

SAC GFCM
Sub-Committee on Stock Assessment

Date*	14	October	2010	Code*	ANE0710BIG
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- Species Scientific name***
- 1 *Engraulis encrasicolus* - ANE
 Source: GFCM Priority Species
 - 2
 Source: -
 - 3
 Source: -

Geographical area* Northwestern Mediterranean

Geographical Sub-Area (GSA)* 07 - Gulf of Lions

Combination of GSAs	1	
	2	
	3	

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	Sheet #0 Basic data on the assessment

Code: ANE0710BIG

Date*	14 Oct 2010	Authors*	BIGOT J.L., ROOS D., LE CORRE G.
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Species Scientific name*	Engraulis encrasicolus - ANE	Species common name*	European anchovy
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Data Source

GSA*	07 - Gulf of Lions	Period of time*	1993-2010
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Description of the analysis

Type of data*	Biomass by acoustic method, official landings from commercial fleet	Data source*	IFREMER - Statiscal data from ministry - AMOP (producers organisation) - DCF
Method of assessment*	Acoustic Biomass	Software used*	IFREMER softwares: Mowies+, Fishview, Weieval, Baracouda

Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	1	1	---	1	---	---	---	2	1	1	---

Comments, bibliography, etc.

<p>The stocks of the main species of small pelagics in the gulf of the Lion are evaluated annually by acoustics (Survey PELMED carried out in July. The survey data is described in the sheet "Other").</p> <p>LIORZOU B., ABAD R., et BIGOT, J-L., 1994. Anchovy stock estimate through acoustic. In : Northwestern Mediterranean Anchovy : distribution, biology, fisheries, and biomass estimation by different methods. Ref. CEE, projet MA, 3.730, Final report : 14-42 p.</p> <p>BAILLY D. et L. LE GREL, 1995. La pêche de petits pélagiques dans le golfe du Lion.</p> <p>GUENNEGAN, Y., B. LIORZOU, J.L BIGOT, 2000. Exploitation des petits pélagiques dans le golfe du Lion et suivi de l'évolution des stocks par écho-intégration de 1995 à 1999. CGPM Groupe de travail « petits pélagiques ». Sous Comité Aménagement des pêches. Fuengirola, Espagne 1-3 mars 2000, 29p.</p> <p>GUENNEGAN, Y., B. LIORZOU, J.L BIGOT, 2001. Méthodologie utilisée en écho-intégration dans le golfe du Lion : description et analyse. CGPM Groupe de travail « petits pélagiques » Sous Comité Aménagement des pêches, Néa Paramos, Kavala Grèce mars 2001, 21 p.</p>

Comments, bibliography, etc.

GUENNEGAN, Y., B. LIORZOU, J.L BIGOT, octobre 2001 Contrat UE 00/05. MEDIANE. Analyse de l'abondance et de la répartition de l'anchois et des petits pélagiques dans le golfe du Lion. 25 p.

F. ALEMANY, J.L BIGOT, A. GIRALDEZ, Y. GUENNEGAN, B. LIORZOU, J. MIGUEL, I. PALOMERA, 2002. Preliminary results on anchovy shared stock in the Gulf of Lion. WORKING GROUP ON SMALL PELAGIC SPECIES. Rome, Italy, 20-22 march, 2002.

GUENNEGAN Y., GUILLARD J., BIGOT J.L., BREHMER P., COLON M., CHERET Y. et LIORZOU B., 2004. Importance de la zone côtière dans les évaluations des stocks de petits poissons pélagiques : Analyse d'une série de campagnes acoustiques et d'une expérimentation en zone côtière. CGPM groupe de travail "petits pélagiques". Sous comité Aménagement des pêches. Málaga, Espagne, 6-7 May, 2004. 17 p.

LIORZOU B., BIGOT J.L. et GUENNEGAN Y. 2004. Evolution des stocks de sardines et d'anchois dans le golfe du Lion. CGPM groupe de travail "petits pélagiques". Sous comité Aménagement des pêches. Málaga, Espagne, 6-7 May, 2004. 11 p.

GUENNEGAN Y., GUILLARD J., BIGOT J.L., B LIORZOU., CHERET Y., COLON M., FARRUGIO H., BREHMER P., 2004. "Variabilité spatio-temporelle des populations de poissons de la zone littorale observée par acoustique", Actes du Colloque « Rhône Méditerranée », C.O.M. 6-7 Mai, 2004 Marseille.

BREHMER P., J. GUILLARD, Y. GUENNEGAN, J.L BIGOT, B. LIORZOU, 2006.- Evidence of a variable "unsampled" pelagic fish biomass in shallow water (<20 m) : the case of the Gulf of Lion. ICES Journal of Marine Science, ICES J. Mar. Sci. 63

LIORZOU B., Y. GUENNEGAN, J.L. BIGOT, D. ROOS, 2006.- Les campagnes PELMED: Evaluation des ressources de petits pélagiques dans le Golfe du Lion. Journées de restitution du CIRMED, Marseille 19-20 janvier 2006

LIORZOU B., Y. GUENNEGAN, J.L. BIGOT, D. ROOS, 2006.- Evaluation des ressources de petits pélagiques dans le Golfe du Lion. CGPM, ROME sept 2006

LIORZOU B., J.L. BIGOT, D. ROOS, 2007.- Stock assessment of small pelagics in the gulf of Lion. GFCM, Athens sept 2007

LIORZOU B., J.L. BIGOT, D. ROOS, 2008.- Evaluation des stocks de petits pélagiques dans le Golfe du Lion. Restitution AMOP, Sète 06 fev 2008

LIORZOU B., J.L. BIGOT, D. ROOS, 2008.- Stock assessment of small pelagics in the gulf of Lion. GFCM, Izmir sept 2008

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	Sheet B Biology of the species

Code: ANE0710BIG

Biology	Somatic magnitude measured (LH, LC, etc)*				Total length	Units*	Centimeters
	Sex	Fem	Mal	Both	Unsexed		
Maximum size observed	18.5	17	18.5	18.5	Reproduction season	Spring - Summer	
Size at first maturity	9*	9*	9*	9*	Reproduction areas	Shelf and upper	
Recruitment size	5	5	5	5	Nursery areas	Shelf and upper	

Parameters used (state units and information sources)

		Sex				
		Units	female	male	both	unsexed
Growth model	L_{∞}	cm				19.1
	K	year-1				0.35
	t_0	year				-1.45
	Data source	Aging (Gulf of Lions)				
Length weight relationship	a					0.0033**
	b					3.2354**
M						
sex ratio (mal/fem)		42/58				

Comments

(*) Size of first maturity is done on July 2009

(**) Length-weight relationship is calculated on July 2010

(***) sex ratio change every year

2002 M/F 49/51
 2003 M/F 47/53
 2004 M/F 47/53
 2005 M/F 46/54
 2006 M/F 37/63
 2007 M/F 36/64
 2008 M/F 40/60
 2009 M/F 42/58

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Assessment form

Sheet P1

General information about the fishery

Code: ANE0710BIG

Data source*	IFREMER - Statistical data from ministry - AMOP (producers organisation) - DCF	Year (s)*	2009
Data aggregation (by year, average figures between years, etc.)*	Period average 2004-2009		

Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	FRA	07	E - Trawl (12-24 metres)	03 - Trawls	31 - Small gregarious pelagic	ANE
Operational Unit 2						
Operational Unit 3						
Operational Unit 4						
Operational Unit 5						

Operational Units*	Fleet (n° of boats)*	Kilos or Tons	Catch (species assessed)	Other species caught	Discards (species assessed)	Discards (other species caught)	Effort units
FRA 07 E 03 31 - ANE	20	Tons	3325*	PIL	YES	YES	Nb boats
Total	20						

Legal minimum size	9 cm total length
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Comments

Comments

Exploitation rates of acoustic estimated biomasses were stable around 10%, except 18-20% for 2007-2008 years

(*) : Average from 2004 to 2009



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Assessment form	Sheet P2a Fishery by Operational Unit

