SHARING KNOWLEDGE FOR SUSTAINABLE FIHSERIES

Mixed fisheries forecasts for Iberian stocks

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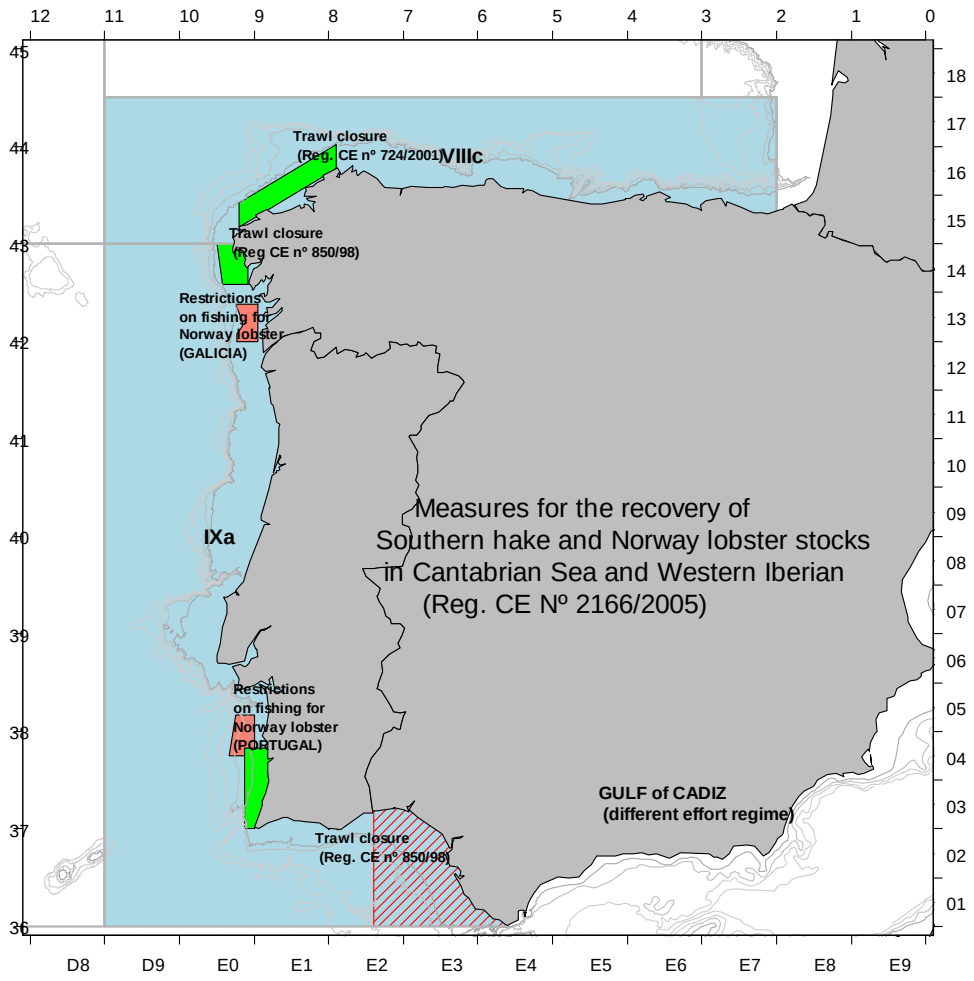
Iberian fishing resources in Atlantic waters



Scientific_name	FAO code
Engraulis encrasicolus	ANE
Scomber scombrus	MAC
Trachurus trachurus	HOM
Octopus vulgaris	OCC
Merluccius merluccius	HKE
Sardina pilchardus	PIL
Scomber japonicus	MAS
Parapenaeus longirostris	DPS
Micromesistius poutassou	WHB
Sepia officinalis	CTC
Conger conger	COE
Lophius piscatorius	MON
Solea solea	SOL
Lepidorhombus spp	LEZ
Brama brama	POA
Lophius budegassa	ANK
Penaeus kerathurus	TGS
Loligo spp	SQC
Diplodus sargus	SWA
Dicologlossa cuneata	CET
Palaemon serratus	CPR
Dicentrarchus labrax	BSS
Necora puber	LIO
Nephrops norvegicus	NEP
Trisopterus luscus	BIB

Mixed fisheries forecast method used by ICES

Fcube method: a multi-stock deterministic forecast prediction method applied to the North Sea single species advice for demersal fish and *Nephrops* since 2010 (WGMIXFISH).

