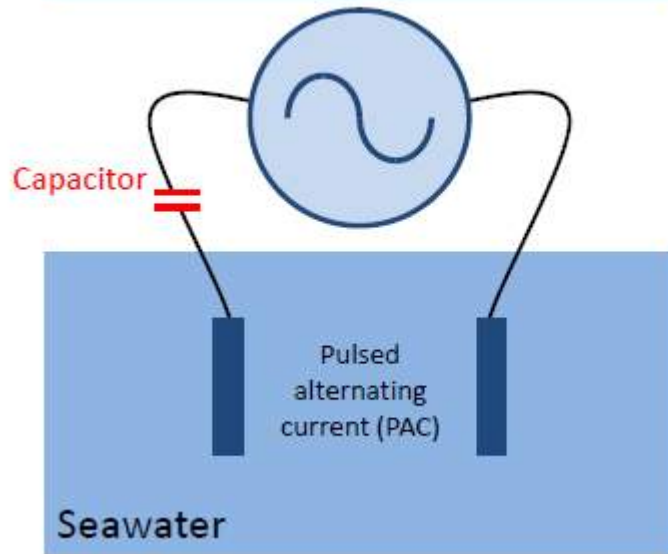
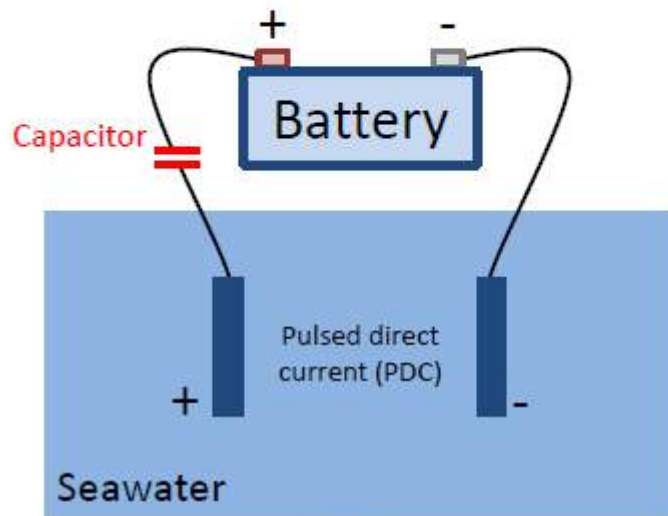
Some basic electrical principles



