



CopeMed II – ArtFiMed Meeting Document



SRWG on shared demersal resources ad hoc Scientific Working Group
between Morocco and Spain on *Pagellus bogaraveo* in the Gibraltar Strait area
Malaga (Spain), 22 July 2010

Spanish information about the red seabream (*Pagellus bogaraveo*) fishery in the Strait of Gibraltar Region

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Part I: Biology and Fishery



THE SPECIES

VORAZ: *Pagellus bogaraveo* (Brünnich, 1768)



Inshore waters above various types of bottom (rocks, sand, mud) to 400 m (Mediterranean) and 700 m (Atlantic); young near the coast, adults on the continental slope specially over muddy bottoms. Omnivorous, but feed mainly on crustaceans, mollusks, worms and small fish. Protandric hermaphrodites. Adults move towards the coast up to the edge of the continental shelf to spawn from January to June. Important foodfish: marketed mainly fresh.

Taxonomy:

Superclass GNATHOSTOMATA

Class ACTINOPTERYGII

Subclass NEOPTERYGII

Division TELEOSTEI

Subdivision EUTELOSTEI

Superorder ACANTHOPTERYGII

Order PERCIFORMES

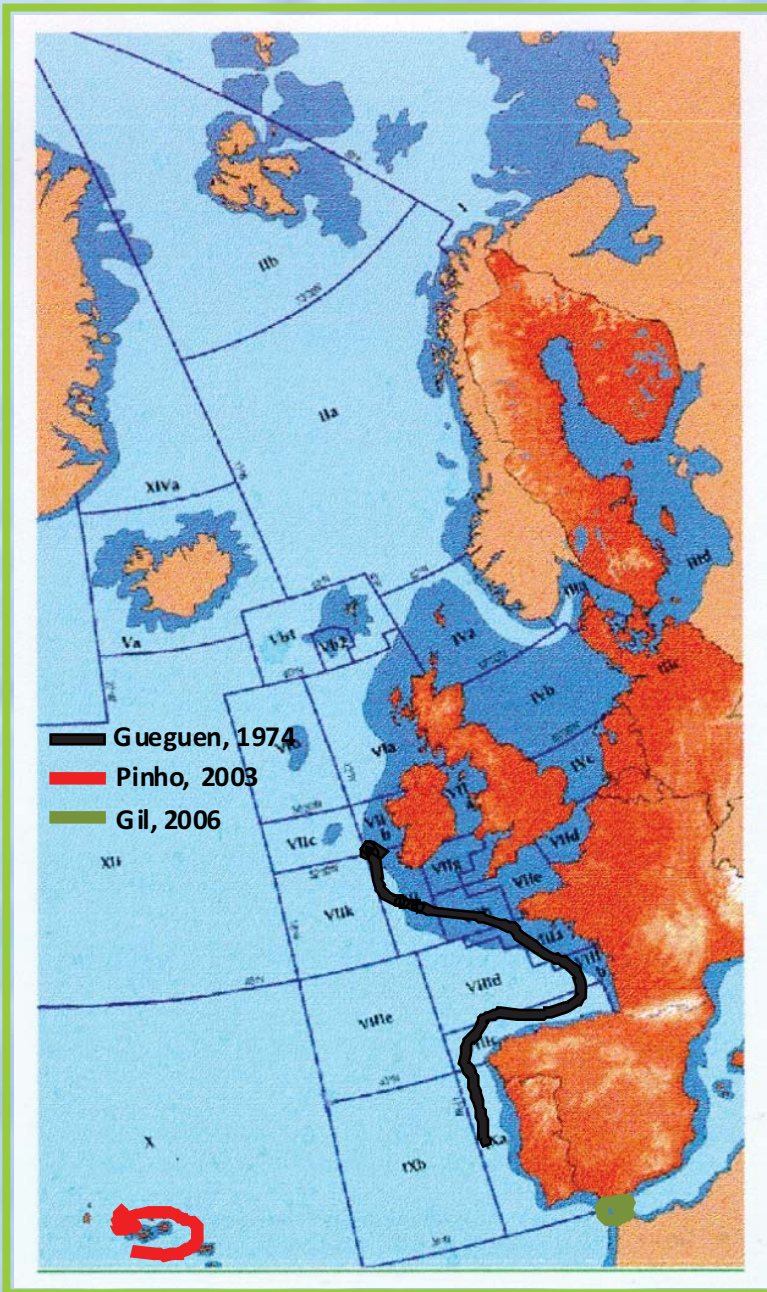
Family **SPARIDAE**

Genus *Pagellus* (Valenciennes, 1830)

Distribution: Eastern Atlantic (Norway, Strait of Gibraltar to Cape Blanc in Mauritania, Madeira, Canary Islands) and western Mediterranean (rare beyond the Sicilian Strait).

Pagellus
2006

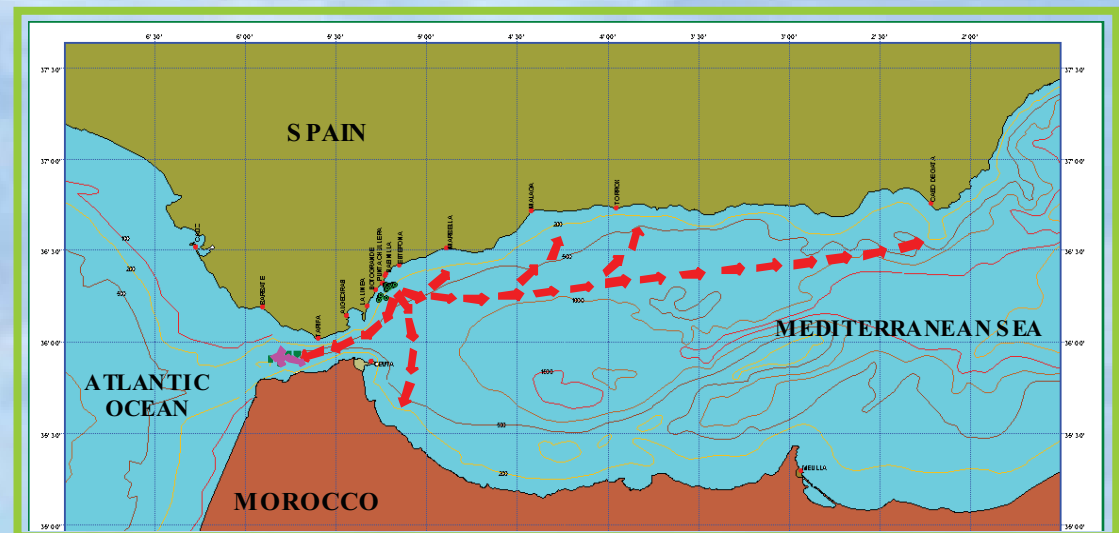
ITS BIOLOGY



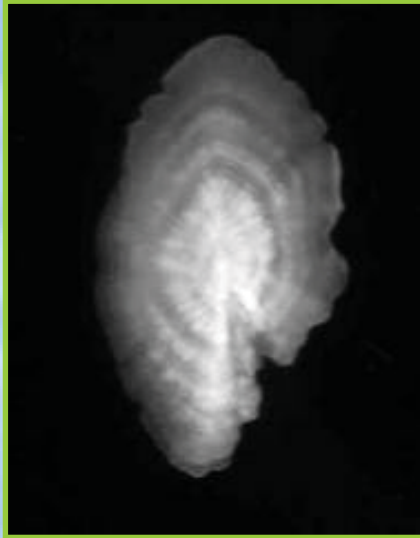
□ Stock identity:

- Tagging programmes
- Genetic
- Viral studies

ICES considered three different components for this species: a) areas VI, VII, and VIII; b) area IX (where the case study fishery take place) and c) area X. This separation does not pre-suppose that there are three different stocks of red (blackspot) seabream, but it offers a better way of recording the available information (ICES WGDEEP Report 2008).



