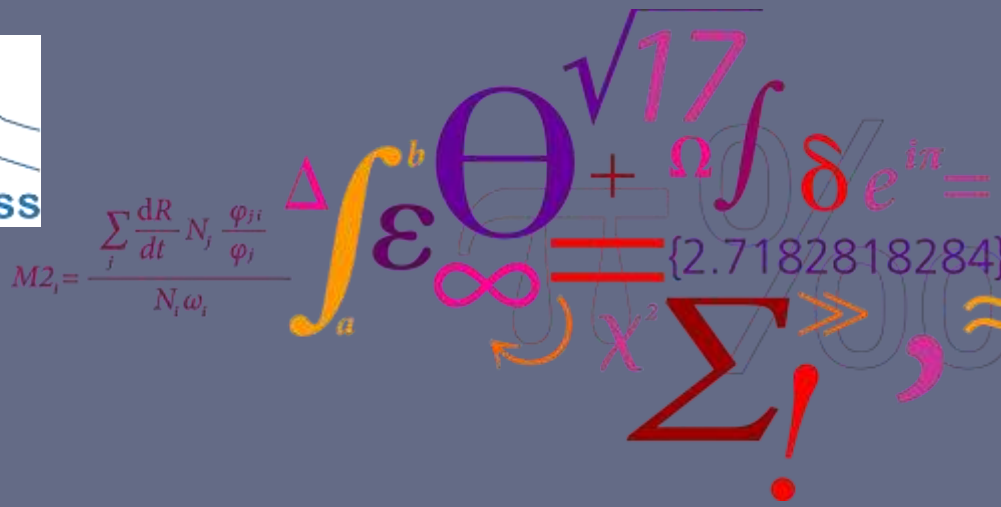
H2020 DiscardLess (2015-2019)

What can science do to help with the landing obligation?

Pr. Clara Ulrich, DTU Aqua, Denmark, coordinator
on behalf of the DiscardLess Consortium

DiscardLess

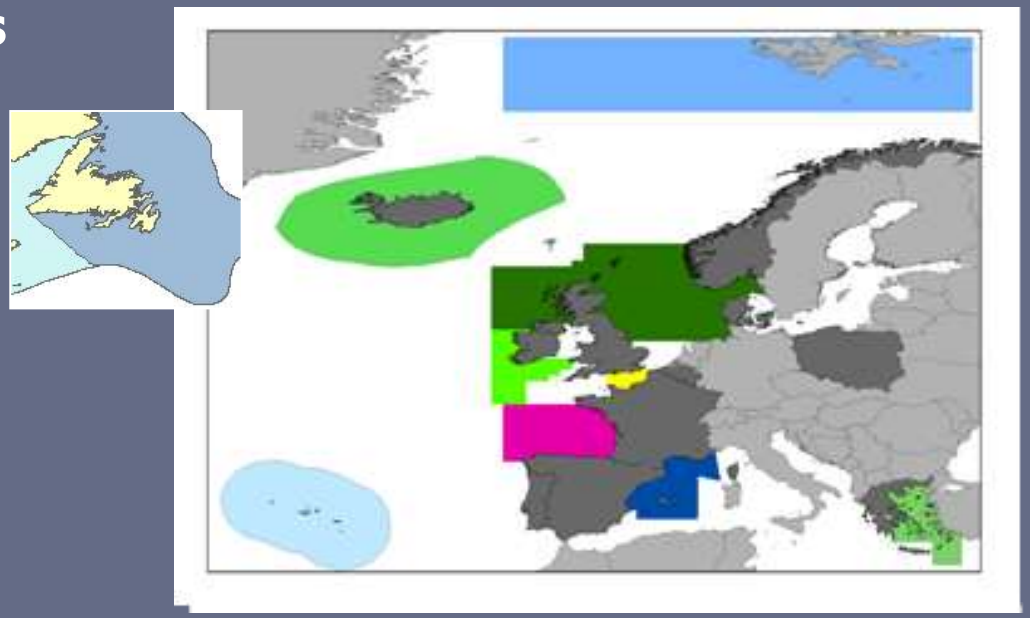
www.discardless.eu



DTU Aqua
National Institute of Aquatic Resources

Consortium overview

- **31 partners in 12 countries**
  - 9 universities
  - 9 SMEs
  - 8 research institutes
  - 3 industries
  - 2 organisations



Project thread

The 2013 EU Landing Obligation: An ambitious policy, that may impact the fishing industry in the short-term…

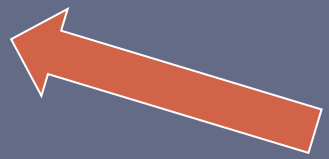
- *Q: What can Science do to help mitigate such impacts, and so support the successful implementation of the policy?*
- **A: Science cannot force changes, but Science GATHERS and SHARES USEFUL KNOWLEDGE to inform changes!**

DiscardLess: Multidisciplinary Science that aims to

- ***UNDERSTAND* the economic, biological and social drivers and impacts of discard**
- ***PROPOSE* a set of cost-effective Discard Mitigation Strategies: the DMS ToolBox**

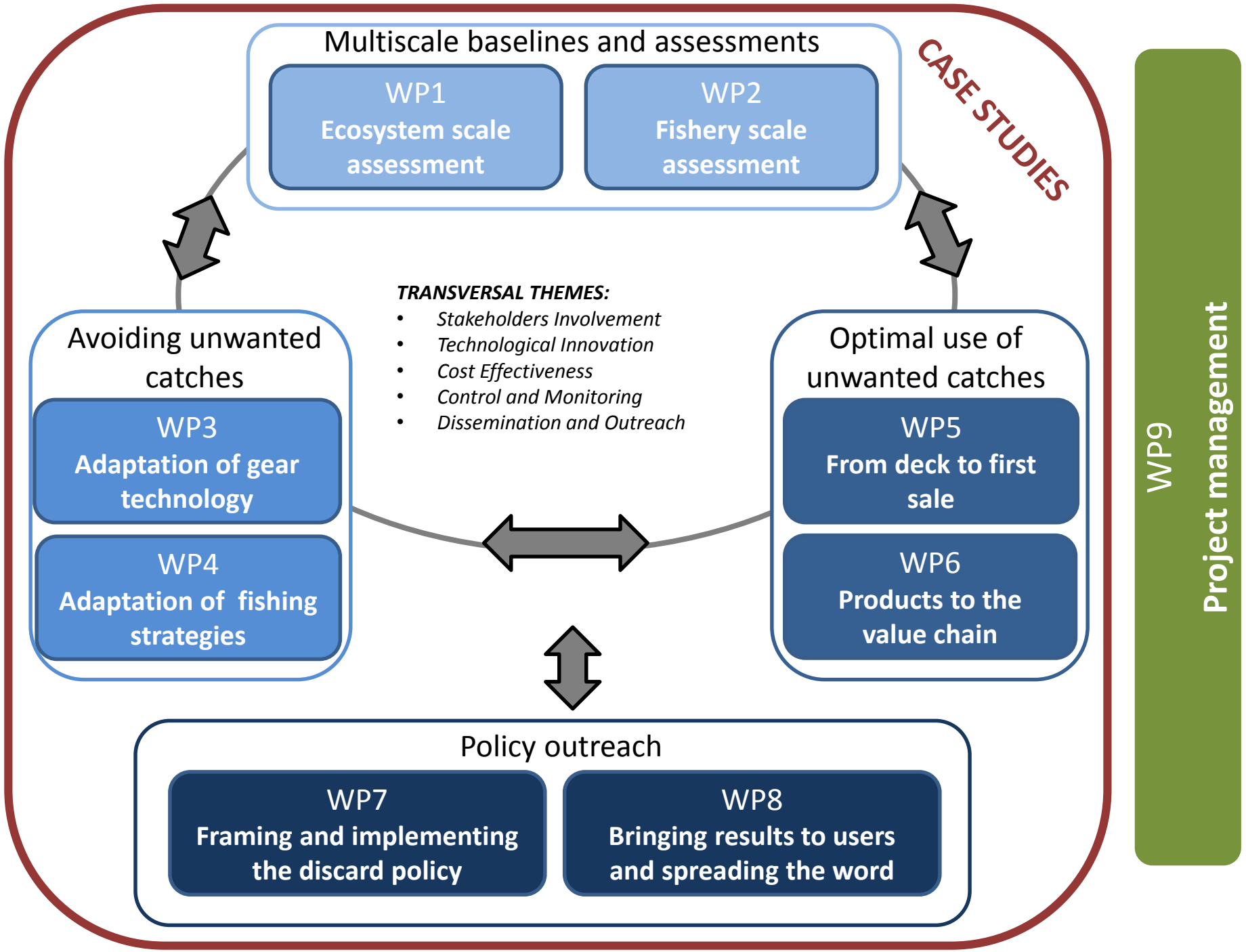
What can Science do to help with the LO?

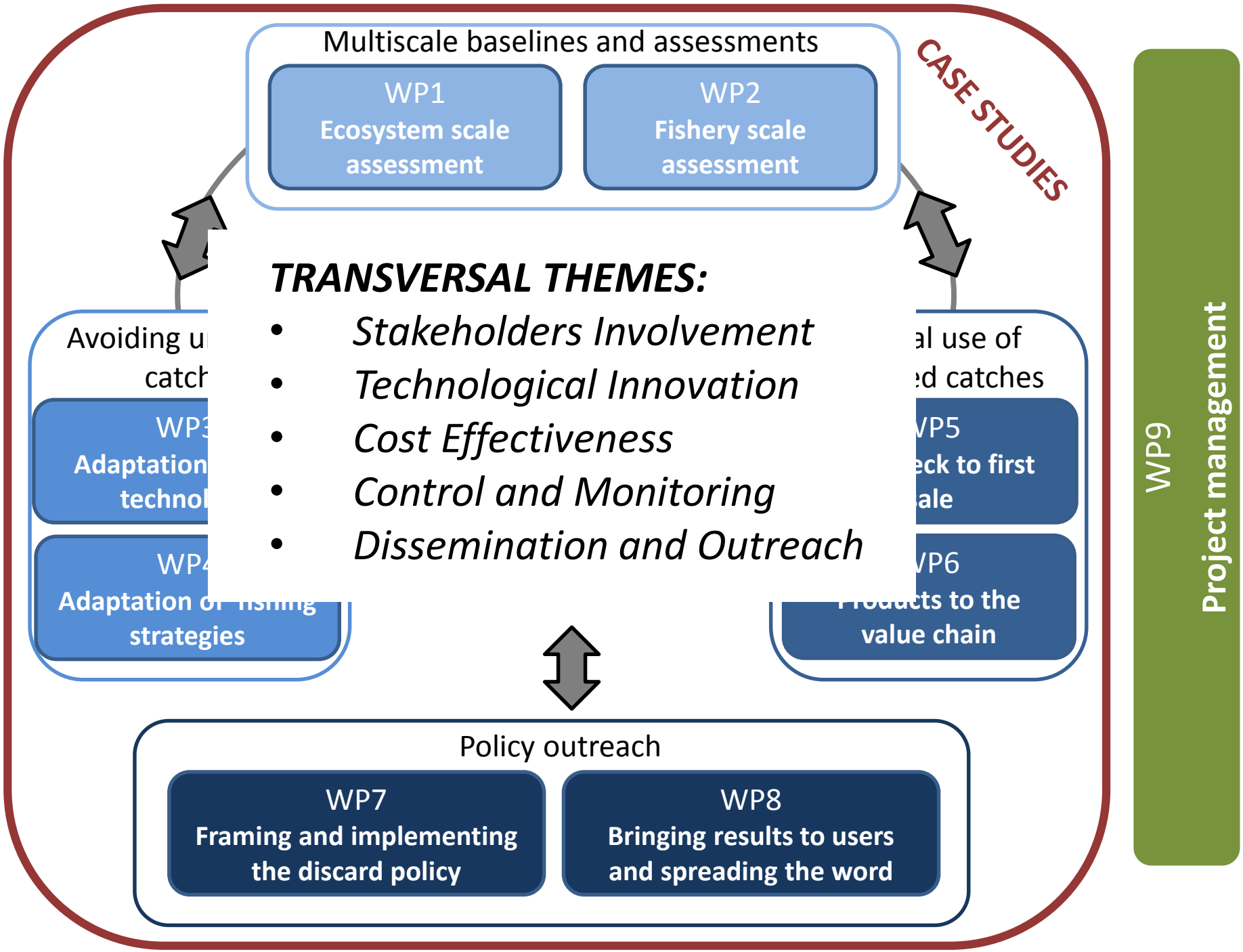
- What can Science NOT do alone? **FORCE CHANGES**
  - Force the productivity of Nature
  - Force uptake of selective devices and compliance
  - Force rational policy
  - Force the market