Some basic electrical principles



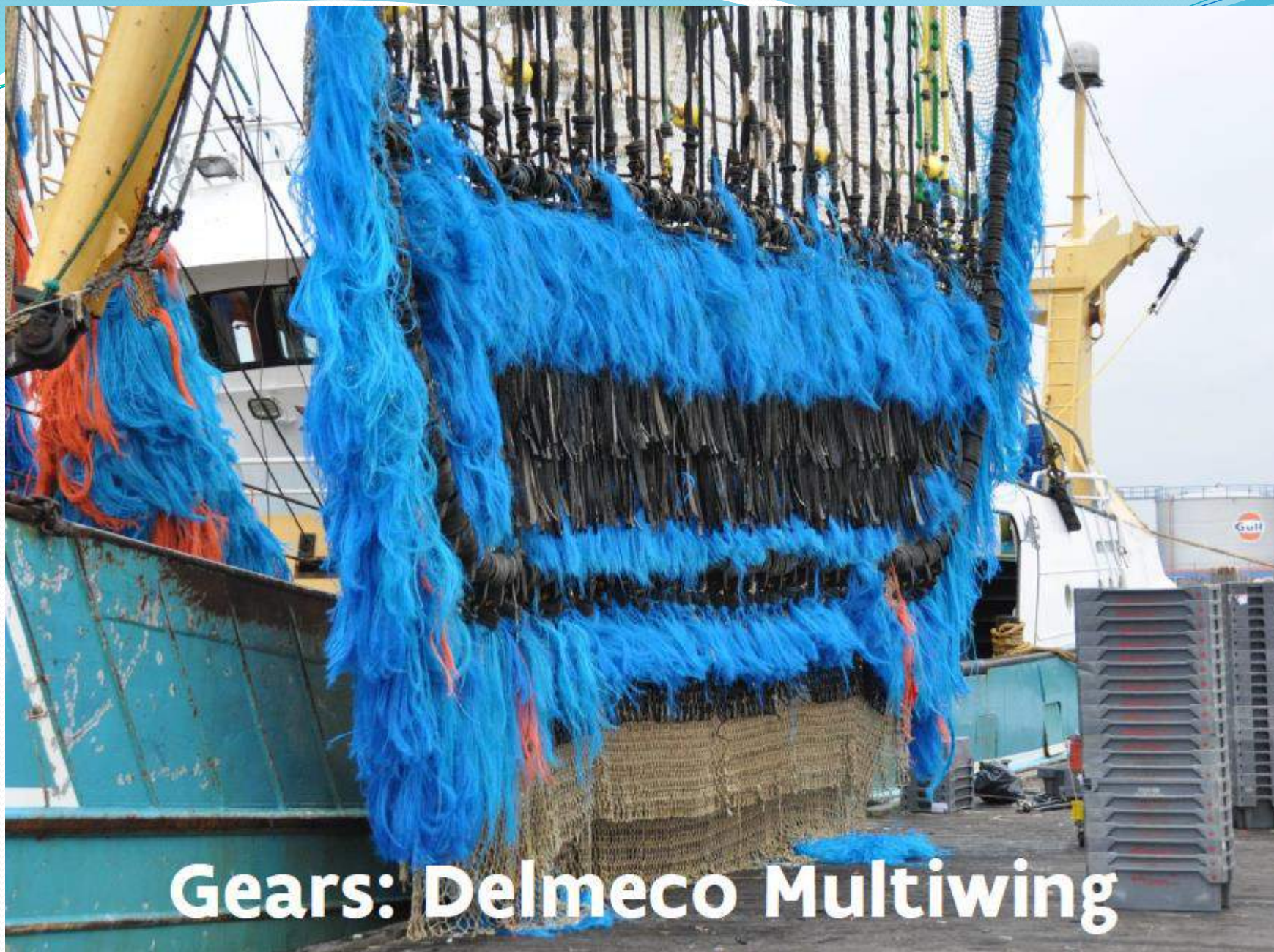
Pulse Fishing



- Playing around with pulse parameters:
 - Pulse frequency (Hz)
 - Pulse duration (ms)
 - Pulse shape
 - Pulse amplitude (V)
- Allows targetting different species
 - Animal muscles react differently according to various stimuli
 - Taking into account the natural behaviour
 - Cramp pulse (Sole)
 - Fright pulse (Shrimp)