Fcube requirements:

- Population parameters by stock: N, F, M, weight and maturity ogive.
- Commercial data disaggregated by métier and fleet segment (in order to better parameterize technical interactions). Theoretically, available since DCF application (2009). In practice, not.
- Management objectives: CFP TAC regime, management plans…

Iberian stocks with ICES advice

FAO	Stock	Area	Assessment	Reference points
ANK	Black anglerfish southern stock	VIIIc-IXa	Analytical (ASPIC)	Relative value
HKE	Hake southern stock	VIIIc-IXa	Analytical (GADGET)	F_{MSY} = 0.24
HOM	Horse mackerel western stock	II-VIII	Analytical (ADAPT)	F_{MSY}=0.13
	Horse mackerel southern stock	IXa	Analytical (AMISH)	(F_{MSY} proposal= 0.11)
LDB	Four-spot megrim	VIIIc-IXa	Analytical (XSA)	F_{MSY}=0.18
MAC	Mackerel	I-IX	Analytical (ICA)	F_{MSY} = 0.22
MEG	Megrim southern stock	VIIIc-IXa	Analytical (XSA)	F_{MSY}=0.17
MON	White anglerfish southern stock	VIIIc-IXa	Analytical (SS3)	F_{MSY} = 0.19
NEP	*Nephrops* FU25	VIIIc	Qualitative	NO
	Nephrops FU26/27	IXa	Qualitative	NO
	Nephrops FU28/29	IXa	Qualitative	NO
	Nephrops FU30	IXa	Qualitative	NO
	Nephrops FU31	VIIIc	Qualitative	NO
WHB	Blue whiting (WHB)	I-XIV	Analytical (SAM)	F_{MSY} = 0.18