Code: ANE0710BIG

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Data source*	IFREMER - Statistical data from ministry - AMOP (producers organisation) - DCF	OpUnit 1*	FRA 07 E 03 31 - ANE
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Time series

Year*	1998	1999	2000	2001	2002	2003
Catch	8000	5000	6000	4769	6941	7073
Minimum size						
Average size Lc						
Maximum size						
Fleet	(113)	(113)	(113)	(113)	56(123)	50(123)

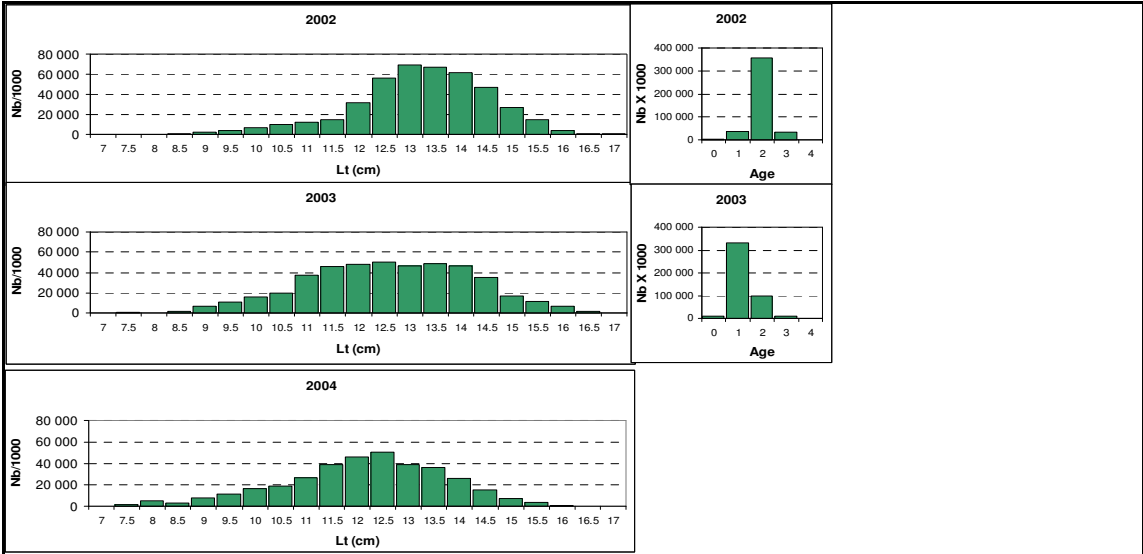
Year	2004	2005	2006	2007	2008	2009
Catch	4497	2249	2605	4133	4003	2460
Minimum size						
Average size Lc						
Maximum size						
Fleet	50(121)	50(114)	50(111)	50(101)	30(92)	20(92)

Selectivity

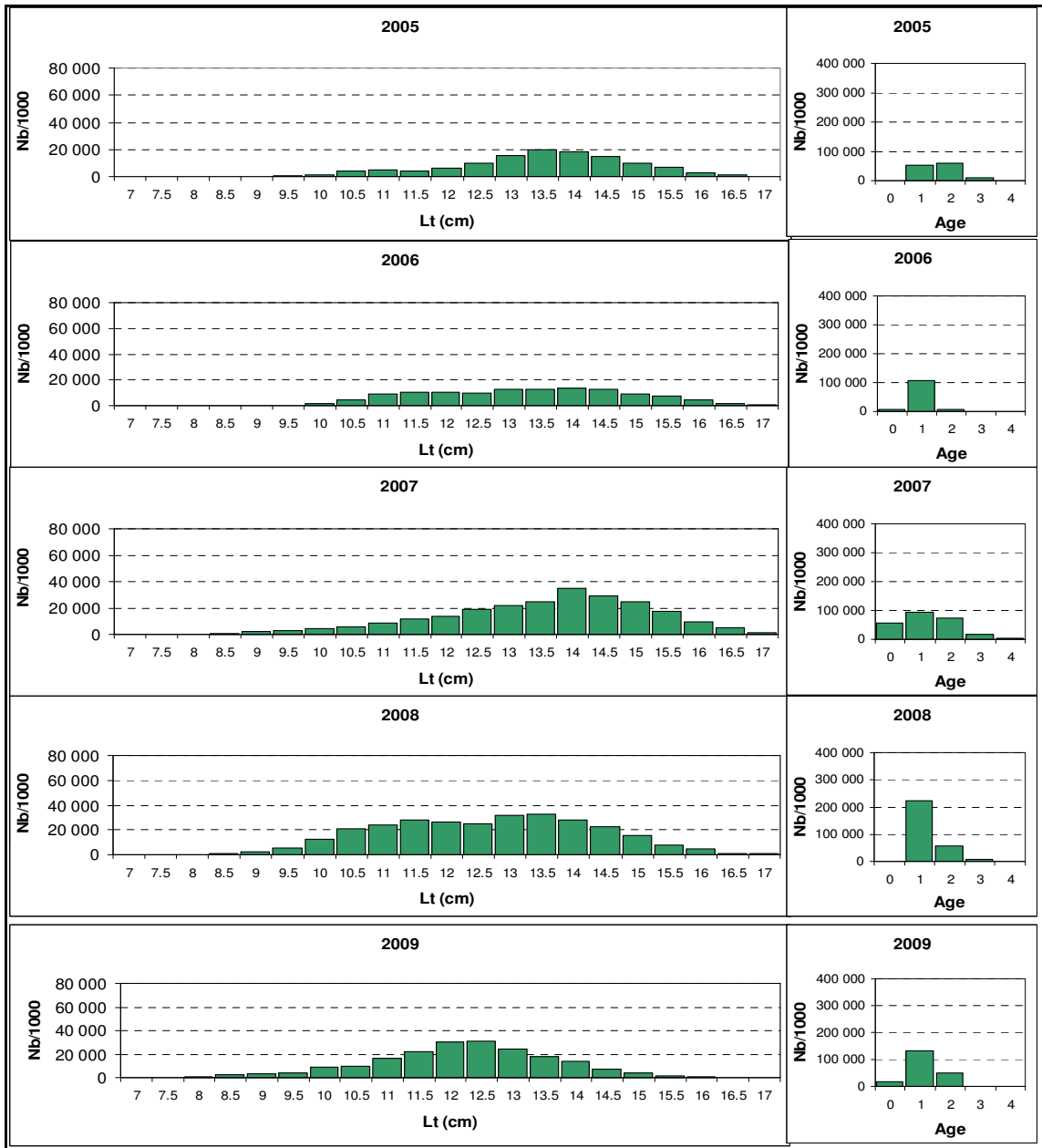
Remarks

L25		Note : Effort is noted "number of boat which targeted the anchovy (number of boat administratively authorized to catch anchovy)"
L50		
L75		
Selection factor		