Gears: Delmeco Multiwing





Gears: Delmeco Multiwing



Gears: Eurocutters

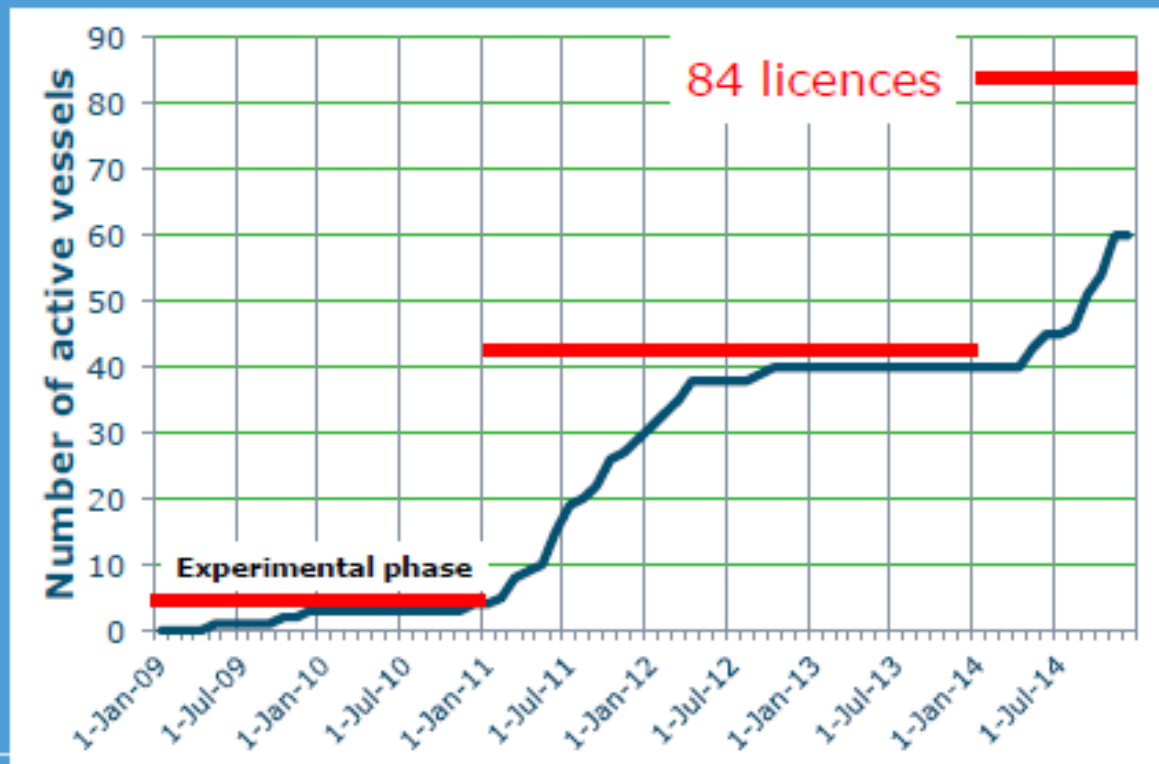


Gears: HFK SumPuls

Development

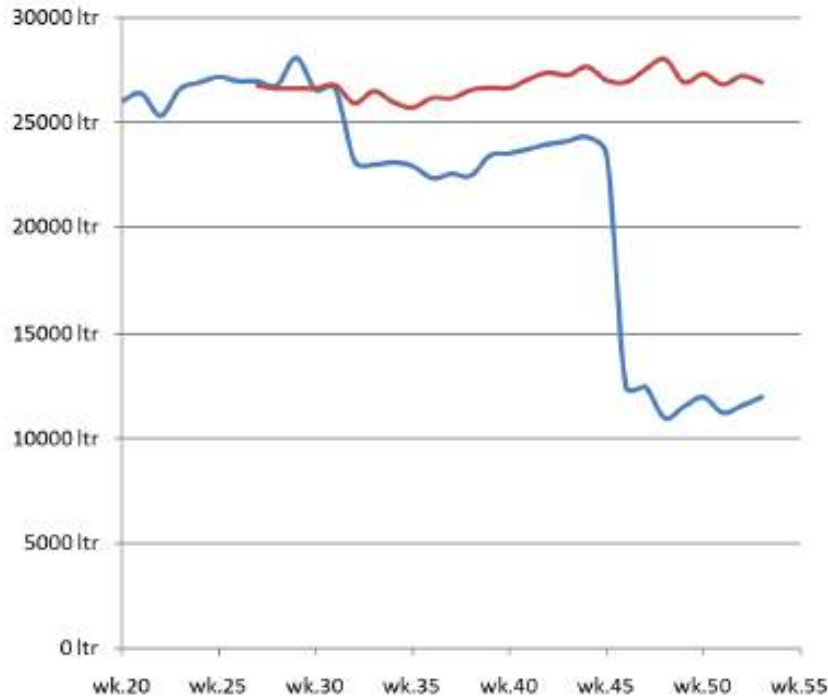
- 1988 – EU Ban on use of electricity [850/98]
- 1992-2004 – development of a pulse system by Verburg-Holland Ltd
- 2004-2006 – pilot project on a commercial vessel
- 2006 – beginning of ICES evaluations
- 2007-2010 – Pulse wing study group [fuel crisis]
- 2008 – NL Fishing with Headwind Report – boost for innovation
- 2009 – EU gives 5% derogation for pulse trials to member state beam trawl fleets –EU 43/2009
- 2010 – 5 Dutch beam trawlers convert to pulse fishing
- 2011- present, dramatic increase via CFP Article 14 for projects in support of “avoidance, minimisation and elimination of unwanted catches in a fishery....

