



# MINOUW

Science, Technology, and Society  
Initiative to Minimize Unwanted  
Catches in European Fisheries

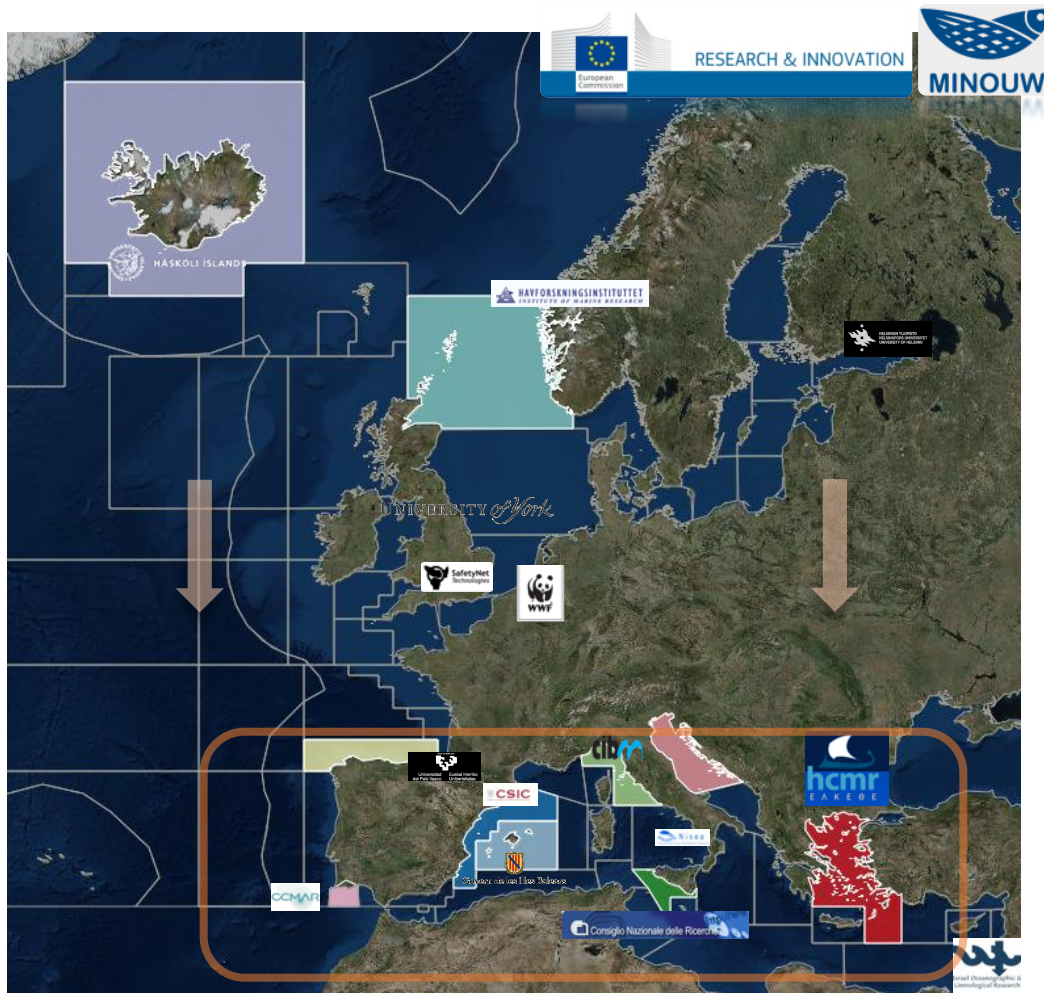
Francesc Maynou,  
coordinator

**MEDAC-MINOOW**  
**Mallorca, 11 October 2017**



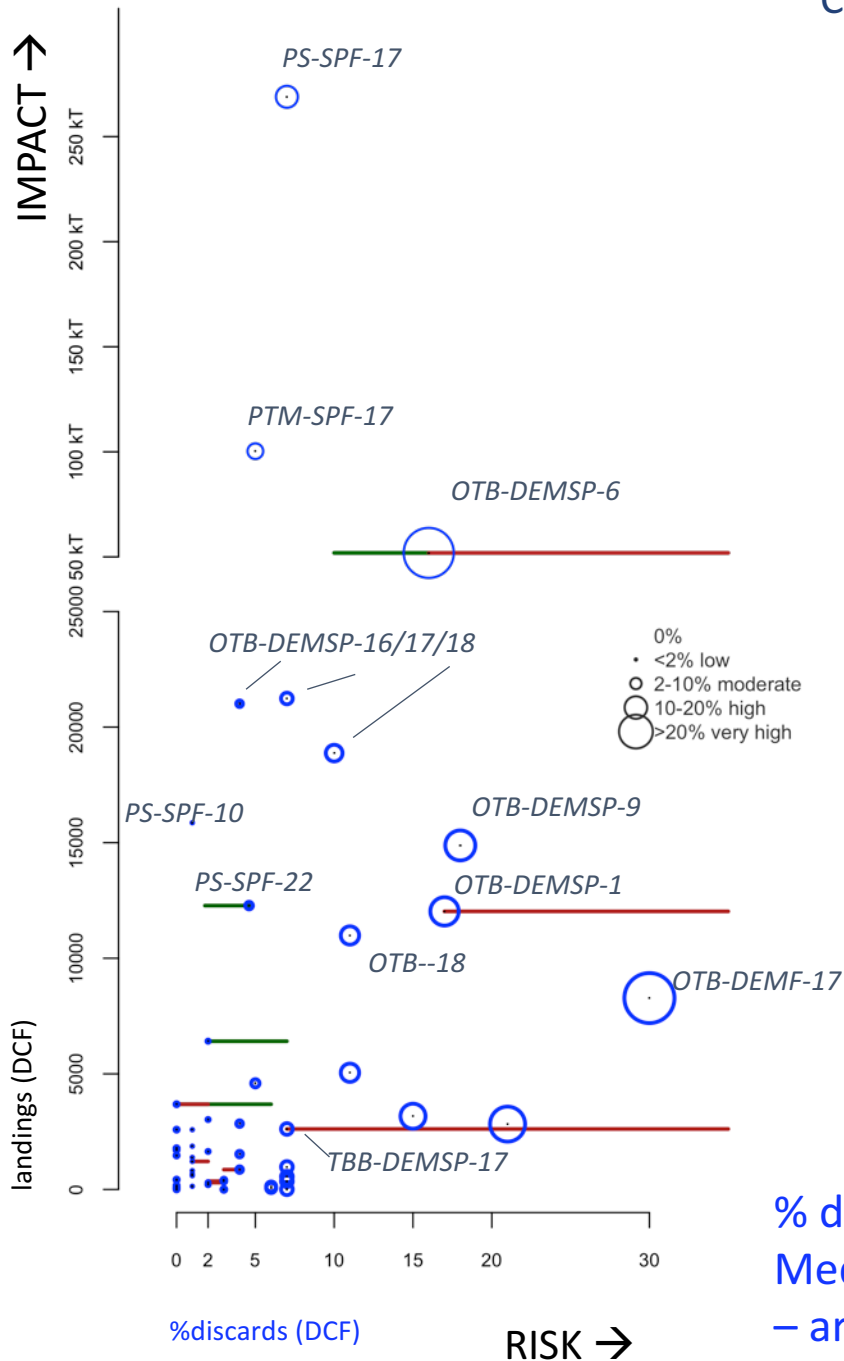
Co-funded by the Horizon 2020  
Framework Programme of the European Union





- EU H2020 Research and Innovation Action
- SFS-9-2014: Towards a gradual elimination of discards in European fisheries
- Mar 2015 – Feb 2019
- 5.9 M€ - 15 beneficiaries in 10 countries