ITS BIOLOGY



□ Growth:

- Otoliths reading
- Tagging programmes (recaptures)

Red seabream is considered a slow growing species. Gueguen (1969) reported a maximum age of 20 years. In the Azores Islands a maximum age of 15 years was observed in a 56 cm length fish (Krug, 1994).

In the Strait of Gibraltar VBGF parameters were also estimated from the increasing size of 271 recaptures.

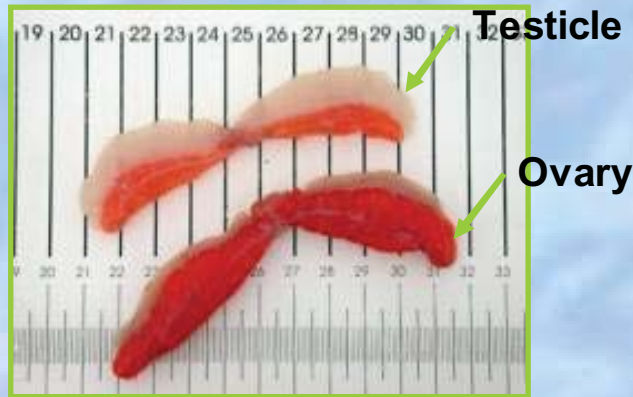


ITS BIOLOGY

Author	Study Area	Methodology	t0	k	L _∞	Phi (φ')
Ramos, 1967	Cantabrian Sea	Otoliths reading	-1.02	0.127	53.86	2.57
Gueguen, 1969	Cantabrian Sea	Otoliths reading	-2.92	0.092	56.80	2.47
Sánchez, 1983	Cantabrian Sea	Otoliths reading	-0.53	0.209	51.56	2.74
Krug (1982-1985), 1994	Azores Islands	Otoliths reading	-0.91	0.118	58.89	2.61
Krug (1987-1991), 1994	Azores Islands	Otoliths reading	-0.39	0.121	64.18	2.70
Menezes <i>et al.</i> , 2001	Azores Islands	Otoliths reading	-1.08	0.135	56.67	2.64
Pinho, 2003	Azores Islands	Otoliths reading	-1.29	0.102	62.24	2.60
Sobrino and Gil, 2001	Strait of Gibraltar	Otoliths reading	-0.67	0.169	58.00*	2.75
Gil <i>et al.</i> , 2008	Strait of Gibraltar	Otoliths reading	-1.23	0.169	62.00*	2.77
Gil <i>et al.</i> , 2009	Strait of Gibraltar	Otoliths reading	-0.34	0.162	62.00*	2.79
Gil <i>et al.</i> , 2008	Strait of Gibraltar	Recaptures ⁽¹⁾		0.079	62.00*	2.48
Gil <i>et al.</i> , 2008	Strait of Gibraltar	Recaptures ⁽²⁾		0.098	62.00*	2.58
Gil <i>et al.</i> , 2008	Strait of Gibraltar	Recaptures ⁽³⁾		0.161	62.00*	2.79
Gil <i>et al.</i> , 2008	Strait of Gibraltar	Recaptures ⁽⁴⁾		0.080	62.00*	2.49
⁽¹⁾ Gulland y Holt, 1959 ⁽²⁾ Munro, 1982 ⁽³⁾ Fabens, 1965 ⁽⁴⁾ Appeldoorn, 1987						
*Fixed (from the largest observed sample)						

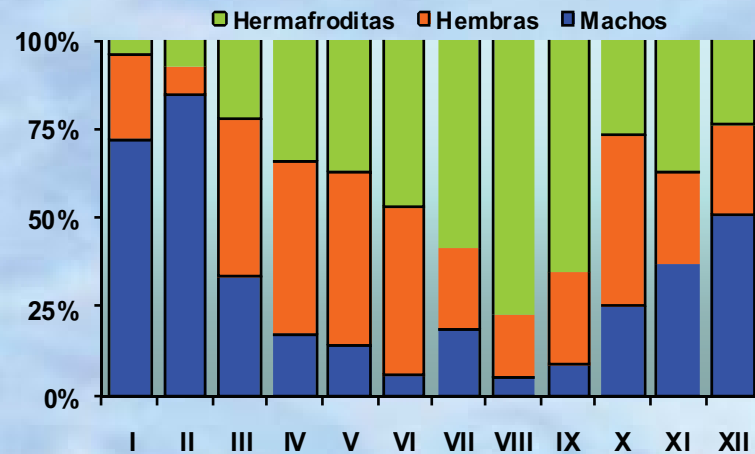
Similar growth patterns can be assumed for the red seabream in all the areas. This assumption does not denote a single stock: growth patterns are similar but not the same!

ITS BIOLOGY



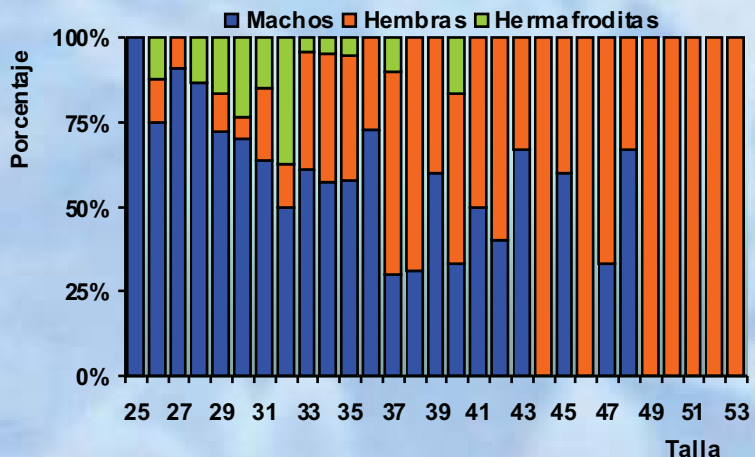
□ Reproduction:

- Hermaphroditism
- Spawning season
- Length at first maturity



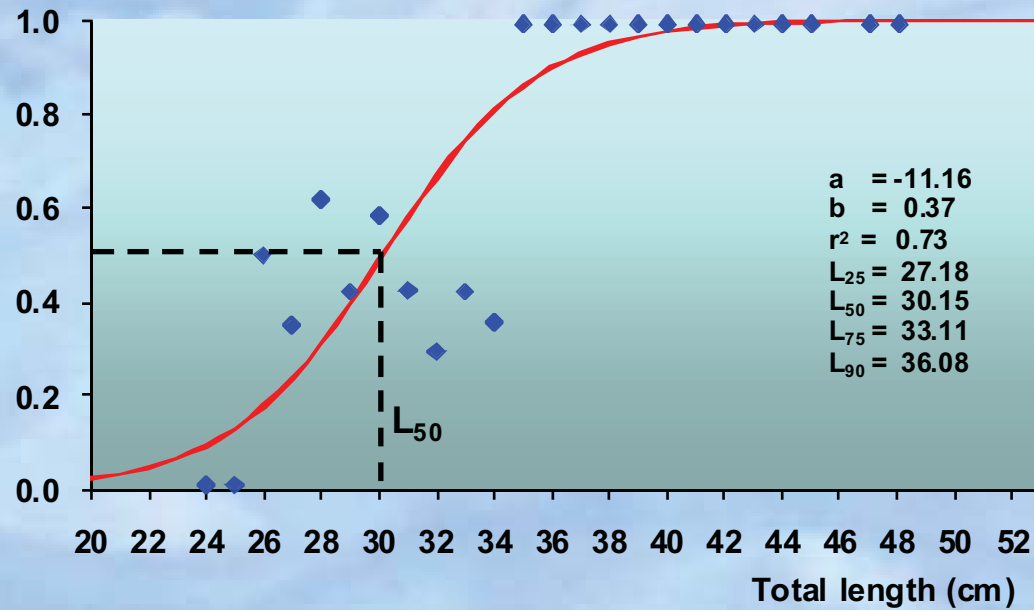
The smallest specimens are mainly males, then an important part of individuals change their sex and become females.