Number of pulse trawlers in North Sea

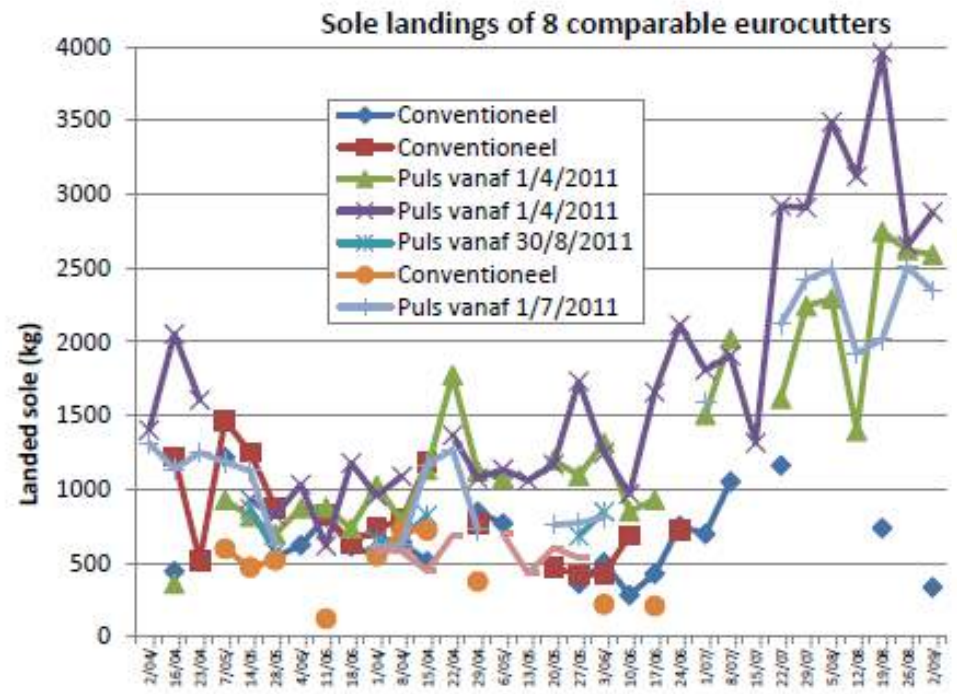


Currently over 100 pulse trawlers, 85 NL; 12 UK; 10 DE, BE 1
Average cost of conversion; £300,000....

Why Pulse Trawling?

