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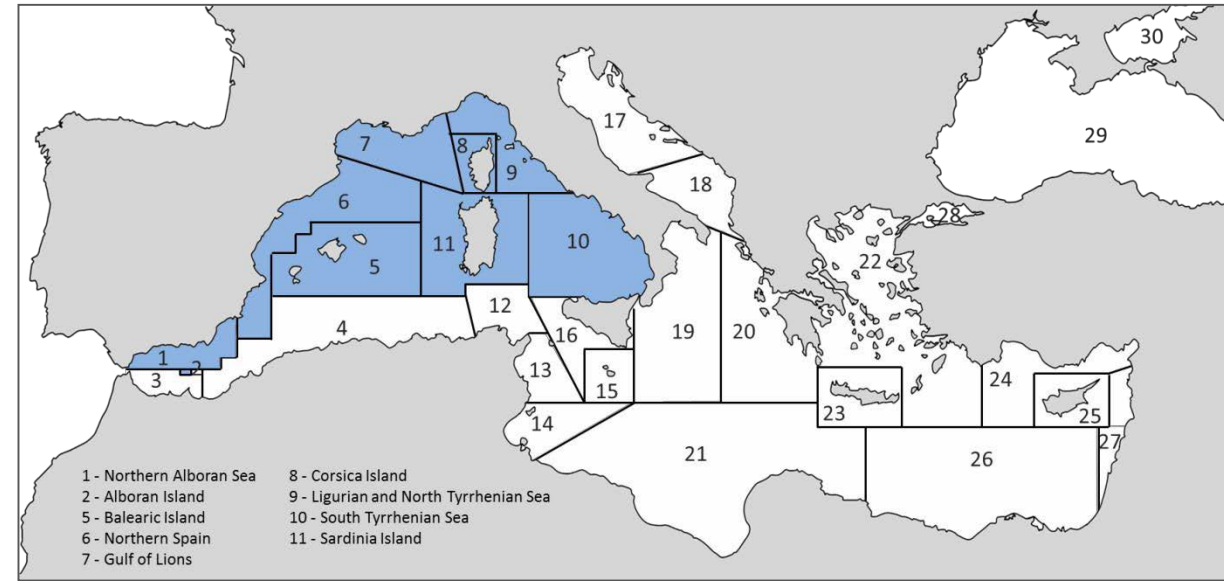
Scientific challenges and ways forward for fishing effort management regimes

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DTU Aqua, Denmark

*On behalf of
STECF EWG 18-09 (June) and EWG 18-13 (October)
<https://stecf.jrc.ec.europa.eu/ewg1809>
<https://stecf.jrc.ec.europa.eu/ewg1813>*

Background

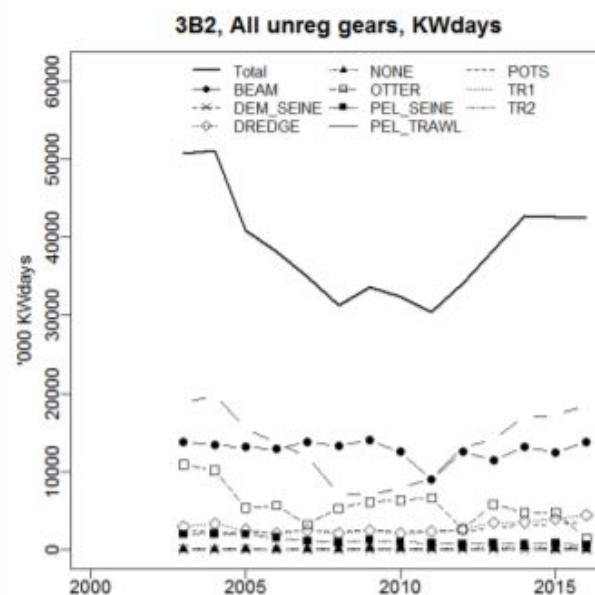
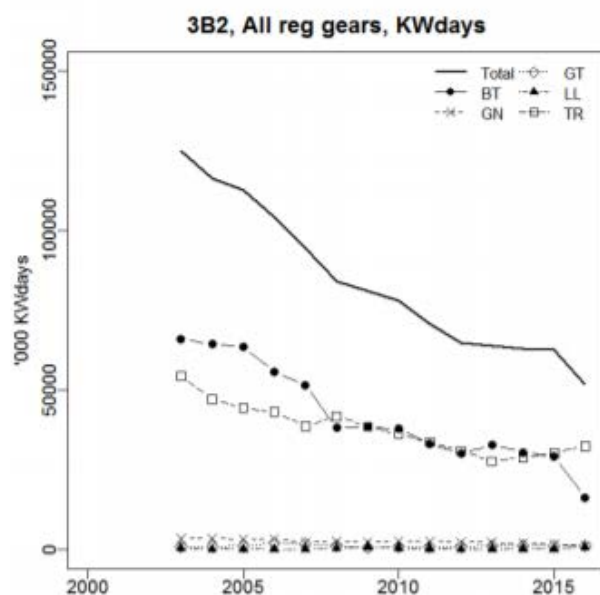
- March 2018: EU Commission proposal for a Multiannual plan for the fisheries exploiting demersal stocks in the western Mediterranean Sea
- Effort management rather than quota management



- STECF analyses of the scientific challenges

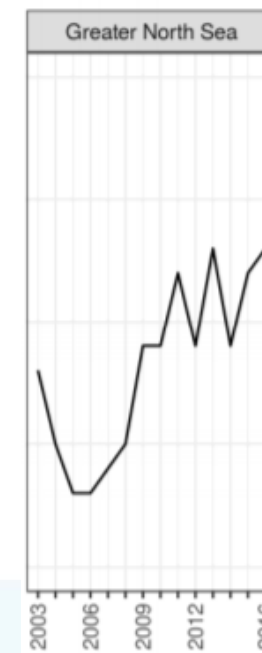
Effort regimes in the world – what have they taught us?

- ❖ Faroes Islands: Pure effort regime since 1998... system not limiting, overfishing. Will re-introduce TACs in 2019
- ❖ Queensland, Australia: Tradable effort units since 2001... Complex system with conversion rules. has re-introduced harvest limits in 2016
- ❖ EU effort regimes in the Baltic and Atlantic: effort limitations set in addition to TACs, either as fast reductions (-10% per year) or indexed on F reduction...



<- Effort trends in the North Sea
(*STECF 17-09, FDI database*)

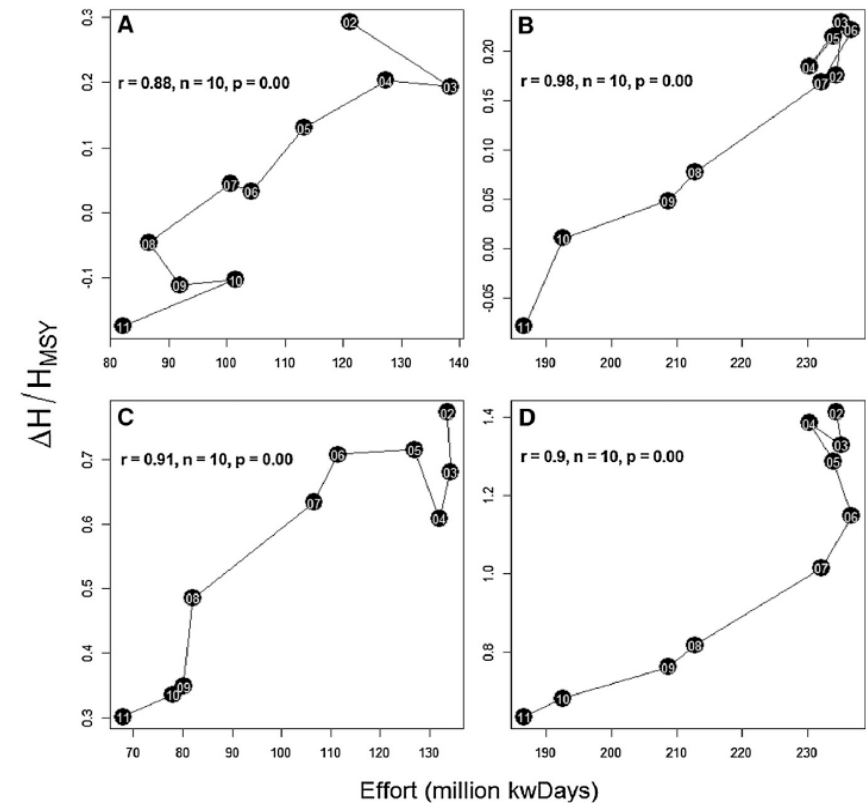
Nbr of stocks where $F \leq F_{msy}$ ->
(*STECF 18-01, CFP monitoring*)



Effort regimes in the world – what have they taught us?