Spawning seems to take place in the Strait of Gibraltar area, where the fishery is carried out. The spawning season in the Strait of Gibraltar seems to take place during the first quarter of the year (Gil, 2006). The period coincides with those obtained by Krug (1994) for the Azores Islands and from previous studies in the Cantabrian Sea by Sanchez (1983), Alcaraz *et al.* (1987) and Castro (1990).

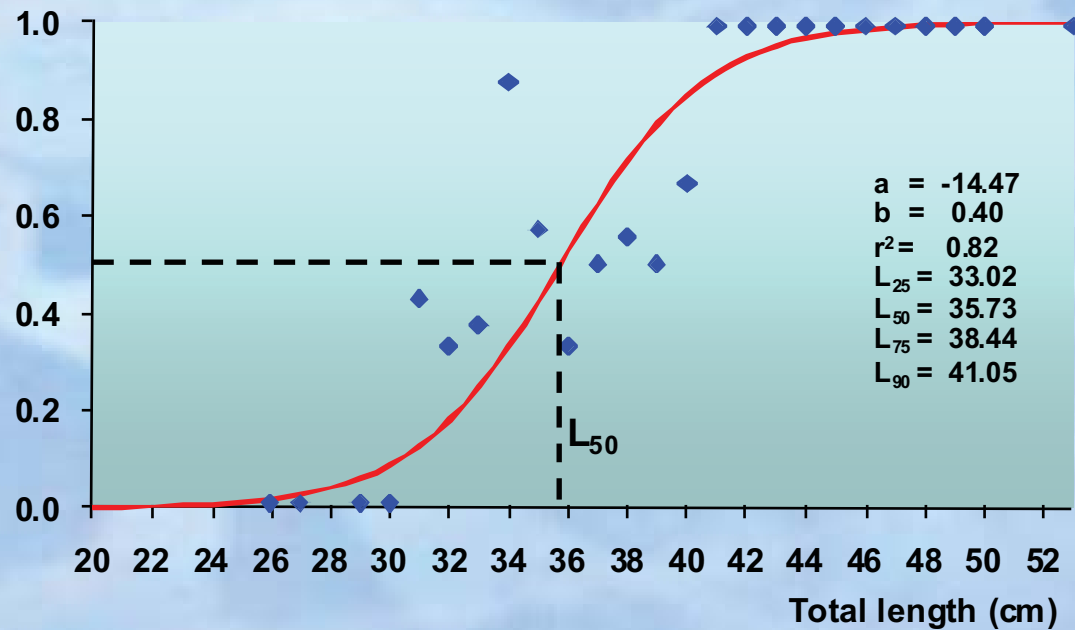


ITS BIOLOGY

Length at first maturity estimates (Gil and Sobrino, 2001)



Males

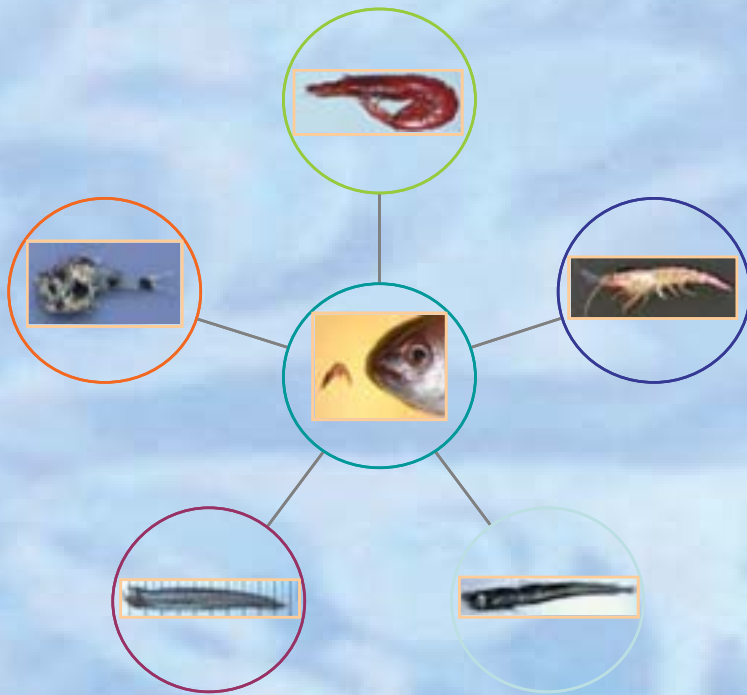


Females



□ Feeding:

- Study difficulties (bait!)
- Main preys
- Predators (without taking humans into account!)

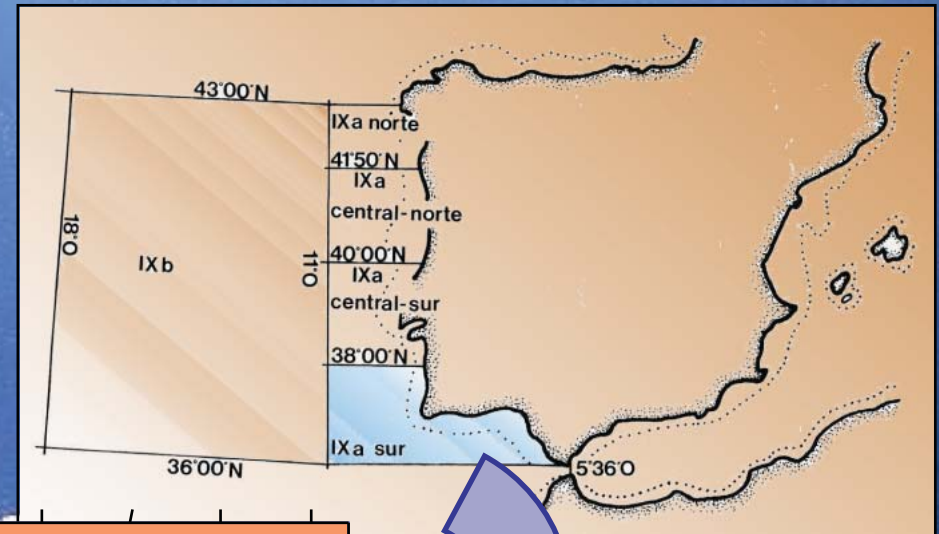


Not too much studies. The overall diet is not very diverse, mainly composed by *Sergia robusta* as main prey while the order teleosts Stomiiformes can be considered as a secondary prey. Other appearing species are *Lampanyctus crocodiles*, *Lophogaster typicus*, *Argyropelecus hemigymnus* and *Chauliodus sloani* (Polonio et al., 2008).

Main predators are unknown in the Strait of Gibraltar waters but maybe dolphins' predation should be taken into account (personal communication from Ceuta veterinary). Studies in Azores (Gomes et al., 1998) cite that *Conger conger*, *Raja clavata* and *Galeorhinus galeus* should be considered as potential predators (all three species are present in Strait of Gibraltar area).