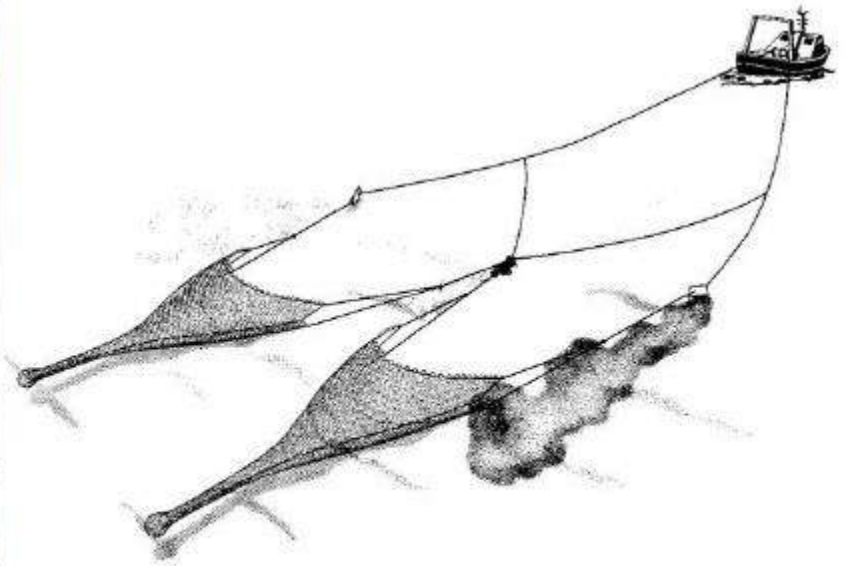


TX36 GASOLIE
TX38 GASOLIE

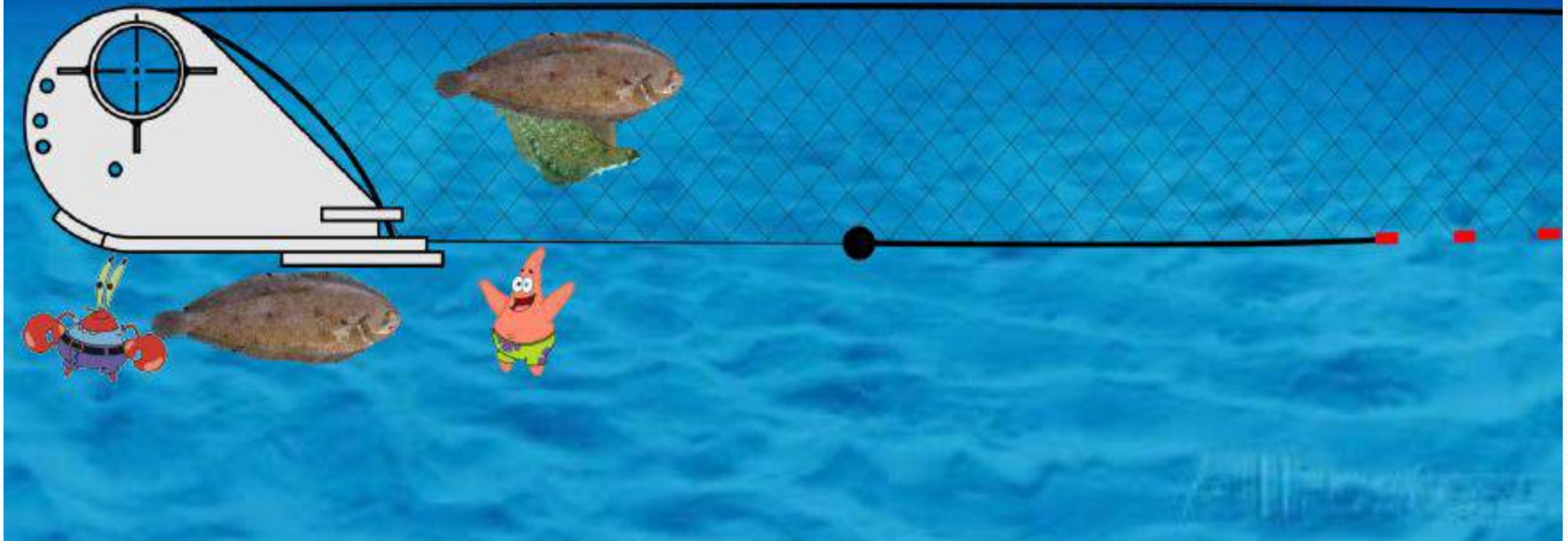


Future applications?

- Pilot Twinrig Pulse: summer 2015
- Masterplan Sustainable Fishery
- MDV 1: First in a series of many?



Possible solution: **Electrified** BRP



eBRP: Preliminary results

Electric stimulation on a BRP:

- Is not affecting the release of benthos/debris
- Helps to retain marketable sole
- Enables larger BRP mesh sizes to be used, increasing the release of benthos, debris and undersized fish without commercial losses
- Further development



Why 2:

Dutch Wadden Sea Shrimp fishery; Year round monitoring 2013:

- Commercial Shrimp +2%
- Small Shrimp -21%
- Fish / Benthos -66%
- Drag Resistance -23%
- Seabed Contact -60%

North Sea [Sgelectra Trials 2012] compared to beam trawl:

- Fuel consumption: -40% to -50%
- Net earnings: + 150%
- Fewer discards: -30 to -40%
- More Sole [expensive], less Plaice [cheap].....

