ILVO
Institute for Agricultural and Fisheries Research

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European Parliament

Technological innovations: from mechanic to electric stimulation

As presented at the BENTHIS Final Symposium 14 June 2017

Brussels, 21 June 2017

Presenter: Hans Polet

Effects of electric pulse fields on marine organisms

- A wide range of studies available
- This presentation, focus on seafloor impact

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The Benthis project
North Sea case study

- Partners: IMARES, LEI, CEFAS, UNIABDN, Marlab, IFREMER, DTU-Aqua, SME07, SME08, SME17, FPS Economy Belgium, ILVO

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Beam trawling and seafloor impact

- Once upon a time …

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Beam trawling and seafloor impact

- Today… ?

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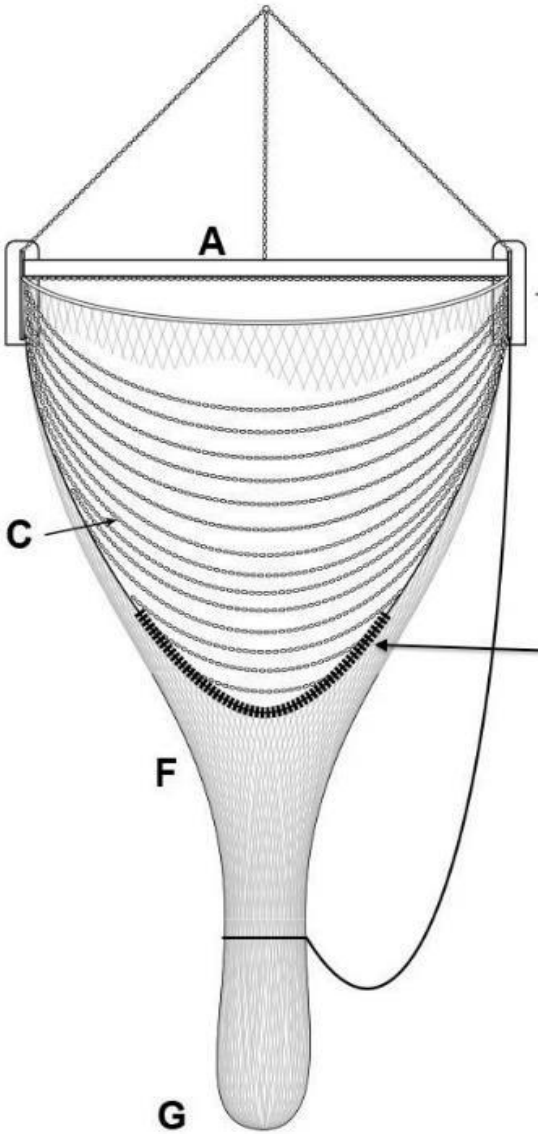
The flatfish beam trawl



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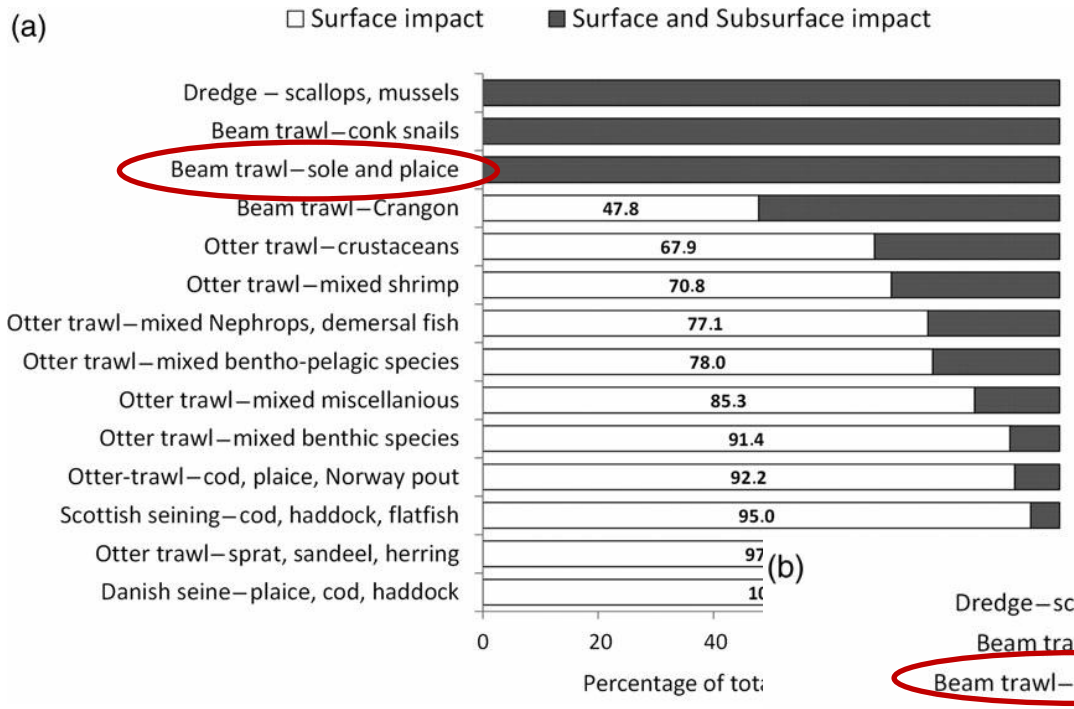
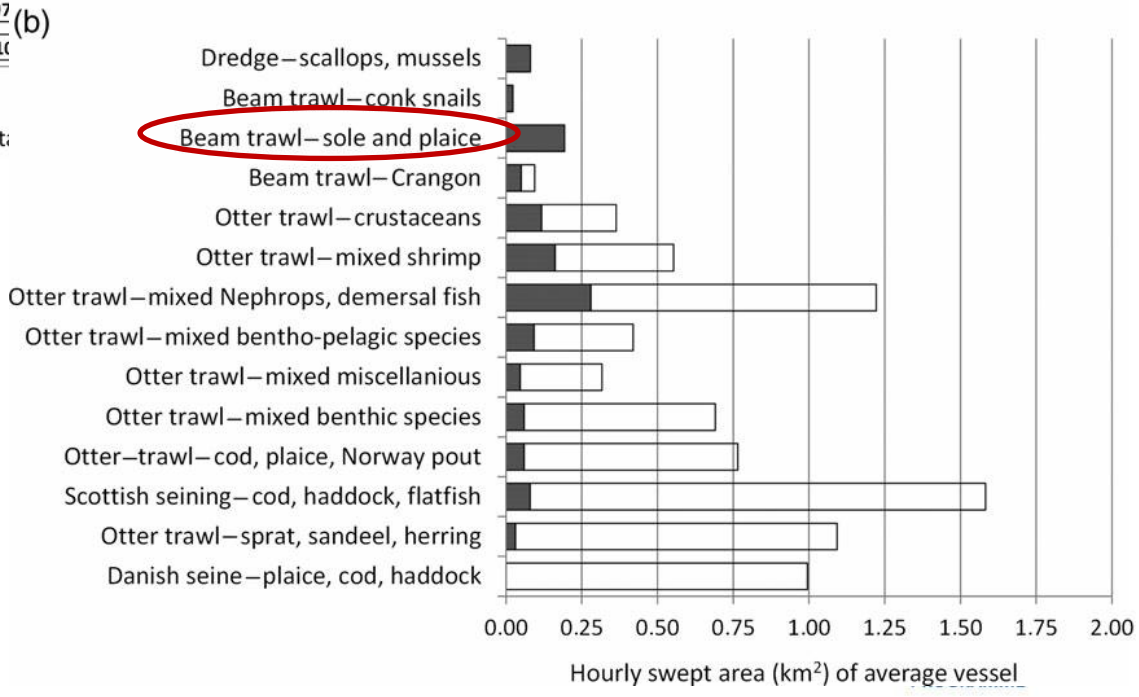
Footprint as swept area – surface & subsurface