This we do together : stakeholders, policymakers, consumers, scientists

- What can Science do? **GATHER AND SHARE USEFUL KNOWLEDGE**
  - Work closely with all groups of stakeholders
  - Bring facts on what is known and what is not known, and work up to fill the gaps
  - Share knowledge across regions and disciplines
  - Merge various sources of information into a whole-scale picture
  - Contrast local against global realities
  - Link biological processes with socio-economic constraints
  - Propose alternative cost-effective technological strategies
  - Conduct trials and assess bottom-up initiatives
  - Communicate trade-offs and orientate rational policy
  - Enhance control and monitoring
  - Tell the good story


Multiscale baselines and assessments
WP1
Ecosystem scale assessment
WP2
Fishery scale assessment
CASE STUDIES
TRANSVERSAL THEMES:
Stakeholders Involvement
Technological Innovation
Cost Effectiveness
Control and Monitoring
Dissemination and Outreach
Avoiding unwanted catches
WP3
Adaptation of gear technology
WP4
Adaptation of fishing strategies
Optimal use of unwanted catches
WP5
From deck to first sale
WP6
Products to the value chain
Policy outreach
WP7
Framing and implementing the discard policy
WP8
Bringing results to users and spreading the word
WP9
Project management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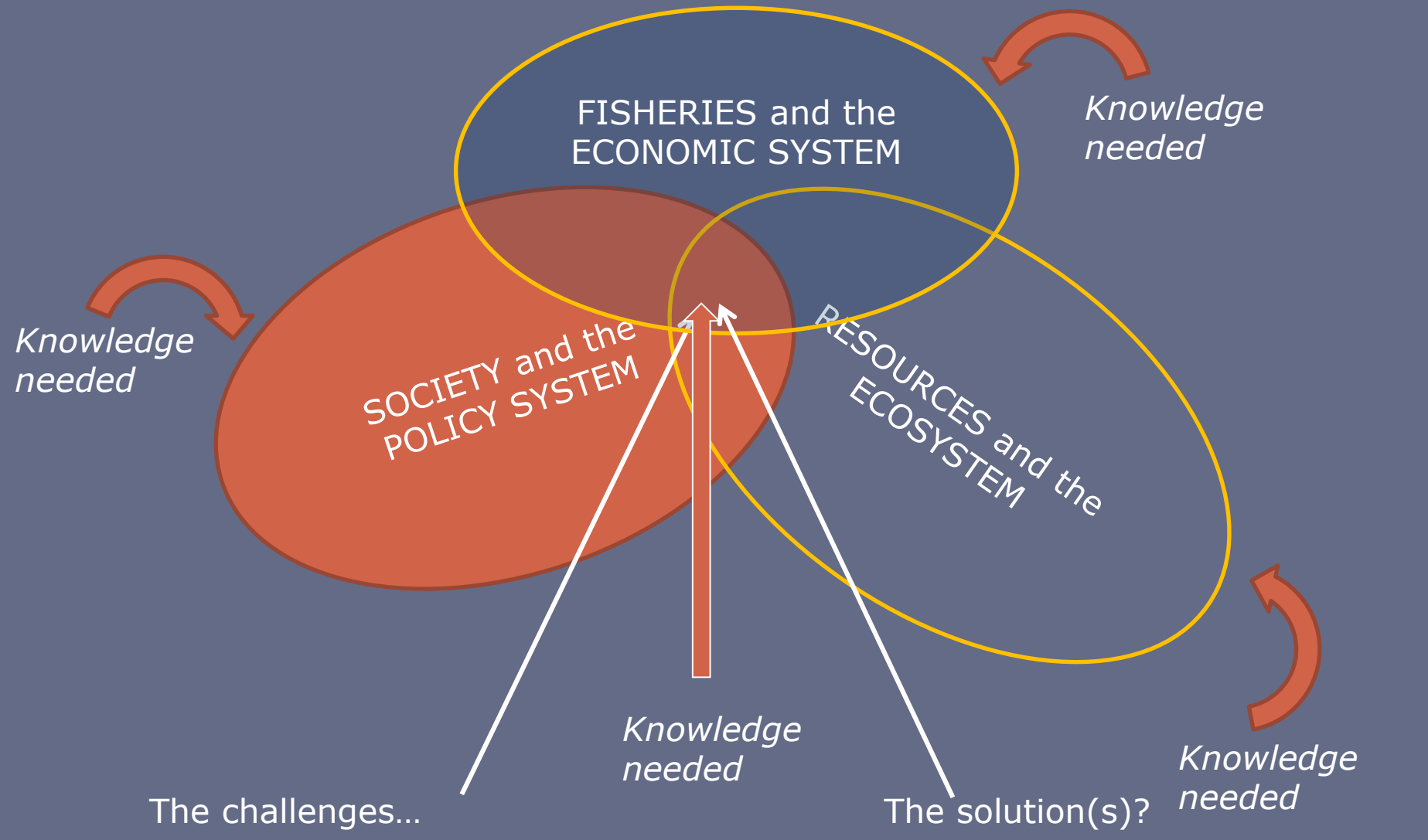
I. DISCARDS… WHAT IS THE PROBLEM?

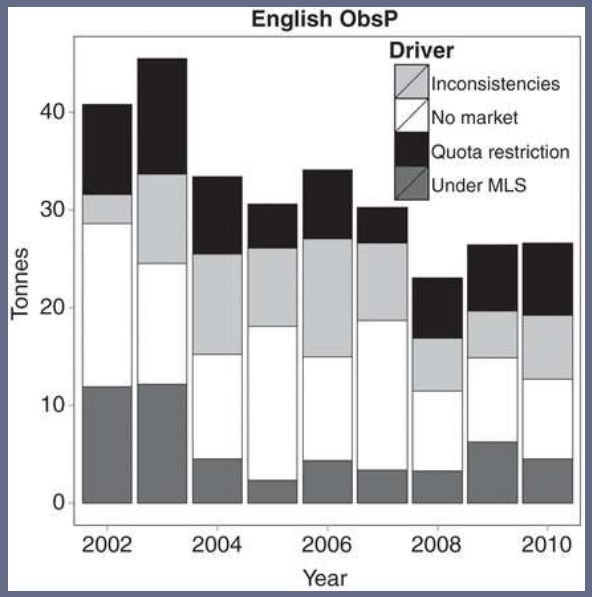
Discards – when three systems conflict



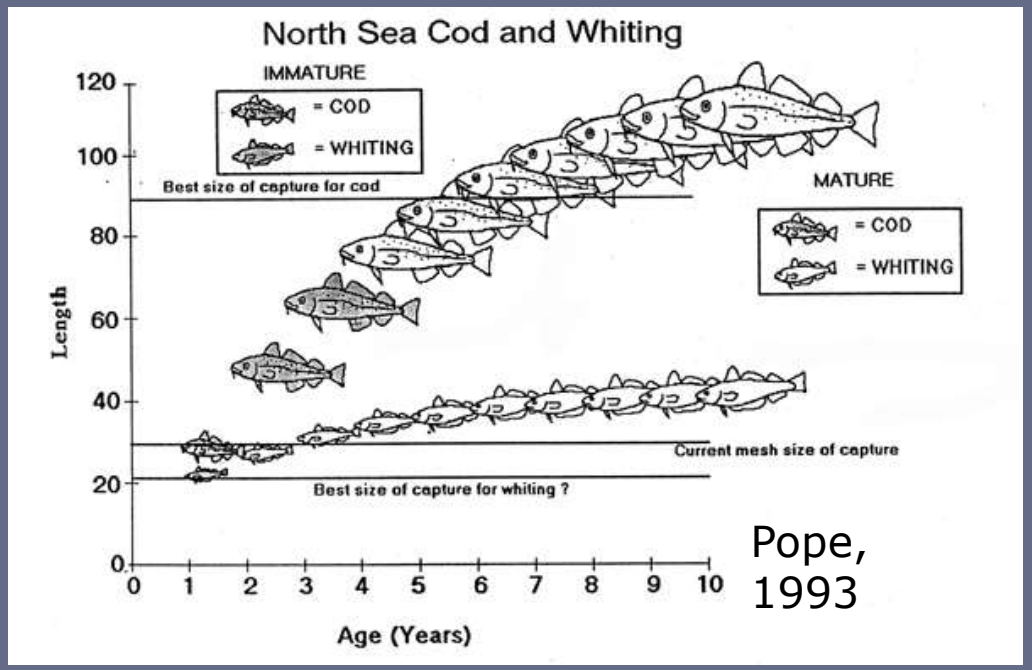
I.1 – Why do discards exist?

- Regulation (size)
- Low quota
- Damaged fish
- Low value
- High-grading

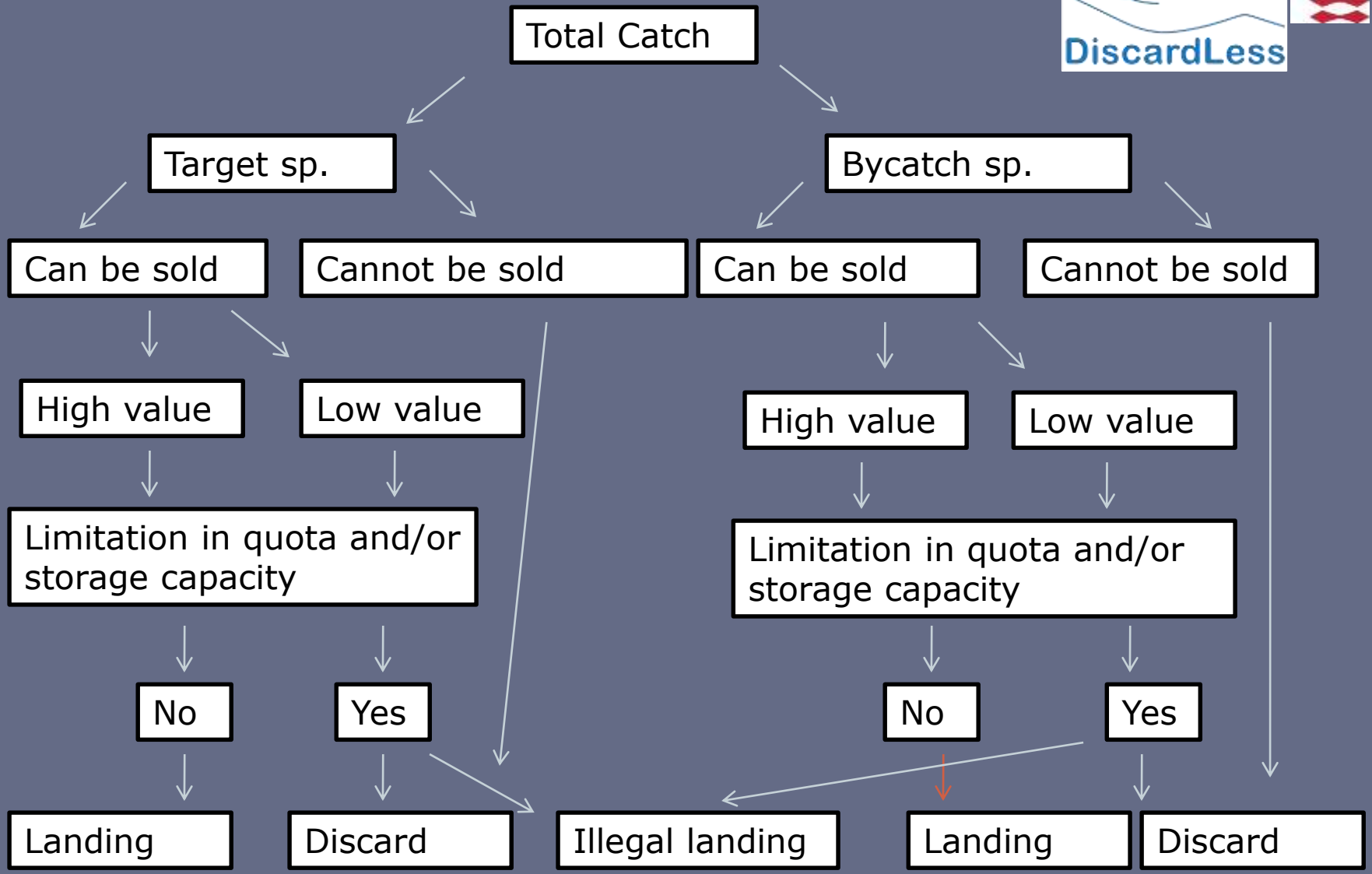
Mixed-fisheries issues



Catchpole et al., (2013)



