

**GAP**  
Connecting Science  
Stakeholders and Policy



# Rethinking the summer temporary trawling closure in the Northern Adriatic Sea:

## a proposal from the fishers of Chioggia participating to the GAP2 project

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**ISPRA**

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e la Ricerca Ambientale

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[www.gap2.eu](http://www.gap2.eu)

# ***Bridging the gap between science, stakeholders and policy makers***

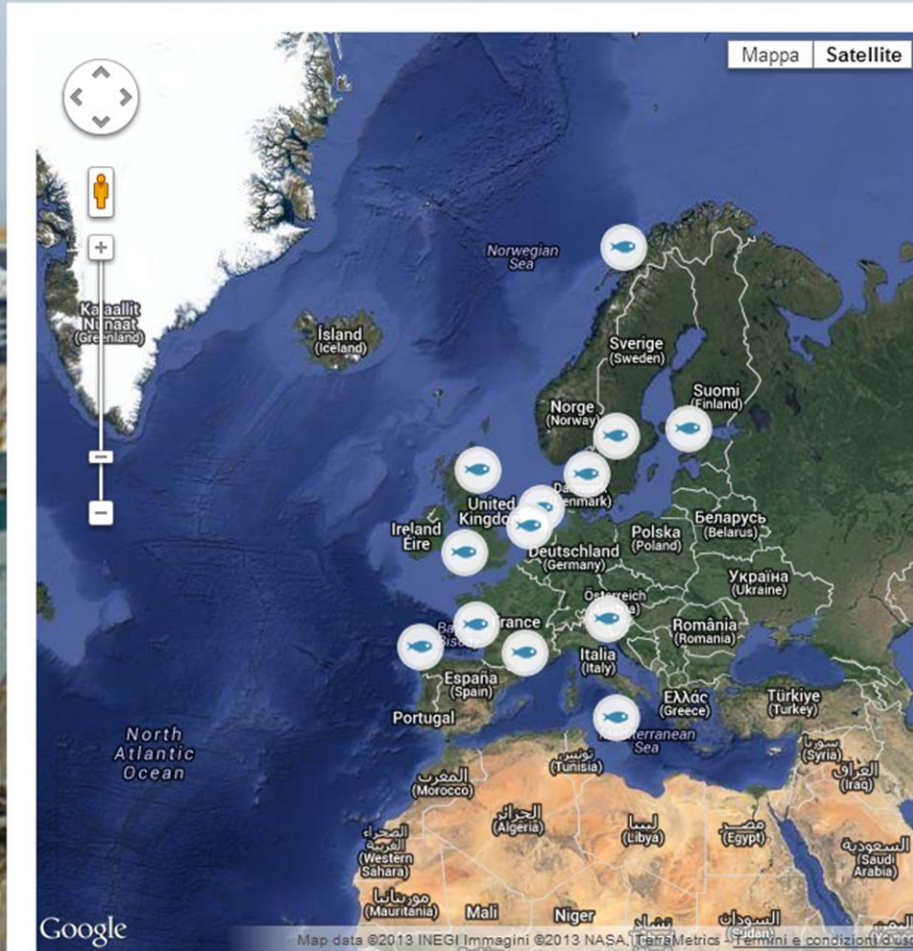
*Phase 2 - Integration of evidence-based knowledge and its application to science and management of fisheries and the marine environment*

Through participation in joint research and shared learning, we work together for healthy seas which society can depend upon for food, income and livelihoods


**GAP2's purpose is to demonstrate the role and value of stakeholder driven science within the context of fisheries' governance**

GAP2's work is coordinated by a interdisciplinary team across Europe, with expertise ranging from social science to fisheries management


The project is divided into six work packages




## CASE STUDIES IN DEPTH

-  Denmark – Herring Management


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-  Estonia – Marine Spatial Planning


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-  France/Spain – Tuna FAD Fisheries


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-  Germany – Joint Fishery Management


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-  Italy – Fish and Fishing Effort


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-  Malta – Trawl Industry Management


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-  Netherlands – Self-Sampling and Discards


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-  Norway – Monitoring Coastal Cod


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-  Spain – Galicia TURF Model


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-  Spain – Mediterranean Red Shrimp


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-  Sweden – Selective Whitefish Fishery


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-  UK – Brown Crab Stocks

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-  UK – Long-term Management Plans

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-  Case Studies Map



# ***GAP2 Italy – Northern Adriatic Sea case study***

Spatio-temporal distribution of fishing effort and biological resources in the Northern Adriatic Sea: toward the identification of fish habitats and management proposals in the framework of a participatory approach

## **FISHERY-DEPENDENT SAMPLING: OBSERVERS ON BOARD**



Total weight of all commercial species and length frequency distribution of the most important target species; Discard analysis on samples

## **ELECTRONIC LOG-BOOK**

Electronic log-books allow storing real-time position data (GPS) and catch data haul by haul



## **FISHERY-INDEPENDENT SURVEYS (SCIENTISTS + FISHERMEN)**

To assess the state of fish stocks in the waters of the Veneto Region before the end of the summer fishing ban (survey performed in 2012, 2013 and 2014)

## **SHARING DATA AND BUILDING KNOWLEDGE WITH FISHERMEN**

Periodical meetings are organized in order to update the fishermen with the latest data and to discuss new topics and future activities



# Chioggia fishermen



DENIS PADOAN



WILLIAM PERINI



ROBERTO PENZO



SANDRO ZENNARO



GIORGIO FABRIS



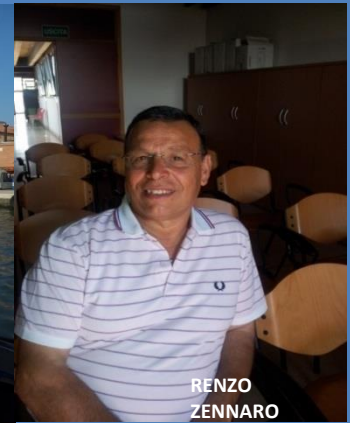
ELIO DALL'ACQUA



MARCO PERINI



MARIO CASSON



RENZO ZENNARO

# ISPRA researchers



**SASA RAICEVICH**  
Lead scientist



**OTELLO GIOVANARDI**  
Case study scientist



**GIANLUCA FRANCESCHINI**  
Case study scientist



**LAURA SABATINI**  
Case study scientist



**TOMASO FORTIBUONI**  
Case study scientist



**MONICA MION**  
Case study researcher



**CAMILLA PIRAS**  
Case study researcher



**MARCO NALON**  
Case study scientist



**MARIANNA BULLO**  
Case study researcher



**IGOR CELIC**  
Case study scientist

# UNIMAR and CNR Researchers

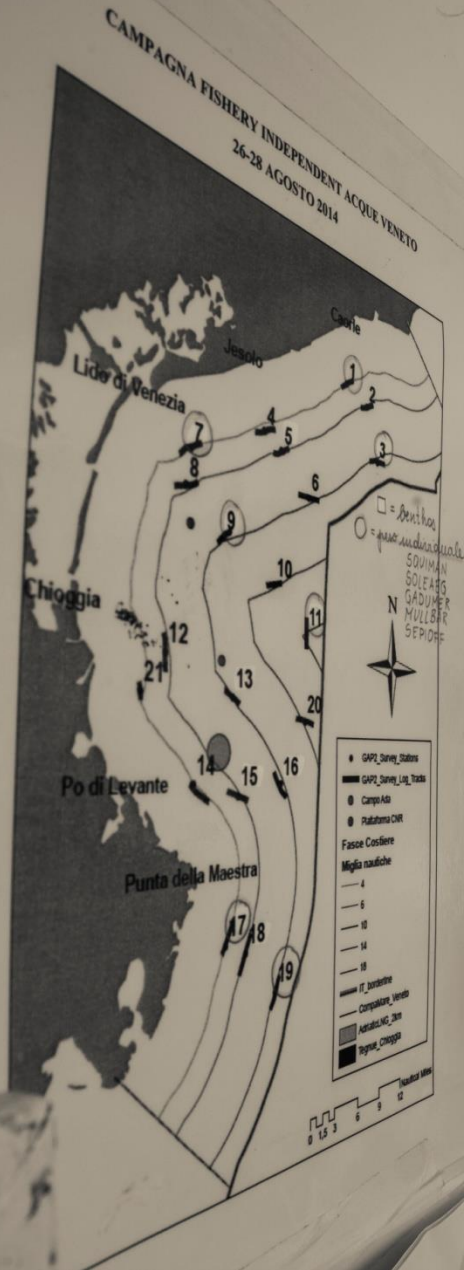


# ***RESULTS FROM RESEARCH ACTIVITIES***





# Trawl- survey (Researchers + Fishermen)



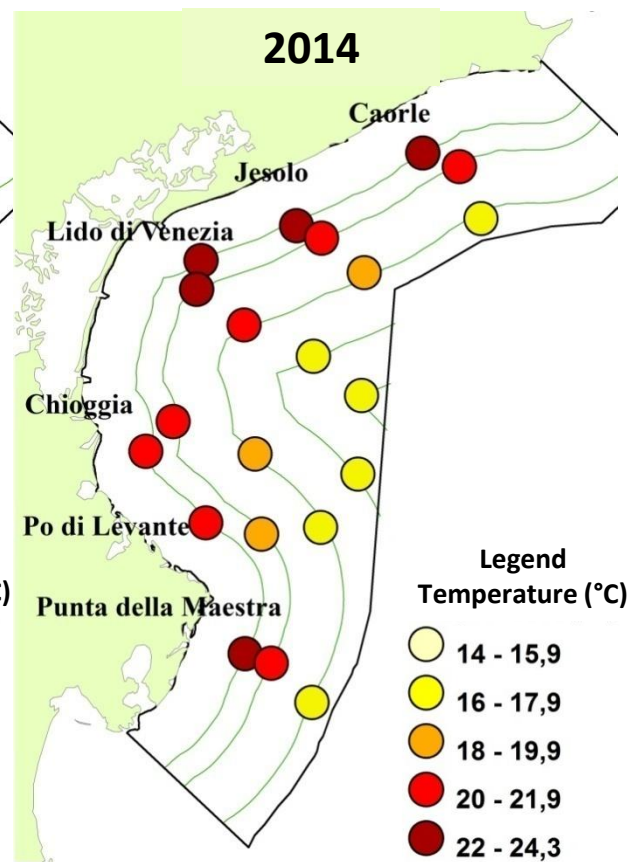
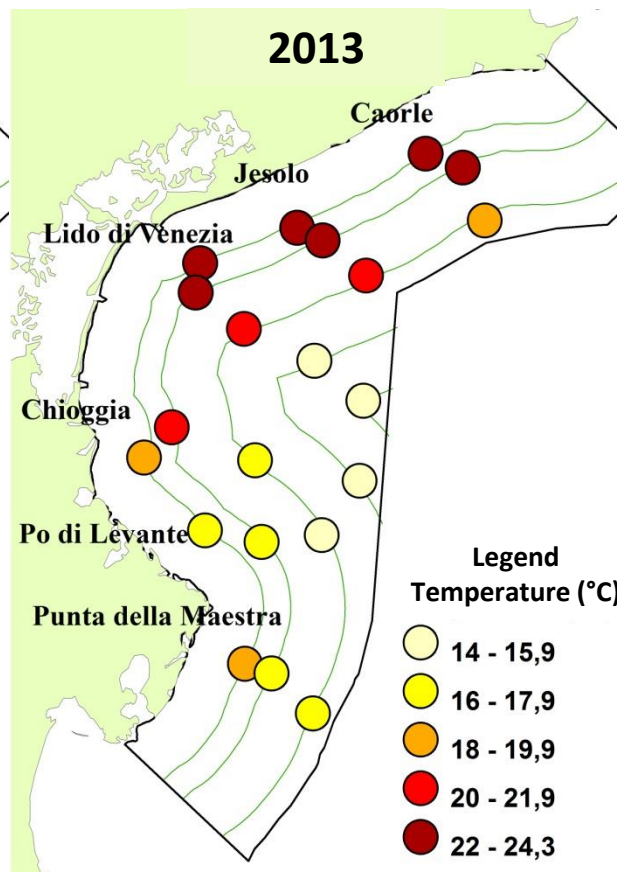
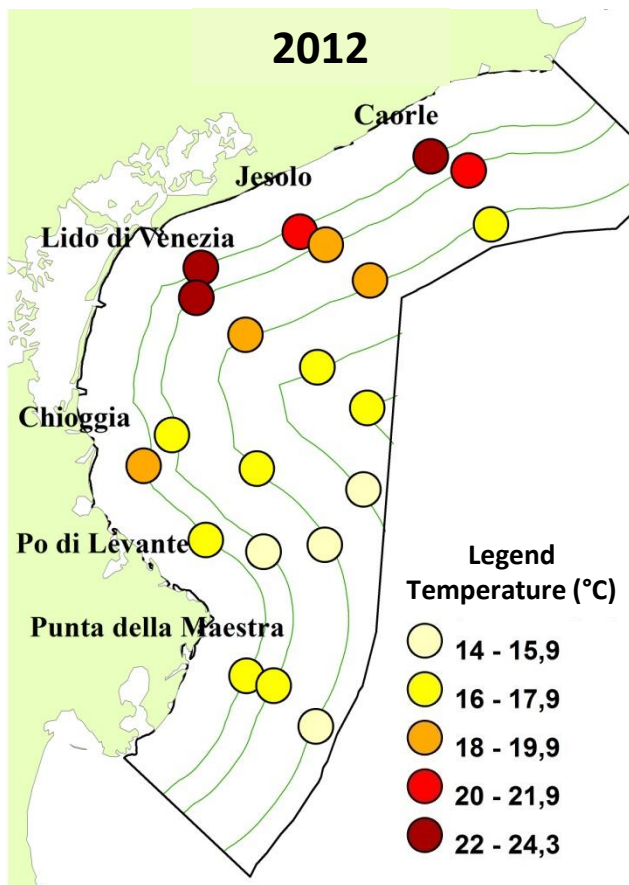
**Assessment of the fisheries resources' status of the Veneto Region waters at the end of the annual fishing ban (August 2012, 2013, 2014)**

- 2 fishing vessels (GAP2 fishermen)
- 21 stations (allocation defined by fishermen and researchers)
- Coastal perpendicular transect (4, 6, 10, 14 e 18 nautical miles from the coast)
- Study area extension: 59 nautical miles from Grado-Marano Lagoon to Po Delta
- Haul duration about 60 minutes
- 3 days of activities at the sea
- Activities at the laboratory to collect biometrics data, data entry and analysis

# Environmental data: BOTTOM TEMPERATURE

Higher temperature near the shore

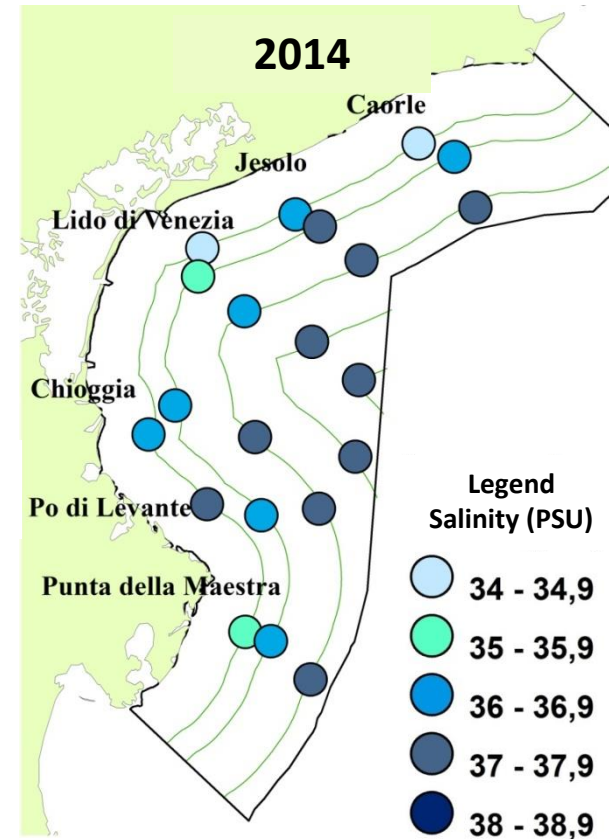
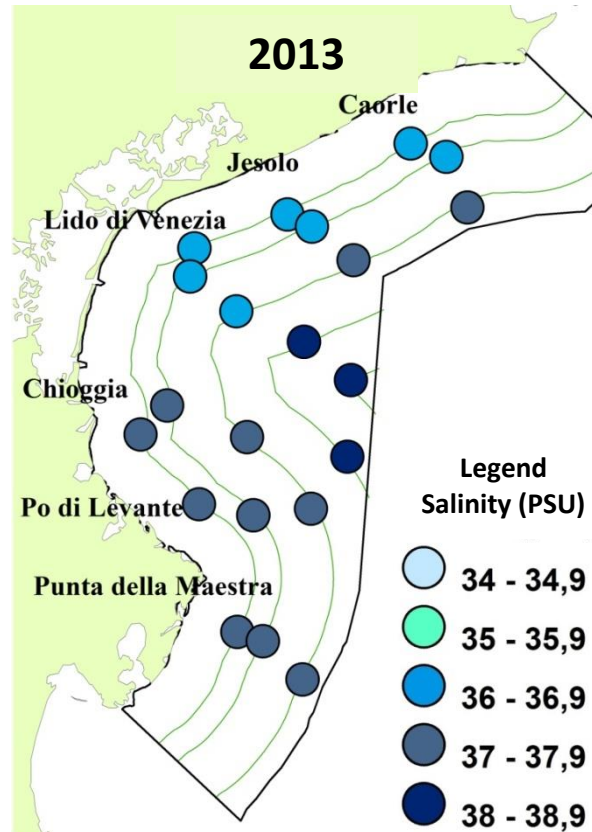
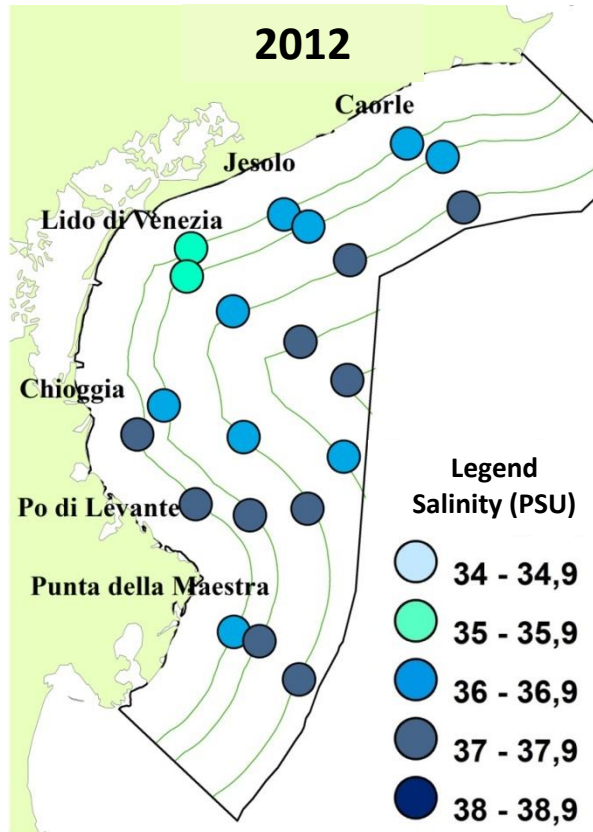
In 2014 increasing of the bottom temperature in the south area compared to the previous years



