ANNUAL REPORT

On the Greek National Fisheries Data Collection Program for 2012

(IN APPLICATION OF EC DECISION 93/2010)

MINISTRY OF RURAL DEVELOPMENT AND FOOD

DIRECTORATE GENERAL FOR FISHERIES

MAY 2013

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I. GENERAL FRAMEWORK

The current document presents the Annual Report on the work carried for the Greek National Programme (NP) for the collection of data in the fisheries sector for the year 2012. The programme has been carried out following the rules of the:

Commission Regulation No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy

Commission Regulation No 665/2008 laying down detailed rules for the application of Council Regulation (EC) No 199/2008 concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy.

Commission Decision 2010/93/EU adopting a multiannual Community programme for the collection, management and use of data in the fisheries sector for the period 2011-2013.

The format of the document follows the most recent guidelines from the Commission.

Due to administrative and financial obstacles, DCF has not been applied since 2007 (with the exception of 2nd half of 2008). The Greek Law 4072/2012 (passed in April 2012), resolved the main problems. However the late authorization of the budget in December 2012 allowed the implementation of only some modules of 2012 NP. Thus, collection of data concerning the processing industry (IV.B) and a pilot study on eel fishery (III.D) was fully implemented. Concerning the research surveys at sea (III.G.) only a part from the MEDIAS survey was implemented. Data for Metier-related variables (III.C) and Stock-related variables (III.F) were collected only for the longline métier targeting swordfish (LLD_LPF_0_0_0 SWO).

The only derogation requested by Greece is presented in the following table:

Short title of derogation	**NP proposal section**	**Type of data - Variables**	**Region**	**Derogation approved or rejected**	**Year of approval or rejection**	**Reason / Justification for derogation**
Derogation in relation to the collection of catches of Bluefin tuna by recreational fisheries	III. D. MODULE OF THE EVALUATION OF THE FISHING SECTOR *Recreational fisheries*	Catches	Mediterranean Sea	Approved	2005	The Fishery of large pelagic species(i) can only be practiced by professional fishermen with a special licence, (ii) is forbidden by the Greek law for recreational fishermen

II. NATIONAL DATA COLLECTION ORGANIZATION

II. A. National correspondent and participating institutes

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The National Fisheries Data Collection Program for Greece was carried out by the following institutes.

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The FRI is a semi state marine research organisation charged with the collection of scientific data on the fisheries sector in North and Central Aegean Sea, and on processing industry.

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The H.C.M.R is a semi state marine research organisation charged with the collection of scientific data on the fisheries sector in South Aegean Sea, Ionian Sea and Cretan Sea.

No national co-ordination meetings have been held as the modules that were implemented didn't need coordination of the participating institutes.

II B Regional and International coordination

II B 1 Attendance of International meetings

Standard table II.B.1 indicates which meetings have been attended by Greece.

Only a small number of meetings were attended by MS because the travelling expenses were not covered by the MS as a result of the reduction of public expenses. Consequently, the staff of the institutes participated in some of the meetings by covering the travelling expenses with their own expenditure.

II B 2 Follow-up of regional and international recommendations

The list of recommendations made by the RCM and the action taken by the MS is reported in the following table:

Metier-related variables: on the accuracy of geographical origin of landings and effort data		
RCM Med&BS 2012 Recommendation	The RCM Med&BS recalls its 2008 recommendation and recommends MS to investigate the accuracy of the geographical origin of landings and effort data (using the VMS data where possible). This information should be reviewed during the next RCM Med & BS.	*MS has followed the recommendation*
Follow-up actions needed		
Responsible persons for follow-up actions	MS, RCM Med& BS	
Time frame (Deadline)	Before next RCM Med& BS	
*** On the regional database		
RCM Med&BS 2012 Recommendation	The Group agreed that the Med&BS RDB will include biological and transversal data. It was decided that economic and survey data will be excluded for the time being from the RDB, following the decision by PGECON to develop one European Database for including economic and transversal data from all supra-regions. The Group agreed that the Mediterranean & Black Sea regional database could be hosted by GFCM and that the Steering Committee for the development of the RDB will include 1 person per MS, 2 economists for the transversal data, the Chairs of Medias and Medits and a GFCM representative. It was further agreed that the RDB steering group will be represented at the planned GFCM Workshop for the finalization of GFCM Task 1 and Task 2.	*MS will participate in the development of the RDB*
Follow-up actions needed		
Responsible persons for follow-up actions	DGMARE, MS, LM, RCM MED&BS, GFCM	

Time frame (Deadline)	Before the new DCMAP	
*** Workshop on large pelagic		
RCM Med&BS 2012 Recommendation	RCM Med&BS reiterates the 2011 recommendation by RCM Med&BS and RCM LDF on a joined workshop among ICCAT representatives, scientists involved in large pelagic sampling, as well as representatives from RCM LDF and RCM MED&BS for harmonising the biological sampling issues on large pelagic and specifying additional data or modifications that should be included in the future DCF, taking into account the ICCAT requirements for stock assessment.	*MS participated in the workshop*
Follow-up actions needed		
Responsible persons for follow-up actions	DG MARE; Liaison meeting; STECF; RCM LDF; RCM MED&BS; ICCAT; MS	
Time frame (Deadline)	Before the new DCMAP	

2011

Review feedback from data end users: Data presentation		
RCM Med&BS 2011 Recommendation	Following a review of the 2011-2013 NPs of the Mediterranean MS concerning the availability of the data to end users (see data presentation in each section of NPs), the group recommends MS to agree on a harmonized time period required for data to be available for transmission to end-users. The group suggests, for all transversal and biological data collected, a time period of 6 months following the reference year of the collection of data; this time period should be respected by the data calls and the end users	*MS has already adopt the time period of 6 months following the reference year of the collection of data for biological and transversal variables in 2011-2013 NP*
Follow-up actions needed	MS modify national programmes accordingly	
Responsible persons for follow-up actions	MS, JRC, SGMED, DG MARE, Liaison Meeting; RCMMED&BS	
Time frame (Deadline)		
Large pelagic issue: participation in the ICCAT working group meetings		
RCM Med&BS 2011 and RCM LDF Recommendation	Considering that the quality of the work of the ICCAT working groups depends on the adequate participation of experts, the two groups strongly recommend the participation of experts to the ICCAT scientific meetings. It is reminded that ICCAT scientific meetings are eligible for participation under the DCF.	*MS has participated during the previous years to ICCAT meetings and will continue to do this.*
Follow-up actions needed	MS modify national programmes accordingly	
Responsible persons for follow-up actions	MS, EU DG MARE,	
Time frame (Deadline)	Annual bases, ICCAT calendar	

III MODULE OF THE EVALUATION OF THE FISHING SECTOR

III A General description of the fishing sector

The Greek fishery sector has some distinctive features, which differentiate it from the other Mediterranean fishery sectors. These features include the exploitation of an extended coastline with many islands and the existence of numerous small vessels of a multi-gear character, which form the largest artisanal fleet segment among all EC countries. Fishing activities are mainly extended down to 500 m, which suggests that fishing grounds below that depth are under-exploited. The fishery sector is separated into 2 categories: (a) small scale (coastal fisheries) and (b) medium (trawlers, purse-seiners and large pelagic longliners). The fleet comprises of about 17,500 vessels in total while there are around 40,000 active professional fishermen. Both number of vessels and fishermen are the highest among European Union member states. Greek fisheries are characterised by great spatio-temporal variation and scattering of fishing activity in the extensive Greek coastal zone (the Greek coastline length is higher than 17,000 km), resulting to difficulties in the monitoring of fishing activity and production. Due to the multi-species and multi-gear nature of the Greek fisheries, more than 70 species have been recorded in the commercially retained catches. Greek fishing activities cover three GSAs: (a) Aegean Sea (GSA 22), (b) Ionian Sea (GSA 20) and (c) Crete (GSA 23).