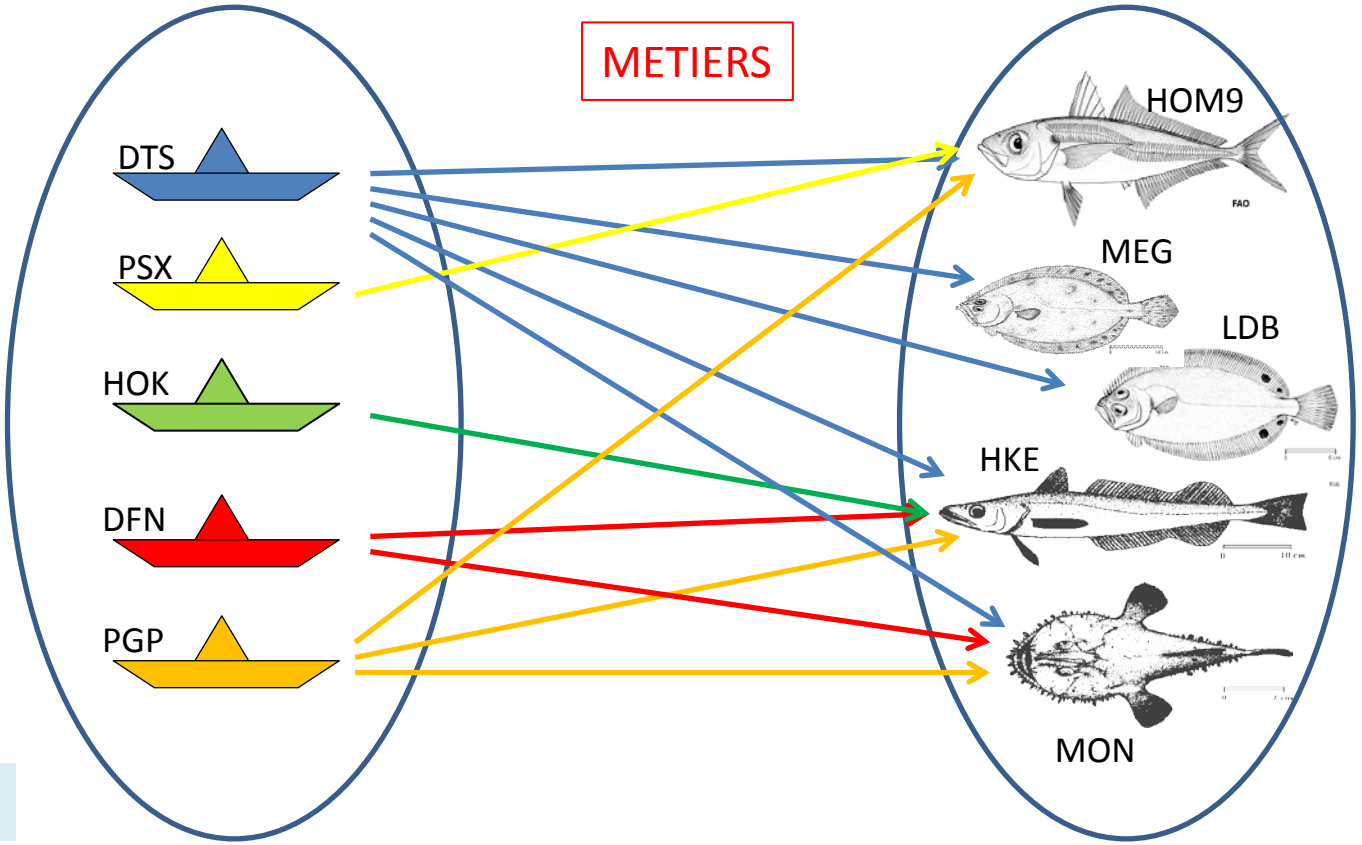
Atlantic Iberian métiers

Métiers fishing the 5 stocks selected (13):

Métier DCF	Definition	ES	PT
GNS_DEF_60-79_0_0	Set gillnet directed to demersal fish (60-79 mm)	X	
GNS_DEF_80-99_0_0	Set gillnet directed to demersal fish (80-99 mm)	X	
GNS_DEF_>=100_0_0	Set gillnet directed to demersal fish (at least 100 mm)	X	
GTR_DEF_60-79_0_0	Trammel net directed to demersal fish (60-79 mm)	X	
LHM_DEF_0_0_0	Hand line directed to demersal fish	X	
LLS_DEF_0_0_0	Set longline directed to demersal fish	X	
MIX_polyvalent	Selection of the Portuguese polyvalent fleet with catches from the stocks included in the analysis		X
OTB_CRU_>=55_0_0	Bottom otter trawl directed to crustaceans (at least 55 mm)		X
OTB_DEF_>=55_0_0	Bottom otter trawl directed to demersal fish (at least 55 mm)	X	X
OTB_MCD_>=55_0_0	Bottom otter trawl directed to crustaceans and demersal fish (at least 55 mm)	X	
OTB_MPD_>=55_0_0	Bottom otter trawl directed to pelagic and demersal fish (> 55 mm)	X	
PS_SPF_0_0_0	Purse seine directed to small pelagic fish	X	X
PTB_ MPD _>=55_0_0	Pair bottom trawl directed to pelagic and demersal fish (> 55 mm)	X	

Data compiled under the GEPETO project

Parameterization of technical interactions



DFN: drift and/or fixed netters
DTS: demersal trawlers
HOK: vessels using hooks
PGP: polyvalent artisanal fleet
PSX: purse seiners

HKE: hake
HOM9: southern horse mackerel
LDB: four-spot megrim
MEG: megrim
MON: white anglerfish

