

Resilience for whom and according to what criteria?

An examination of adaptations to changes in the Bay of Biscay anchovy fishery.

SPF Symposium Nov. 7-11, 2022, Lisbon

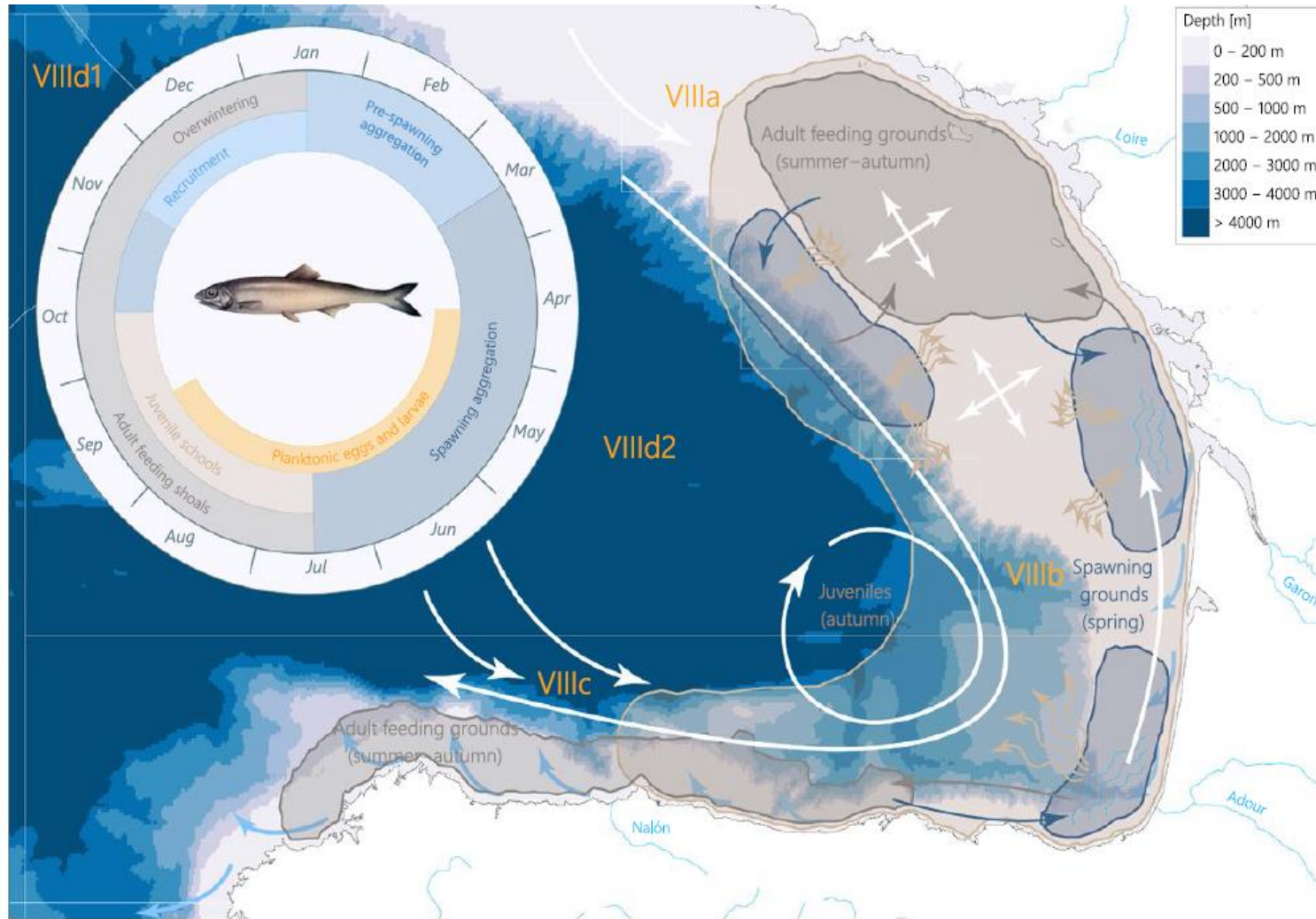


Beckensteiner J.^{1,2}, Villasante S.³, Charles A.⁴, Petitgas P.⁵, Le Grand C.^{5,2}, Thébaud O.^{5,2}

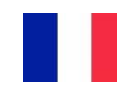
Need for fisheries management that promotes resilient social and ecological systems to ensure sustainability in face of changes and variability

- A fishery socio-ecological system → the Bay of Biscay anchovy fishery
- A shock → anchovy collapse and fishery closure from 2005 to 2010
- Its responses → Was this system resilient to the change(s)?

The Bay of Biscay anchovy *Engraulis encrasicolus* fishery



- **VIII a Summer + Fall**
- **VIII b Winter + Summer**



- **VIII a Fall (Breton)**
- **VIII b Spring (Basque)**



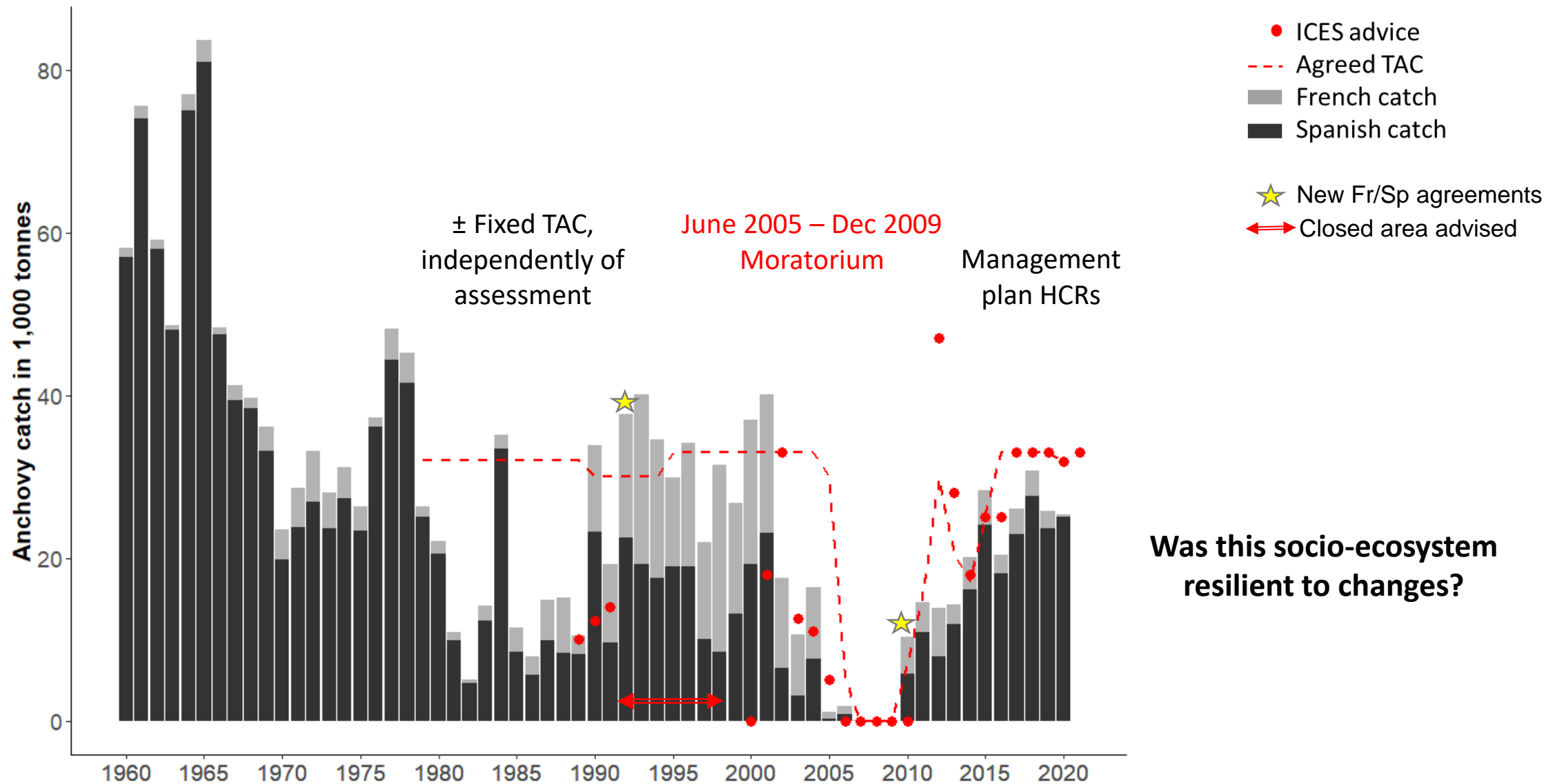
- **VIII b c Spring**



(Taboada & Anadon 2016)

