SAC GFCM
Sub-Committee on Stock Assessment

Date*	**24**	**October**	**2011**	**Code***	**MUT0911Abe**

Authors*

Abella A., Colloca F., Ligas A., Mannini A., Sbrana M.

Affiliation*

ARPAT, Livorno; Univ.Roma La Sapienza, CIBM Livorno; Univ. Genova

Species Scientific name*

1

Source: GFCM Priority Species

2

Source: -

3

Source: -

Geographical area*

Ligurian and Tyrrhenian Seas

Geographical Sub-Area (GSA)*

09 - Ligurian and North Tirrenian Sea

Combination of GSAs 1

2

3

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Assessment form

Sheet #0
Basic data on the assessment

Code: MUT0911Abe

Date*	24	Oct	2011	Authors*	Abella A., Colloca F., Ligas A., Mannini A., Sbrana M.

Species Scientific name*	Mullus barbatus - MUT , ,	Species common name*	

Data Source

GSA*	09 - Ligurian and North Tirrenian Sea	Period of time*	1994-2010

Description of the analysis

Type of data*	catch, effort, abundance indexes, biological parameters	Data source*	catch assessment survey, trawl surveys
Method of assessment*	Non-equilibrium Production Model. LCA, Yield per recruit	Software used*	ASPIC 5.3; YR NOAA toolbox, LCA spreadsheet

Sheets filled out

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

Comments, bibliography, etc.

Comments, bibliography, etc.

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Assessment form

Sheet B
Biology of the species

Code: MUT0911Abe

Biology

Somatic magnitude measured (LH, LC, etc)*	5	Units*	1

Sex	Fem	Mal	Both	Unsexed		
Maximum size observed	29	22			Reproduction season	may-june
Size at first maturity	14	11			Reproduction areas	yes
Recruitment size	8	8			Nursery areas	yes

Parameters used (state units and information sources)

Sex	both							
Growth model	onBertalanffy							
Data source	rawl surveys							
L∞ (growth)	29							
K (growth)	0.6							
t0 (growth)	-0.1							
length-weight relationship								
a (length-weight)	0.00053							
b (length-weight)	3.12							
sex ratio	01:01							
M	vector	age1=1.3	age2=0.79	age3=0.62	age4=0.54	age>4=0.5		

Comments

Comments

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Assessment form

Sheet P1

General information about the fishery

Code: MUT0911Abe

Data source*	commercial catch+trawl surveys	Year (s)*	1994-2009
Data aggregation (by year, average figures between years, etc.)*	year		

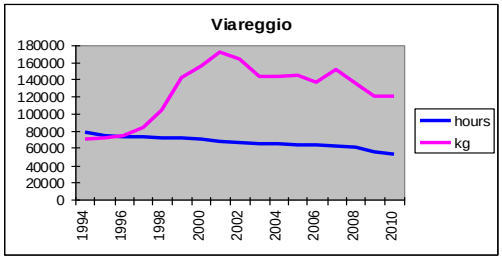
Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	ITA	09	D - Trawl (6-12 metres)	03 - Trawls	33 - Demersal shelf species	MUT
Operational Unit 2	ITA	09	E - Trawl (12-24 metres)	03 - Trawls	33 - Demersal shelf species	MUT
Operational Unit 3	ITA	09	B - Minor gear with engine (<6 metres)	9 - Gillnets and Entangling Nets	33 - Demersal shelf species	MUT
Operational Unit 4						
Operational Unit 5						

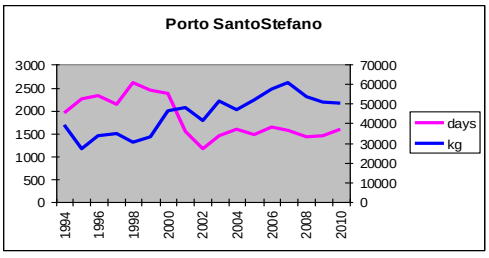
Operational Units*	Fleet (n° of boats)*	Kilos or Tons	Catch (species assessed)	Other species caught	Discards (species assessed)	Discards (other species caught)	Effort units
ITA 09 D 03 33 - MUT	250	Kg					
ITA 09 E 03 33 - MUT	101	Kg	786				
ITA 09 B 9 33 - MUT	50	Kg	22.2				
Total	401		808.2				