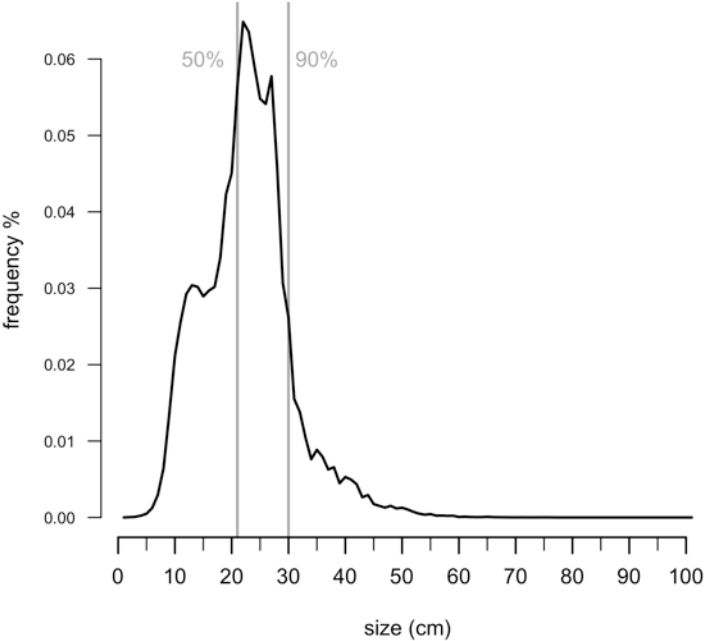
- **What:** to minimise unwanted catches by incentivising the adoption of fishing technologies and practices that reduce pre-harvest mortality and post-harvest discards, while avoiding damage to sensitive marine species and habitats.
- **How:** multi-actor approach, whereby scientists, fisheries technologists, fish producers and NGOs work collaboratively to provide the scientific and technical basis to achieve the gradual elimination of discards in European marine fisheries.