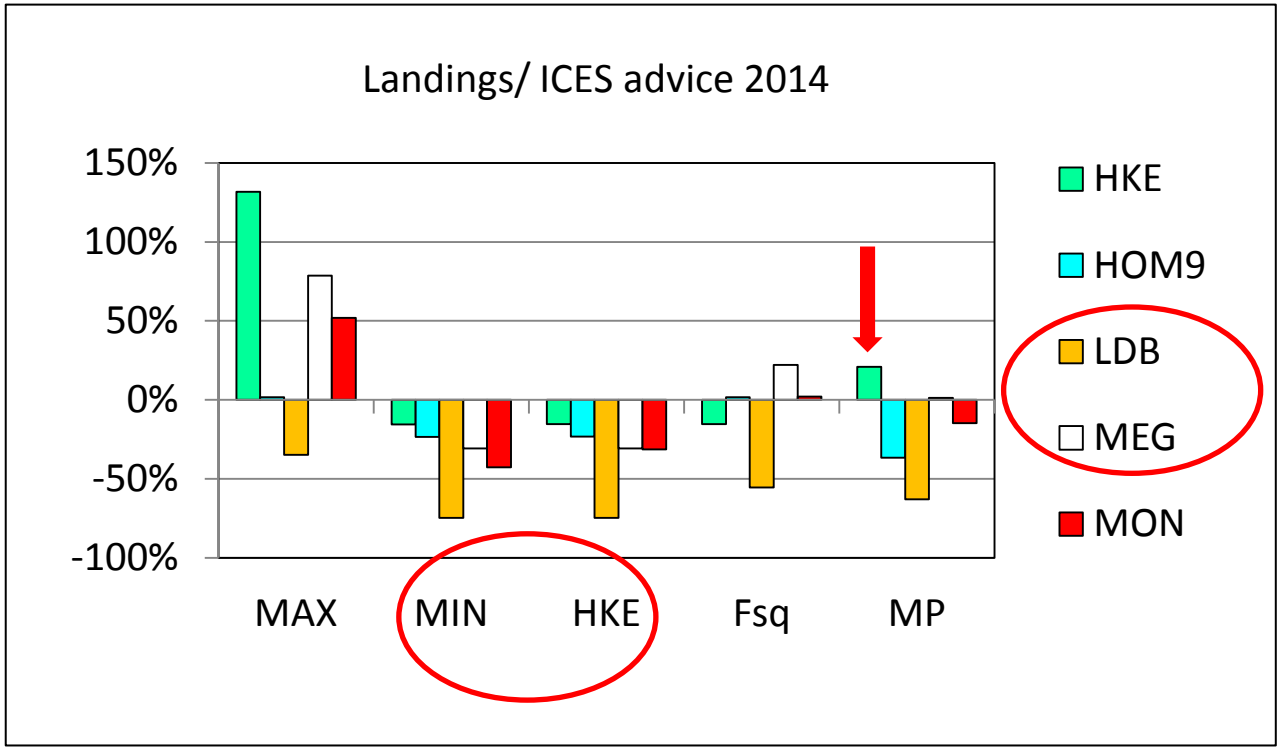
Management scenarios (WGMIXFISH 2013)

- **MAX**: fishing stops when all quota species are fully utilized achieving the highest single TAC).
- **MIN**: fishing stops when the catch for the lowest quota species is achieved.
- **HKE**: all fleets set their effort at the level corresponding to their hake quota share, regardless of other stocks.
- **Fsq**: effort was set as equal to the most recently recorded year (2012).
- **MP**: effort was adjusted according to the effort management regime currently implemented in Atlantic Iberian waters.

