SAC GFCM
Sub-Committee on Stock Assessment

Date*	27	September	2010	Code*	NEP0510Gui

Authors*

Guijarro, Beatriz; Valls, Maria and Massutí, Enric

Affiliation*

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Species Scientific name*

1 *Nephrops norvegicus* - *NEP*
Source: GFCM Priority Species

2
Source: -

3
Source: -

Geographical area*

05 - Balearic Islands

Geographical Sub-Area (GSA)*

05 - Balearic Island

Combination of GSAs
1
2
3

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Assessment form

Sheet #0
Basic data on the assessment

Code: NEP0510Gui

Date*	27	Sep	2010	Authors*	Guijarro, Beatriz; Valls, Maria and Massutí, Enric

Species Scientific name*	Nephrops norvegicus - NEP	Species common name*	Norway Lobster

Data Source

GSA*	05 - Balearic Island	Period of time*	2002-2009

Description of the analysis

Type of data*	Size composition of commercial trawl catches and official landings, CPUE data from bottom trawl survey and	Data source*	IEO, Fishermen Association, Ministry of Fisheries and Regional Government
Method of assessment*	LCA- Pseudocohort analysis	Software used*	VIT programme (Lleonart and Salat, 1992) and EXCEL

Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	1	1	---	4	1	1	1	---	1	1	1

Comments, bibliography, etc.

- North-eastern Iberian Peninsula and Balearic Islands:

Sardà F. and J. Lleonart.- 1993. Evaluation of the Norway lobster (Nephrops norvegicus, L.) resource off the "Serola" bank off Barcelona (western Mediterranean). Scientia Marina, 57 (2-3): 191-197.

Merella P., F. Alemany, A. Carbonell and A. Quetglas.- 1998. Fishery and biology of Norway lobster (Decapoda: Nephropidae) in Mallorca (western Mediterranean). Journal of Natural History, 32: 1631-1640.

Sardà F.- 1998. Symptoms of overexploitation in the stock of the Norway lobster (Nephrops norvegicus) on the "Serola Bank" (Western Mediterranean Sea off Barcelona). Scientia Marina, 62 (3): 295-299.

Maynou F. and F. Sardà.- 2001. Influence of environmental factors on commercial trawl catches of Nephrops norvegicus. ICES Journal of Marine Science, 58: 1318-1325.

- European Mediterranean waters:

Abelló P., A. Abella, A. Adamidou, S. Jukic-Peladic, P. Maiorano and M. T. Spedicato.- 2002. Geographical patterns in abundance and population structure of Nephrops Norvegicus and Parapenaeus longirostris (Crustacea: Decapoda) along the European Mediterranean coasts. Scientia Marina, 66 (Suppl. 2): 125-141.

Comments, bibliography, etc.

- European Mediterranean waters:

Sardà F. (Editor).- 1998. Nephrops norvegicus: comparative biology and fishery in the Mediterranean Sea. Scientia Marina, 62 (Suppl. 1): 5-143.

Sardà F., J. Lleonart and J.E. Cartes.- 1998. An analysis of the population dynamics of Nephrops norvegicus (L.) in the Mediterranean Sea. Scientia Marina, 62 (Suppl. 1): 135-143.

- Other papers (methodological aspects):

Abella A. and P. Righini.- 1998. Biological reference points for the management of Nephrops norvegicus stocks in the northern Tyrrhenian Sea. Journal of Natural History, 32: 1419-1430.

Abella A., A. Belluscio, J. Bertrand, P.L. Carbonara, D. Giordano, M. Sbrana and A. Zamboni.- 1999. Use of MEDITS trawl survey data and commercial fleet information for the assessment of some Mediterranean demersal resources. Aquatic Living Resources, 12 (3): 155-166.

Morello E.B., C. Froglia and R.J.A. Atkinson.-2007. Underwater television as fishery-independent method for stock assessment of Norway lobster (Nephrops norvegicus) in the central Adriatic Sea (Italy). ICES Journal of Marine Science, 64: 1116–1123.

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Assessment form

Sheet B
Biology of the species

Code: NEP0510Gui

Biology

Somatic magnitude measured (LH, LC, etc)*		Carapace length		Units*	mm

Sex	Fem	Mal	Both	Unsexed		
Maximum size observed	65	80			Reproduction season	see comments
Size at first maturity		See comments			Reproduction areas	
Recruitment size	18*	19*			Nursery areas	

Parameters used (state units and information sources)

			Sex			
		Units	female	male	both	unsexed
Growth model	L∞		56	72.1		
	K		0.214	0.169		
	t0					
	Data source	GSA09 (Ligurian and North Tyrrhenian Sea)				
Length weight relationship	a	0.0004				
	b	3.126				

M	0.329***	0.319***	0.340***		

sex ratio (mal/fem)	****

Comments

- Size at first maturity:

For the assessment we have considered data from GSA09 (Ligurian and North Tyrrhenian Sea) as no information from GSA05 is available.

- Reproductive season:

Ovarian maturation: maximum peaks in spring or at the beginning of summer**
Brooding period: summer and autumn peaks**

(*) Minimum size in catches

(**) Orsi-Relini L., A. Zamboni, F. Fiorentino and D. Massi.- 1998. Reproductive patterns in Norway lobster Nephrops norvegicus (L.), (Crustacea Decapoda Nephropidae) of different Mediterranean areas. Scientia Marina, 62 (Suppl. 1): 25-41.

(***) From PROBIOM (Abella et al., 1997): 1.004 (0), 0.579 (1), 0.387 (2), 0.277 (3), 0.227 (4), 0.202 (5), 0.188 (6), 0.178 (7), 0.172 (8), 0.166 (9+)

(****) Sex-ratio was estimated from length frequency distributions (see sheet P2a)

Comments

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Assessment form

Sheet P1
General information about the fishery

Code: NEP0510Gui

Data source*	IEO, Fishermen Association, Ministry of Fisheries and Regional Government	Year (s)*	2002-2009
Data aggregation (by year, average figures between years, etc.)*	Average 2002-2009		

Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	ESP	05	E - Trawl (12-24 metres)	03 - Trawls	34 - Demersal slope species	NEP
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
ESP 05 E 03 34 - NEP	37	Tons	9.9	See comments	Almost null	See comments	1301**
Total	37		9.9				

Legal minimum size	

Comments

Norway lobster catches from the Balearic fleet comes exclusively from bottom trawl. Fleet and catch data correspond to average 2000-2009 from Mallorca island, represent around >75% of the Balearic Islands.

(*) Total number of bottom trawlers

(**) Estimated standardised effort in days (average 2000-2009; from Palmer et al., 2009): Four different fishing tactics (shallow shelf : SS; deep shelf: DS; upper slope: US; middle slope: MS) and their combinations.
US & US+SS & US+DS & US+MS = 1301 days

OTHER SPECIES CAUGHT on US (350-600 m): important by-catch of large Merluccius merluccius, Lepidorhombus spp., Lophius spp. and Micromesistius poutassou (Guijarro and Massutí 2006).