Legal minimum size	10

Comments



Catch and Effort (hours fishing) in Viareggio port



Catch and effort(days fishing) in porto Santo Stefano

Comments

	2004	2005	2006	2007	2008	2009	2010
Nets	60.0	24.0	16.0	9.0	11.0	21.0	22.2
Trawlers	521.0	684.0	1033.0	1087.0	716.0	707.0	764.2
Longlines					0.0		
Miscelaneus	2.3		0.5				
Seines	0.0	0.1					
TOTAL	583.3	708.1	1049.5	1096.0	727.0	728.0	786.7

Data source*	Official data	OpUnit 1*	ITA 09 D 03 33 - MUT

Time series

Year*	2004	2005	2006	2007	2008	2009
Catch	521.1	684	1033	1087	716.3	750
Minimum size	10	10	10	10	10	10
Average size Lc						
Maximum size						
Fleet						

Year	2010					
Catch	786.7					
Minimum size	13.6					
Average size Lc						
Maximum size						
Fleet						

Selectivity

L25	6
L50	7.4
L75	9
Selection factor	

Remarks

Structure by size or age

size	artisanal	b.trawl landed	b.trawl discard
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	6.6
7	0.0	0.0	10.7
8	0.0	77.7	50.3
9	0.0	422.4	262.8
10	0.0	1217.4	1052.2
11	0.0	1615.0	921.2
12	0.3	2418.1	480.6
13	0.6	2347.7	144.2
14	1.8	2467.4	57.1
15	57.1	2248.2	15.5
16	73.2	1581.8	6.3
17	105.7	1291.1	3.2
18	63.5	908.6	0.0
19	16.2	598.1	0.0
20	25.9	345.6	0.0
21	0.0	186.9	0.0
22	0.0	100.1	0.0
23	5.3	59.7	0.0
24	0.0	32.4	0.0
25	1.2	15.0	0.0
26	0.0	5.0	0.0
27	0.0	2.4	0.0
28	0.0	4.1	0.0
29	0.0	3.1	0.0
30	0.0	2.1	0.0
31	0.0	2.1	0.0
32	0.0	2.1	0.0