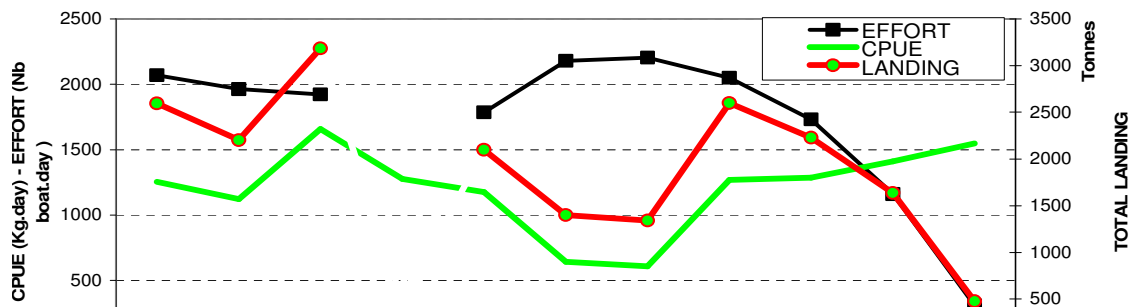
Structure by size or age



Structure by size or age



SMALL PELAGIC FLEET TARGETTING ANCHOVY - SETE HARBOUR

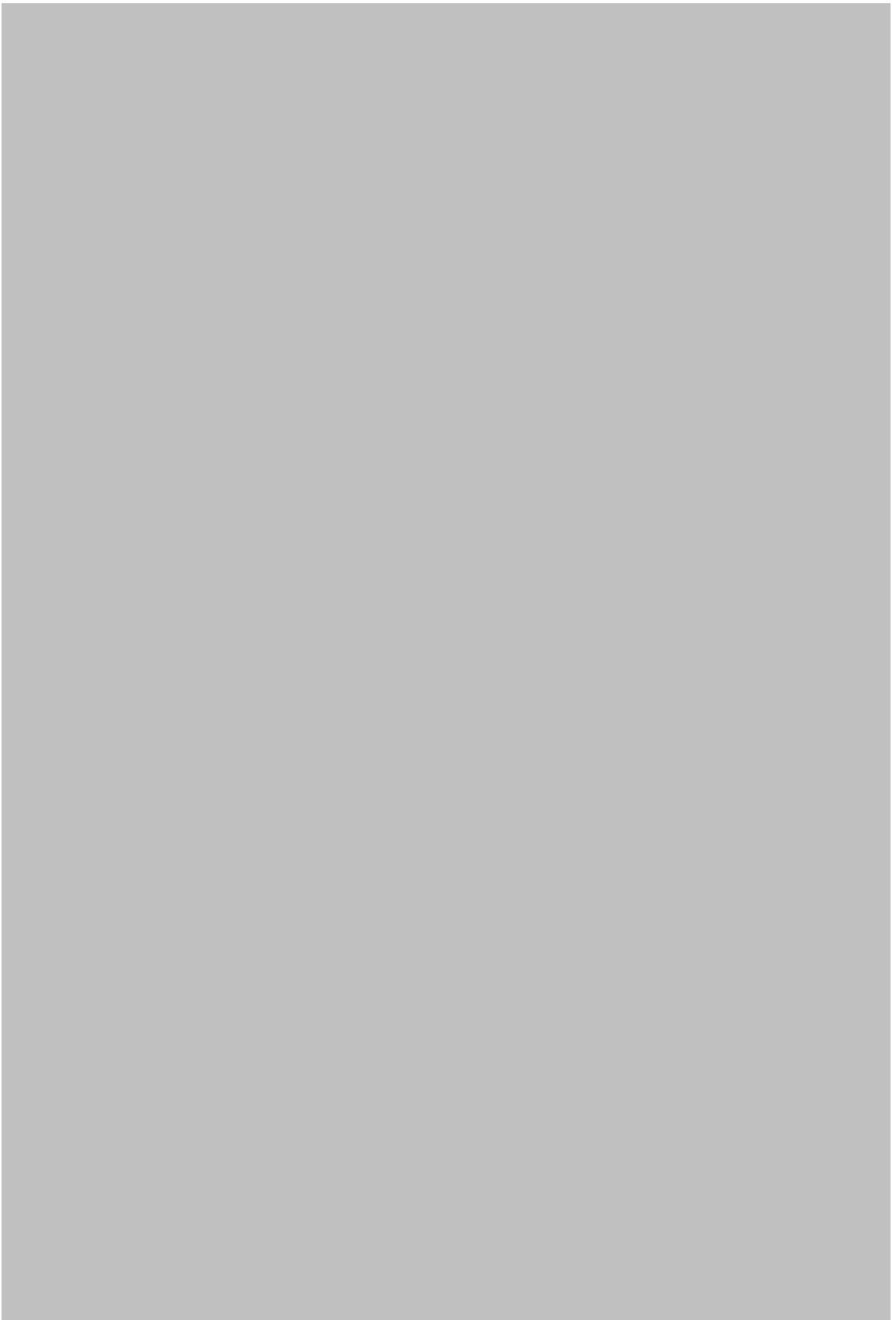


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Assessment form	Sheet P2a Fishery by Operational Unit

This sheet will be activated once the Operational Unit information (P1 section) will be successfully filled in