# Environmental data: BOTTOM SALINITY

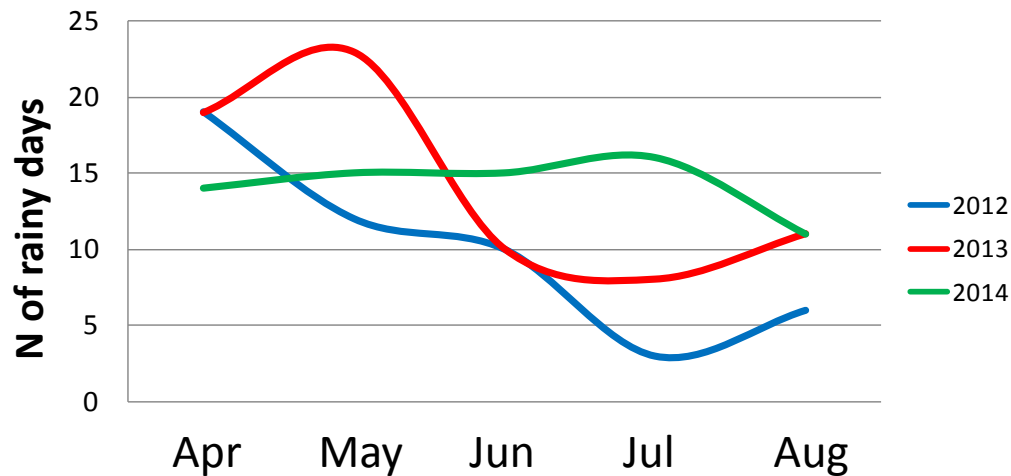
Higher values off-shore

In 2014 decreasing of the bottom salinity in the southern waters near the shore



# WEATHER CONDITIONS

## Rainy days

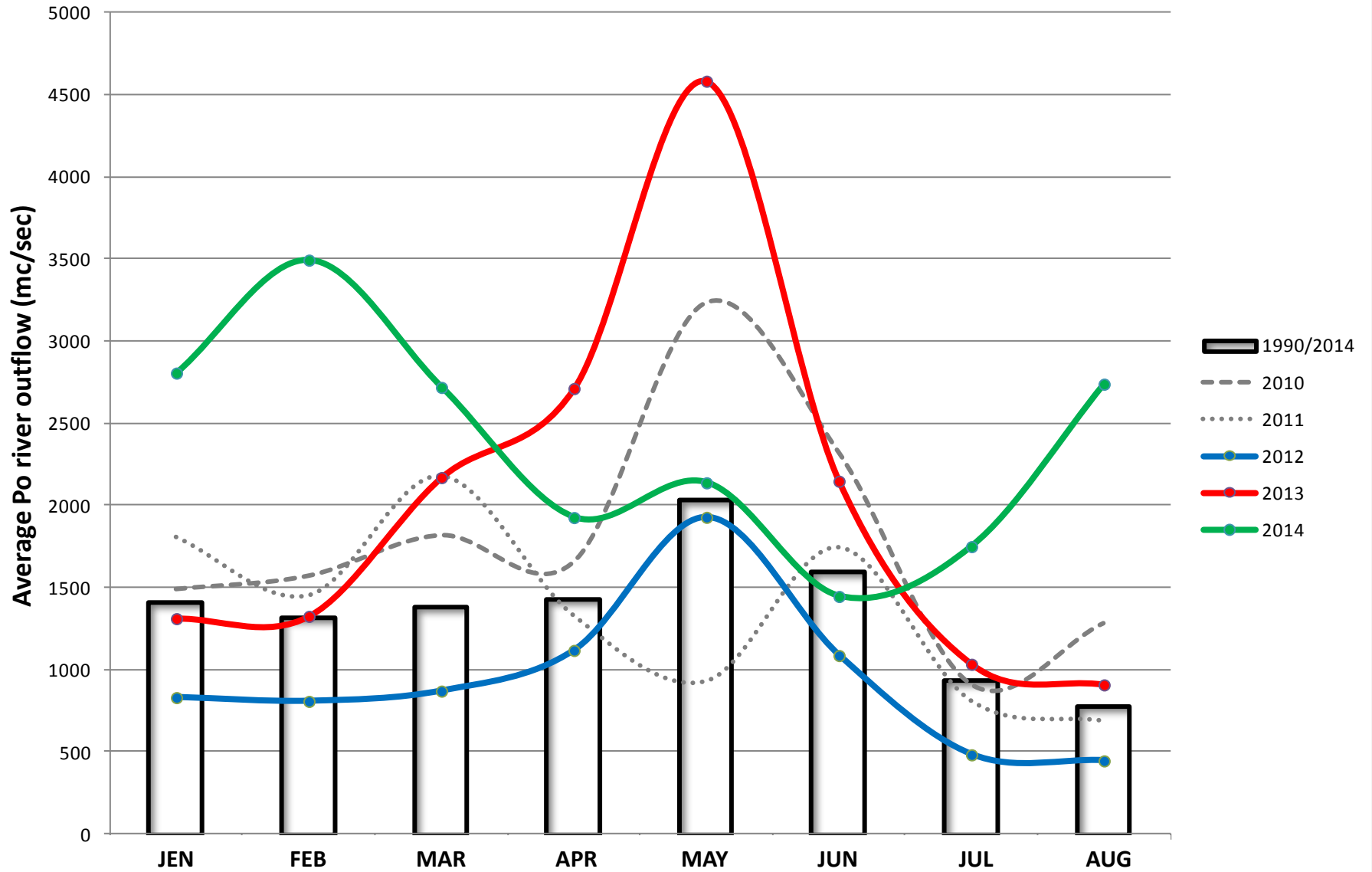


2014: rainy and variable summer

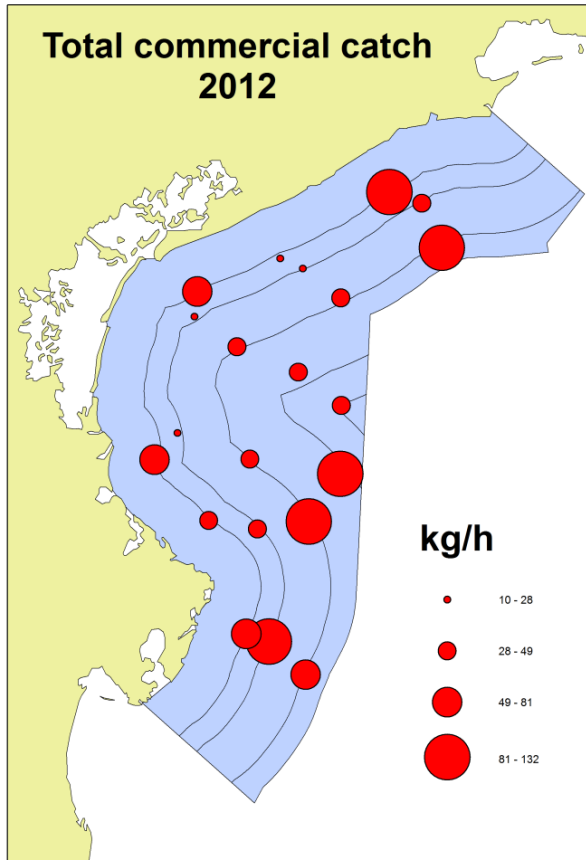
In 2014:

- intensive rainfalls
- higher rivers outflow
- stable bottom temperature and salinity in the northern area
- increasing of the bottom temperature, mainly in the southern waters (instable water column)
- decreasing of the bottom salinity, mainly in the southern area

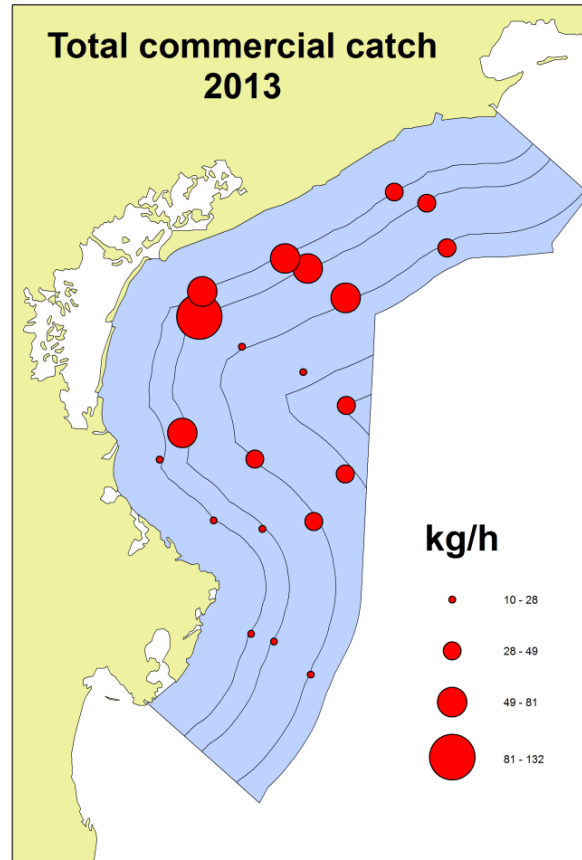
# PO RIVER OUTFLOW



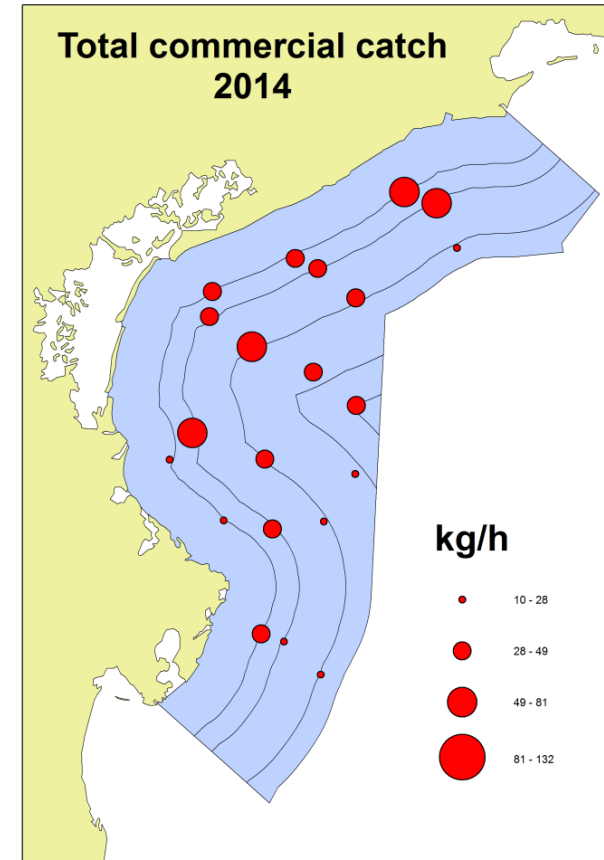
# Total commercial catch (kg/h)



**62 mean  $\pm$  32 kg/h**



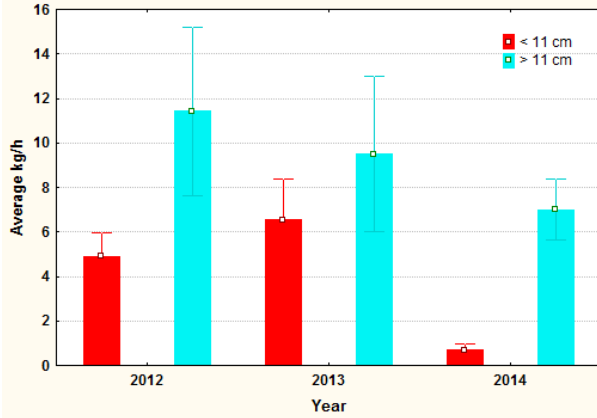
**44 mean  $\pm$  30 kg/h**



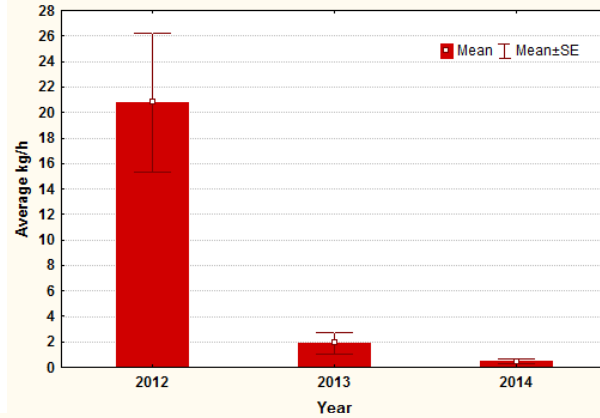
**40 mean  $\pm$  17 kg/h**

# An overview of the main commercial species...

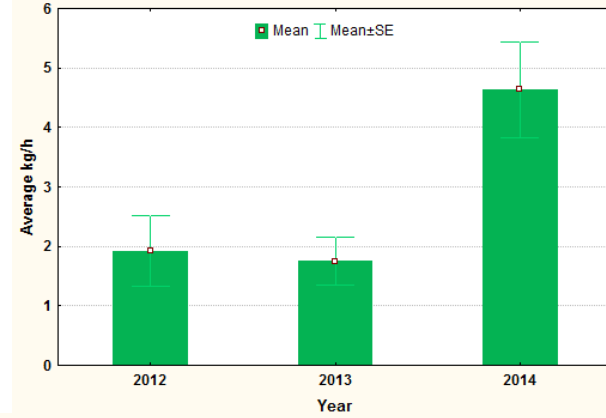
*Mullus barbatus*



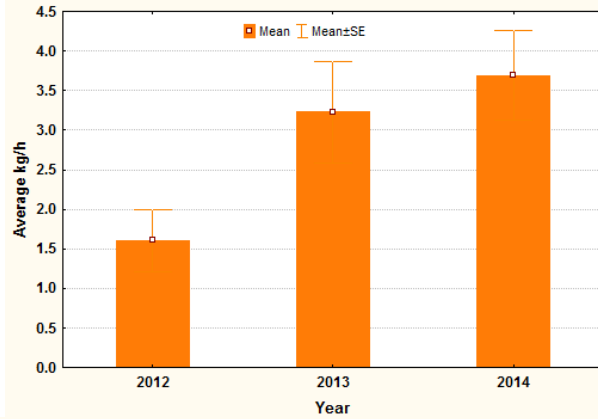
*Merlangius merlangus*



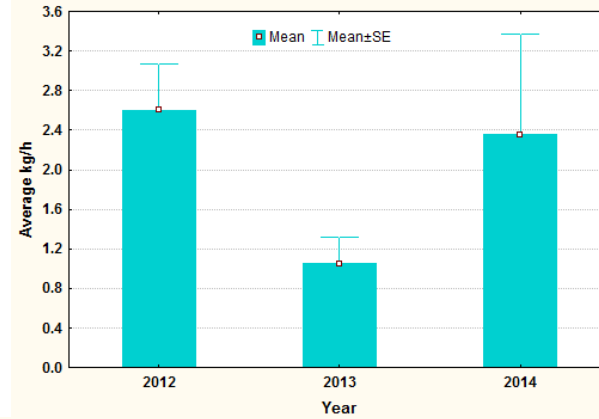
*Sepia officinalis*



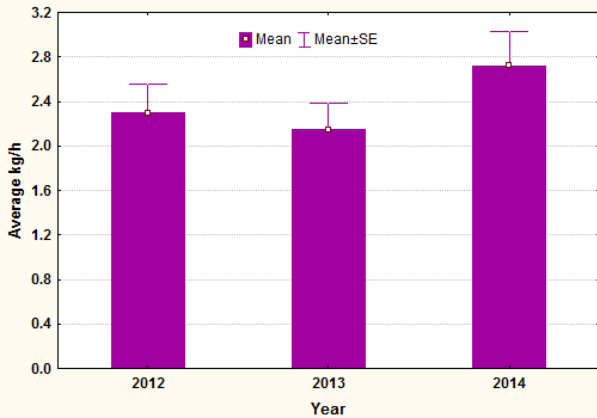
*Eledone moschata*



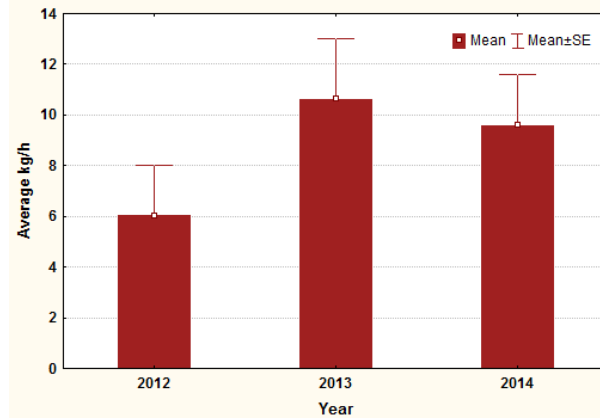
*Loligo vulgaris*



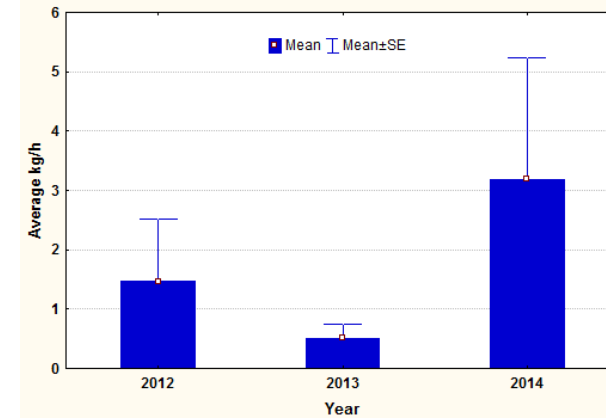
*Chelidonichthys lucerna*



*Mustelus spp*

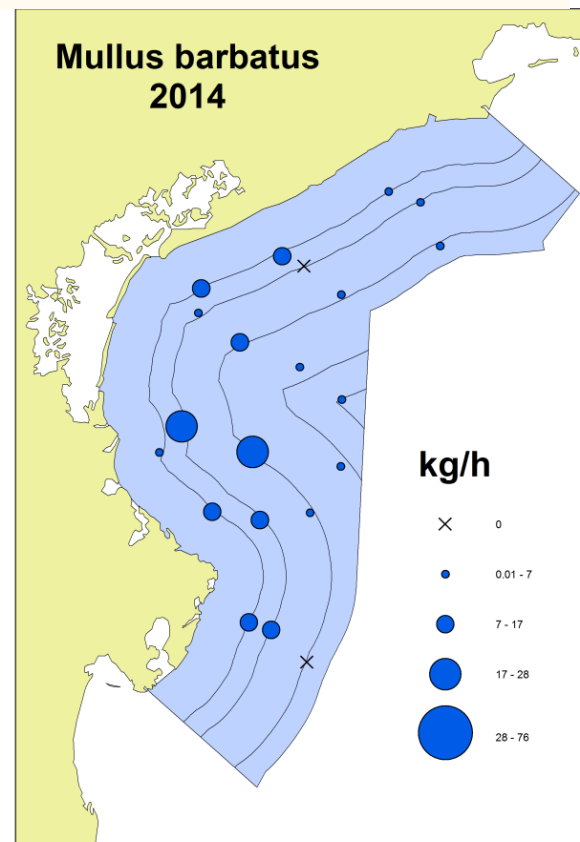
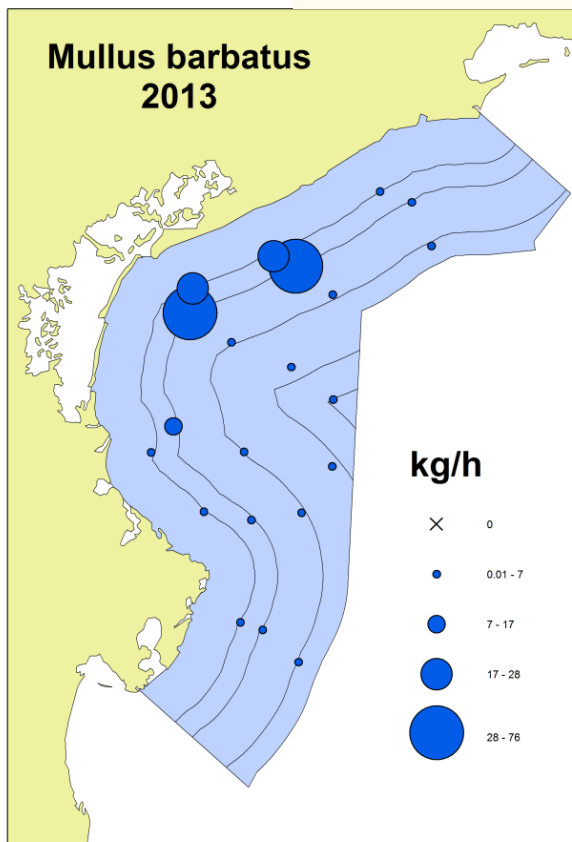
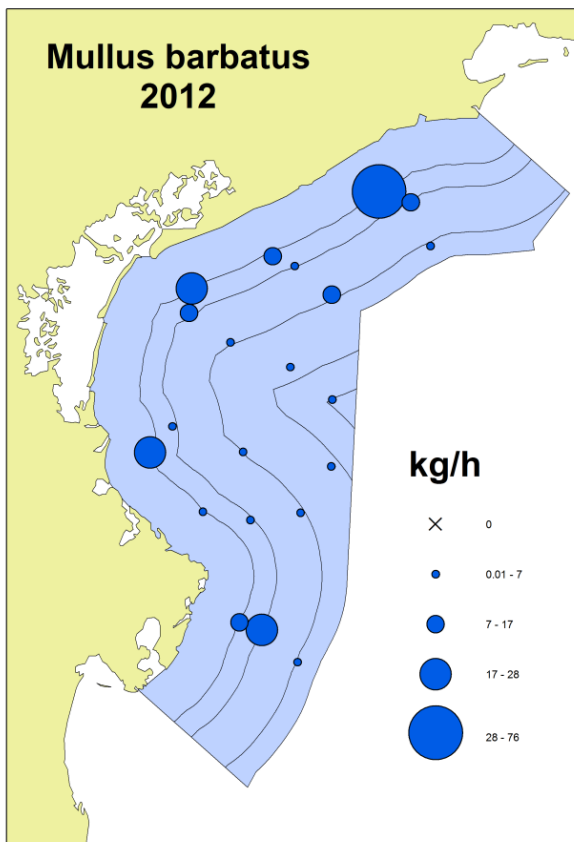
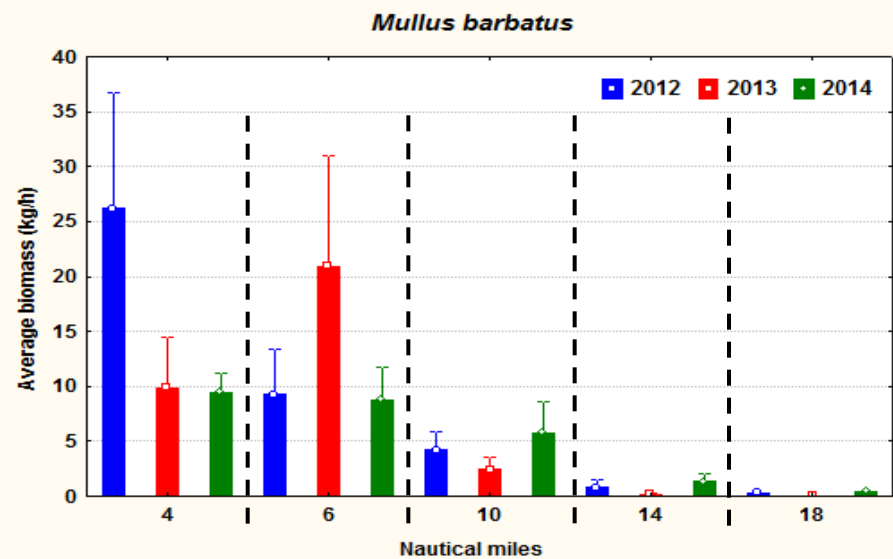