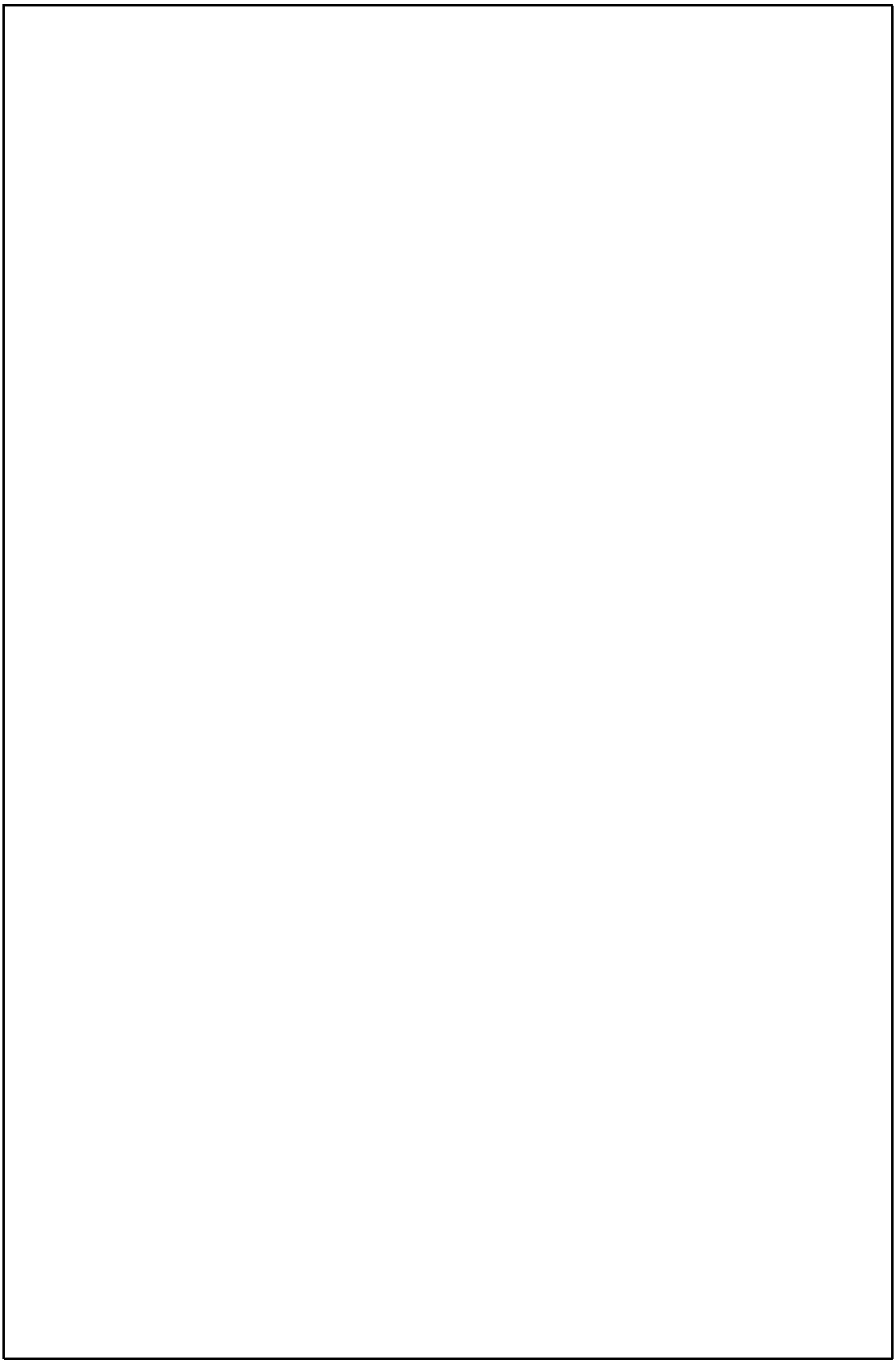
Structure by size or age

Data source*	Official data	OpUnit 1*	ITA 09 D 03 33 - MUT

Regulations in force and degree of observance of regulations

•Fishing closure for trawling: 45 days in late summer
•12 cm TL as minimum legal landed size
•Legal cod end mesh size 40mm stretched up to June 2010, 40 mm square mesh ir
•Trawling not allowed within three nautical miles from the coast or at depths less tha

Accompanying species



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Assessment form

Sheet G
Indirect methods. Global model

Code: MUT0911Abe

Analysis #*	1

Data source*	catch assessment surveys	Gear*	bottom trawl net

Model characteristic

Type of model*	Non-equilibrium Surplus Production Model	Fitting criterion	least squares procedure+ a robust objective function (least absolute
Software	ASPIC 5.3	Bibliographical source	Prager, 2005. ASPIC Manual, NOAA

Data

Year	see comments						
Catch							
Effort							
CPUE							

Year							
Catch							
Effort							
CPUE							

Adjustment

RMS	

Results

Carryng capacity	1157000	a	
Growth rate	0.85	b	
Catchability	0.00009959		
MSY	274500		
EMSY	Fmsy=0.474	TACMSY	
E0.1		TAC0.1	
Ecurrent	Fcurr 2010=0.54		

Comments

PORTO SANTO STEFANO

year	days	kg	KG/day
1994	1928	39029	20.2
1995	2250	27357	12.2
1996	2320	33643	14.5
1997	2137	34715	16.2
1998	2626	30091	11.5
1999	2454	33161	13.5
2000	2354	46063	19.6
2001	1532	48069	31.4
2002	1174	40993	34.9
2003	1448	51027	35.2
2004	1591	46948	29.5
2005	1475	51949	35.2
2006	1629	57511	35.3
2007	1550	60936	39.3
2008	1423	53411	37.5
2009	1449	50396	34.8
2010	1576	50176	31.8

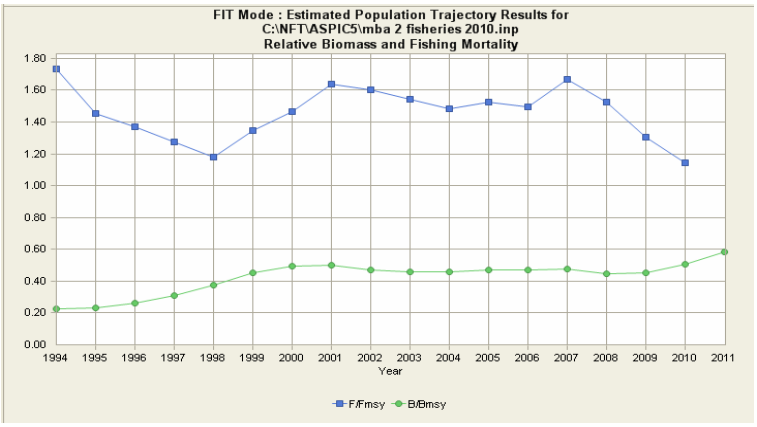
VIAREGGIO

year	hours	kg	kg/h
1994	78375	69650	0.9
1995	75240	71340	0.9
1996	74195	74663	1.0
1997	73150	85110	1.2
1998	71060	104051	1.5
1999	71060	141873	2.0
2000	70015	154654	2.2
2001	67925	170953	2.5
2002	66880	163647	2.4
2003	65835	143018	2.2
2004	64790	142679	2.2
2005	63745	144629	2.3
2006	63556	137005	2.2
2007	62630	150682	2.4
2008	61726	135800	2.2
2009	55403	120991	2.2
2010	53187	120734	2.3