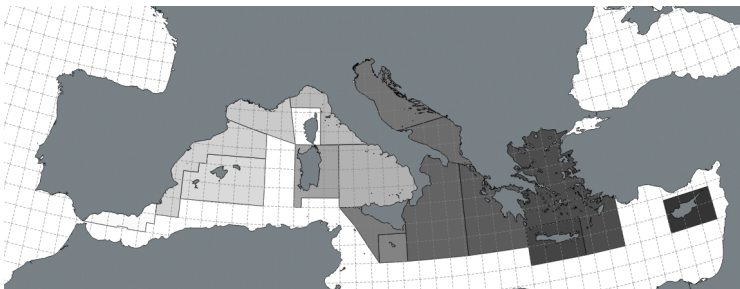
- It is difficult to estimate with **accuracy** the amount of discards in fisheries for different reasons.
- Even with important sampling effort, it is not always possible to obtain accurate estimates of regulated species discards.
- Due to the reasons that lead to discarding themselves:
  - changing quotas,
  - time-varying availability of fish,
  - market conditions,
  - weather conditions that can constrain sorting time,
  - etc.
- Obtaining accurate figures not essential
- Preferable to proceed along a **risk / impact analysis**.

% discards under the remit of Art. 15 in Mediterranean fishing areas by fleet – gear – area combination

fish size in trawl landings in EU Med. waters (2002-2014)



historically inadequate (trawl) selection pattern results in high amount of unwanted catches\*, that were to be discarded and now must be landed for alternative uses



\*unwanted catches: in this context, undersize individuals of species covered by Annex III of the Med. regulation

- Low level of compliance; high number of fishing units; diverse fishing strategies; high number of landing places
- Low confidence by fishers that the L.O. is of any use to improve the situation of fish stocks: only 20% or less in different CS believed that the implementation of the L.O. would have a significant effect
- Absence of markets for UWC → no incentive to comply
- Absence of markets for UWC → complying fishers must pay for destruction (~ 0.50 €/kg)
- Absence of markets for UWC, but valuable product for human consumption in some cases → risk of illegal marketing

From stakeholders interviews carried out in the project.

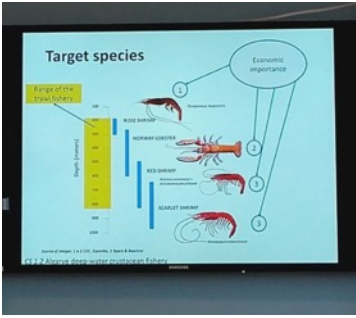
Main problems for implementation of LO:

- lack of incentives 73%
- lack of awareness 62%
- labelling or certifying 79%



### 3) MINOUW's view on Results-Based Management approach?

- The project follows a Multi-Actor approach, involving all relevant stakeholders in pilot study areas in the analysis of the discards problem and seeking technological solutions.
- We aim at relatively simple, efficient and low cost solutions that do not require an engineer on board to operate.



technologists evaluate results of enquiry process



Local scientists prepare field interventions

- ✓ identifying solutions with industry
- ✓ testing technological solutions in commercial fishing conditions
- ✓ identifying implementation issues



	2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017	Jan	Feb	Mar	Apr
		1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4
<b>Catalan Bottom Trawling</b>																		
Regular monitoring on board																		
Lights for fisheries Norw. Lobster																		
Gear modifications for red shrimp																		
Deep Vision field test																		
<b>Sicilian Bottom Trawling</b>																		
Grid field experiments																		
<b>Tuscan Bottom Trawling/lights</b>																		
On board observation/field test																		
Regular fishermen visits																		
<b>Adriatic Pelagic trawling</b>																		
Participation in public consultancy																		
<b>Algarve Purse seiners</b>																		
Improving pre-catch identification																		
Enhancing Survival rates/slipping texts																		
Survival assessment 2 slipping methods																		



A. Ligas, CIBM

### 3) MINOUW's view on Results-Based Management approach?

self-regulation: is possible and can work in certain institutional settings (e.g. *cofradías*).  
 Examples of “success” in specific small-scale fisheries



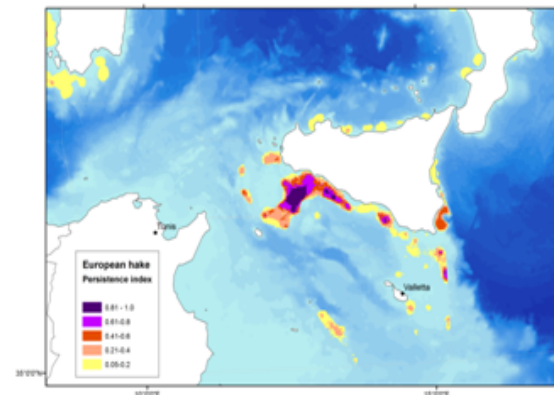
Sand-eel management plan in Catalonia



Utilization of by-catch in Catalonia

In data-rich settings, it is possible to identify fishing strategies or fishing areas likely to produce infringements with the L.O.:  
 i.e. full documentation of what and where

Nursery areas of hake: high risk of producing UWC



### 3) MINOUW's view on Results-Based Management approach?

#### pros:

- Results Based-Management Approach relatively cheap to implement.
- Making fishers accountable / responsible may incentivise compliance.

#### cons:

- relies heavily on self-monitoring by fishers, including –importantly – full documentation of catches;
- need to devise a methodology for independent checks (“auditing”);
- relies strongly on public authorities setting catch (and bycatch) limits: traditionally, Mediterranean fisheries are controlled by input, not output.