- ❖ *Monitoring and control: Is it really easier to measure effort than catches?*
- ❖ *Measure and definition of nominal effort: Hours, days, kWdays?*
- ❖ *Relationship between nominal fishing effort and fishing mortality*
- ❖ *Effective fishing effort, targeting behavior and skipper effect*
- ❖ *Vessels move to less regulated segments*
- ❖ *Input substitution, technological creep and hyperstability*
- ❖ *Idle overcapacity (inactive and partly active vessels)*

- ❖ *Pros and cons of TAC vs TAE*
- ❖ *hybrid system best: limit effort and monitor that catches decrease*



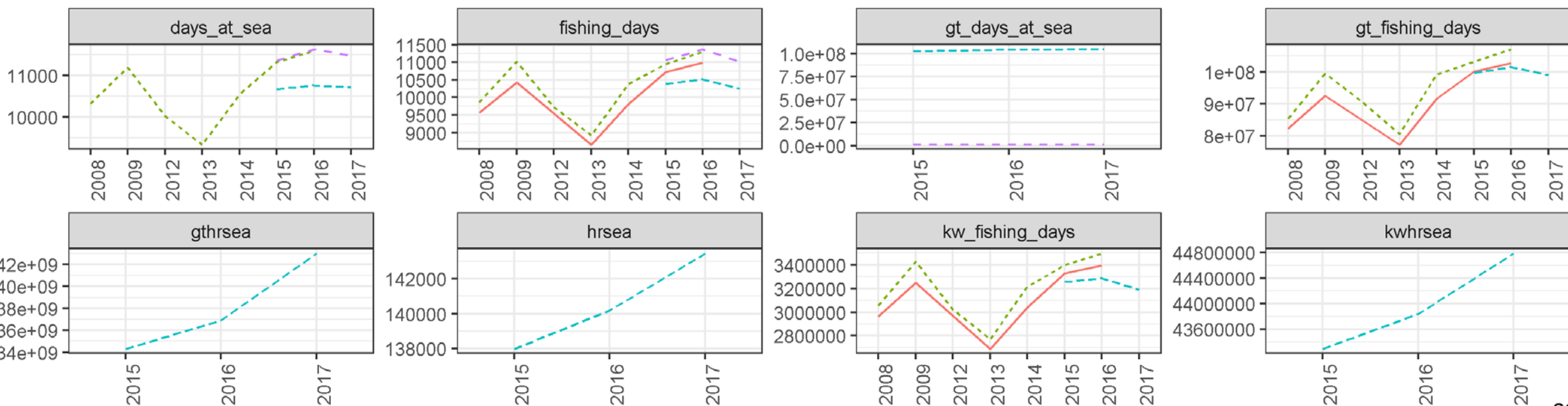
=> What are the implications for the Western Med?

F-E relationship for 4 types of stocks

Fernandes and Cook 2013, 10.1016/j.cub.2013.06.016

1) Which measure of fishing effort?

A good measure shall be measurable, controllable and reflect the true activity of the fleet

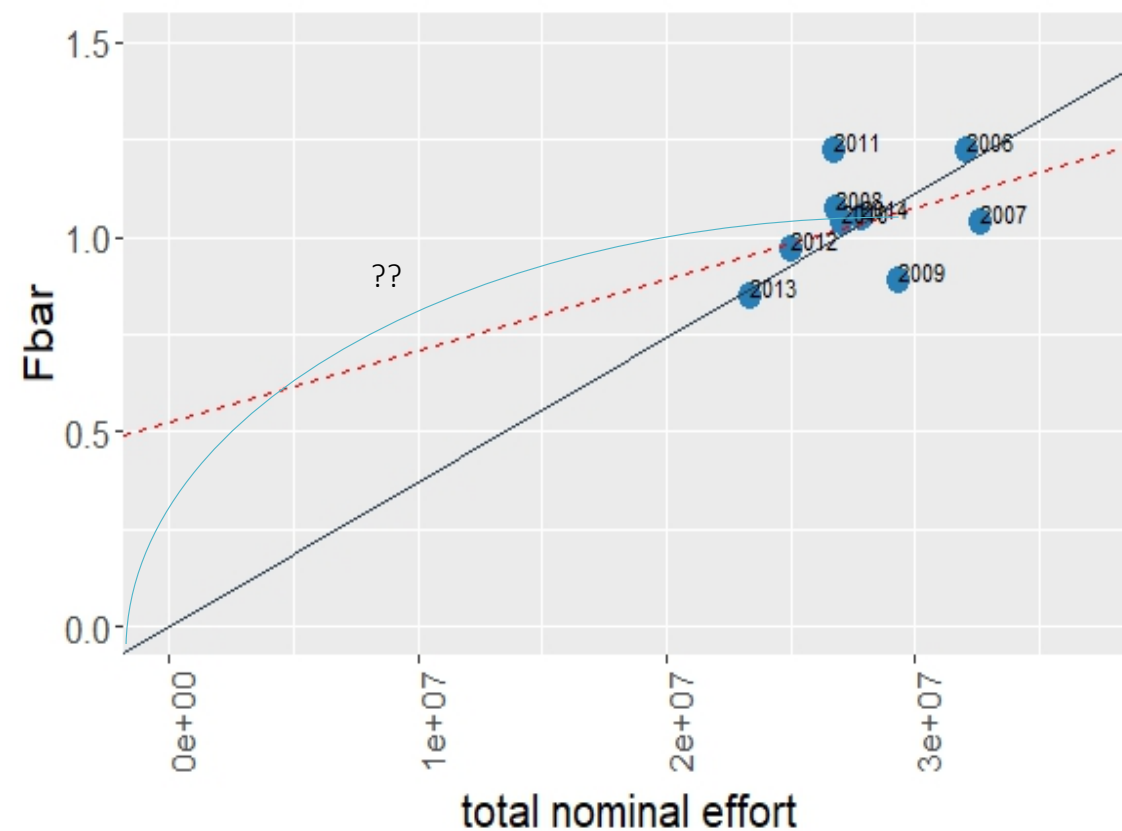
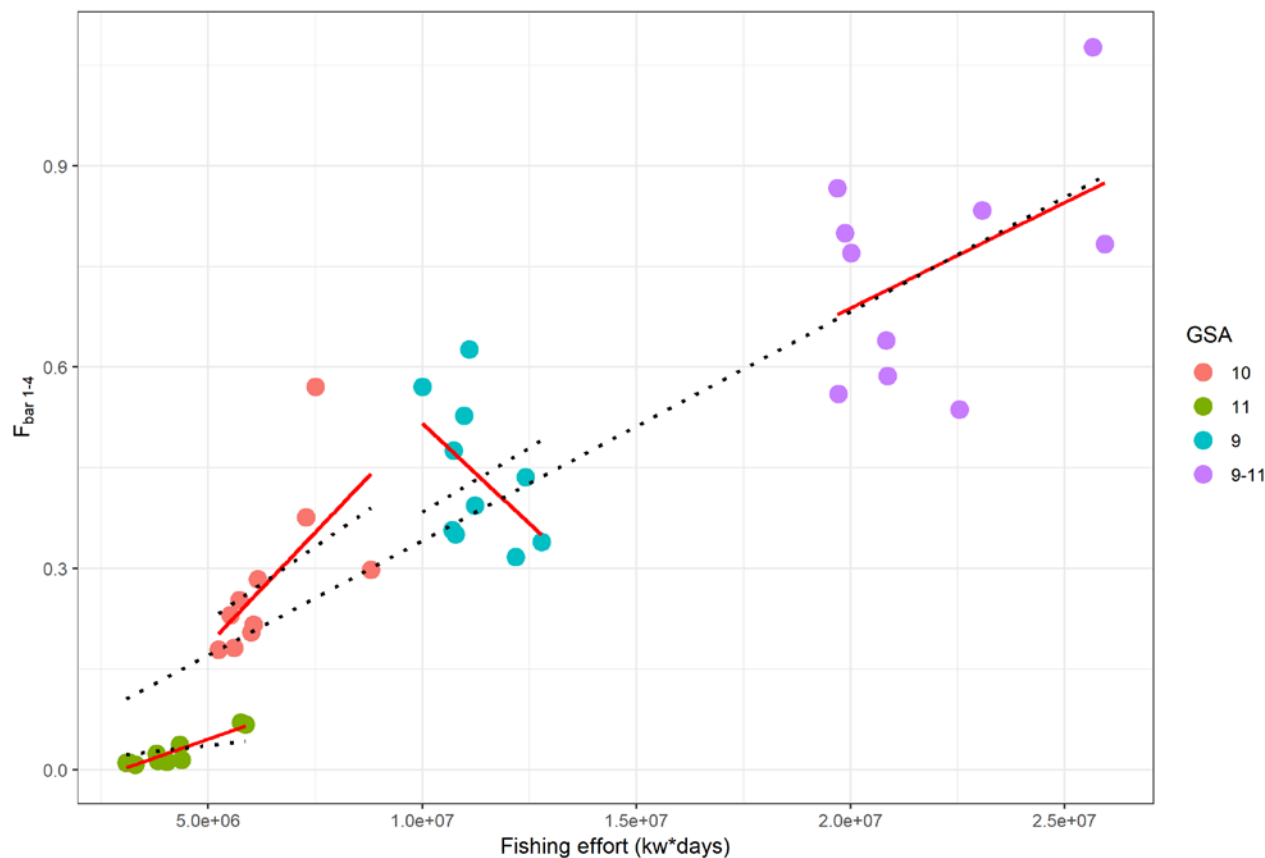


source

- AER
- AER2
- FDI
- MBS

2) Is fishing effort correlated with fishing mortality?

FISHING MORTALITY against EFFORT
DPS - GSAs 9-11 - OTB



total nominal effort and F_{bar} for hake in GSAs 9-10-11.

3) Do some fishers catch more than others with the same fishing effort, and why?

Length	Percentiles	TOTAL	<i>A. antennatus</i>	<i>N. norvegicus</i>	<i>P. longirostris</i>	<i>A. foliacea</i>	<i>M. merluccius</i>	<i>M. barbatus</i>
12 ≤ X ≤ 18	HR p0,50	1	1	1	1	1	1	1
	HR p0,85	4.1	2.0	2.5	3.8	3.5	2.5	3.0
18 ≤ X ≤ 24	HR p0,50	1	1	1	1	1	1	1
	HR p0,85	3.9	3.0	2.5	2.8	2.5	4.3	4.2
X ≥ 24	HR p0,50	1	1	1	1	1	1	1
	HR p0,85	3.0	2.3	2.8	2.2	2.7	4.3	3.2

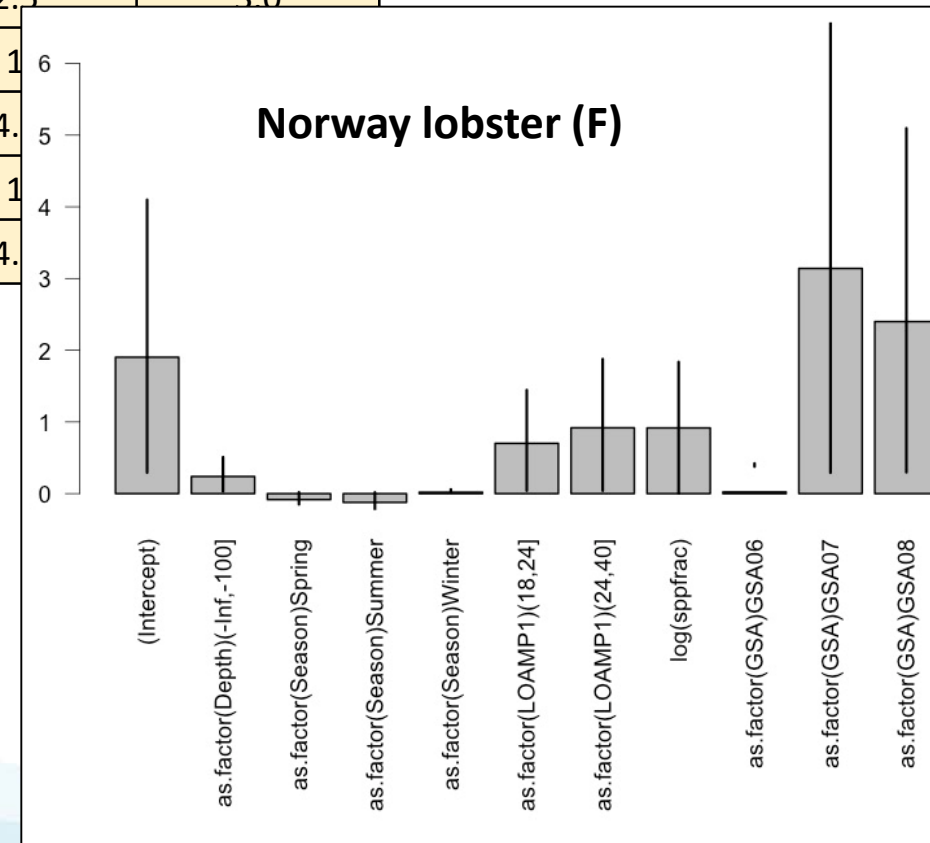
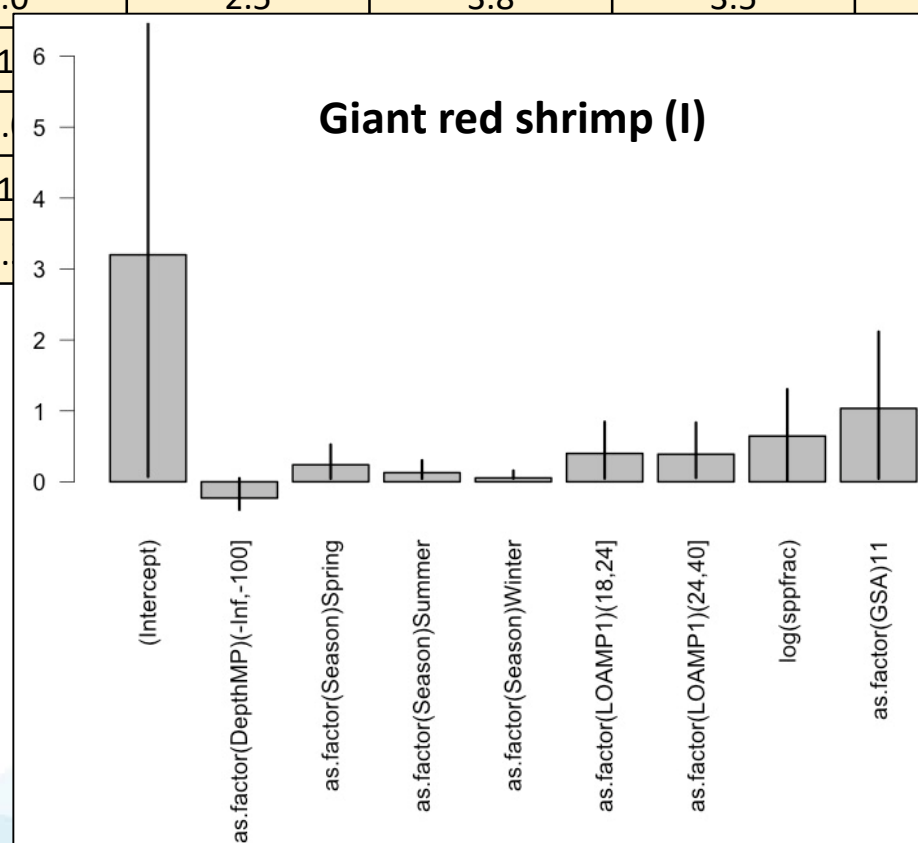
LPUE Quantiles : median trip vs. 85th quantile most efficient trip

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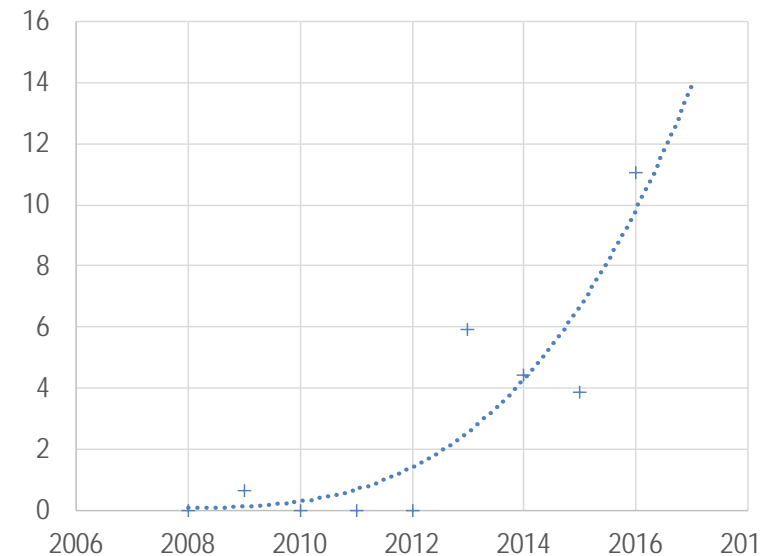
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	HR p0,85	3.0	2.	2.	2.	2.	2.	2.

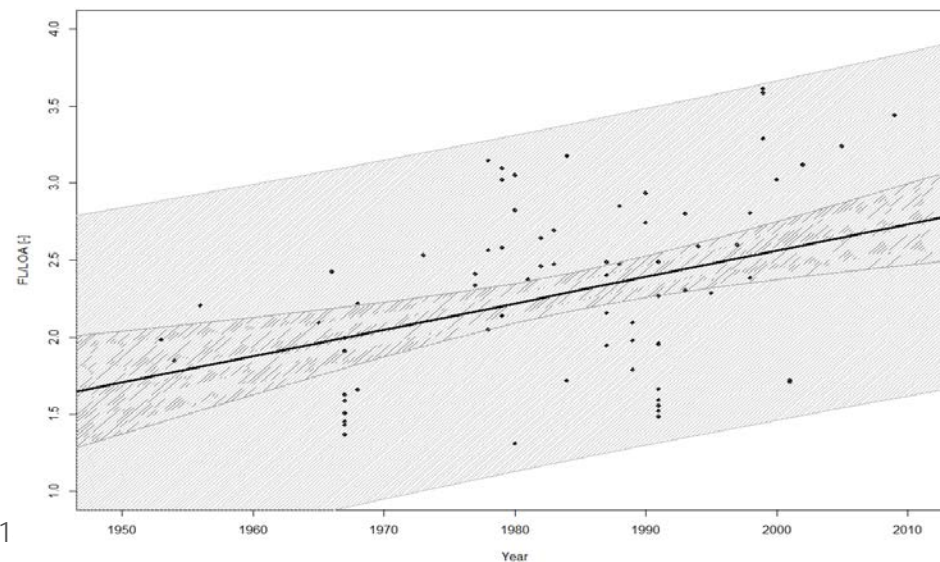
GAM models of LPUE



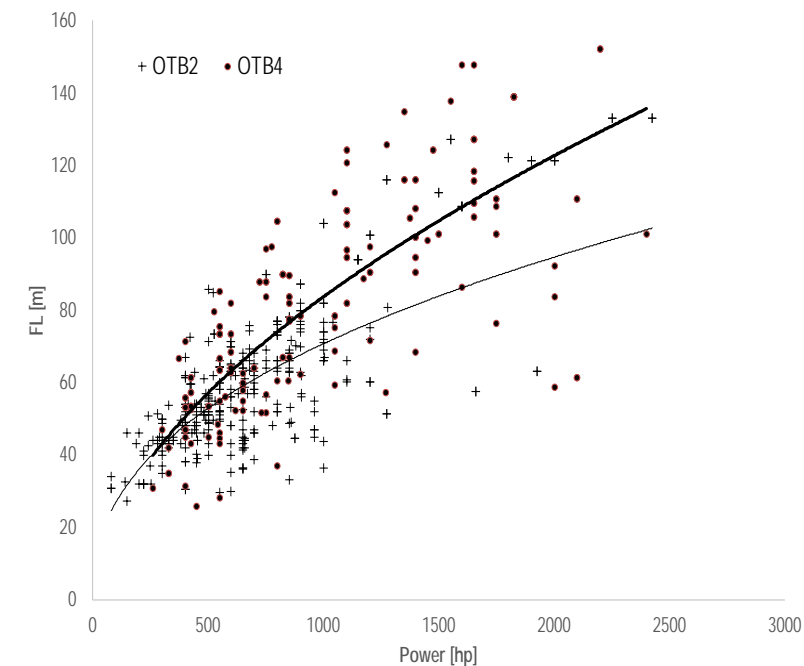
4) Can technical creeping annihilate the effects of effort reduction?



% twin trawl in trawl effort



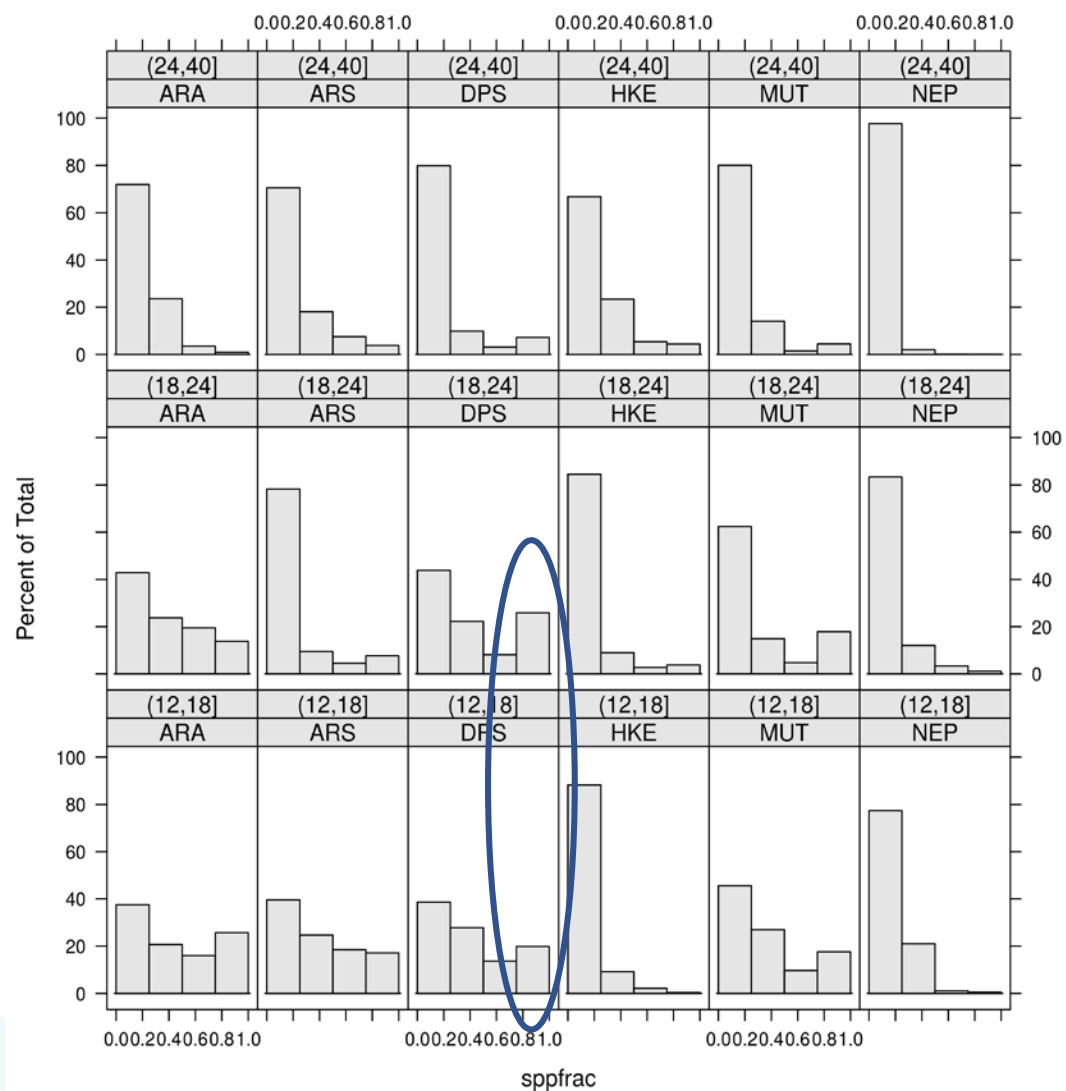
Increase in relative headline length (FL/FOA) and Otterboard area



Potential for shifting to more efficient gear with same horsepower

Fishing effort is a poor descriptor of the efficiency of the gear used

5) Is it possible to avoid the most overexploited stocks?



Specialisation of trips: percentage of trips having a given fraction of the species

Only few trips are highly specialised in one species. Most are mixed.

Conclusions: challenges and ways forward

- There are several ways to measure fishing effort. Hours (measured with VMS/AIS) is likely a better measure than days
- The relationship between F and E is likely less than 1:1 linear. Fishing mortality will decrease less than fishing effort, especially at the beginning
- There is a huge potential for technical creep and efficiency increase that will maintain high catches (and thus high F) if effort is decreased
- Effort management requires patience and long-term commitment... Visible effects will first be seen after a few years of implementation