Examples of energy conservation and development of sustainable fishing techniques in Europe

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- Research themes (1975-2010)
  - Improving selectivity and reducing by-catches
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  - Reducing sea bed impact and effects on benthos
    - EU-projects: e.g TRAPESE; REDUCE; DEGREE
  - Reducing energy consumption and associated costs
    - National projects (1970-1985); EU-projects: ESIF; VIP-projects (NL)
- Gear development procedure
- Examples of project results
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- Trends in the EU – CFP reform
- Conclusions

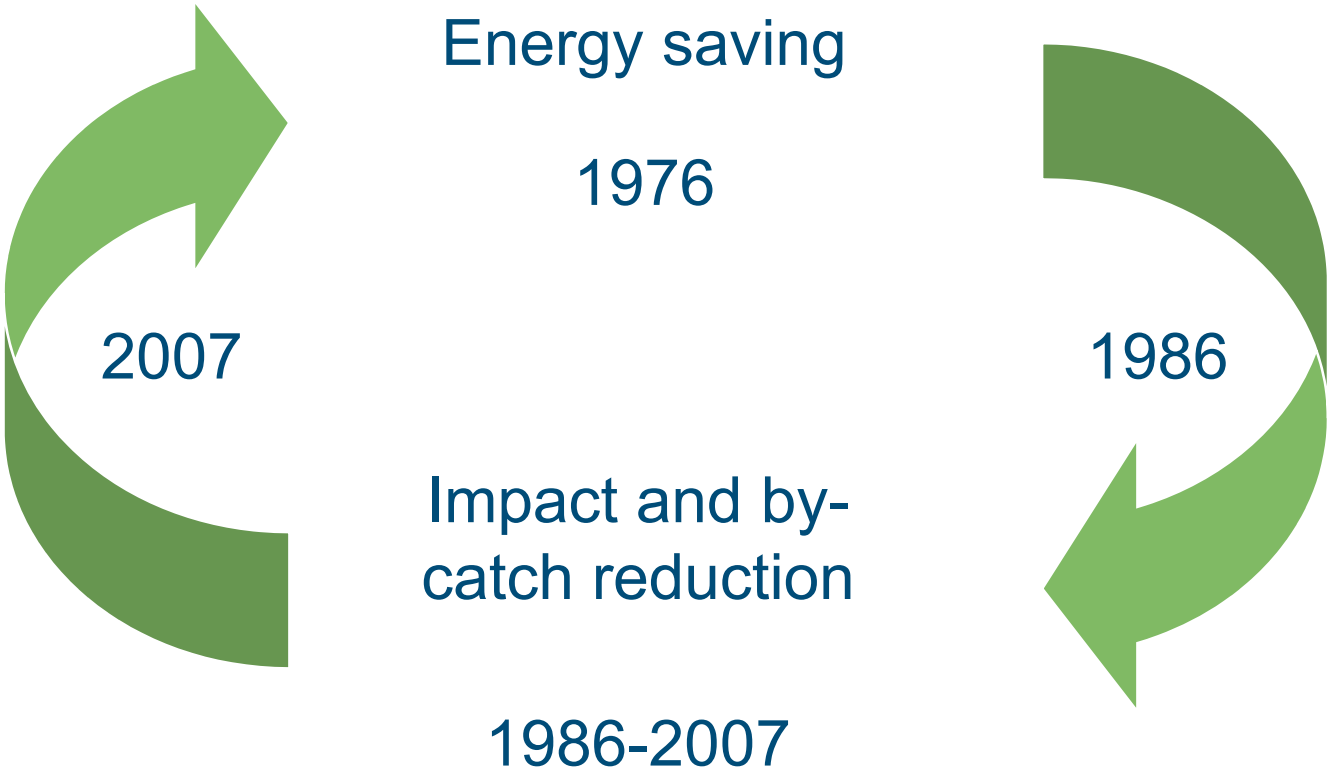
Examples of EU & National fishing gear projects - 1

Project	Contract	Gear	spp	#	Years	Objectives
E-trawl	National	TBB	shrimp, flatfish	1	1970-1988	Energy ↓
PEL-trawl	National	OTM	pelagic	1	1973-1985	Energy ↓
Model study	FAR TE 1.154	OTM	pelagic	3	1989-1992	Modelling
Select. TBB	FAR TE 2.554	TBB	flatfish	3	1990-1993	By-catch ↓
Separation	Study 91/02	OTB	COD/WHG	1	1991-1993	By-catch ↓
SELMITRA	FAR TE 3.613	OTM	pelagic	4	1992-1995	By-catch ↓
SOBETRA	AIR2-CT93-1850	TBB	flatfish	3	1993-1996	By-catch ↓
CETASEL	AIR3-CT94-2423	OTM	pelagic	6	1994-1997	By-catch ↓
RESCUE	Study 94/044	TBB	shrimp	7	1995-1997	By-catch ↓
TRAPESE	Study 96/006	TBB	flatfish	4	1997-1999	Impact ↓
REDUCE	FAIR-CT97-3809	TBB, OTB	various	4	1998-2001	Impact ↓
Pulse trawl	National	TBB	flatfish	1	1998-now	By-catch ↓, impact ↓
DISCRAN	Study 98/012	TBB	shrimp	4	1999-2001	By-catch ↓

Examples of EU & National fishing gear projects - 2

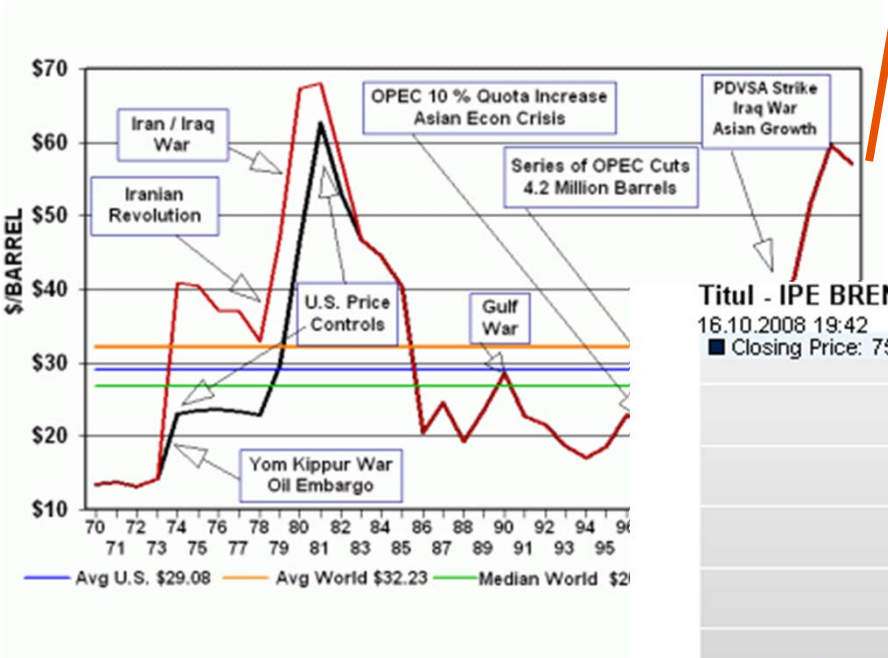
Project	Contract	Gear	spp	#	Years	Objectives
RECOVERY	Q5RS-2002-00935	TBB, OTB	flatfish, Nephrops	8	2002-2005	By-catch ↓
NECESSITY	SSP8-CT-2003-501605	various	pelagic, flatfish, Nephrops	26	2004-2007	By-catch ↓
DEGREE	SSP8-CT-2004-022576	TBB, OTB dredge	various	12	2006-2009	Impact ↓
ESIF	FISH/2006/17 LOT3	various	various	11	2007-2009	Energy ↓
VDTN	National PVis	TBB	flatfish	1	2007-2009	By-catch ↓
SumWing	National VIP	TBB	flatfish	4	2008-2009	Energy ↓ Impact ↓
Outriggen	National VIP	OTT	flatfish	3	2008-2009	Energy ↓
HydroRig	National VIP	TBB	flatfish	4	2008-2010	Energy ↓ Impact ↓
FLATNOSE	FISH/2007/07 LOT3	various	PLE, SOL	5	2008-2010	Energy ↓ Impact ↓

