



# Stock Assessment Form of *Mullus surmuletus* (Demersal sp.) in GSA 26

**Reference Year: 2016**

**Reporting Year: 2017**

Five species (*Mullus surmuletus*, *Mullus barbatus*, *Upeneus moluccensis*, *Upeneus pori*, *Parupeneus forsskali*) of the family Mullidae were recorded in the catch of Egyptian Mediterranean (GSA 26). *Mullus surmuletus* is one of the important commercial species in the Mediterranean waters of Egypt (GSA 26). Its landings were 779 tonnes during 2014, 529 tons during 2015 and 483 during 2016. The landed catch of *Mullus surmuletus* came mainly from the trawl vessels and it constituted about 55% of the goatfishes in GSA 26. The size of the sample ranged between 7 and 29 cm and the information used for the assessment of the stock consisted of catch length structure, length weight relationship, Von Bertalanffy growth parameters, Sex ration, the values of total (Z) and fishing (F) mortalities, length at first sexual maturity, yield per recruit, biomass per recruit and biological reference points. ProdBiom was used to estimate natural mortalities. Length cohort analysis and Beverton & Holt Yield per recruit analysis were performed in order to estimate the limit and target reference points using different models such as LFDA & VIT4WIN. According to the obtained results, the current fishing level of *M. surmuletus* is higher than the biological reference point ( $F_{0.1}$ ) that shows a state of high overfishing in GSA 26 (according to GFCM recommendations 2012).

# Stock Assessment Form version 1.0 (January 2014)

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## Stock assessment form

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# 1 Basic Identification Data

<b>Scientific name:</b>	<b>Common name:</b>	<b>ISCAAP Group:</b>
<i>Mullus surmuletus</i>	Striped Red Mullet	
<b>1<sup>st</sup> Geographical sub-area:</b>	<b>2<sup>nd</sup> Geographical sub-area:</b>	<b>3<sup>rd</sup> Geographical sub-area:</b>
[GSA_26]		
<b>1<sup>st</sup> Country</b>	<b>2<sup>nd</sup> Country</b>	<b>3<sup>rd</sup> Country</b>
Egypt		
<b>Stock assessment method: (direct, indirect, combined, none)</b>		
Indirect Methods (VPA with VIT and yield per recruit model)		
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## **2 Description of the fisheries**

The fishing grounds along the Egyptian Mediterranean coast are divided into four regions; Western region (from Alexandria to El-Salloum), Nile Delta region, Damietta region and Eastern region (From Port Said to Rafah).

The continental shelf is narrow in the western region comparable to the wider delta and Damietta and eastern regions. Fish production in this area is low due to the nature of the bottom (mostly rocky) and the limited fishing grounds for trawling.

The main fishing grounds used by the Egyptian vessels are on the continental shelf off the Nile delta; recently extend to the eastern side off Sinai Peninsula and seasonally to the western side of Alexandria. The seabed along the middle and eastern area is flat, mostly muddy to sandy and is suitable for trawling.

There are nine official main landing centers (Fishing ports) most of them are located along the Nile River Delta region.

### ***2.1 Data and parameters:***

Monthly samples were collected from landings during the period from January till December 2016. The monthly length frequency distributions were raised to the monthly landings and analyzed by ELEFAN program incorporated in LFDA software for the estimation of growth parameters for the sexes combined. The lengthweight relationship, the length at first maturity ( $L_{m50}$ ) and the sex ratio were also studied. ProdBiom was used to estimate natural mortalities.