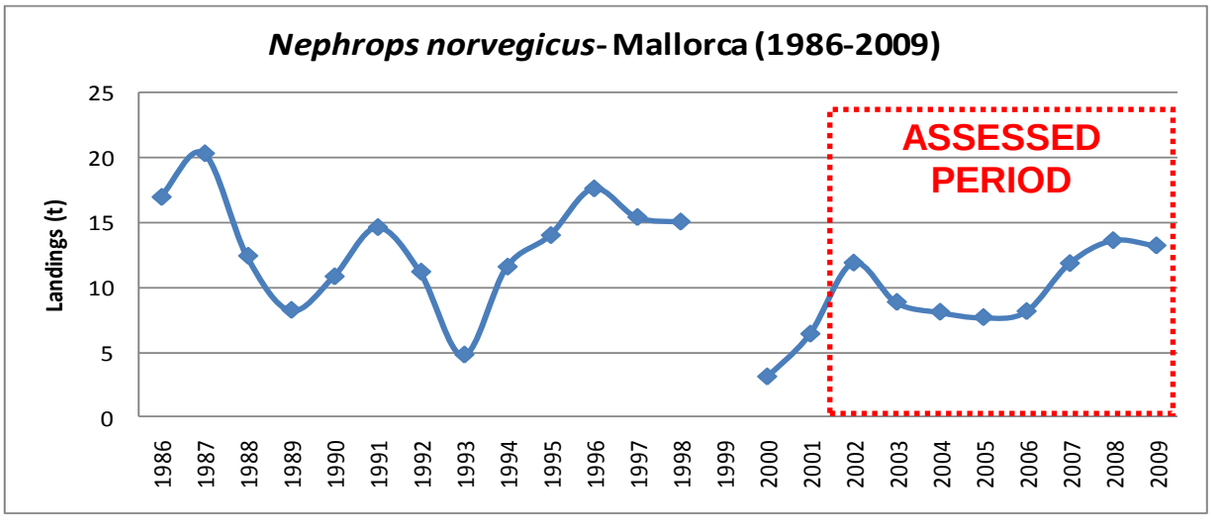
Total DISCARDS on US have been estimated up to 18% (autumn) 45% (spring) of captured biomass. They are mainly composed by the following species (Guijarro and Massutí, 2006):

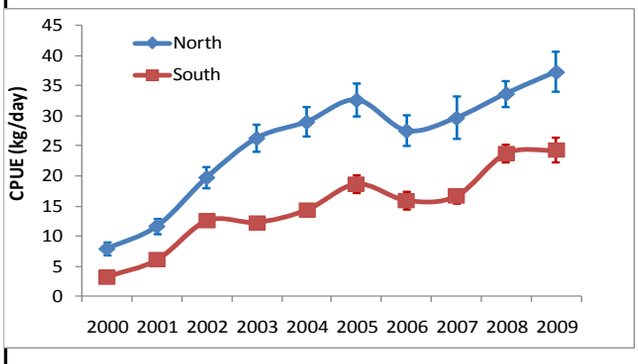
Comments

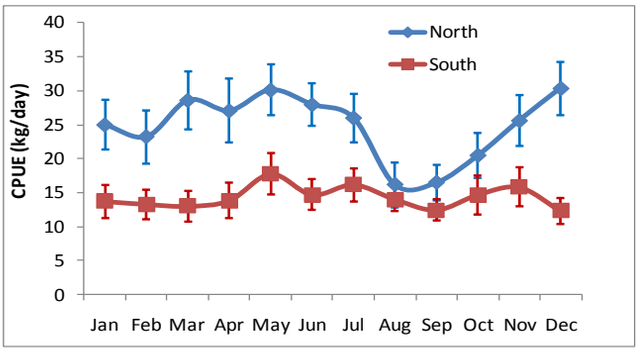
- Elasmobranchs: Dipturus oxyrinchus, Scyliorhinus canicula and Galeus melastomus.
- Teleosts: Argentina sphyraena, Argyropelecus hemigymnus, Arnoglossus rueppelli, Bathysolea profundicola, Capros aper, Cetrolophus niger, Chauliodus sloani, Citharus linguatula, Conger conger, Epigonus telescopus, Epigonus denticulatus, Gadiculus argenteus, Hoplostethus mediterraneus, Lepidopus caudatus, Molva dypterigia , Myctophidae, Notacanthus bonapartei, Notolepis rissoi, Peristedion cataphractum, Stomias boa, Symphurus nigrescens, Synchiropus phaeton, Caelorinchus caelorinchus, Hymenocephalus italicus and Nezumia aequalis.
- Crustaceans: Macropipus tuberculatus, Munida spp., Paromola cuvieri, Pasiphaea sivado, Pasiphaea multidentata, Plesionika heterocarpus and Sergestes arcticus.
- Cephalopods: Bathypolypus sponsalis, Octopus salutii, Histioteuthis spp. and Sepietta oweniana.
- Others: Echinidae, Gryphus vitreus, Porifera and Salpidae.

Guijarro B. and E. Massutí (2006) Selectivity of diamond- and square-mesh codends in the deepwater crustacean trawl

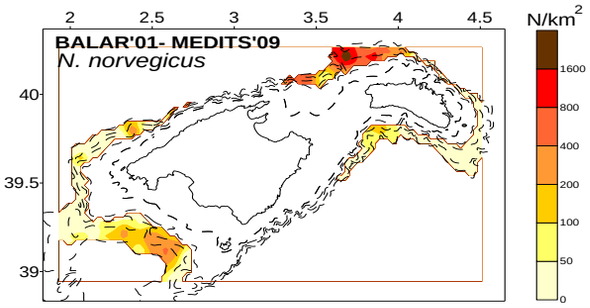
FISHERY: ANNUAL LANDINGS AND STANDARDIZED CPUEs

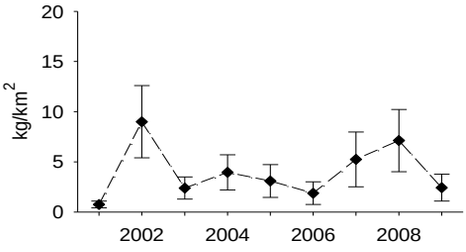






BOTTOM TRAWL SURVEYS (MEDITS)





Data source*	Size composition of commercial trawl catches from monthly sampling on board	OpUnit 1*	ESP 05 E 03 34 - NEP

Time series

Year*	2002	2003	2004	2005	2006	2007
Catch	11.87	8.84	8.07	7.66	8.13	11.83
Minimum size	23	22	19	19	18	21
Average size Lc	37	40	35	37	39	40
Maximum size	70	67	72	63	69	80
Fleet	27	27	26	22	31	31

Year	2008	2009				
Catch	13.6	13.2				
Minimum size	16	19				
Average size Lc	34	34				
Maximum size	66	68				
Fleet	31	29				

Selectivity

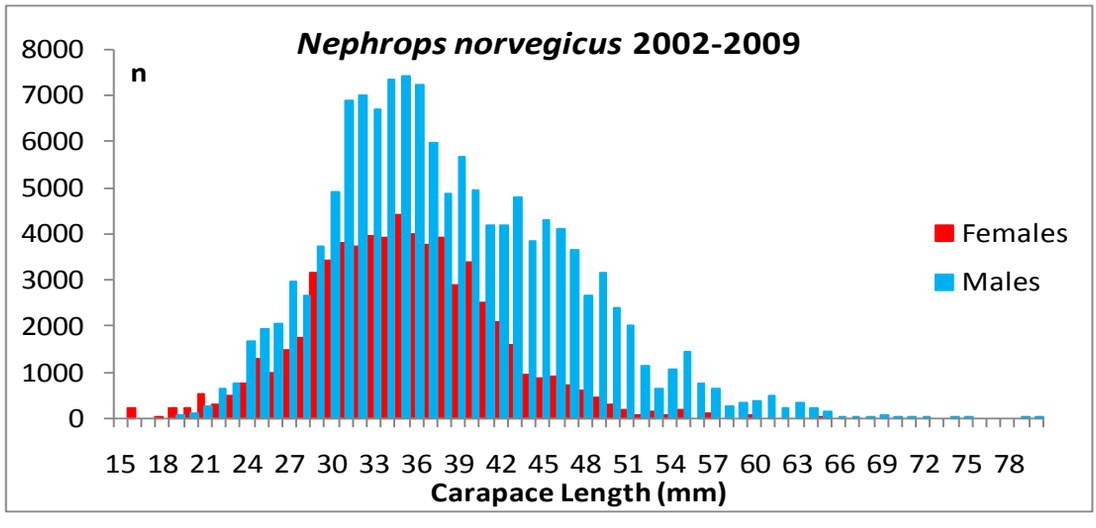
L25	15.32
L50	17.83
L75	20.34
Selection factor	0.44

Remarks

Mytilineou C., C.Y. Politou and A. Fourtouni.- 1998. Trawl selectivity studies on Nephrops norvegicus (L.) in the eastern Mediterranean Sea. Scientia Marina, 62 (Suppl. 1): 107-116.