Code: ANE0710BIG



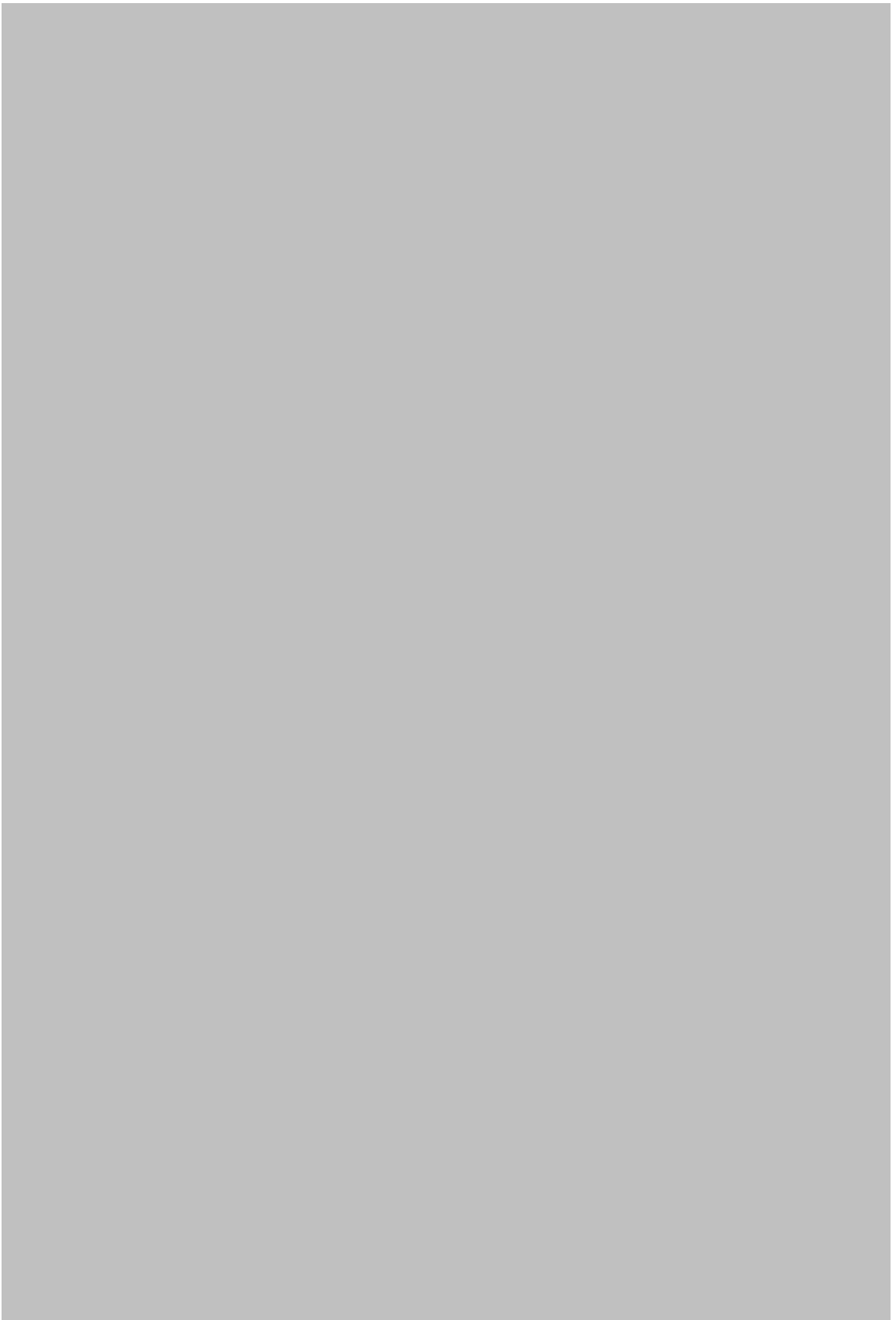


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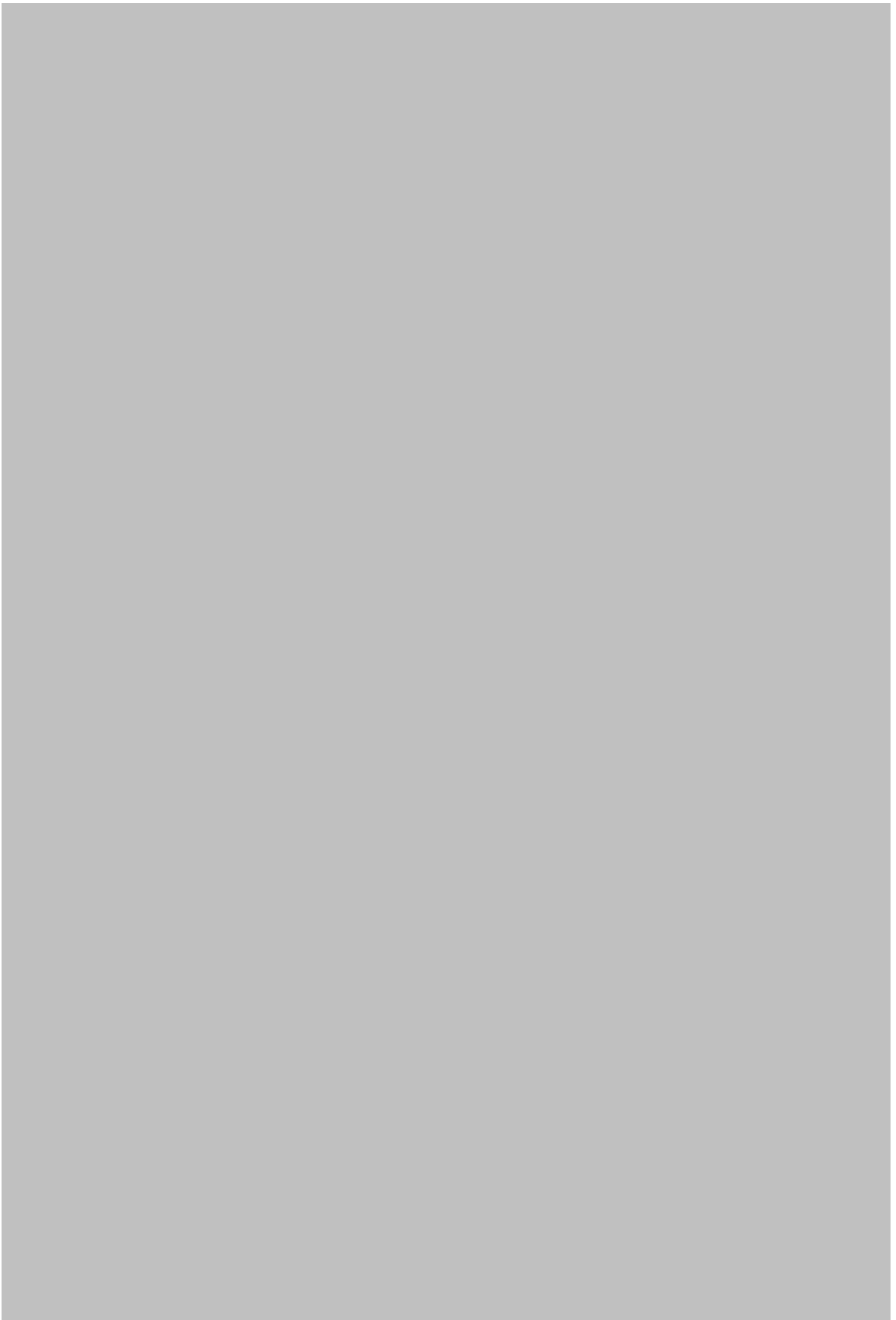


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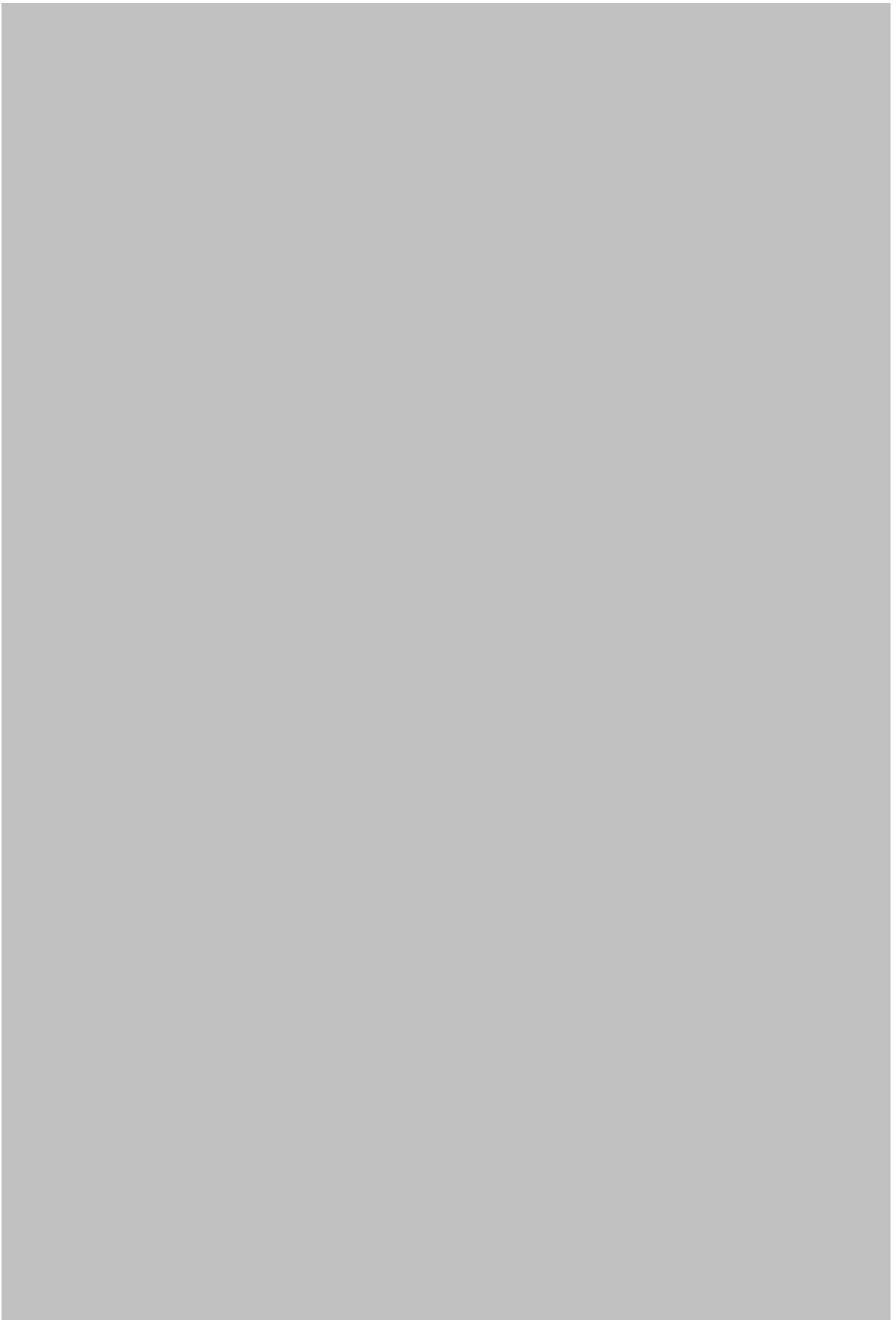


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Assessment form	Sheet P2a Fishery by Operational Unit

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Assessment form

Sheet P2b
Fishery by Operational Unit

Code: ANE0710BIG

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Data source*	IFREMER - Statistical data from ministry - AMOP (pr	OpUnit 1*	FRA 07 E 03 31 - ANE
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Regulations in force and degree of observance of regulations

National regulations :

- Exclusive licence for trawling, with numerus closus (both small pelagics and demersals) - fully observed
- Engine power limited for trawlers to 318 kW or 430 hp - not observed
- Length of fishing trawlers less 25 meters - fully observed