For a general description of the sector see Table III.A.1

III B Economic variables

III B 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

No data collection was taken in 2012, due to late authorization of the budget in December 2012

III B 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

III B 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

Not applicable

III B 4 ACTIONS TO AVOID SHORTFALLS

Not applicable

III C. Metier-related variables

Sampling covered only the longline métier targeting swordfish (LLD_LPF_0_0_0 SWO).

III C 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

Tables III.C.3, III.C.4, III.C.5 and III.C.6 provide information on the data collected. Data collection was accomplished through sampling both on landings and at-sea, as foreseen in the submitted proposal. The planned sampling intensity, in terms of number of trips was not achieved due to financing problems.

III C 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

The achieved precision estimate of length is higher than the required target value.

III C 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

In 2012, the sampling plan (i.e. number of individuals to sample) for drifting longlines was set following the Regional agreement (RCMMed&BS reports 2009, 2010 and 2011). However, due to delays in starting the DCF the spatiotemporal sampling coverage was incomplete.

RCMMed&BS 2011 Recommendations	**Actions**
Large pelagic issue: RCMMed&BS 2011 strongly recommends that the large pelagic species included in the Appendix VII of DCF Decision under the Mediterranean and Black Sea remain under the responsibility of the RCMMed&BS, for what concern the data collection (the minimum number of individual that each Member States must sample; the collection of stock related variables) and Regional coordination issues (the CV calculation as requested by EC Reg. 193/2010 must be calculated at stock level and for large pelagic this requires a Regional approach).	*Greece supports the recommendation*
Concerning the issue on large pelagic, RCMMed&BS recommends to continue the exercise carried out during PGMed 2011 reviewing yearly the sampling figures for métier related (length) and to estimate CV at regional level. MS should adjust their NP accordingly to these results. Moreover, RCMMed&BS recommend using the conversion table finalized during the meeting to transmit the data to the different end-users (i.e. ICCAT and/or European Commission).	*Greece agrees with the recommendation but could not follow in 2012 due to incomplete sampling.*
RCMMed&BS and RCM Long Distance Fishery 2011 Recommendations	**Actions**
Considering that the quality of the work of the ICCAT working groups depends on the adequate participation of experts, the two groups strongly recommend the participation of experts to the ICCAT	*Greece agrees with the recommendation and strongly promotes the participation of experts in the ICCAT working groups*

scientific meetings. It is reminded that ICCAT scientific meetings are eligible for participation under the DCF.	
The two groups propose a joined workshop among ICCAT representatives, scientists involved in large pelagic sampling, as well as representatives from RCM LDF and RCM MED&BS in order to harmonize the biological sampling issues on large pelagic and specify additional data or modifications that should be included in the future DCF, taking into account the ICCAT requirements for stock assessment.	*Greece supports the recommendation*
Liaison Meeting 2011 Recommendations	**Actions**
Concerning Metier related variables: Large pelagic sampling - Concerning the issue on large pelagic, RCM Med&BS recommends to continue the exercise carried out during PGMed 2011 reviewing yearly the sampling figures for métier related (length) and to estimate CV at regional level. MS should adjust their NP accordingly to these results. Moreover, RCM Med&BS recommend to use the conversion table finalized during the meeting to transmit the data to the different end-users (i.e. ICCAT and/or European Commission).	*Greece supports the recommendation*
Concerning Large pelagic issue: Workshop proposal concerning large pelagic sampling: The two groups (RCM LDF and RCM MED&BS) propose a joined workshop among ICCAT representatives, scientists involved in large pelagic sampling, as well as representatives from RCM LDF and RCM MED&BS in order to harmonize the biological sampling issues on large pelagic and specify additional data or modifications that should be included in the future DCF, taking into account the ICCAT requirements for stock assessment.	*Greece supports the recommendation*

III C 4 ACTIONS TO AVOID SHORTFALLS

The existing shortfalls (sampling intensity lower than the required levels) are related to the late financing of the project which resulted in poor coverage of the 2012 fishing activities. It is expected that such problems will be solved if the project is financed on time.

III D. Recreational fisheries

III D 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

Recreational fisheries of bluefin tuna

There is no recreational fisheries of bluefin tuna in Greece. According to the Ministerial Decision 170317/162669/20-4-2004) which lays down specific rules for the fisheries of large pelagic species (*Thunnus thynnus*, *Thunnus alalunga* and *Xiphias gladius*) in Greek waters, the fisheries for these species (i) can only be practiced by professional fishermen with a special licence, and (ii) is strictly forbidden for recreational fishermen.

Also, in 2003, a derogation was requested by Greece concerning blue fin tuna and the derogation was justified according to SGRN document: 05-01 Evaluation of NP for 2005_Sec(2005)-255 (pages 55, 103-104)

Recreational fisheries of eels

According to pilot study conducted in 2012 for eel fishery (Annex 1), no recreational fishery for eels was recorded.

Recreational fisheries of sharks

Sharks and rays are not target but by-catch species in commercial fishery of Greece. In recreational fishery, according to recreational fishing associations, the capture of sharks and rays is rare and random. However, in the submission of the new NP (2015-20) Greece intends to include a pilot study in order to investigate the existence of recreational fishery of sharks.

III D 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

III D 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

RCM Recommendations, May 2010	*Actions*
The RCMMed & BS recommends that all the Mediterranean countries that are not performing biological samplings on eel (Anguilla anguilla) in Mediterranean area should present their grounds for not doing it. RCMMed & BS reminds that eel is Group 1 species and is under Recovery Plan. Metier data (i.e. length frequencies distribution) shall be collected by MS. Stock related variables (sex, age, weight and maturity) should be also collected. In case eel Stock variables are not collected justification shall be provided.	*Greece conducted pilot study for eel fishery in 2012 and according to the findings of the study will proceed to data collection in 2013*
RCMMed & BS considers that sampling of recreational fisheries on eel in marine waters is not necessary, this activity not really being a real targeted practice.	*According to pilot study conducted in 2012 for eel fishery (Annex 1), no recreational fishery for eels was recorded.*

III D 4 ACTIONS TO AVOID SHORTFALLS

Not applicable

III E Stock-related variables

III E 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

Sampling covered only the swordfish fishery by longlines (LLD_LPF_0_0_0 SWO) in the GSAs 22 & 23. The sampling unit has been the fishing day (corresponding to the fishing trip). The survey has covered almost one-year period Data have been obtained from sampling on board commercial vessels.
Table III.E.3 provide information on the data collected. The planned sampling intensity, in terms of number of individuals measured has been achieved.