Back to square 1 !!!



Oil price history

> $140



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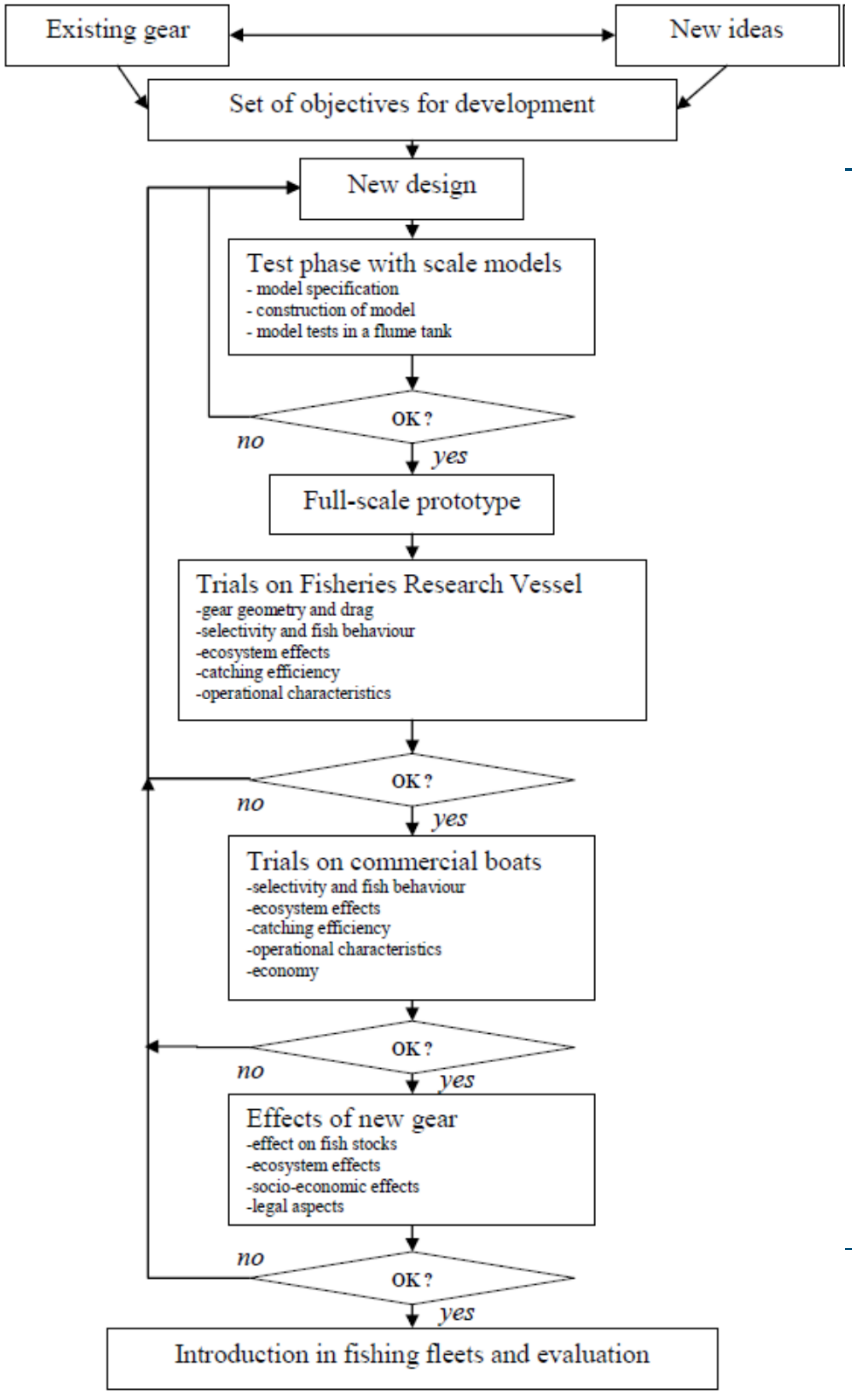
Gear innovation scheme



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Results: Selectivity and by-catch reduction

- New prototypes selective gear developed
- Co-operation with industry (Liaison Groups)
- Often losses in target fish and associated income
- Some cases in legislation (SMWs, sorting grids)
- Uptake relatively low, unless good incentives