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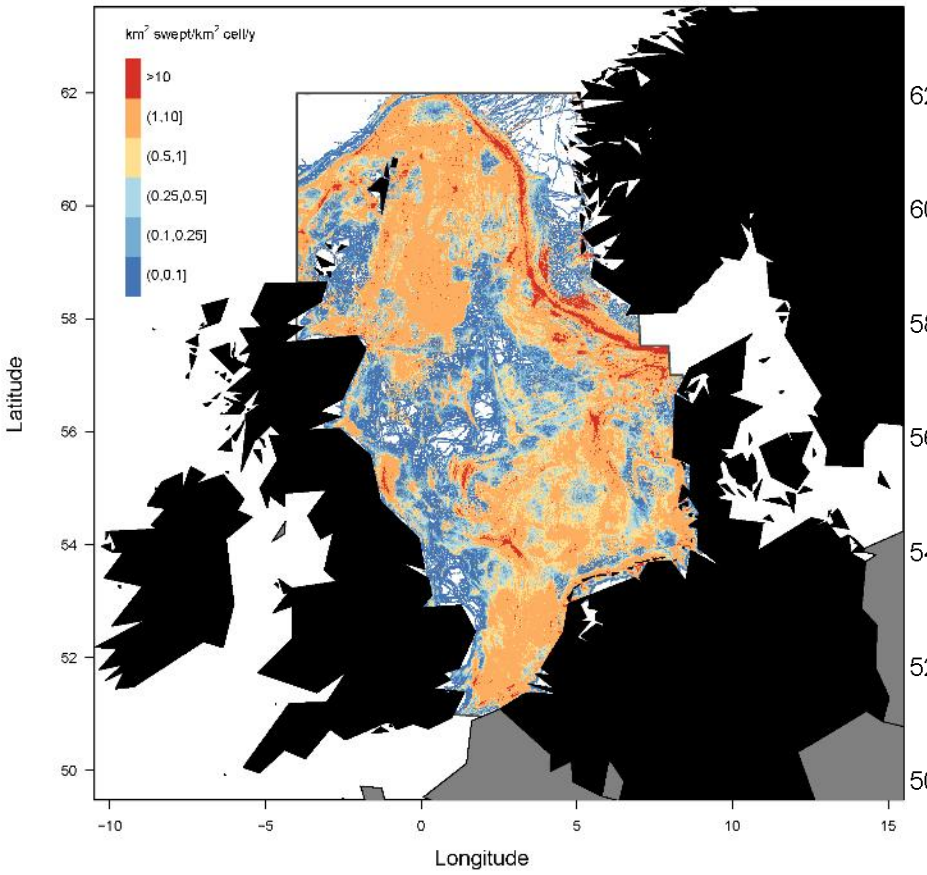
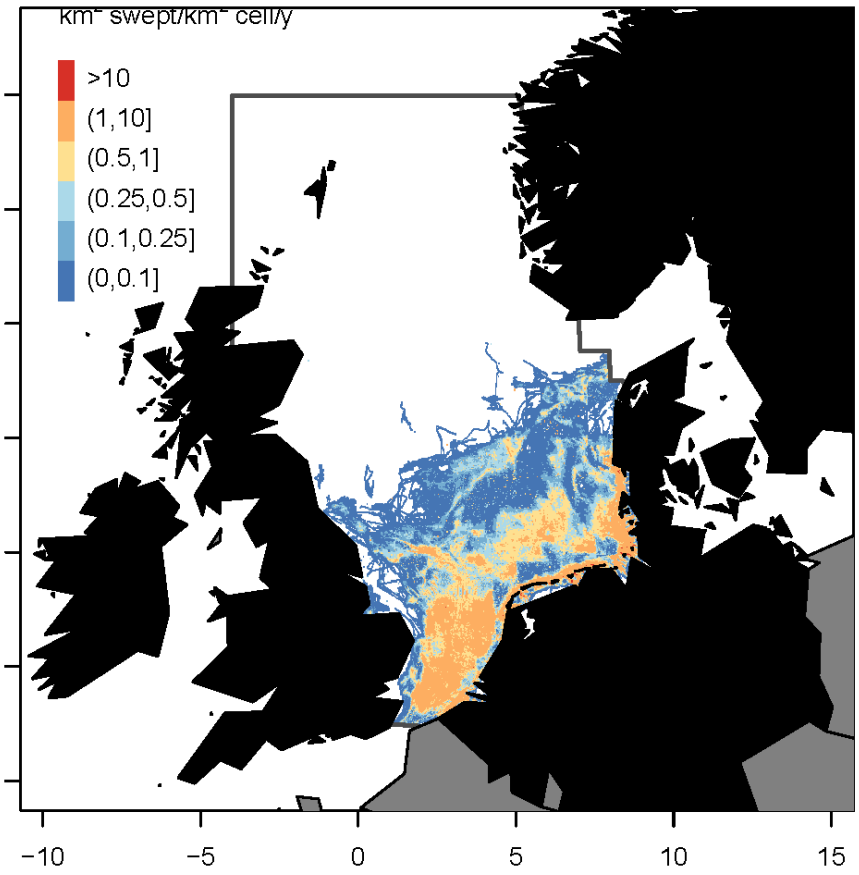
The footprint on maps

All towed gears



Beam Trawl



Combine this with sensitivity maps !

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Proposed useful alternatives for fishing gears

Beam trawl versus **pulse trawl**

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Beam trawl versus pulse trawl

- New discussion…

… with more scientific knowledge !