Fishing effort limitation :

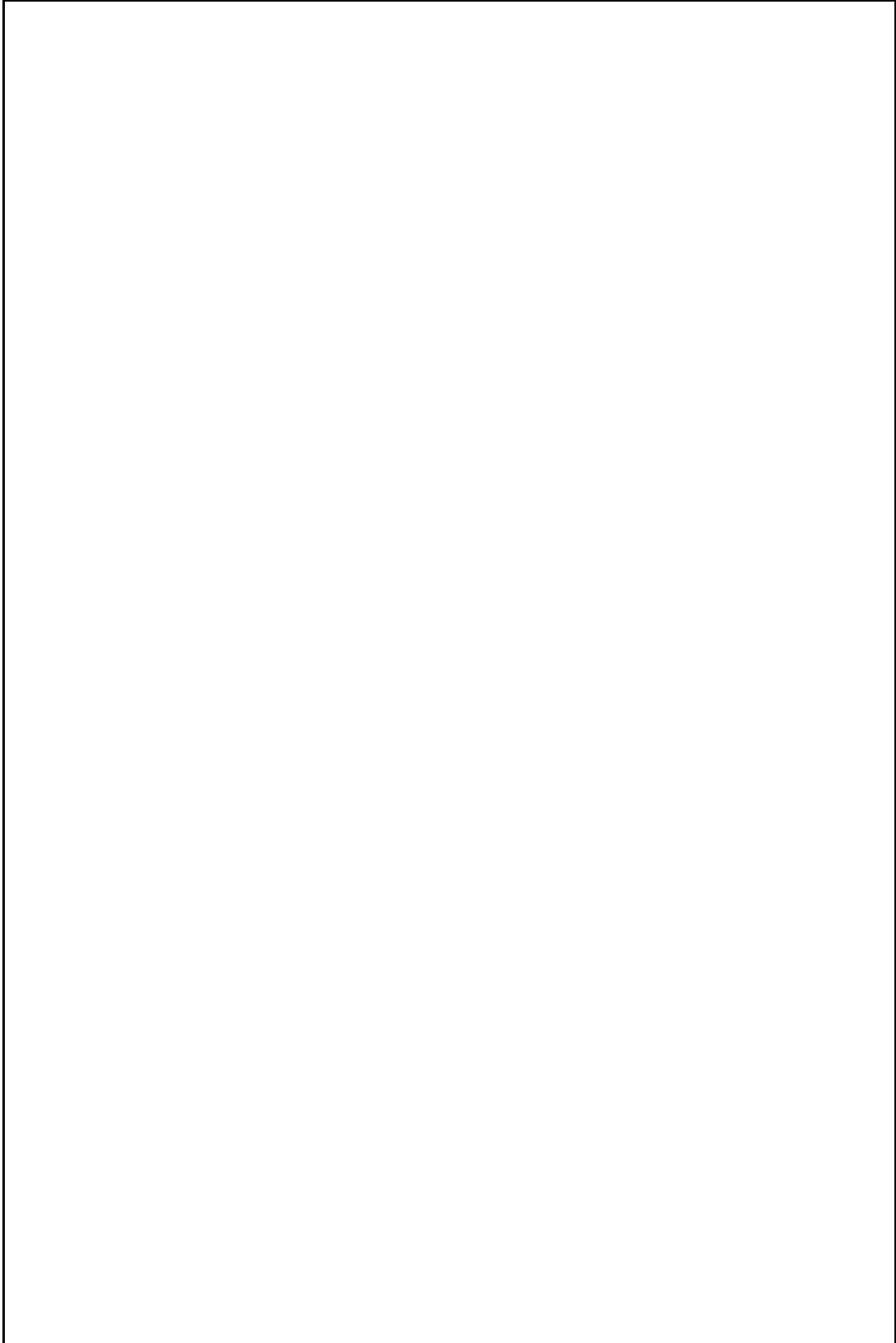
- (no fishing saturday and sunday, autorised hours trip : 3.00am – 8.00pm) - fully observed
- Trawling forbidden from coast until 3NM - not fully observed

Professional organisations regulations :

- Additional hollydays days : in average 40 days/year - fully observed

Accompanying species

European pilchard (*Sardina pilchardus*)
Atlantic mackerel (*Scomber scombrus*)
Chub mackerel (*Scomber japonicus*)
Atlantic horse mackerel (*Trachurus trachurus*)
Mediterranean horse mackerel (*Trachurus mediterraneus*)
Round sardinella (*Sardinella aurita*)
Sprat (*Sprattus sprattus*)
Seabreams (*Pagellus spp.*)
Blue whiting (*Micromesistius poutassou*)
European hake (*Merluccius merluccius*)



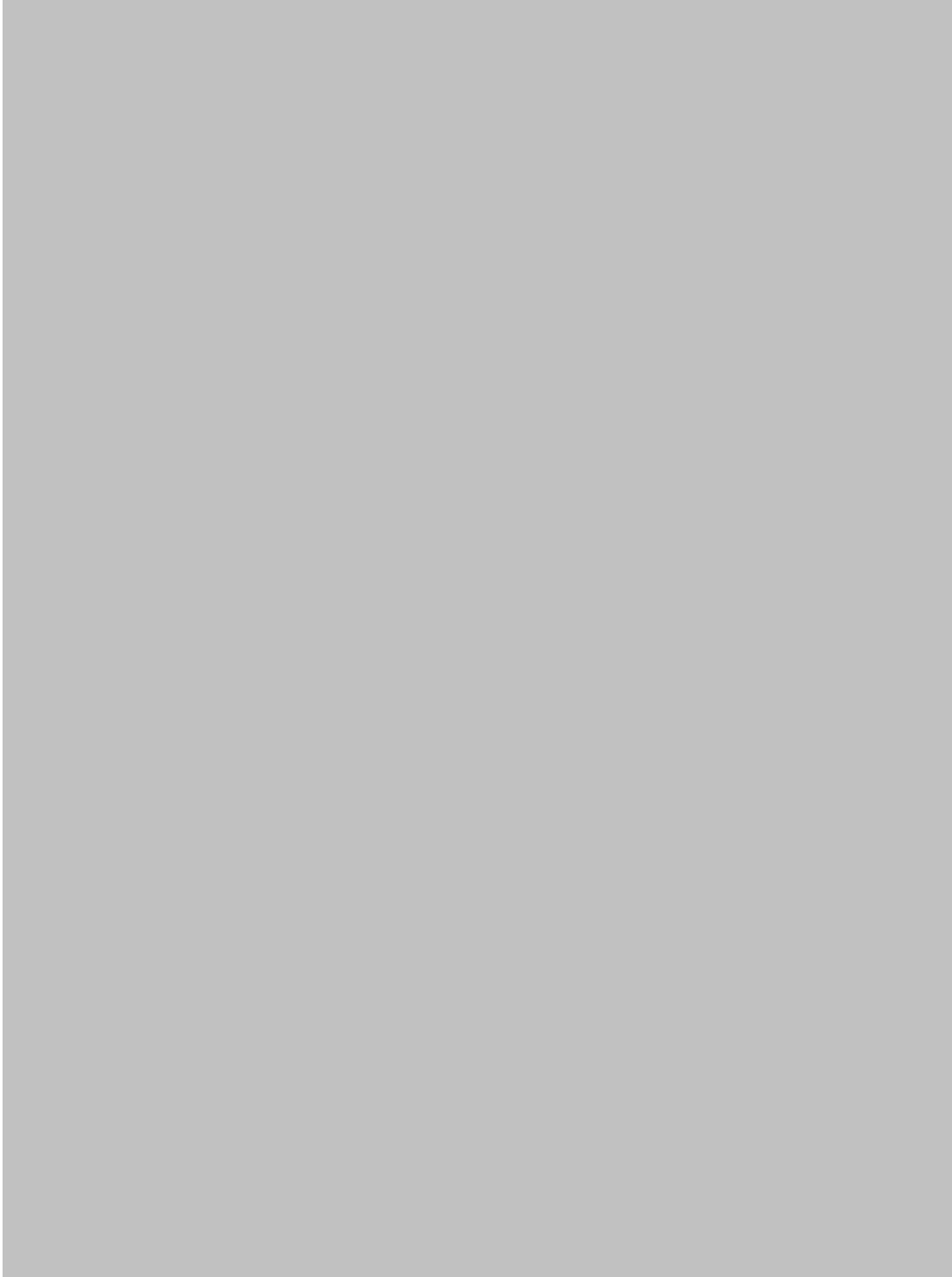
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Assessment form