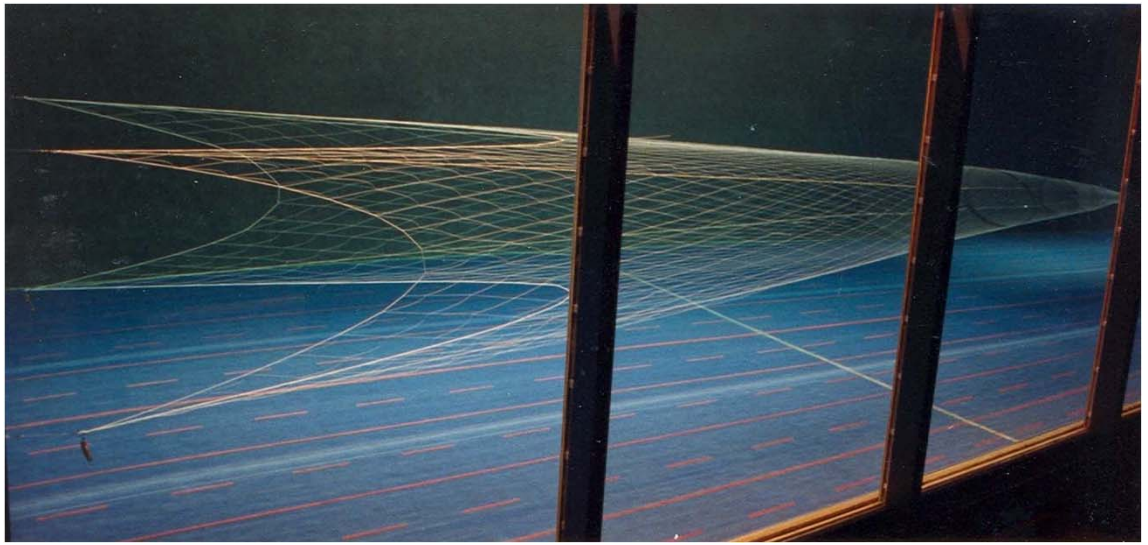
Results: Impact reduction

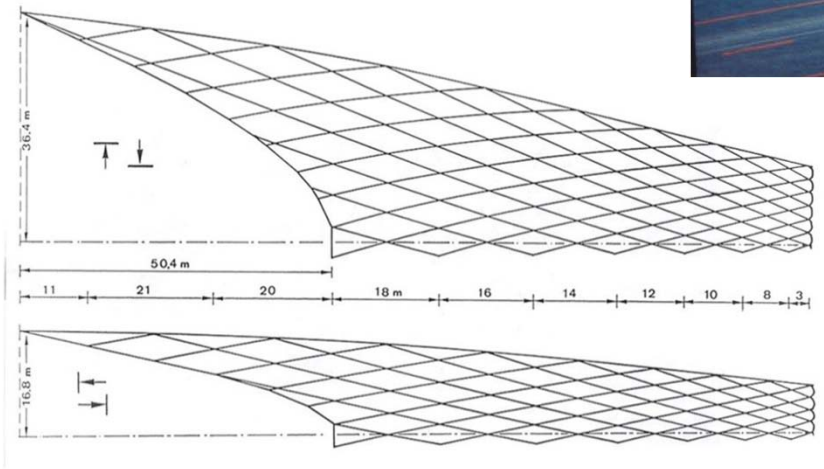
- New prototypes low impact gear developed
- Co-operation with industry (Liaison Groups)
- Often losses in target fish and associated income
- Uptake relatively low, unless good incentives

Results: Energy saving and cost reduction

- New prototypes of energy efficient gear developed
- Recently initiated and done by industry, financially backed by the government
- Uptake high

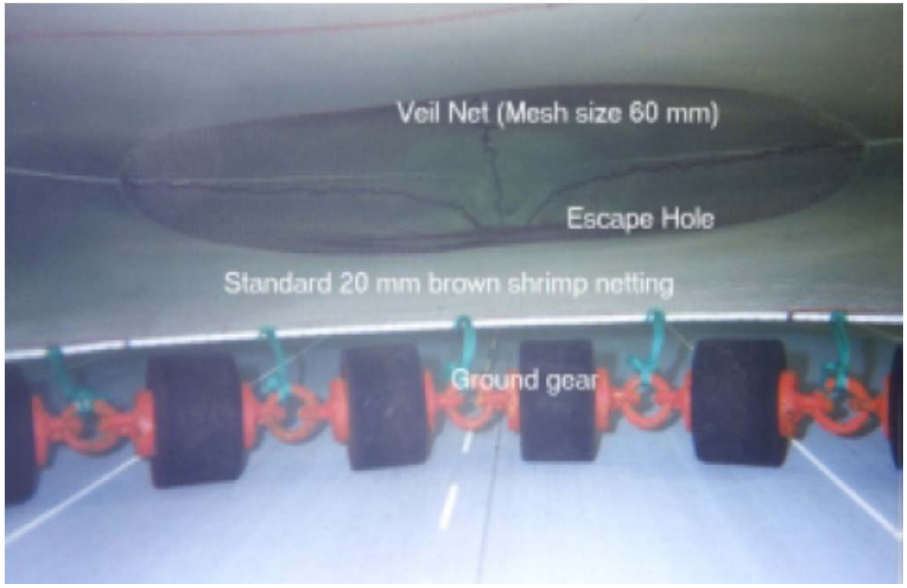
Examples of new selective gears commercially used (1976-1985)

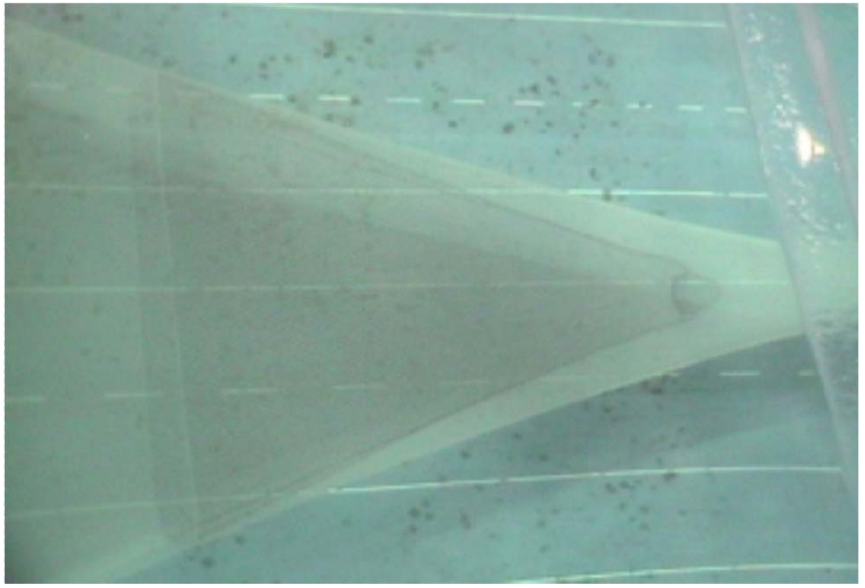




Large mesh front part in pelagic trawls (NL)