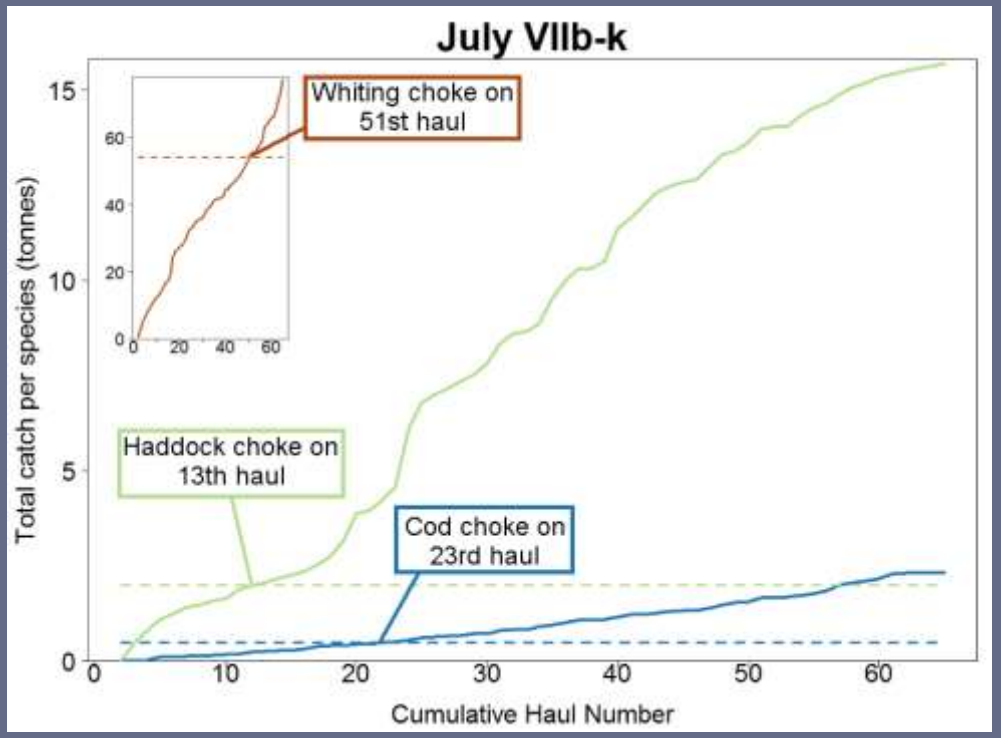
Pope, 1993


Total Catch
Target sp.
Bycatch sp.
Can be sold
Cannot be sold
Can be sold
Cannot be sold
High value
Low value
High value
Low value
Limitation in quota and/or storage capacity
Limitation in quota and/or storage capacity
No
Yes
No
Yes
Landing
Discard
Illegal landing
Landing
Discard

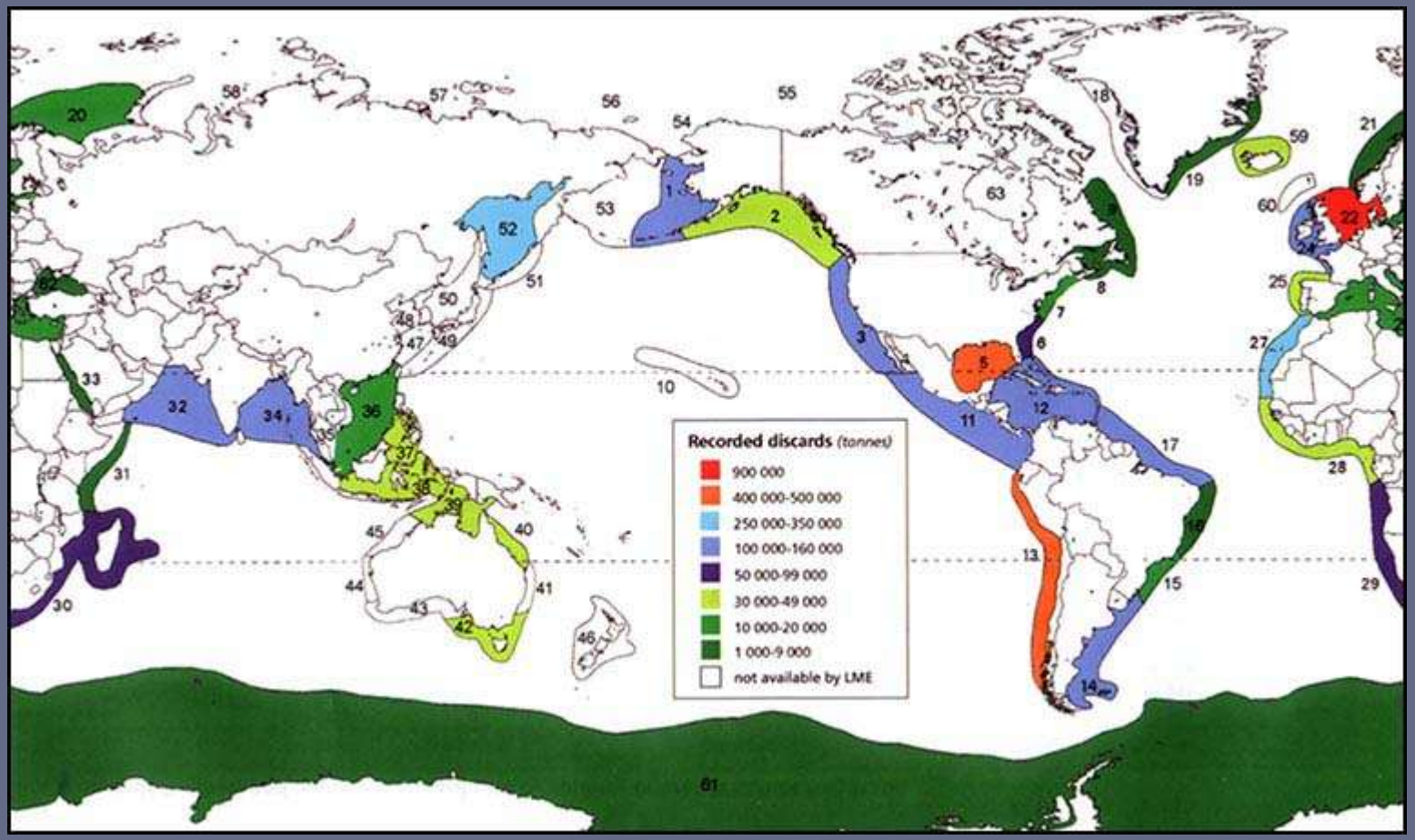
I.2 Discards exist because it is more cost-efficient than retaining onboard

Legal discarding means:

- Higher landings value
  - Selection of species
  - Selection of sizes
  - Cleaner landings
- Lower costs
  - Fewer trips
  - Less sorting time
  - Less crew
  - Less infrastructures at shore
- No choke effect
- Less control and monitoring



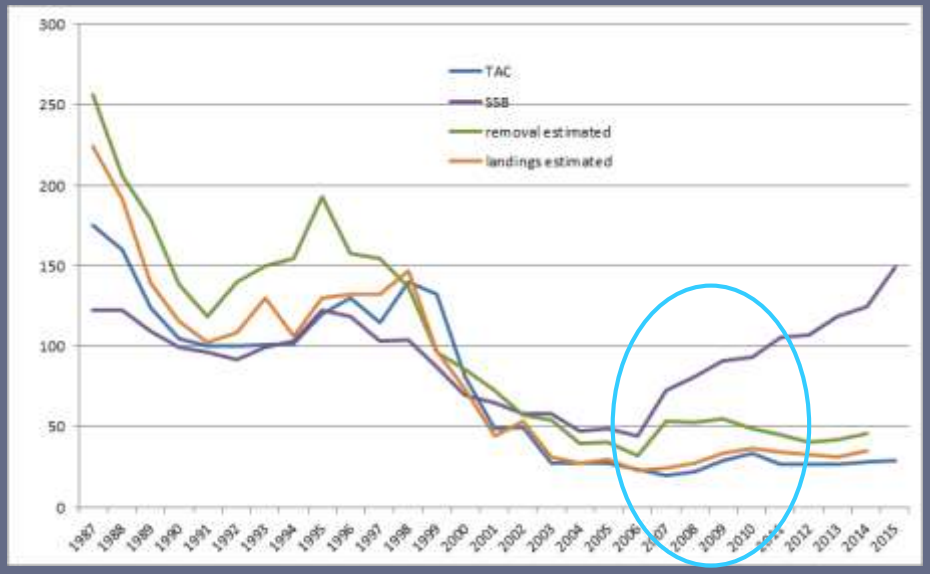
Low discards are not necessary linked with good management… and vice-versa

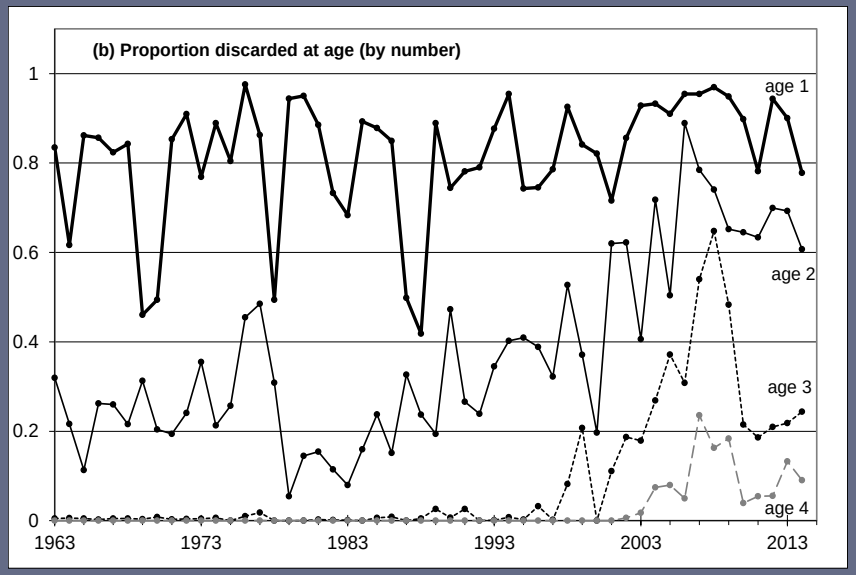


(FAO, 2005)