III E 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

The collected age and maturity data have not been analyzed yet; hence precision estimates are not available.

III E 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

RCMMed&BS Recommendations	Actions
RCMMed&BS 2011 recommended each MS organize the stock related variables sampling for large pelagic along the three years period, accordingly to their own suitability. MS should adjust their NP accordingly to these results.	*Greece, followed this decision, and will organize the stock related variables sampling for large pelagic along the three years period.*

III E 4 ACTIONS TO AVOID SHORTFALLS

Not any

III E 5 MONITORING OF COMMERCIAL EEL

Greece conducted pilot study for eel fishery in 2012 (Annex 1) and according to the findings of the study MS will proceed to data collection on commercial eel fishery in 2013. However data for the evaluation of the stock variables (length, weight, sex and maturity) were also collected in 2012 in the frames of the pilot study (Annex 1).

III F Transversal variables

III F 1 CAPACITY

III F 1 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

No data collection was taken in 2012, due to late authorization of the budget in December 2012

III F 1 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

III F 1 3 ACTIONS TO AVOID SHORTFALLS

Not applicable

III F 2 EFFORT

III F 2 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

No data collection was taken in 2012, due to late authorization of the budget in December 2012

III F 2 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

III F 2 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

Not applicable

III F 2 4 ACTIONS TO AVOID SHORTFALLS

Not applicable

III F 3 LANDINGS

III F 3 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

No data collection was taken in 2012, due to late authorization of the budget in December 2012

III F 3 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

III F 3 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

Not applicable

III F 3 4 ACTIONS TO AVOID SHORTFALLS

Not applicable

III G Research surveys at sea

III G 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

According to appendix IX of DCF (EU Dec. 93/2010), the Greek National Program for 20011-2013 included two surveys:

- MEDITs, MEDiterranean International bottom Trawl Survey
- MEDIAS, Pan-Mediterranean pelagic survey.

The MEDITS survey was not performed in 2012 due to the delayed start of the program (December)

MEDIAS

The MEDIAS acoustic research survey was carried out in December 2012. Collected data were used for abundance and biomass estimation of anchovy and sardine stocks by acoustics.

The realized survey covered 33% of the planned days at sea. The survey covered 5% of the planned survey in terms of area covered. Fish hauls and CTD stations covered 27% and 16% respectively of the target (Table III.G.1). Deviations were due to the delayed start of the program (December) and thus the limited time available for sampling.

The survey followed the MEDIAS protocol. Acoustic echoes were registered continuously along pre-defined transects in the study area in December 2012 (Fig. 1) with a Biosonics Split Beam 38 kHz DT-X. The partitioning of integrated deflection was done by comparing the echogram at corresponding times. Echograms were examined in order to identify school marks that characterize anchovy and sardine (MacLennan and Simmonds, 1992). Acoustic survey covered a total area of 1,719 km2 of echo-integration acquisition.

In order to estimate anchovy and sardine's biomass, the weight-length relationship is required as well as species length frequency distribution per area. Therefore, 37 pelagic trawls were held along transects in the positions of high fish concentrations (Fig. 2)

The density of targets (F) from the observed echo integrals were estimated according to the equation $F= (K/<\sigma>)E$, were K is the calibration factor, $<\sigma>$ is the mean cross-section and E is the Echo integral after partitioning (MacLennan and Simmonds 1992). The $<\sigma>$ was calculated for the mean total fish length of each area according to the equations $<\sigma>= 4\pi\sum_{\iota} f_i 10^{TS/10}$, where f_I is the corresponding length frequency as deduced from the fishing samples.

The abundance Q was estimated separately for the eastern and the western part of the study area. The abundance Q in each elementary statistical sampling area was calculated from the average density within each sub-area according to the equation:

$$Q = A_k \sum_i F_i / N_k ,$$

where F_I is the I sample; A_k is the area of each elementary statistical sampling area and N_k is transects in A_k. The variance V was estimated as

$$V=\sum_i (AF_I-Q)^2/[N_r(N_{r-1}-1)]$$

The data have been log transformed and the means and variances of F estimated according to the following equations:

$F=\exp(m)\mathbf{G_N}[0.5\ S/(n-1)$; $V=F^2-\exp(2m)\ \mathbf{G_N}[S(n-2)/(n-1)^2]$;

where m = average (lnF); S= variance (lnF) and n = independent observations of F

The total abundance Q_t and its variance are obtained by summing the results for each region $Q_t=Q_1+Q_2+\ldots$, and $V_t=V_1+V_2+\ldots$. Standard error of Q_t is the square root of V (MacLennan and Simmonds, 1992).

Anchovy and sardine distribution in the study area is presented in Figure 3 and 4.

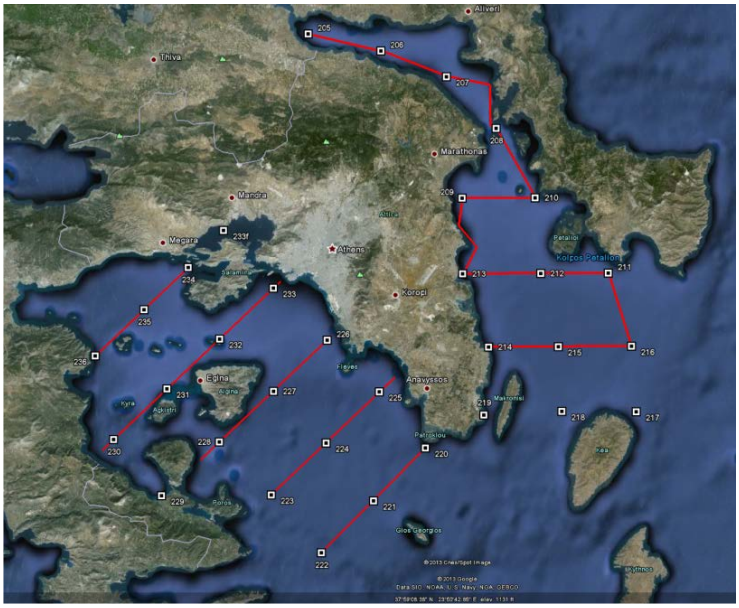

Figure 1. Map of the area covered during the acoustic survey in December 2012. Lines are the transects used during the trips, while bullets are the CTD stations.