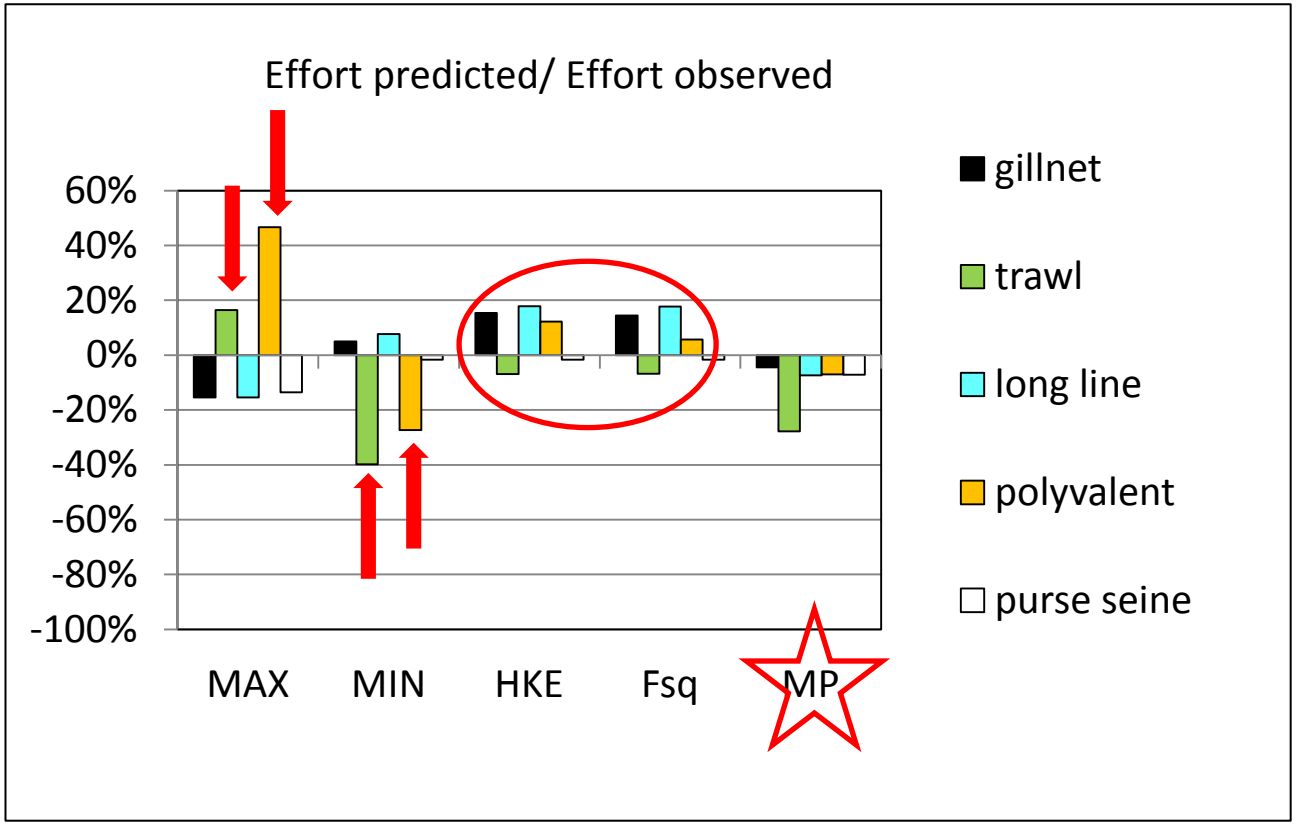
Results: reproduction of single-stock forecasts

Year		HKE	HOM9	LDB	MEG	MON
2013	test	17951	24452	1807	236	1232
	ICES	19640	24000	1807	236	1330
	% difference	-9.4	1.8	0.0	-0.1	-8.0
2014	test	11834	36772	1911	250	1291
	ICES	13123	35000	1957	300	1476
	% difference	-10.9	4.8	-2.4	-19.9	-14.3

Results: multi-TAC versus single-TAC



Results: Effort predicted vs. effort observed



MAIN CONCLUSIONS

Iberian mixed-fisheries forecast:

- Stocks:
  - Stocks assessed by length needs further revision: HKE and MON.
  - Inconsistencies between LDB and MEG results (could be mgw8c9a part of mgw78ab?)
- Fleets/Métiers:
  - Time-consuming compilation which can be improved with InterCatch.
- Method:
  - Fcube: shows the TAC-TAE relationships.
- Management:
  - Current MP must include other stocks and better match TAC and TAE measures.

NEXT STEPS

Next steps:

- To update the deterministic Fcube analysis with WGBIE2014 and WGHANSA2014 results (**WGMIXFISH2014**, next October).

- To investigate stochastic approaches: the data compiled by the GEPETO project were provided to MyFish project in order to apply the **FLBEIA** method.