STUDY AREA

- Strait of Gibraltar: Artisanal longline fishery targeted red seabream has been developed along the Strait of Gibraltar area. Actually the Spanish fishery covers almost the 70 % of the landings for the species in the Subarea IX.



STRAIT OF GIBRALTAR SPANISH RSB FISHERY (AND MARKETING)



“Voracera” fleet

- ▣ Artisanal
- ▣ ±100 boats

Main ports

- ▣ Tarifa
- ▣ Algeciras

Commercial cat.

- ▣ Burro
- ▣ Tamaño
- ▣ Mediano
- ▣ Pequeño

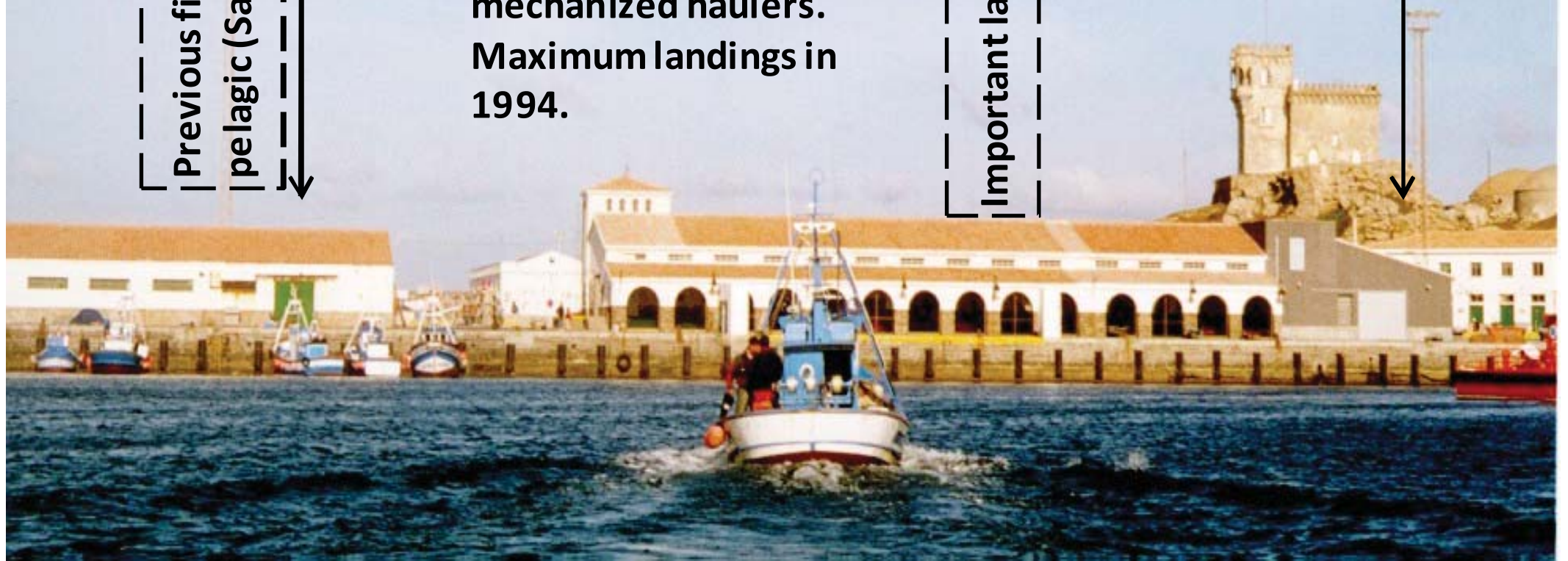
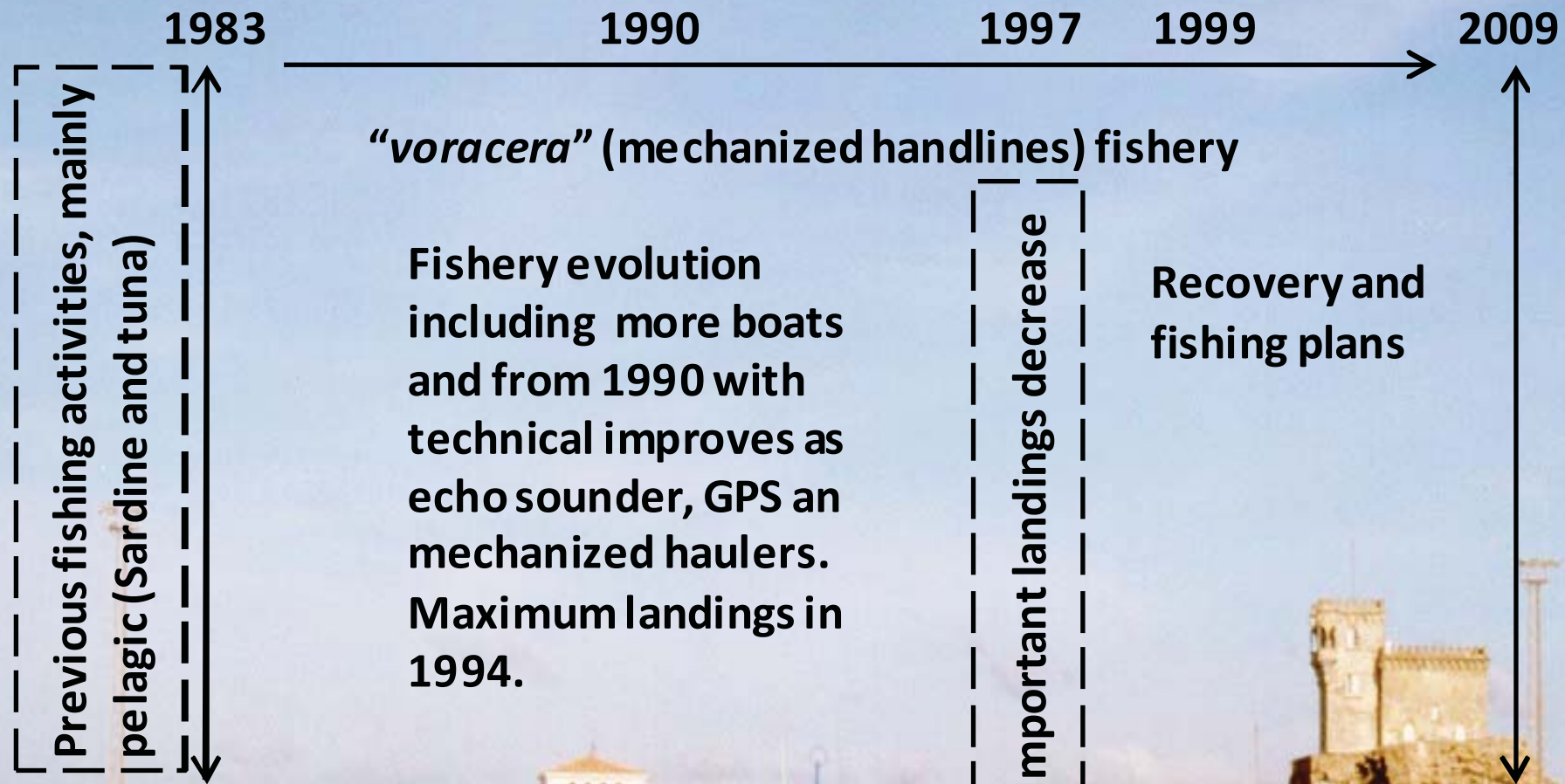
> 1.300 grs.

850 a 1.300 grs.

550 a 850 grs.