*Pagellus erythrinus*



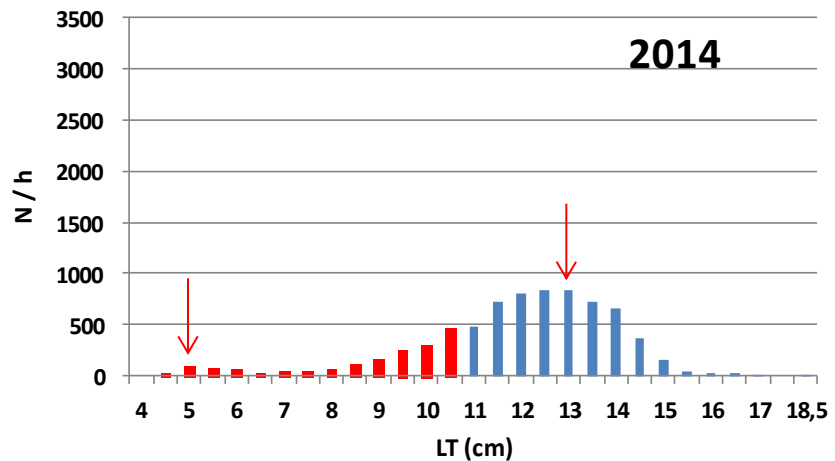
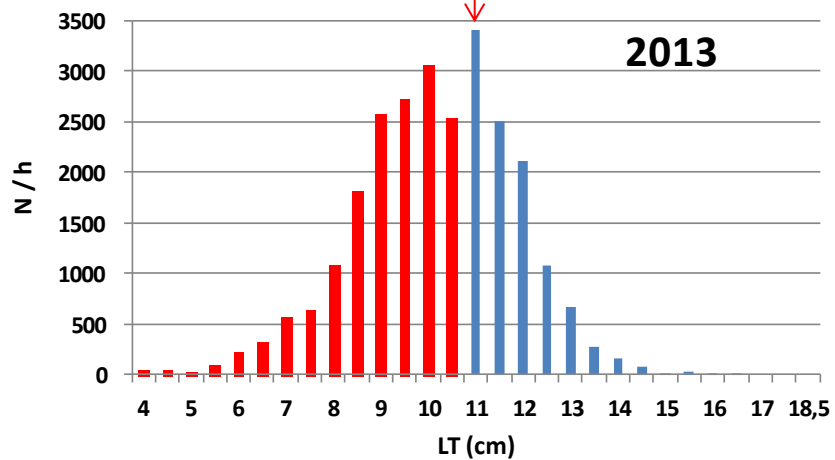
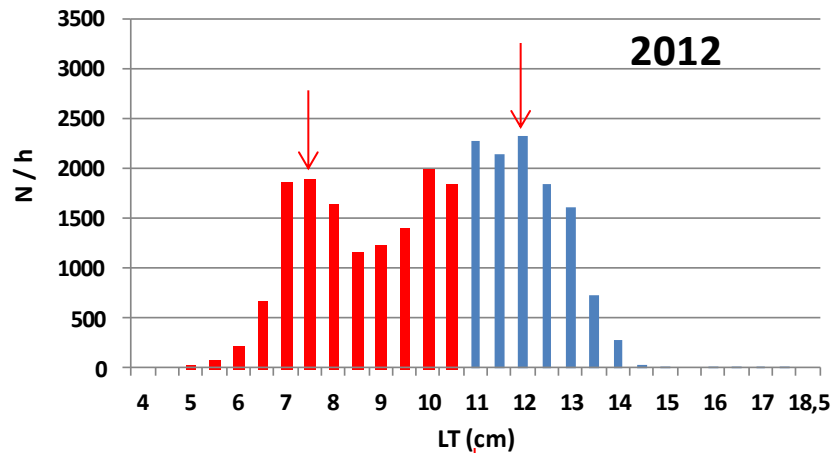


**Red mullet**





# Length frequency distribution of the Red mullet

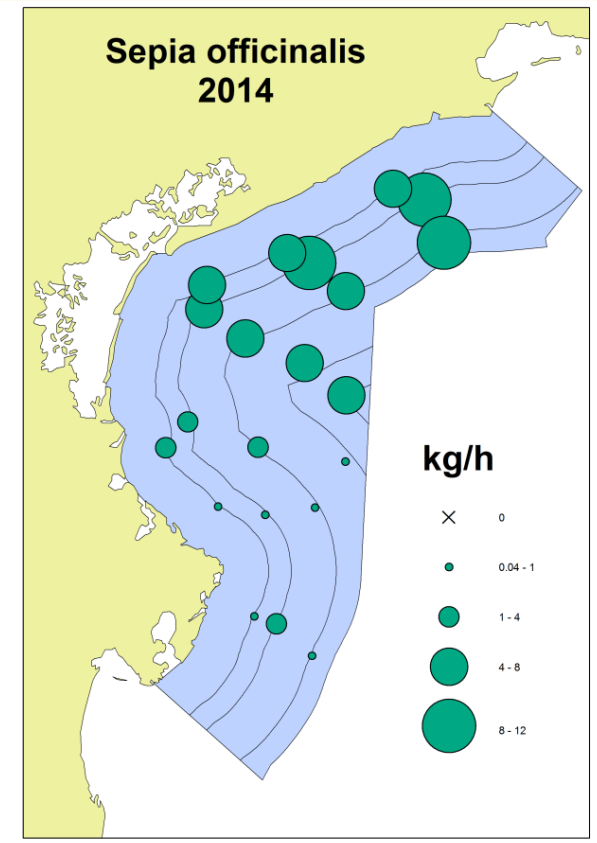
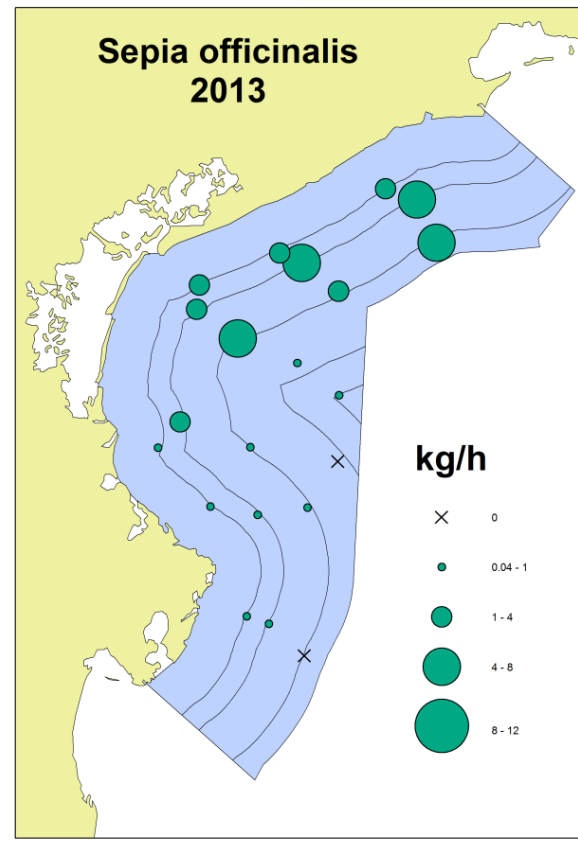
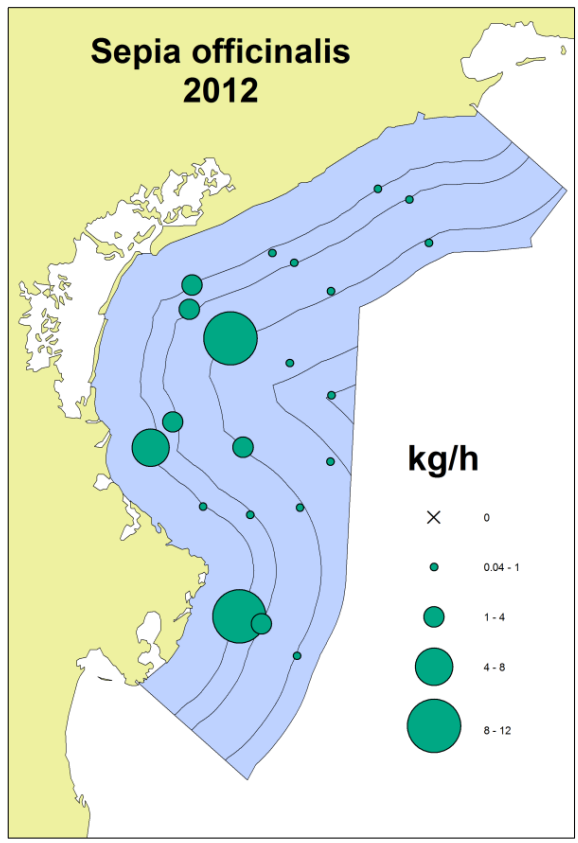
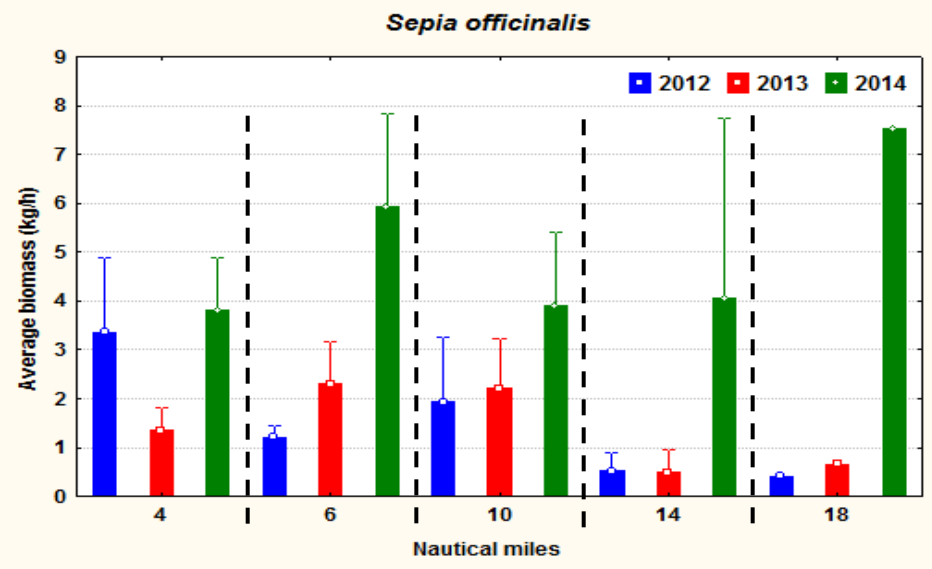


Lower CATCHES  
Larger SIZES compared to 2013

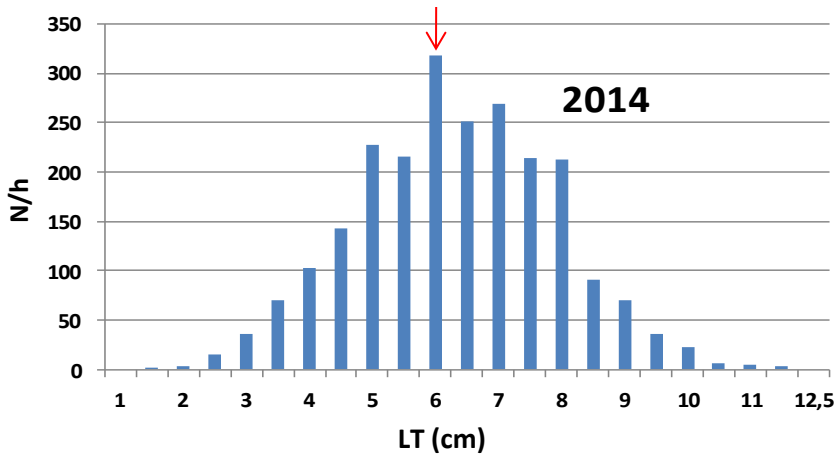
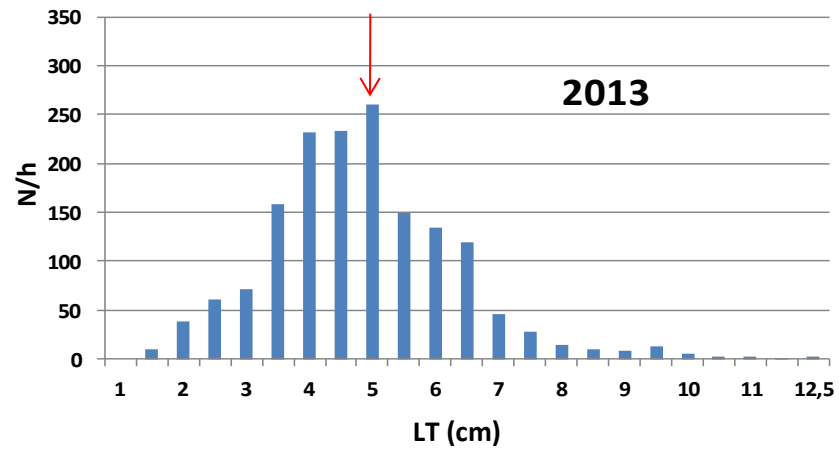
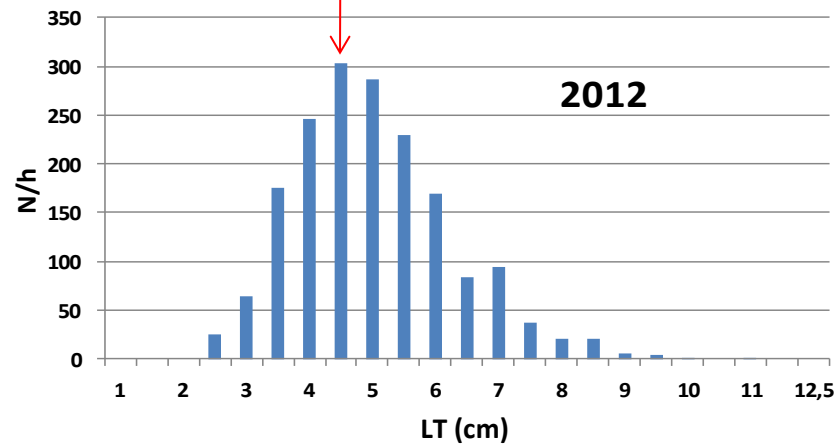




Common cuttlefish



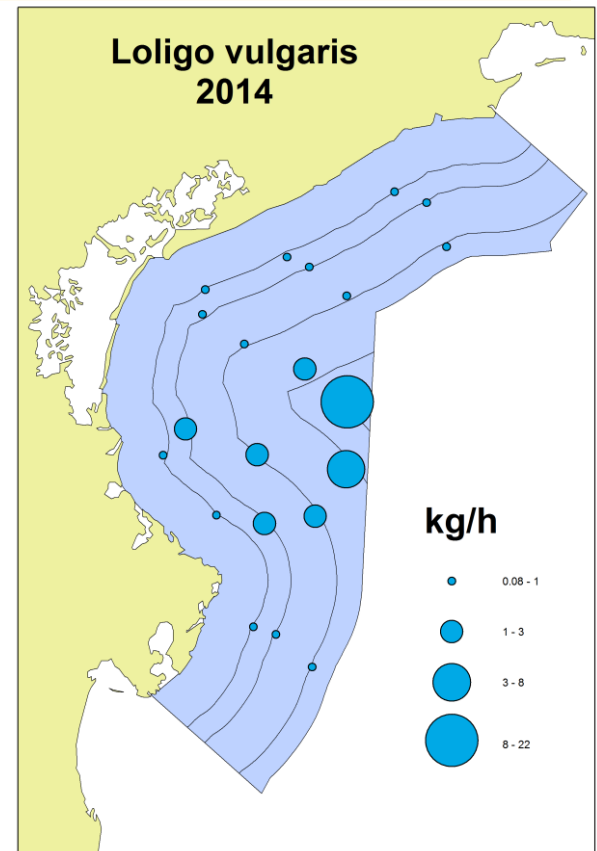
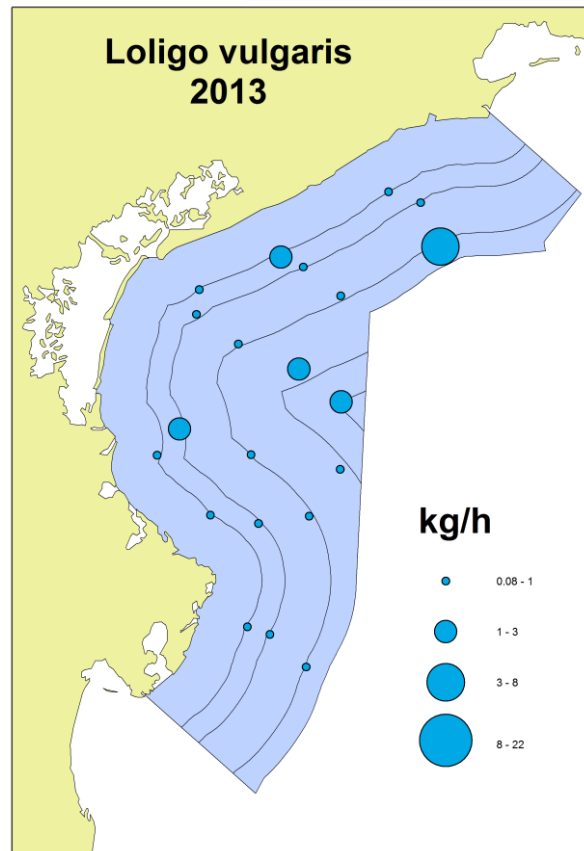
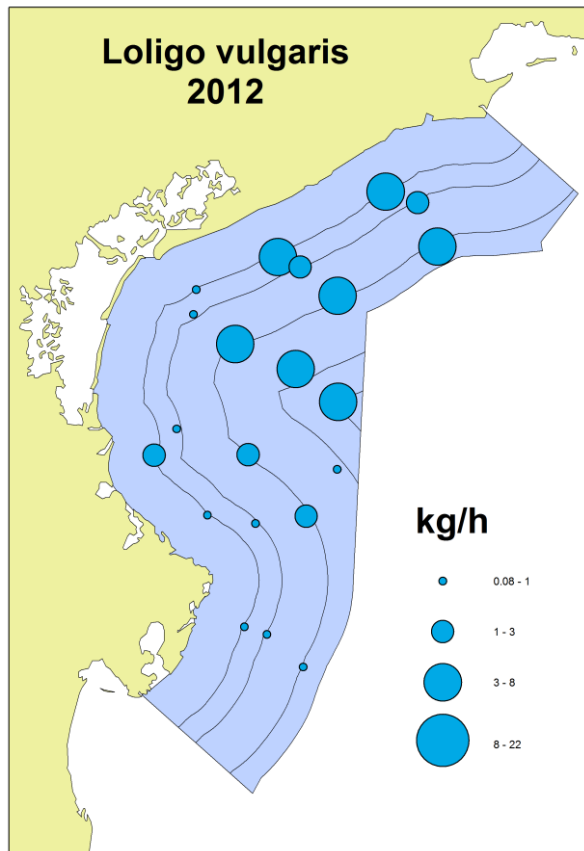
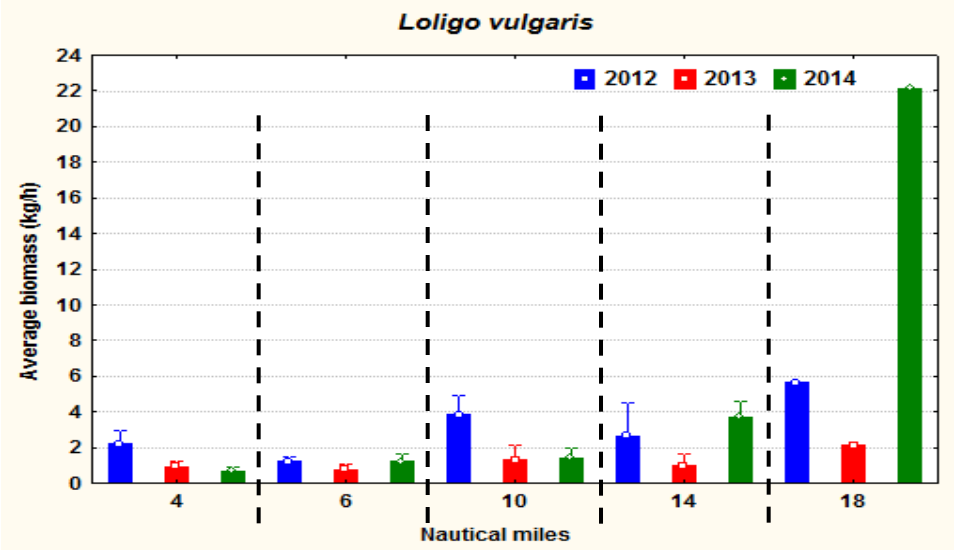
# Length frequency distribution of the Common cuttlefish



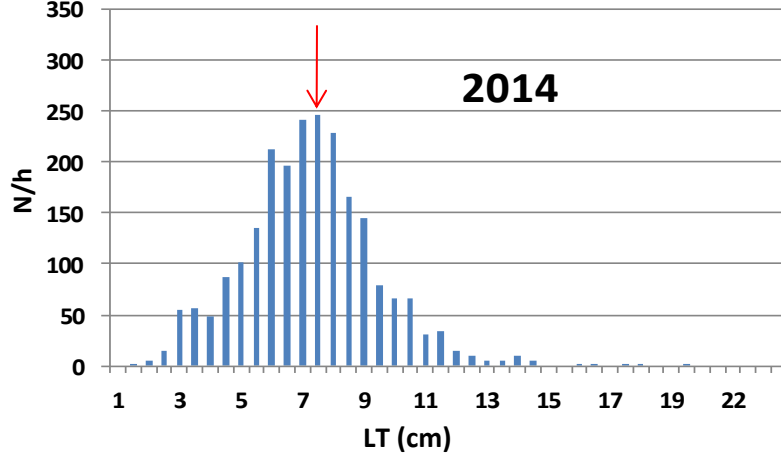
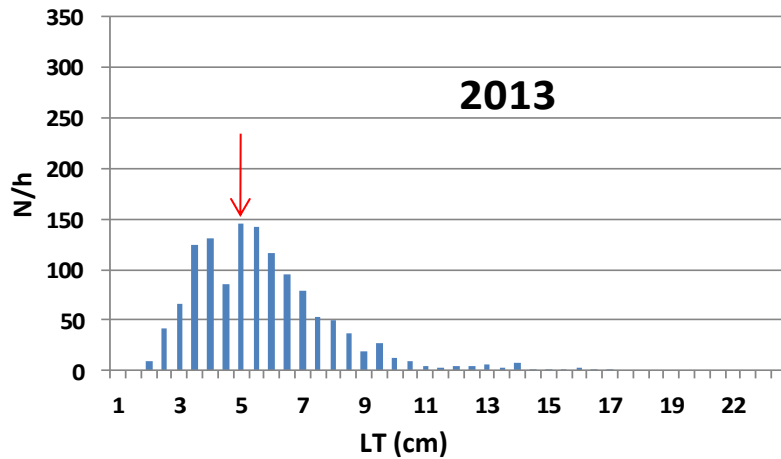
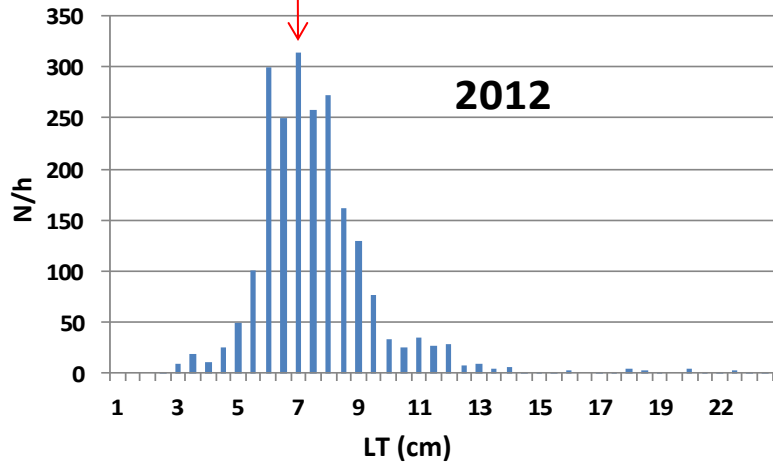
Higher CATCHES  
Larger SIZES



# European squid



# Length frequency distribution of the European squid

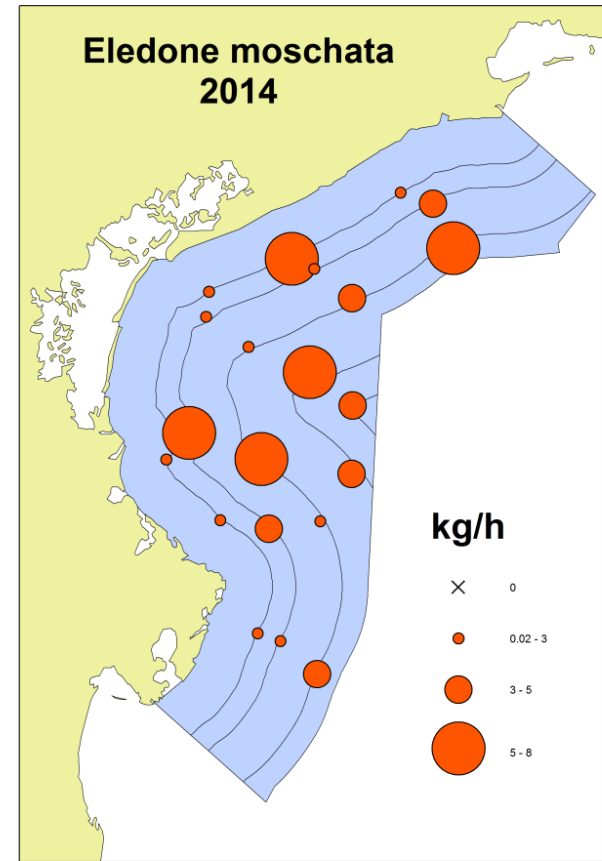
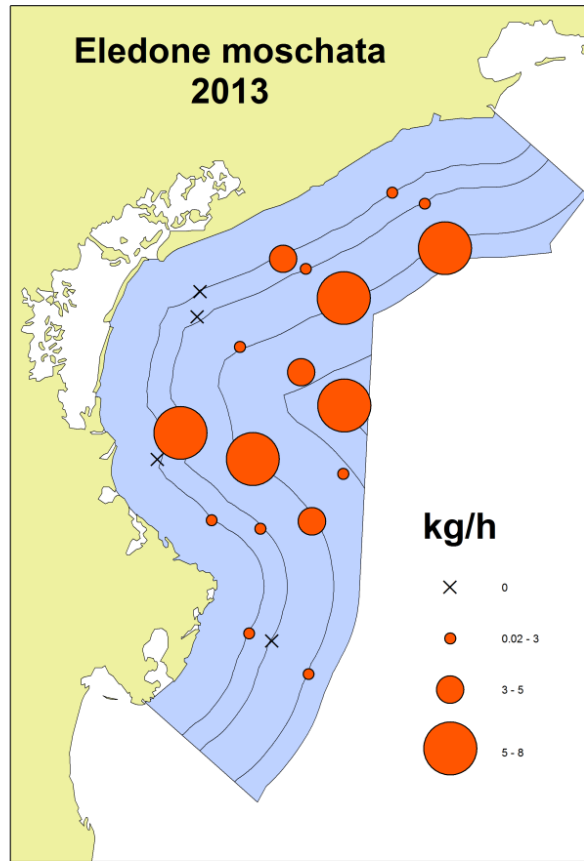
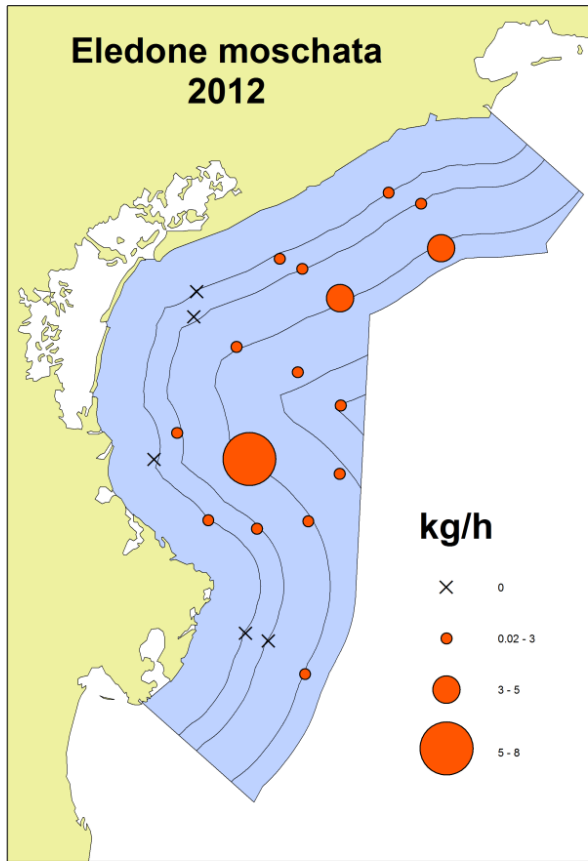
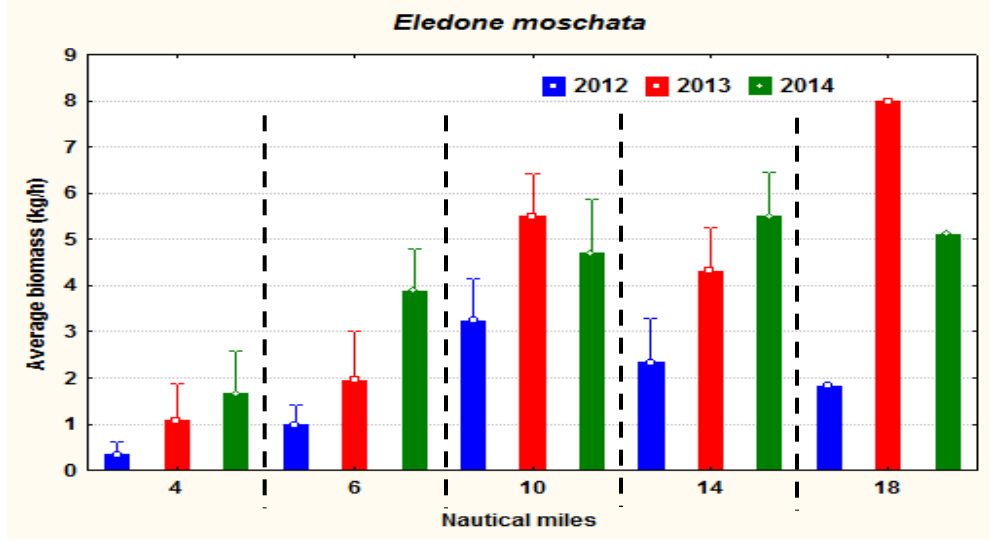


CATCHES mainly off-shore  
Larger SIZES compared to 2013

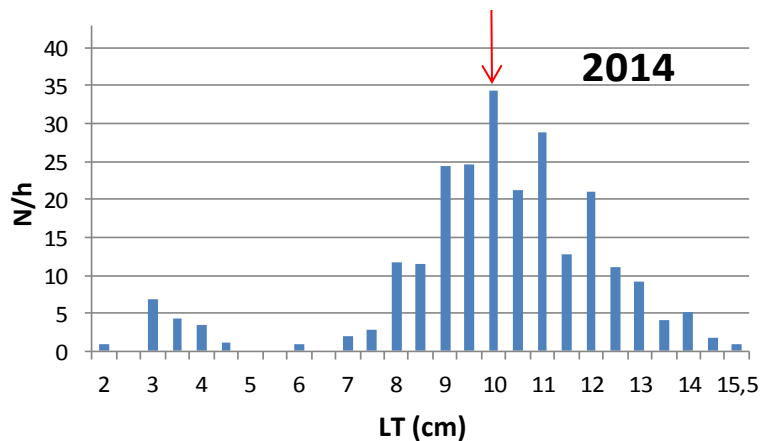
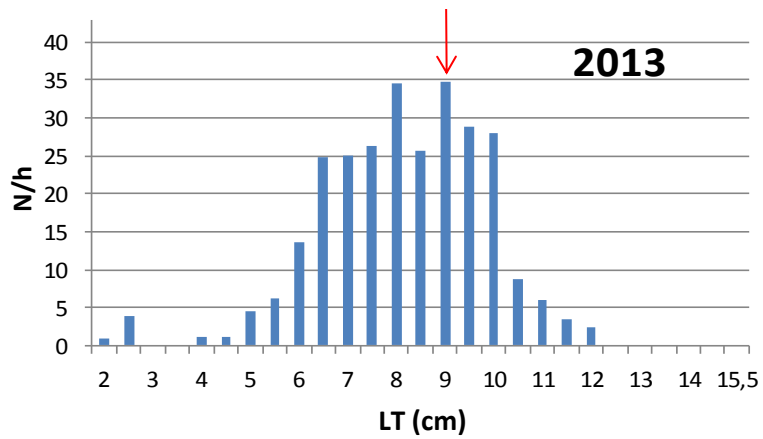
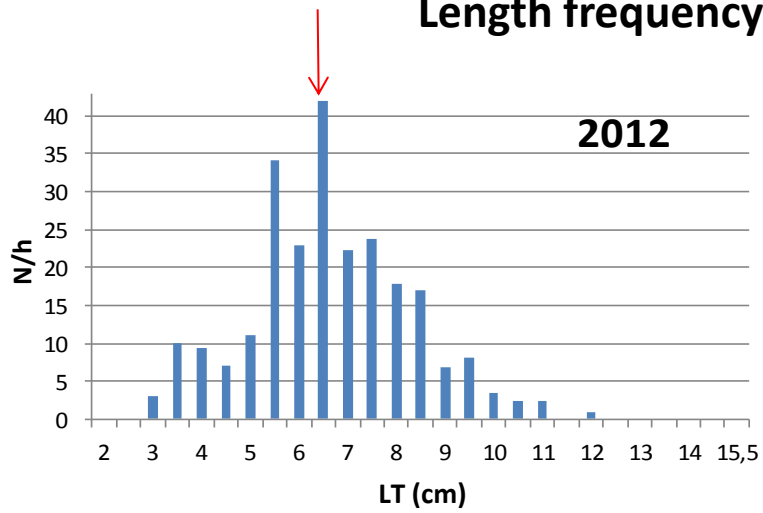




Musky octopus



# Length frequency distribution of the Musky octopus

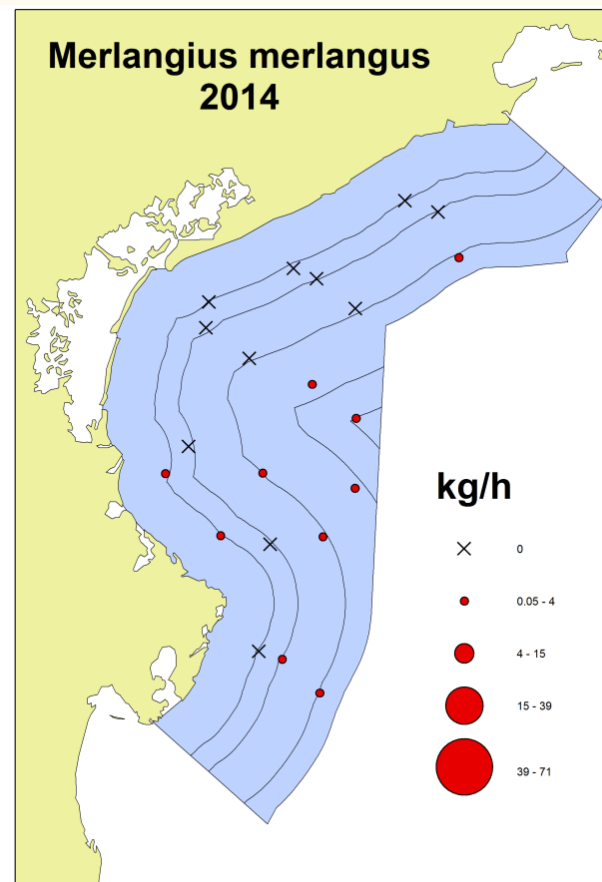
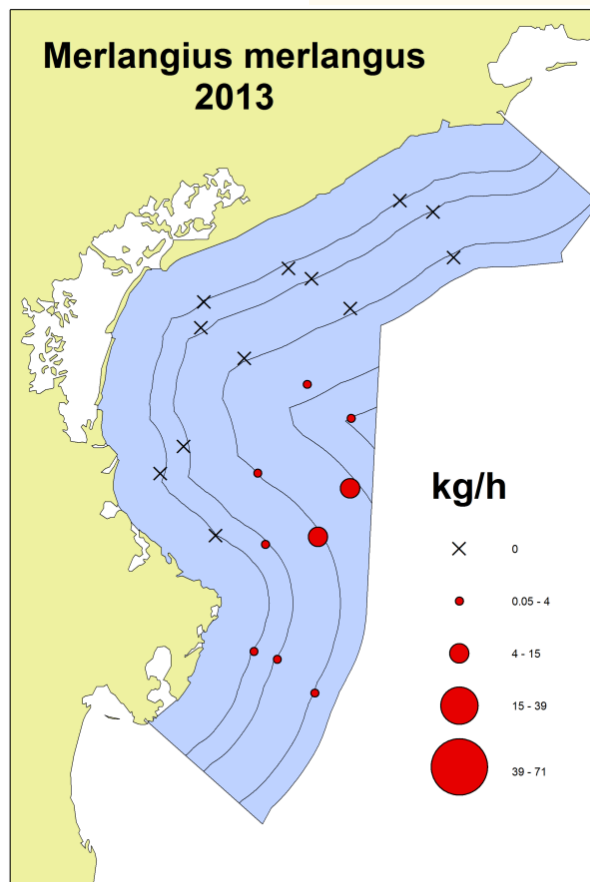
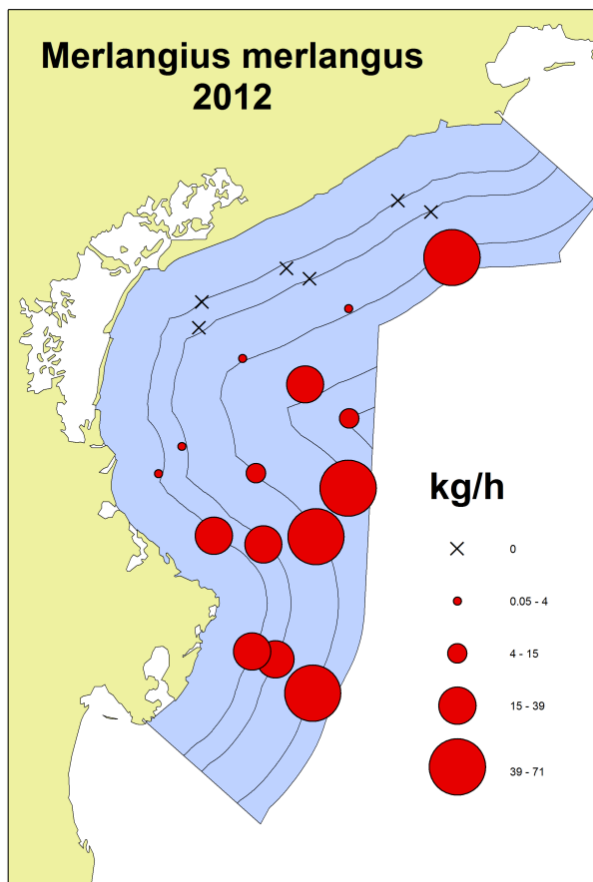
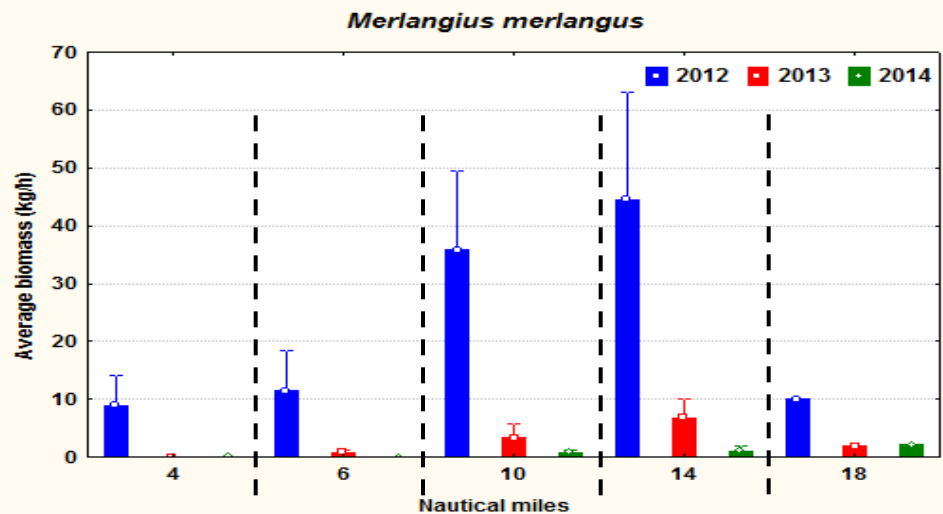