Turenhout Wageningen Study:

- Fuel/Kg fish landed: Beam 2.13 Pulse 1.89
- Fuel use per day: Beam 7311 Pulse 4017
- Net profit: Beam -1.4m Pulse +8.4m

Why not? [perhaps]

- Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know.

Donald Rumsfeld Secretary of Defence US

- There isn't any way of putting the Genie back in the bottle

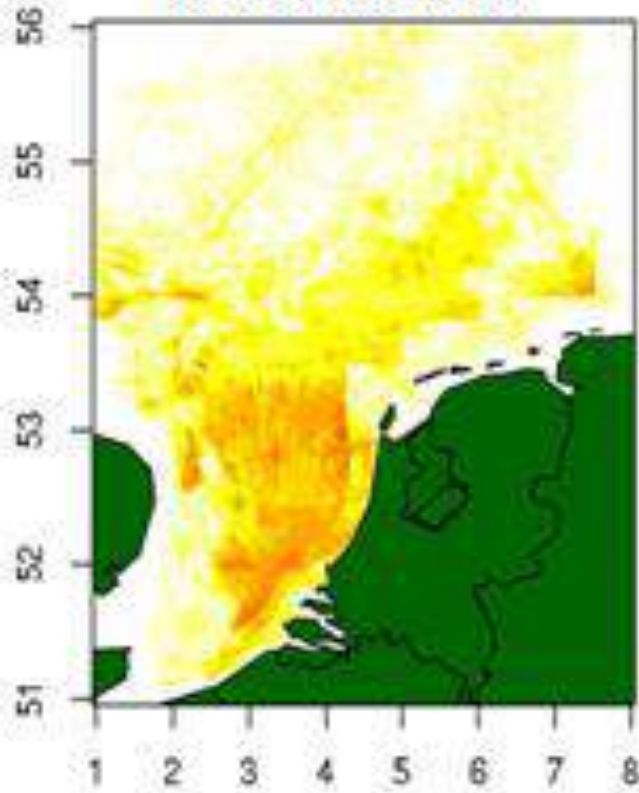
Edward MacMahon

Why Not:

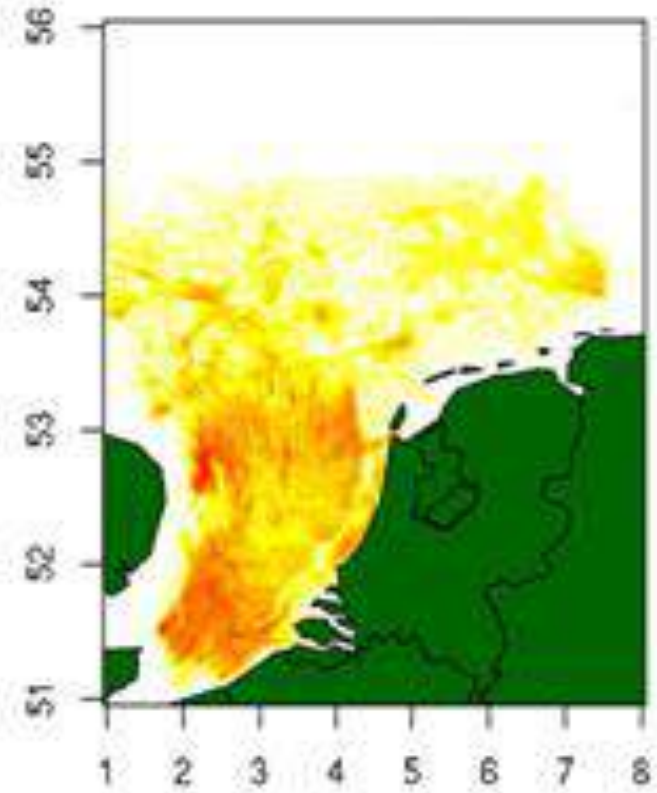
- “100+ pulse vessels, little research, shifting to new soft ground, no effective research on uncaught biota and reports of significant damage to fish, both caught and left.
- Article 6 Habitats Directive: “until satisfactory Before, After, Control, Impact science has been carried out..... do not believe that an absence of adverse effects on site integrity can be proven [*Client Earth*]
- “relevant information” will be collected but this has yet to be done
- Research projects “will start in 2015 and take 4 years”
- “research into this fishery is just into its infancy” [2015]
- “Decision framework and models are not yet fully developed”!
- Dutch pulse trawl research programme is:
- Ambitious
- Funding not secured yet
- There is far from “adequate knowledge of the impacts of the fishery on the ecosystem”.....