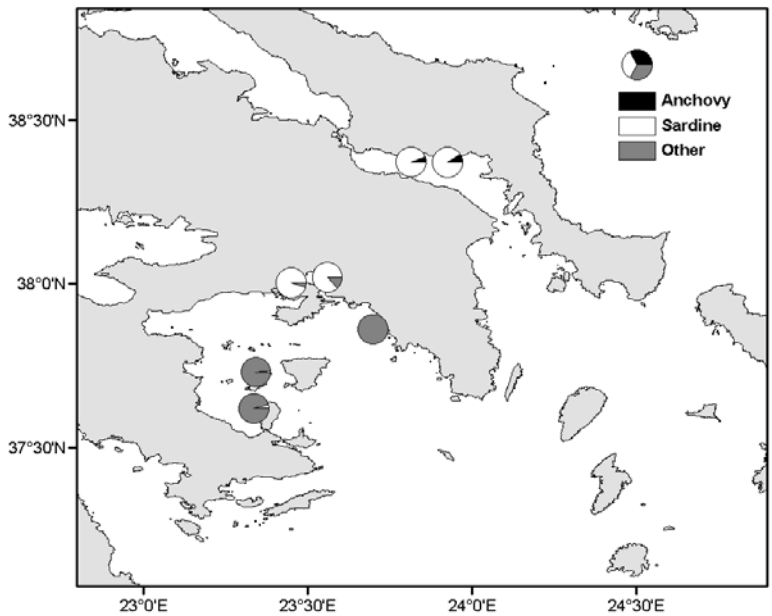

Figure 2. The experimental hauls during the survey in December 2012.

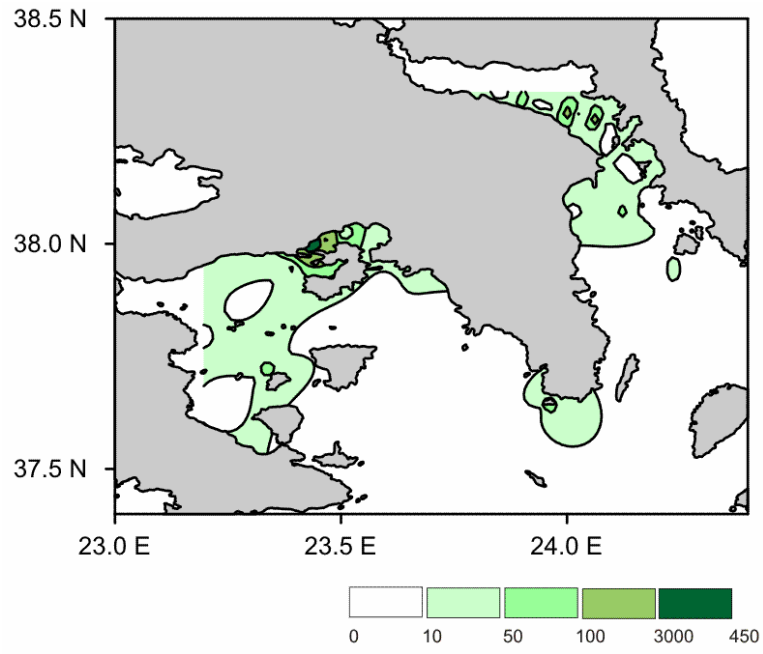

Figure 3. Anchovy distribution in the sampling area. (NASC)

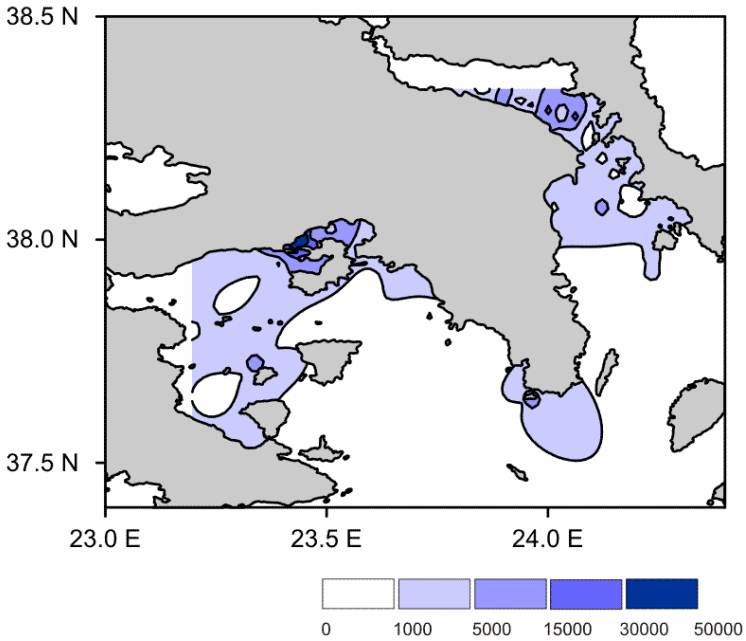

Figure 4. Sardine distribution in the sampling area. (NASC)

III G 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

MEDIAS

Deviations in Data quality are related to the survey period; the survey took place in December instead of summer 2012, as originally planned, because of the delayed start of the programme.

III G 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

There were no relevant regional or international recommendations.

III G 4 ACTIONS TO AVOID SHORTFALLS

In order to avoid shortfalls, the project should start in the beginning of each year and should concern wider time periods, i.e., at least 2-3 years. The MS is trying hard to resolve the situation in this direction, as far as possible in the present conditions of economic crisis.

IV MODULE OF THE EVALUATION OF THE ECONOMIC SITUATION OF THE AQUACULTURE AND PROCESSING INDUSTRY

IV A Collection of data concerning the aquaculture

IV A 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

No data collection was taken in 2012, due to late authorization of the budget in December 2012

IV A 2 DATA QUALITY: RESULTS AND DEVIATION FROM NP PROPOSAL

Not applicable

IV A 3 FOLLOW-UP OF REGIONAL AND INTERNATIONAL RECOMMENDATIONS

Not applicable

IV A 4 ACTIONS TO AVOID SHORTFALLS

Not applicable

IV B COLLECTION OF DATA CONCERNING THE PROCESSING INDUSTRY

The exploitation of fisheries products is an important part of our National economy and includes the activities of freezing, processing (filleting, salting, drying, smoking, marinating, cooking, canning) of fish, and the de-shelling of mussels. In Greece for the year 2011 152 active small to medium scale-sized enterprises (SMEs) were recorded (recording, December 2012).Herein, an assessment of economic (number of enterprises, activities, basic financial indices), social (socio-economic criteria), and financial status of this sector in our country for the fiscal year 2011 is attempted. By the term “basic financial indices” is meant: (1) value of total sales per processed products, (2) personnel costs, (3) energy related costs, (4) quantity and value of purchased processed raw material and other material necessary for the production, (5) production costs and value of the final product, (6) capital costs, (7) special costs, (8) capital value (total value of assets), (9) investments, and (10) debt. The socio-economic criteria of the sector are attributed to: (1) total employment of human resources per sector, (2) number of enterprises, and (3) the problems of the enterprises. Furthermore, basic financial ratios of economic liquidity, productivity, structure and activity are estimated for the fiscal year 2011, with the purpose of estimating the basic financial indices of LTD or SA companies that are obliged to publicize their balance sheets and also have the largest sales of seafood products in the Greek and the International food market.

IV B 1 ACHIEVEMENTS: RESULTS AND DEVIATION FROM NP PROPOSAL

The research method for acquiring economic and social data for 2011 in the processed seafood sector, involved the edition and sending for completion of a properly structured questionnaire to the total of the SMEs of the sector, during the period September to December 2012. The results of the present research were gathered from processing and analyzing the data from 100 completed questionnaires (a total of 152 were sent out). The completed questionnaires produce a significantly high percentage

of sampling (>85%, based on purchases of raw materials) consequently the credibility of estimations, conclusions, and comparisons in time scales was ensured.