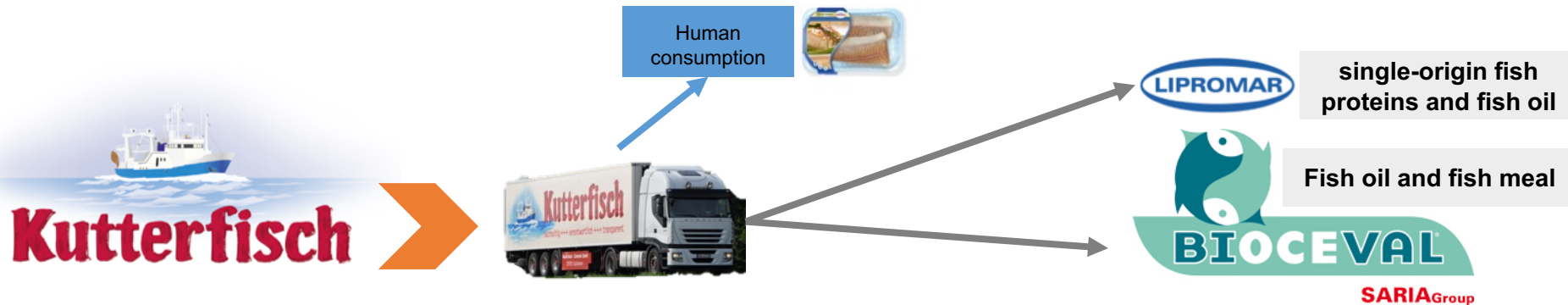
### 3) MINOUW's view on Results-Based Management approach?

#### Specifically, for the implementation of the L.O.

*The utilization of UWC is authorized solely for purposes other than direct human consumption: for example, fishmeal, fish oil, animal food, food additives, pharmaceuticals or cosmetics.*

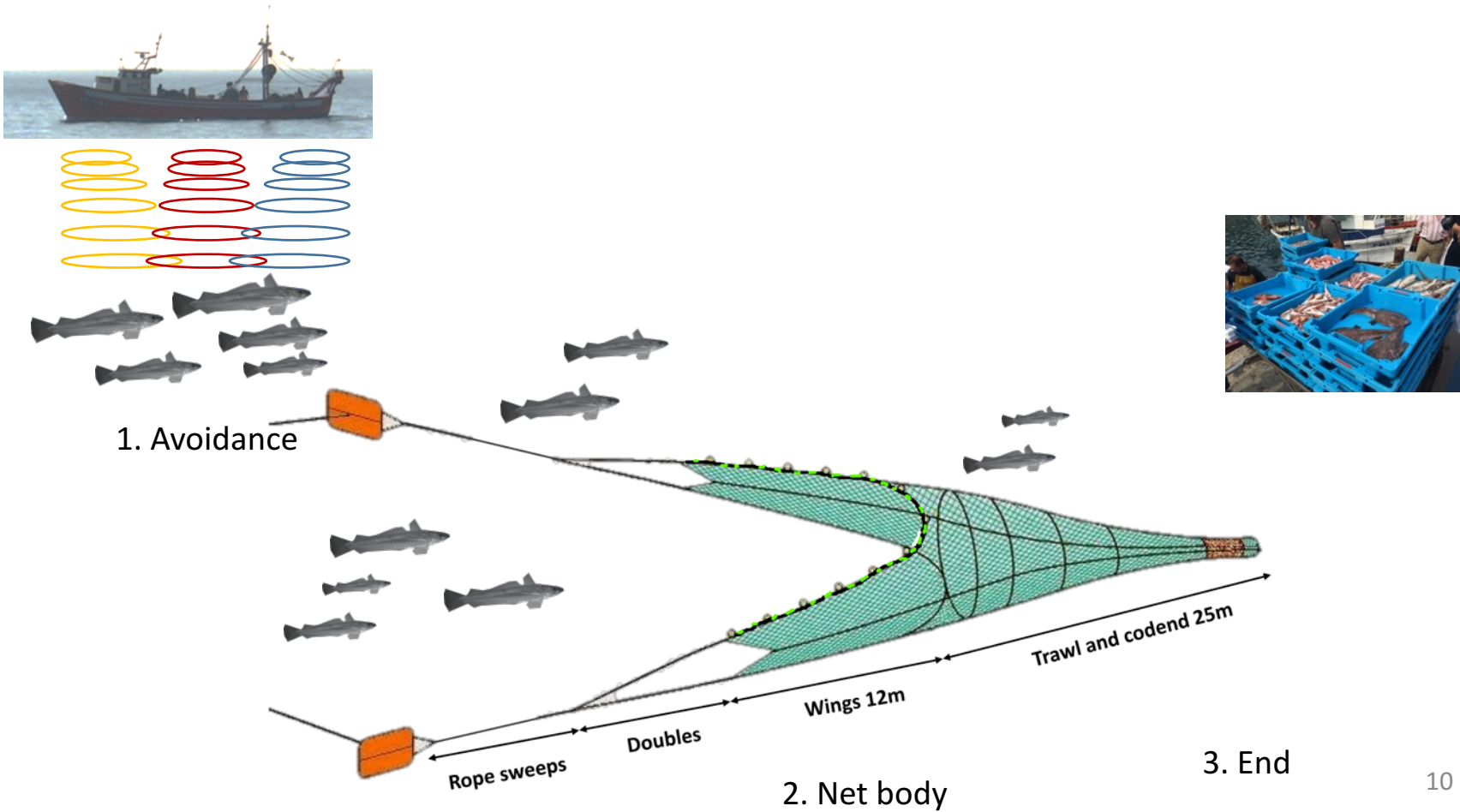
#### Critical issues

- Costs and difficulties in setting up a discards management system;
- Quantities and qualities not always suitable to create local processing plants and/or cost of transport makes product not competitive;
- Landing points scattered along the coast, with consequent high costs to collect discards, product not competitive;
- When the landed UWC are not collected, they become special waste and industry must pay the costs for their disposal;
- Lack of hold space in vessels for transport of UWC to land.



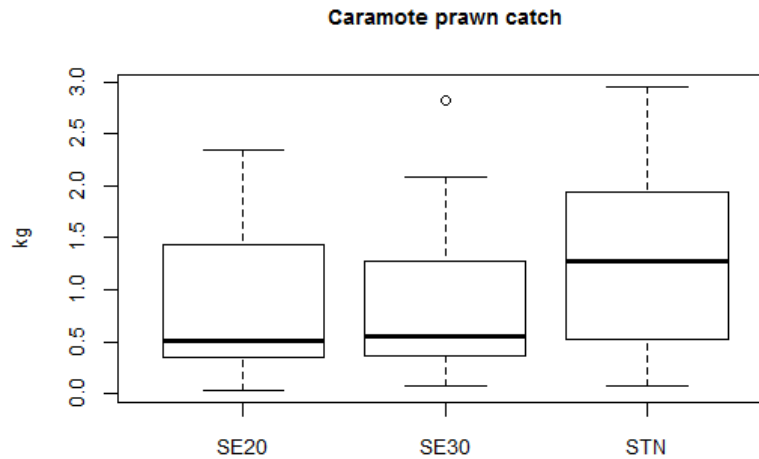
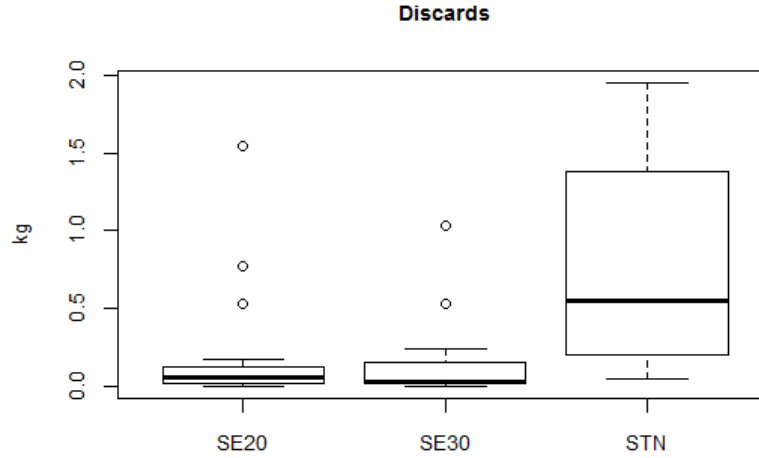
## 2) Modifications to fishing gear to avoid unwanted catches?

- MINOUW is carrying out field tests with new or modified fishing gear to decrease UWC
- Exploring solutions for bottom trawl, set nets, longlines and purse seine

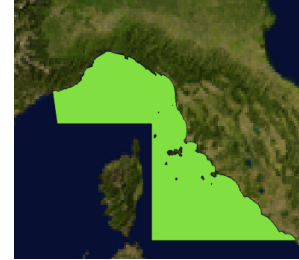


# SPECIES SELECTION – Modified trammelnet with “guarding net”

- tested 2 configurations (SE20, SE30) against control (STN)
- Target species: Caramote prawn
- Problem: by-catch mortality due to predation by scavengers; damage to fishing gear



SE20 = selvedge 20 cm, SE30 = selvedge 30 cm, STN = no selvedge



- **Reduced sorting costs**
- **longer-lasting fishing gear (net)**
- **Considerably reduced amount of discards (both total discard and Annex III species)**
- **Non-significant reduction of main species catches**

- In purse seine targeting small pelagics, the problem are catches of undersize sardine or anchovy or low value sp (bogue, horse mackerel)
- UWC can be reduced to less than 2% by a combination of early detection, avoidance, selection and post-capture release.