4. Change distribution pulse trawlers: consequences for ecosystem effects

Tickler chain beam trawls

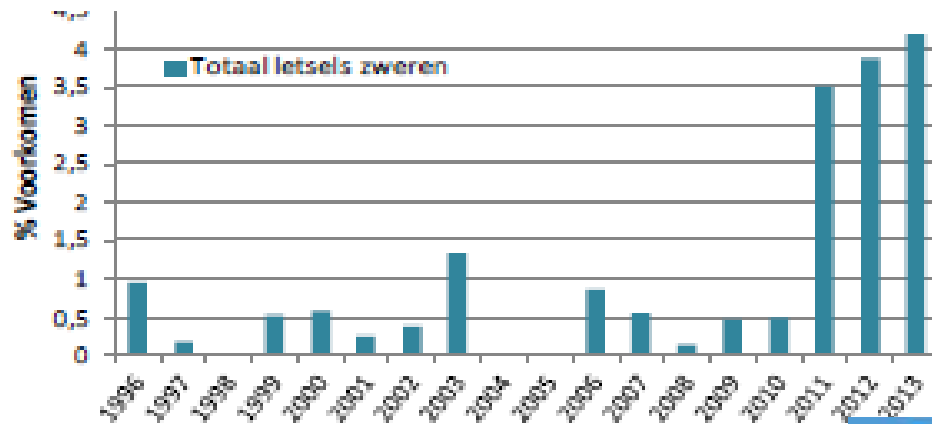


Pulse trawls



Physiological Effects

% dab with ulcers (Belgian coast)

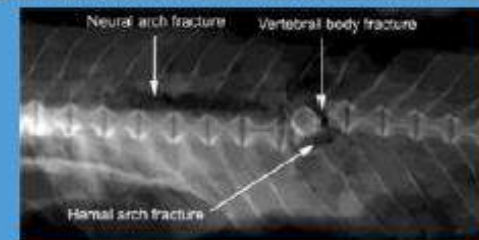


(ILVO: Devriese, L., 2013)