350 a 550 grs.

STRAIT OF GIBRALTAR SPANISH RSB FISHERY



STRAIT OF GIBRALTAR SPANISH RSB FISHERY

Spanish red seabream fishery in the Strait of Gibraltar is almost a monospecific fishery with one clear target species. *Pagellus bogaraveo* represents the 74% from the total landed in average percentage which constitutes a fleet component by himself (Silva *et al.*, 2002)

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Species
77	95	59	75	61	70	92	47	87	73	69	<i>P. bogaraveo</i>
0	1	35	11	26	5	5	51	2	0	0	<i>B. brama</i>
5	0	5	14	13	20	1	1	0	0	2	<i>T. thynnus</i>
0	0	0	0	0	0	0	0	7	16	21	<i>L. caudatus</i>
0	0	0	0	0	0	0	1	1	7	7	<i>Trachurus spp.</i>
0	0	0	0	0	0	1	0	1	0	0	<i>H. dactylopterus</i>
0	0	0	0	0	0	0	0	0	0	0	<i>P. americanus</i>
0	0	0	0	0	0	0	0	0	0	0	<i>E. guaza</i>
19	4	1	1	0	5	0	1	2	3	1	Other fishes



STRAIT OF GIBRALTAR SPANISH RSB FISHERY

□ Available information:

Landings since the start of the fishery

Fishing boats

Fishing effort: the effort unit chosen (number of sales) cannot be too appropriate as do not consider the missing effort. Thus, in the recent years this missing effort increases substantially (fishing vessels with no catches and precisely why with no sale sheet to be recorded).

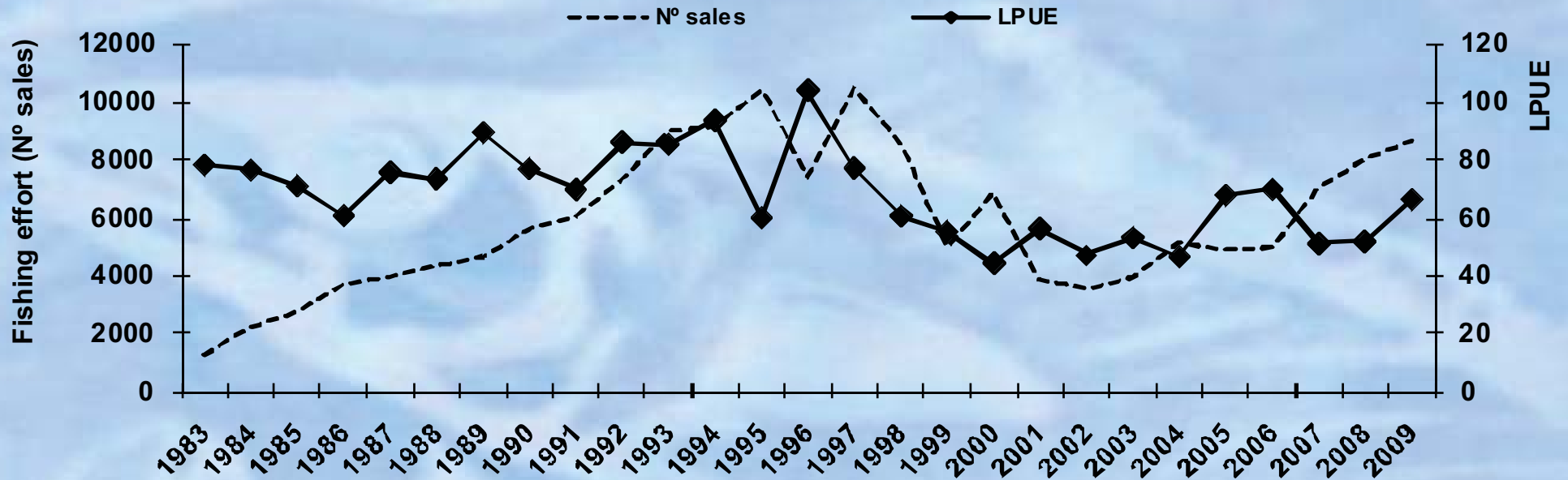
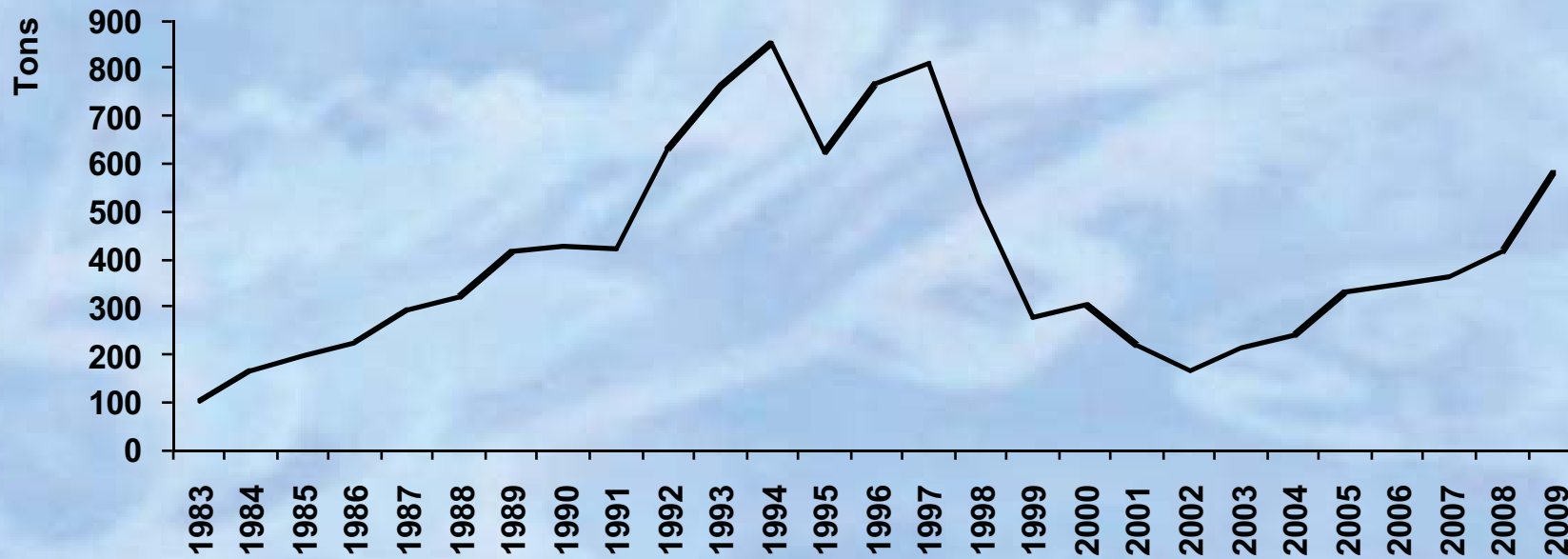
Landings length distribution

Observers on board programme (2005 – 2009)