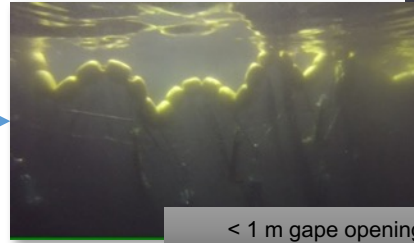
# SPECIES / SIZE SELECTION – Pre-catch selection and post-release survival

Purse seine:

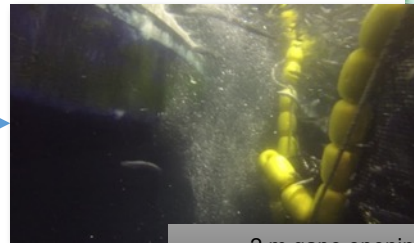
1. Pre-catch selection: echosounder, sonar, skipper experience
2. Post-catch selection and release, comparing ‘early slipping’ techniques
  - Standard technique practiced by Algarve PS fishers vs. modified techniques
  - Modified technique with weighted floats
3. Survival of escapes (40-70%)



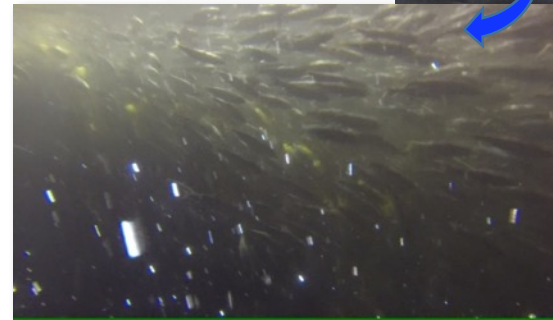
Standard slipping procedure. The catch is densely crowded inside the net and a combination of the weight of the catch on the net and wave action forces the floatline underwater, to a depth of <1 m, allowing some of the catch on the surface to spill out of the net



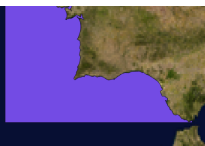
< 1 m gape opening



2 m gape opening



Modified slipping procedure with increasingly large weights allow for higher escape rates of sardine



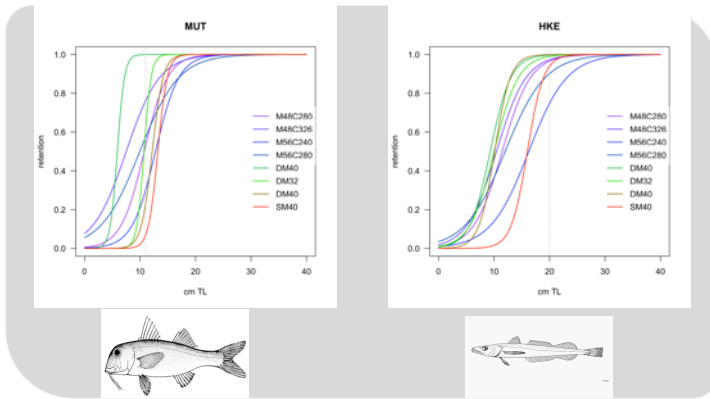
## Bottom trawl

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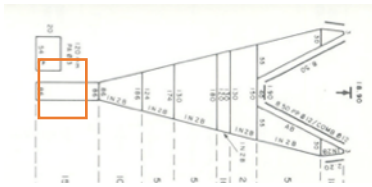


- **Bottom trawling** is the most problematic fishing gear:
- bottom trawling on continental shelves lead to mixed fisheries that are the predominant mode of exploitation of demersal resources in S Eu waters.
- These fisheries are high risk / high impact.
- The traditional place of selection has been the codend, which is the part of the trawl that has received largest research effort and is the focus of legislation.
- However, the codend may not be the best place for selection, especially when we consider the limits to selectivity as shown by experimental studies.

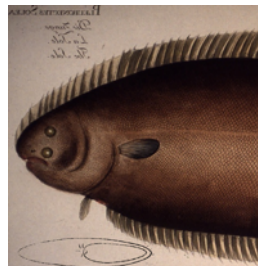
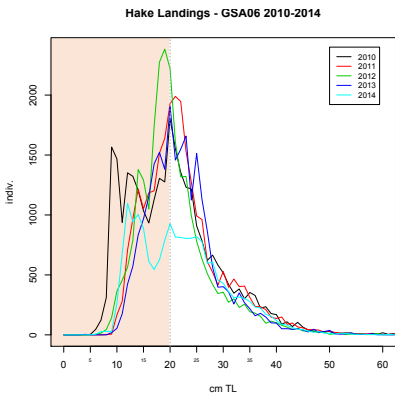
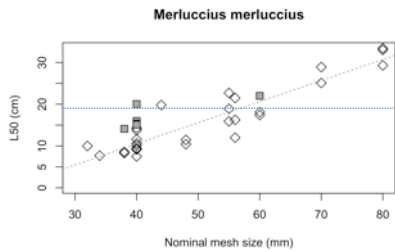




Square mesh (SM40) has contributed significantly to improve selectivity in Med. OTB, particularly for roundfish, although far from sufficient for certain species (eg hake)