Sheet P2b
Fishery by Operational Unit

This sheet will be activated once the Operational Unit information (P1 section) will be successfully filled in

Code: ANE0710BIG



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Assessment form

Sheet P2b
Fishery by Operational Unit

This sheet will be activated once the Operational Unit information (P1 section) will be successfully filled in

Code: ANE0710BIG



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Sheet P2b
Fishery by Operational Unit

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Sheet P2b
Fishery by Operational Unit

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Sex*	M+F
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Analysis # *	ICA
--------------	-----

Time series

Data	Size	Age
(mark with X)		

Model	Cohorts	Pseudocohorts
(mark with X)		

Equation used		Tunig method	
# of gears		Software	
F _{terminal}			

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum			Recruitment		
Average			Average population		
Maximum			Virgin population		
Critical			Turnover		

Average mortality

	Total	Gear				
F ₁						
F ₂						
Z						

(F1 and F2 represent different possible calculations. Please state them)

Comments

Extract from results published in FP6 - 44294 SARDONE PROJECT (2010) :

"A - ICA model

No pertinent results were obtained with ICA model because the times series were too short and the age composition of catches and surveys, as well as the growth and mortality parameters, were still considered to be too preliminary as to allow this type of analysis. Conventional age-structured models such as VPA and Cohort Analyses work particularly well when long time series of catches at age and associated indices of abundance are available for several ages. The conventional usage of age-structured models that add-up catches at age on year-class basis working backwards (i.e. starting with the most recent years) faces particular difficulties when only a few age-groups are present in the catch and when the natural mortality is uncertain (as in our case). For the Gulf of Lions, the completion of the revision of the historical data before 2002 is desirable. In addition, the slow growing rates, basically equal to sardine, suggest low natural mortalities if the approach of Abella is followed (see below). But the age composition from surveys suggests somewhat higher M (of about 1 or 1.2). For this reason just an experimental trial in a spread sheet was implemented as a way of analysing the potential fitting of the data. Further development is to be carried out when accurate age structuring and growth parameters would allow better guessing of the natural mortality of the stock."

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Sex*	
------	--

Analysis # *	
--------------	--

Time series

Data	Size	Age
(mark with X)		

Model	Cohorts	Pseudocohorts
(mark with X)		

Equation used		Tunig method	
# of gears		Software	
F _{terminal}			

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum			Recruitment		
Average			Average population		
Maximum			Virgin population		
Critical			Turnover		

Average mortality

	Total	Gear				
F ₁						
F ₂						
Z						

(F1 and F2 represent different possible calculations. Please state them)

Comments

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Assessment form

Sheet A1

Indirect methods: VPA, LCA

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Assessment form

Sheet A1

Indirect methods: VPA, LCA

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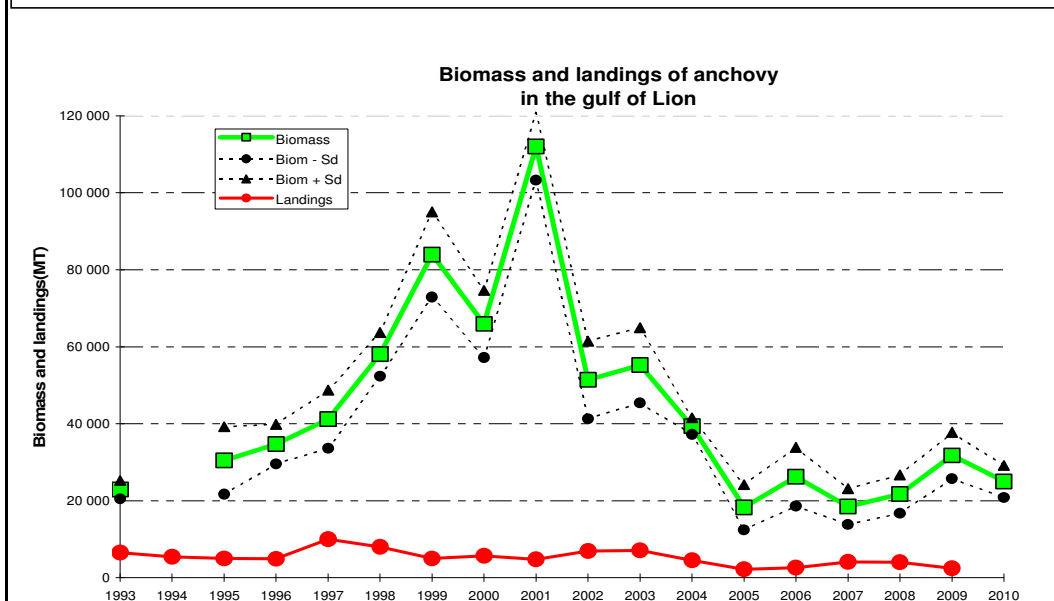


Other assessment methods

The stocks of the main species of small pelagics in the gulf of the Lion are evaluated annually in July by acoustics (Survey PELMED). The objective is to provide some advices to administrations and the profession on the state of resources in view of a durable exploitation. The pelagic species studied are anchovy and sardine in priority but also mackerels, horse mackerels, sardinella and sprat when present. The different species don't have the same biology and behaviour (life span, reproduction period, habitat,...). Also, the catches data and specific fishing effort collected by producer organisations are not sufficiently precise to permit an indirect approach of the stock assessments. Nevertheless some additional exploratory analysis based on the population at age estimates from the survey and the age composition of catches was presented the past year, but those results were considered too preliminary as to be adopted (see next page).

The solution chosen for the gulf of Lion is to use direct assessment method of stocks by echo - integration while completing them with indicators of the fishing activity. At this end, PELMED surveys are performed at daytime in July. Transects are prospected, perpendicular to the coast at a speed of 8 knots, from 15-20m depth until the offshore break. Pelagic and bottom trawling operations are performed to identify species met along transects. Population structures are identified by size and age. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses. In the current assessment just a direct comparison of the level catches to the level of biomass of the stock was carried out.

The global species biomass estimated during Pelmed surveys showed strong fluctuations according to years. In 2005, the level of accessible biomass of small pelagic fishes (all species) was around 472000 tons, highest level of 1993–2008 period. Mainly, the presence of a rich inshore zone of small sardines and an offshore zone of anchovy and biggest sardines was observed. After a downward trend from 2001 peak until 2005 (18000 MT), anchovy biomass increased a little between 2005 and 2010 with a positive trend and a mean of 25 000 tons.