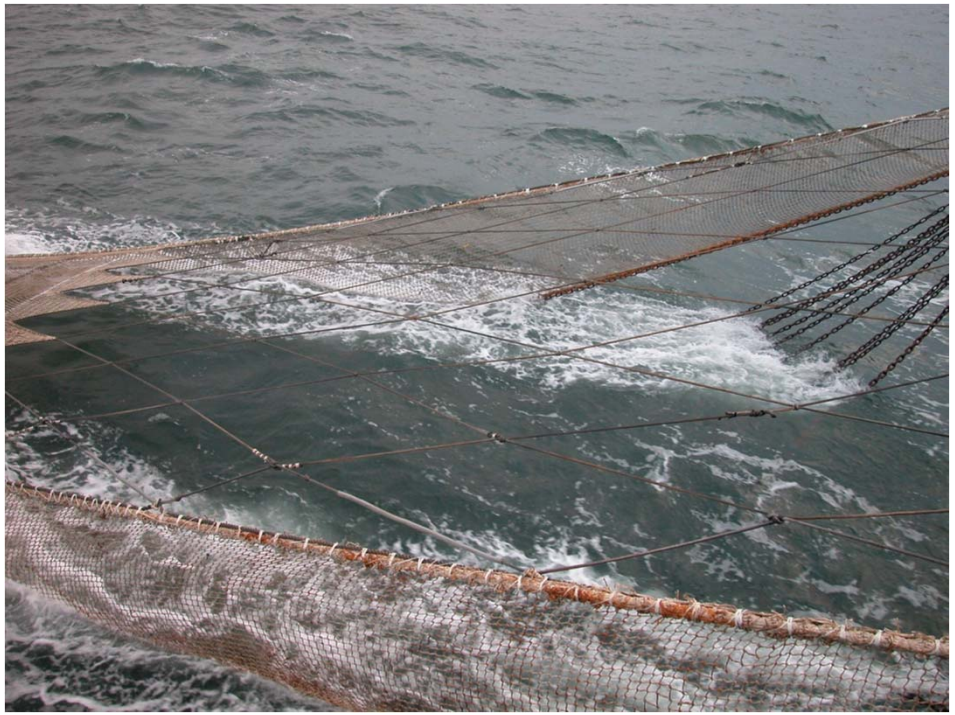
Examples of selective gears commercially used





Sieve net or veil net in brown shrimp (*Crangon crangon*) trawls (DE, NL, UK, BE, DK)

Examples of new selective gears not commercially used



LMTP in beam trawls (NL)

multi-level *Nephrops* trawl (DK)

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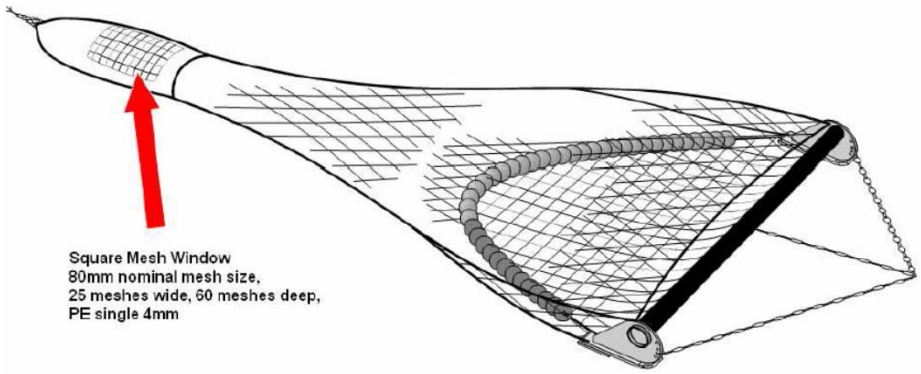
Examples of new selective gears not commercially used

"FISP" in *Nephrops* trawl (DK)

LMTP in *Nephrops* trawl (DK)

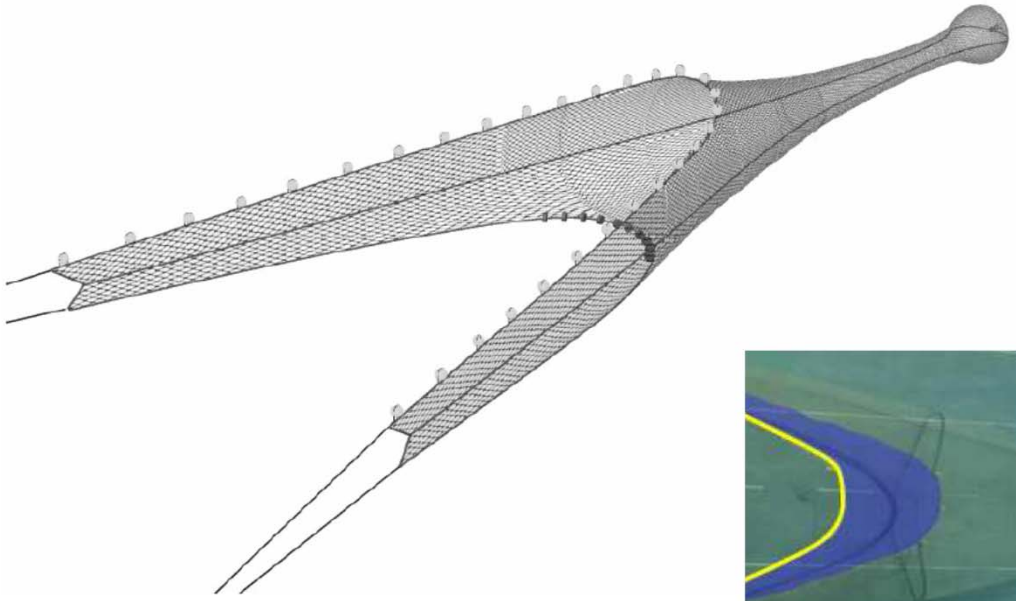
Examples of new selective gears not commercially used (?)

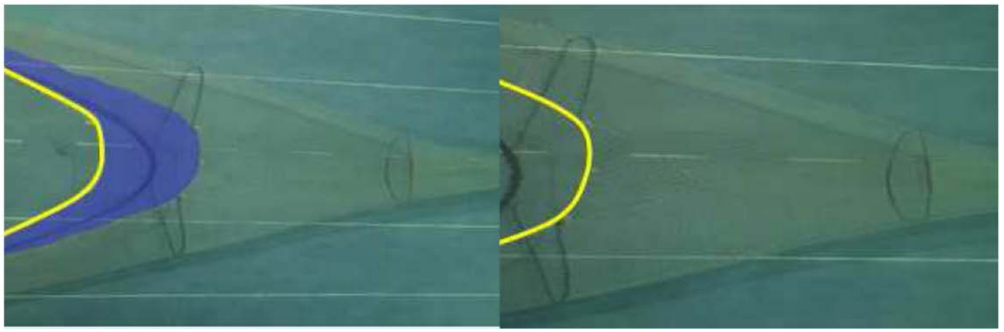
T90 panel and cod-end (BE)



SMW in beam trawl (BE)

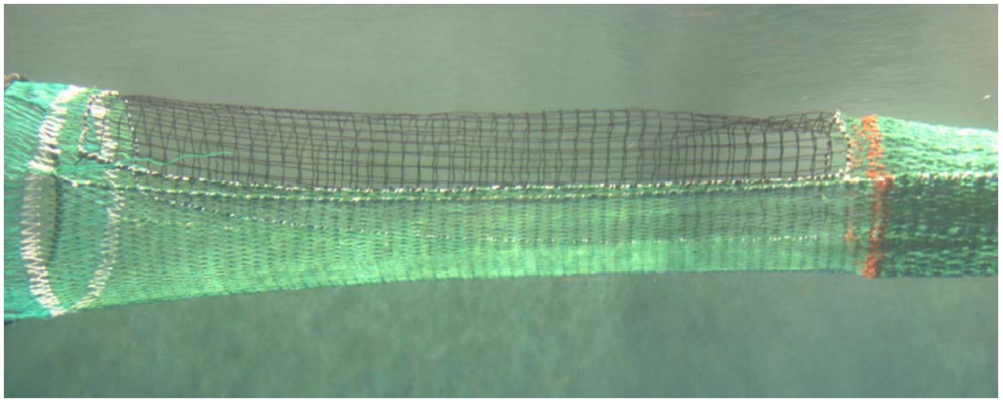
Examples of new selective gears not commercially used



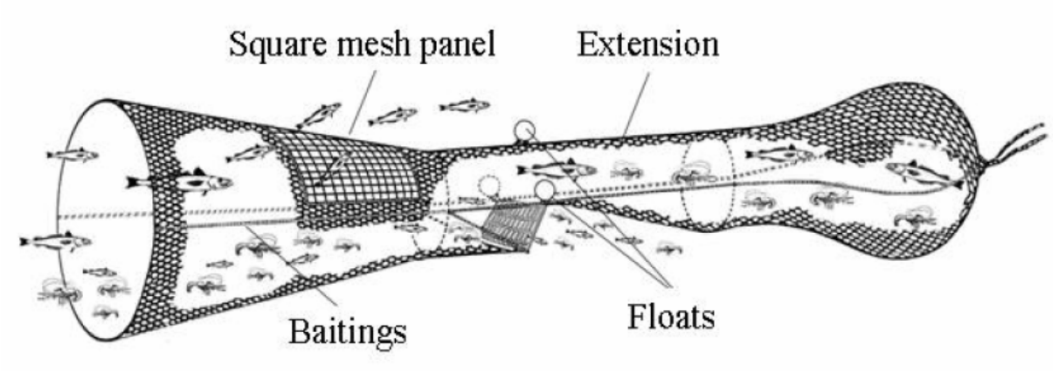


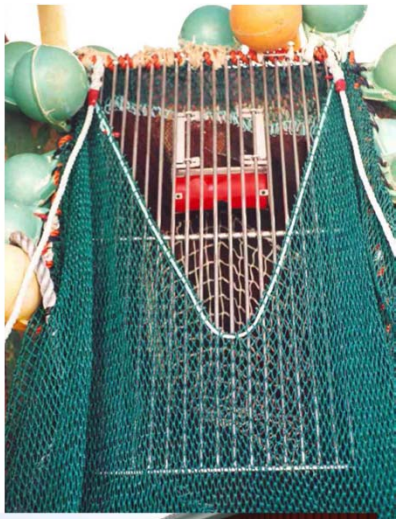
‘Cut-away’ or ‘coverless’ trawl (UK)

Examples of new selective gears not commercially used



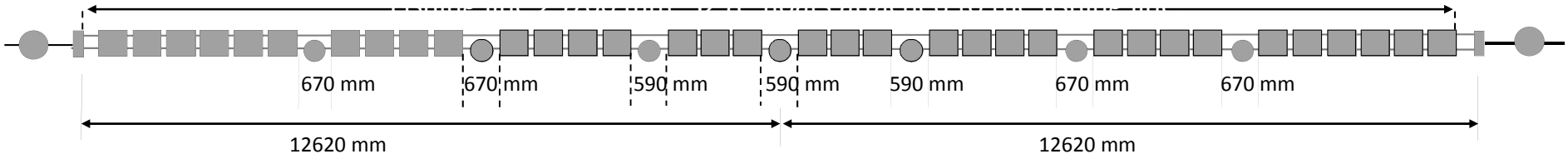
SMP and Sorting Grid (UK, FR)





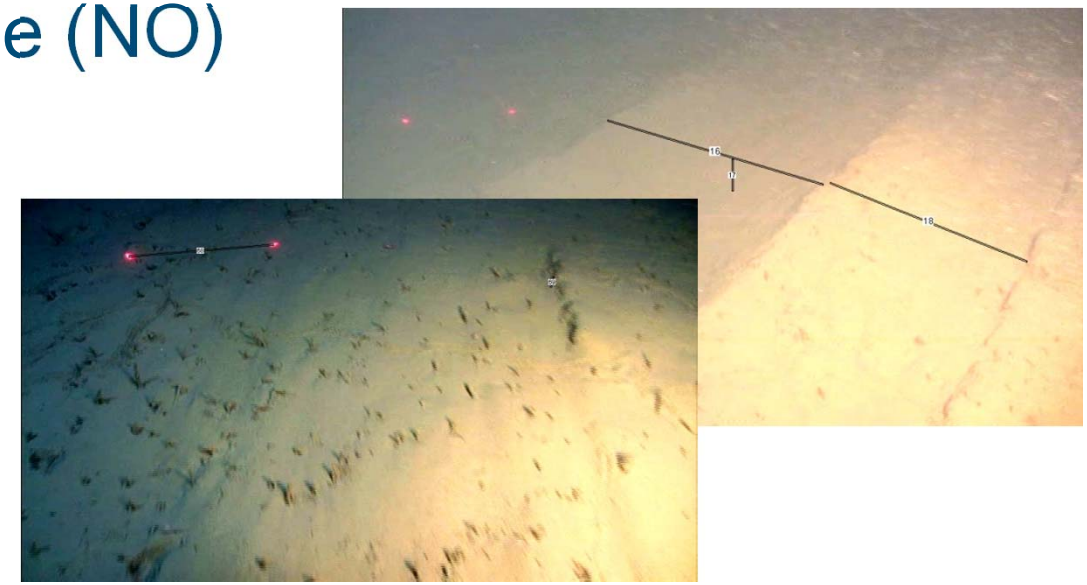
Sorting Grid (PT, DK)

Examples of new selective gears not commercially used



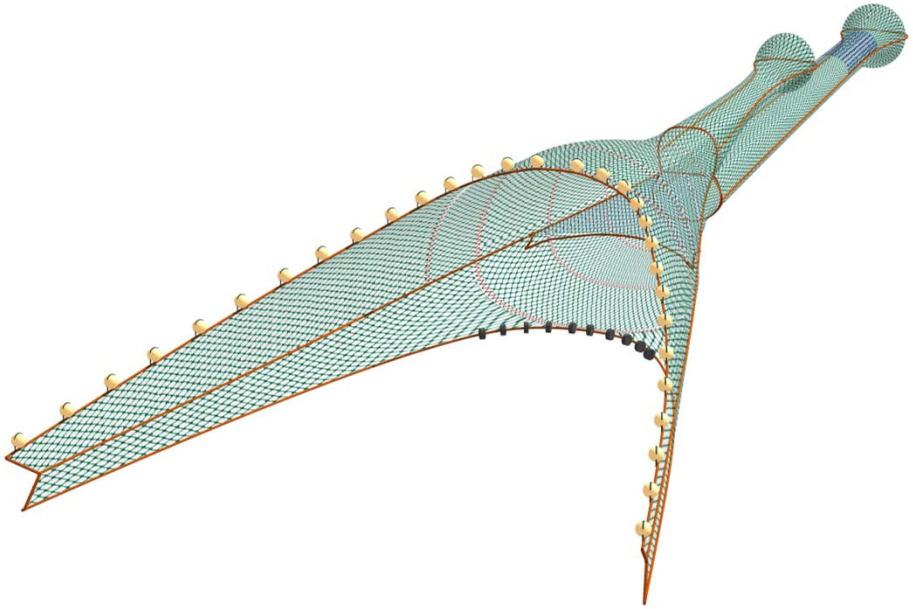
The plate ground rope (NO)

Bobbins in plate gear

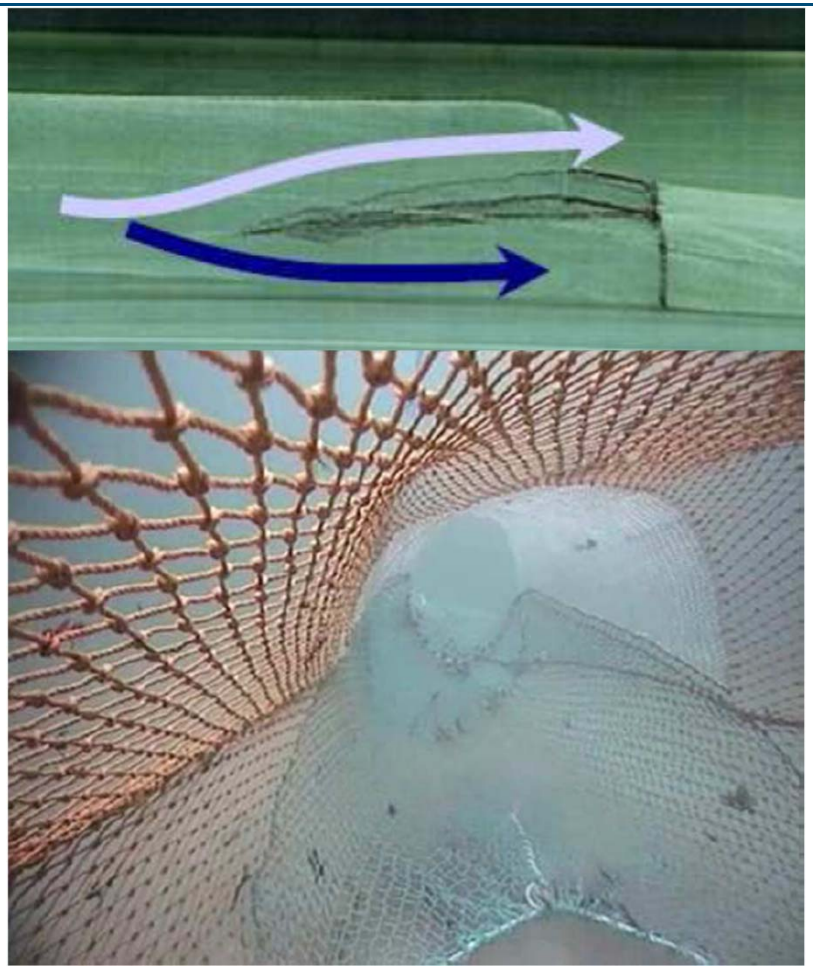


Tracks from plates

Examples of new selective gears not commercially used (?)

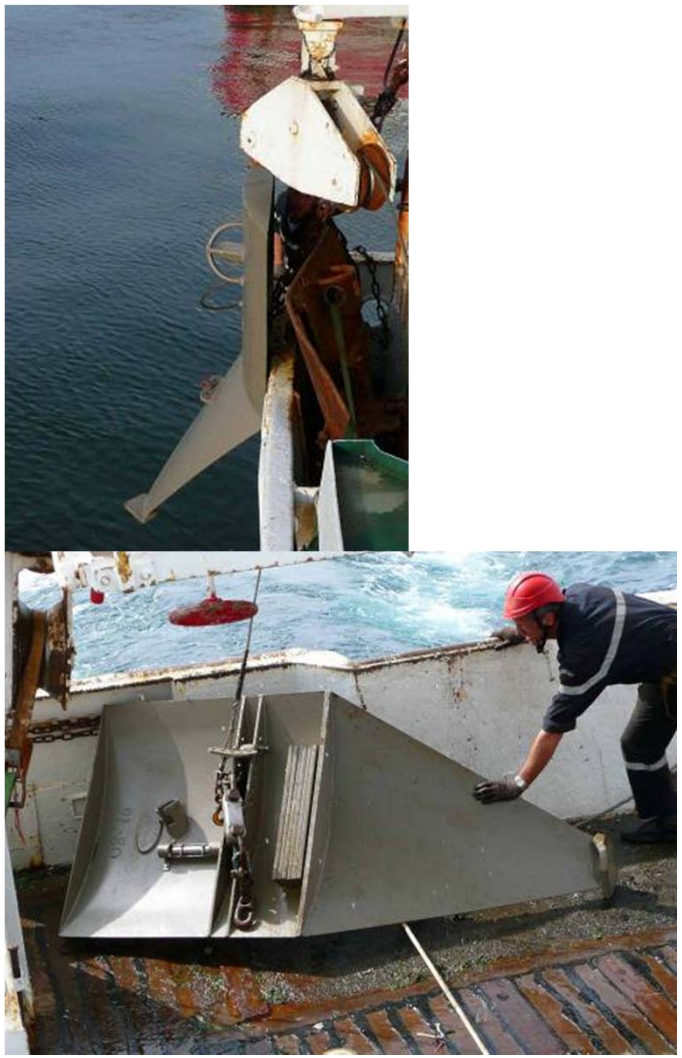


Separator Panel (UK-Scot)



Inclined Separator Panel (IE)

Examples of new selective gears not commercially used (?)



Low impact “Jumper” door (FR)