Understanding the ”North Sea madness”: North Sea cod vs. North Sea plaice

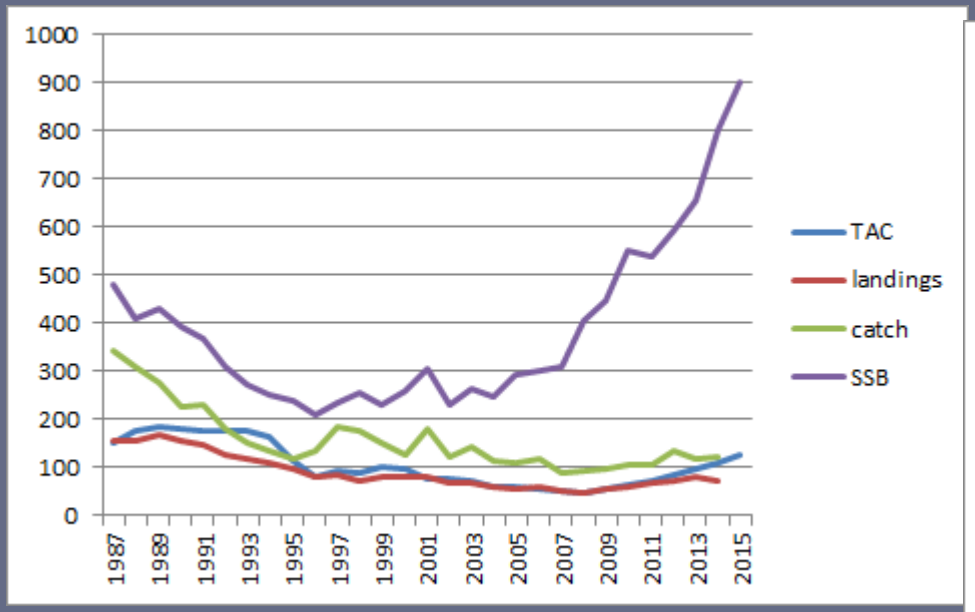
- North Sea cod:
  - 80% decrease of TAC in 4 years
  - Days at sea regulation
  - Increased high-grading
  - Situation worsened by biomass started to increase
  - → TAC did not contrain fishing mortality

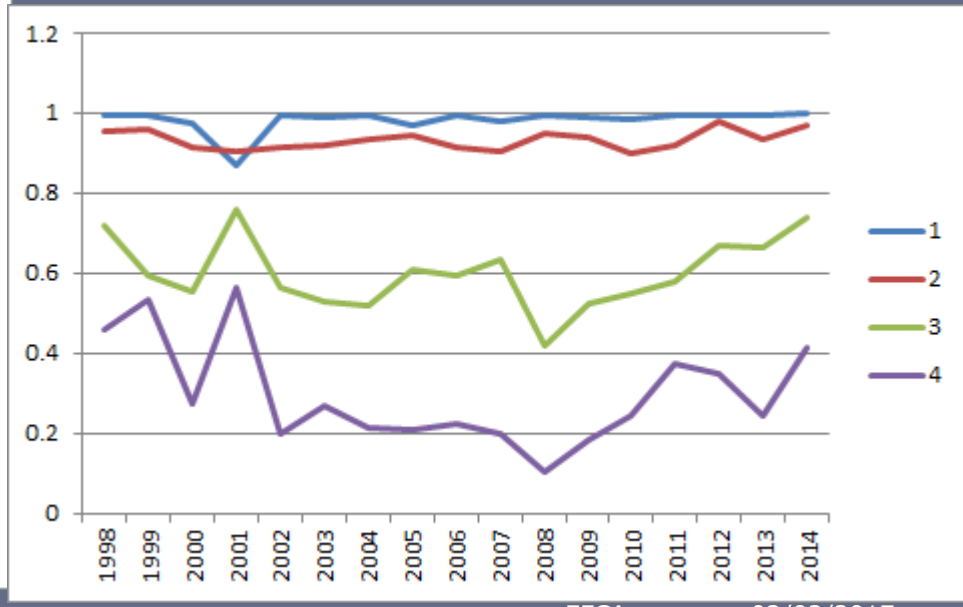




Understanding the ”North Sea madness”: North Sea cod vs. North Sea plaice

- North Sea plaice:
  - Enormous quantities of discards in the sole beam trawl fishery
  - Mainly size-related
  - Low value of plaice
  - Discards well correlated to both recruitment size and TAC





summary: Are discards an issue for sustainability?

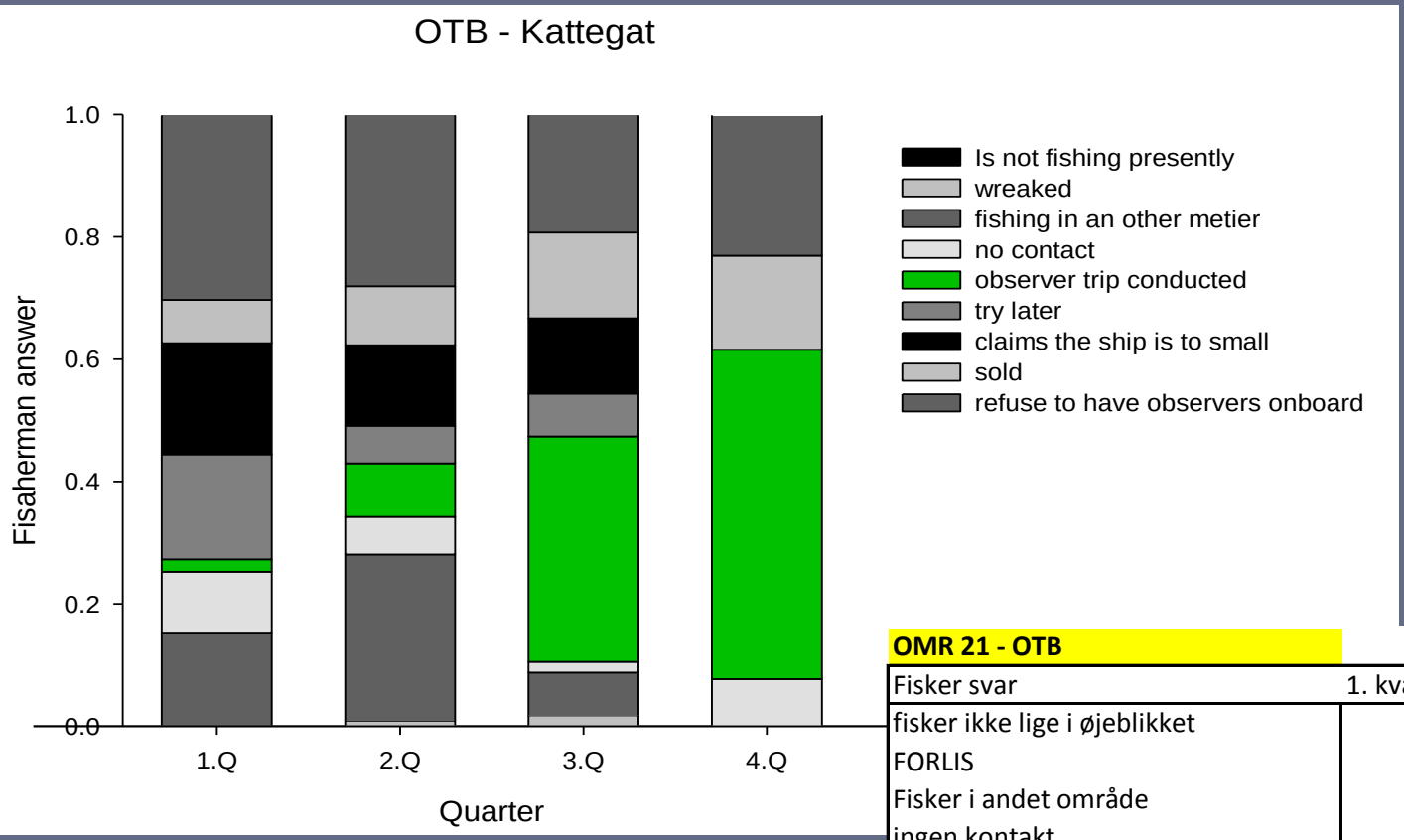
- It depends on the quantity of discards and the sensitiveness of the stock
- Uncertain discards affect the estimation of recruitment
- Regulatory discards vs. Technical discards
- The number of commercial stocks with discards estimates included in the assessment and advice has been regularly increasing.

II. DATA ISSUES

II.1 – Statistical Sound Sampling

- Choose a random trip – from a draw list
- Ask to get on the first conducted trip
- Register the fisherman answer
- Conduct a discard trip
- Raise the trips conducted to the total fleet
- Quality control