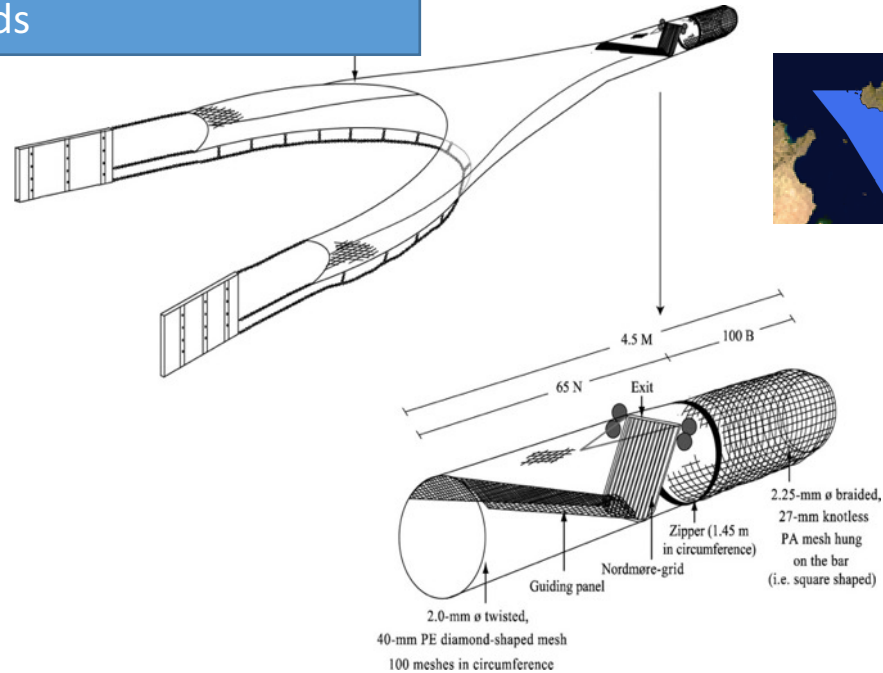
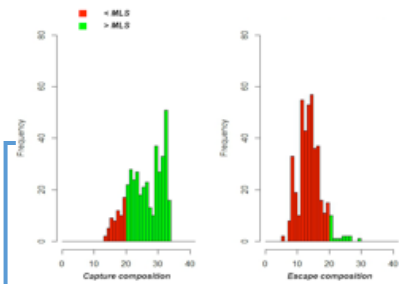


## Codend SM40

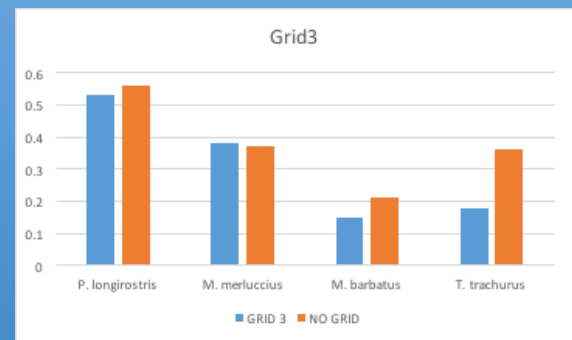
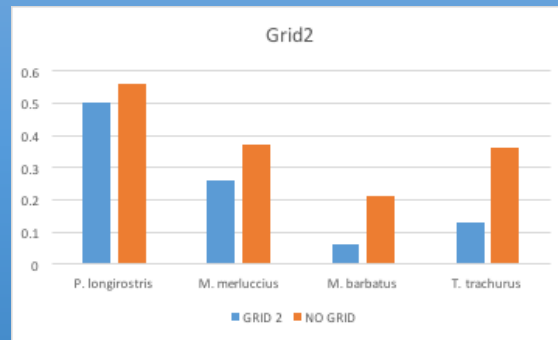
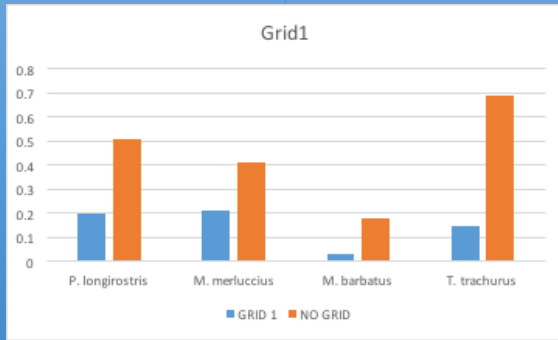


- Due to the limits of improvement of codend selectivity, we tried other options related to the modifications in the body of the net
- The project has worked on a number of Bycatch Reduction Devices, among which, testing new designs of sorting grids within the body of the trawl to increase selectivity.
- The idea is not new and widely used in N Eu fisheries, but in S Eu fisheries this technology is insufficiently considered.