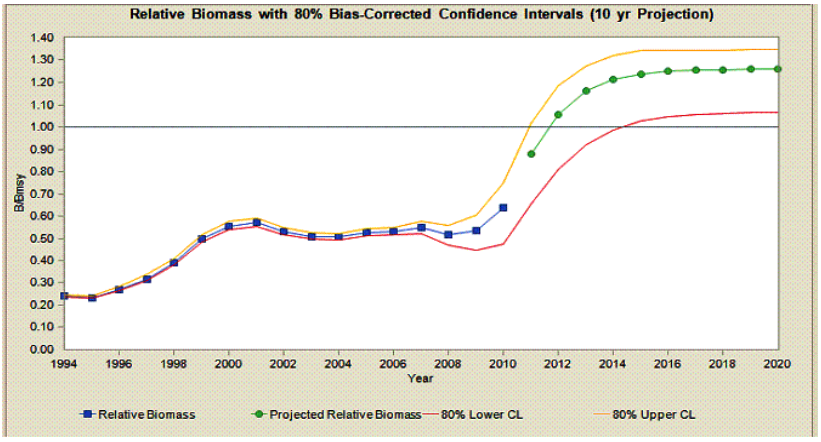
SURVEY ABBUND INDEX

year	Kg/Km2
1994	7.4
1995	11.0
1996	13.0
1997	14.6
1998	17.6
1999	19.3
2000	19.9
2001	22.5
2002	24.2
2003	23.0
2004	17.9
2005	16.4
2006	18.8
2007	17.8
2008	16.6
2009	15.5
2010	18.4

Comments



The assessment of the status of the stock derived from the Non-equilibrium Production Model ASPIC suggest that the stock is currently overexploited
(Bcurr/Bmsy Ratio: B (2009-2010) /Bmsy = 0.6)
Fcurr/FMSY is 1.14, which is much lower tna from previous years, suggesting that a reduction of F is occurring for this stock. In the case F is kept constant at current level in a short term is expected Biomass to reach about 90% of BMSY. A reduction of about 10% of F should drive B to BMSY and a reduction of about 20% will drive B/BMSY at 1.2



Expected B/BMSY rate by reducing F of 20%

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Assessment form

Sheet A1

Indirect methods: VPA, LCA

Code: MUT0911Abe

Sex*	

Analysis # *	

Time series

Data	Size	Age
(mark with X)	x	

Model	Cohorts	Pseudocohorts
(mark with X)		2010

Equation used	classical survival and catch equations	Tunig method	
# of gears		Software	excel spreadsheet
$F_{terminal}$			

Population results (please state units)

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

Average mortality

		Gear					
	Total						
F_1	0.54	ASPIC					
F_2	0.59	LCA					
Z							

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

Comments

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Assessment form

Sheet A3

Indirect methods: VPA results

Code: MUT0911Abe

Sex*		Gear*		Analysis #*	

Population in figures

age	N (x1000)
0	701250
1	88527
2	4371
3	753
4	142
5	56

Population in biomass

age	B year
0	1739438
1	2706776
2	379915
3	97584
4	22922
5	10273

Fishing mortality rates

age	F OTB landed	F OTB discarded	F artisanal
0	0.16	0.11	0.00
1	1.47	0.08	0.03
2	0.92	0.00	0.03
3	0.78	0.00	0.03
4	0.43	0.00	0.00
5	0.37	0.00	0.03

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet Y** **Indirect methods: Y/R**

Code: MUT0911Abe

Sex	M+F

Analysis #	1

# of gears	1	Software	Yield (FAO Package FAO Fish.Tech.Pap.487

Parameters used

Vector F	0-3
Vector M	0.65 (weighted average value)
Vector N	

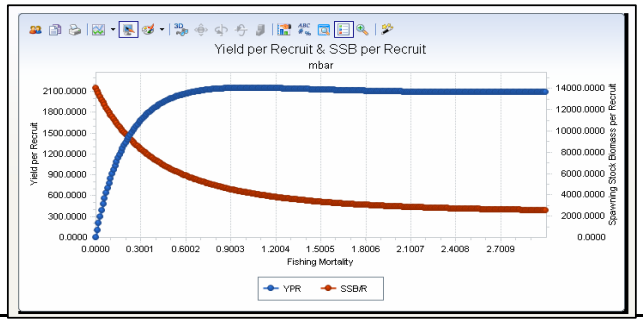
Model characteristics

The models allows estimating Y/R, B/R and some Reference Points as F0.1
Data requested: growth parameters, L/W relationship, an estimate of M, age of first capture