95% of French landings are sold on the Basque market and processed in Spain

The Bay of Biscay anchovy fishery management (Subarea 8)



(ICES WGHANSA 2020)

Multidisciplinary and systemic approach

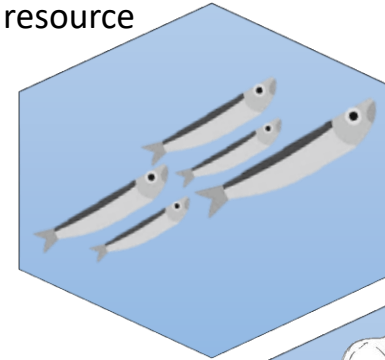


Perception survey with fishers and their representatives, processors, fishery administration and managers, scientists FR and ESP

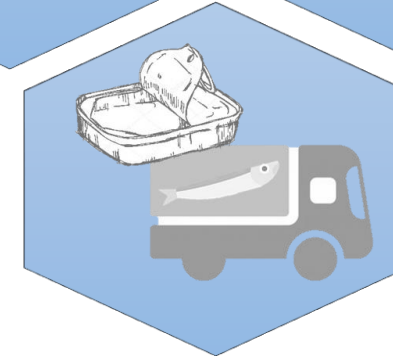
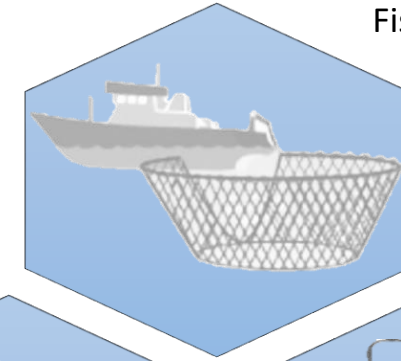


4 dimensions of the socio-ecological system evaluated

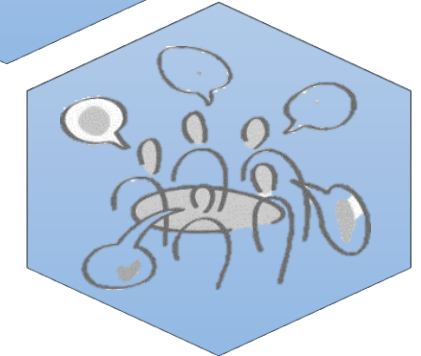
Biological resource



Fishing activities, fishers, fishing communities



Processing sector and buyers



Fisheries management & Decision-making process



Time series analyses of French catch (SIH) and international trades (COMEXT)



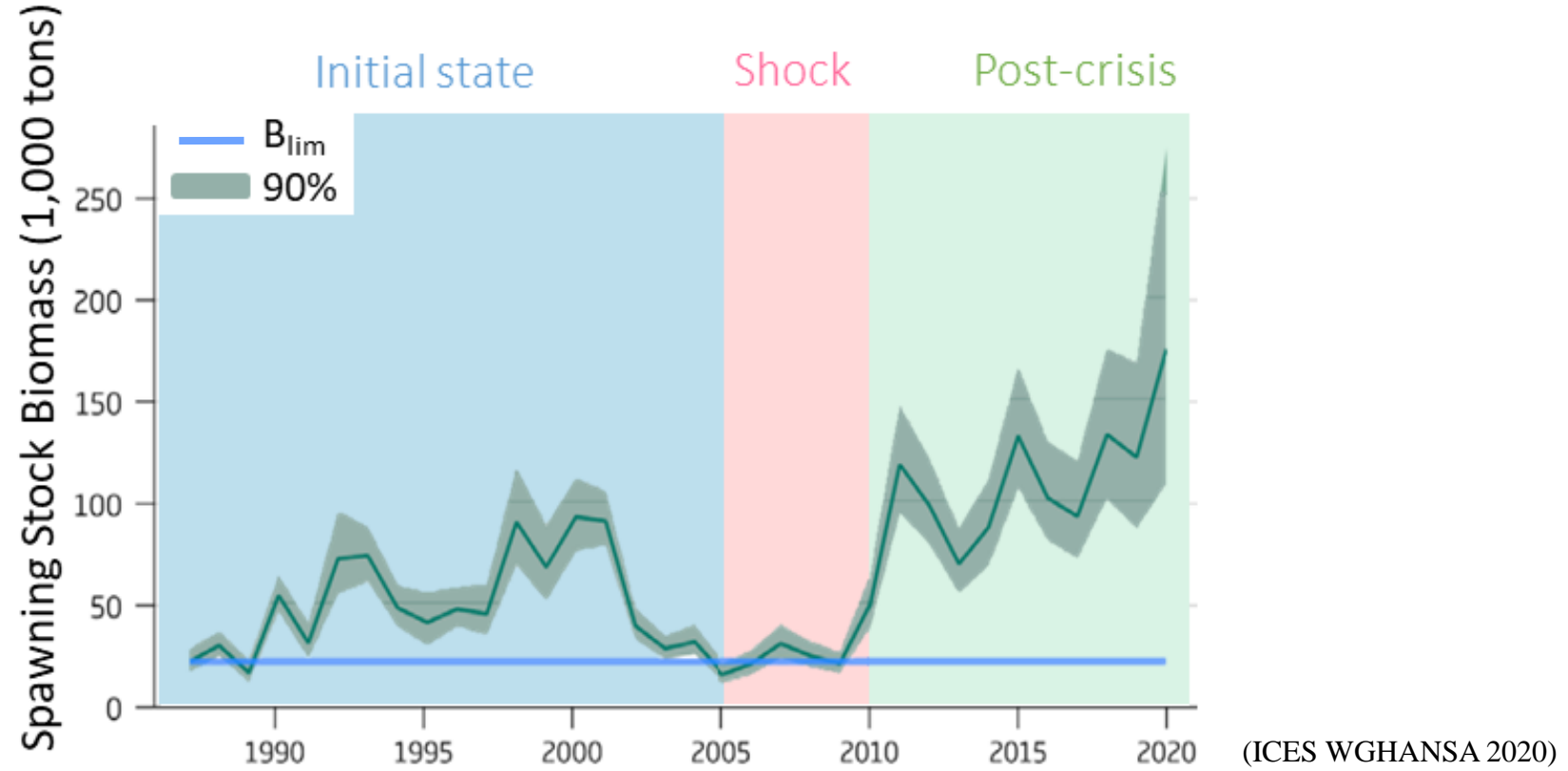
What responses to the changes?

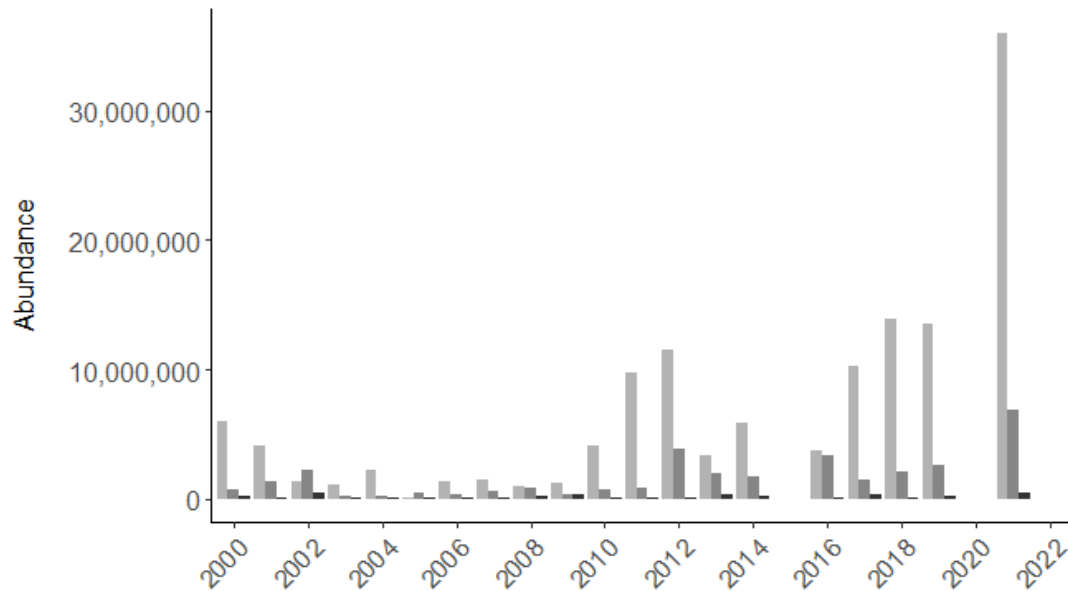
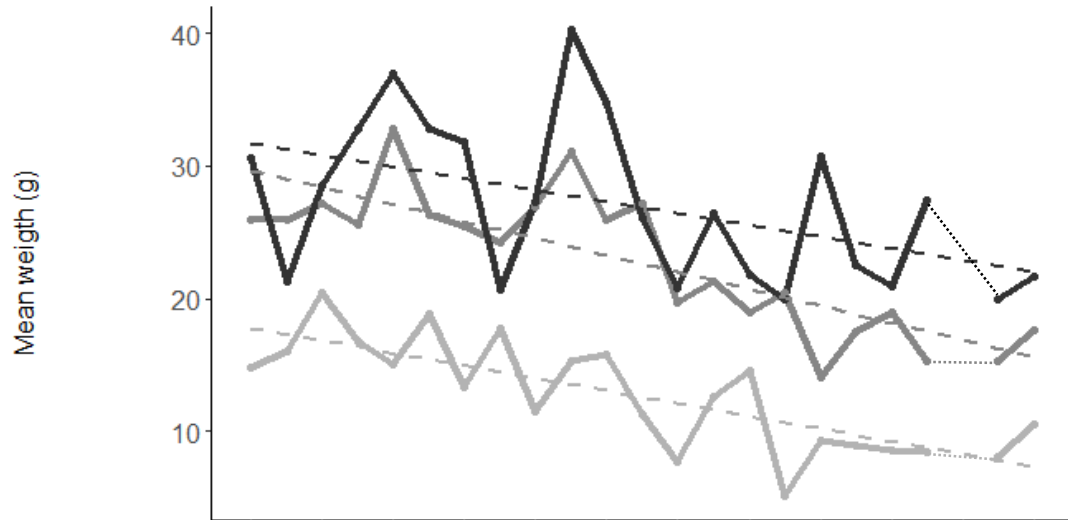
The biological resource dimension





Anchovy stock recovery





Anchovy stock recovery

...but smaller size and mixed

Rebound of the stock but its composition is different:

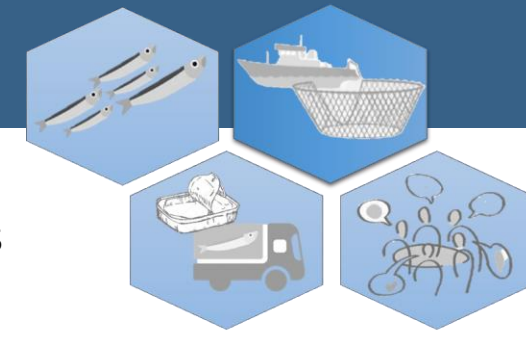
- Bigger anchovies are getting smaller (density dependence phenomena?)
- Important cohorts of age1 anchovies mixed with bigger anchovies & sorting is no longer profitable

(Ifremer, Pelgas 2022)

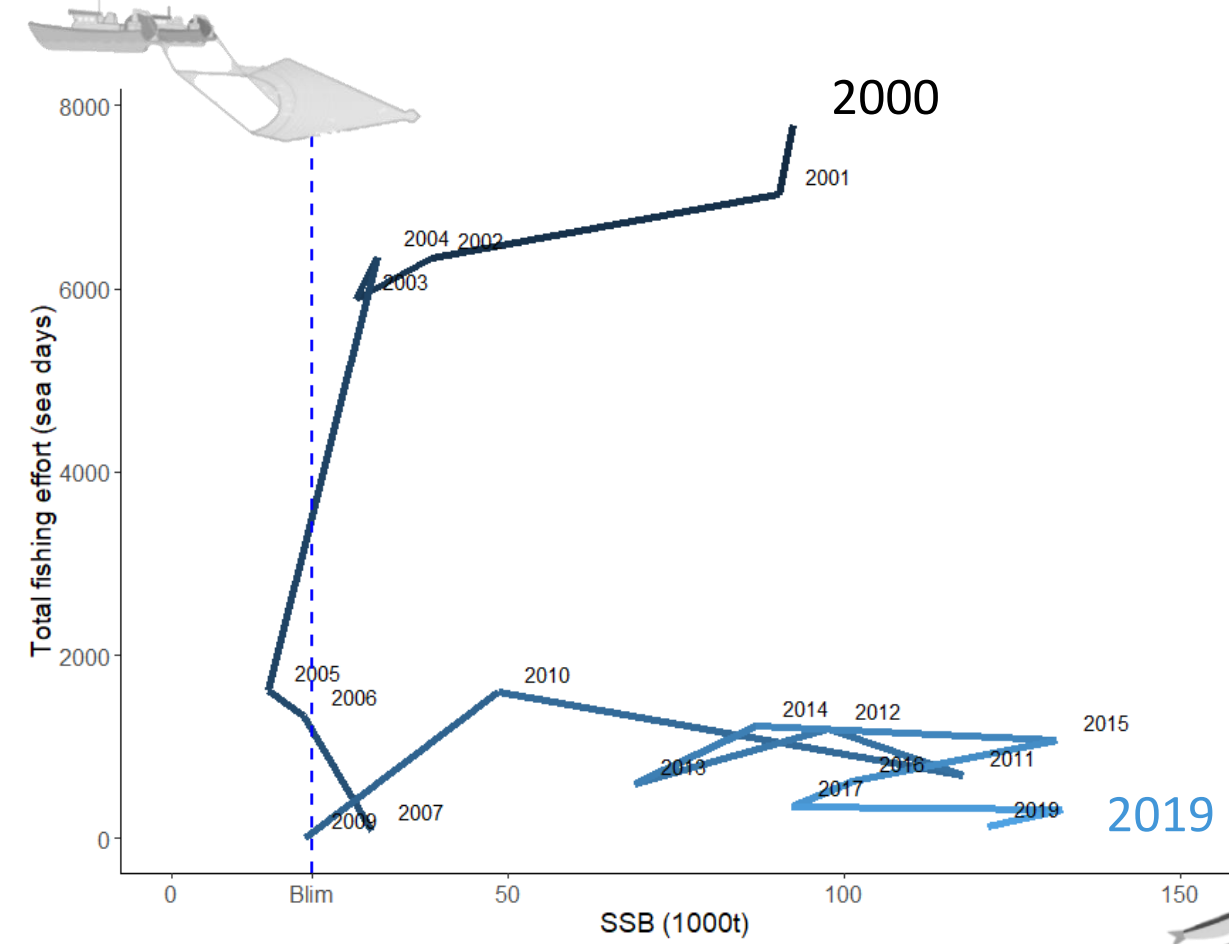
Fishing activities & fishers communities



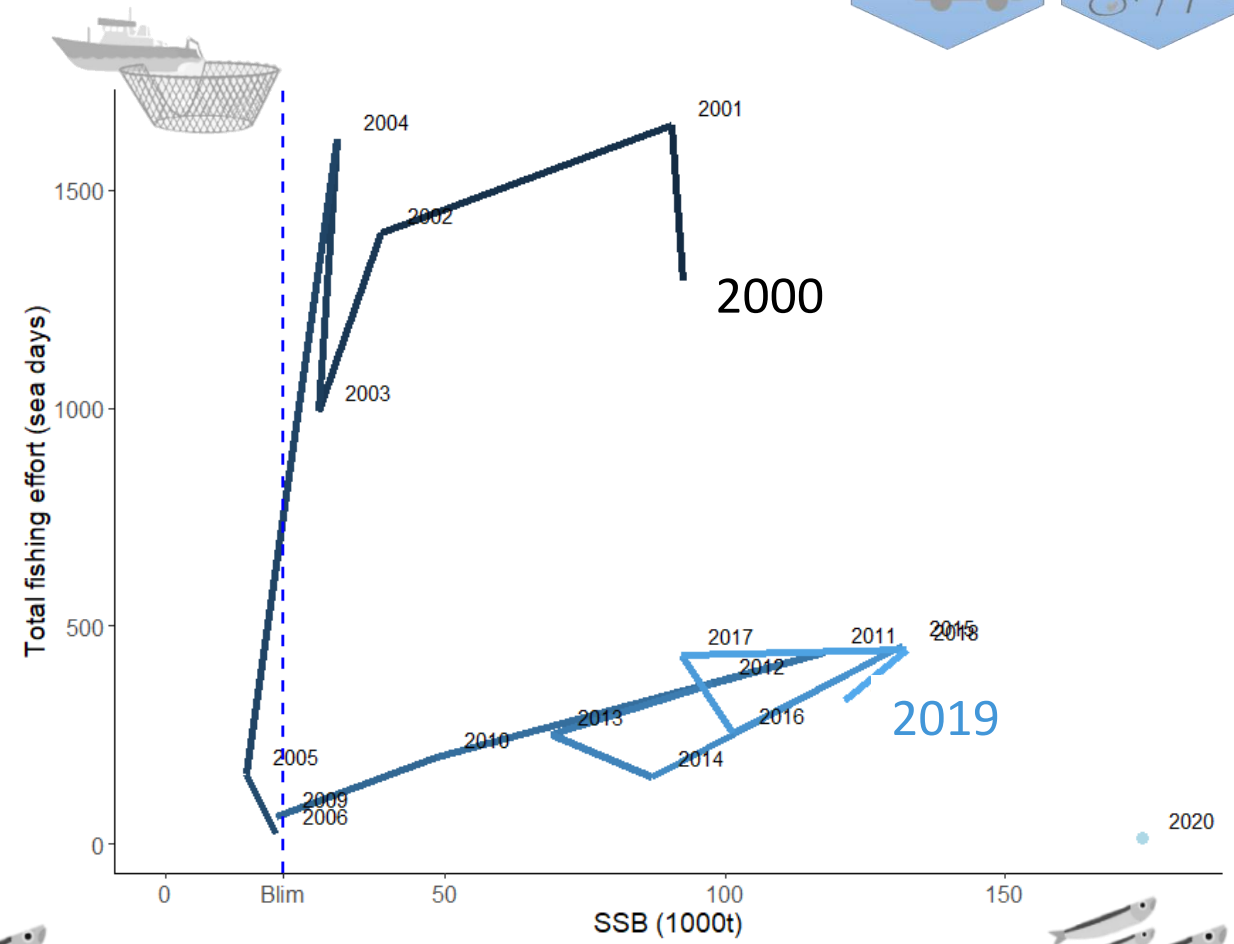
Changes in the resource and in the fleet behavior



French anchovy Pelagic trawlers

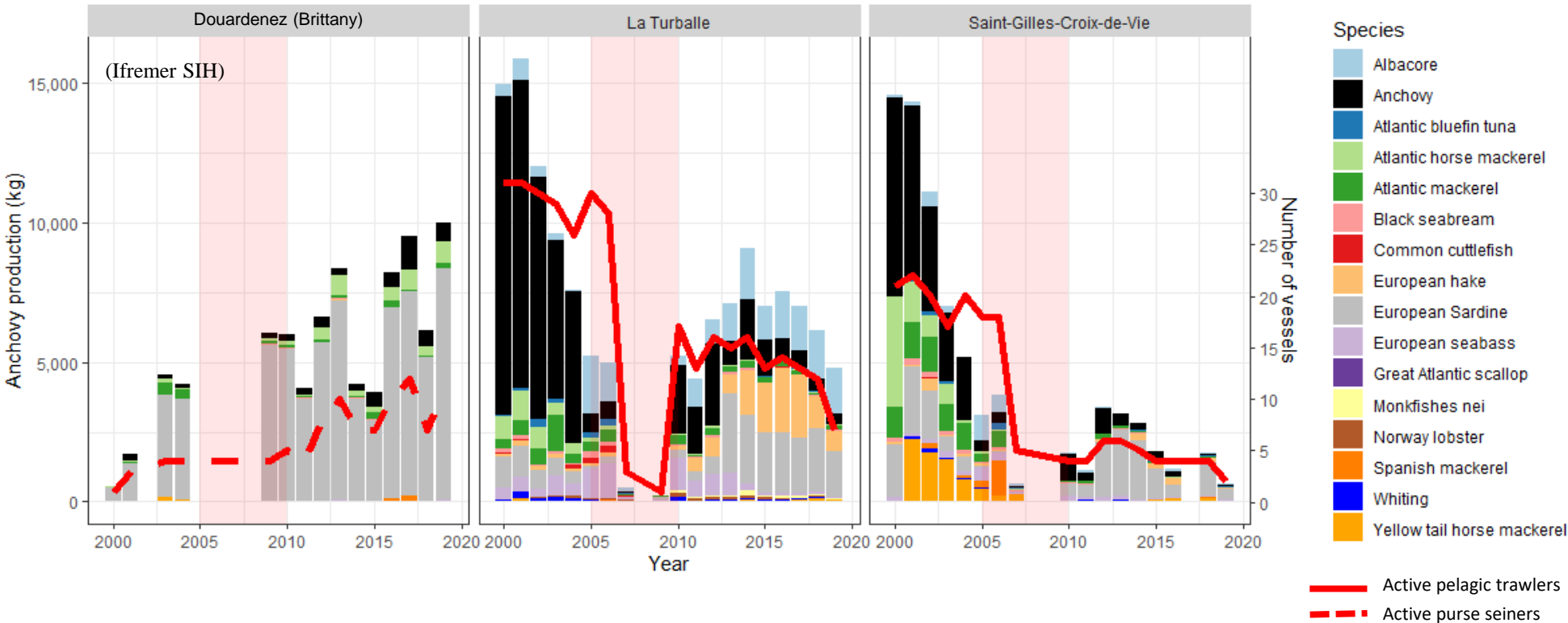
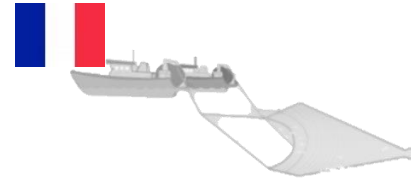
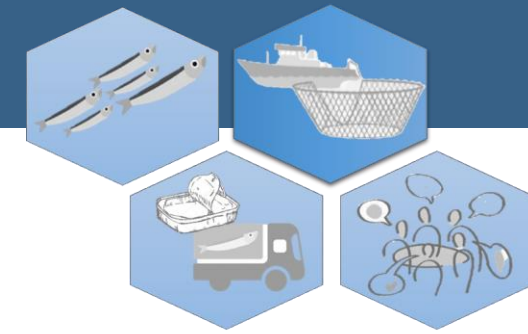


French anchovy Purse seiners



(ICES WGHANSA 2020 and Ifremer SIH)

Adaptation strategies

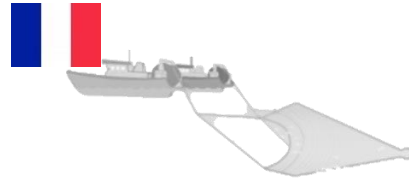


➤ **Changes in the target species**
(sardines)

➤ **Changes in techniques**
(bottom trawl)
➤ **Resource diversification**
(squids, hake, seabass, albacore)

➤ **Decommissioning schemes**
(retirements)
➤ **Conversion**

Adaptation strategies



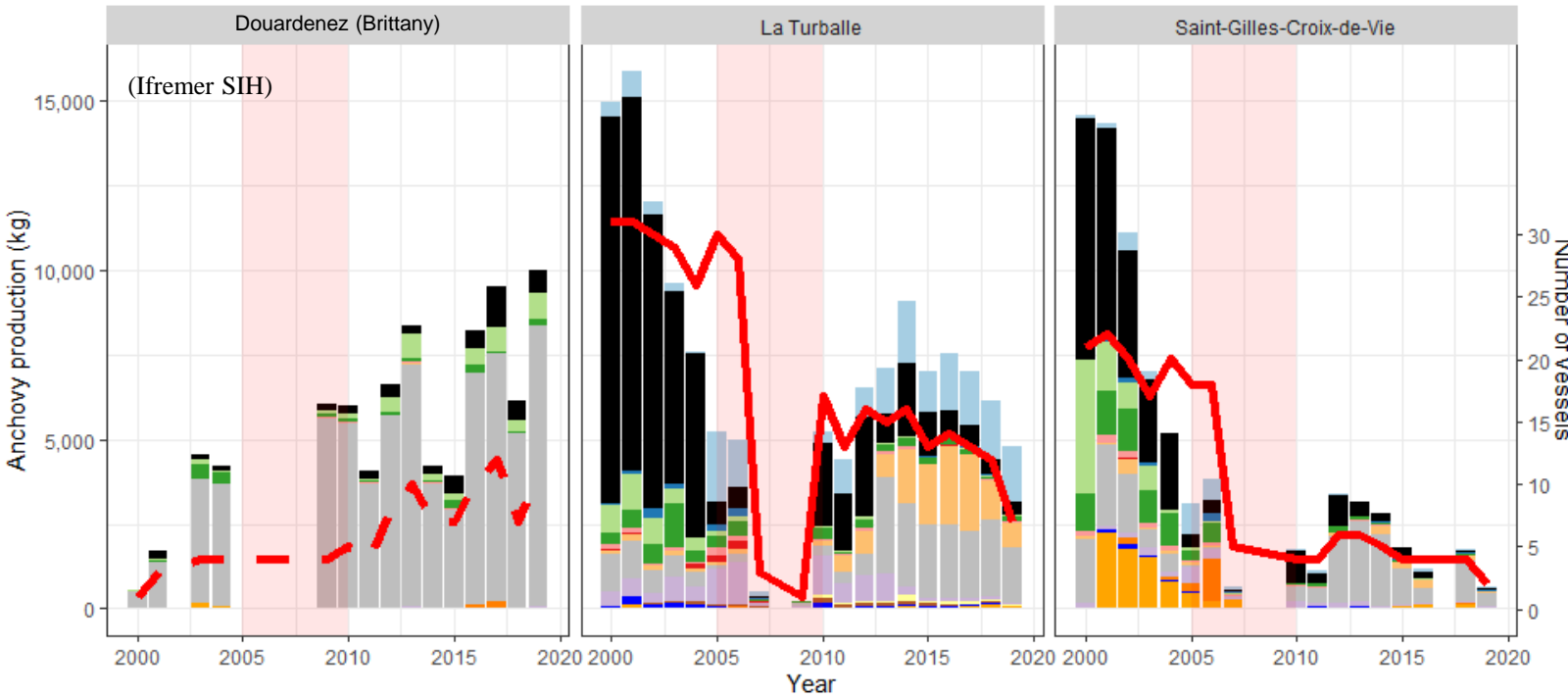
Galicia

- Temporary conversion
- Changes in the target species
- Change of fishing area



Basque country

- Changes in techniques - Larger seiners?
- Changes in the target species (mackerel and Bluefin tuna)



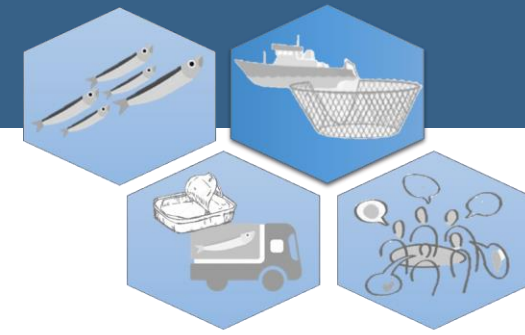
- Species
- Albacore
 - Anchovy
 - Atlantic bluefin tuna
 - Atlantic horse mackerel
 - Atlantic mackerel
 - Black seabream
 - Common cuttlefish
 - European hake
 - European Sardine
 - European seabass
 - Great Atlantic scallop
 - Monkfishes nei
 - Norway lobster
 - Spanish mackerel
 - Whiting
 - Yellow tail horse mackerel

- Active pelagic trawlers
- - Active purse seiners

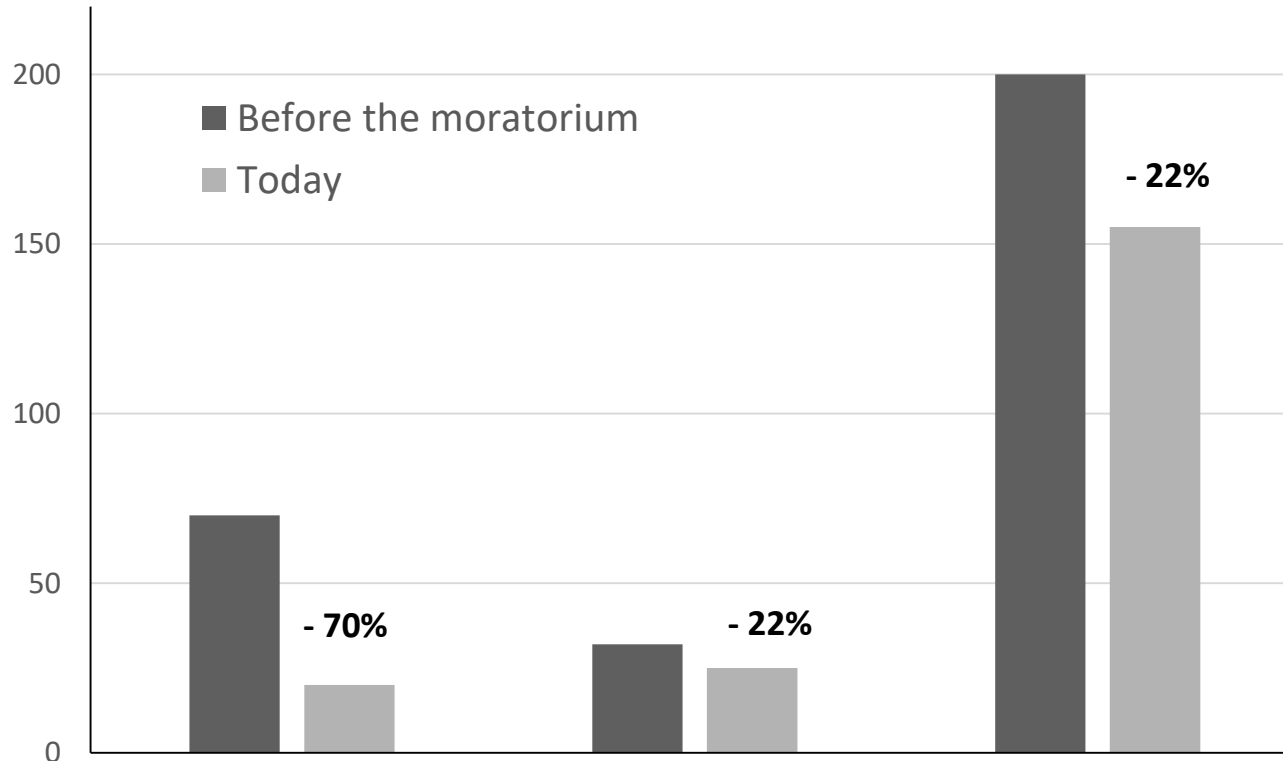
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- Changes in techniques (bottom trawl)
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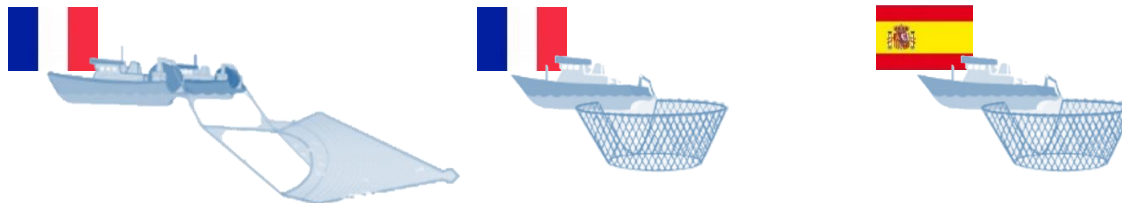
- Decommissioning schemes (retirements)
- Conversion



Number of Anchovy vessels

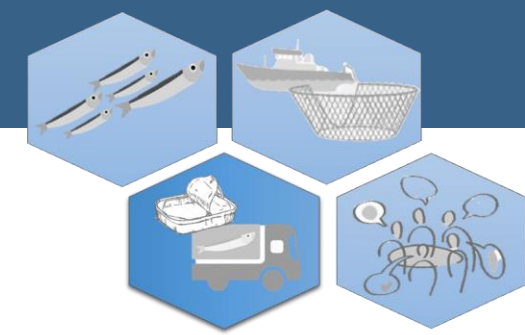


- Overall decrease of the fleets but regional variability
- Strongest negative impact for pelagic trawlers (FR) that have been scrapped and/or lose the market

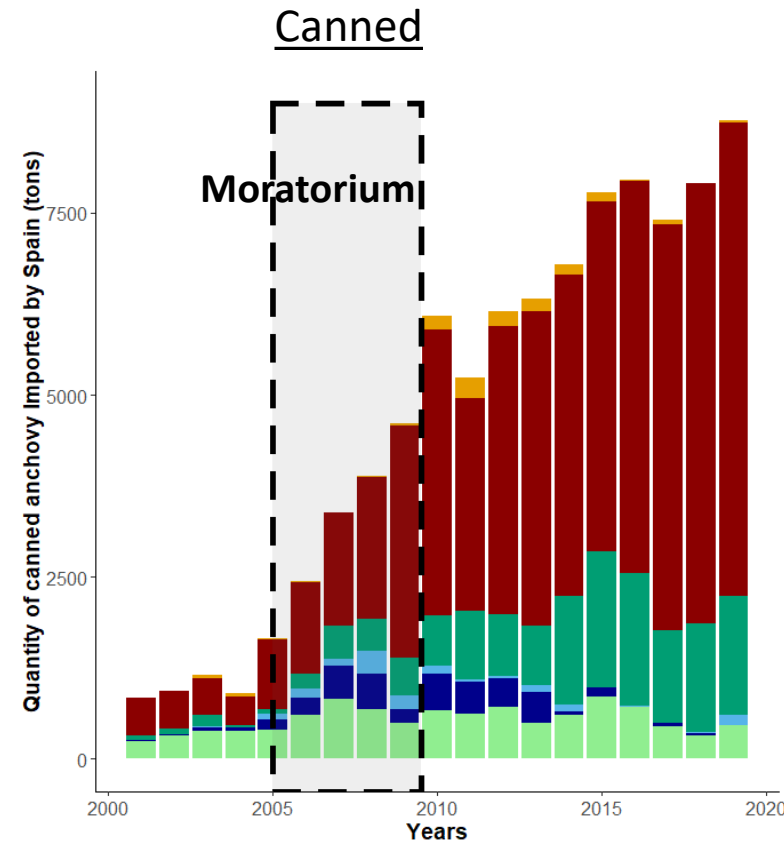
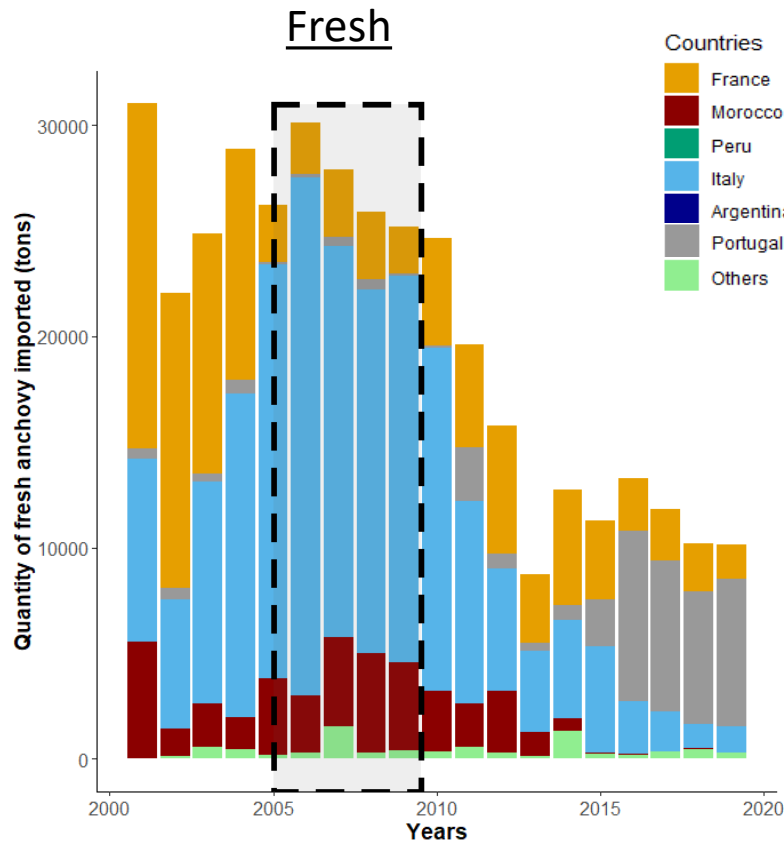


Processing sector and buyers





Quantity of Anchovy imported by Spain by main origins



- During the crisis: increased imports from Italy & Morocco
- French imports are disappearing to the benefit of Moroccan and Portuguese anchovies
- New market with a dominant proportion of transformed products in Morocco

(Source data: EU Comext)

Long-term reorganization of the industry

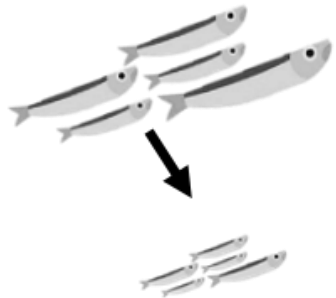


«During the crisis, processors had to **work with South American anchovies**, which are cheaper. Today, ‘they kept a foot in it’, they are still importing from these sources » (Pelagic Trawler)

« To have a good price, you need to **start long-term contracts** » (Scientist)

« Spanish canneries have adapted: they have **relocated their production to Morocco because their labor is 5 times cheaper**. They pre-transform in Morocco and finish the process in Spain. I had units that had 300 to 500 employees which became overnight at <50 employees » (Fishmonger)

Changes in product quality



«Today, we found a **lot of small anchovies** [~60ind/kg]. We would like to **open the anchovy season earlier** so that we can find bigger anchovy [30-40ind/kg] for the Spanish market» (Industry Representative)

« We **don't want the French anchovy b/c it comes from trawling**, it is not suitable for canning, being of poorer quality » (Industry Representative)

«**We lost the fresh market**» (Purse Seiner, Pelagic Trawler)

Fisheries management & Decision-making process





Some management measures on access regulation that have hindered fishers' adaptation

« The calculation of **anteriorities based on 2001-2003** has completely blocked us, and is a barrier to enter a new fishery » (Pelagic Trawler)

« the management is done at the European level and we (with the Spanish) are not going to the same direction. Even today it's **not going at the same speed** » (Port manager)



Opportunities

« Fortunately, the PO has done a good job and has made sure that boats are not stuck on a single species » (Pelagic Trawler)

« The only good thing about this crisis is that we were too monospecific; we **learned from our mistakes** and now we try to **be on several species** » (Pelagic Trawler)

« The crisis has served to improve management; now fishing is **more responsible** » (Purse Seiner)

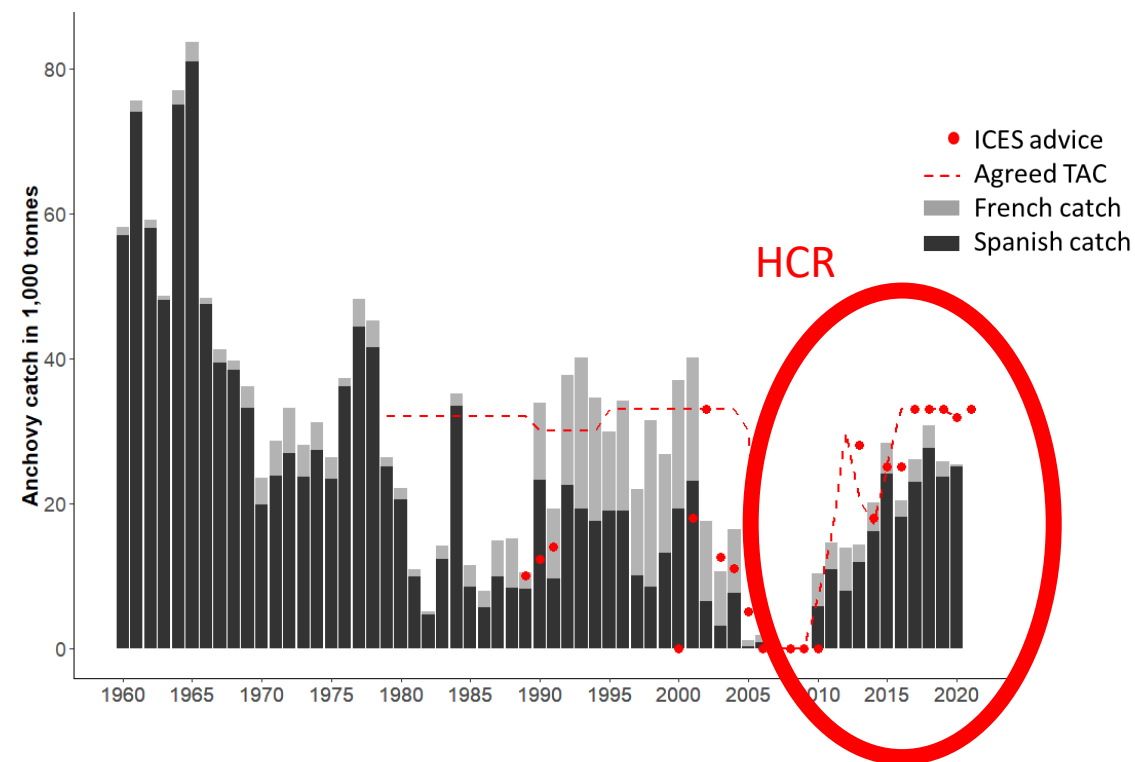


Relationships between actors have improved and have led to a better integration of science?

« Relationships between French and Spanish actors have improved » (PS)

« Now the administration considers much more scientists' opinions, which is good... but not fishers' opinions » (Ind. Representative)

« We discussed much more today with scientists. I think it is important that there is good relations between fishers and scientists » (PT)



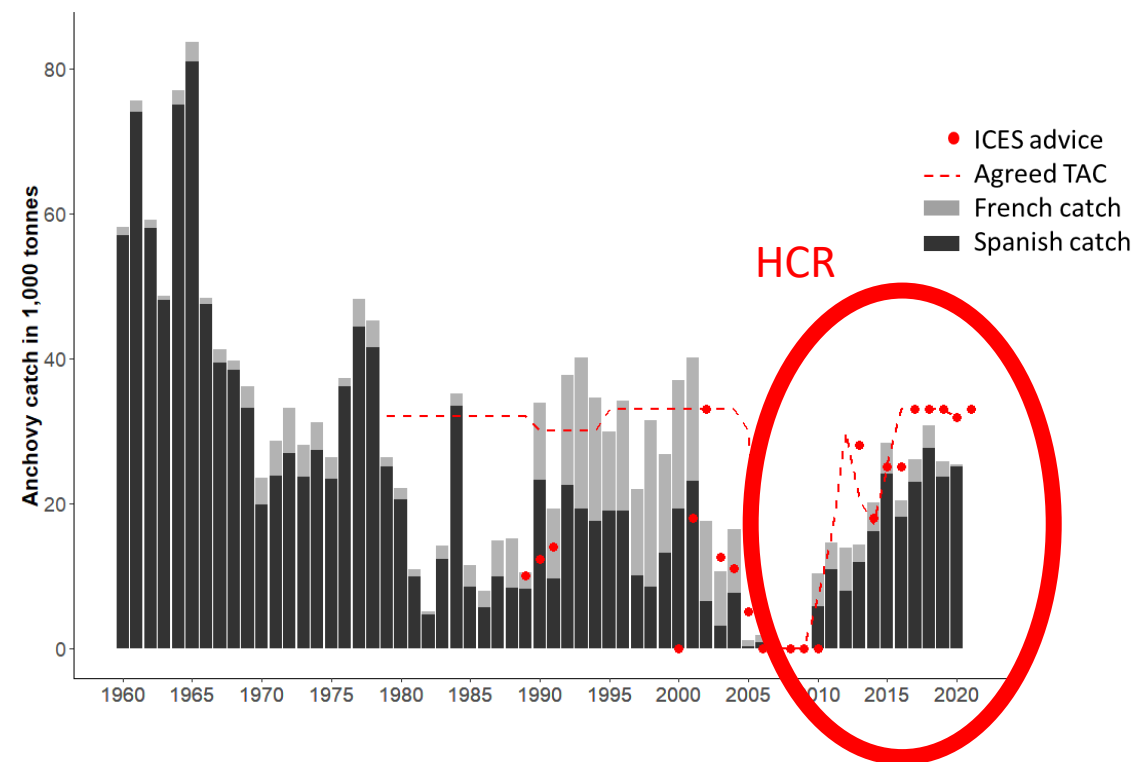


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→ Less fleet competition + higher biomasses = less scientific disagreements?

Important variability of perceptions about the moratorium among actors

AGREE



DISAGREE



From 40 interviewees:

- 60% of Spanish agreed with it
- 62% agreed from purse seiners

➤ No trend among scientists

- **100%** of pelagic trawlers disagreed with it
- 75% disagreed among industry representatives

*“It was necessary b/c they [pelagic fleet] were fishing in spawning areas. Now, the anchovy had **recovered**” (PS)*

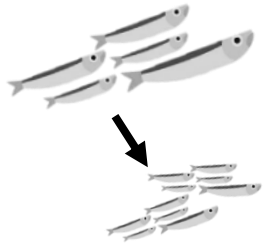
*“we **lost the market, then the boats and then the sailors**” (PS)*

*“It was a necessary closure which has **served as a lesson** for the management approach” (Ind. Representative)*

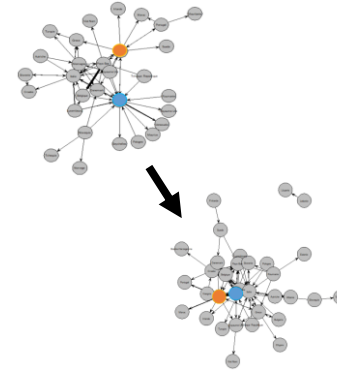
*“They close everything but they don't think about **fishing effort displacement**” (PT)*

*“The moratorium was an urgency, although **market was sacrificed**” (PS)*

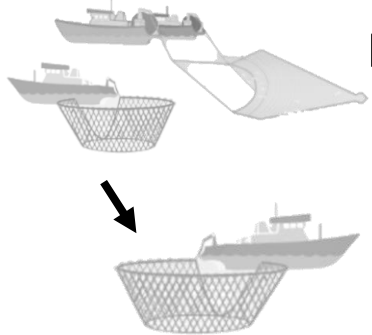
Concluding remarks



Resource has changed
Recovery of the anchovy stock
Smaller and/or mixed



Market has changed
Relocation of Spanish canneries
New imports sources
Loss of the market in France

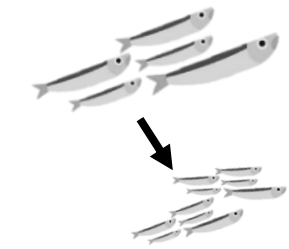


Fleet has changed
Downfall of the French pelagic trawlers
No more fleet competition
Spanish catch prevalence



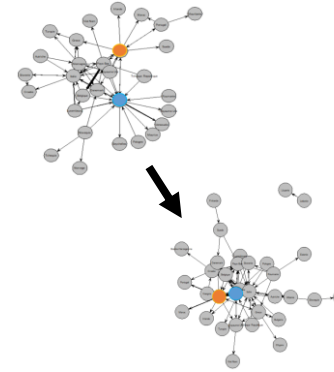
Rather adaptive management
Evolution of assessment methods
TACs that follow scientific advices
Implementation of temporary fishing interruption & financial compensation

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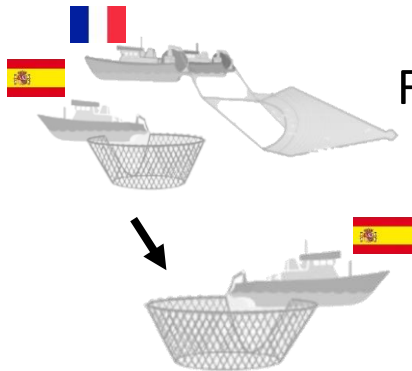
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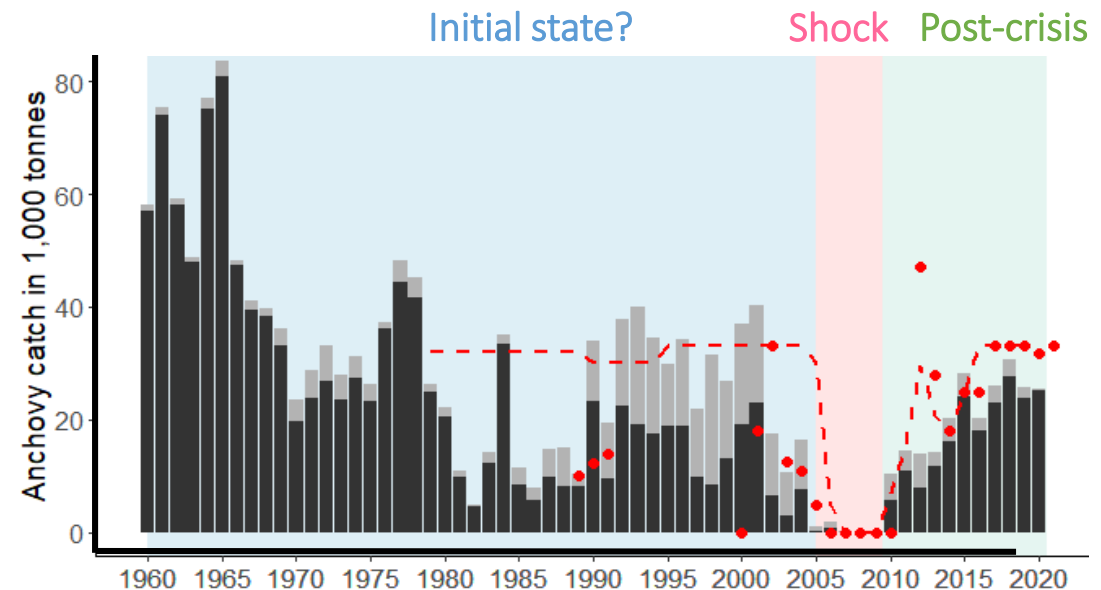
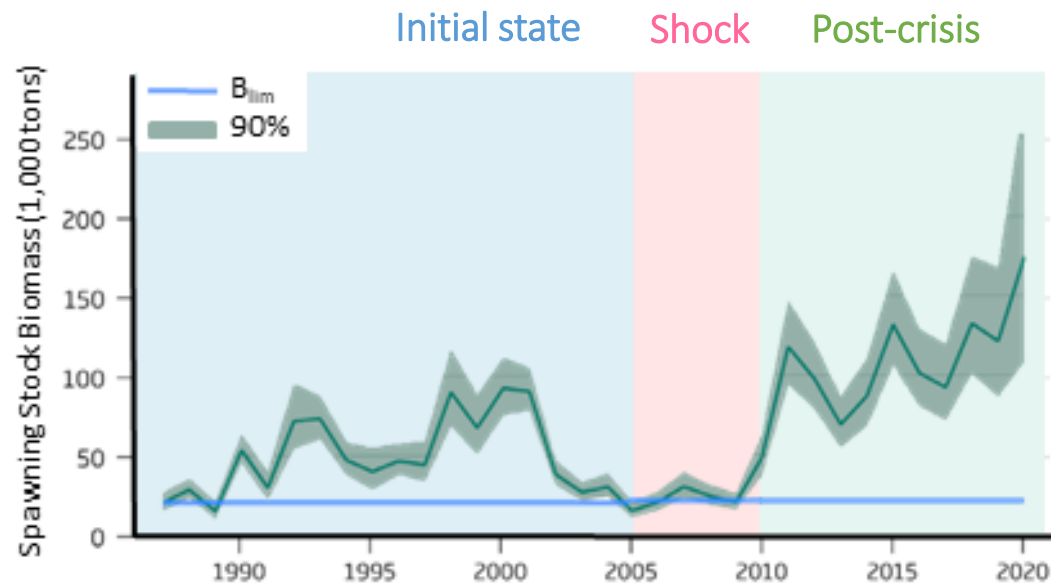


Rather adaptive management

Evolution of assessment methods
TACs that follow scientific advices
Implementation of temporary fishing interruption & financial compensation

➤ **Was this system resilient to the moratorium?**

SYSTEM BOUNDARIES?



➤ Was this system resilient to the moratorium?

It depends on whom is asked, as well as on the management objectives and their application scales

Achieving resilient system is complex

Importance of considering all its dimensions and defining its boundaries

Thank you for your attention
And don't hesitate to get in touch!

Beckensteiner J., Villasante S., Charles A., Petitgas P., Le Grand C., Thébaud O.

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