TRAWL – testing new designs of sorting grids

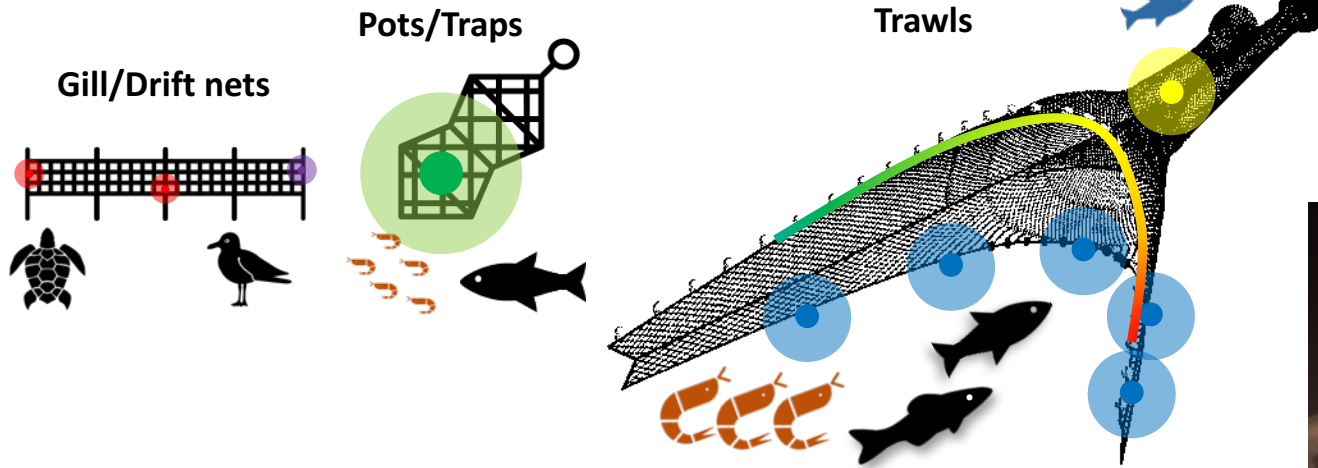


proportion retention indiv. < MCRS



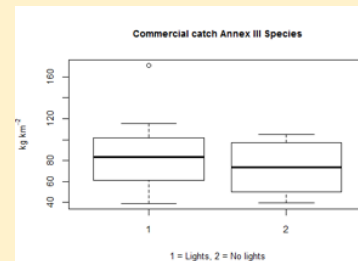
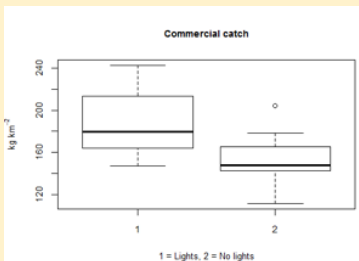
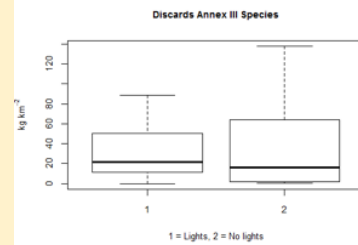
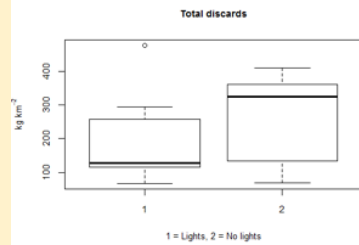


# SPECIES / SIZE SELECTION – ARTIFICIAL LIGHT STIMULI TO ATTRACT / REPEL



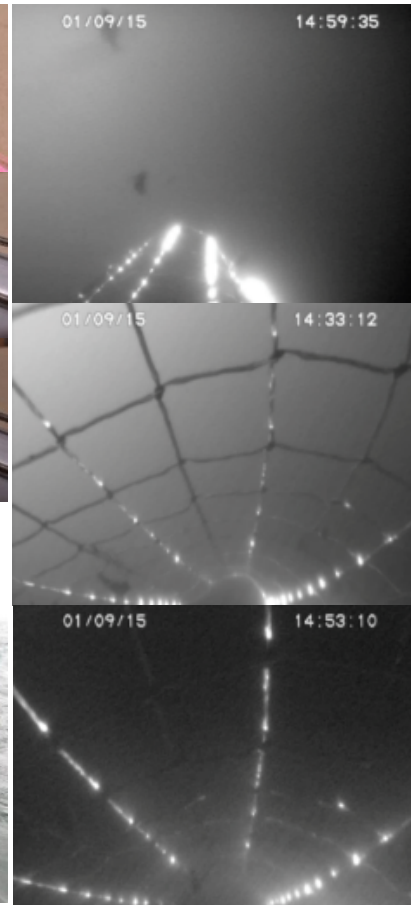
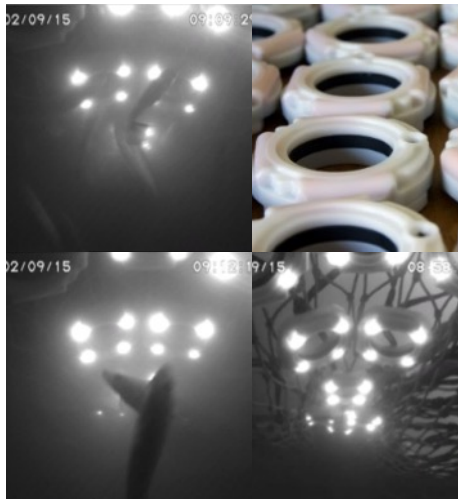
## TRAWL – testing artificial light stimuli

### Reduced sorting costs and increased commercial fraction (bulbs)



- Two different configurations: “bulbs” and “neon stripe”
- Started June 2016
- Preliminary results suggest:
  - reduced overall discards
  - no significant difference in discards or catches of Annex III sp
  - increased commercial by-catch

# devices built by SNTEch for MINOUW or DiscardLess - Applications



Escape Rings

Light Lines

Illuminated SMP

LED-LL



# Minouw Project

Applying science, innovation and partnership to reduce discards in European fisheries.

[Learn More](#)



**Thank you!**

<http://www.minouw-project.eu>



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