Higher CATCHES  
Larger SIZES





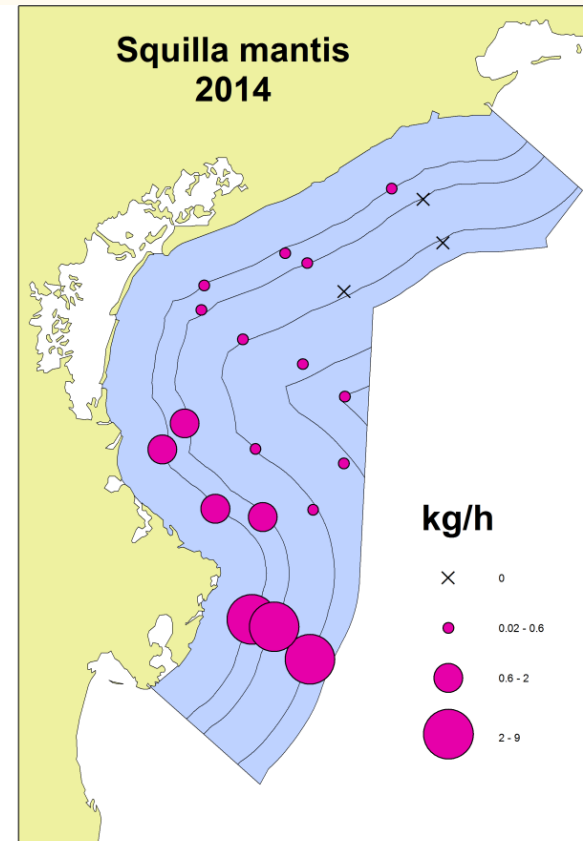
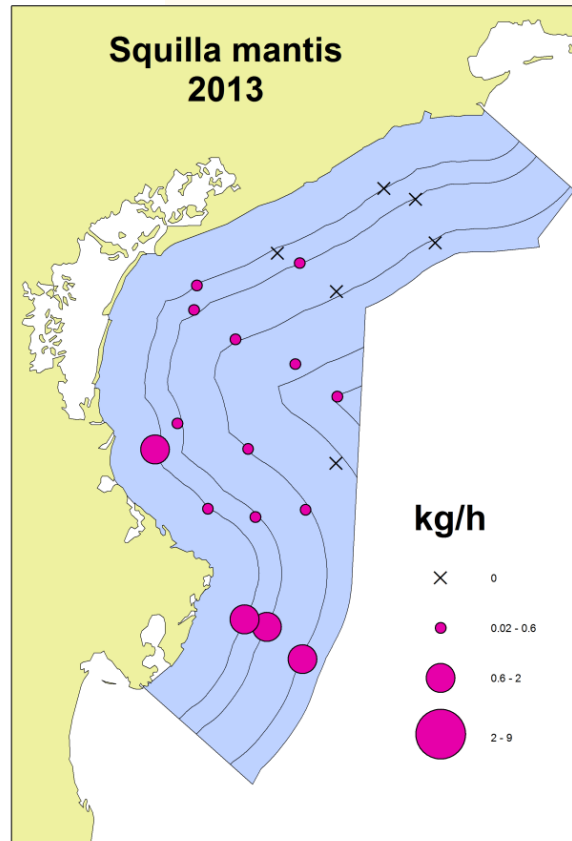
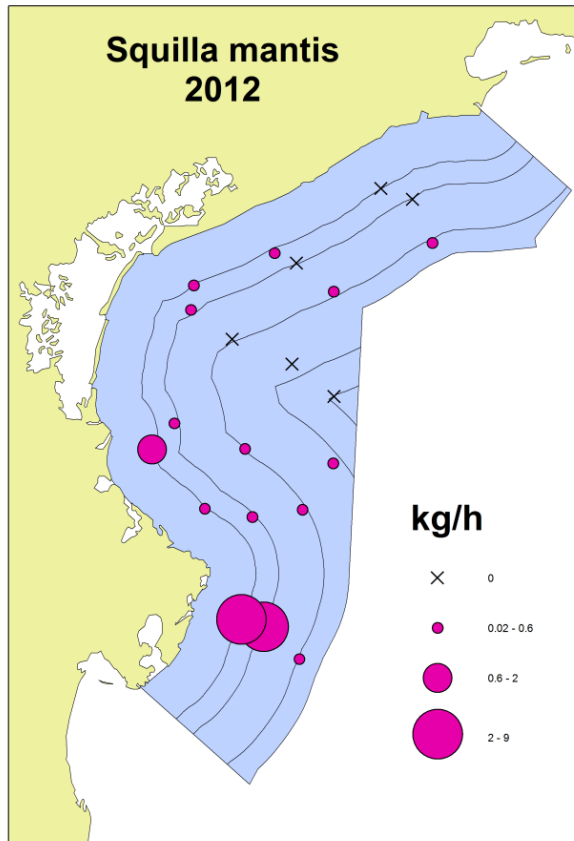
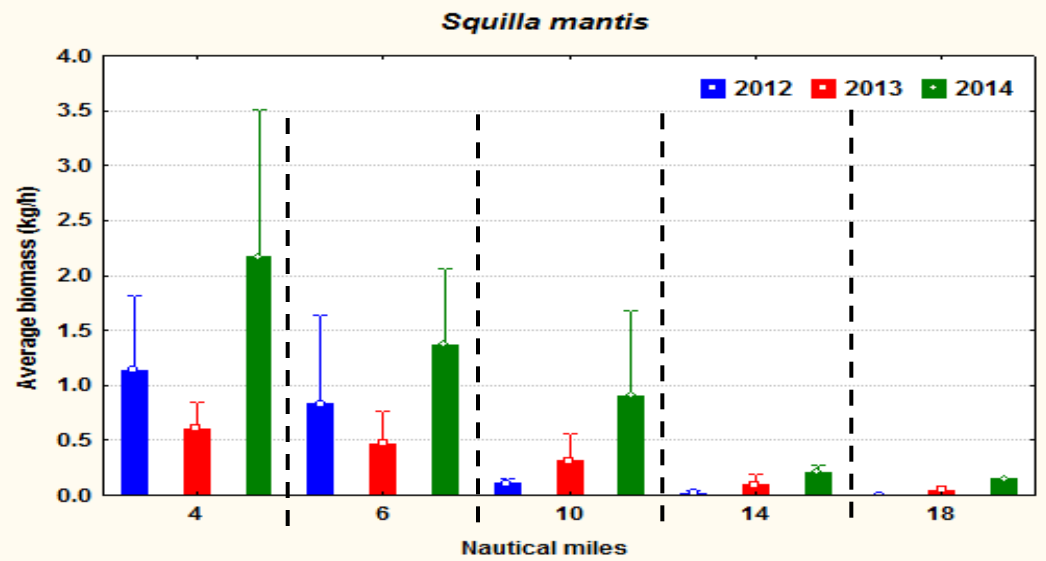
# Whiting







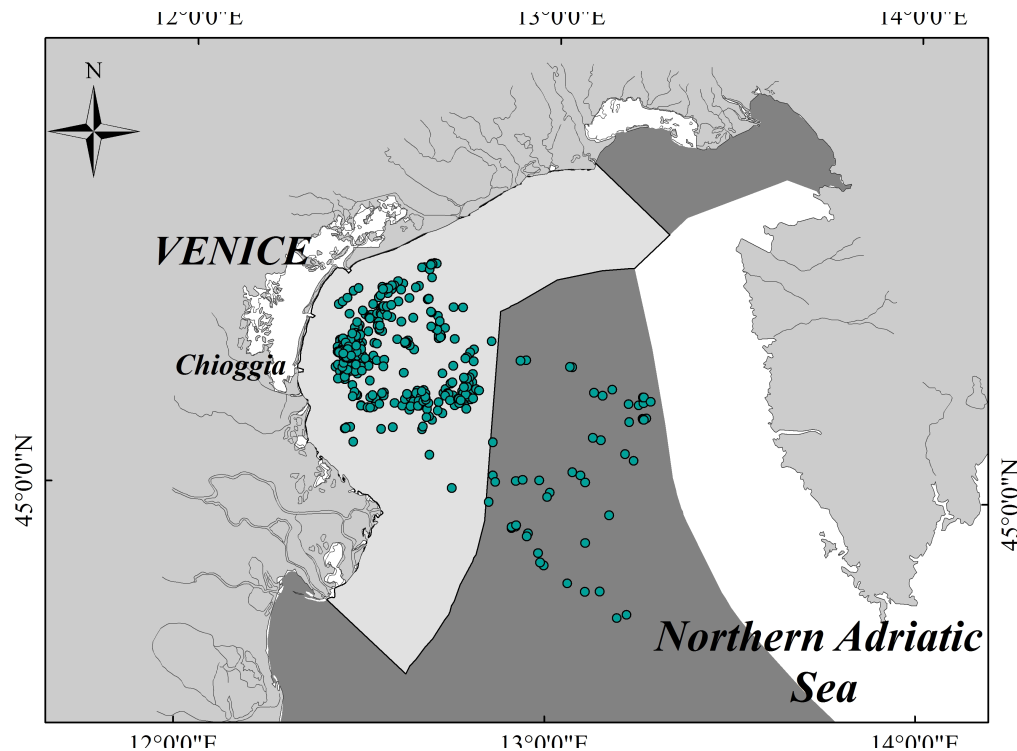
# Mantis shrimp



# Summarizing...

- Intensive rains and river discharges during spring and summer 2014.
- Higher bottom temperature and lower bottom salinity, mainly in the southern area.
- Larger sizes (Red mullet, Common cuttlefish, Squid and Musky octopus) probably due to favorable high temperature (anticipation of the spawning period) and food availability (river input).
- The broad length distributions suggest that the spawning period was more extended.
- The presence of juveniles of Red mullet was recorded each year, even if it was characterized by annual variability in terms of quantity (lower in 2014, probably because the majority of the juveniles was still concentrated in the inshore area).
- Decrease of the Red mullet catches and an increase of the catches and sizes of the Common cuttlefish and the Musky octopus.
- The Squid was caught mainly in the off-shore waters during all the three surveys.
- Collapse of the catches of the Whiting (2013-2014) , probably due to the increase of the sea temperature.
- The Mantis shrimp was caught mainly in the inshore southern area, characterized by muddy sea-bottom.

# On-board observers



Scientific observers on-boarded during commercial fishing trips (Chioggia fleet)

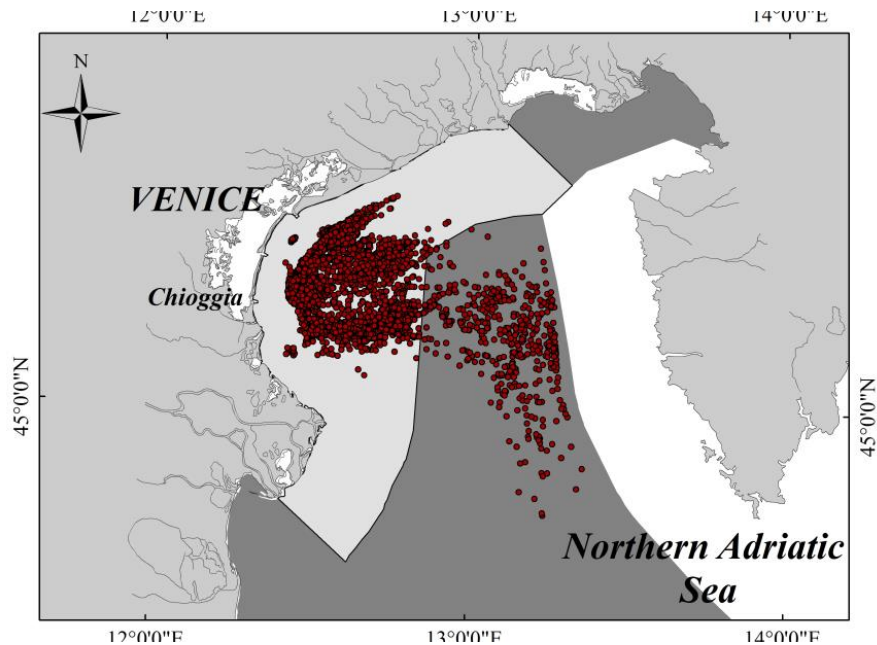
2012-2014: **78 fishing trips monitored** with 5 otter-trawls

## Data collected for each haul:

- Navigation data
- Environmental parameters (bottom water temperature, salinity, depth)
- Length frequency distribution of the most important demersal commercial species (*Sepia officinalis*, *Mullus barbatus*, *Solea vulgaris*, *Loligo vulgaris*, *Eledone moschata*, *Merlangius merlangus*)
- Total catch weight
- Total weight of commercial species
- Discard samples for laboratory analysis



# Electronic logbook



Electronic logbooks have been installed on 5 otter-trawls. The target is to increase the participation to other fishing vessels.

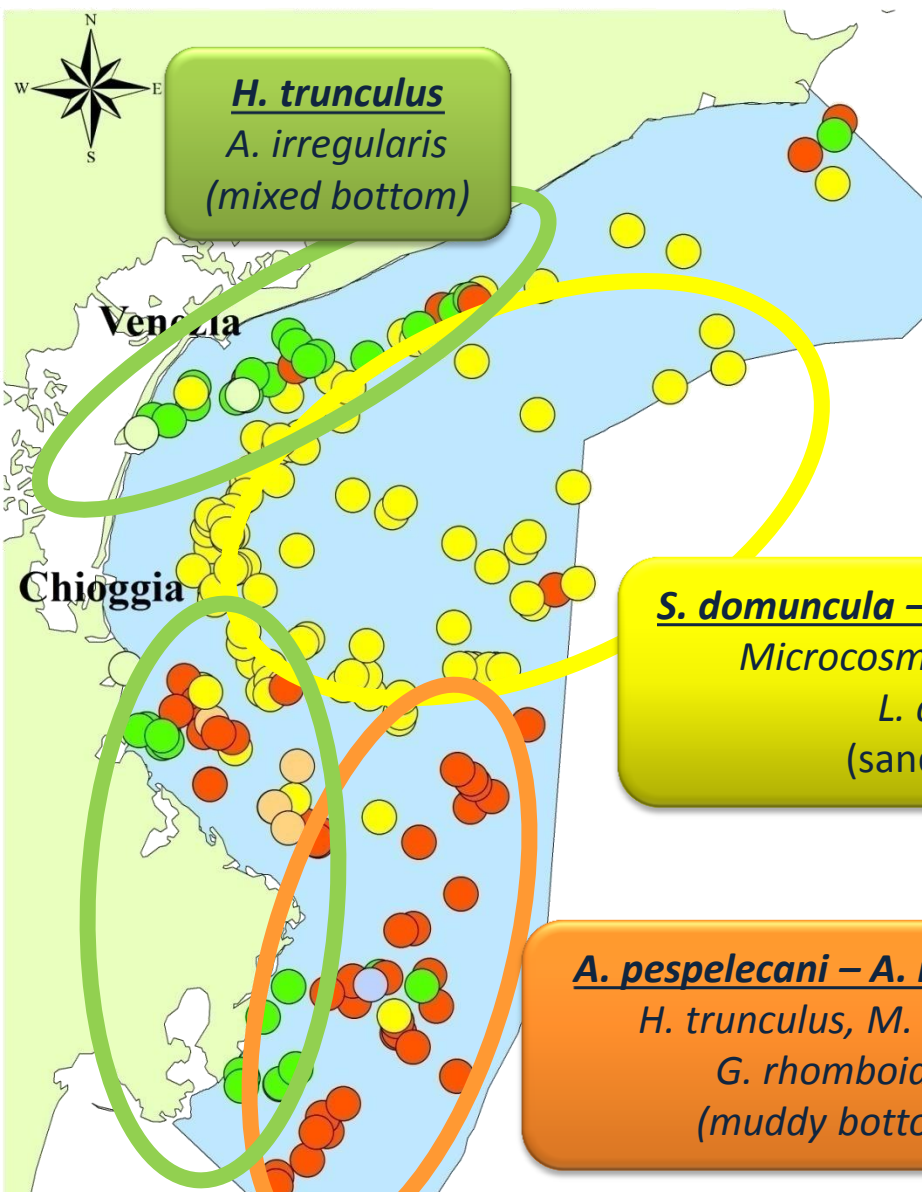
2012-2014: **4228 fishing trips monitored** with 5 otter-trawls

## Data collected for each haul:

- Navigation data recorded by GPS loggers
- Total weight of main commercial species recorded by fishermen



# Benthic assemblages



***H. trunculus***  
***A. irregularis***  
(mixed bottom)

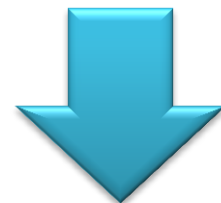
***S. domuncula* – *P. microtuberculatus***  
*Microcosmus* sp., *Pyura* sp.,  
*L. depurator*  
(sandy bottom)

***A. pespelecani* – *A. irregularis***  
*H. trunculus*, *M. lanata*,  
*G. rhomboides*  
(muddy bottom)



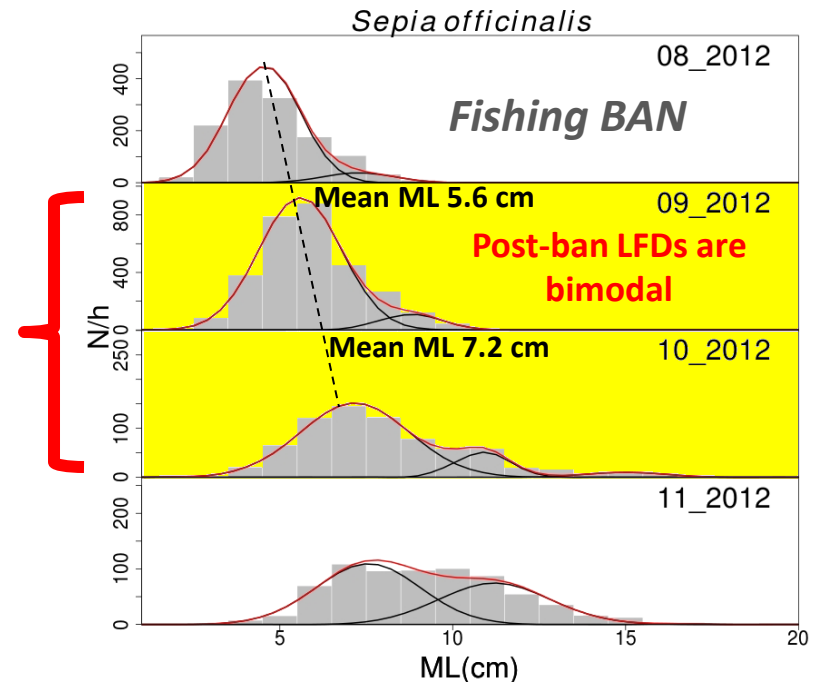
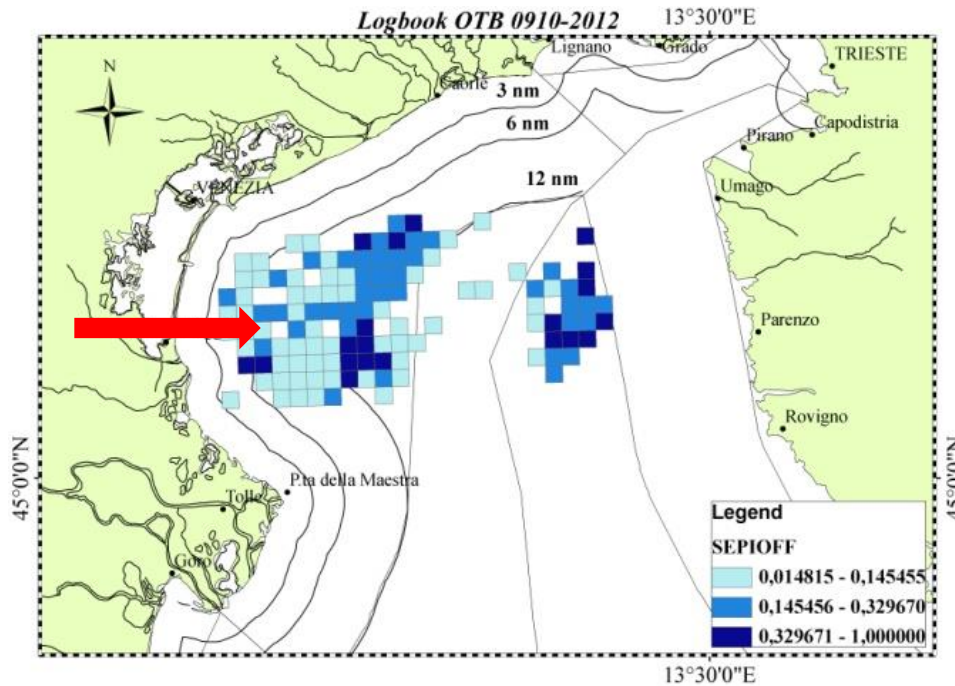
Demersal discard samples

Evaluation of specific composition, abundance, biomass



**COGNITIVE TOOL**  
describe benthic habitat  
to improve  
**EXPLICIT SPATIAL  
MANAGEMENT**

## September – October 2012



### SEASONAL MIGRATION:

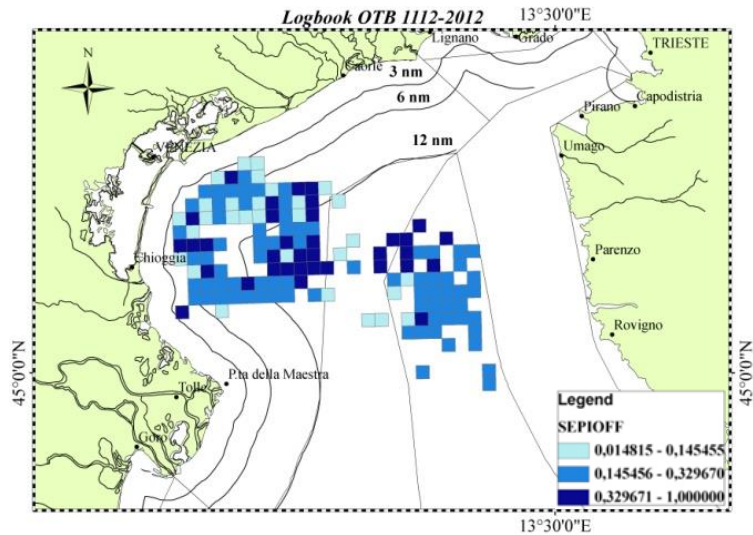
In autumn *S. officinalis* moves away from the coast to offshore area

→ Trawlers capture mainly juveniles cuttlefish in migration

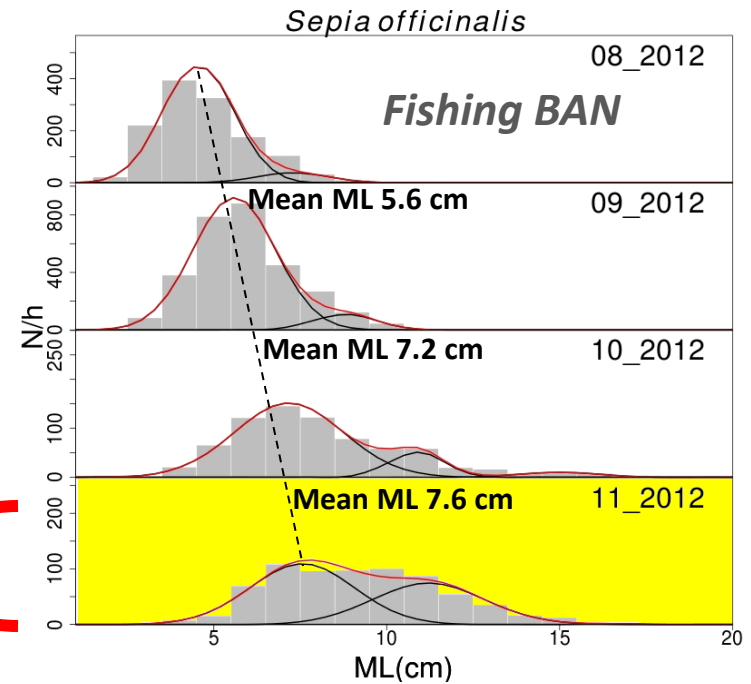
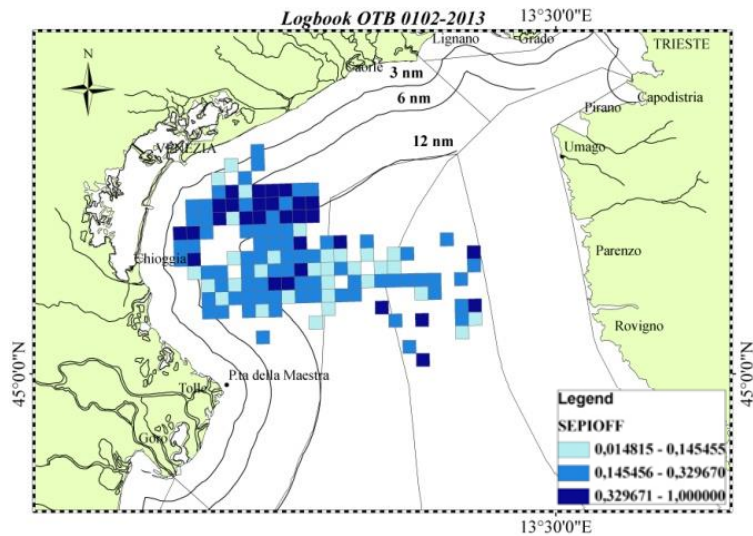
POTENTIAL LOSS OF CATCH

# Spatial distribution: *S. officinalis*

## November – December 2012



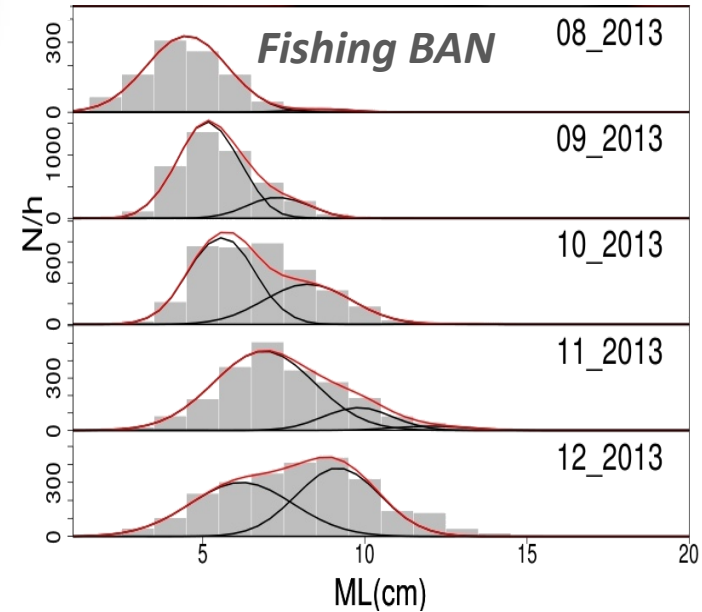
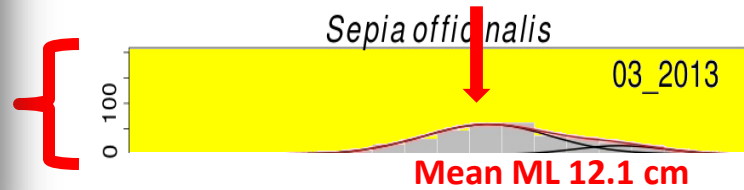
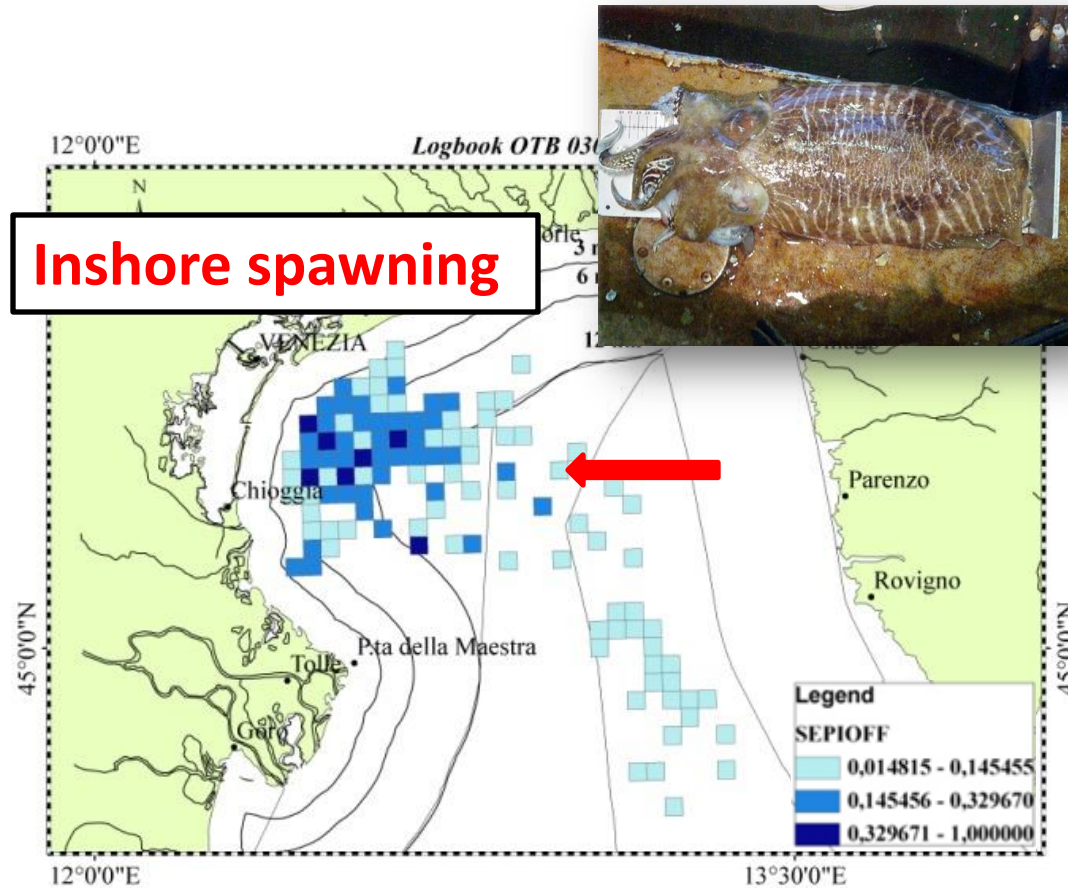
## January – February 2013



In late autumn and winter *S. officinalis* is distribute homogeneously on fishing areas

# Spatial distribution: *S. officinalis*

## March – April 2013

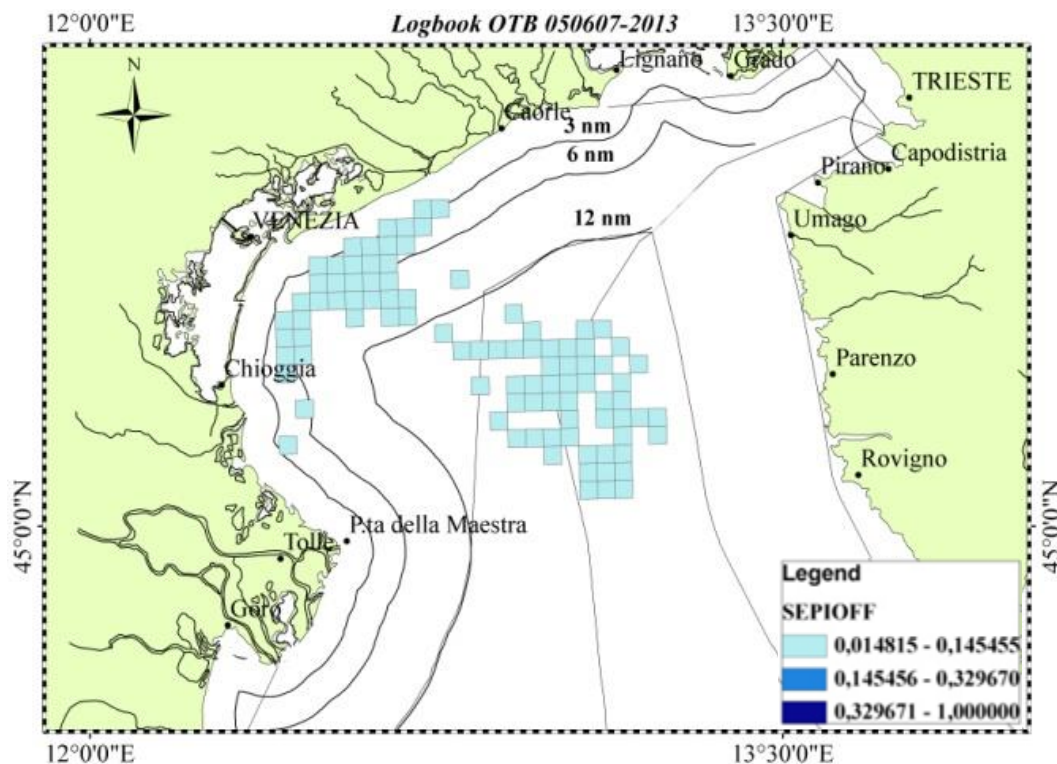


**SEASONAL MIGRATION FOR SPAWNING  
LARGER INDIVIDUALS**



# Spatial distribution: *S. officinalis*

## May – June - July 2013

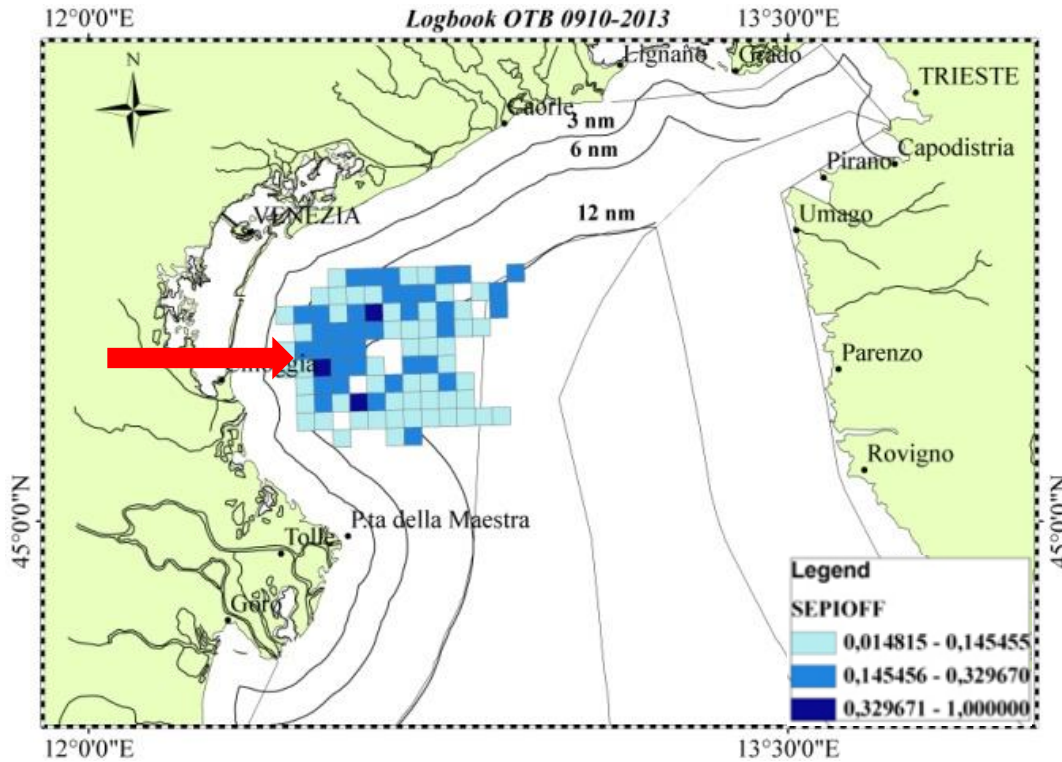


In the late spring and summer *S.officinalis* is not available for trawlers because it is concentrated in inshore area and lagoon for spawning

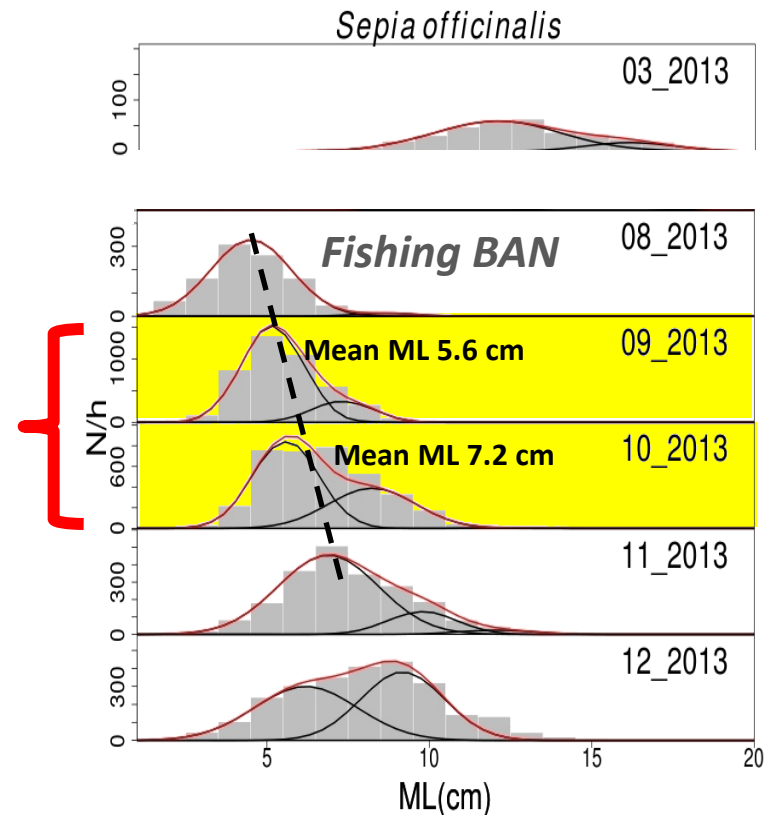
**MAIN target species for the artisanal fisheries (Belcari *et al.*, 2002)**



# September – October 2013

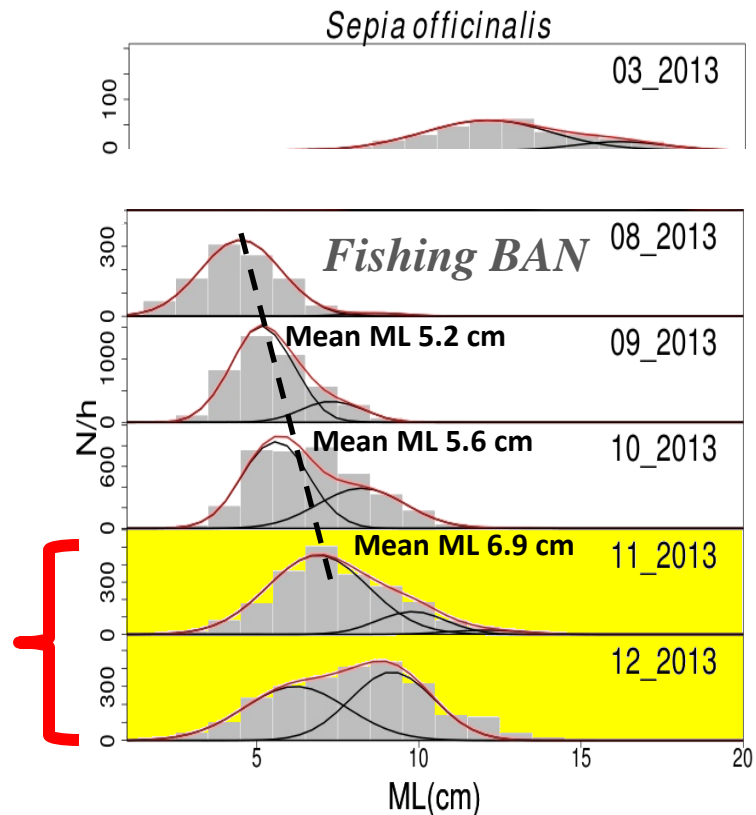
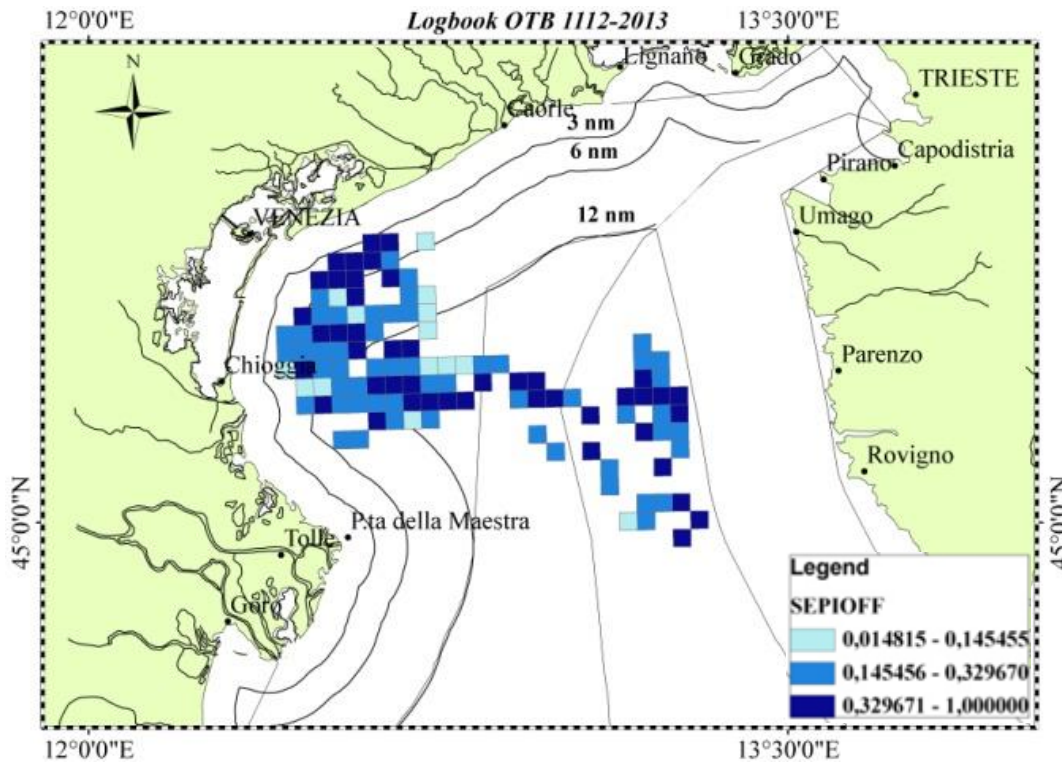


SEASONAL MIGRATION = 2012



Post-ban LFDs are bimodal

## November – December 2013

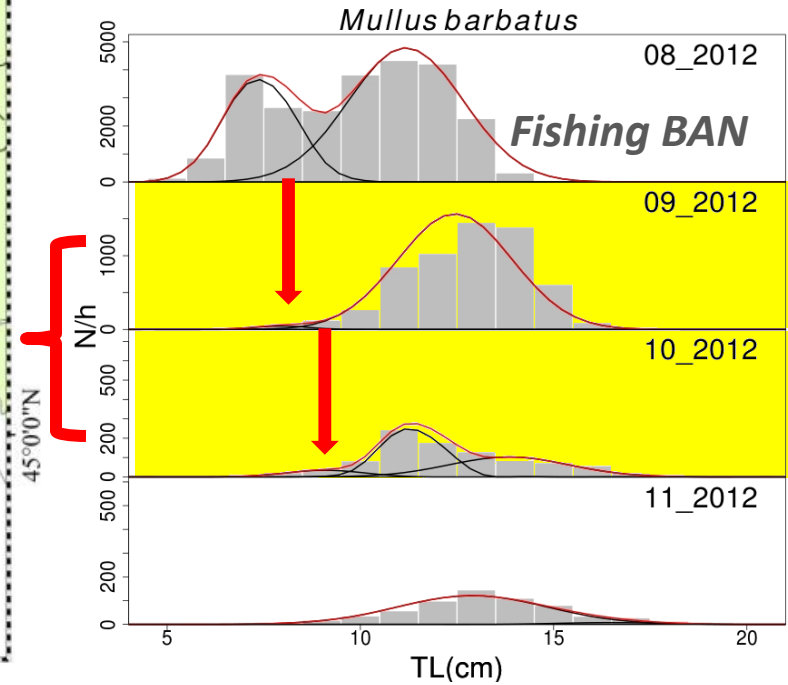
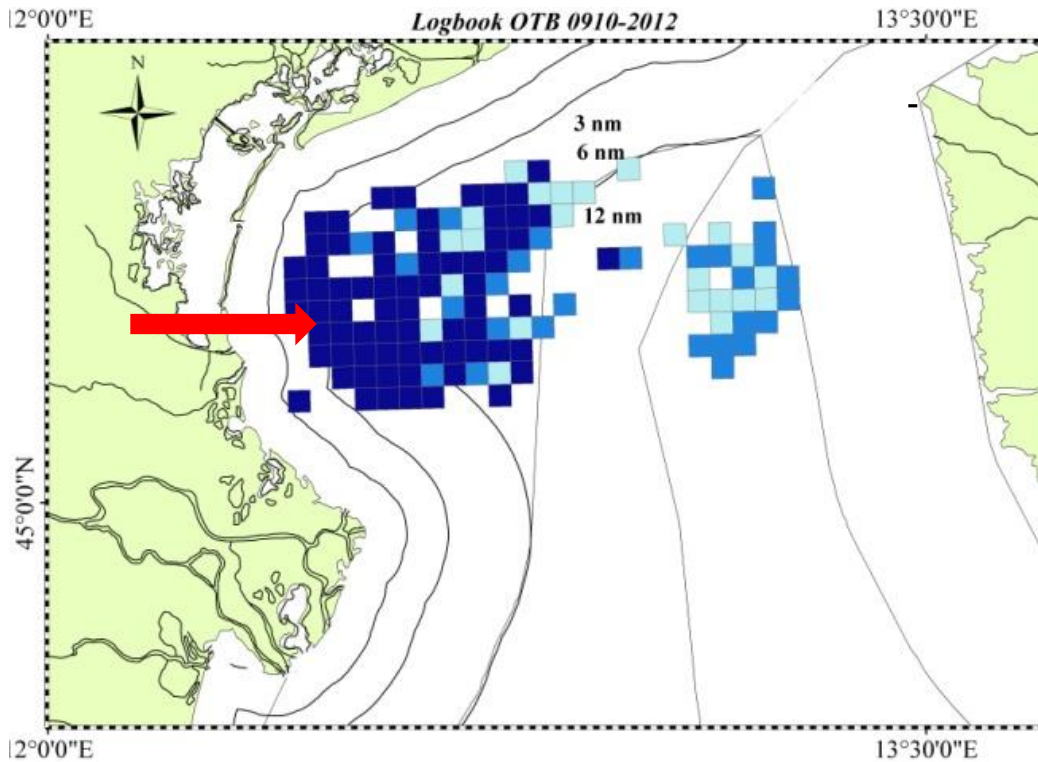


In late autumn and winter *S. officinalis* is distributed homogeneously in fishing areas = 2012



## September – October 2012

SEASONAL MIGRATION  
from inshore to deeper water

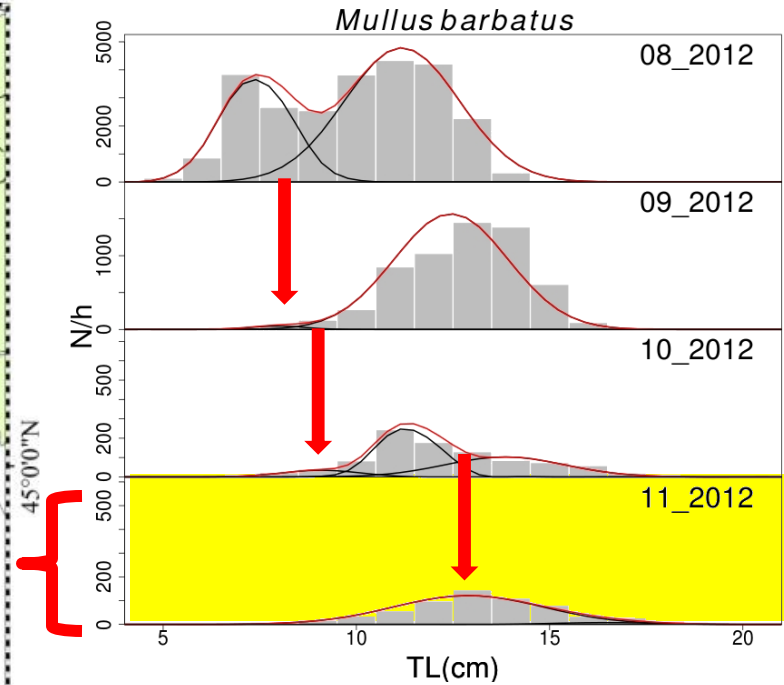
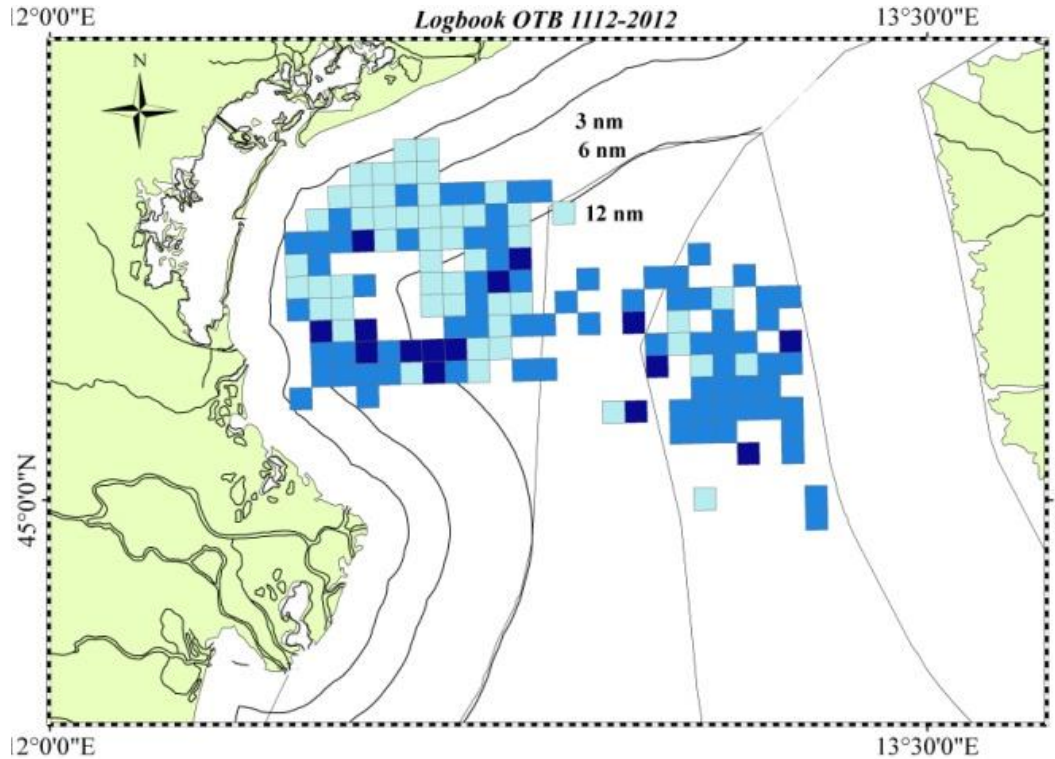


Post-ban LFDs are bimodal with the first component formed by small fishes  
→ Mean TL 7,9 – 9,1 cm

# Spatial distribution: *M. barbatus*



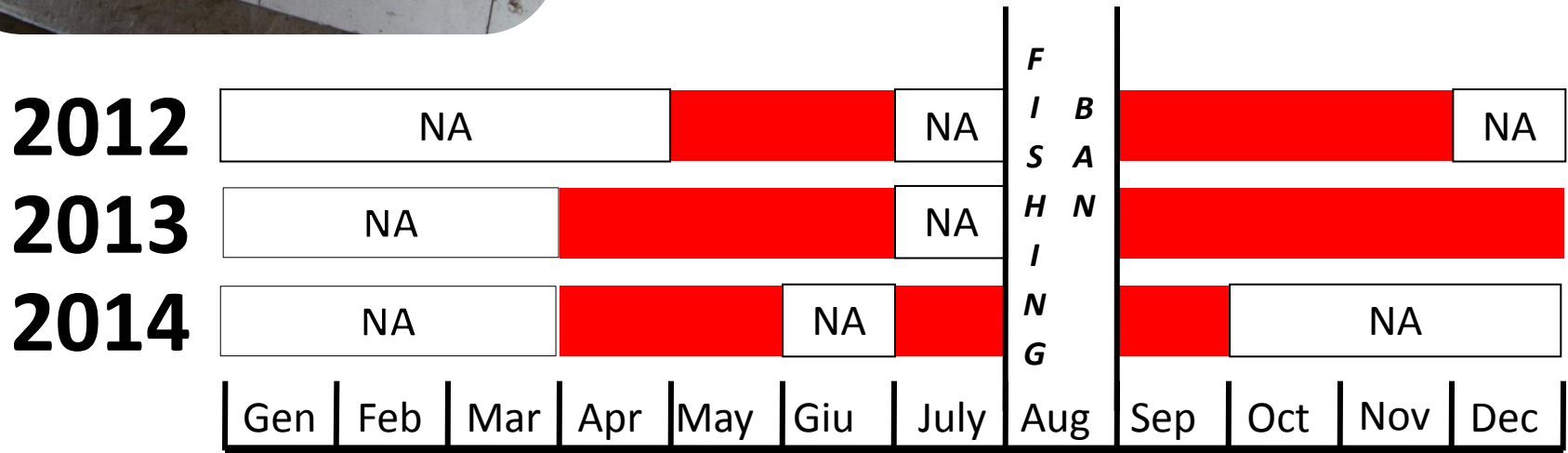
## November – December 2012



**Mean TL 12,9 cm**

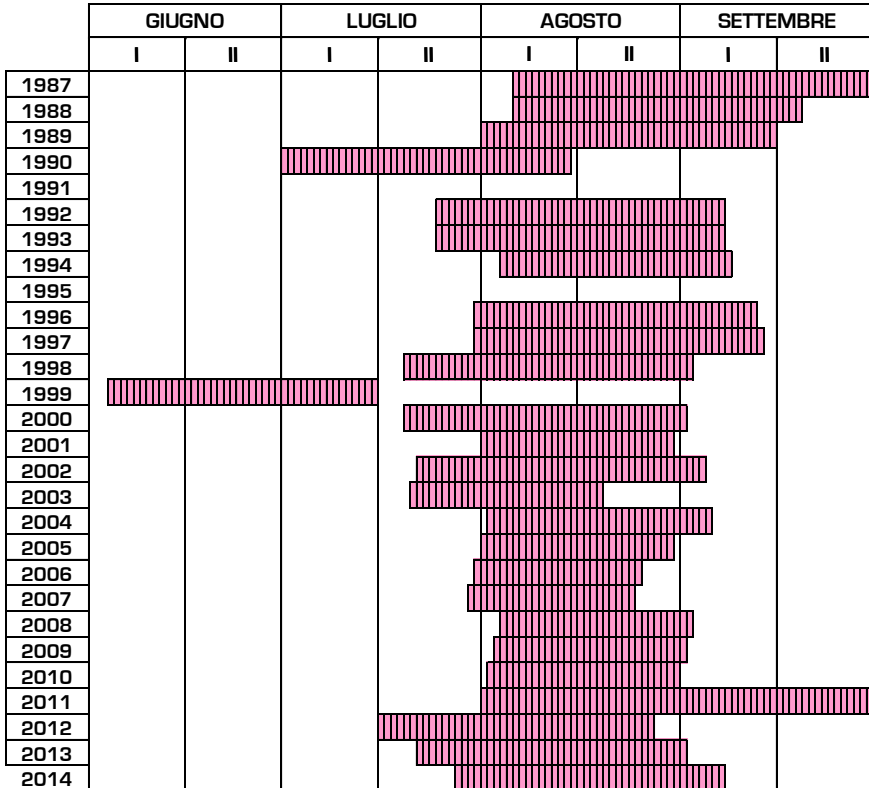


## Presenze di piccoli mulletti rossi

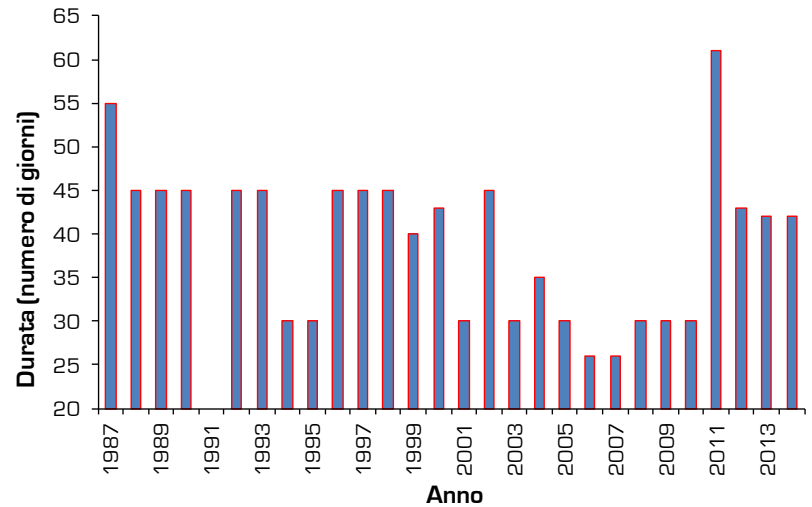


Presenza di individui sottosviluppati prima e dopo il divieto di pesca commerciale (agosto)

# Linking data to management: reflections on the Summer trawling closures



Time frame



Number of days

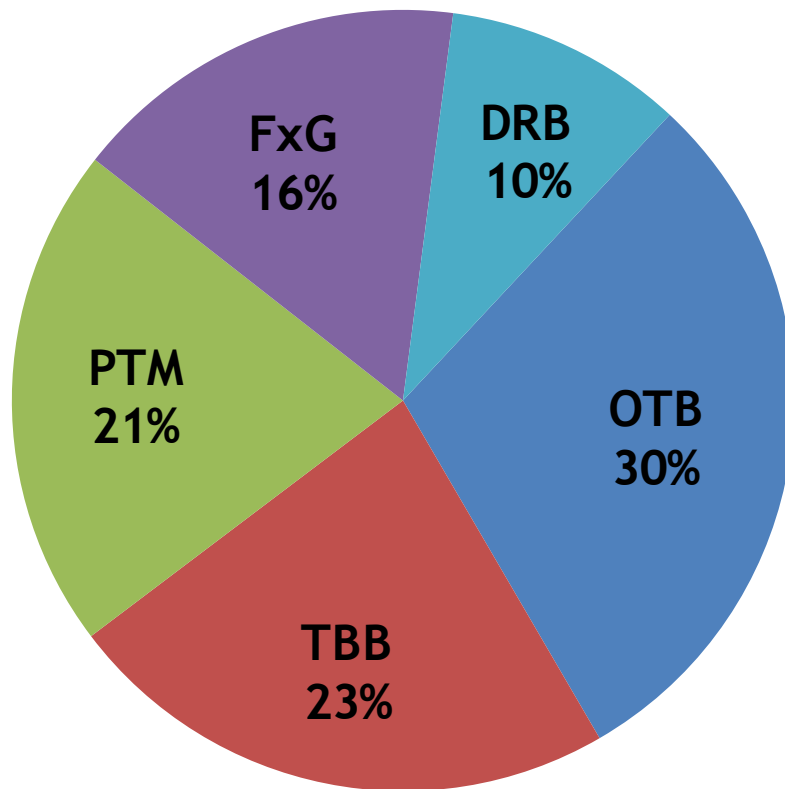


***FISHERMEN  
OPINIONS***



# *ITAFISH project interviews (2013 results)*

94 STAKEHOLDERS interviewed



9 shipowners

38 captains

42 sailors

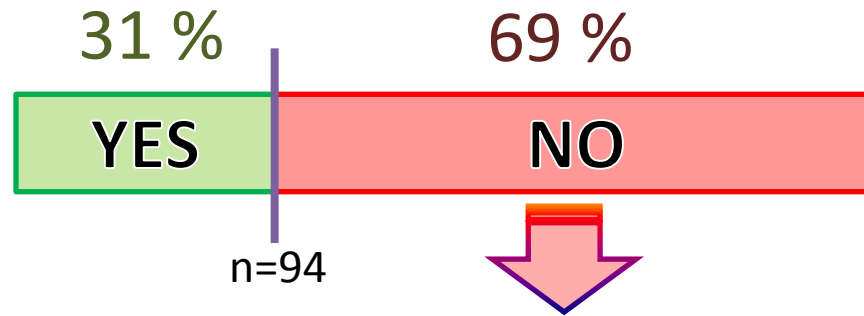
5 administrative officers

## **EXPERIENCE ON BOARD FISHING VESSELS**

From **2** to **55** years

(mean **28**)

## ***FISHING-BAN PERIOD, APPROPRIATE?***



### **MAIN REASONS highlighted**

#### **ECONOMIC**

**LOW** commercial catch

**LOW** commercial value

**LOW** market demand

(**BEFORE** fishing-ban)

#### **BIOLOGICAL**

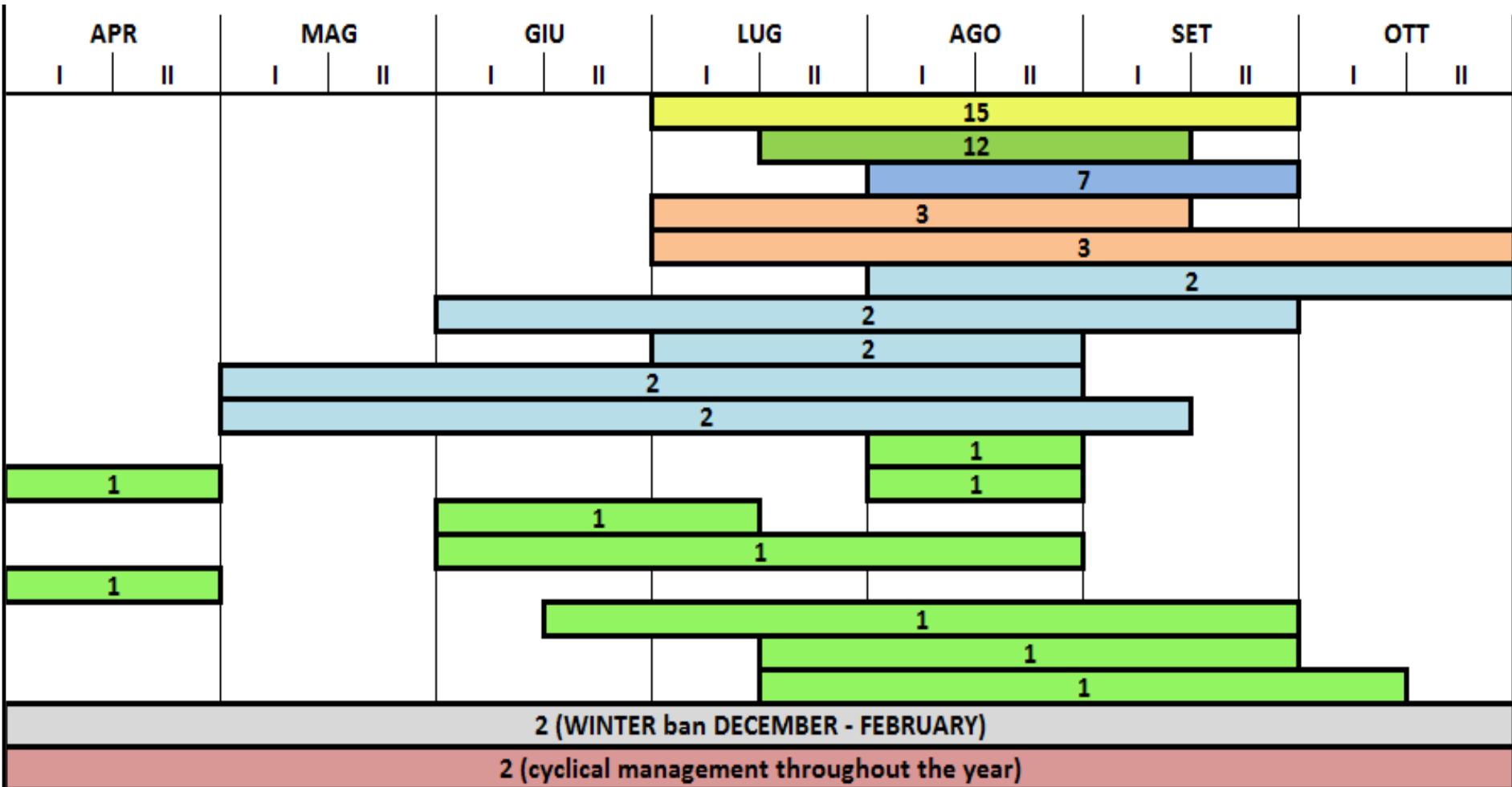
presence of **JUVENILES**,  
commercial and non-comm.  
species

(**BEFORE** and **AFTER** fishing-ban)

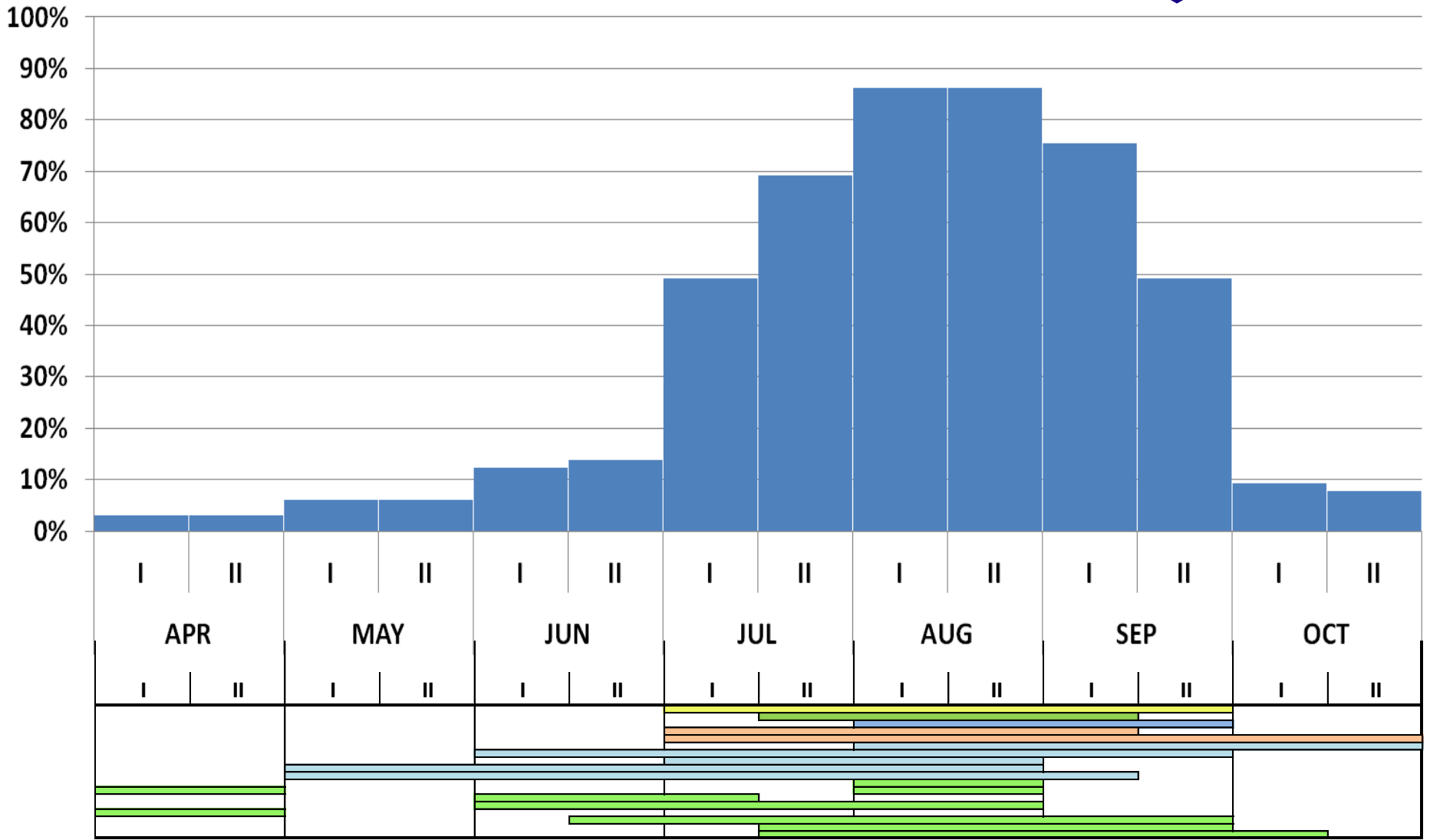
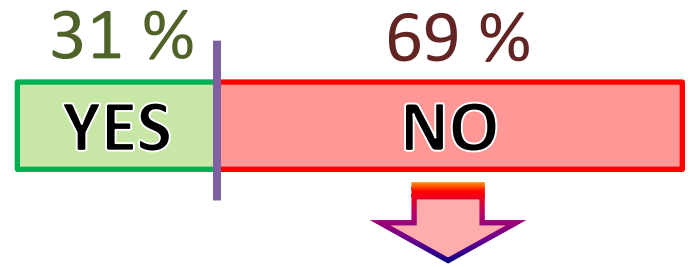
# ALTERNATIVE PERIODS SUGGESTED



~95% suggested alternative periods

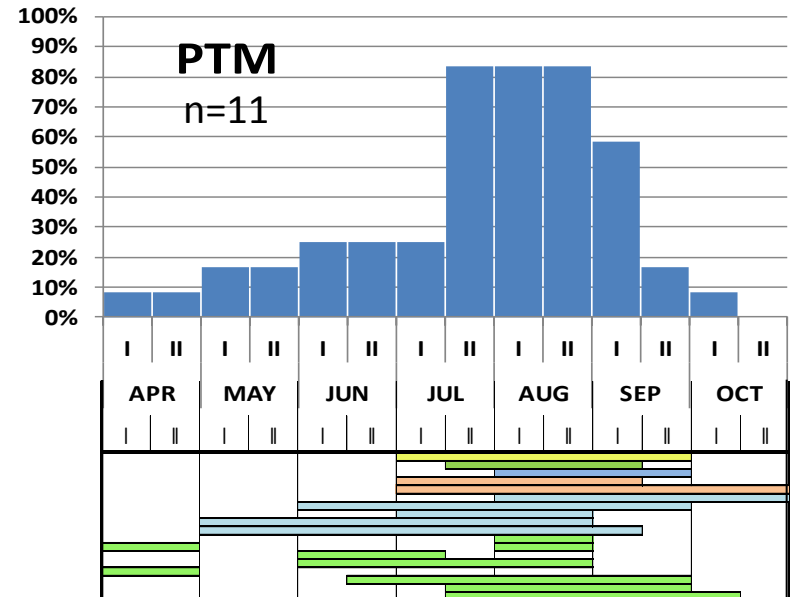
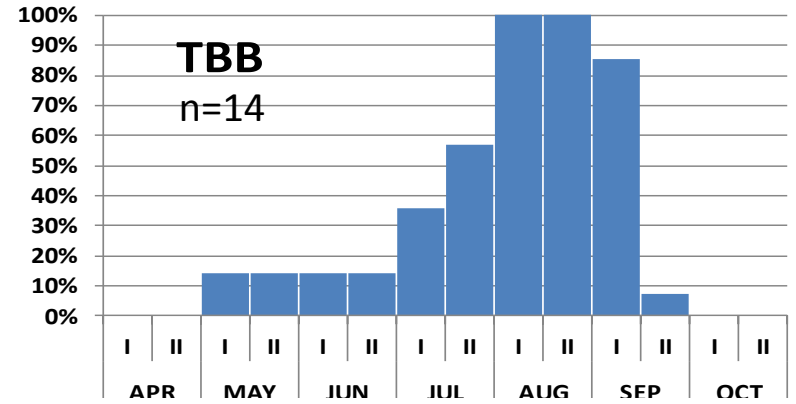
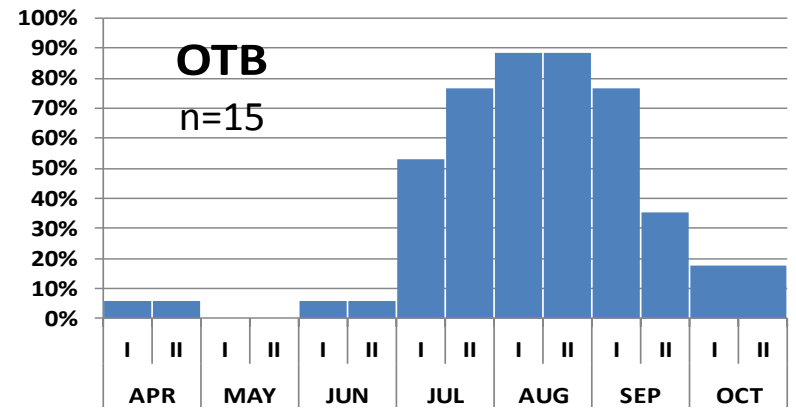
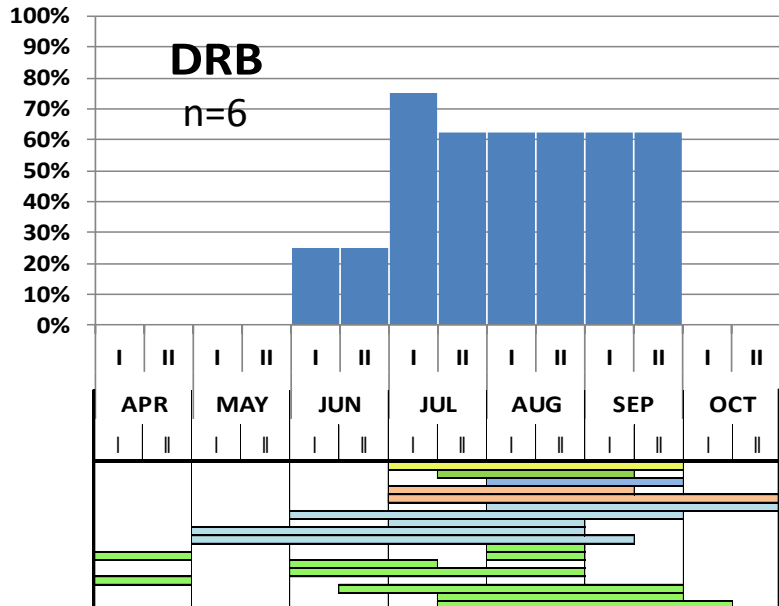
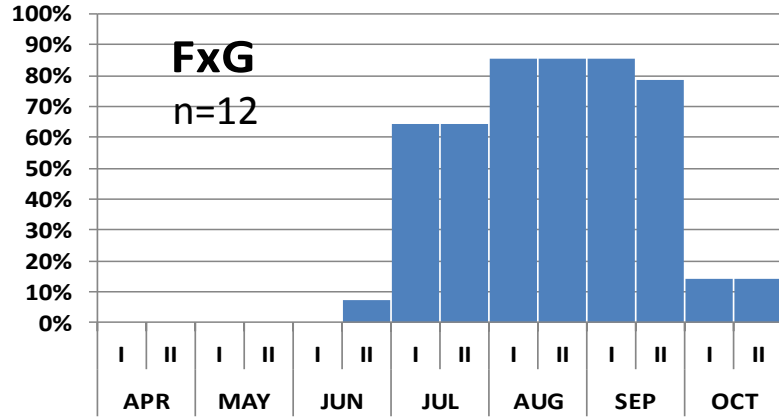


# ALTERNATIVE PERIODS SUGGESTED



# ALTERNATIVE PERIODS SUGGESTED

by main fishing gear used



# *Fishing ban period, further thoughts*

A fisherman wearing a tan cap and a light-colored jacket is sitting on the deck of a boat. He is looking out towards the sea. The boat has blue railings and various pieces of equipment like ropes and pipes are visible. The background shows a clear blue sky and the ocean.

...a recent meeting (Sept. 2014) with fishermen and other stakeholders highlighted:

- **Lengthen the FISHING-BAN period, involving the two adjacent months (JULY – SEPTEMBER)** same reasons as stated by ITAFISH interviews (2013), both BIOLOGICAL and ECONOMICAL
- **Extend the FISHING-BAN to ALL fishing gears, both active and passive ones**
- **Conservation and management measures → structured on Adriatic basin level** involvement of all the States facing and exploiting the same resources/stocks (GSA17)
- **Regulate products IMPORTATION → large quantities seen as promoters of unfair-competition, especially during the FISHING-BAN**

## *Main conflicts*

A harbor scene with numerous fishing boats of various sizes and colors (white, green, blue) docked. The boats have complex rigging and masts. In the background, there are buildings with red-tiled roofs under a clear blue sky. The water is calm and reflects the boats and sky.

**among different meters**

**among different dimensional categories**

**with the other Adriatic countries**

# Conclusions

- The **results** of the research activities and the fishermen opinions **suggest that the duration of the fishing ban should be increased** (anticipating and postponing by 15 days);
- The inter-annual variability observed suggest that it would be appropriate to enforce an adaptive approach, deciding the extension of the ban on the basis of the results of the scientific researches;
- It is necessary to extend the sampling activities to the inshore area (within the 4 nautical miles);
- **It is necessary to manage the restart of the fishing avoiding the fast depletion of the resources and the collapse of the prices at the market.**
- **It is necessary to extend the management measures to the entire Adriatic basin, or at least to the northern area, calibrating the measures on the basis of the ecological, economic and social peculiarities of the different countries**



# The GAP2 group proposal for the Northern Adriatic Sea Fishery District

- 1) Summer trawling closure of 60 days (e.g. from 11<sup>o</sup> July to 13<sup>o</sup> Sept. 2015);
- 2) In the following 8-10 weeks **max. 60 hours of fishing per week** from Monday to Thursday;
- 3) In the following period, **max. 72 hours of fishing per week** within a maximum of 4 days within a week;

**Thanks!**