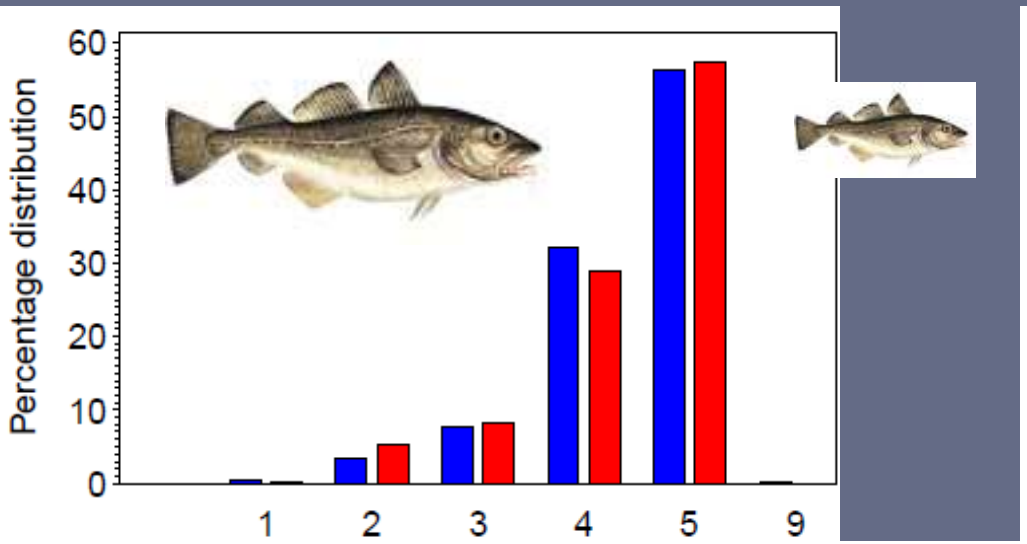
Fishers answer

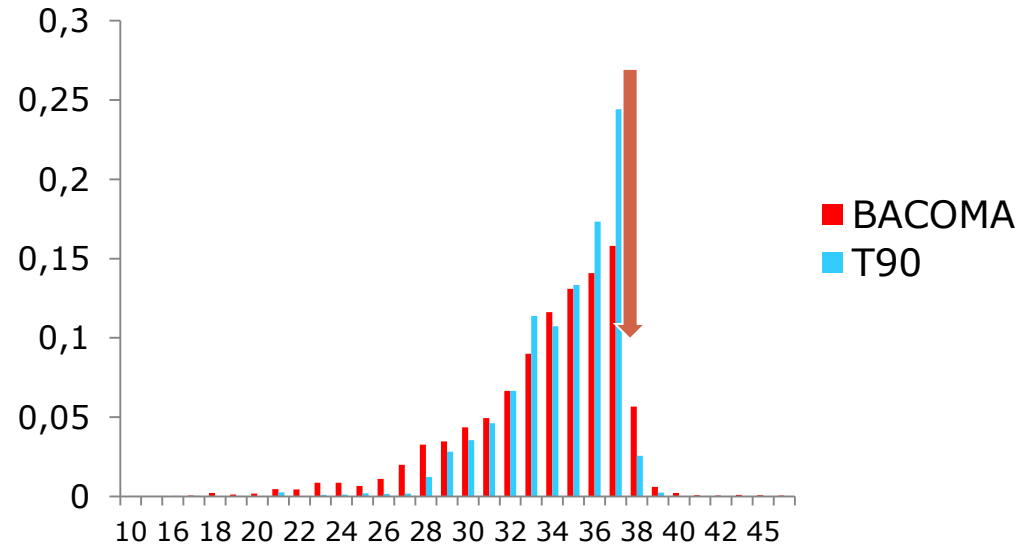


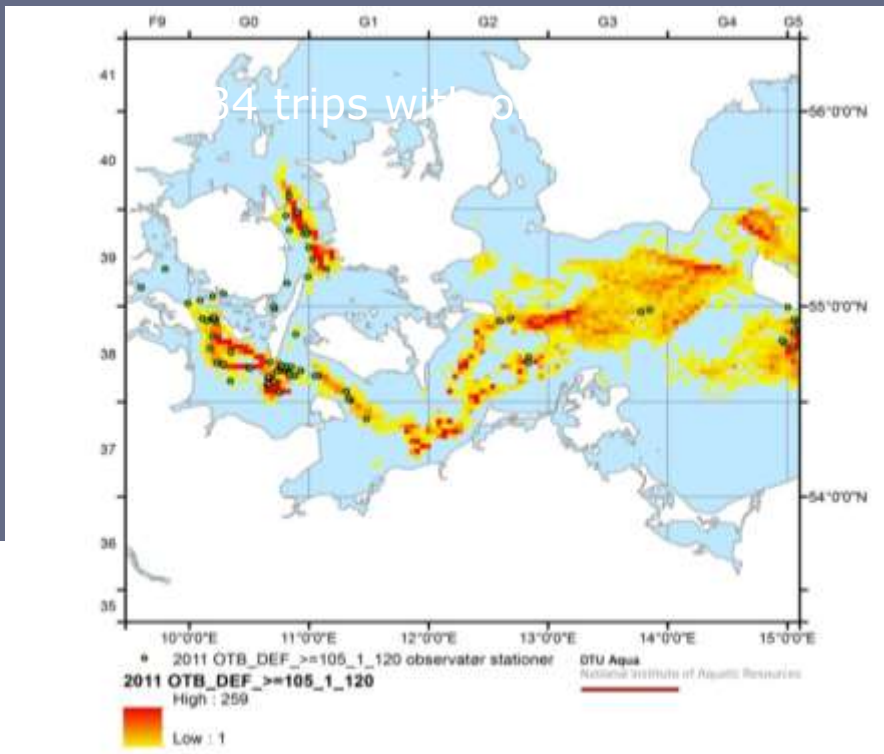
OMR 21 - OTB

Fisker svar	1. kvartal	2. kvartal	3. kvartal	4. kvartal
fisker ikke lige i øjeblikket				
FORLIS		1	1	
Fisker i andet område	15	31	4	
ingen kontakt	10	7	1	1
ja	2	10	21	7
prøv senere	17	7	4	
siger hans båd er for lille	18	15	7	
solgt	7	11	8	2
Vil ikke have os med	30	32	11	3
Total	99	114	57	13

Quality control – comparison with or without observers







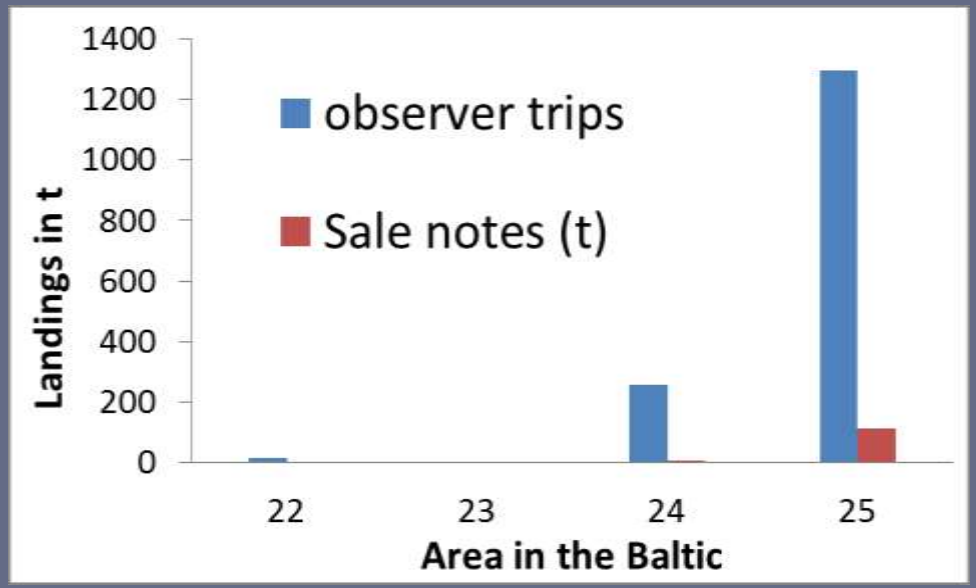
Western Baltic

II.2 But when discarding becomes illegal…

- Fishermen must write discards in their logbooks
- Can we trust information?
- Do they still accept observers onboard?
- Do they change behaviour when an observer in onboard?

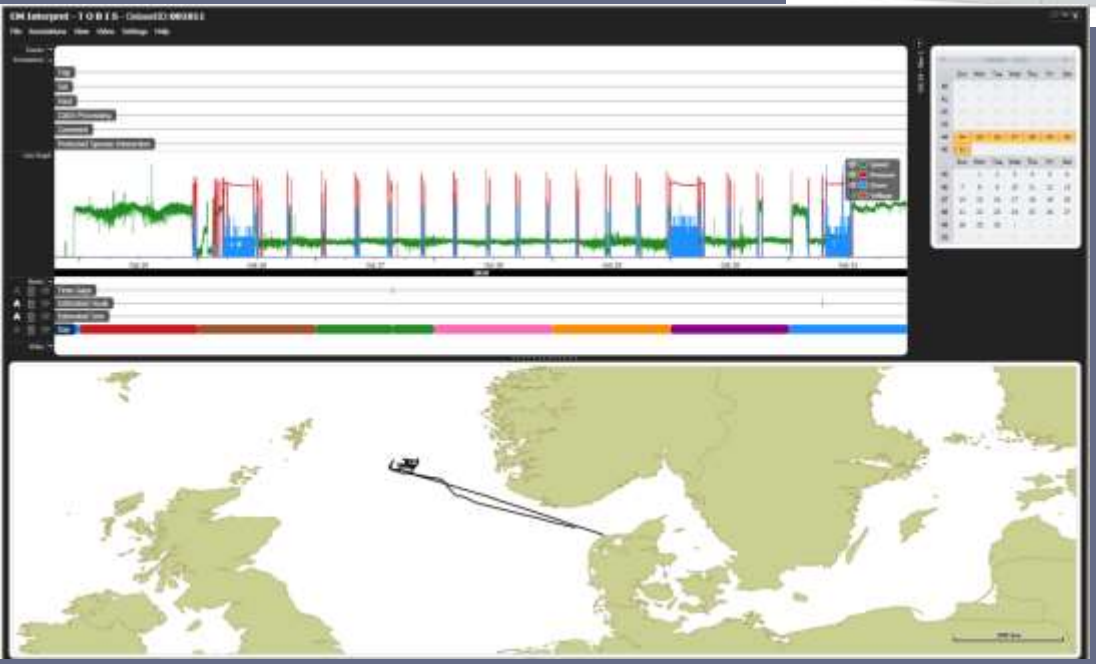
First experiences after one year of landing obligation

- Denmark – Baltic cod < MCRS



- Other countries : The refusal rate has increased dramatically and many skippers state that ” they never want to see an observer again”

II.3 Remote Electronic Monitoring and Fully Documented Fisheries



Ulrich et al., 2015

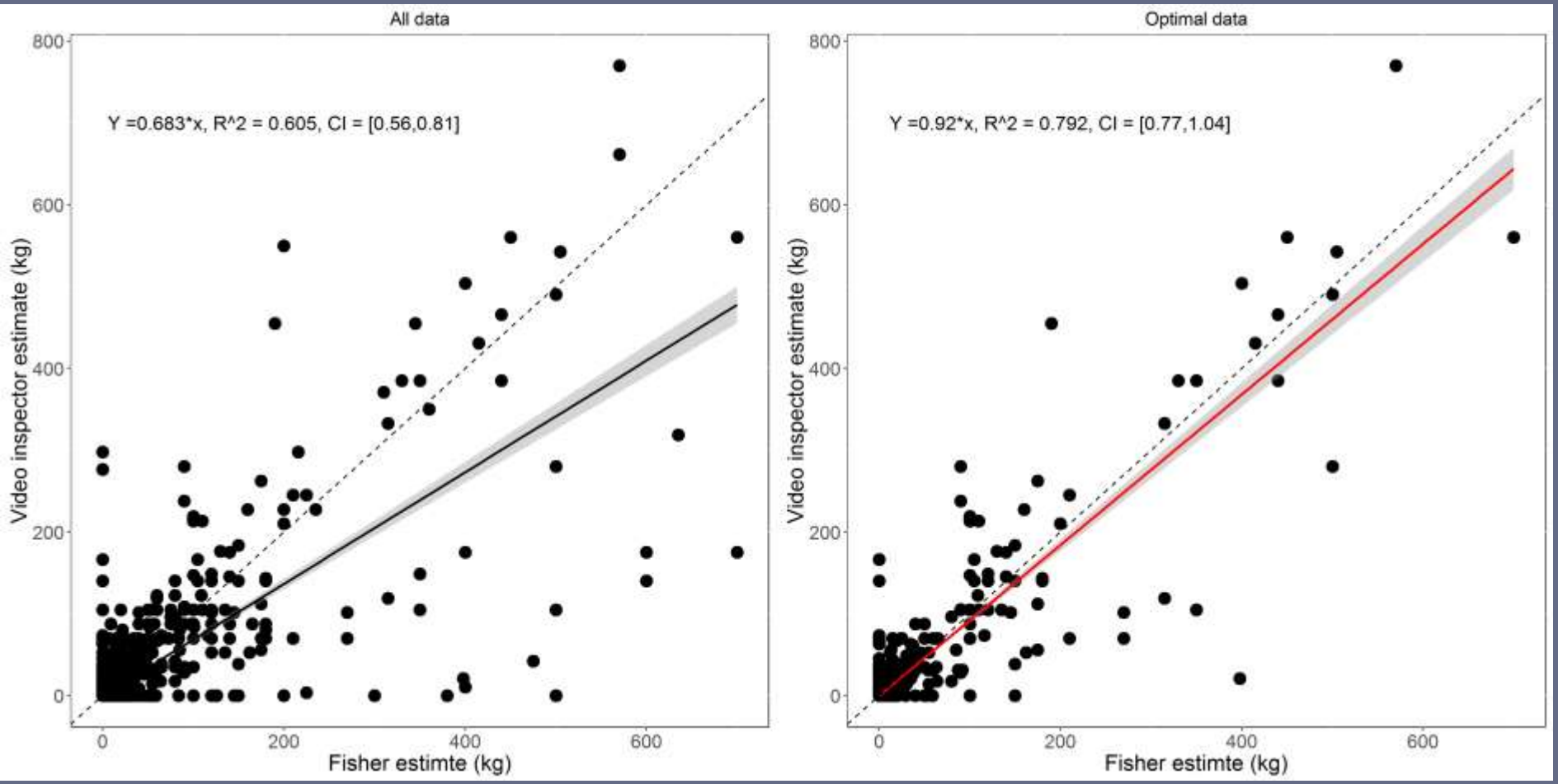
https://www.youtube.com/watch?v=6ZNv09wiYk

AnchorLab system

REM... Hated but obviously useful!

- Various trials ongoing in several North Sea countries
- Including catch quota management with increased cod quota
- More cost-efficient than any other control tool
- Deterrent and awareness effect
- Major technological progresses ongoing

French et al., 2015



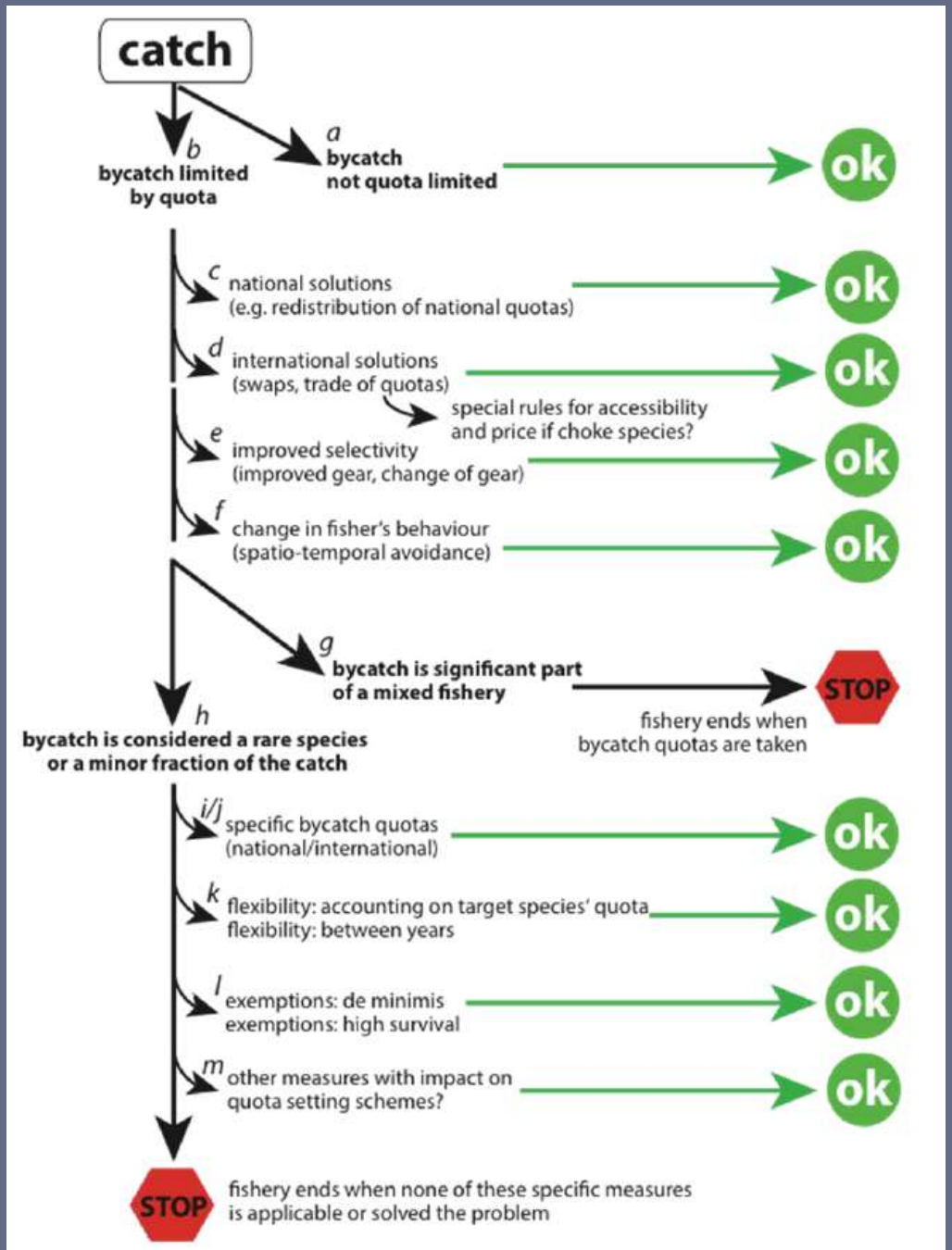
Correlation between fishers' self estimate and video inspection, MINIDISC trial (Mortensen et al., 2016)


Video
Cam0
Cam1
Cam2
Cam3

Summary

- The monitoring of discards has greatly improved over the last ten years, owing to EU framework for data collection
- This has improved the quality and reliability of stock assessment and advice
- Voluntary scheme that requires collaboration and acceptance from the fishing industry
- It is greatly feared that the quality of catch data will deteriorate with the landing obligation
- CCTV can be used as a supplementary tool but there is great reluctance in many places

III. AVOIDING DISCARDS AND BYCATCH



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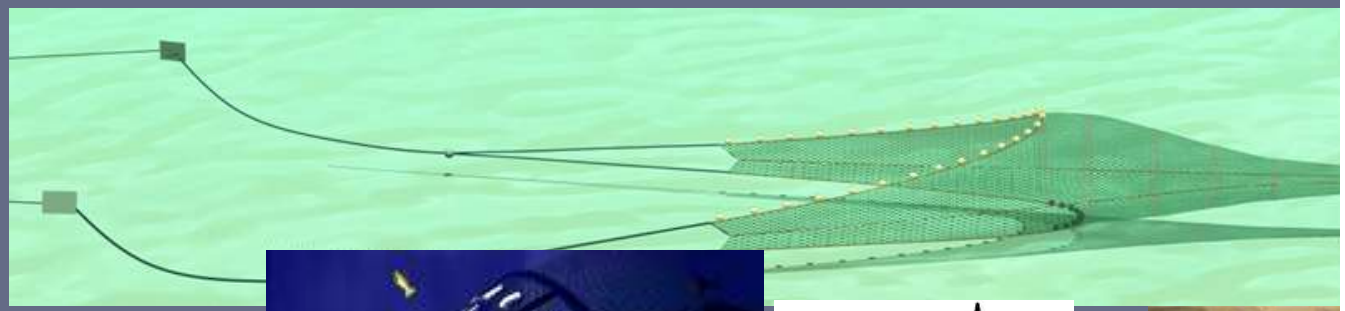
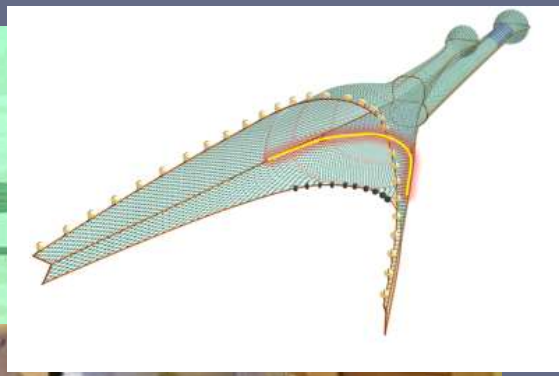
Decision tree for reducing choke effects

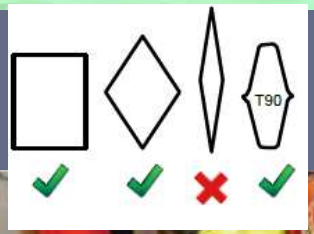
Zimmermann et al., 2016

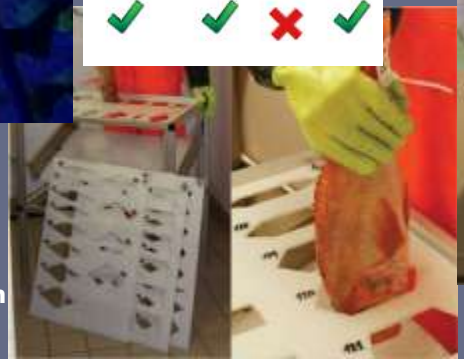
III.1 Escapement and selective gears is this the magic solution?

- Research on fish behaviour to increase selective avoidance
  - https://vimeo.com/channels/801304
- Tailoring specific solutions to specific problems
- Which of the trawl elements influence most the catching processes?





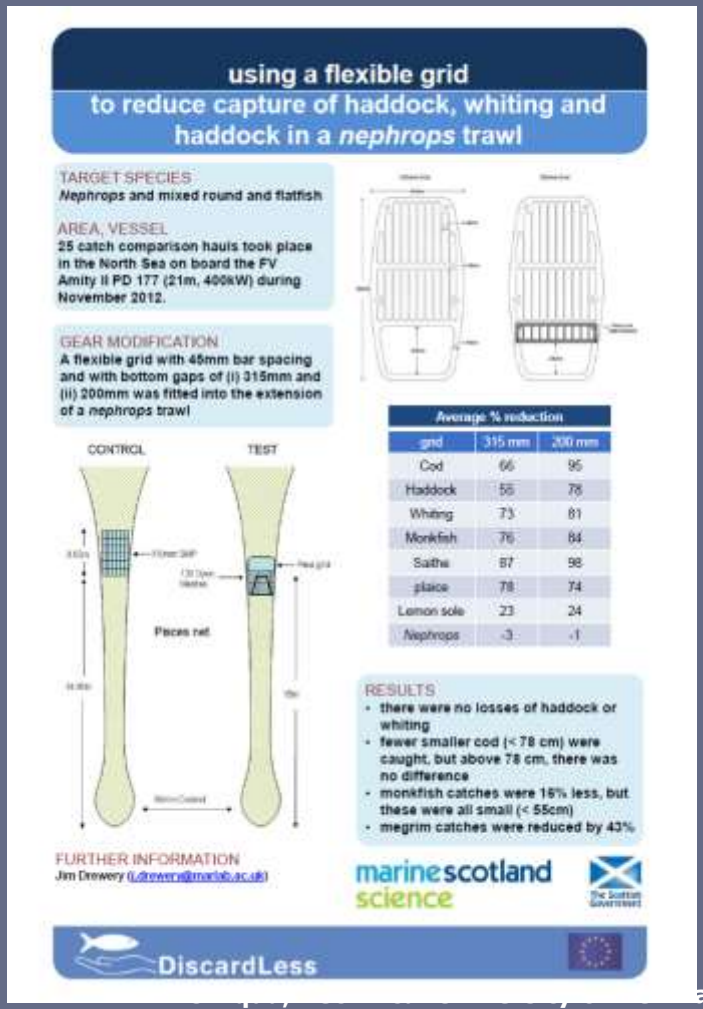




SMART GEAR
THE INTERNATIONAL COMPETITION

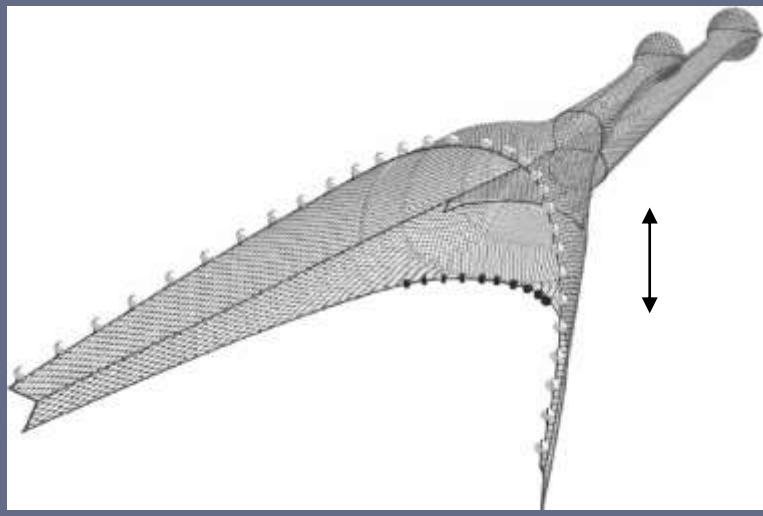
Fish behaviour for improved selectivity

>60 sheets, Catalogue released in Feb. 2017

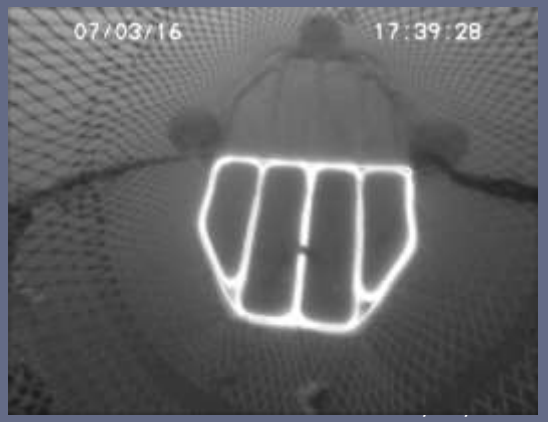


B. O' Neill, MSS

Factors influencing fish vertical distribution



Ongoing analyses of the effects of light



	Torsk	Hvilling	Kuller	Kulmule	Rødspætte	Tunge	Rødtunge		Jomfruhummer
Masker i fangstposen									
· Kvadratmasker						?	?		
· Diamantmasker				?					
· T90							?		
Vinduer									
· SELTRA						?	?		
· BACOMA						?			
· Vinduer i bundpanelet		?	?	?		?	?		
Riste									
· Svensk rist						?			
· Net-rist (skotsk)						?	?		
Vertikal deling af pose									
· Værdifisk						?	?		
Ændringer i trawl									
· Topløs trawl						?			
· Længere vinger*					?	?	?		
Rigning									
· Løft fiskelinen / rubben				?					
· Kortere mellemliner				?		?	?		
· Multirig		?		?		?	?		

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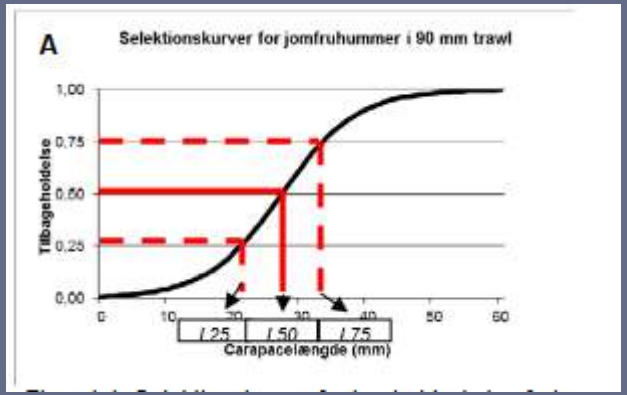
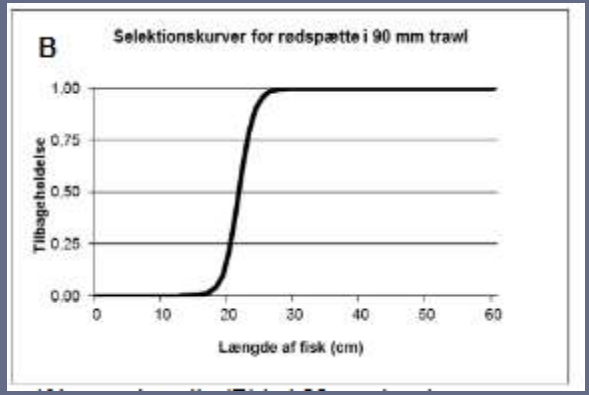
Effect of various selective devices for various species, Frandsen et al., 2015 DTU Aqua catalogue



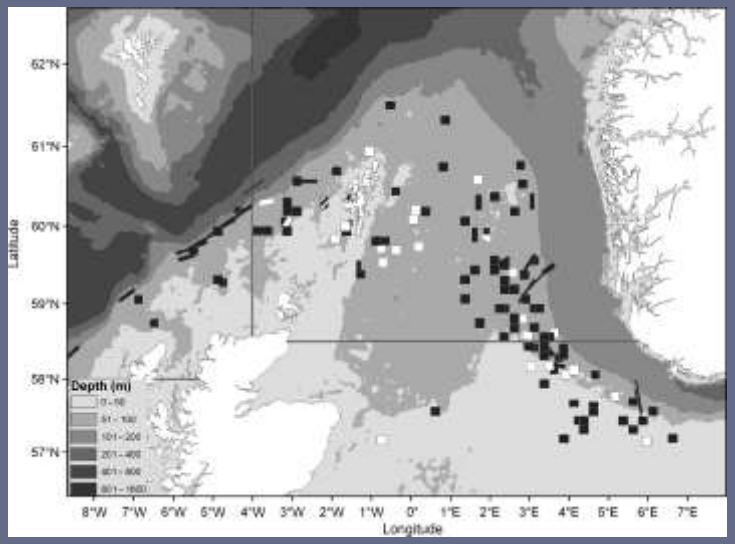


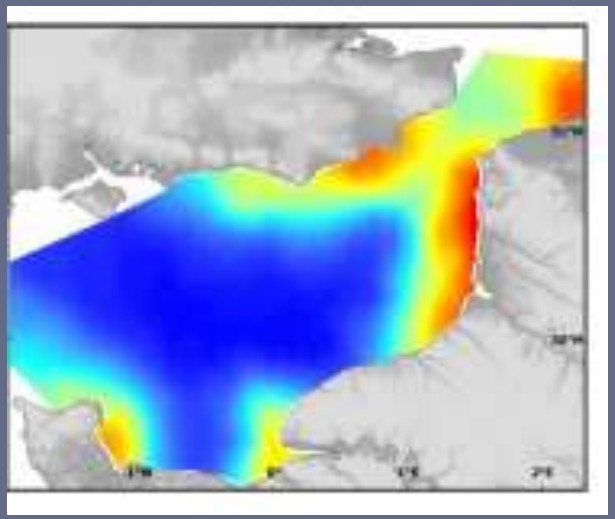
III.2 – Avoidance through changes in time and space

- Tentative prediction of ”hot-spots”

- Real-Time closures

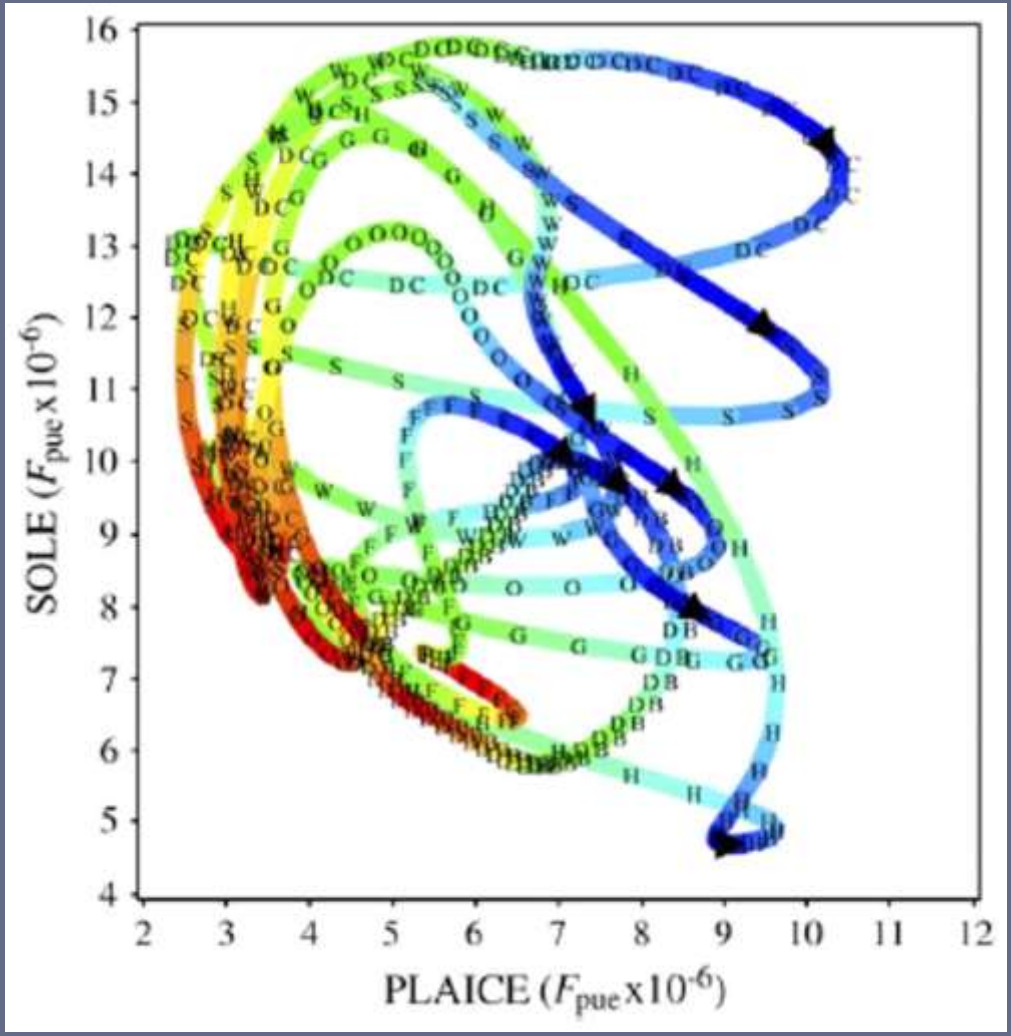
(Holmes et al., 2011)





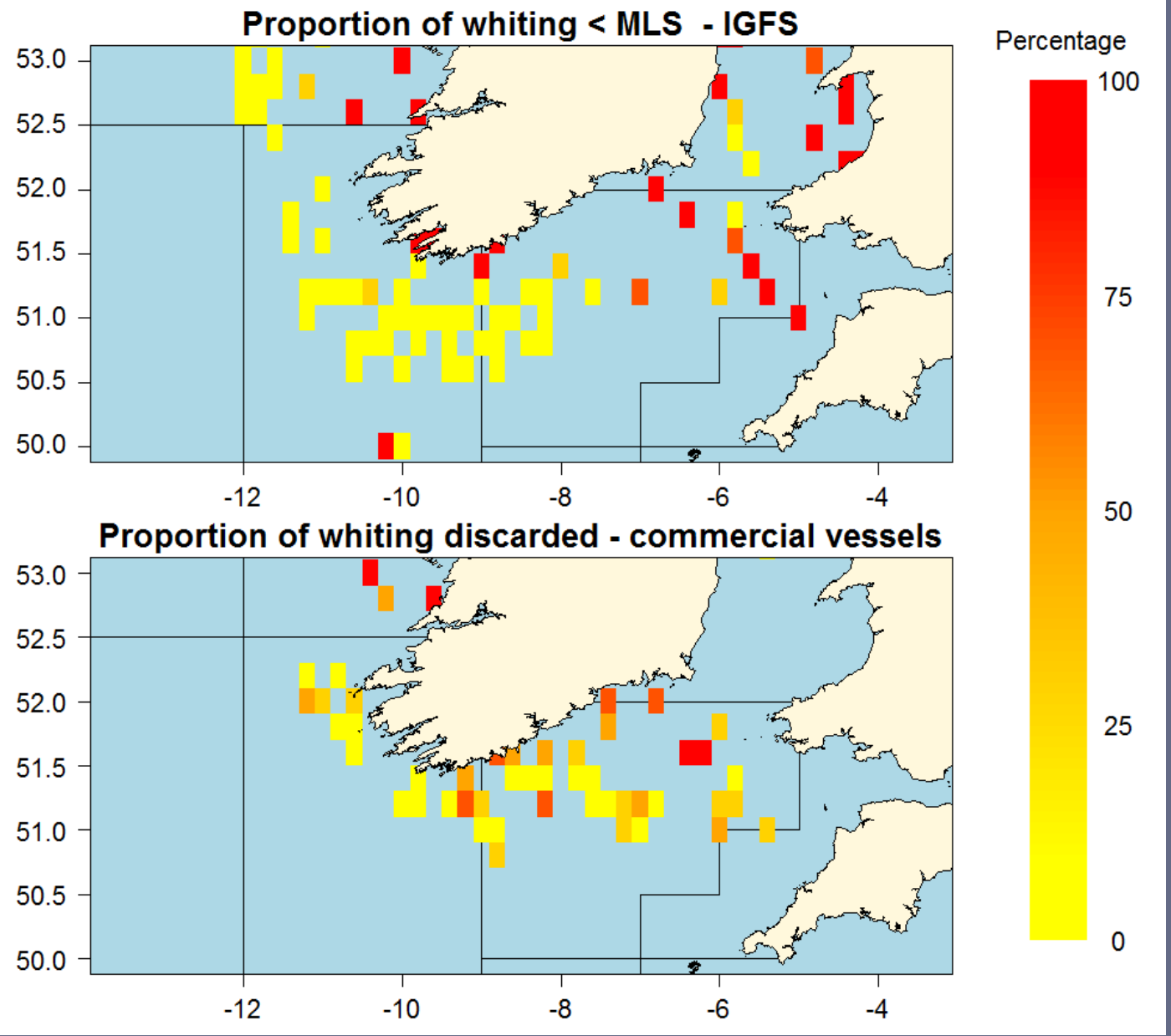
Vermard 2016

But that is not so easy!



Spatio [Letters]-temporal [colour] correlations between sole and plaice in the North Sea, Rijnsdorp et al., 2006

Survey data as a predictive tool?



It is likely easier to predict where bycatch risk is low than where bycatch risk is high!

III.3 The difficulty to incentivise changing behaviour

- Lack of proper incentives and motivation
  - Economic (loss of commercial catches)
  - Regulatory (Difficulty to have new gears agreed)
  - Peer pressure (nobody or everybody)

- Exponential increase in technical regulations and micro-management

- The selective gear is modified afterwards

- How to improve uptake and use of selective behaviour?
  - Coercive ;-(
  - Voluntary

Exploring individual ideas for reducing discards without reducing profits

Mortensen et al., 2017

Area	Vessel	Hauls	Landings	Discards	Ratio	Hauls	Landings	Discards	Ratio	
North sea		32	1314	3	0.2	32	1177	3	0.3	0.1
		104	367	8*	2.2*	104	357	6*	1.7*	- 0.5*
		35	704	5*	0.7*	138	784	23*	2.8*	2.1*
		81	460	13*	2.8*	74	457	4*	0.9*	- 1.9*
		104	814	24*	2.9*	103	913	46*	4.8*	1.9*
		56	1197*	16*	1.3*	29	948*	6*	0.6*	- 0.7*
Skagerrak		15	193'	74*	27.6*	15	150.1'	17*	10.0*	- 17.6*
		129	160*	16	9.3*	129	173*	16	8.5*	- 0.8*
		49	199'	32*	13.8*	49	186'	25*	11.7*	- 2.1*
Baltic sea		19	1004*	217	17.7*	19	1367*	184	11.9*	- 5.8*
		61	615	197*	24.3*	53	570	130*	18.6*	- 5.7*
		30	2024	665*	24.7*	37	2238	474*	17.5*	- 7.2*

Control

Test

Incentives

- Types of incentives
  - Access to closed areas,
  - Additional quotas,
  - Revenue guarantees,
  - Covering the cost of gear modifications,
  - Prize money

- The right incentive for the right case
  - Case specific
  - Promote fishermen's ideas without it resulting in financial difficulties for them
  - Does not lead to artificial involvement
  - Encourages involvement and delivers strong results

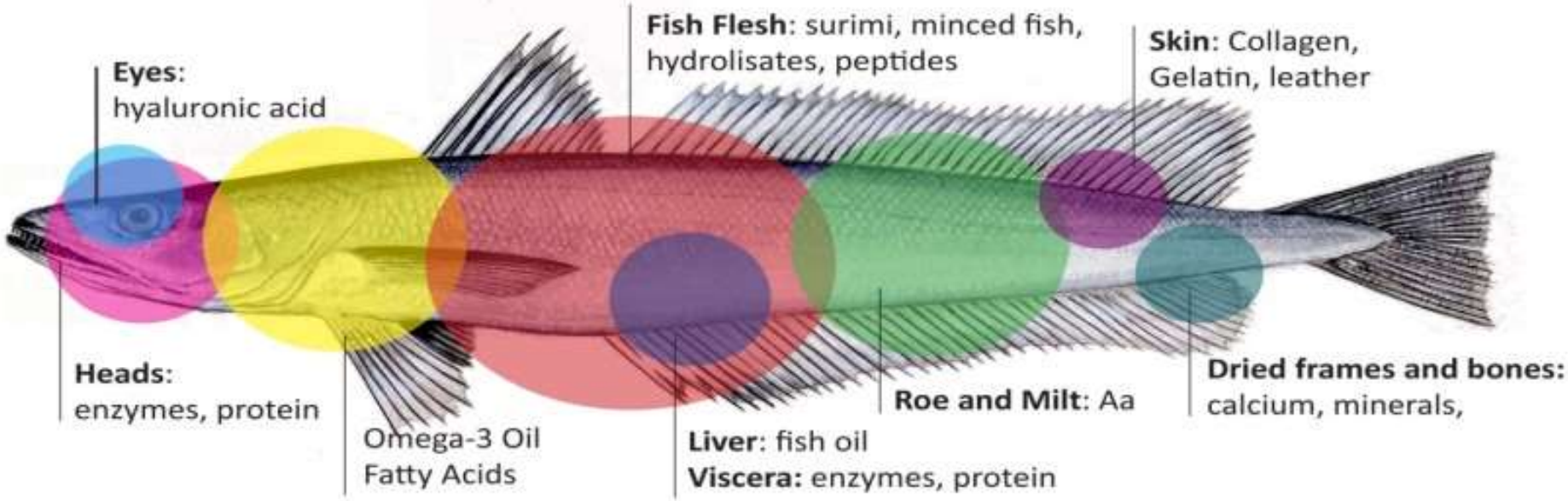
- But – No perfect solution exist, trade-offs might be required

Results-Based Management

- The industry is accountable of its full impact
- Regardless of how it is produced
- The impact must then be fully documented
- Some fishermen are already moving forward
- FDF trials / Eco-Labelling
- https://www.youtube.com/watch?v=bpH_dtM5suU
- https://www.youtube.com/watch?v=zsuNxpH4alo

IV. MAKING USE OF DISCARDS ("KEEPSCARDS")

Fish waste bears a great potential



All Ingredients: For foods, dietary supplements, animal nutrition, medicine, cosmetic Ingredients, and what cannot be used previously , can go ultimately to bioenergy (biogas)

Experience from Iceland

After 30 years of a discard ban

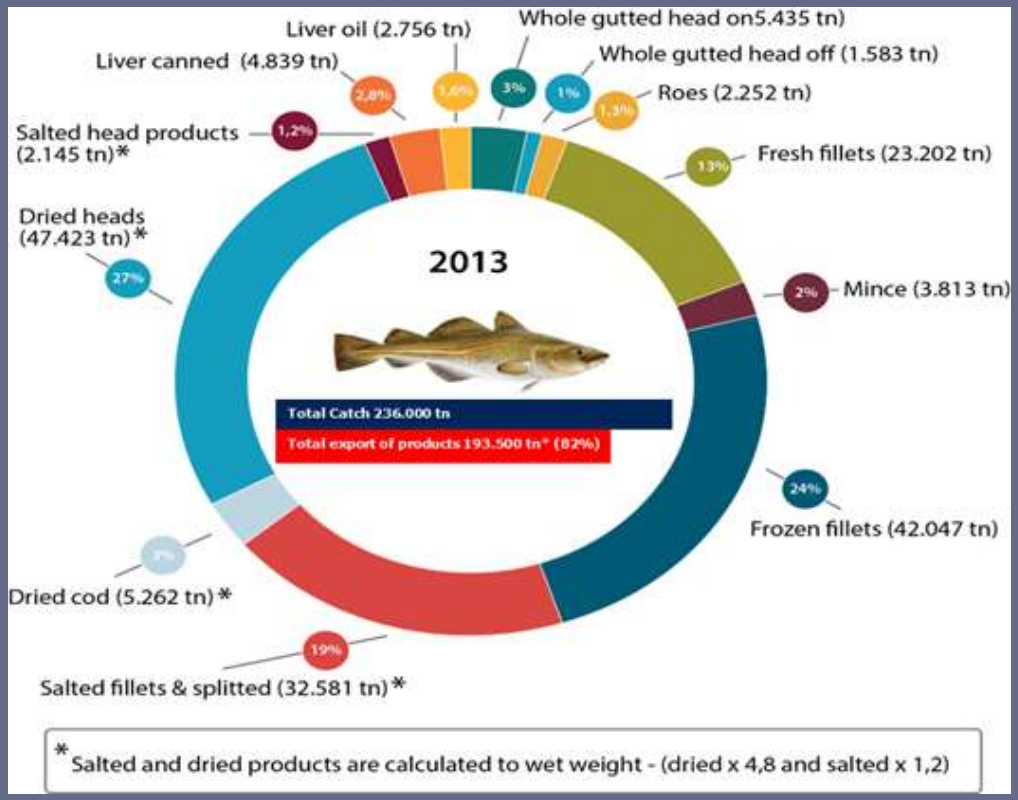


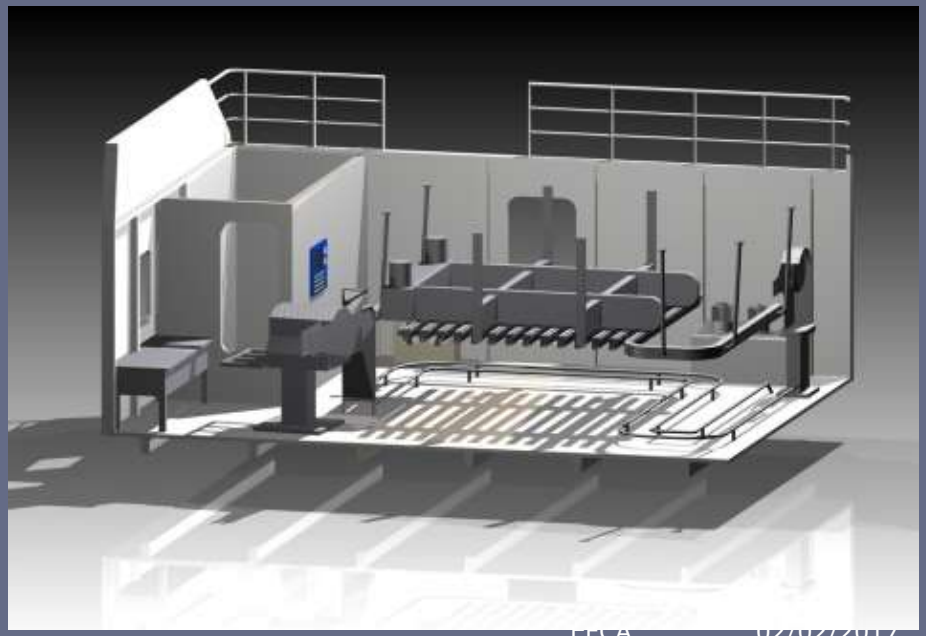
Figure 11: Fashion clothing and accessories made from fish skin

Vidarsson et al., 2015

Main issues

- Storage onboard (space/ice/handling type)
  - Difficult on small and old vessels
- Contamination of fresh products
- Heterogeneous sizes and quality
- Handling in harbours (lack of infrastructure in small harbours)
- No long-term market if discards are avoided
- Constraining regulation

- → Who shall pay?



Onboard handling of unwanted catches

J. R. Viðarsson, MATIS

Coastal Vessel 11m

Bottom trawler 23 m

Bottom trawler 39 m

Large trawler 50 m

- Many options already exist… mainly for larger trawlers
- Investment Payback time estimated 1-2 years

Summary of DiscardLess results so far

- Addressing choke species requires
  - Analysing issues at EU, regional, national, fishery and individual levels
  - Making knowledge on existing options easily available and shared
  - Exploring new ideas, including technical feasibility, cost-benefits and controllability
- Everything is easier when stocks are not depleted (>Bpa) and exploited around Fmsy
- The discard ban has transformed the fishery sector in Iceland, Norway, Feroese islands… but it took several decades