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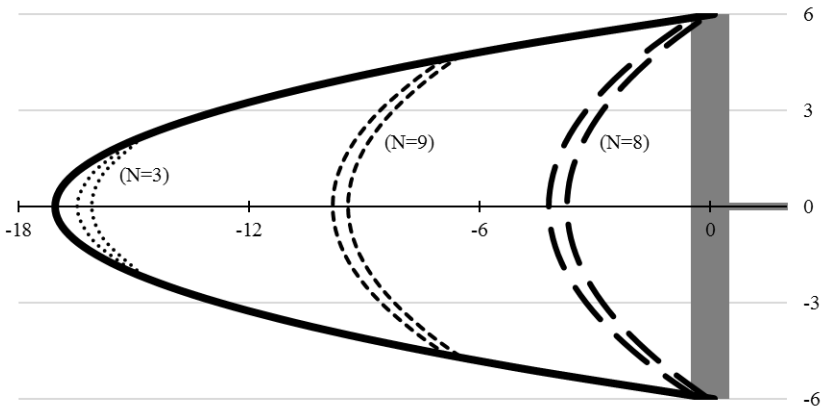
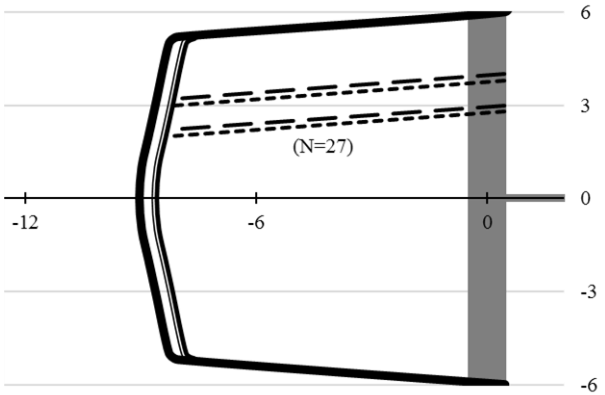
Beam trawl versus pulse trawl





V-shaped groundrope

Mechnaical stimulation by chains

High towing speed (6-7 kn)

Straight groundrope

Pulse stimulation by electrodes

Lower towing speed (5 kn)

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Beam trawl versus pulse trawl – sea trials

Flatfish: Sea trials - BACI

- ✓ **Sea trials – comparison of impact tickler vs pulse**
  - Benthic dredge
  - SPI
  - Boxcorer
  - Sediment-sledge
  - Multibeam (acoustic)
  - Catch comparison
  - Catch Damage Index (injuries)
  - Stomach analysis

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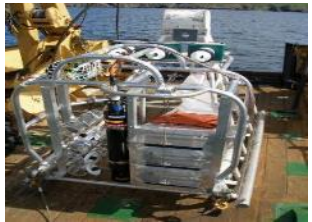

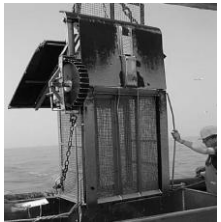

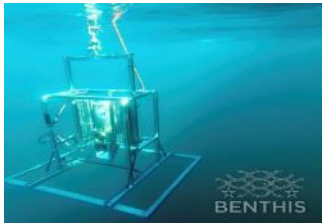

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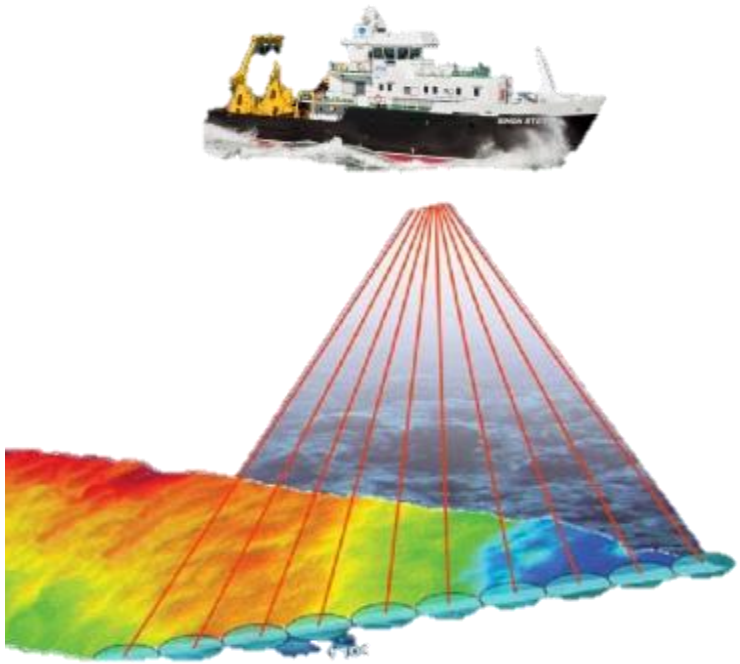
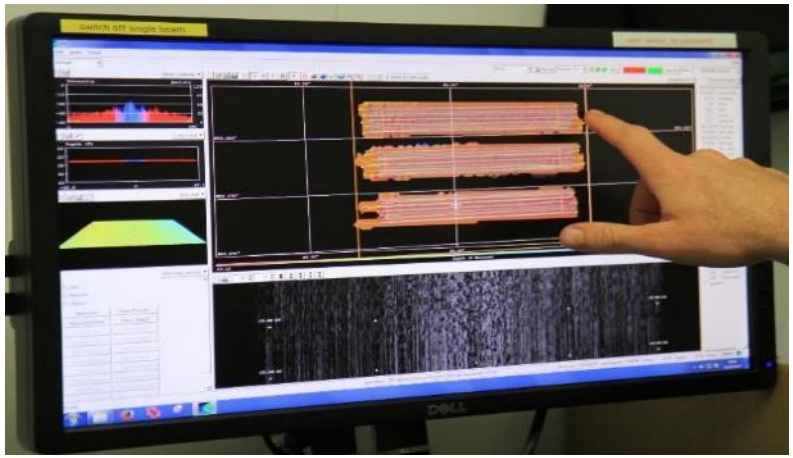
Beam trawl versus pulse trawl – sea trials

Multibeam recordings





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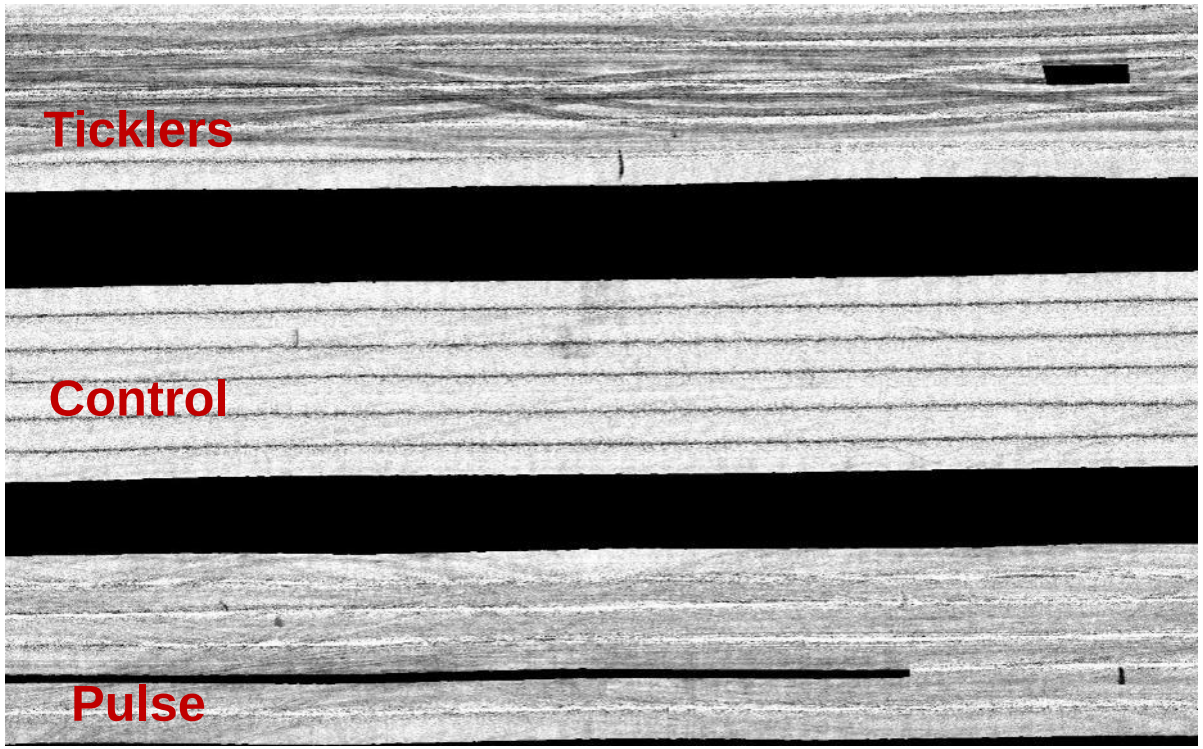
Beam trawl versus pulse trawl – sea trials