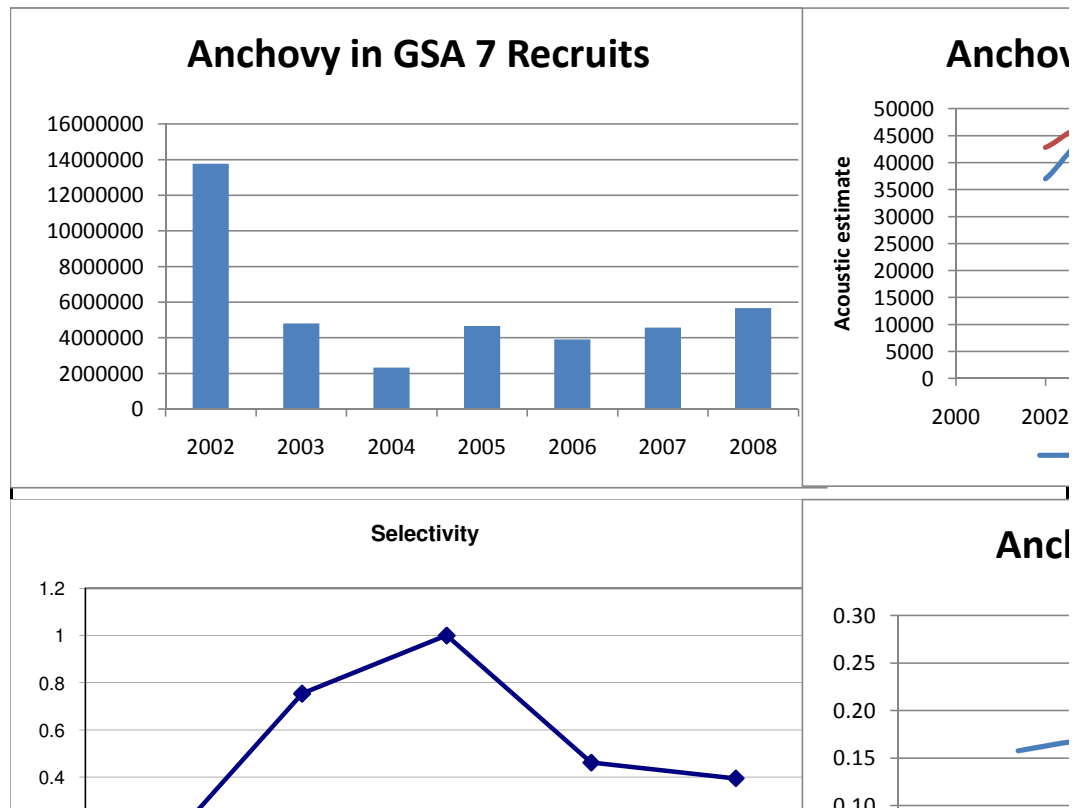
Other assessment methods

Exploratory analysis based on the population at age estimates from the survey and the age composition of catches is presented in this page.

A direct minimization of the catches at age and the population at age estimates (in log scales) was produced, in a way similar as the ICA (Patterson and Melvin) including in addition minimization to the total numbers in the population and the catches and to the total biomass and catches in tonnes. For the minimization of squared residuals the totals in numbers and biomass were weighted 5 times higher than the age structured so as to assure succesful fitting to the total biomass values. Acoustic biomass is assumed to be an estimator of biomass in absolute terms.

The fitting to the spawning biomass was successfully achieved, and the decreasing tendency in biomass in the first period of the series is explained by the big recruitment occurring in 2002. A selectivity at age 1 of about 0.8 is found relative to that of age 2. And Fishing mortality in recent years might have increased. The absolute level of mean fishing mortality (for age 1 to 3) is low (ranging between 0.1 and 0.25) and as expected similar to the ratio between catches and total acoustic biomass.

However residuals to both the catches and population at age estimates were very high (see figures in next page). Other fitting not giving higher weights to the biomass residuals resulted also in poor fitting of the catches and population at age. Therefore the analysis was considered to be still too noisv and preliminarv as to be adopted.



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Assessment form

Sheet other

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Other assessment methods

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Assessment form

Sheet other

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Code: ANE0710BIG

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B					
SSB					
F					
Y					
CPUE					
Catch/Bio	0.16				Average ratio of catches to Acoustic biomass for the last three years

Stock Status* Use one (or both) of the following two systems for the stock assessment status description

Unidimensional	<input type="checkbox"/> ? - (or blank) Not known or uncertain. Not much information is available to make a judgment;
	<input type="checkbox"/> U - Underexploited, undeveloped or new fishery. Believed to have a significant potential for expansion in total production;
	<input type="checkbox"/> M - Moderately exploited, exploited with a low level of fishing effort. Believed to have some limited potential for expansion in total production;
	<input type="checkbox"/> F - Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;
	<input type="checkbox"/> O - Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse;
	<input type="checkbox"/> D - Depleted. Catches are well below historical levels, irrespective of the amount of fishing effort exerted;
	<input type="checkbox"/> R - Recovering. Catches are again increasing after having been depleted or a collapse from a previous;

Bidimensional	Exploitation rate		Stock abundance	
	<input type="checkbox"/>	No or low fishing	<input type="checkbox"/>	Virgin or high abundance
	<input type="checkbox"/>	Moderate fishing	<input type="checkbox"/>	Intermediate abundance
	<input type="checkbox"/>	High fishing mortality	<input type="checkbox"/>	Depleted
	<input type="checkbox"/>	Uncertain / Not assessed	<input type="checkbox"/>	Uncertain / Not assessed
			<input type="checkbox"/>	Low abundance

Comments

The assessment provided here is entirely dependent on the assumption of Acoustic biomass providing unbiased estimates of the absolute level of biomass at sea. In support of the catchability assumption it is worthwhile mentioning however that a DEPM carried out in June 2007 on the Gulf of Lion by Palomera et al (2007) gave a spawning biomass of about 21000 t, a value very close to the acoustic biomass estimate provided by PELMED for that year.

The evolution of the biomass of this stock provided by acoustic is almost consistent with that being recorded in GSA06 by the acoustic survey (ECOMED in SGMED-09-02 June 2009 WG report) and to the analysis of catches in that area (VPA). Given the uncertainties about the potential connection of the anchovy population in these two GSA areas and the parallel decrease of anchovy biomass in the two regions, this hypothesis should be considered at a supra-GSA scale.

Updated indicators :

1) Stock :

- Estimated total biomasses was 33,000 T in 2009 and 25,000 T in 2010 surveys. These biomasses levels were into the regular range of last part of the time series for the Gulf of Lion (between 20,000T and 33,000T in 2005-2010 period). Previously, it was a sequence with higher range of biomasses (1997 to 2004, 40,000 T to 80,000 T)
- Modale length class progressively decrease since 2005 to 2010 to reach to 10-13 cm in 2009-2010 (vs 13-14.5 cm before)
- Large anchovy (>15 cm) quasi disappear in 2009-2010, which are common during before 2007 (maximum length observed 18 cm in the gulf of Lion)

2) Fishery :

- Exploitation rates of acoustic estimated biomasses were stable around 10%, except 18-20% for 2007-2008 years
- Trawlers targeted fishes size >13 cm before 2007, corresponding to age 1 and 2, with annual variability. Current modal class was < 13cm from 2009. Age 0 was not targeted, except in 2007 (25% of landing)
- Trawlers effort and catches were progressively reduced from 2005 to 2010, and almost stopped their activity. Current fishery effort on anchovy was limited to a exploratory activity. Catches were characterized by stable CPUE
- From 2009, low commercial value for anchovy combined with mixed catches (small anchovy and small sprat) reduce the attractiveness for anchovy

3) Population, demographic and biological parameters obtained in 2009 and 2010 periods present some alterations:

- More 80 % of biomasses was composed by age 1,
- Age 1 in 2008-2009 do not produce abundances as high as expected for age 2 and 3 in 2009-2010 period;
- Few fishes had survived after 2 years in 2010 (<1%) and larger anchovy (>14cm) are composed in more than 60% by females.
- Condition index, growth rate, and size at first maturity decrease significantly and quickly these 3 last years;
- Only small adult anchovy are disponible to constitute the spawning biomass : low fecondity and high recruitments levels observed in this stock since 2008, suggest an external spawning biomass contribution to Gulf of Lion.

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet Z

Objectives and recommendations

Code: ANE0710BIG

Management advice and recommendations*

The stock seems to be highly unbalanced in 2009 and 2010, with a very low abundance of commercial-sized anchovy (groups 2+). Even if total biomass was not very much lower than the average level of the last six years (20,000 – 25,000 T), most of the recorded biomass consisted of 1-group anchovy, and even these showed a mean size and condition factors appreciably below the values usually found for this stock.

The low market status and the low catchability of the anchovy in the gulf of Lions do not justify a high fishing pressure and this have allowed a low exploitation rate during the last two years, particularly in 2010. Historically the economic value of the anchovy is variable and is the main factor affecting the level of fishing effort. This value is currently low however an increase of the price could produce an increase of the exploitation on ages 1+ in the short term preventing the biomass of large spawners (2+) to increase significantly.