Furthermore, these data were cross-referenced to ensure their validity by visiting and interviewing 80 (out of 152) enterprises. Some basic points of the questionnaire such as the identity of the companies, their fundamental financial indices, and the impact on the socio-economic environment of the area were confirmed and completed with data from the following sources: (a) Prefectural Chambers of Commerce, Industry and Trade (e.g. brand name, location, VAT number, phone and fax numbers) (b) Prefectural Directorates of Fisheries and Veterinary Services, as well as the National Food Control Agency (EFET), and the Hellenic Ministry of Rural Development and Food (e.g. purchase of raw material, production per species, total sales in quantity and value, employment, functioning regulations) and (c) World Wide Web (e.g. location, phones, capacity, projected investments, sales, general economic data).

The methodology referring to the financial indices of the companies, (gross incomes, net profits, assets, and liabilities) and to the fundamental ratios (of liquidity, productivity, economic structure and activity) for year 2011, involved the elaborate analysis of the balance sheets of 52 SA and LTD companies (29 of the freezing and 23 of the processing sector). This number of companies provides a significantly high percentage of sampling (> 82%, based on purchases of raw material for the year 2011) guaranteeing credible estimations and conclusions for the sector of seafood processing. The above methodology, namely: (1) the completion of the questionnaire, (2) in situ visits and interviewing, (3) analysis of the balance sheets, as well as the results drown for the year 2011 after the data collection, resulted in no significant differences and deviations from the original plan of the NP proposal 2011-2013. Table IV.B.1. gives the details to the sample size as well as to the sampling strategy employed.

IV.B.2 Data quality: Results and deviation from NP proposal

All requested indicators listed in Appendix XII of Commission Decision 2010/93/EC are collected in the Greek data collection program for the fish processing industry.
For most variables the achieved sample rate and the response rate exceeded 90% (Table IV.B.2.).
As mentioned earlier in IV.B.1, the significant high percentage of received, fully completed questionnaires (100/152), the visits and interviews on-site (80/152) and the data received by National Authorities and Public Organizations, provided cross checked and credible information about Greek seafood processing companies.
More specifically, the data provided by Prefectural Directorates of Fisheries and Veterinary Services contained detailed information about annual raw material purchases; employment, and company's subsidies which overlapped the data gathered by the questionnaires and the onsite interviews. That proved extremely helpful considering the companies' reluctance on answering questions about their production costs and sales policies.
Moreover, onsite visits by experienced personnel confirmed information regarding energy costs by checking the existing heating and refrigeration equipment and comparing their certified average energy consumption to the received questionnaire data.
As for the companies' financial information, the data provided by the 52 SA and LTD companies (responsible for more than 82% of Greece's annual raw material

purchases), was crosschecked by their publicized annual balance sheets. The financial data of smaller companies was compared to the data provided by Prefectural Chambers of Commerce, Industry and Trade, the Prefectural Directorates of Fisheries and Veterinary Services and the Hellenic Ministry of Rural Development and Food.

IV.B.3 Follow-up of Regional and international recommendations

There are no relevant regional or international recommendations.

IV.B.4: Actions to avoid shortfalls

Although the research achieved a very high percentage of sampling from larger companies' data analysis (based on annual purchases of raw materials, over 85% from questionnaires and over 82% from publicized balance sheets analysis), it nevertheless proved the difficulty of acquiring adequate and reliable data input from small sized companies. Consequently and in order to achieve a maximized sampling, extra effort will be applied in collecting completed questionnaires from small fisheries processing companies along with onsite visiting and interviewing. Existed research data from similar small companies and information provided by Prefectural Directorates of Fisheries and Veterinary Services, will be used to verify the reliability of the new input data.

V. Module of evaluation of the effects of the fishing sector on the marine ecosystem

V. 1. Achievements: results and deviation from NP proposal

Even though the MEDIAS survey was not complete, biological data was collected and could therefore contribute to the ecosystem indicators 1-3. However, the collected data are not representative of the area as only a small proportion of the area covered, therefore although are available, are not representative and compatible with previous ones and we do not suggest their use.

V. 2. Actions to avoid shortfalls

In order to avoid shortfalls, the project should start in the beginning of each year and should concern wider time periods, i.e., at least 2-3 years

VI. Module for management and use of the data

VI. 1. Achievements: results and deviation from NP proposal

The data are centralised in an integrated database and GIS Fisheries Information System called IMAS-Fish which supports the Data Collection program. IMAS-Fish was developed between 2003 and 2006. During the development of the IMAS-Fish databases, a particular attention was attached to design the system to fulfil the requirement of the Data Collection Regulation in force at that time. The system in place needs now to be updated to fit with the new DCF requirements. This includes the update of the database structure, the update/building of forms and the update of the query tool. In addition, supplementary tests will be done to ensure the system is working properly and is able to provide the expected results. The database contains more information than what is required for the DCF but the data extraction functions needs to be revised, possibly adapted to be able to extract easily certain information (like the JRC data call) from the IMAS-Fish database. This specific extraction can

also probably be performed by writing specific sql queries directly in the oracle database.

VI. 2. ACTIONS TO AVOID SHORTFALLS

Not applicable

VII FOLLOW-UP OF STECF RECOMMENDATIONS

Considering that DCF has not been applied in Greece since 2007 (with the exception of 2nd half of 2008) and therefore no AR were submitted by the country, there were no specific recommendations addressed to the country. Below the table with general comments of STECF is presented.

4.1. STECF EWG 11-19 on the DCF –Assessment of 2012 National Programme (NP) Amendments	
Recommendation	**MS action**
In order to facilitate enhancements in the NPs, STECF recommends that the Commission should: Include in the guidelines definitions of minor, major, or substantial changes (e.g. methodological issues, sampling design, changing in the surveys, derogations etc.) publish the list of all relevant recommendations from STECF, RCM, Liaison meetings in the data collection web site.	Not applicable to MS
request all MS to include a summary page giving a brief overview of the main revision made to the NP.	No revision was made to NP by the MS
STECF recommends that the Commission provide to the NP review group, the original text and the proposed NP revisions for ease of comparison. The final version of the approved NP is what should appear on the DCF website. This website is currently not up to date.	Not applicable to MS
4.2. STECF- EWG 11-20 on the Assessment of Mediterranean Stocks Part III	
Recommendation	**MS action**
Given that 95% of the demersal and small pelagic stocks in the Mediterranean assessed by STECF in 2011 (Reports of EWG 11-05, EWG 11-12 and EWG 11-20 meetings) were classified as being subject to overfishing, STECF recommends that, in order to avoid future losses in stock productivity and landings, fishing mortality should be reduced to reach the proposed FMSY reference points.	Not applicable to MS
4.3. STECF- EWG 12-01 on the Review of proposed DCF 2014-2020 part 1	
Recommendation	**MS action**
In relation to the revision of the new DCF, STECF would like to reiterates its previous recommendation from PLEN 11-01. *"STECF recommends that overlap in the Control Regulation (CR) and the DCF should be avoided. Data collected under the CR should not be included in the DCF unless it is to be expected that the quality of the data collected under the CR does not fulfill the quality requirements of the DCF.* *STECF further recommends including in the new DCF commitments for Member States to set up at national or regional level, a system to encourage cooperation between control authorities and the National Programmes of the DCF. The cooperation system should address all issues of relevance for the collection and processing of data to be collected under the CR and the DCF.* Before this is achieved, STECF concludes that scientific analysis in MS could be improved if MS scientists had access to online data from VMS and logbooks, as well as to data collected under the Control Regulation etc. *The CR includes commitments for Member States to develop and implement sampling plans for vessels not subject to logbook requirements and landing declarations. STECF recommends that when Member States develop the sampling plans, due notice is taken to the data requirements under the DCF. This could be done by actively*	Not applicable to MS

involving at national level, the DCF experts in the development of the sampling plans." STECF recommends that the roles of the institutions involved in the collection and analysis of transversal data should be discussed and clearly defined in a dialogue between all relevant parties, i.e. research institutes, control & enforcement agencies and fishing industry representatives. Furthermore, efforts should be made to ensure that the data needs of end-users are being considered in the new DCF.	
4.4. STECF-EWG 11-15 and EWG 12-02 on multi-annual Management plans	
Recommendation	**MS action**
STECF notes that the work carried out so far does not give a full range of risks and options and that currently only sparse data is available and models are limited. Nevertheless, STECF recommends that the current single species FMSY values are sufficiently robust for use as F targets in a management plan for the main fisheries in the Baltic and that if managers wish to continue with exploitation at or below these values, this would be consistent with achieving high yield and low risk to stock productivity.	Not applicable to MS
If managers wish to understand the likely consequences of fishing at Fs higher than the single species FMSY values, there needs to be a dialogue involving managers, scientists and stakeholders to focus the work in the correct area. A sensitivity analysis is needed to understand the robustness of the higher Fs to the assumptions implied in the models. Furthermore, there are trade-offs between stock size, yield, and risks of stock decline to biological limit points among sprat, herring and cod stocks, which have only been examined superficially which could be explored further. In addition other approaches, for example incorporating biomass considerations into the HCR, could be explored.	Not applicable to MS
4.5. STECF- EWG 12-03 on the AER EU Fleet part 1	
Recommendation	**MS action**
The following recommendations are primarily directed to the EWG 12-05. In response to the request for guidance from the EWG 12-03, STECF recommends that the economic performance indicators are based on the macroeconomic approach at the society level, instead of having the current mixture of macro- and microeconomic indicators, which could potentially lead to confusion.	Not applicable to MS
Following this, STECF thus recommends that the indicators of Gross Value Added and economic profit are calculated without including the cost/income from TCF transfers, and that instead of including the Operating Cash Flow calculations, these should be substituted with an indicator for Gross Profit being calculated as: *Income from landings + other income – [crew costs + opportunity cost of unpaid labour + energy costs + repair costs + other variable costs + non variable costs]* STECF recommends that two cases are analysed based on different levels of the theoretical maximum number of days at sea in order to illustrate how this influence the results. STECF recommends that the maximum number of days at sea is set as: 1) the vessel using most days 2) the average of the top 10% most active vessels	Not applicable to MS
For the selected fleets, STECF recommends that an explanation is given on whether any management limitations could potentially influence the maximum level. STECF recommends that any analysis of overcapacity includes a clear description of how the results should and should not be interpreted, also clearly stating the methodology with all the various caveats and limitations.	Not applicable to MS
STECF recommends that priority is given to completing the standard chapters	Not applicable to MS
5.6. Request for an STECF opinion on the implementation of Article 13.2 of the Regulation (EC) No 1342/2008	
Recommendation	**MS action**
STECF recommends that DG Mare calls the 2011 data on aggregated (summed) national cod catch (landings and discards separately estimated in weight in units of tonnes, preferably also by age groups in numbers in units of thousands of individuals) and fishing effort (kW*days at sea) for	Not applicable to MS

• each of the effort regulated fisheries defined in Annex I of the Council Reg. • 1342/2008 and granted additional effort allowances (BT1, BT2, GN, GT, LL,TR1, TR2, TR3) in • each of the cod plan areas 2a (Kattegat), 2b (Skagerrak, North Sea, Eastern Channel), 2c (Irish Sea), 2d (West of Scotland) specifically coded as o CPart13.2.a for highly selective gears used. o CPart13.2.b for cod-avoiding fishing trips. o CPart13.2.c for cod avoidance or discard reduction plan. CPart13.2.d for fishing activity to the west of the west of Scotland line.	
5.8. Assessment of various requests submitted by Member States relating to current EU Technical Measures Regulations	
Recommendation	**MS action**
1. Request from the Irish Authorities on the use of the entangling nets STECF recommend that if the derogation is authorized in order to prevent the expansion of the fishery it must be subject to the following restrictions: • the fishery is constrained to waters within 3 nautical miles of the coast; • the fishery is limited to vessels less than 10 m; • vessels are restricted to a maximum of 1000m of gillnet and with a maximum soak time of 24 hours; • the fishery is restricted to the months of June to September and for a maximum of 10 days per month; • and the target species, *Scyliorhinus Canicula*, is not sold for human consumption. Furthermore, due to the absence of analytical assessment for *Scyliorhinus Canicula* STECF recommend that the derogation should be reviewed periodically. In order to ensure such a review the Irish Authorities must ensure that monitoring is carried out using dedicated logbooks and that vessels are obliged to carry observers when requested.	Not applicable to MS
5.8. Assessment of various requests submitted by Member States relating to current EU Technical Measures Regulations	
4. Request from the Irish Authorities to fish with sorting grids STECF recommend permitting the use of the Swedish grid in the *Nephrops* trawl fishery in the Irish Sea Cod Recovery closed area. **6. Request from the Dutch Authorities on the use of the Pulse Trawl in ICES Area IVc and IVb** STECF recommend that the control and enforcement issues are resolved before the proportion of the beam trawl fleet using pulse trawls is increased. STECF recommend that any extension of the fishing area should be considered only after an impact assessment on the effects of the pulse trawl on the ecosystem, in particular when species not subject to a prior impact study, such as *Nephrops*, could be encountered by the gear. STECF recommend that any application of pulse technology in other gear types should be considered only after an impact assessment on the effects of the new pulse gear on the ecosystem, in particular when species not subject to a prior impact study.	Not applicable to MS
5.11. Survival of discarded fish The following recommendations are based solely on the available evidence on survival rates of discarded fish in the present review. STECF recommends that total landing obligations should apply to teleost fish that are under TAC regulation as part of a full catch quota system. In contrast, the current scientific knowledge, which suggests the potential for high survival rates for certain species discarded, does not support total landing obligations for some stocks of crustaceans and elasmobranchs subject to catch limits, or for all endangered or protected species or for some non-TAC-regulated teleost species with high survival. STECF considers that a discard ban for crustaceans and elasmobranchs should not be introduced unless more reliable stock-specific estimates of survival rates are available. STECF notes that survival of teleost fish caught and discarded by some fishing methods can be high e.g. release of undersized sea bass from hook and line fisheries. STECF suggests that consideration be given to exempting certain fishing methods and species from any future general obligation to land TAC-regulated species. STECF also considers that landing obligations for teleost fish should be an integral part of a	Not applicable to MS

catch quota management system (where TACs refer to the whole catches, and not only to landings). In the case of species that are not subject to TACs and which would normally be discarded, STECF advises that consequences of any landing	
5.12. Overview of selectivity of gears used in EU fisheries STECF recommends that a more detailed analysis of discard data gathered under the Data Collection Framework should be undertaken to provide a quantitative rather than a qualitative assessment and this analysis be used to identify the level of discards for the aggregated fleets	Not applicable to MS
STECF report PLEN 12-02	
Recommendation	**MS action**
4.1. Role of STECF in the advisory process Conclusions or recommendations from EWG reports, ad hoc contracts or other documents are, therefore, not opinion of the STECF before review and adoption by the committee.	Not applicable to MS
5.1. STECF-EWG-11-13: Development of the Ecosystem Approach to Fisheries Management (EAFM) in European seas Based on the Report of its EWG 11-13, the STECF recommends the following: 1) Further consideration be given to how the exploratory data analysis conducted by the EWG 11-13 should inform the development for a management framework for an EAFM and the data and assessment requirements to support such a framework. 2) A revised DCF should include a requirement to collect data to estimate the values of state and pressure indicators to contribute to the requirements of an EAFM and the MSFD. 3) STECF reiterates its previous recommendation from PLEN 11-03, that a study be undertaken to focus on the disaggregation of economic data below the fleet level to subareas and/or métiers, which, for instance, is relevant in relation to future needs for impact assessments and evaluation of management plans, and also when addressing ecosystem based management. 4) An expert working group to further develop the present fleet-based methodological approach, specifically to incorporate a review and analyses of possible targets, should be established under the auspices of STECF. Such an expert group should concentrate on one or two well-studied and understood ecosystems. The feasibility and usefulness of using ecosystem and/or bio-economic models in an advice oriented EAFM perspective, in relation with the fleet-based approach mentioned above also needs to be addressed. Consideration needs to be given as to whether this could be undertaken by the proposed group or whether a separate meeting would be necessary.	Not applicable to MS
5.2. STECF-EWG 12-04: International Dimension STECF recommends that FPAs be based on management plans, which should include management objectives, harvest control rules, TAC or effort allocation keys and should be supported by data collection programs, scientific advice and monitoring. For practical purposes STECF recommends that in the context of FPAs, the estimated surplus should be used to allocate the EU fleet's share of a TAC or effort arising from a management plan.	Not applicable to MS
5.3. STECF-EWG-12-05: Economics – AER fleet part II In relation to the future production of the AER, STECF recommends the following: 1) The preparation of the AER is undertaken by having two separate EWG meetings, one for data quality checks and the writing of national reports and a second for regional analysis and the chapters of special interest, 2) The development and application of a data validation tool by JRC is undertaken in order to enable more initial data checks in order to verify the quality of the submitted data, 3) The regional overview is enhanced with more qualitative cross country comparison of economic performance of fleets, 4) The structure of the chapter on prices is revised in order to give a clear and concise overview of the price developments.	Not applicable to MS
5.4. STECF-EWG-12-06: Fishing effort – part 1	Not applicable to MS

STECF would like to reiterate its recommendation from STECF PLEN-11-03 that data collected under different EU programs and DCF have to be compatible if bioeconomic modeling should be further developed and improved. In particular, there is an urgent need to harmonize gear and area descriptors between economic and biological data calls, as well as to improve the consistency of transversal data such as effort and landings by fleet and métier across these data calls. At present, economic data are only available for aggregated groups of vessels assigned to a single majority activity (to preserve confidentiality) without detailed information on their actual fishing activities, while biological data are collected at the scale of fishing activities =(or métiers) without insights of how individuals select different combinations of activities, making the two data sets largely irreconcilable as they are currently requested under Data Calls. In practice, it might be possible to link the two through allocation to fleets and métiers of logbooks data crossed with fleet register. STECF emphasizes that the DCF needs to explicitly improve this link.	
6.1. Request for a STECF opinion on the evaluation of the contributions submitted by Member States on the draft revised guidelines for an improved analysis of the balance between fishing capacity and fishing opportunities STECF recommends that the Commission disseminate the guidelines proposed by the WG taking into account the minor changes proposed below: 1) p. 26, section 2.1.1 Description and data sourcing, the fifth paragraph should read: The achieved maximum number of days at sea within a fleet segment, observed or estimated for each reference year as described above, could in reality have been limited by effort restrictions. Furthermore, there could be economic (e.g., the fuel crisis), environmental (e.g., weather) and social (e.g., not fishing on weekends) reasons that affect the maximum observed number of days at sea per vessel for certain years, so that this number may not reflect the true technical capacity of the fleet. Therefore, MS should also calculate the ratio based on the theoretical maximum number of days at sea. 2) p. 27, section 2.1.1 Description and data sourcing, the last paragraph should read: A table showing the proportion of inactive vessels of the total fleet should be provided with respect to number of vessels, GT and kW. This could, for example, be done by different length classes. 3) p. 27, section 2.1.2 Application and interpretation, the second paragraph, first sentence should read: Inactive vessels are an unused capacity and as such they reduce the overall capacity utilisation rate of the total fleet. Inactive vessels cannot be allocated to a segment however as segment allocation requires gear type and species landed. To include some assessment of inactive vessels, a table showing the number and proportion of inactive vessels in the total fleet should be provided. Vessels could be categorised by DCF segment length classes.	Not applicable to MS
6.2. Request for a STECF opinion on the Assessment of the statistical method used by NAFO to rectify the reported catch data and provide estimates of discards for 3M cod and Greenland halibut in SA2 and Division 3K-O In order to expedite the work of the Scientific Council, STECF recommends that the Commission urges all Contracting Parties to NAFO to take measures to ensure that catches reported to NAFO are accurate. STECF considers that in the interests of transparency and to provide the best scientific assessments and advice, it is appropriate that STACFIS continues to conduct a general review of catches and to document both the catches reported in Statlant 21 reports together with the STACFIS estimates that are used for the assessment. Furthermore, STECF considers that the methodology to compute best catch estimates is documented in future NAFO STACFIS assessment documents and that catch estimates, including discards, from national sampling programs are clearly documented in National Research Reports	Not applicable to MS
7.9. Request for an STECF advice on tuna fisheries where sharks are associated	Not applicable to MS

species,particularly in Malagasy waters STECF observe that the Scientific Committee (SC) of IOTC has made several recommendations to the IOTC concerning shark conservation. The recommendations have centered on the need to improve the collection and reporting of data on shark catches in association with IOTC fisheries: in particular the need to improve data collection at the species level for stock assessment purposes, including species, sex ratios, numbers and size distributions of catches. STECF note that to facilitate the collection of more accurate species specific fishery data that can be used to develop assessments, the SC have advised that shark fins be matched to the carcass; that is, that sharks be landed with their fins attached naturally or using tamper-proof mechanisms. However, the STECF also noted that SC pointed out the difficulty of practical implementation and safety issues for some fleets and, thus, SC recommended all CPCs to obtain and maintain the best possible data for IOTC fisheries impacting upon sharks, including improved species identification.	
STECF recommends that the conclusion above relating to short-fin mako shark in the Cape Verde FPA (and in FPA areas in the ICCAT area more widely) should be revisited when the SCRS meeting on September 2012 review the results of the 2012 ICCAT short-fin mako assessment. The results of the assessment should be reviewed together with existing results from PSA risk analysis. STECF suggests that this could be undertaken during the EWG 12-17 which is scheduled to meet from 8-12 October 2012. Given (i) the absence of an assessment for short-fin mako shark in the IOTC area, (ii) the high vulnerability to the longline fleet indicated by the PSA and (iii) evidence that short-fin mako shark may be a target species, STECF recommends that to adopt a precautionary approach a minimum requirement is that the annual catch of the short-fin mako shark should not increase above recent levels [2007-2010 average] in any FPA areas within the IOTC area until more reliable stock assessment results are available STECF recommends that more comprehensive species-specific catch and biological data for sharks are needed to support the assessment of population status, to model the effects of fishing and to model the effects of alternate management options, especially in the Madagascar FPA area. For the Madagascar area, STECF recommends that the recommendations on data collection relating to sharks that are provided by the IOTC WPEB are followed. To facilitate data collection and accurate documentation and reporting of catches, STECF recommends that any sharks caught in FPA fisheries should be retained and landed whole (with fins wholly or partly attached to their respective carcass).	Not applicable to MS
7.12. Request for an STECF assessment of bycatches in the industrial fishery in the Baltic Sea STECF notes that monitoring of the bycatch from Baltic pelagic fisheries is currently undertaken by most EU Member States and that these data are reported to ICES. Hence STECF recommends that the Commission request ICES to publish the species composition of catches from pelagic fleets in the Baltic in the Reports of the WGBFAS (as is for example done by the WGNSSK for the North Sea).	Not applicable to MS
STECF report 12-03	
Recommendation	**MS action**
5.1. STECF EWG 12-10: Assessment of Mediterranean Stocks Part I As a result of its review of the Report of the STECF-EWG 12-10 on assessment of Mediterranean stocks, the STECF has drawn the following recommendations: 1) In an attempt to ensure future data quality and completeness, STECF recommends that DG MARE communicate the detailed comments on data quality and completeness contained in section ** of the EWG 12-10 report to Member States' DCF program national correspondents. Noting that the time and resources required to undertake stock assessments of resources in the Mediterranean are finite and that there is little point in undertaking annual assessments for many of the resources, STECF proposes that the annual	Not applicable to MS

requests for stock assessments and advice be focused on a smaller number of stocks. STECF considers that as a rule of thumb, the Committee is unable to adequately deal with more than about 30 assessments per year and proposes that this could be achieved if revised assessments were undertaken biennially. Adopting such an approach would enable better coordination and planning including the appointment of stock co-ordinators and securing availability of appropriate expertise. STECF recommends that DG MARE devise a prioritized biennial schedule for assessments and discuss how such a programme can be incorporated into the annual STECF work programme at the forthcoming STECF Bureau meetings	
5.2. STECF EWG 12-11 and EWG 12-21: Review of national reports on balance between fishing capacities and fishing opportunities STECF recommends to the Commission that further work is carried out by an EWG to evaluate, explore and understand the sustainable harvest indicator and its implications for issues of overcapacity so that more useful expert comments can be made based on the value of the indicator. STECF recommends that in order to facilitate the calculation of the balance indicators, the Commission should ensure that the data required in the DC-map includes the maximum observed number of days at sea per vessel per fleet segment. This would enable the technical indicator to be calculated based on DC-Map data. STECF reiterates its recommendation from STECF PLEN 2012-02 that the Commission adopts the updated "Guidelines for an improved analysis of the balance between fishing capacity and fishing opportunities" and distribute them to MS.	Not applicable to MS
5.3. STECF EWG 12-12: Evaluation of fishing effort management in EU waters –part2 In addition to all of the foregoing evaluation work, STECF has the generic task of reviewing the DCF data call in 2012 to support fishing effort regime evaluations. STECF has two technical recommendations to DG MARE regarding the forthcoming DCF data call 2013 to support fishing effort regime evaluations as compared to the one issued in 2012. **First recommendation** STECF notes that the DCF data call in 2012 to support fishing effort regime evaluations is not fully consistent with the ToR. Thus, the EWG could not fully address the tasks for the Baltic regime, i.e. to assess the fishing activity measured in days absent from port (according to definitions adopted in R(EC) No 1098/2007). STECF recommends that in the Effort Data Call for 2013, the Table D should include an additional fishing effort parameter called "fishing activity" in units of days. The additional parameter shall be specific by country, year, vessel-length, area (A or B) and gear (regulated=REGGEAR or un-regulated=NONGEAR). **Second recommendation** STECF EWG 12-12 notes that FDF has been implemented for sole in the Western Channel in 2012 (Council Reg N 43/2012, EU TAC and Quota regulation for 2012). STECF EWG 12-12 recommends to DG MARE that, if catches and effort under FDF in the Western Channel are to be analysed in 2013, the respective DCF fishing effort data call shall consider an additional specific code in Appendix 6 called "FDFIIC".	Not applicable to MS
5.5. STECF EWG 12-14: Technical Measures and Selectivity The discussion held at EWG 12-14 is an important first step in understanding the current deficiencies in technical measures and how to address these deficiencies in developing a new approach to technical measures based on a results based approach with appropriate impact metrics (impact referring to, e.g., F on fished stocks and damage to other ecosystem elements such as seafloor, seabirds). To assist the Commission further it is recommend that the EWG reconvene in quarter 1, 2013 with the following terms of reference: a) Identify tactical objectives that potentially could be achieved using technical measures in the context of results-based management. b) Identify appropriate metrics to quantify the progress towards the tactical objectives identified in a).	Not applicable to MS

c) Discuss and identify how impact metrics can be monitored and controlled and how the effectiveness of an impact based approach can be evaluated. This should consider required levels of compliance and difficulties associated in achieving these levels. d) Explore the need for minimum standards (baseline regulations), focusing on specifications of technical measures, considering there will be a requirement for a transitional phase from the current input based approach towards a full impact based system as well policy objectives not suited to a strict output based approach e.g. MFSD, NATURA 2000.	
5.8. STECF EWG 12-16: Assessments of Black Sea stocks STECF notes the recommendations of the EWG 12-16 with regard to future work and urges the Commission to take then into account in future planning and act accordingly.	Not applicable to MS
7.11. Update of STECF advice from July 2012 on tuna fisheries where sharks are associated species For north Atlantic short-fin mako the most recent assessments suggest B>BMSY but they are still regarded as highly uncertain by the ICCAT stock assessment group. Given that the susceptibility analyses (PSA) indicate that north Atlantic short-fin mako can be easily overexploited given its life history and low productivity STECF recommends the adoption of a precautionary approach and that the annual catch of the short-fin mako shark should not be increased above recent levels (2007- 2010 average) in the Cape Verde FPA area and in the ICCAT region more widely we have higher confidence in the assessment results. