
French-Spanish Working Group
IFREMER-IEO-CSIC/ICM-CNR/ITPP

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IEO- Centro Oceanográfico de Murcia, Varadero 1, 30740 S. P. del Pinatar (Spain)

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CSIC-ICM, Passeig Joan de Borbó s/n, 08039 Barcelona (Spain)

P. Caltagirone
CNR/ITPP, Via Luigi Vaccara 61, 91026 Mazzara del Vallo TP (Italy)
During the last meeting of the Scientific Advisory Committee (SAC) of GFCM, it was agreed that resource assessment forms should be prepared and distributed.

For the time being, the aim of delivering these assessment forms is to make an estimation of our real possibilities to yield useful results for the management of our fishery resources.

Each assessment will consist of several sheets of paper sharing the same code. The format will be at the option of the person in charge. Each assessment will take, at least, one sheet of paper numbered “0” (Sheet #0) and will also include no less than one copy of sheets “B”, “P1” and “P2a”. It is not compulsory to fill out any of the other sheets that make up this assessment form, but the person in charge is supposed to fill out some of them: otherwise no assessment is actually made. There may be more than one copy in several cases. Sheets “D” (diagnosis) and “Z” (conclusions and recommendations) should be considered as essential too.

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Title</th>
<th>Contents</th>
<th># of sheets</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Preliminary basic data on the assessment</td>
<td>Species, person in charge, date and code. All the sheets that belong to the same assessment share this code.</td>
<td>1</td>
<td>Indispensable</td>
</tr>
<tr>
<td>B</td>
<td>Biology of the species</td>
<td>Biological parameters used in the analyses (it is assumed that only one set of parameters is used)</td>
<td>1</td>
<td>Indispensable</td>
</tr>
<tr>
<td>P1</td>
<td>General information about the fishery</td>
<td>Catches by gear and associated fleet</td>
<td>1 or more</td>
<td>Indispensable</td>
</tr>
<tr>
<td>P2a</td>
<td>Fishery by gear</td>
<td>Time series for the type of gear in question, including structure by size (or age)</td>
<td>At least as many as in previous section</td>
<td>Indispensable</td>
</tr>
<tr>
<td>P2b</td>
<td>Fishery by gear</td>
<td>Accompanying species and regulations applicable to gear</td>
<td>At least as many as in previous section</td>
<td>If available</td>
</tr>
<tr>
<td>TS1</td>
<td>Direct methods: swept area</td>
<td></td>
<td></td>
<td>If available</td>
</tr>
<tr>
<td>TS2</td>
<td>Direct methods: swept area</td>
<td></td>
<td></td>
<td>If available</td>
</tr>
<tr>
<td>TS3</td>
<td>Direct methods: swept area</td>
<td></td>
<td></td>
<td>If available</td>
</tr>
<tr>
<td>TS4</td>
<td>Direct methods: swept area</td>
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<td>If available</td>
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<tr>
<td>AS</td>
<td>Direct methods: acoustics</td>
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<td>If available</td>
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<tr>
<td>PH</td>
<td>Direct methods: egg production</td>
<td></td>
<td></td>
<td>If available</td>
</tr>
<tr>
<td>G</td>
<td>Indirect methods: global model</td>
<td>Description of model, data, parameters and results of each analysis</td>
<td>As many as used in the analysis</td>
<td>If available</td>
</tr>
<tr>
<td>A1</td>
<td>Indirect methods: VPA, LCA</td>
<td>Description of model used and of general results of an analysis</td>
<td>As many as used in the analysis</td>
<td>If available</td>
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<tr>
<td>A2</td>
<td>Indirect methods: data</td>
<td>Description of data used by gear for the analysis in A1</td>
<td>As many as used in the analysis by gear</td>
<td>If available, requires A1</td>
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<tr>
<td>A3</td>
<td>Indirect methods: results of VPA</td>
<td>Detailed description of results by gear, structured by size or age</td>
<td>As many as used in the analysis by gear</td>
<td>If available, requires A1</td>
</tr>
<tr>
<td>Y</td>
<td>Indirect methods: Y/R</td>
<td>Description of model, data, parameters and results</td>
<td>As many as used in the analysis</td>
<td>If available</td>
</tr>
<tr>
<td>D</td>
<td>Diagnosis</td>
<td>Synthesis of results of analyses and diagnosis on the state of resources</td>
<td>1</td>
<td>Indispensable</td>
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<tr>
<td>Z</td>
<td>Objectives and recommendations</td>
<td>Set the objectives to be attained and recommendations for their attainment</td>
<td>1</td>
<td>Indispensable</td>
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<tr>
<td>C</td>
<td>Comments</td>
<td>At the option of the person in charge</td>
<td>Unspecified</td>
<td>If available</td>
</tr>
</tbody>
</table>

February 21st, 1997; Jordi Leonart
### Basic data on the assessment

<table>
<thead>
<tr>
<th>Date</th>
<th>Person in charge</th>
<th>Code</th>
<th>Species common name</th>
<th>Species name</th>
</tr>
</thead>
<tbody>
<tr>
<td>28/02/01</td>
<td>French-Spanish Working Group</td>
<td>MGL9800</td>
<td>Hake</td>
<td>Merluccius merluccius</td>
</tr>
</tbody>
</table>

#### Data source

- **Geographical limits**: Gulf of Lions
- **Period of time**: 1998-2000

#### Description of the analysis

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Data source</th>
<th>Method of assessment</th>
<th>Software used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size composition of landings</td>
<td>IFREMER and IEO</td>
<td>Pseudocohort analysis</td>
<td>VIT (Lleonart and Salat, 1992)</td>
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<tr>
<td>Commercial catches</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Sheets filled out

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

#### Comments, bibliography, etc.


### Biology

<table>
<thead>
<tr>
<th>Somatic magnitude measured (LH, LC, etc)</th>
<th>Total length</th>
<th>Units</th>
<th>Centimeters</th>
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<tbody>
<tr>
<td>Maximum size observed</td>
<td>Fem 96</td>
<td>Mal 69</td>
<td>Reproduction season</td>
</tr>
<tr>
<td>Onset of maturity size*</td>
<td>Fem 37</td>
<td>Mal 28</td>
<td>Reproduction areas</td>
</tr>
<tr>
<td>Recruitment size</td>
<td>Fem</td>
<td>Mal</td>
<td>Nursery areas</td>
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</table>

#### Parameters used (state units and information sources)

<table>
<thead>
<tr>
<th>Growth model</th>
<th>Sex</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source</td>
<td>Length frequency distributions analysis (Aldebert and Recasens, 1996)</td>
<td>Von Bertalanffy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L∞ (growth)</td>
<td>100.7 cm</td>
<td>72.8 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K (growth)</td>
<td>0.124 years⁻¹</td>
<td>0.149 years⁻¹</td>
<td></td>
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</tr>
<tr>
<td>t₀ (growth)</td>
<td>-0.350 years</td>
<td>-0.383 years</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters used (state units and information sources)</th>
<th>Growth model</th>
<th>Sex</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length-weight relationship</td>
<td>Biological studies (Aldebert and Recasens, 1996)</td>
<td>Von Bertalanffy</td>
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<td></td>
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<td>a (length-weight)</td>
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<td>0.0069</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>b (length-weight)</td>
<td></td>
<td>3.03</td>
<td></td>
<td></td>
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<tr>
<td>sex ratio</td>
<td></td>
<td>0.18</td>
<td>0.22</td>
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</table>

(*) Aldebert and Recasens (1996)

#### Comments

Sex-ratio from Aldebert and Recasens (1996)
### General information about the fishery

**Data source:** IFREMER and IEO (French and Spanish Official data)  
**year(s):** 1998-2000  
**Data aggregation (e.g. by year, average figures between years):** Average 1998-2000

### Fleet and catches (please state units)

<table>
<thead>
<tr>
<th>Gear</th>
<th>Fleet (# of boats)</th>
<th>Catch (species assessed)</th>
<th>other species caught</th>
<th>Discards (species assessed)</th>
<th>Discards (other species caught)</th>
</tr>
</thead>
<tbody>
<tr>
<td>French trawl</td>
<td>113</td>
<td>1520 tons</td>
<td>See sheet P2b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>French gillnet</td>
<td>95</td>
<td>501 tons</td>
<td>See sheet P2b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish trawl</td>
<td>26</td>
<td>237 tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish longline</td>
<td>20</td>
<td>128 tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2386 tons</strong></td>
<td></td>
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</tbody>
</table>

**Legal minimum size:** 20 cm total length

### Comments

**Period: 1988-1991**

<table>
<thead>
<tr>
<th>Gear</th>
<th>Boats</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>French trawl</td>
<td>170</td>
<td>2063</td>
</tr>
<tr>
<td>French gillnet</td>
<td>20</td>
<td>369</td>
</tr>
<tr>
<td>Spanish trawl</td>
<td>26</td>
<td>335</td>
</tr>
<tr>
<td>Spanish longline</td>
<td>13</td>
<td>125</td>
</tr>
</tbody>
</table>

**Period 1998-2000 (French and Spanish official data)**

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>GRT</th>
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</thead>
<tbody>
<tr>
<td>French trawlers</td>
<td>21 (13-26)</td>
</tr>
<tr>
<td>French gillnetters</td>
<td>6.5 (3.9-11.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine Power (HP)</th>
<th>TRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish trawlers</td>
<td>500</td>
</tr>
<tr>
<td>Spanish longline</td>
<td>130</td>
</tr>
</tbody>
</table>
**Data source**: IFREMER  
**Gear**: French trawl

<table>
<thead>
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<tbody>
<tr>
<td>Catch</td>
<td>2013</td>
<td>1903</td>
<td>1350</td>
<td>2985</td>
<td>1688</td>
<td>1525</td>
<td>1347</td>
<td>1520</td>
<td></td>
</tr>
<tr>
<td>Minimum size</td>
<td>10</td>
<td></td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average size</td>
<td>22.6</td>
<td>17.3</td>
<td>20.7</td>
<td>20.0</td>
<td>18.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum size</td>
<td>88</td>
<td></td>
<td>92</td>
<td>77</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleet</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>113</td>
<td>113</td>
<td>113</td>
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**Selectivity**

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<td>L25</td>
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<tr>
<td>L50</td>
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<tr>
<td>L75</td>
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**Structure by size or age**

<table>
<thead>
<tr>
<th>Period 1998-2000</th>
<th>Total</th>
<th>French trawl</th>
<th>French gillnet</th>
<th>Spanish trawl</th>
<th>Spanish longline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females catch mean (cm)</td>
<td>19.6</td>
<td>18.6</td>
<td>40.8</td>
<td>18.1</td>
<td>61.7</td>
</tr>
<tr>
<td>Females catch mean (yrs)</td>
<td>1.4</td>
<td>1.3</td>
<td>3.9</td>
<td>1.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Males catch mean (cm)</td>
<td>19.5</td>
<td>18.9</td>
<td>39.2</td>
<td>18.2</td>
<td>52.5</td>
</tr>
<tr>
<td>Males catch mean (yrs)</td>
<td>1.8</td>
<td>1.7</td>
<td>4.9</td>
<td>1.6</td>
<td>8.7</td>
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</table>

Length frequency distributions (cm total length) of French trawl catches by sex and year
Data source: IFREMER

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Catch</td>
<td>385</td>
<td>388</td>
<td>308</td>
<td>396</td>
<td>500</td>
<td>500</td>
<td>500</td>
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<td>Minimum size</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Average size</td>
<td>43</td>
<td>13</td>
<td>16</td>
<td>18</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Maximum size</td>
<td>86</td>
<td>71</td>
<td>77</td>
<td>74</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleet</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>95</td>
<td>95</td>
<td>95</td>
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Selectivity

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<tr>
<td>L₅₀</td>
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<tr>
<td>L₇₅</td>
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Structure by size or age

<table>
<thead>
<tr>
<th>Period 1998-2000</th>
<th>Total</th>
<th>French trawl</th>
<th>French gillnet</th>
<th>Spanish trawl</th>
<th>Spanish longline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females catch mean (cm)</td>
<td>19.6</td>
<td>18.6</td>
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<td>7.6</td>
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</tr>
<tr>
<td>Males catch mean (yrs)</td>
<td>1.8</td>
<td>1.7</td>
<td>4.9</td>
<td>1.6</td>
<td>8.7</td>
</tr>
</tbody>
</table>