Structure by size or age

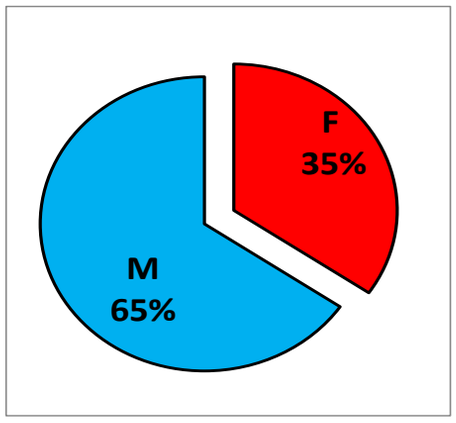
L50= 22.82 (Stergiou et al., 1997). Stergiou K.I., G. Petrakis and C.Y. Politou.- 1997. Size selectivity of diamond and square mesh cod-ends for Nephrops norvegicus in the Aegean Sea. Fisheries Research, 29 (3): 203-209.



Structure by size or age

CATCHES

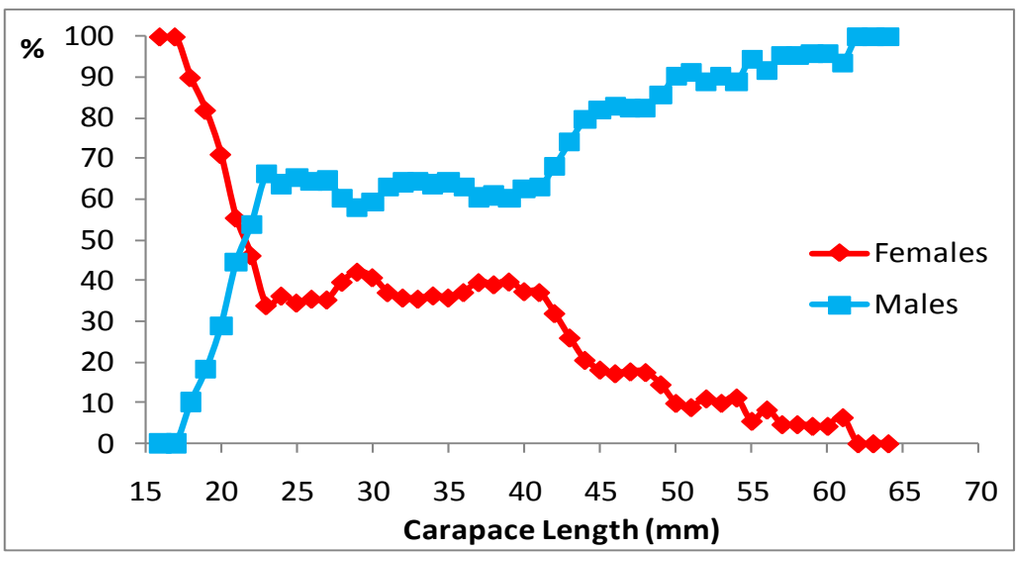
	Females (tons)	Males (tons)
2002	4.2	7.7
2003	3.1	5.7
2004	2.8	5.2
2005	2.7	5.0
2006	2.8	5.3
2007	4.1	7.7
2008	4.8	8.9
2009	5.5	12.1



SIZES

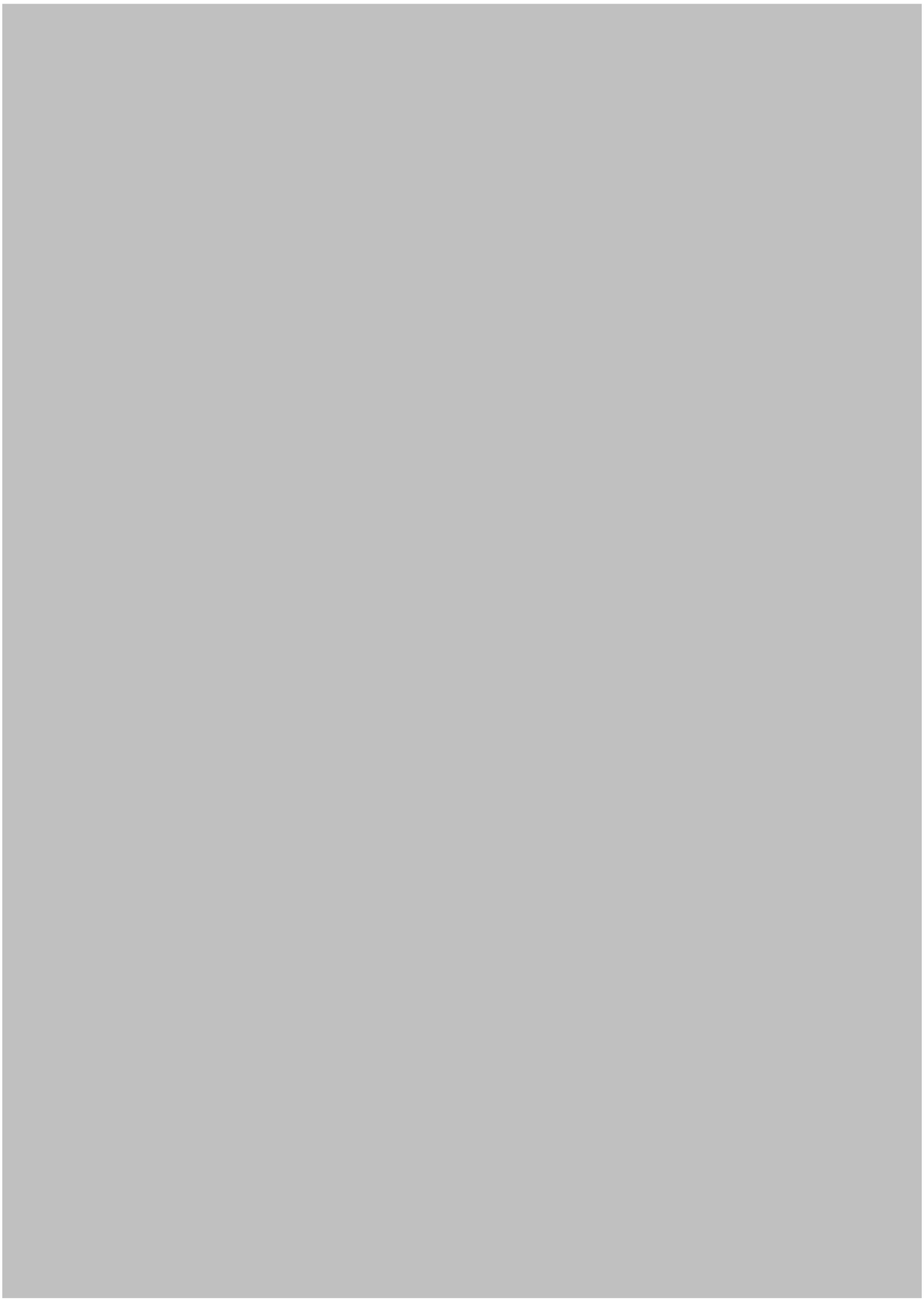
Talles	Females: min	Females: mean	Females: max	Males: min	Males: mean	Males: max
2002	23	36	54	25	37	70
2003	23	38	53	22	41	67
2004	19	33	55	19	36	21
2005	19	34	53	21	38	53
2006	18	37	52	24	40	95
2007	18	37	52	21	42	38
2008	16	33	52	19	36	66
2009	20	32	58	19	35	68

SEX-RATIO



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

Code: NEP0510Gui



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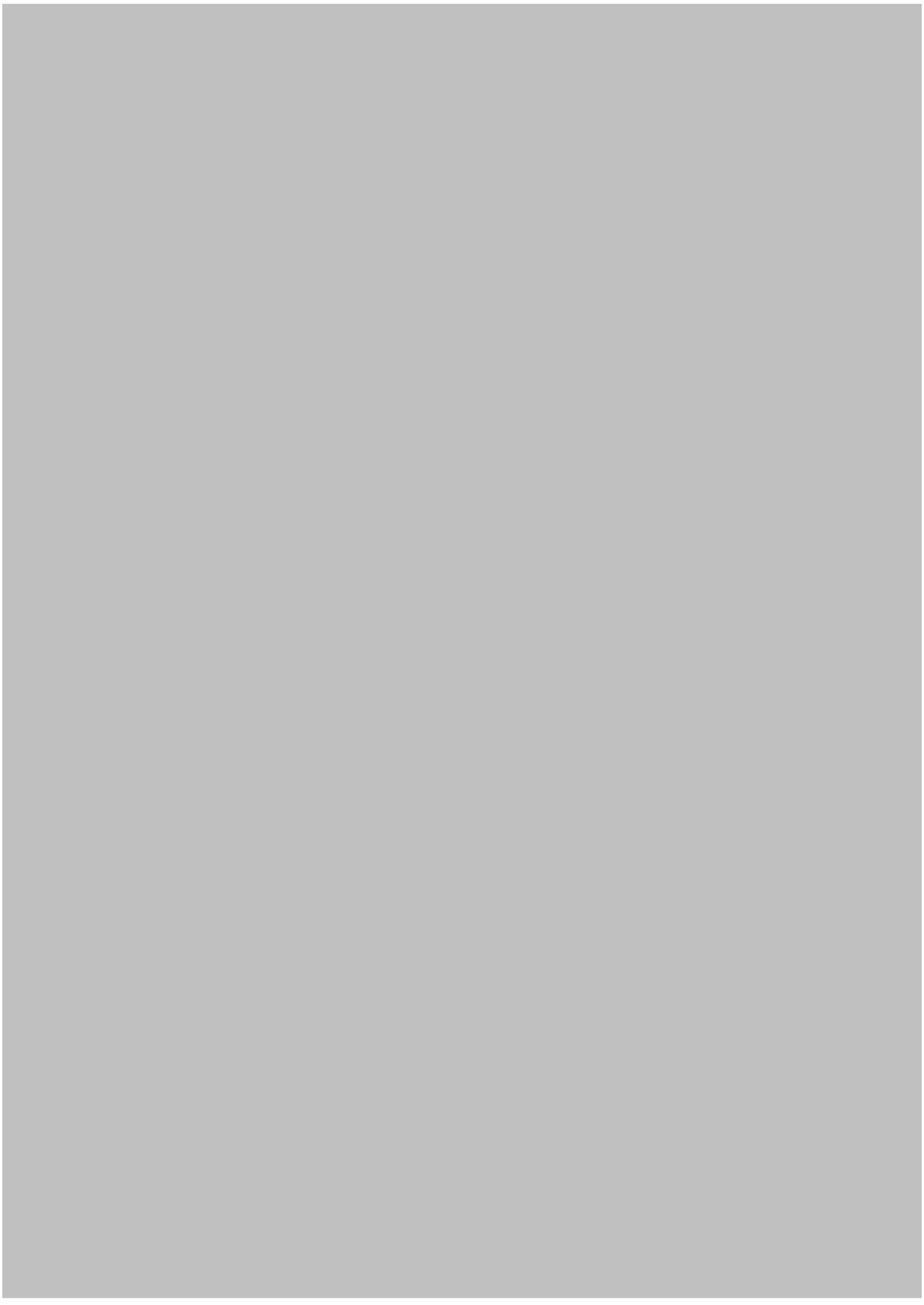

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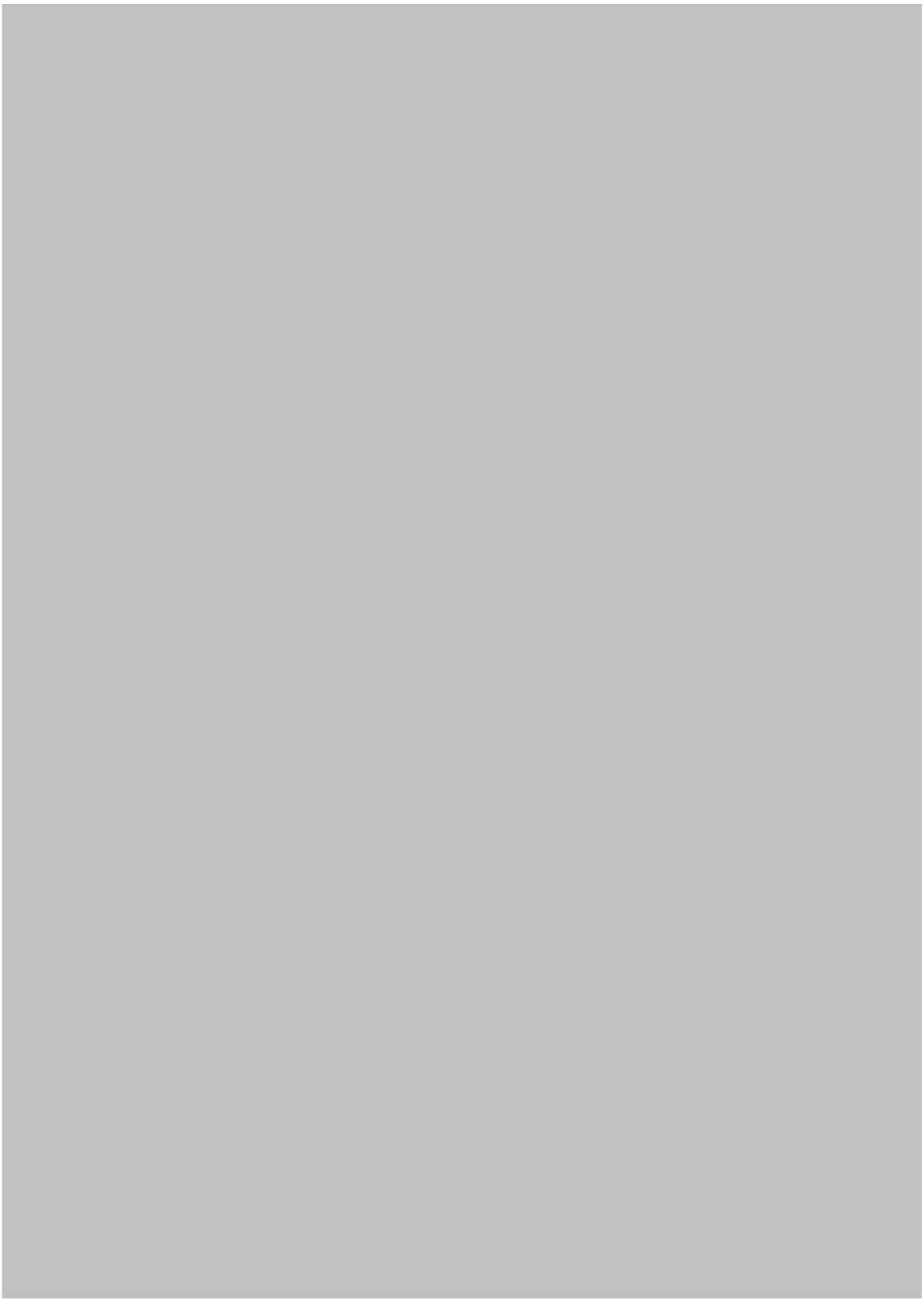
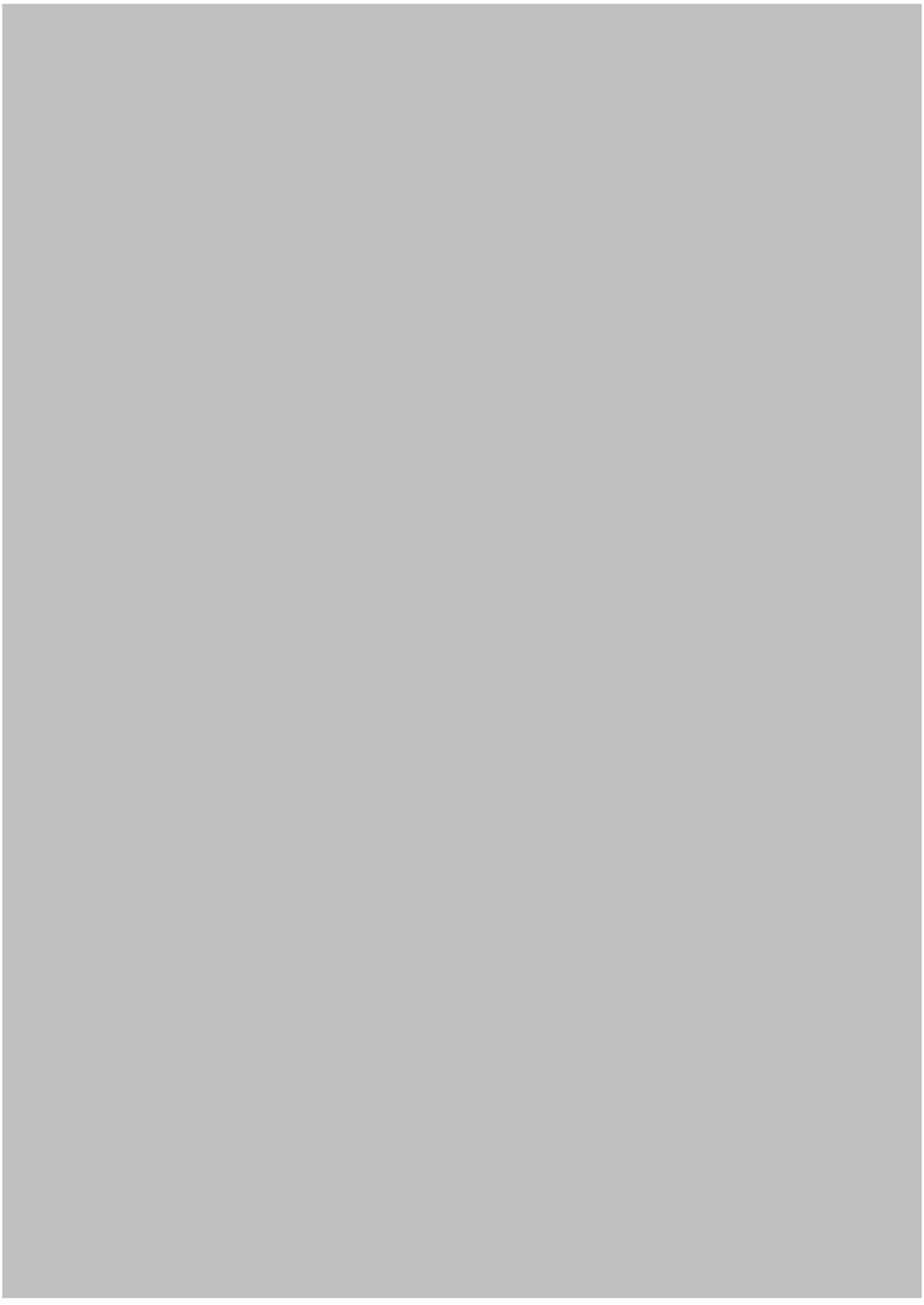


This sheet will be activated once the Operational Unit information (P1 section) will be successfully filled in

Code: NEP0510Gui



Data source*	IEO, Fishermen Association, Ministry of Fisheries and	OpUnit 1*	ESP 05 E 03 34 - NEP

Regulations in force and degree of observance of regulations

- Fishing license: fully observed

- Engine power limited to 316 KW or 500 HP: not observed (at least, doubled)

- Mesh size in the codend (diamond 40 mm stretched): fully observed

- Fishing forbidden shallower than 50 m depth: not fully observed

- Time at sea (12 hours per day and 5 days per week): fully observed

- Minimum legal size (20 mm CL): observed

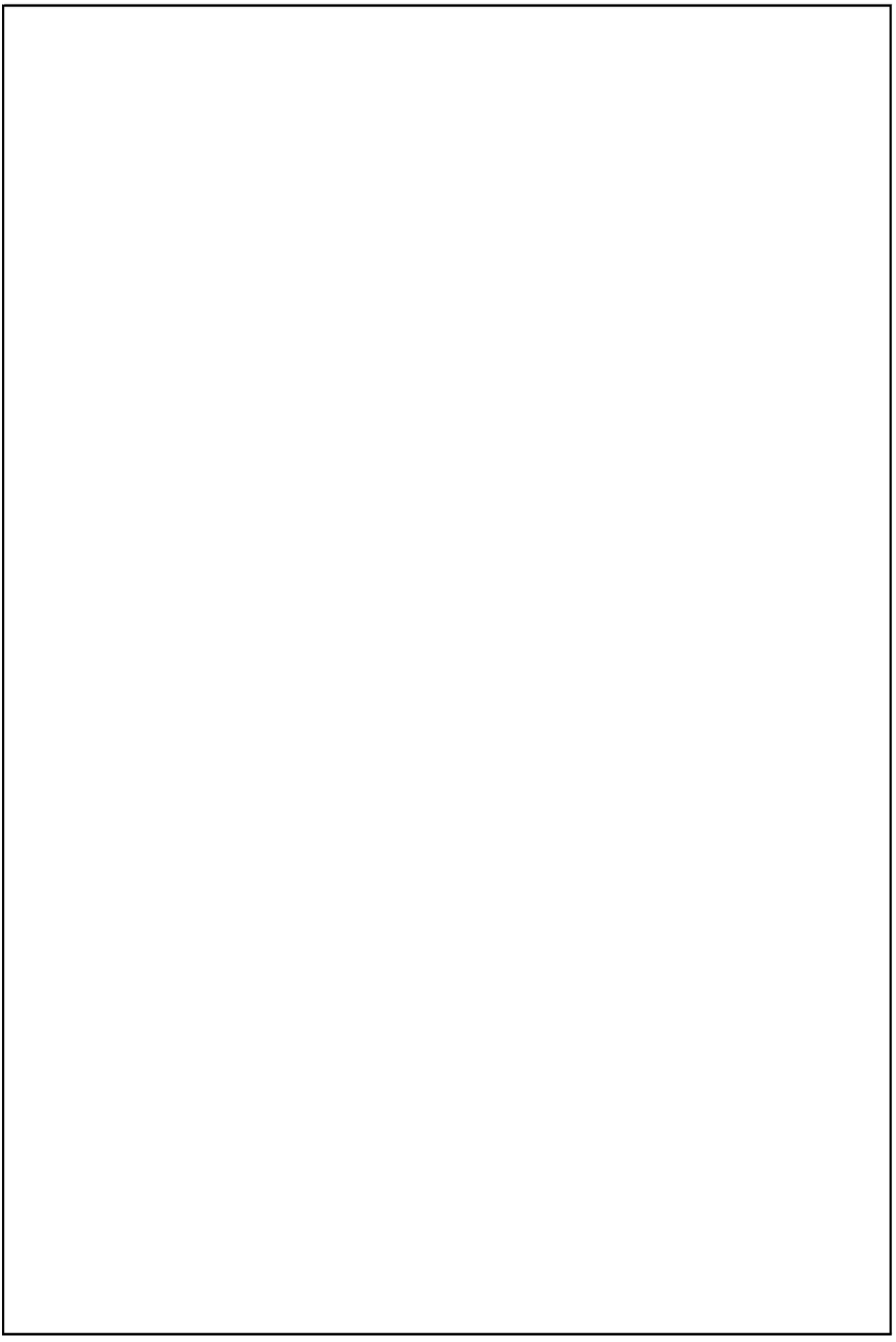
Accompanying species

- Teleosts: Merluccius merluccius, Micromesistius poutassou, Lepidorhombus boscii, Lepidorhombus whiffiagonis, Lophius budegassa, Lophius piscatorius, Argentina sphyraena, Chelidonichthys cuculus, Chlorophthalmus agassizi, Citharus linguatula, Mullus surmuletus, Pagellus acarne, Pagellus bogaraveo, Peristedion cataphractum, Scorpaena elongata, Trachurus trachurus and Trigla lyra.

Elasmobranchs: Raja clavata and Squalus acanthias.

Crustaceans: Parapenaeus longirostris, Palinurus mauritanicus, Paromola cuvieri, Plesionika giglioli and Plesionika heterocarpus.
Cephalopods: Eledone cirrhosa, Scaergus unicirrhus, Illex coindetti, Sepia orbignyana and Todarodes sagitattus.

Guijarro B. and E. Massutí (2006) Selectivity of diamond- and square-mesh codends in the deepwater crustacean trawl fishery off the Balearic Islands (W Mediterranean). ICES Journal of Marine Science, 62: 52-67.



SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
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: NEP0510Gui

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
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: NEP0510Gui

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
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: NEP0510Gui

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
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: NEP0510Gui

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

Assessment form

Sheet A1
Indirect methods: VPA, LCA

Code: NEP0510Gui

Sex*	Both

Analysis # *	**1 (2002-2009)**

Time series

Data	Size	Age
(mark with X)		X

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	Catch equation	Tunig method	
# of gears	1	Software	VIT programme (Lleonart and Salat, 1992)
$F_{terminal}$	0.61 (see comments)		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	11.2*	1	Recruitment	1101.2	2.61
Average		2.5	Average population	2467.8	33.92
Maximum		9	Virgin population		93.01
Critical	28.7	3	Turnover		26.40%
	mm				SSB: 20.23
				Thousands	Tons

Average mortality

		Gear					
	Total	Bottom trawl					
F_1	0.446	0.446					
F_2	0.158	0.158					
Z	0.775						

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

Comments

- Terminal F was estimated from the FLEDA package (Jardim and Azevedo, 2007)

(*) Lower size of first class. Mean length of first class (1.5 years of age): 15.6 mm CL.

- F1: mean F for all age classes (1-9+)

- F2: global F for all age classes (1-9+)

- Z= F1 + M

Jardim E. and M. Azevedo.- 2007. The "Exploratory Data Analysis for FLR" Package. Version 1.4-2.

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

Assessment form — **Sheet A1** — **Indirect methods: VPA, LCA**

Code: NEP0510Gui

Sex*	Both

Analysis # *	2 (2002)

Time series

Data	Size	Age
(mark with X)		X

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	Catch equation	Tunig method	
# of gears	1	Software	VIT programme (Lleonart and Salat, 1992)
$F_{terminal}$	0.61 (see comments)		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	20.7*	2	Recruitment	695.5	6.31
Average	30	3.3	Average population	1503.6	31.9
Maximum		8	Virgin population		102.59
Critical	28.7	3	Turnover		21.80%
					SSB: 19.18
				Thousands	Tons

Average mortality

		Gear					
	Total	Trawl					
F_1	0.583	0.583					
F_2	0.303	0.303					
Z	0.912						

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

Comments

- Terminal F was estimated from the FLEDA package (Jardim and Azevedo, 2007)

(*) Lower size of first class. Mean length of first class (2.5 years of age): 20.7 mm CL.

- F1: mean F for all age classes (1-9+)

- F2: global F for all age classes (1-9+)

- Z= F1 + M

Jardim E. and M. Azevedo.- 2007. The "Exploratory Data Analysis for FLR" Package. Version 1.4-2.

Sex*	Both

Analysis # *	3 (2005)

Time series

Data	Size	Age
(mark with X)		X

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	Catch equation	Tunig method	
# of gears	1	Software	VIT programme (Lleonart and Salat, 1992)
$F_{terminal}$	0.61 (see comments)		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	11.2	1	Recruitment	896.9	2.13
Average	23.7	2.5	Average population	1995	26.3
Maximum		9	Virgin population		75.76
Critical		3	Turnover		24.80%
	mm				SSB: 15.23
				Thousands	Tons

Average mortality

		Gear					
	Total	Trawl					
F_1	0.482	0.482					
F_2	0.161	0.161					
Z	0.811						

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

Comments

- Terminal F was estimated from the FLEDA package (Jardim and Azevedo, 2007)

(*) Lower size of first class. Mean length of first class (1.5 years of age): 15.6 mm CL.

- F1: mean F for all age classes (1-9+)

- F2: global F for all age classes (1-9+)

- Z= F1 + M

Jardim E. and M. Azevedo.- 2007. The "Exploratory Data Analysis for FLR" Package. Version 1.4-2.

Sex*	Both

Analysis # *	**4 (2009)**

Time series

Data	Size	Age
(mark with X)		X

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	Catch equation	Tunig method	
# of gears	1	Software	VIT programme (Lleonart and Salat, 1992)
$F_{terminal}$	0.61 (see comments)		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	11.2	1	Recruitment	1104	2.62
Average	23	2.4	Average population	2332.7	28.09
Maximum		9	Virgin population		93.25
Critical	28.7	3	Turnover		21.30%
	mm				SSB: 15.72
				Thousands	Tons

Average mortality

		Gear					
	Total						
F_1	0.428						
F_2	0.194						
Z	0.757						

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

Comments

- Terminal F was estimated from the FLEDA package (Jardim and Azevedo, 2007)

(*) Lower size of first class. Mean length of first class (1.5 years of age): 15.6 mm CL.

- F1: mean F for all age classes (1-9+)

- F2: global F for all age classes (1-9+)

- Z= F1 + M

Jardim E. and M. Azevedo.- 2007. The "Exploratory Data Analysis for FLR" Package. Version 1.4-2.

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

Assessment form

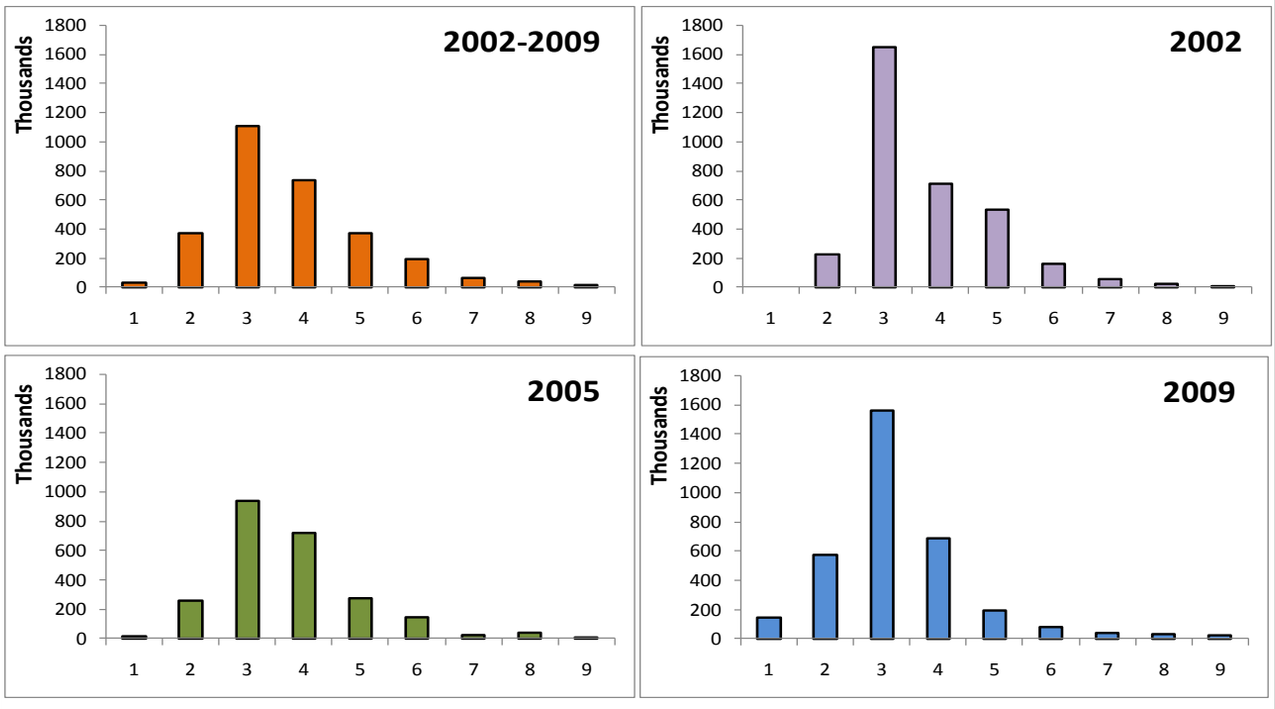
Sheet A2
Indirect methods: data

Code: NEP0510Gui

Sex*	Both	Gear*	Bottom trawl	Analysis # *	1-4

Data source	Size composition of commercial trawl catches from monthly sampling on board

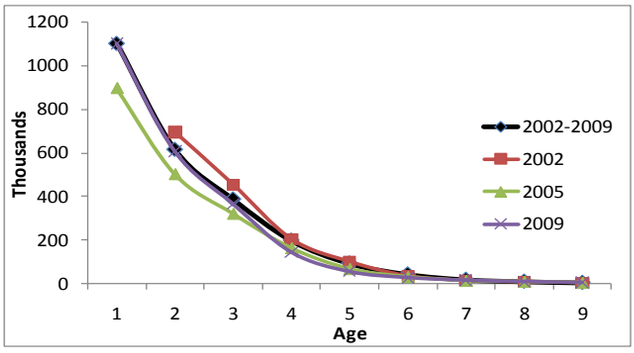
Data

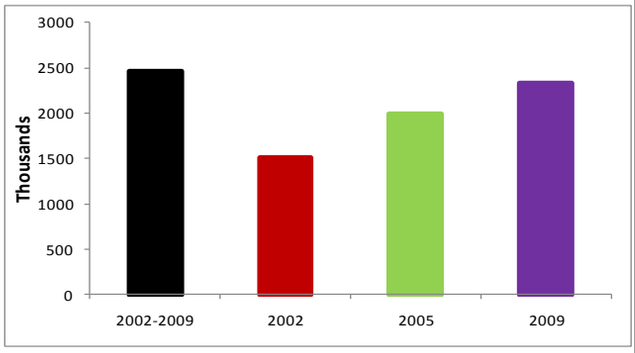


Biological parameters (growth, length-weight, maturity ogive and M) are explained in sheet B

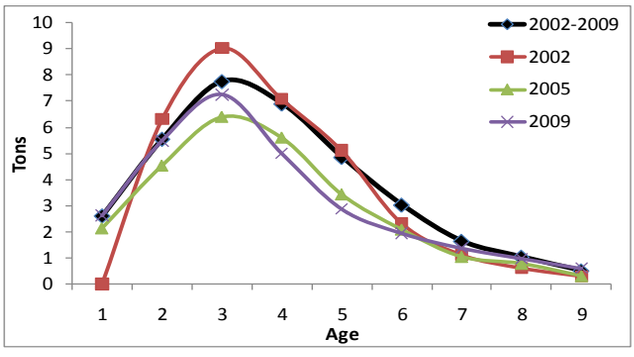
Sex*	Both	Gear*	Bottom Trawl	Analysis #*	1-4

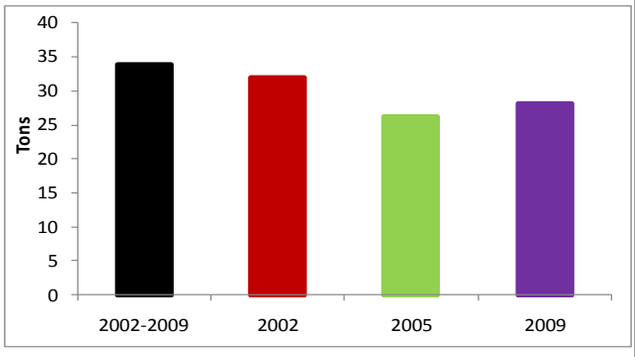
Population in figures



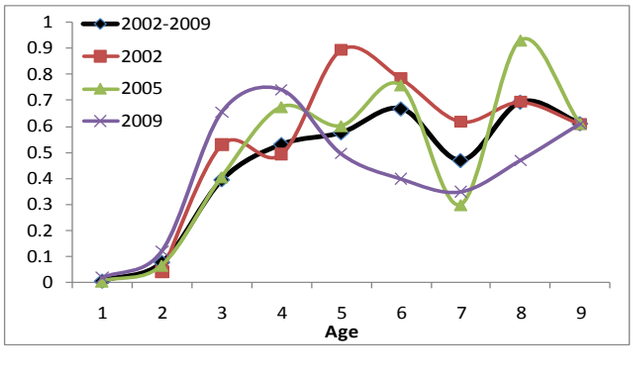


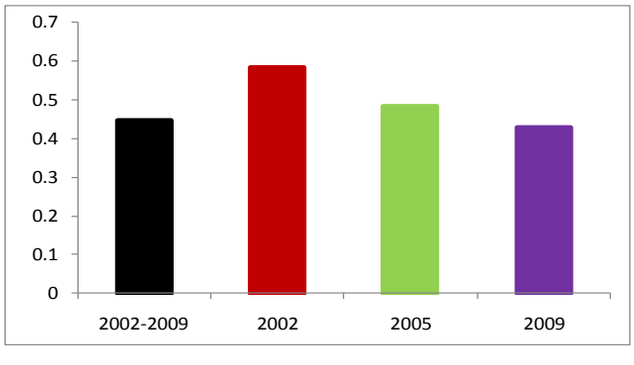
Population in biomass





Fishing mortality rates





Sex*		Gear*		Analysis #*	

Population in figures

Population in biomass

Fishing mortality rates

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Code: NEP0510Gui

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

Assessment form

Sheet Y
Indirect methods: Y/R

Code: NEP0510Gui

Sex	Both

Analysis #	1-4

# of gears	1	Software	EXCEL

Parameters used

Vector F	From pseudocohort analysis
Vector M	See sheet B
Vector N	From pseudocohort analysis

Model characteristics

From calculated mean weights

Results

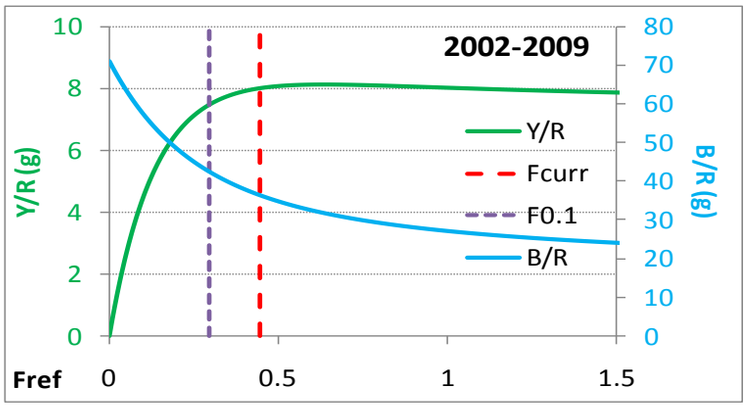
	Total	Gear			
Current YR	8				
Maximum Y/R	8.1				
Y/R 0.1	7.5				
F_{max}	0.634				
$F_{0.1}$	0.295				
Current B/R	36.3				
Maximum B/R	31.7				
B/R 0.1	42.4				
Fref	0.446				
	2002-2009				

Comments

	2002-2009	2002	2005	2009
Current YR	8	16.1	8.6	8.3
Maximum Y/R	8.1	17	8.6	9
Y/R 0.1	7.5	15.4	8	8.2
F_{max}	0.634	0.303	0.511	0.214
$F_{0.1}$	0.295	0.146	0.304	0.111
Current B/R	36.3	49.5	39.8	30.2
Maximum B/R	31.7	76	37.9	50.5
B/R 0.1	42.4	120.3	58.1	77.9
Fref	0.446	0.583	0.482	0.428
F0.1 (factor)	0.66	0.25	0.63	0.26

2002-2009 F	Absolut
Fcurr	0.446
Fmax	0.634
F0.1	0.295

Comments


2002-2009
Y/R
Fcurr
F0.1
B/R
Y/R (g)
B/R (g)
Fref
0
0.5
1
1.5
10
8
6
4
2
0
80
70
60
50
40
30
20
10
0

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

Code: NEP0510Gui

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B					
SSB					
F	0.446		0.295		F0.1
Y					
CPUE					

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

CURRENT ASSESSMENT

Although the species seems to be "overexploited", we don't think that there is a high risk of stock depletion/collapse and the level of overexploitation is rather low as well as it is likely that the reference point F0.1 is too conservative.

OTHER ASSESSMENTS:

For comparison purposes, the assessment carried out by Sardà et al. (1998) at different areas of the Mediterranean and adjacent Atlantic, applying the same methodology, concluded:

- Highly (fully) exploitation in the Catalan Sea, Adriatic Sea and Thyrrehnian Sea.

- Moderate exploitation in the Ligurian Sea and Euboikos Gulf .

- Lightly exploitation in Alboran Sea and in the Algarve (Portugal, Atlantic).

Sardà F., J. Lleonart and J.E. Cartes.- 1998. An analysis of the population dynamics of Nephrops norvegicus (L.) in the Mediterranean Sea. Scientia Marina, 62 (Suppl. 1): 135-143.

Code: NEP0510Gui

Management advice and recommendations*

Decreasing the fishing mortality by 20-30% by reducing effort (capacity)

Advice for scientific research*

Advice for scientific research

The monthly sampling on board bottom trawlers, developed in the Balearic Islands within the framework of the Spanish Data Collection Programme, might allow the assessment of Nephrops norvegicus in the GSA-05. However, further studies will be needed to estimate biological parameters (e.g. growth, first maturity) required as input parameters in the models.

Comments*

Biological seasonal sampling in this area started in late 2009, which may help to estimate biological parameters (e.g. growth, first maturity) required as input parameters in the models.

Comments*

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet C** **Comments**

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SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet C** **Comments**

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Abstract for SCSA reporting

Authors Guijarro, Beatriz; Valls, Maria and Massutí, Enric

Year 2010

Species Scientific name Nephrops norvegicus - NEP

Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area 05 - Balearic Island

Fisheries (brief description of the fishery)*

This species is one of the target species of the bottom trawl fishery developed off Mallorca by a fleet of around 40 vessels, being captured on the upper slope, between 350 and 600 m depth, jointly with other by-catch species such as Merluccius merluccius, Lepidorhombus spp., Micromesistius poutassou and Lophius spp. Annual landings from 1986 to 2008 fluctuated between 3 and 20 tons.

Source of management advice*

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

The assessment of this stock has been carried out by means of virtual population analysis (VPA) and yield-per-recruit (Y/R), on a mean pseudo-cohort for the period 2002-2008. For that period average annual catches were 10 tons (3.5 for females and 6.5 for males). It has been used monthly size composition of catches by sex, estimated from on board sampling between 2002 and 2008, and official landings (daily sale bills). The biological parameters for both sexes (growth, length-weight and first maturity) were the same than previous assessment of this species in the Catalan Sea (GSA-06; Sardà et al., 1998). Natural mortality was estimated from Pauly's method (1980) and a terminal fishing mortality (F) of 0.36 for females and 0.22 for males were used.

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

Moderate fishing mortality

Stock abundance

Intermediate abundance

Comments

Management advice and recommendations*

Decreasing the fishing mortality by 20-30% by reducing effort (capacity)

Advice for scientific research*

The monthly sampling on board bottom trawlers, developed in the Balearic Islands within the framework of the Spanish Data Collection Programme, might allow the assessment of Nephrops norvegicus in the GSA-05. However, further studies will be needed to estimate biological parameters (e.g. growth, first maturity) required as input parameters in the models.