### ***2.2 Assessment method:***

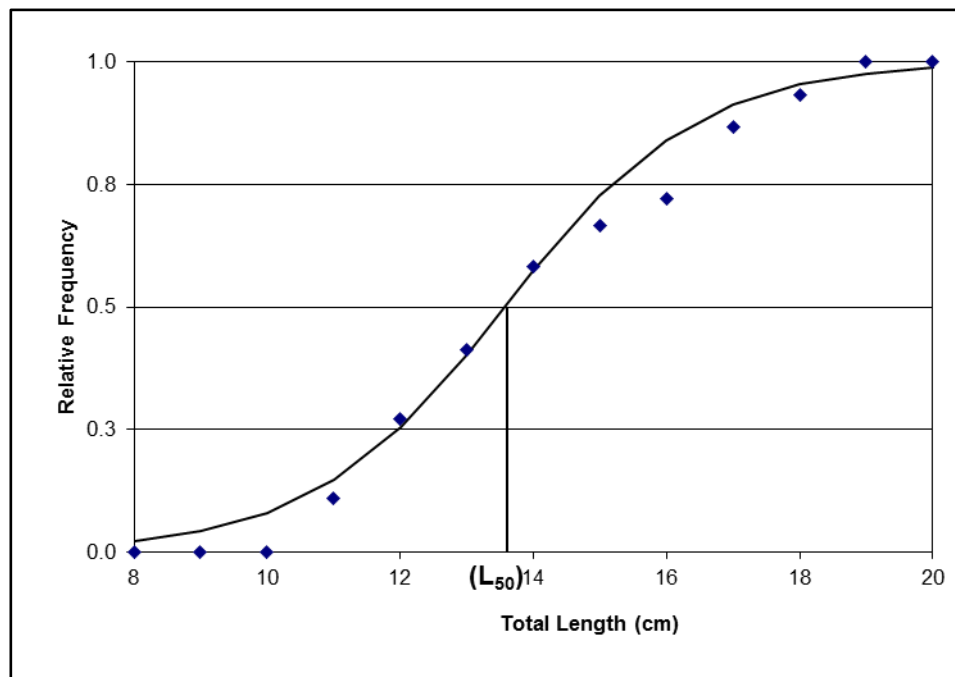
VIT software was used for pseudo cohort analysis (Leonart and Salat, 1992). In addition, The Y/R analysis which implemented in VIT was applied for the calculation of the reference point  $F_{0.1}$ .

### 2.2.1 Stock unit

### 2.2.2 Growth and maturity

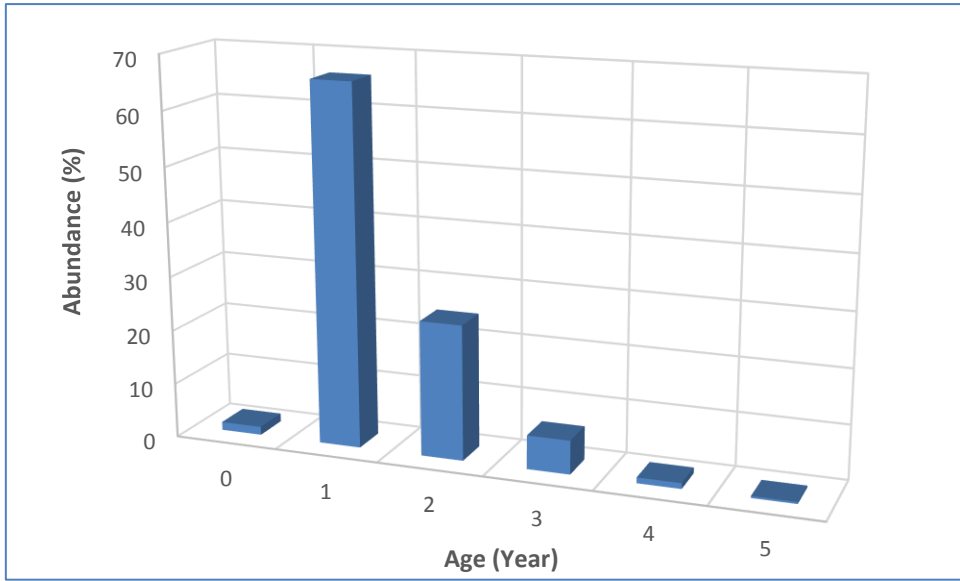
Table 2.2-1: Maximum size, size at first maturity and size at recruitment.

Somatic magnitude measured (LT, LC, etc)				Units	
Sex	Fem	Mal	Combined	Reproduction season	From April to June
Maximum size observed			29 cm	Recruitment season	
Size at first maturity			13.57 cm	Spawning area	
Recruitment size to the fishery			7.01 cm	Nursery area	

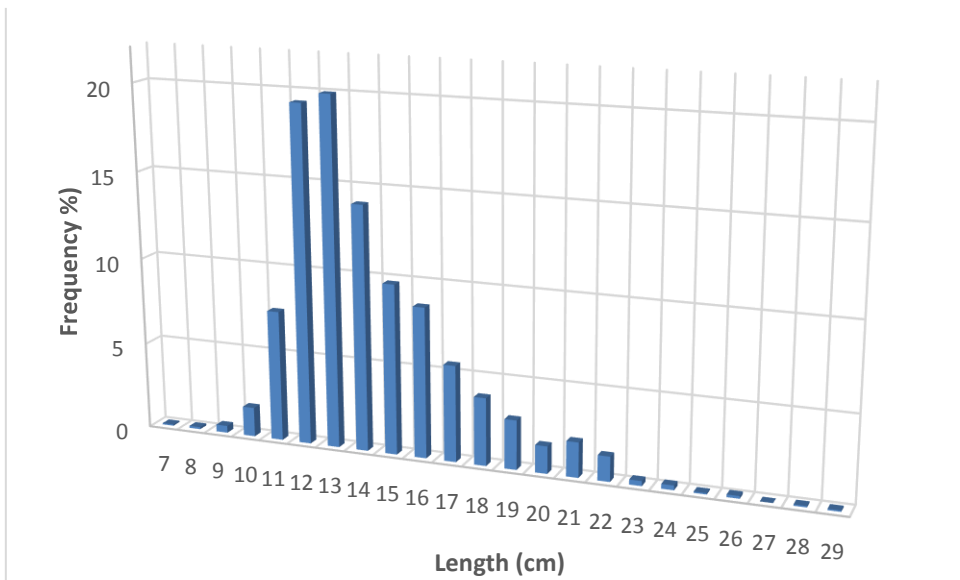


Length

at first sexual maturity of *Mullus surmuletus*



**Age composition of *Mullus surmuletus* in 2016.**



**Length frequency of *Mullus surmuletus* in GSA 26.**

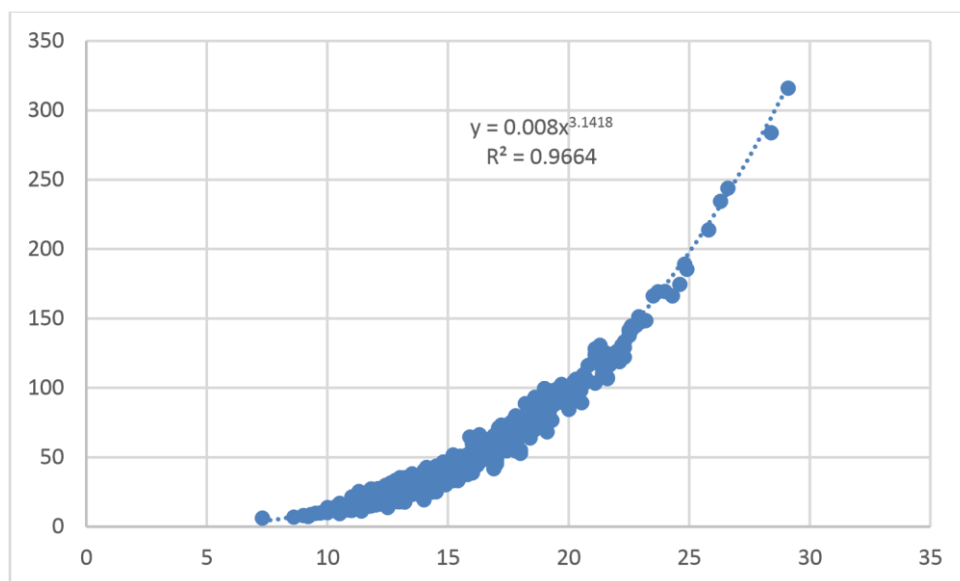
Table 2.2-2: M vector and proportion of matures by length class

		Sex				
		Units	female	male	Combined	Years
Growth model	L <sub>∞</sub>				36.51	2016
	K				0.21	
	t <sub>0</sub>				-0.62	
	Data source	.ength frequency				
Length weight relationship	A				0.008	
	B				3.1418	
	sex ratio (% females/total)	% 43				

Table 2.2-3: Growth and length weight model parameters

L. class (cm)	Maturity ratio	M (ProdBiom)
7	0.00	1.208
8	0.00	1.208
9	0.00	1.208
10	0.00	1.208
11	0.11	0.370
12	0.27	0.370
13	0.41	0.370
14	0.58	0.370
15	0.67	0.370
16	0.72	0.230
17	0.87	0.230
18	0.93	0.230
19	1.00	0.183
20	1.00	0.183
21	1.00	0.183
22	1.00	0.160
23	1.00	0.160
24	1.00	0.160
25	1.00	0.146
26	1.00	0.146
27	1.00	0.146
28	1.00	0.146
29	1.00	0.146





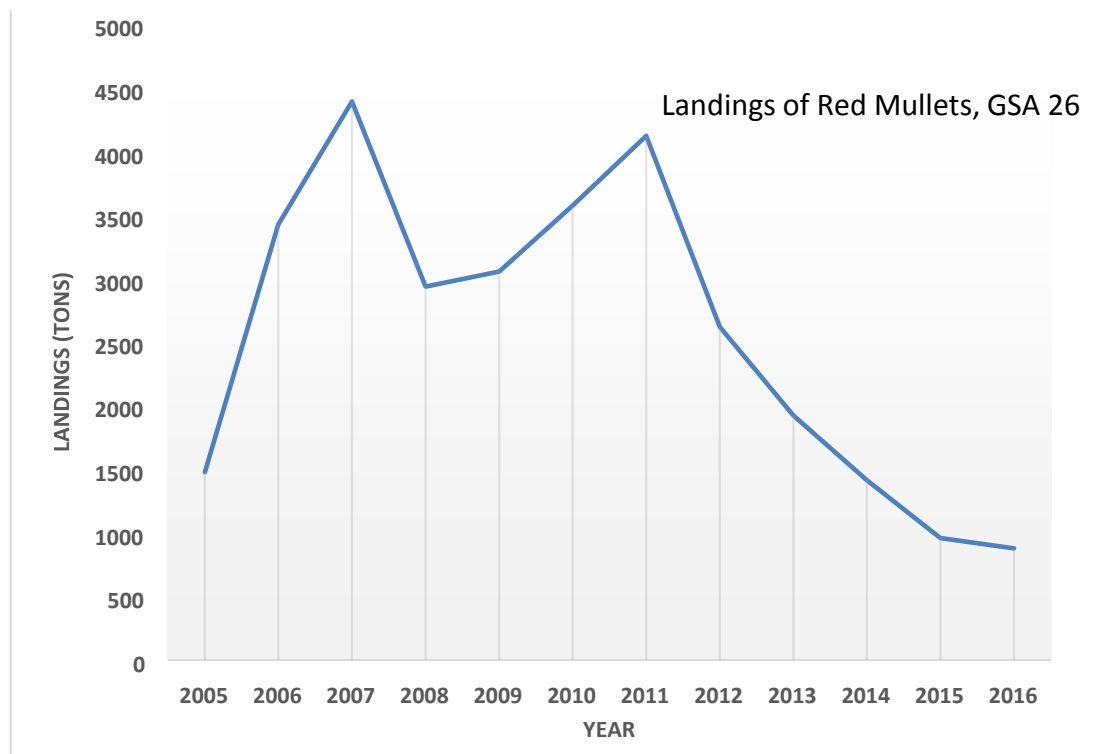
**Length weight relationship of *Mullus surmuletus* in 2016.**

### 3 Fisheries information

*Table 0.1-1: Catch, bycatch, discards and effort by operational unit in the reference year*

Operational Units*	Fleet (n° of boats)*	Catch per ton (species assessed)	Effort units
Trawlers	1049	<b>483 Tons (2016)</b>	<b>No. of fishing vessels</b>
Purse seiners	253		
Longline	1185		
Trammel Net	623		

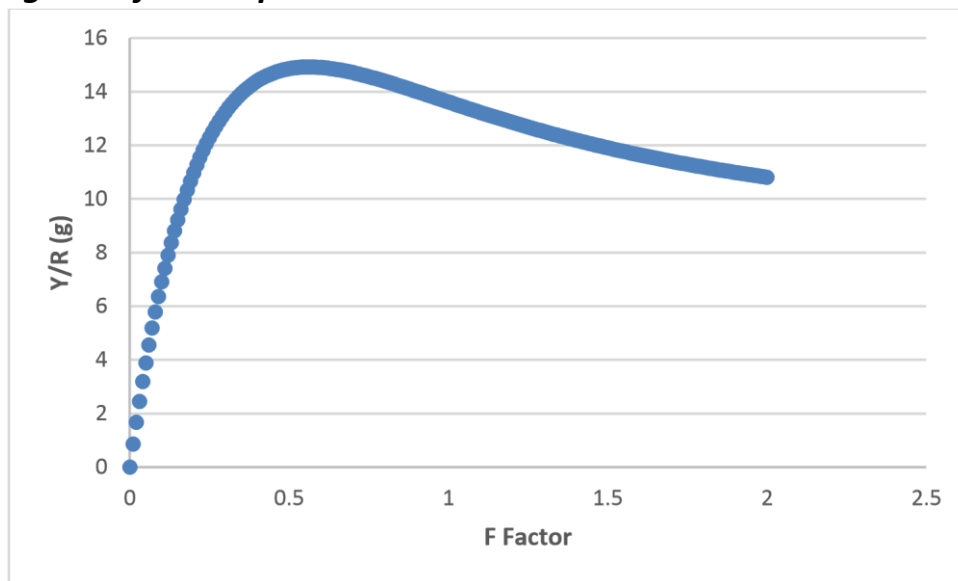
### 3.1 Historical trends



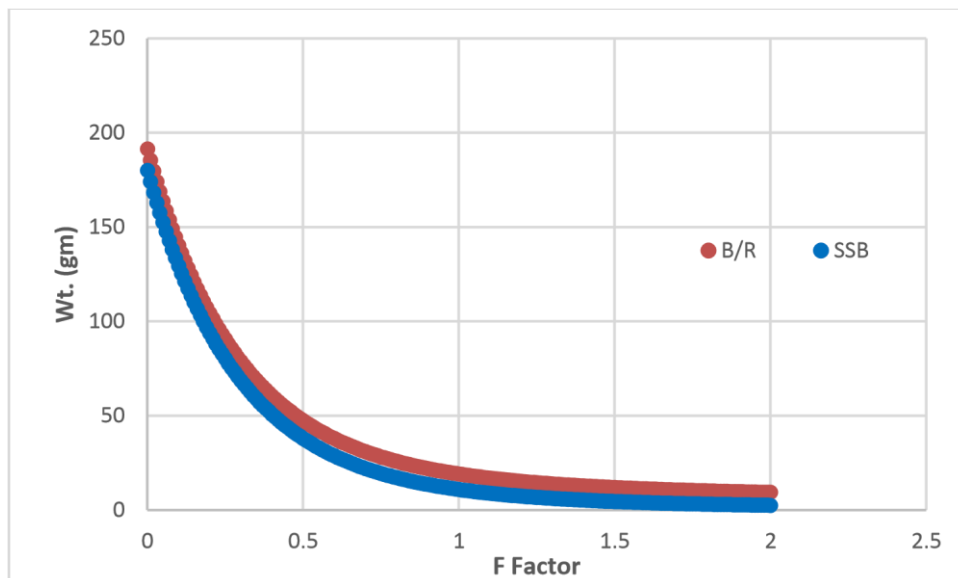
### 3.2 Management regulations

The fisheries management tools for the Egyptian Mediterranean coast are limited (for example, there is no implementation for the recommended minimum landing sizes and the closed season is barely implemented). The only used management tool is to freeze the fishing licenses.

### 3.3 Biological reference point:



Yield per recruit of *Mullus surmuletus* in 2016, GSA 26.



Biomass per recruit and SSB of *Mullus surmuletus* in 2016, GSA 26.

### 3.4 Reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B/R	19.081		$B/R_{0.1} = 62.057$		
SSB	10.888		$SSB_{0.1} = 52.264$		
$F_{cur}$	0.556	Year <sup>-1</sup>	$F_{0.1} = 0.2168$	$F_{cur}/F_{0.1} = 2.564$	The stock of <i>Mullus surmuletus</i> in GSA (26) is in high overexploitation
Y/R	13.615		$Y/R_{0.1} = 14.321$		

### 3.5 Reference points

Year	$F_c$	$F_{0.1}$	$F_{max}$	$F_{0.1}/F_{curr}$
2011	0.395	0.217	0.308	1.82
2012	0.464	0.223	0.316	2.08
2013	0.485	0.228	0.33	2.128
Merged data (2011-2013)	0.482	0.188	0.27	2.56
2016	0.556	0.217	0.317	2.56