Examples of new innovative gears with potential

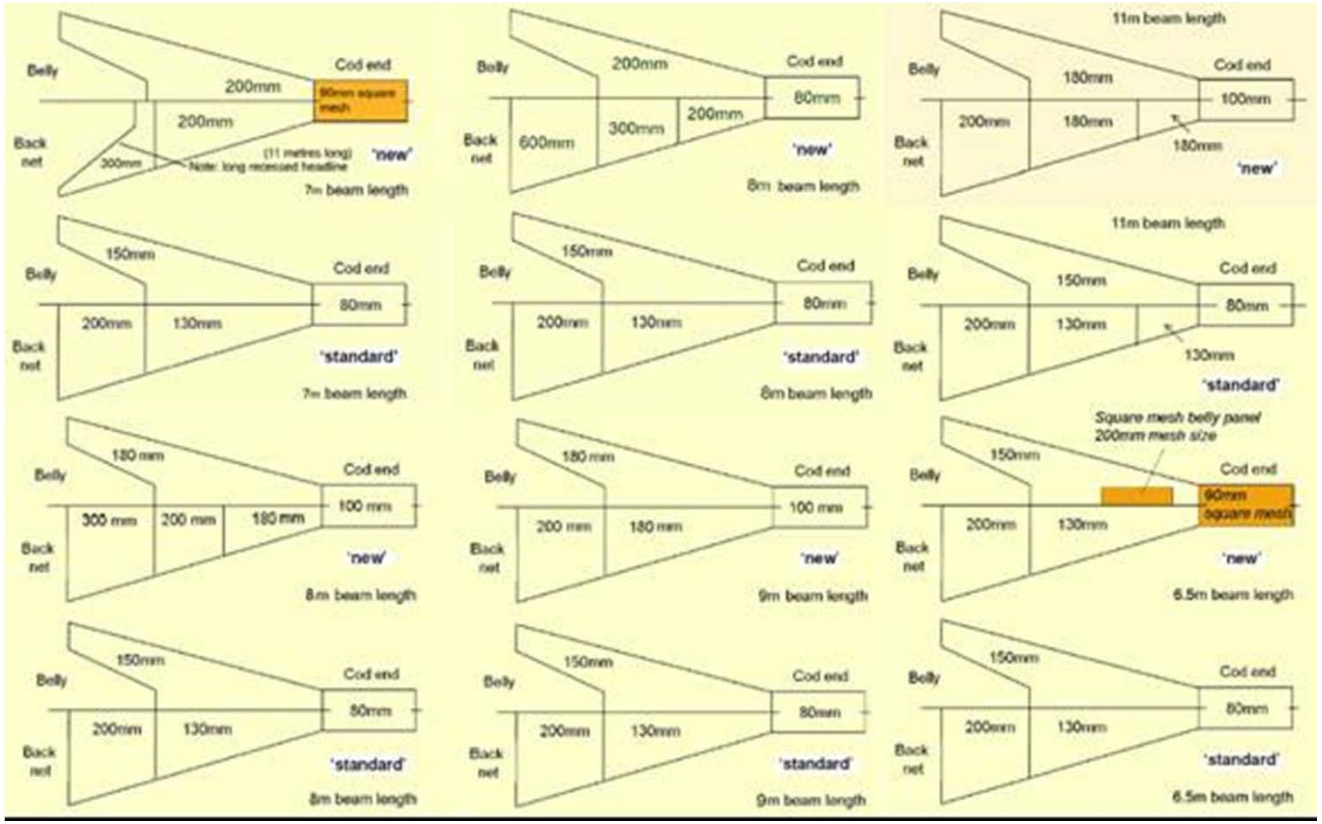
HydroRig (NL)

Outrig (NL, BE)

Examples of new innovative gears with potential

Brown shrimp (Crangon crangon) pulse trawl
“Hovercran”(BE, NL)

Examples of new selective gears commercially used



CEFAS 50%-project (UK)

Examples of new innovative gears commercially used

SumWing (NL, BE)

Flatfish pulse trawl (NL)

SumPulse (NL)

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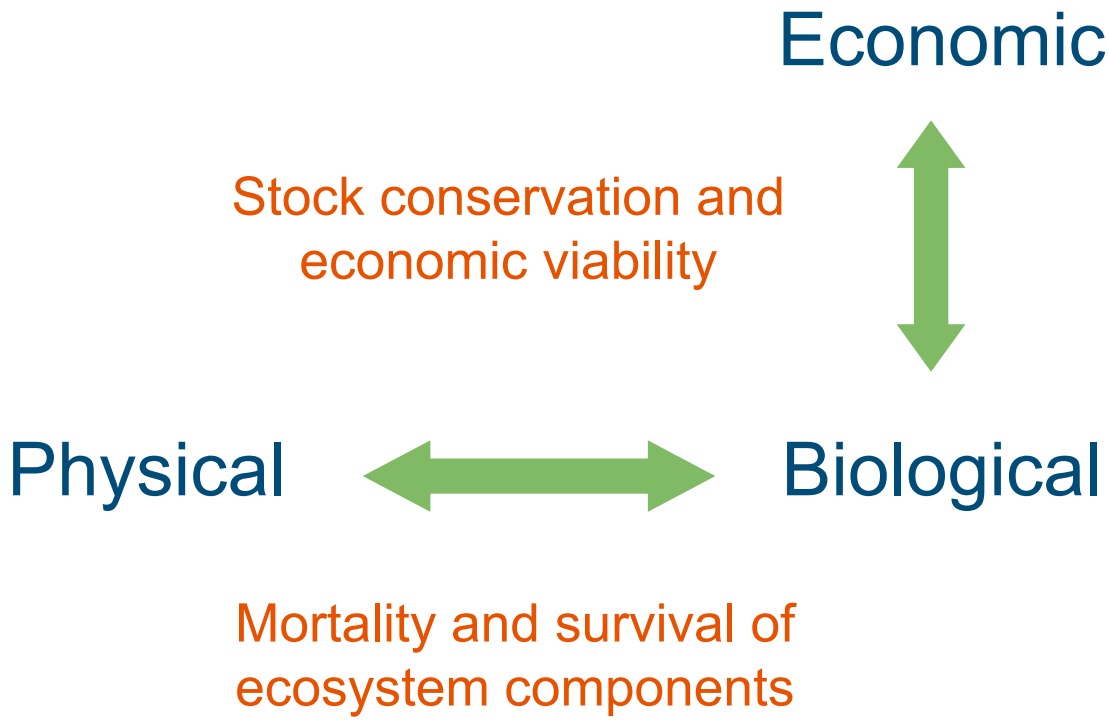
Summary of uptake and reasons

Modification	Gear	Motive(s)	Level of use
LM	OTM	Fuel costs ↓, catch ↑	++++
Sieve net	TBB	By-catch ↓, obliged	++++
Sorting grid	OTB	By-catch ↓, obliged	++++
SMP, SMW	OTB	By-catch ↓, obliged	+++
SumWing	TBB	Fuel costs ↓, impact ↓	++
LM & SMW	TBB	By-catch ↓	++
Outrig	TBB	Fuel costs ↓	+
Pulse Trawl	TBB	By-catch ↓, fuel costs ↓	+
SP, ISP	OTB	By-catch ↓	+
HydroRig	TBB	By-catch ↓, fuel costs ↓	-
LMTP	TBB	By-catch ↓	-
Plate gear	OTB	Impact ↓	-

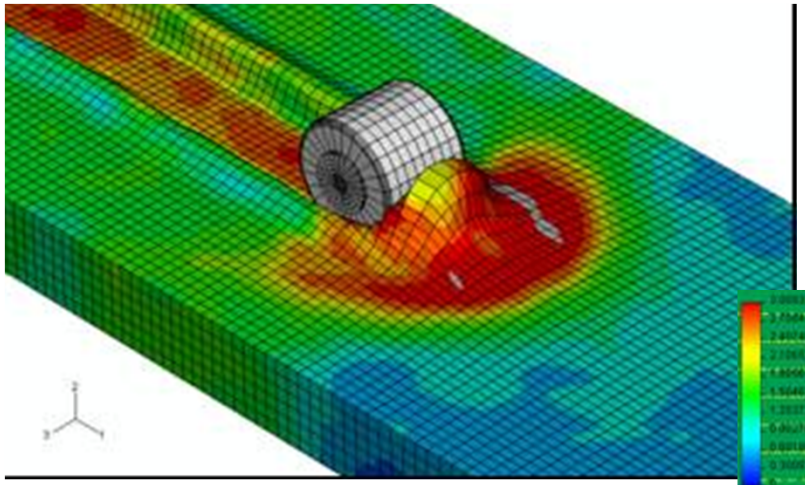
Appraisal of effects

- Use physical models to evaluate effect on habitats, then translate these to biological effects
- Use economic and ecosystem models to evaluate effect of more selective gears
  - E.g. in NECESSITY: ECOPATH/ECOSIM, or FLR
    - Short term losses in landings and revenues
    - Stocks improve after introducing selective gear
      - North Sea fisheries: stocks ↑ by 41% COD, 14% HAD and 29% WHG in 10 years, when discarding = 0.
  - E.g. in DEGREE and FLATNOSE: MAFCONS model to evaluate effect of more selective gears on target species
    - Showing effect of pulse trawl and outrigger trawls

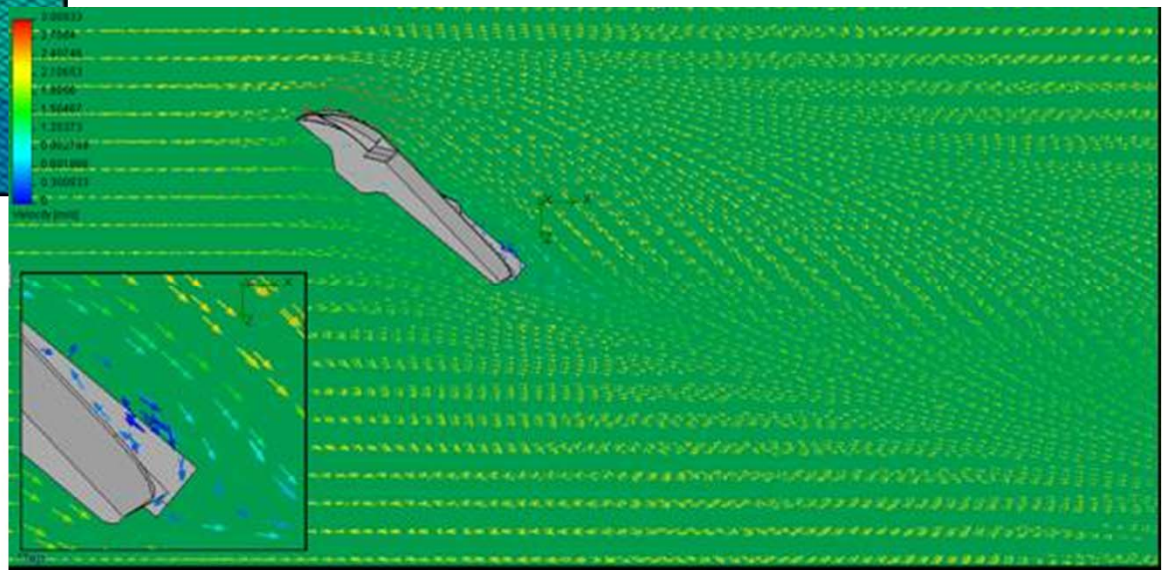
Models


Economic
Stock conservation and economic viability
Physical
Biological
Mortality and survival of ecosystem components

Physical models developed



Finite Element FE model
(UK-Scot)



Flow model (FR)

Economic and biological models

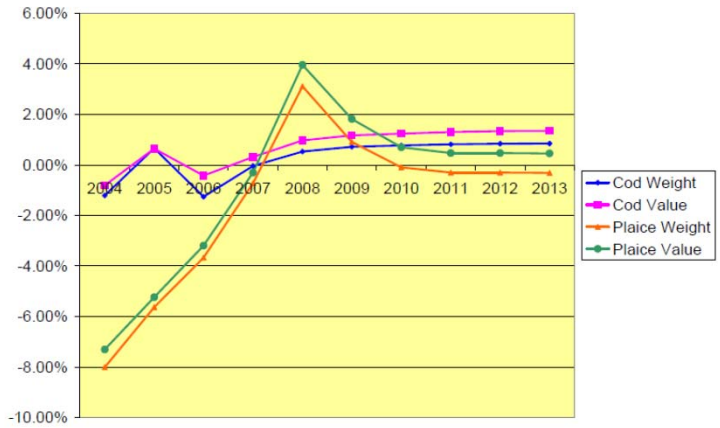


Figure 39: Projected changes in landings of cod and plaice with 120 mm square mesh panel

Figure 40: Increase in gross revenue at vessels level

From: NECESSITY FPAR, COD and PLE in Danish *Nephrops* fleet Skagerak/Kattegat

EU CFP reform and changes - 1

- Less complexity in regulations
- More ‘bottom-up’ than ‘top-down’ approach
- Participatory management
  - Co-management
  - Self-management
  - Results-based management
- Enhanced collaboration between fishermen and scientists
  - Fisheries Science Partnerships (FSPs)
  - Conservation Credit Schemes
  - Co-operative Research Platforms (e.g. NL)
    - Better communication ☺
    - Better mutual understanding ☺
    - More trust ☺

EU CFP reform and changes - 2

- Stronger incentives for the industry
  - Problem identification and ownership by fishermen
  - Changes in markets and consumer preferences – e.g. fish lists
  - Certification (MSC)
  - Discard ban ?
    - Introduced in Norway
- New ways of management
  - Ecosystem Approach in Fisheries (EAF)
  - Regionalized approach (RACs)
  - Long Term Management Plans (LMTPs)
  - Sustainable Fishing Plans (SFPs)
  - Catch Quota Management (CQM) ?
  - Fully Documented Fisheries (FDF) ?
    - Use of CCTVs showing catches

EU CFP reform and changes - 3

- More responsibility in the fishing industry
  - Reversal of the burden of proof
  - Involvement in stock assessment and data collection
- Role of fisheries scientists
  - Provide scientific evidence
  - Develop management options
  - Be at cutting-edge of developing sustainable and profitable fisheries
- Legal framework
  - Moving away from ‘right to fish’ to ‘license to produce’

Conclusions

- Energy saving often coincides with ecosystem friendliness
- Gear modifications can substantially save energy
- Proper incentives needed for fishermen to use them
- Scientific community can help to develop prototype fishing gears
- Let fishermen identify themselves with potential solutions
- Fishermen's views and attitudes are changing
- Stimulate good cooperation between fishermen and scientists, both have a role to play

Thanks ☺

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