Multibeam recordings



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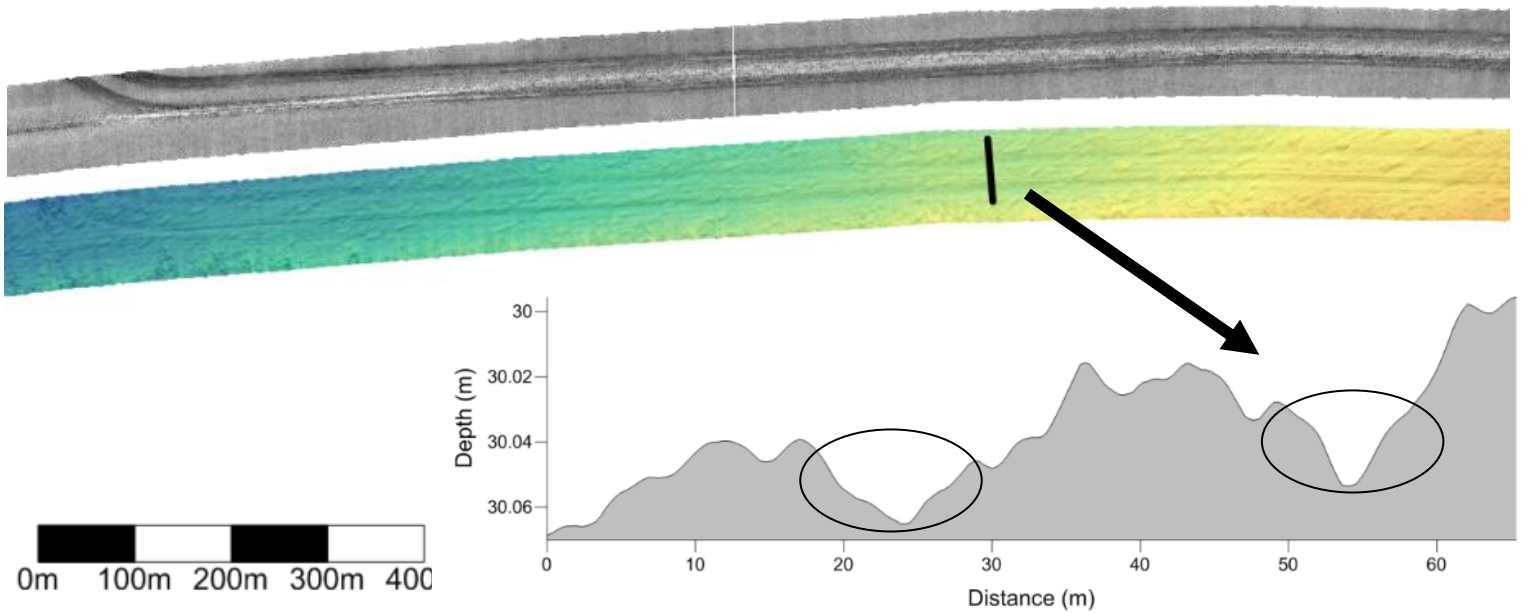
Beam trawl versus pulse trawl – sea trials



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Beam trawl versus pulse trawl – sea trials

Multibeam recordings

Average depth of the trawl track

	Tickler chain beam trawl	Pulse trawl
2013	2.0 cm	1.2 cm
2014	1.5 cm	0.9 cm

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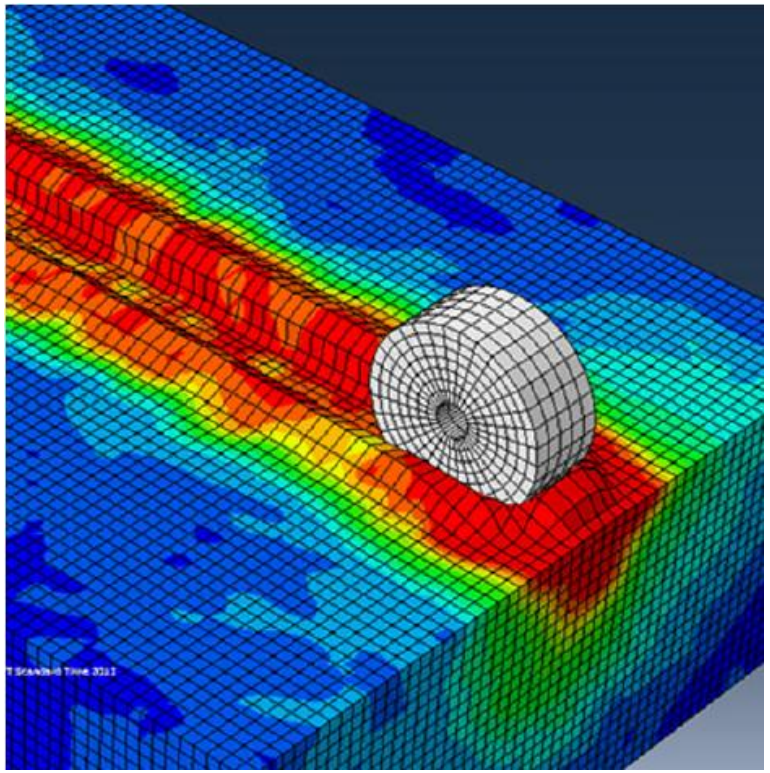
Beam trawl versus pulse trawl – sea trials