The system of the Gulf of Lions shows important signs of disequilibrium since 2008, with important reductions and changes in structure of the stocks of sardine and anchovy, and an unusually high abundance of sprat.

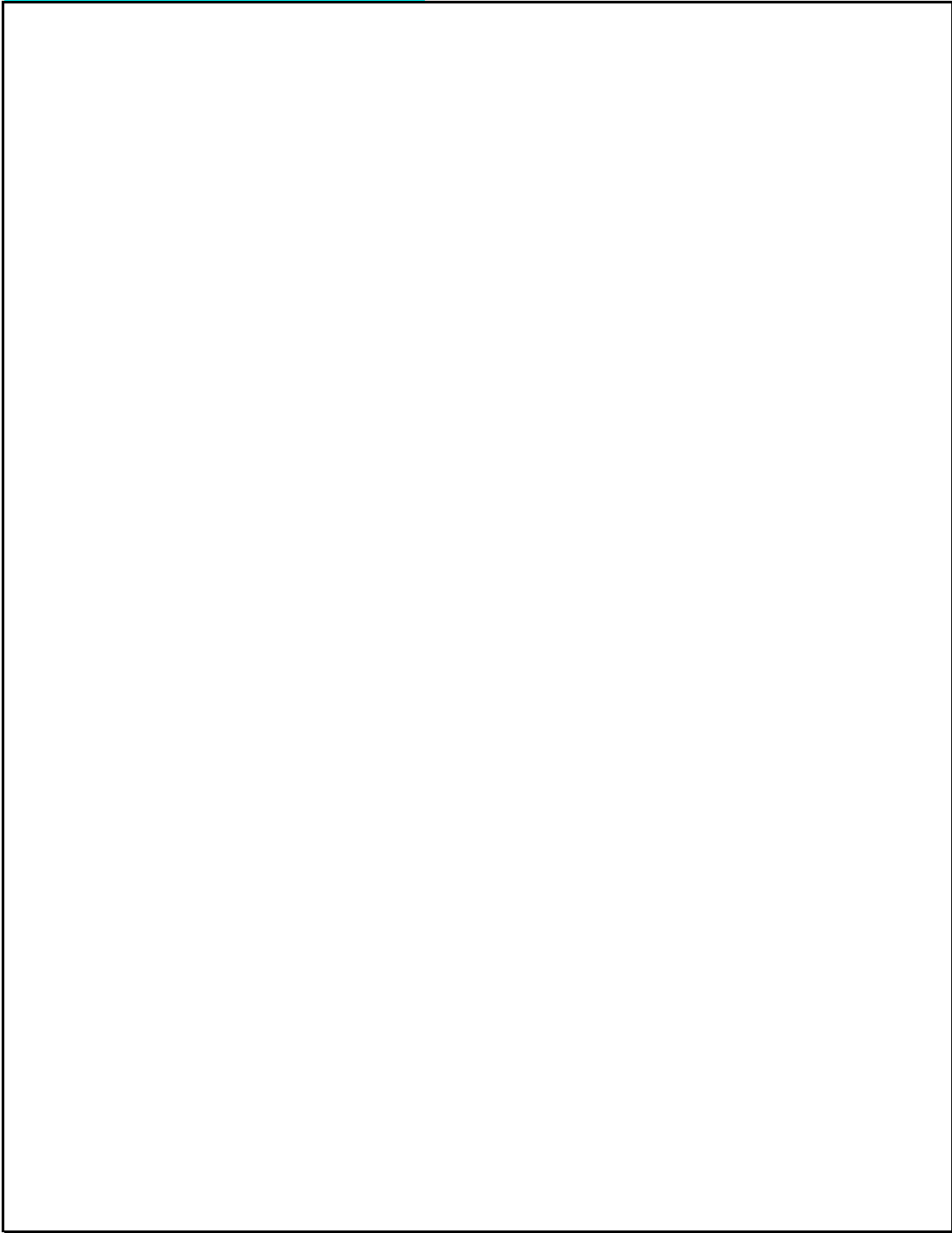
All these signs indicate that the production capacity of the stock, and its potential to sustain an economic activity, is severely hampered, and it is essential to allow it to recover, by preventing the addition of additional sources of mortality to this already depleted population.

Therefore, the WG recommends:

- To reduce fishing effort on anchovy in the Gulf of Lion, such as the case already applied by the fishery in an adaptive behavior in the first six month of 2010,
- To respect the European regulation on minimum length size of catch (> 9 cm, UE 1976/2006) to protect age 1, until constate a balanced stock, and significant anchovy biomass in age 2+ (by grow and/or immigration).

Gulf of Lion small pelagic fisheries are multispecies and effort on sardine cannot be separated from effort on sardine, so that most of the management decisions have to be taken, considering both species.

Advice for scientific research*



Abstract for SCSA reporting

Authors

BIGOT J.L., ROOS D., LE CORRE G.

Year

2010

Species Scientific name

Engraulis encrasicolus - ANE

Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area

07 - Gulf of Lions

Fisheries (brief description of the fishery)*

Source of management advice*

(brief description of material -data- and methods used for the assessment)

Stock Status*

F - Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;

Exploitation rate

Moderate fishing mortality

Stock abundance

Low abundance

Comments

The assessment provided here is entirely dependent on the assumption of Acoustic biomass providing unbiased estimates of the absolute level of biomass at sea. In support of the catchability assumption it is worthwhile mentioning however that a DEPM carried out in June 2007 on the Gulf of lion by Palomera et al (2007) gave a spawning biomass of about 21000 t, a value very close to the acoustic biomass estimate provided by PELMED for that year.

The evolution of the biomass of this stock provided by acoustic is almost consistent with that being recorded in GSA06 by the acoustic survey (ECOMED in SGMED-09-02 June 2009 WG report) and to the analysis of catches in that area (VPA). Given the uncertainties about the potential connection of the anchovy population in these two GSA areas and the parallel decrease of anchovy biomass in the two regions, this hypothesis should be considered at a supra-GSA scale.

Updated indicators :

1) Stock :

- Estimated total biomasses was 33,000 T in 2009 and 25,000 T in 2010 surveys. These biomasses levels were into the regular range of last part of the time series for the Gulf of Lion (between 20,000T and 33,000T in 2005-2010 period). Previously, it was a sequence with higher range of biomasses (1997 to 2004, 40,000 T to 80,000 T)
- Modale length class progressively decrease since 2005 to 2010 to reach to 10-13 cm in 2009-2010 (vs 13-14.5 cm before)
- Large anchovy (>15 cm) quasi disappear in 2009-2010, which are common during before 2007 (maximum length observed 18 cm in the gulf of Lion)

2) Fisherv :

Management advice and recommendations*

The stock seems to be highly unbalanced in 2009 and 2010, with a very low abundance of commercial-sized anchovy (groups 2+). Even if total biomass was not very much lower than the average level of the last six years (20,000 – 25,000 T), most of the recorded biomass consisted of 1-group anchovy, and even these showed a mean size and condition factors appreciably below the values usually found for this stock.

The low market status and the low catchability of the anchovy in the gulf of Lions do not justify a high fishing pressure and this have allowed a low exploitation rate during the last two years, particularly in 2010. Historically the economic value of the anchovy is variable and is the main factor affecting the level of fishing effort. This value is currently low however an increase of the price could produce an increase of the exploitation on ages 1+ in the short term preventing the biomass of large spawners (2+) to increase significantly.

The system of the Gulf of Lions shows important signs of disequilibrium since 2008, with important reductions and changes in structure of the stocks of sardine and anchovy, and an unusually high abundance of sprat.

All these signs indicate that the production capacity of the stock, and its potential to sustain an economic activity, is severely hampered, and it is essential to allow it to recover, by preventing the addition of additional sources of mortality to this already depleted population.

Therefore, the WG recommends:

- To reduce fishing effort on anchovy in the Gulf of Lion, such as the case already applied by the fishery in an adaptive behavior in the first six month of 2010,
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