## 4 Draft scientific advice

Based on	Indicator	Analytic al reference point (name and value)	Current value from the analysis (name and value)	Empirical reference value (name and value)	Trend (time period)	Stock Status
<b>Fishing mortality</b>	Fishing mortality	( $F_{0.1} = 0.217$ , $F_{max}=0.317$ )	$F_c = 0.556$		I	$IO_H$ High overfishing
	Fishing effort					
	Catch					
<b>Stock abundance</b>	Biomass	( $B/R_{0.1}=62.057$	$B/R_{cur} = 19.081$			
	SSB	$SSB_{0.1} = 52.264$	$SSB_{cur} = 10.888$			
<b>Recruitment</b>						
<b>Final Diagnosis</b>	According to the results obtained in (2011, 2012, 2013 & 2016), the current fishing level of the striped red mullet is higher than the biological reference points ( $F_{0.1}$ ) which shows that <i>Mullus surmuletus</i> resources in GSA 26 is in overexploitation (according to GFCM recommendations 2012).					
<b>Recommendations</b>	It is recommended to maintain the fishing mortality of the striped red mullet in GSA 26 in line (equal or less) with the agreed reference point. It is also recommended to improve the selection pattern of the trawl fishery.					

## 4.2 Explanation of codes

### Trend categories

- 1) N - No trend
- 2) I - Increasing
- 3) D – Decreasing
- 4) C - Cyclic

### Stock Status

#### Based on Fishing mortality related indicators

- 1) **N - Not known or uncertain** – Not much information is available to make a judgment;
- 2) **U - undeveloped or new fishery** - Believed to have a significant potential for expansion in total production;
- 3) **S - Sustainable exploitation**- fishing mortality or effort below an agreed fishing mortality or effort based Reference Point;
- 4) **IO –In Overfishing status**– fishing mortality or effort above the value of the agreed fishing mortality or effort based Reference Point. An agreed range of overfishing levels is provided;

#### Range of Overfishing levels based on fishery reference points

In order to assess the level of overfishing status when  $F_{0.1}$  from a Y/R model is used as LRP, the following operational approach is proposed:

- If  $F_c^*/F_{0.1}$  is below or equal to 1.33 the stock is in (**O<sub>L</sub>**): **Low overfishing**
- If the  $F_c/F_{0.1}$  is between 1.33 and 1.66 the stock is in (**O<sub>I</sub>**): **Intermediate overfishing**
- If the  $F_c/F_{0.1}$  is equal or above to 1.66 the stock is in (**O<sub>H</sub>**): **High overfishing** \* $F_c$  is current level of F

- 5) **C- Collapsed**- no or very few catches;

#### Based on Stock related indicators

- 1) **N - Not known or uncertain**: Not much information is available to make a judgment
- 2) **S - Sustainably exploited**: Standing stock above an agreed biomass based Reference Point;
- 3) **O - Overexploited**: Standing stock below the value of the agreed biomass based Reference Point. An agreed range of overexploited status is provided;

## Empirical Reference framework for the relative level of stock biomass index

- **Relative low biomass:** Values lower than or equal to 33<sup>rd</sup> percentile of biomass index in the time series (**O<sub>L</sub>**)
  - **Relative intermediate biomass:** Values falling within this limit and 66<sup>th</sup> percentile (**O<sub>I</sub>**)
  - **Relative high biomass:** Values higher than the 66<sup>th</sup> percentile (**O<sub>H</sub>**)
- 4) **D – Depleted:** Standing stock is at lowest historical levels, irrespective of the amount of fishing effort exerted;
- 5) **R –Recovering:** Biomass are increasing after having been depleted from a previous period;

### ***Agreed definitions as per SAC Glossary***

***Overfished (or overexploited)*** - A stock is considered to be overfished when its abundance is below an agreed biomass based reference target point, like *B<sub>0.1</sub>* or *B<sub>MSY</sub>*. To apply this denomination, it should be assumed that the current state of the stock (in biomass) arises from the application of excessive fishing pressure in previous years. This classification is independent of the current level of fishing mortality.

***Stock subjected to overfishing (or overexploitation)*** - A stock is subjected to overfishing if the fishing mortality applied to it exceeds the one it can sustainably stand, for a longer period. In other words, the current fishing mortality exceeds the fishing mortality that, if applied during a long period, under stable conditions, would lead the stock abundance to the reference point of the target abundance (either in terms of biomass or numbers)