Multibeam recordings compared to modelling results



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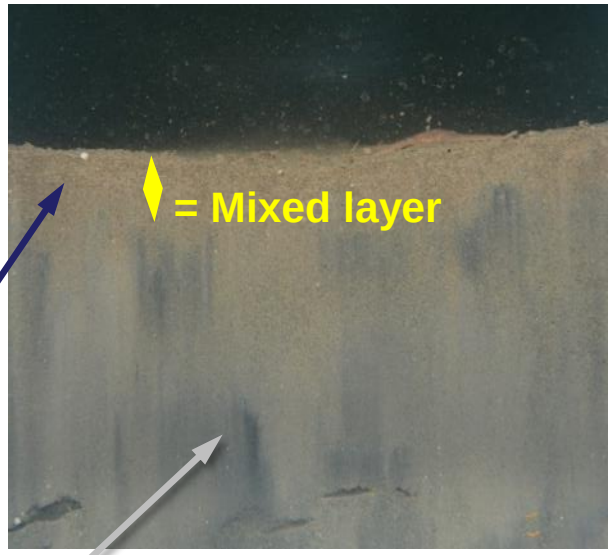
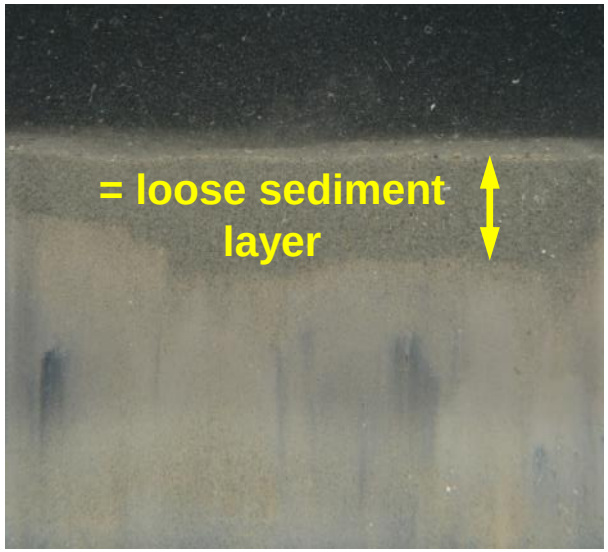
Beam trawl versus pulse trawl – sea trials

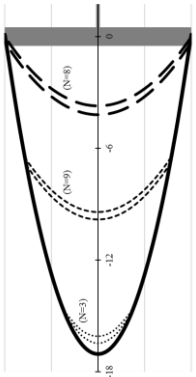
SPI

BEFORE

AFTER

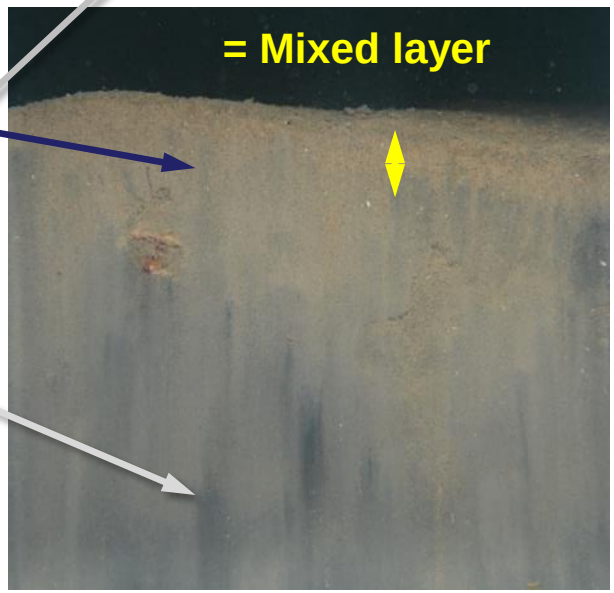


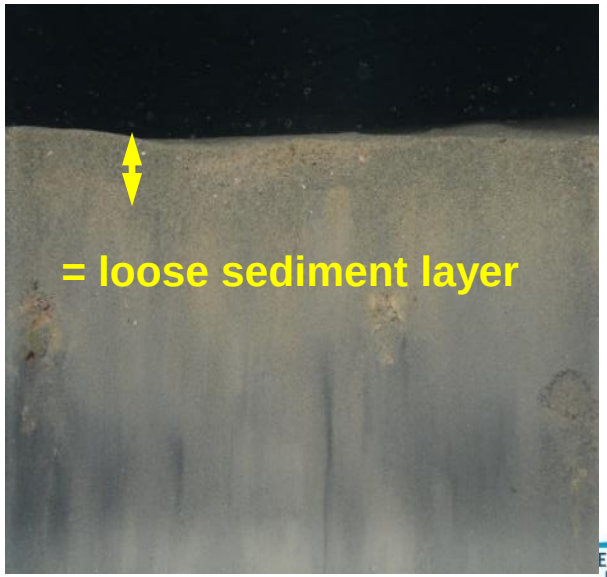


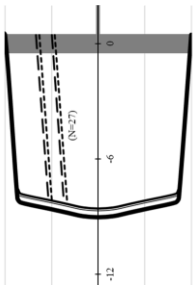


Brown = oxidised sediment

Grey = reduced sediment







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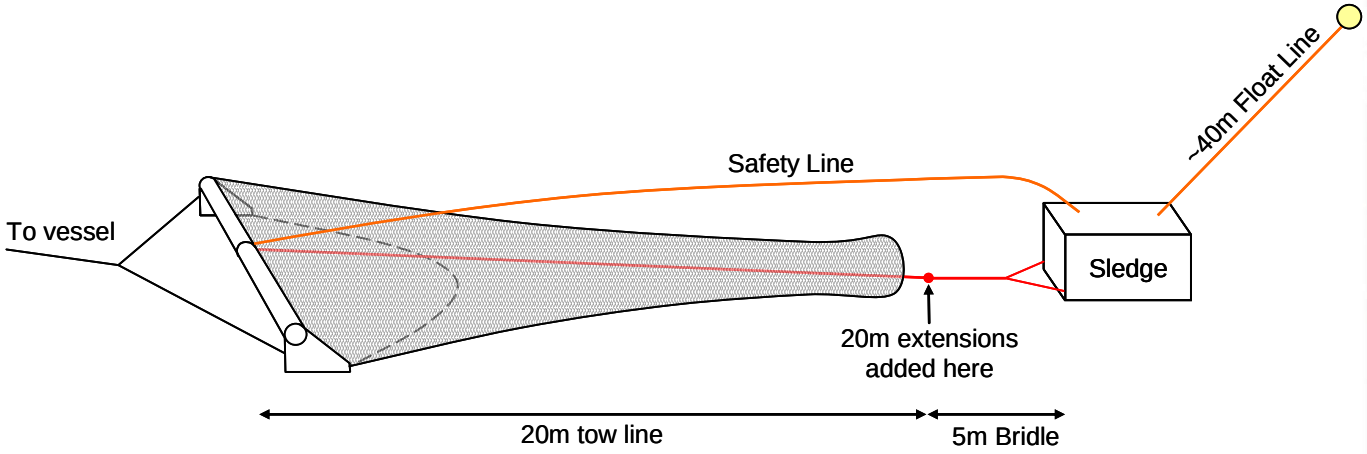
Beam trawl versus pulse trawl – sea trials

Sediment in suspension behind trawl



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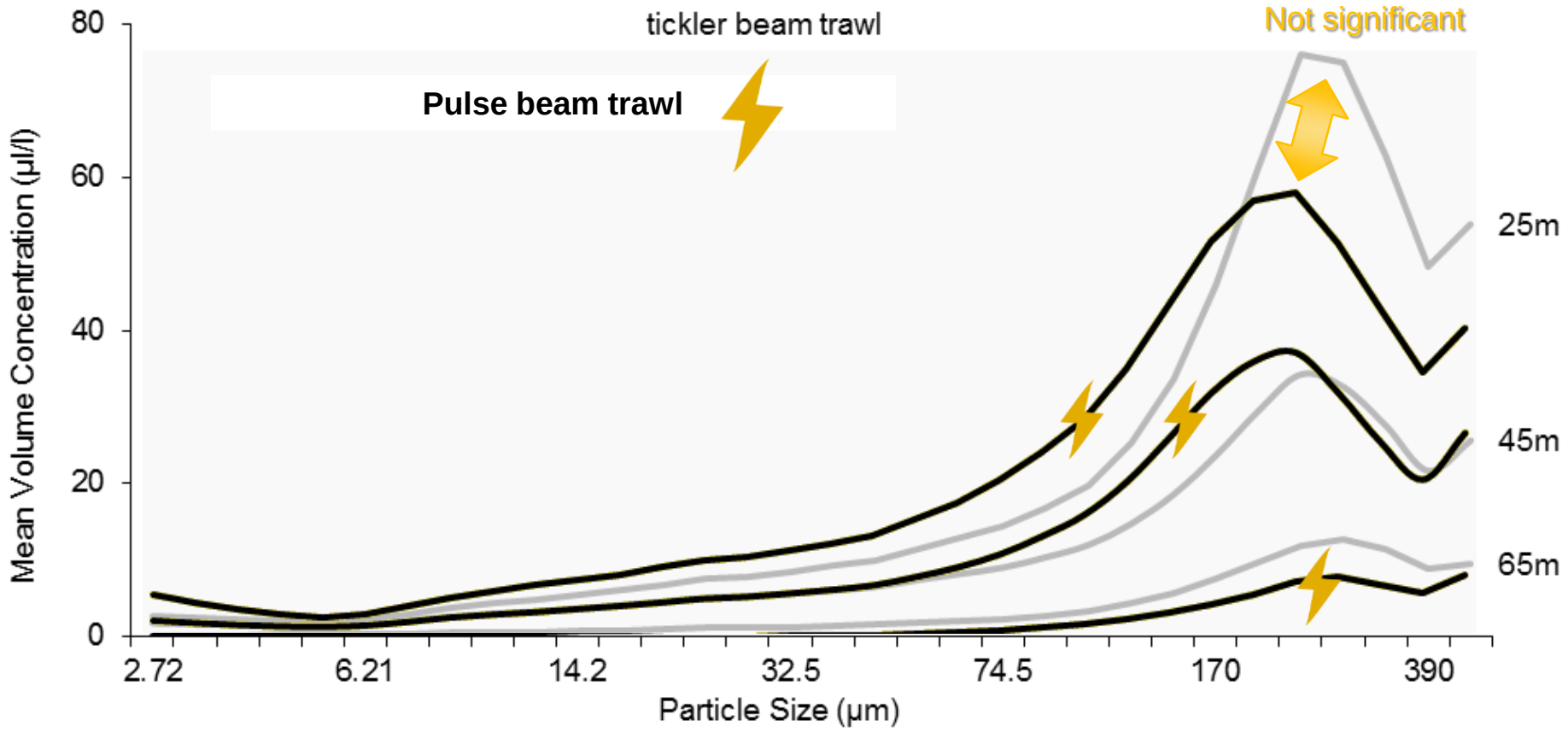
Beam trawl versus pulse trawl – sea trials

Sediment profiler



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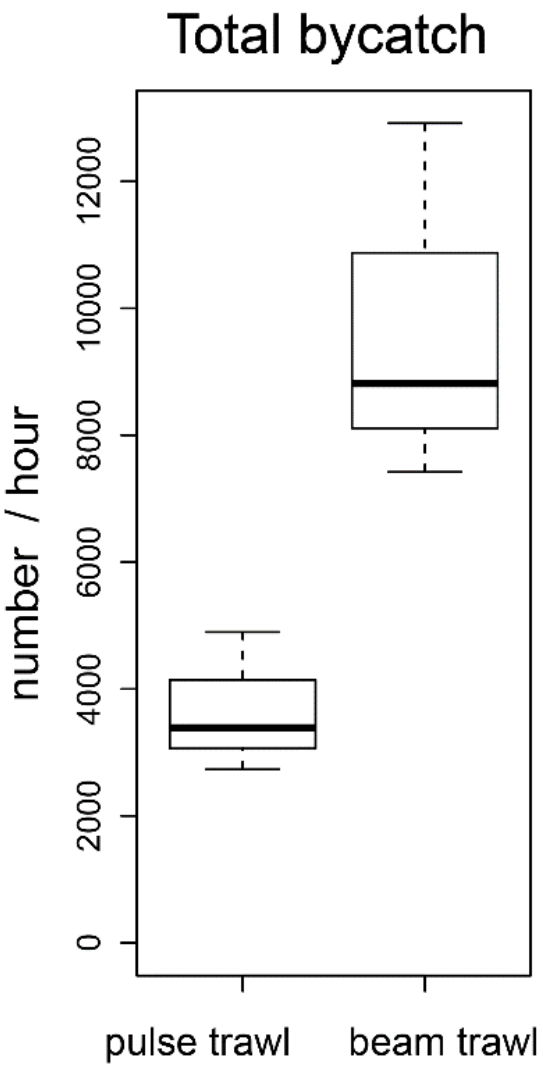
Beam trawl versus pulse trawl – sea trials

Catch composition



Individuals/km²

Pulse trawl: 29,600
Beam trawl: 51,500

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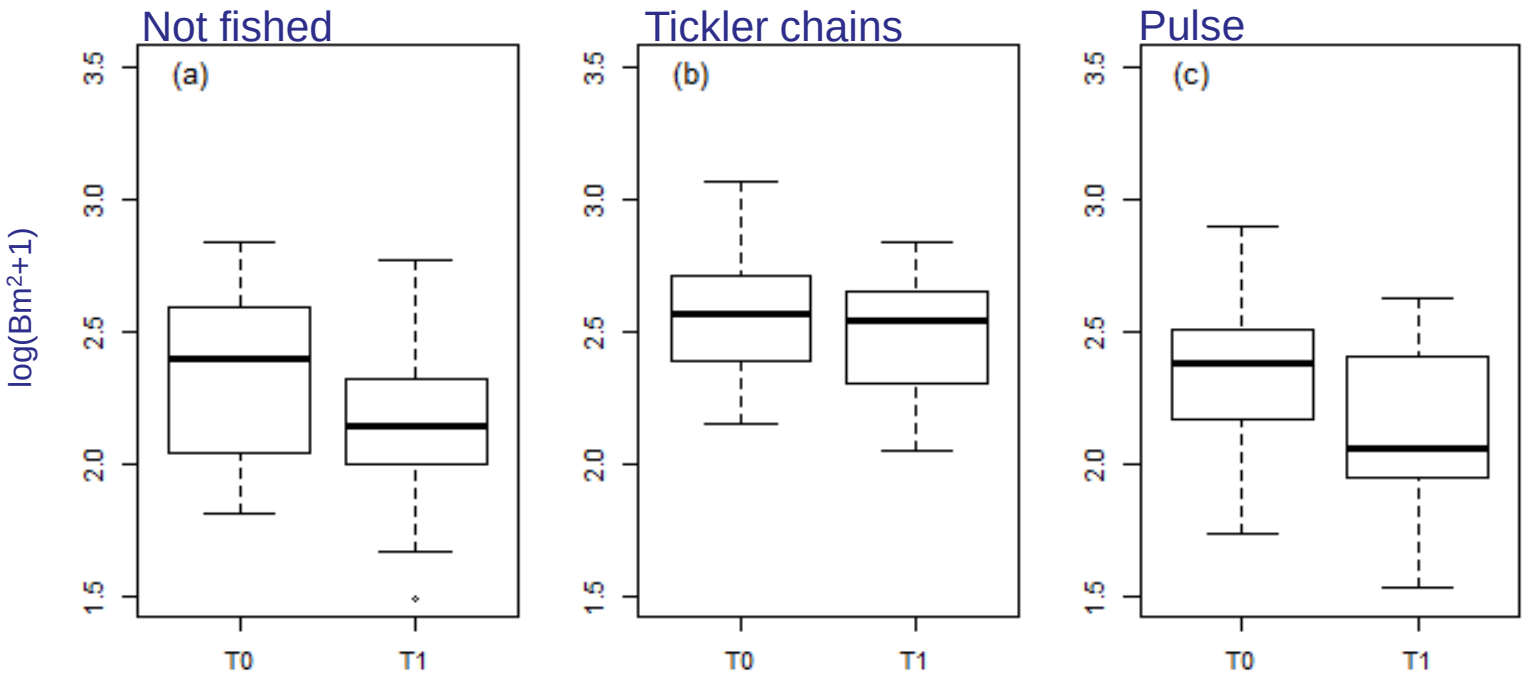
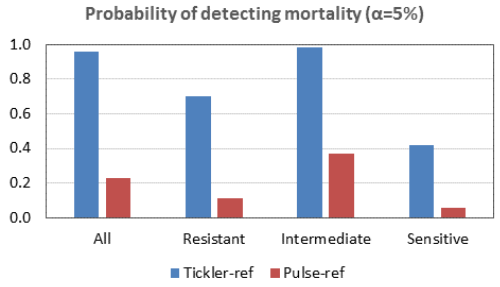
Beam trawl versus pulse trawl – sea trials

Trawl path mortality





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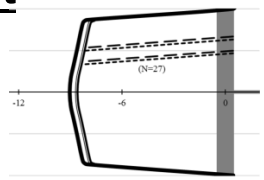
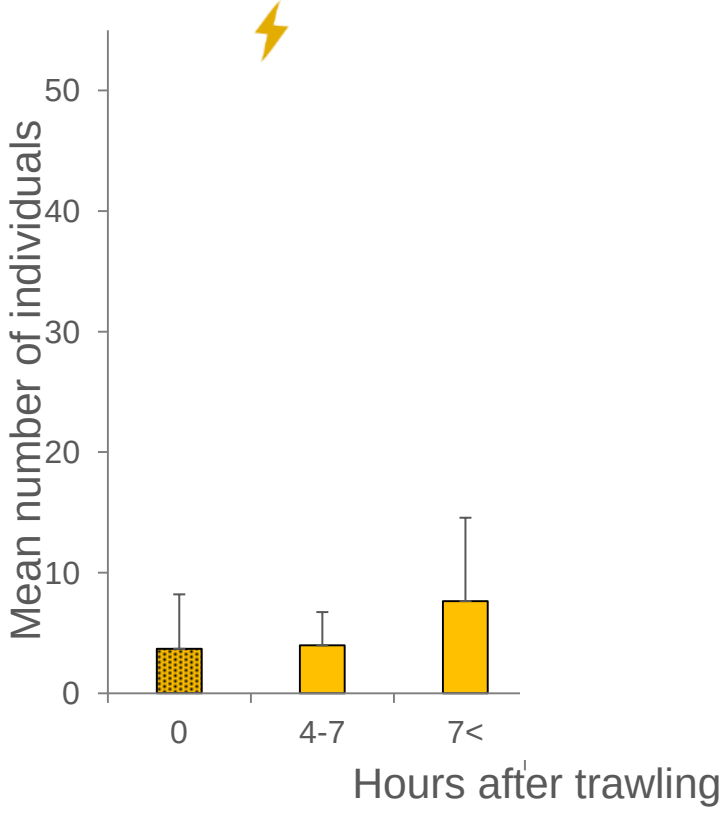
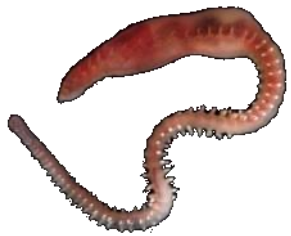
Beam trawl versus pulse trawl – sea trials

Stomach content







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Scalibregma inflatum

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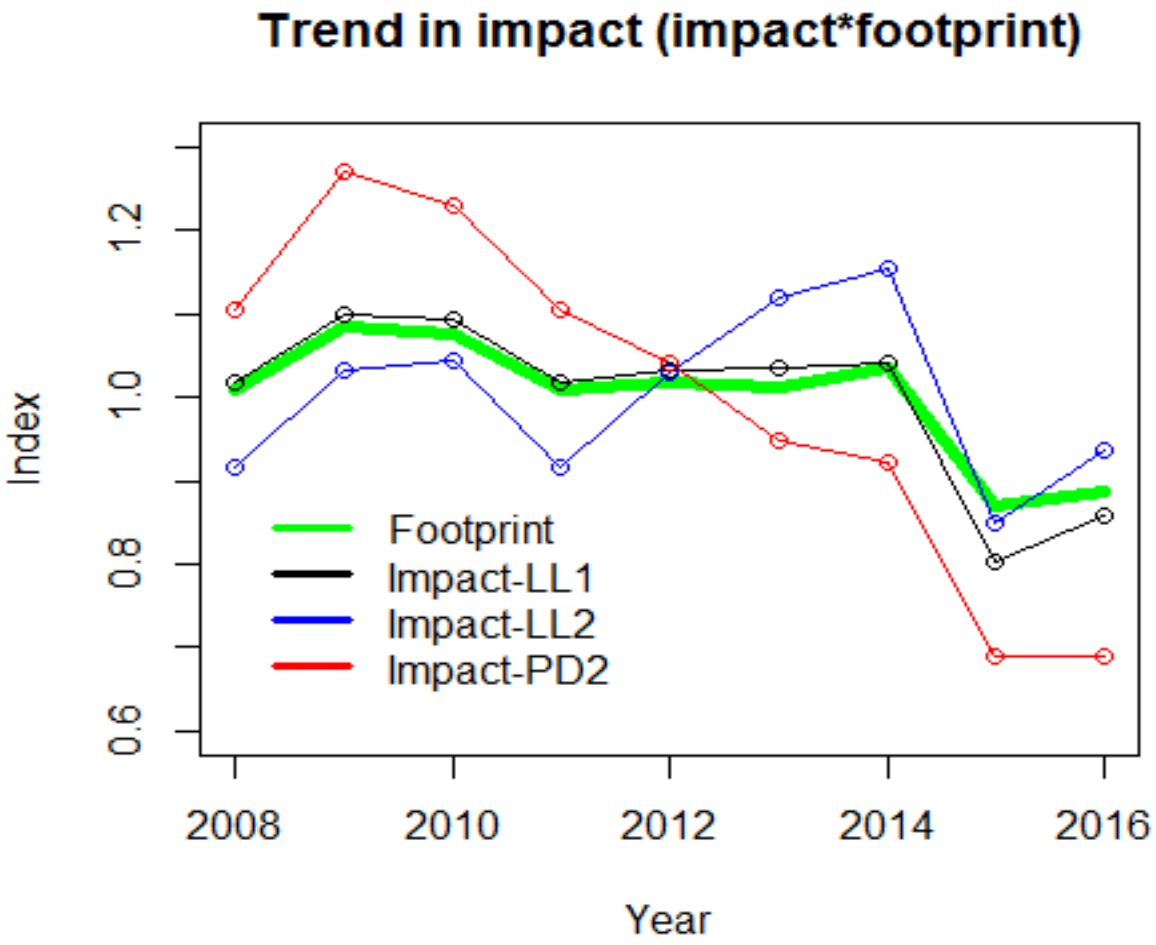
Beam trawl versus pulse trawl – impact analysis



Footprint of sole fishery (bt + pt) + impact*footprint

(Not taking into account potential red. trawl path mort. For pulse trawl)

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Main conclusions

- Seafloor disturbance of beam trawl > pulse trawl
- Difference in trawl path mortality not proven
- Impact of pulse trawling in NS is lower compared to beam trawling
- Difficult questions often need a lot of time and conflict to get resolved

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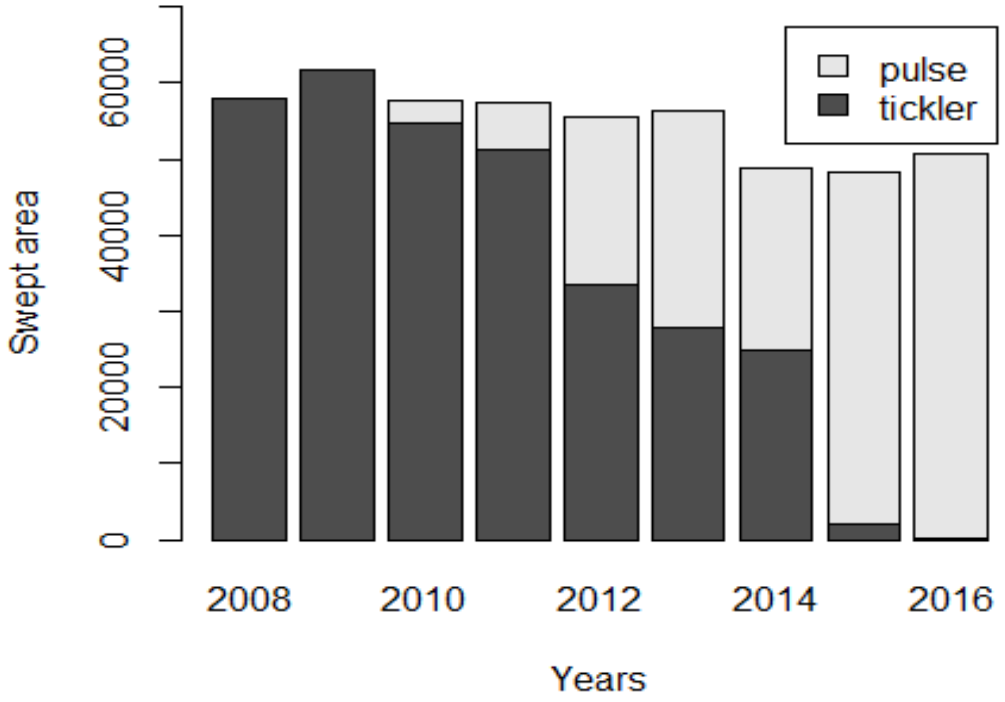
Beam trawl versus pulse trawl – impact analysis

Footprint since 2008 of Dutch pulse trawlers



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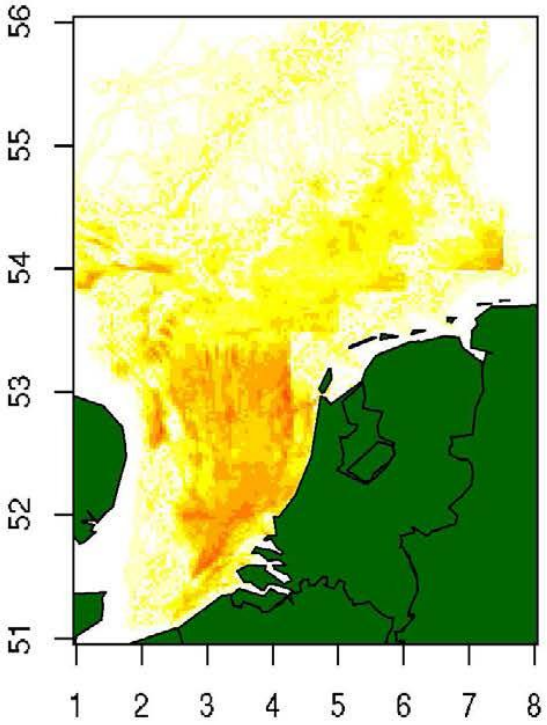
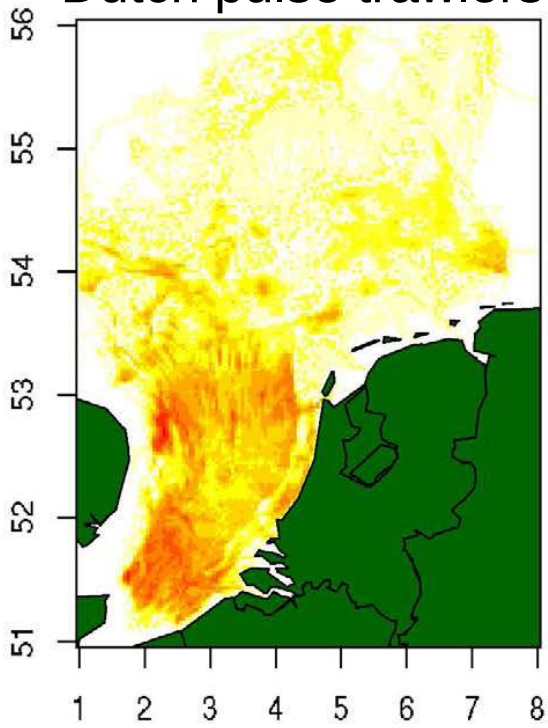
Beam trawl versus pulse trawl – impact analysis

Footprint displacement of pulse trawlers

Dutch beam trawlers



Dutch pulse trawlers



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