Experiments: Injuries in COD

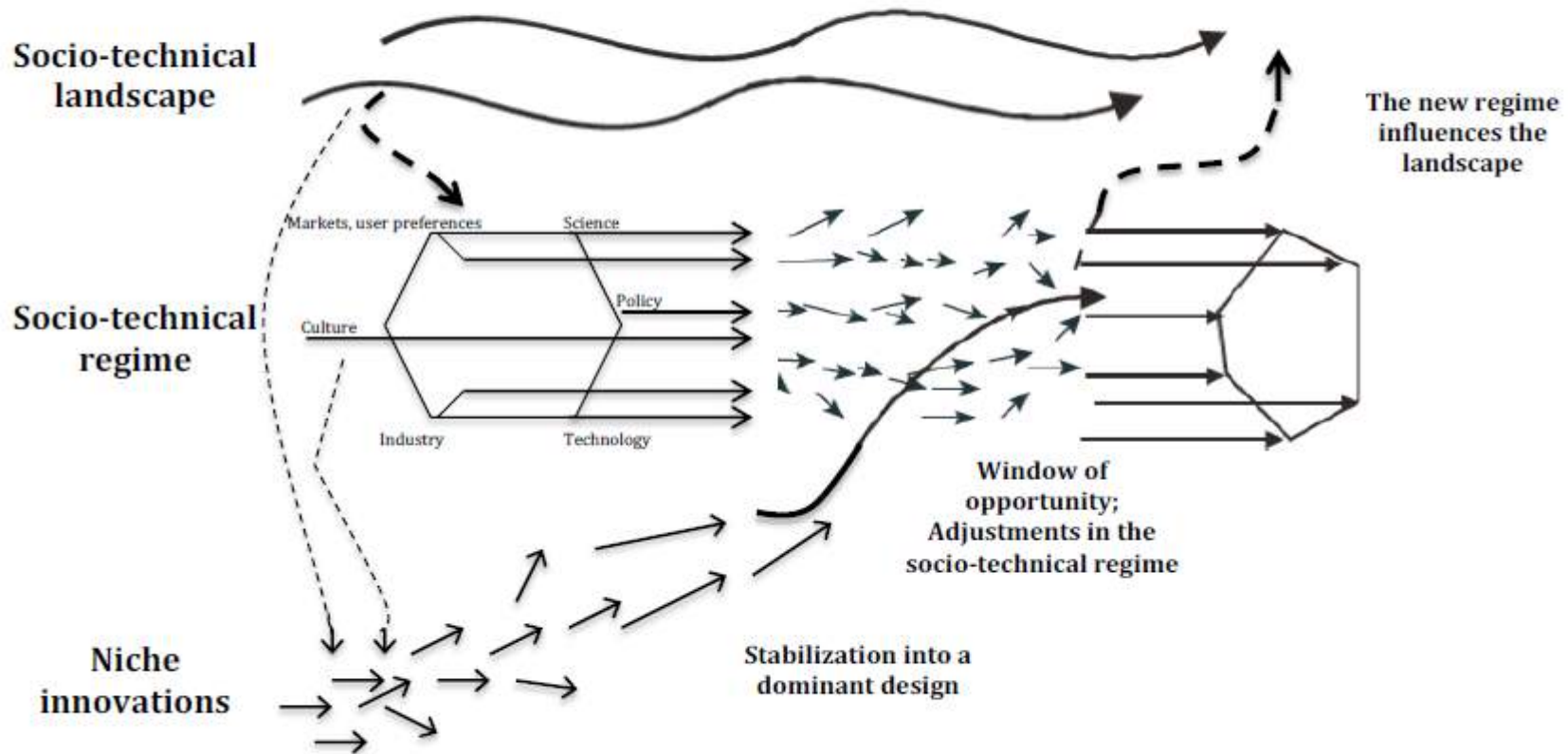
- Wild cod
 - 4% (1/25)
- Aquaculture cod
 - 0% (0/145)
 - 2% (1/53)
 - 17% (5/29)
 - 48% (125/260) large cod
 - 0% (0/122) small cod



Fisher's observations:

- “It’s like fishing in a graveyard after the pulse trawlers have been in the area, virtually everything is dead”
- “This is absolutely devastating for us because we have never caught so many fish that were already dead”
- “I have fished there for 30 years and have never seen anything like it [electric fishing].
- “They are just sitting there, hoovering up the Sole waiting to go up the Thames to spawn”
- “we told our authorities that the damage was caused by the electric trawlers but they didn’t believe us”
- NSAC Pulse Group: “we should learn from this case how a new gear is introduced in the EU”

Multi-level perspective on transitions (Geels 2011)



Discussion

- Marine equivalent of Fracking
- Has very significant benefits over traditional beam trawling:
 - Reduction of oil consumption
 - Reduction of bottom impact
 - Reduction of swept area
 - Increased selectivity
- Poses a whole new series of concerns:
 - ❑ Impact of pulse on fish & benthos
 - ❑ Impact of pulse on bottom
 - ❑ New areas can be fished
 - ❑ Increased efficiency
 - ❑ Competitive advantages [how many and who?]
- Hard Fact: It's not going away anytime soon [Genie in the bottle] but vital that research programmes are funded and undertaken before any further increase in effort or spatial extent permitted and specific management initiatives introduced without delay

So long and thanks for all the fish.