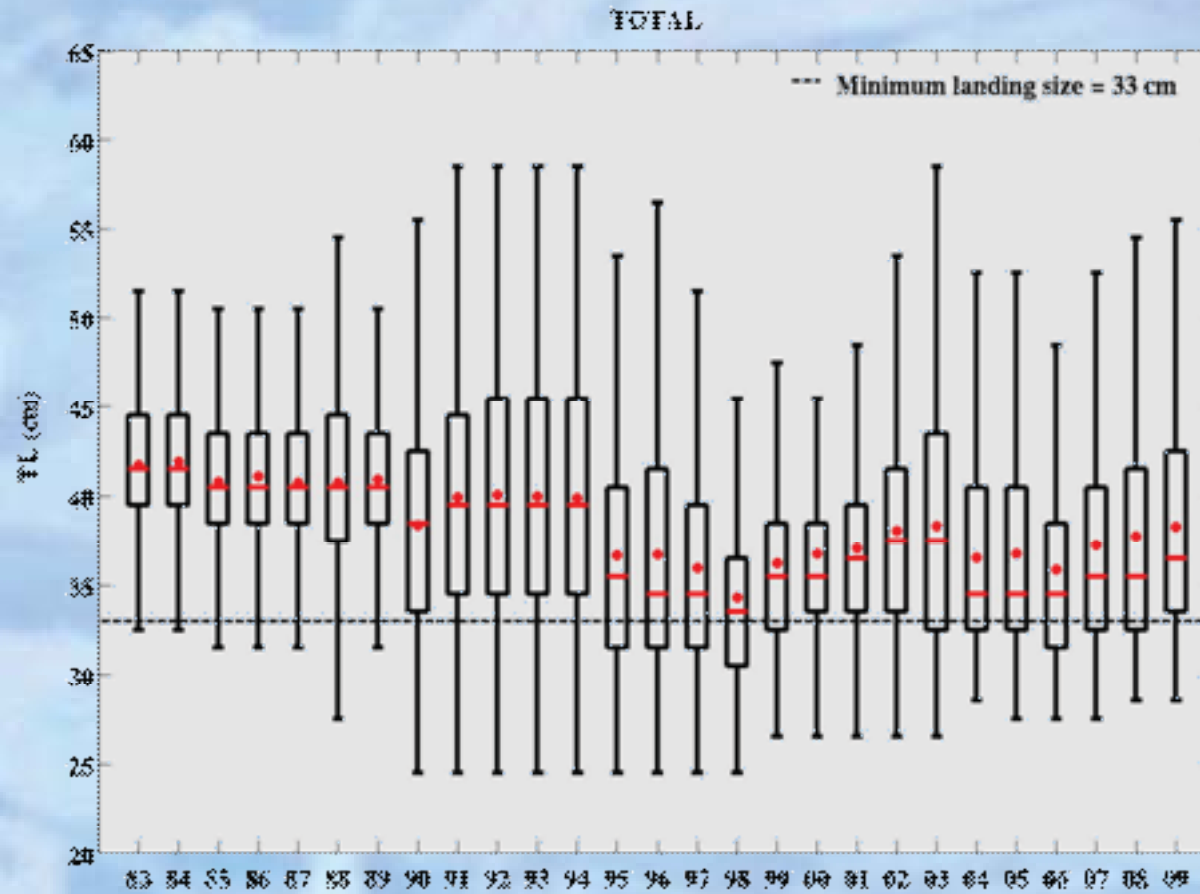
VMS information (“*Cajas verdes Junta de Andalucía*”)



STRAIT OF GIBRALTAR SPANISH RSB FISHERY

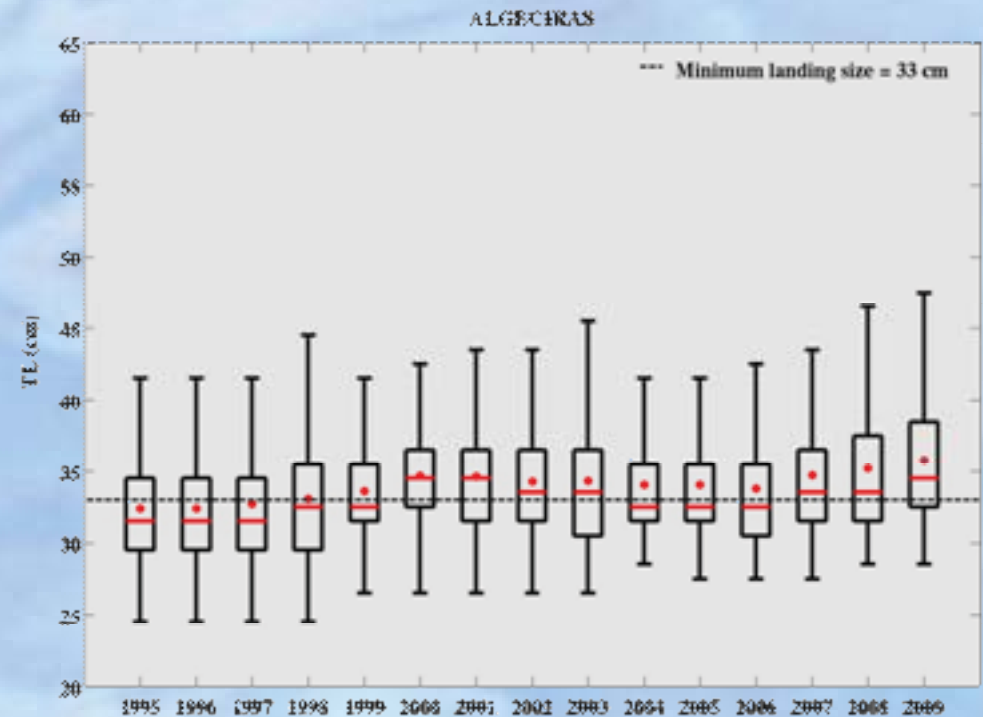
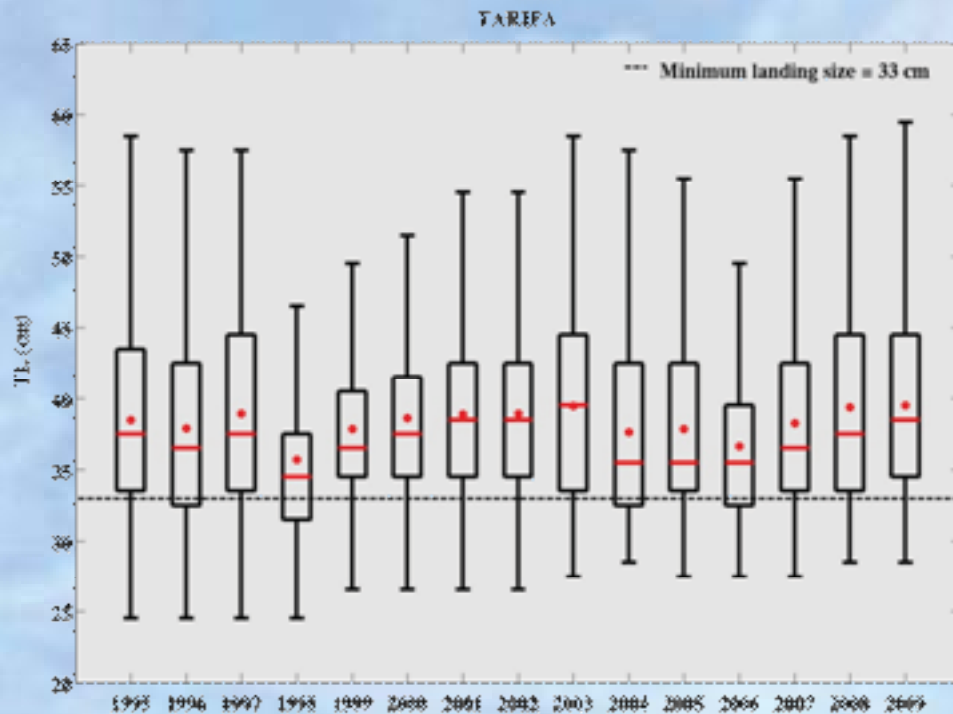


STRAIT OF GIBRALTAR SPANISH RSB FISHERY



The median value in the last years remains under the mean in every case and....