Length frequency distributions (cm total length) of French gillnets catches by sex and year.
Data source | IEO and CSIC/ICM
---|---
Time series | gear | Spanish trawl
Catch | 381 | 288 | 294 | 340 | 266 | 277 | 168 | 237
Minimum size | 7 |
Average size | 18 |
Maximum size | 65 |
Fleet | 26 | 26 | 26 | 26 |
Selectivity | Remarks |
L<sub>25</sub> | |
L<sub>50</sub> | |
L<sub>75</sub> | |
Selection factor | |
Structure by size or age
Period 1998-2000 | Total | French trawl | French gillnet | Spanish trawl | Spanish longline
Females catch mean (cm) | 19.6 | 18.6 | 40.8 | 18.1 | 61.7
Females catch mean (yrs) | 1.4 | 1.3 | 3.9 | 1.3 | 7.6
Males catch mean (cm) | 19.5 | 18.9 | 39.2 | 18.2 | 52.5
Males catch mean (yrs) | 1.8 | 1.7 | 4.9 | 1.6 | 8.7
Length frequency distributions (cm total length) of Spanish trawl catches by sex and year
Data source | IEO + CSIC/icm  
---|---
gear Spanish longline

### Time series

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<thead>
<tr>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Catch</td>
<td>162</td>
<td>156</td>
<td>88</td>
<td>84</td>
<td>101</td>
<td>109</td>
<td>174</td>
<td>128</td>
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<tr>
<td>Minimum size</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td>30</td>
<td>32</td>
<td>30</td>
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<tr>
<td>Average size $L_c$</td>
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<td>58.6</td>
<td>55.3</td>
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<td>57.0</td>
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<td>Maximum size</td>
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<td></td>
<td>96</td>
<td>92</td>
<td>94</td>
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<td>13</td>
<td>13</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
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### Selectivity

<table>
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<tr>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>$L_{25}$</td>
</tr>
<tr>
<td>$L_{50}$</td>
</tr>
<tr>
<td>$L_{75}$</td>
</tr>
</tbody>
</table>

### Structure by size or age

<table>
<thead>
<tr>
<th>Period</th>
<th>Total</th>
<th>French trawl</th>
<th>French gillnet</th>
<th>Spanish trawl</th>
<th>Spanish longline</th>
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<tr>
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### Length frequency distributions

Length frequency distributions (cm total length) of Spanish longline catches by sex and year
Length frequency distributions by sex and gear on 1988: Aldebert et al. (1993)

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<th>Spanish trawl</th>
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| Total length (cm) | 7 | 7 | 88 | 67 | 22.1 | 22.3 |

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<td>67</td>
<td>22.1</td>
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Fishery by gear

Data source | IFREMER and IEO  
gear | Trawl, gillnet and longline

Regulations in force and degree of observance of regulations

Trawl:
- Fishing license: fully observed
- Engine power limited to 316 KW or 500 CV: not fully observed
- Mesh size in the codend (40 mm stretched): not fully observed
- Fishing forbidden within 3 miles and upper 50 m depth: not fully observed
- Time at sea of Spanish fleet: fully observed

Gillnet:
- Fishing license: fully observed

Longline:
- Fishing license: fully observed

Accompanying species

Bottom trawl:
- European pilchard (*Sardina pilchardus*)
- European anchovy (*Engraulis encrasicolus*)
- Common sole (*Solea solea*)
- Striped mullet (*Mullus barbatus*)
- Red mullet (*Mullus surmuletus*)
- Angler (*Lophius piscatorius*)
- Black-bellied angler (*Lophius budegassa*)
- Gilthead seabream (*Sparus aurata*)
- European seabass (*Dicentrarchus labrax*)
- Blue whiting (*Micromesistius poutassou*)
- Poor-cod (*Trisopterus minutus capelanus*)
- Horned octopus (*Eledone cirrhosa*)

Gillnet:
- Atlantic mackerel (*Scomber scombrus*)
- Tub gurnard (*Trigla lucerna*)
- Poor cod (*Trisopterus minutus capelanus*)
- Fluke (*Lepidorhombus whiffiagonis*)
- Small-spotted dogfish (*Sciorhinus canicula*)

Longline:
- Rockfish (*Helicolenus dactylopterus*)
- Silver scabbard fish (*Lepidopus caudatus*)
- Conger eel (*Conger conger*)
- Red sea bream (*Pagellus bogaraveo*)
**Model characteristics**

<table>
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<th>Age</th>
<th>Cohorts</th>
<th>Pseudocohorts</th>
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**Population results (please state units)**

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(*) Current stock

(**) Critical size and age at virgin stock assuming constant recruitment

**Average mortality**

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<th>Spanish longline</th>
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(F₁ and F₂ represent different possible calculations. Please state them)

**Comments**

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<tr>
<td>Mean F</td>
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</table>

| | 1988-91 | 1998-00 |
| Maximum biomass/Mean biomass | 23.2% | 17.41% |
| Balance biomass | 2116 tons | 1608 tons |
**SAC GFCM.**  
Subcommittee of Stock Assessment

### Assessment form Sheet Al
- **Code**: MGL9800
- **Analysis #**: 2
- **Indirect methods**: VPA, LCA

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**Population results (please state units)**

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<td>Critical*</td>
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<td>2.44 years</td>
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<td>Virgin***</td>
<td>48 cm</td>
<td>6.84 years</td>
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(*) Current stock  
(**) Critical size and age at virgin stock assuming constant recruitment

**Average mortality**

<table>
<thead>
<tr>
<th>Gears</th>
<th>Total</th>
<th>French trawl</th>
<th>French longline</th>
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<td>F1 = Mean F</td>
<td>0.29</td>
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(F1 and F2 represent different possible calculations. Please state them)

**Comments**

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<td>Maximum biomass/Mean biomass</td>
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<td>Balance biomass</td>
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**SAC GFCM.**

**Subcommittee of Stock Assessment**

Assessment form  Sheet A2

**Indirect methods: data**

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**Data source** Monthly length frequency distributions

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**SAC GFCM.**  
Subcommittee of Stock Assessment

**Assessment form**  
Sheet A2

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#### Subcommittee of Stock Assessment

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### SAC GFCM.
#### Subcommittee of Stock Assessment

**Indirect methods: data**

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Fishing mortality rates

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<td>Vector N</td>
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**Model characteristics**

From calculated mean weights

**Results**

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<th>French trawl</th>
<th>French gillnet</th>
<th>Spanish trawl</th>
<th>Spanish longline</th>
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(*) As a factor of F actual  
(**) At F_max

**Comments**

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<th>Spanish trawl</th>
<th>Spanish longline</th>
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### SAC GFCM.
Subcommittee of Stock Assessment

**Assessment form** Sheet Y

Indirect methods: Y/R

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<tr>
<th>software</th>
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**Parameters used**

- Vector F  From LCA
- Vector M  0.22
- Vector N  From LCA

**Model characteristics**
From calculated mean weights

**Results**

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(*) As a factor of F current
(**) At Fₘₐₓ

**Comments**

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General state of resource: underexploited, overexploited, collapsed, unknown, etc.

Growth overexploitation

Particularities of the state of the resource: growth overexploitation, recruitment overexploitation, existence of inaccessible segments, trends observed, etc.

Current biomass under 2% of virgin biomass

Risks

Risk of recruitment overexploitation
Management recommendations

- Improve the fishing pattern of the trawl
- Reduce effort of all gears

Management strategies

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<th>Effort limitation</th>
<th>Minimum size</th>
<th>Technical steps concerning gear</th>
<th>Quotas</th>
<th>Market</th>
<th>Data collection</th>
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<tr>
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<td>Reduce time at sea or/and engine power</td>
<td>Enforce the existing regulations (especially mesh sizes), adopt a minimum landing size corresponding, at least, to length at first maturity</td>
<td>Improve trawl selectivity, avoid “ghost fishing”, etc.</td>
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<td>Improve national statistics on catches and effort, Improve sampling activities</td>
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Data collection

- Improve national statistics on catches and effort
- Improve sampling activities