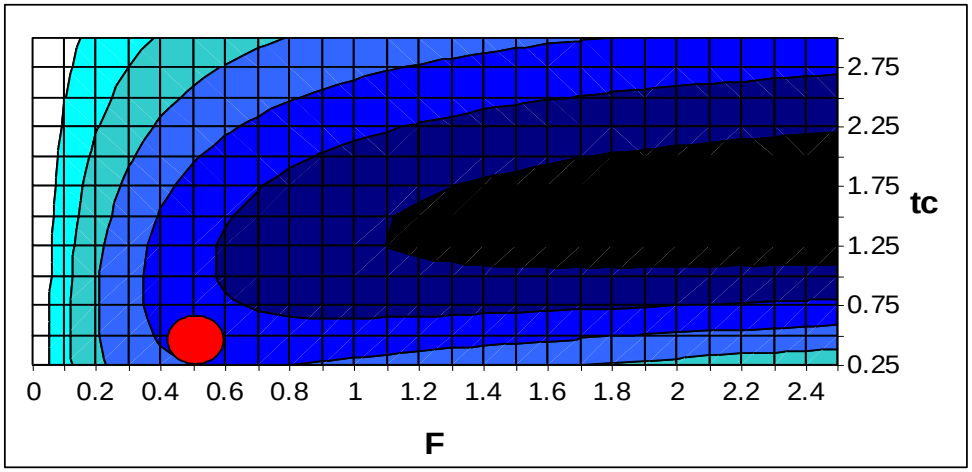
Results

	Total	Gear			
Current YR					
Maximum Y/R					
Y/R 0.1					
F_{max}	1.02				
$F_{0.1}$	0.48				
Current B/R					
Maximum B/R					
B/R 0.1					

Comments



Comments



An ASPIC forecasting model (ASPIC-P) was run to estimate future 10 years stock parameters under status
quo fishing mortality. Projections suggest that a light increase in biomass should occur in the medium term
(up to 2020) if F is kept at the current rate. The new biomass level that is assumed to be obtained at medium

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet D Diagnosis**

Code: MUT0911Abe

Reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B				+	Biomass is approaching Bmsy (about 60%)
SSB	0.3		F40%SSB	+	F40%SSB=0.63
F			Fmsy	-	F is decreasing and approaching Fmsy (Fcurr/Fmsy=1.14)
Y					
CPUE				+	cpue's are lightly increasing

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

Unidimensional

○	? - (or blank) Not known or uncertain. Not much information is available to make a judgment;
○	U - Underexploited, undeveloped or new fishery. Believed to have a significant potential for expansion in total production;
○	M - Moderately exploited, exploited with a low level of fishing effort. Believed to have some limited potential for expansion in total production;
○	F - Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;
◉	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;
○	D - Depleted. Catches are well below historical levels, irrespective of the amount of fishing effort exerted;
○	R - Recovering. Catches are again increasing after having been depleted or a collapse from a previous;

Bidimensional

Exploitation rate

○	No or low fishing
○	Moderate fishing
◉	High fishing mortality
○	Uncertain / Not assessed

Stock abundance

○	Virgin or high abundance
○	Intermediate abundance
◉	Low abundance

○	Depleted
○	Uncertain / Not assessed

Comments

Code: MUT0911Abe

Management advice and recommendations*

The species is considered overexploited. The current F was estimated with ASPIC to be of 0.73. The value of the Reference Point Fmsy resulted to be 0.64. An overexploitation status is assumed and it is advisable a reduction of fishing mortality. Simulations suggest that a reduction of about 20%, the Biomass will reach the level of Bmsy in a medium term.
It is also advisable to reduce the fishing pressure on the individuals of small size, concentrated near the shore in late Summer-Autumn. Such change in the fishing pattern is expcted to improve Y/R.

Advice for scientific research*

Abstract for SCSA reporting

Authors Abella A., Colloca F., Ligas A., Mannini A., Sbrana M.

Year 2011

Species Scientific name Mullus barbatus - MUT

Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area 09 - Ligurian and North Tirrenian Sea

Fisheries (brief description of the fishery)*

Source of management advice*

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

Stock Status*

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;

Exploitation rate

High fishing mortality

Stock abundance

Low abundance

Comments

Management advice and recommendations*

Advice for scientific research*