STRAIT OF GIBRALTAR SPANISH RSB FISHERY

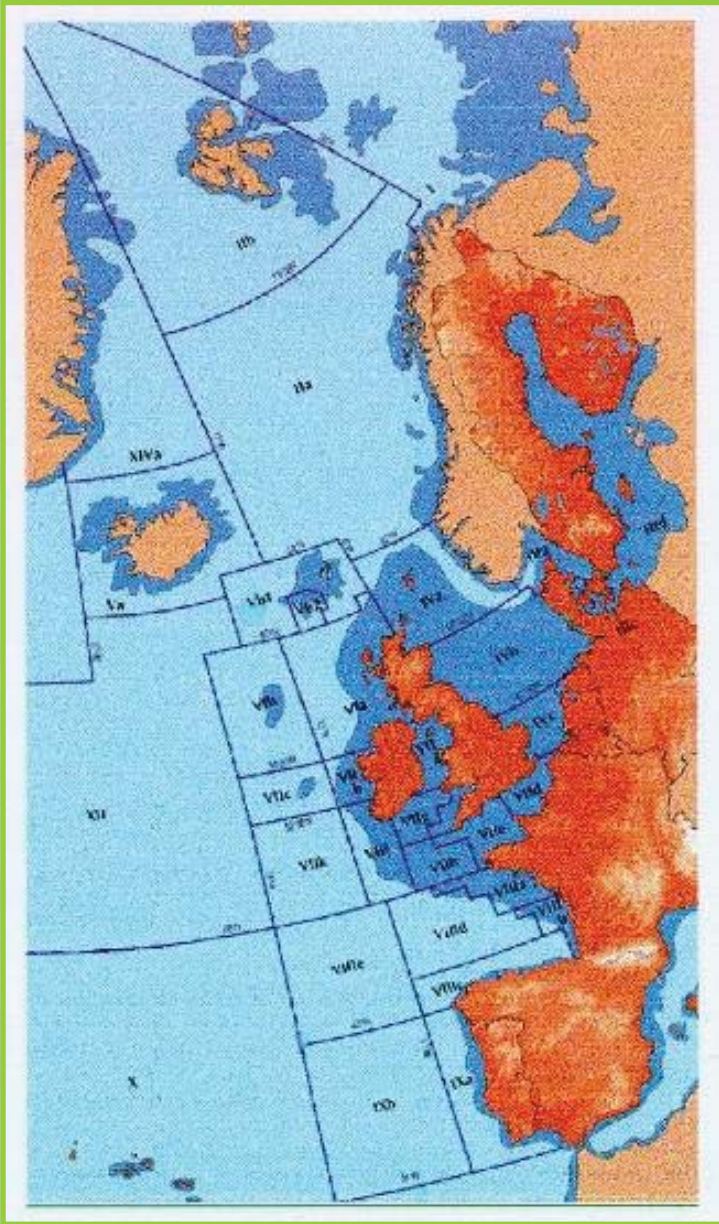


...more close to the minimum landing size in Algeciras. It is necessary to point out that species probably does not have a homogeneous geographic and bathymetric distribution related to their length. This fact could explain the different landed mean length between both ports (Tarifa and Algeciras).

Part II: Status revision according stock assessments



EUROPEAN AND LOCAL MANGEMENT FRAME



- **ICES WGDEEP**

- **EU Regulation**
Fishing effort [Reg. EC since 2002]

Biannual TACs [Reg. EC since 2002]

- **Spanish and Andalusian Regulations for the Strait of Gibraltar RSB fishery (Fishing plans since 1999)**

 - Fishing boat list

 - Close season

 - Minimum landing size (33 cm)

 - Hook size and hooks number limitation

ASSESSMENT METHODOLOGIES USED AT ICES WGDEEP

DIRECT METHODS

NO CATCHES

INDIRECT METHODS

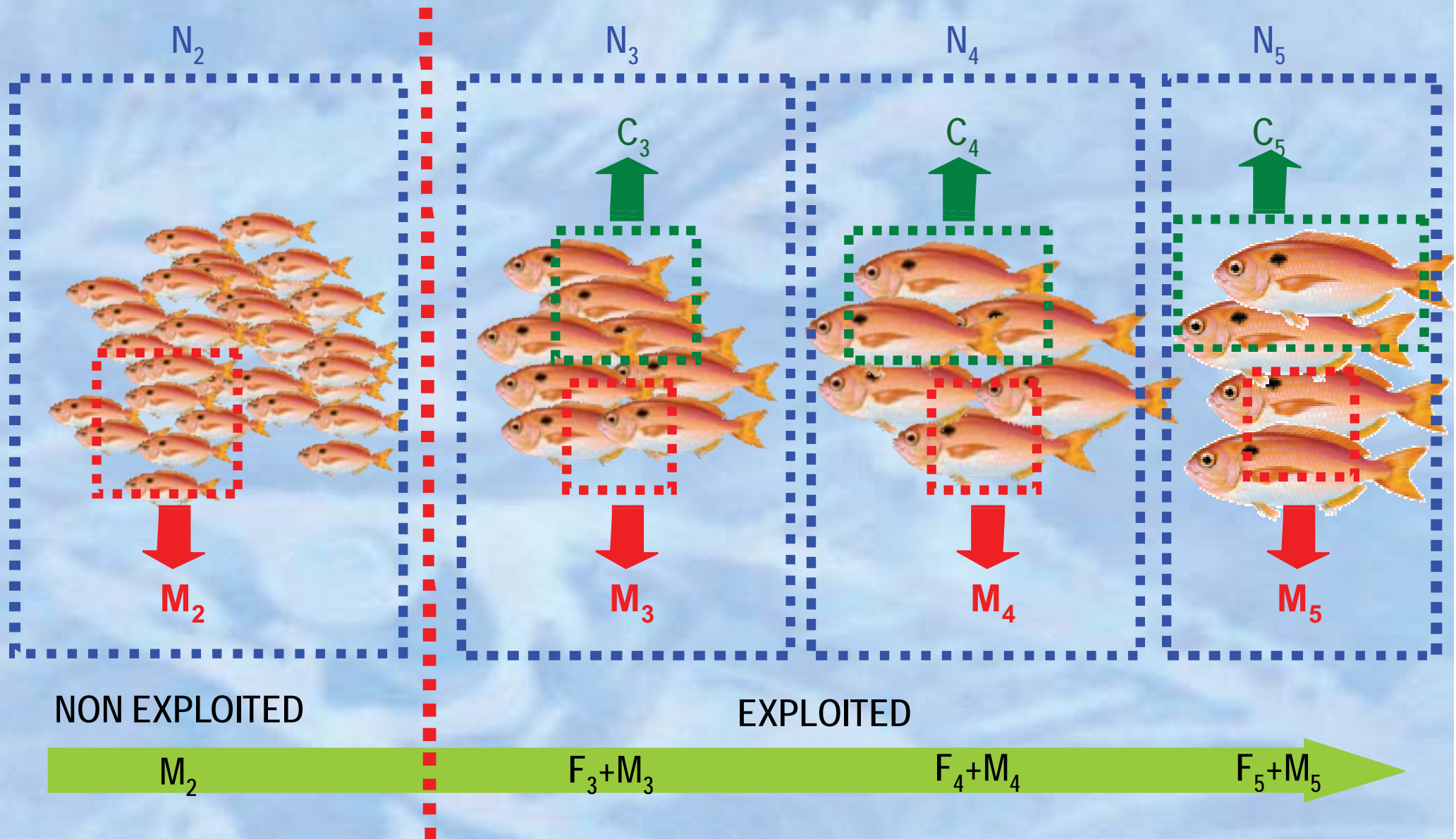
Production models

Standardized LPUE and missing effort problem

Analytical models

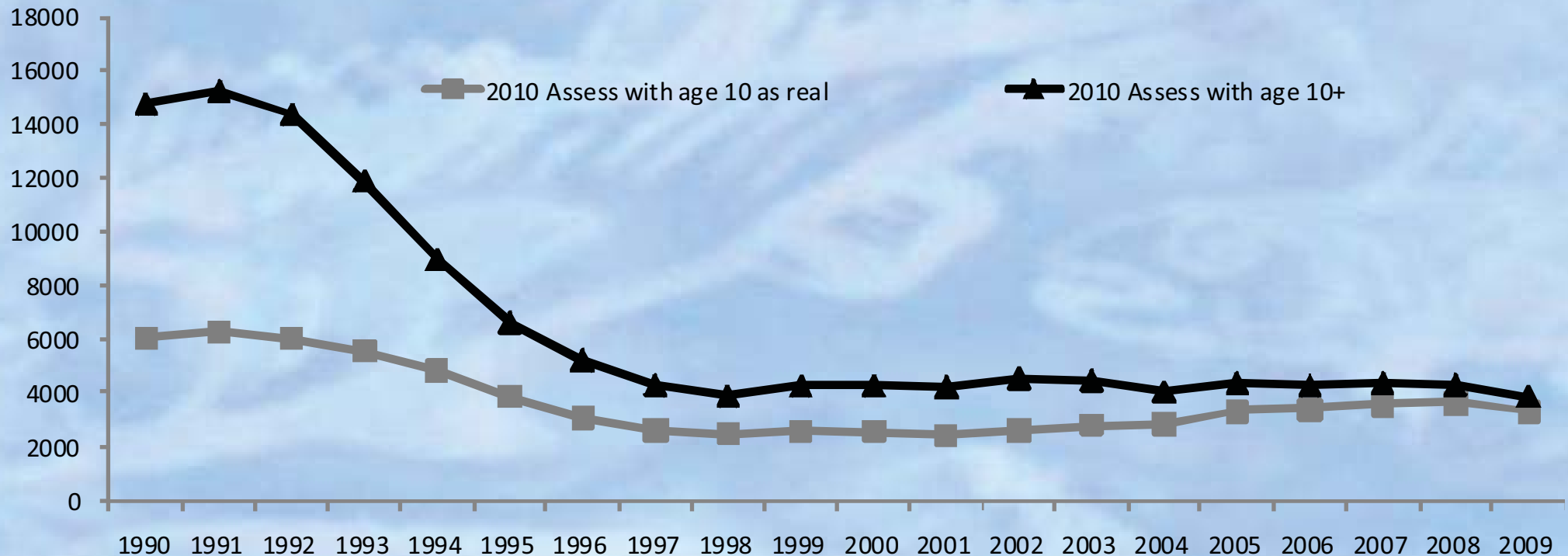
Separable VPA

ASSESSMENT METHODOLOGIES USED AT ICES WGDEEP



Without tuning fleet information, Separable VPA could be used in order to define terminal F of the analysis (Gil *et al.*, 2009)

LAST STOCK ASSESSMENT AND 2010 ICES ADVICE



As in previous years, the assessment attempt was considered as an exercise due to its related uncertainty and its results was examined only in qualitative terms. Anyway, based on the assessments attempts, the recent increasing trend of landings in the fishery may be considered unsustainable. Despite the uncertainty of the assessment exercise, fishing mortality rates should be reduced until reliable assessments prove the fishery sustainability.

LAST STOCK ASSESSMENT AND 2010 ICES ADVICE

Year	ICES Advice	Predicted catch corresp. to advice	TAC EU Subarea IX	ICES landings Subarea IX
2003	¹	-	1.271	0.47
2004	¹	-	1.271	0.48
2005	¹	-	1.271	0.49
2006	¹	-	1.271	0.54
2007	¹	-	1.080	0.59
2008	¹	-	1.080	0.60
2009	Constrain catches to average catches 2003-07	0.5	0.918	0.72
2010	Biennial	0.5	0.780	
2011	Same advice as previously	0.5		

Weights in '000 t.

¹Advice prior to 2008 included for all areas

ICES advises that “catches in 2011 should be less than 500 t which is a reduction from 2008 - 2009 landings” (ICES ADGDEEP 2010).

Part III: Critical areas



STRAIT OF GIBRALTAR SPANISH RSB FISHERY

□ On the biology:

Ageing: consistency of the age readings between the readers and different areas (Strait of Gibraltar and Azores) should be checked. Therefore, otolith exchange between Spain and Portugal that are currently ageing this species is recommended to estimate precision and relative/absolute bias in the age estimations from age readers from different laboratories.

Reproductive pattern: role of hermaphroditism in the catch composition? Where are the potential spawning grounds? What about the earlier life stages?

Feeding biology: relationship with the special features (productivity) of the Strait of Gibraltar. Differences between life stages and within ages? Which are the potential predators?

Besides, from an ecosystem point of view, stock dynamics of *Pagellus bogaraveo* should be affected by environmental variability. This is a benthic - pelagic species, feeding mainly in the water column and changes on the water mass structure or on the distribution of the preferential prey species may introduce severe catchability problems.

Also, fisheries should be considered one of the sources of man impact in the ocean. Despite hooks and lines have been considered less impact gears in the marine environment studies about its effects on the seabed will be welcome.

STRAIT OF GIBRALTAR SPANISH RSB FISHERY

□ On the fishery:

No information on discards (despite it could be consider minor for the target species). The enforcement of the management measures (mainly the minimum landing size) should increase the discard of the target species. Landings length distribution in 2010 shows a knife edge shape in the smaller market category.

Missing effort problem. Need of LPUE standardization.

Length distribution sampling (by commercial categories vs. concurrent).

STRAIT OF GIBRALTAR SPANISH RSB FISHERY

□ On the assessment:

The absence of reliability of the effort unit should be considered in case of production models assessments attempts.

Combined ALK must not be applied to samples taken in a different year, because they could give biased results (Westrheim and Ricker, 1978) and does not take into account possible growth differences between years.

Unresolved modelling issues could be tackled with a modern statistical catch - at - age model, rather than VPA. That approach would be better suited to make explicit modeling assumptions and portray the uncertainty in probabilistic terms (because should be easier to see how each model fits the catch - at - age data and compare the goodness of fit in likelihood terms).

STRAIT OF GIBRALTAR SPANISH RSB FISHERY

□ Useful documents:

Along the last years large papers has been written about the Spanish red seabream fishery of the Strait of Gibraltar. Some of them are more accessible to the research community while much of the acquired knowledge has been presented in more restricted forums (“*grey literature*”). Thus, several documents have been submitted to the Junta de Andalucía (Reports) according the agreement with the Instituto Español de Oceanografía (IEO) for the fishery monitoring. Besides, the available information about the Spanish fishery is presented every year to the ICES WGDEEP and is also included in the respective ICES WGDEEP Reports.

Under the support of the 7th Frame Work Programme by the European Union, DEEPFISHMAN Project (Management and Monitoring of Deep-sea Fisheries and Stocks) will develop a range of strategy options for the management of deepwater fisheries in the NE Atlantic. One of the cases of study included in the project is the Spanish red seabream fishery of the Strait of Gibraltar. Available information about this ongoing project (2009 – 2012) can be look at the wiki web address (<http://deepfishman.hafro.is/doku.php>).

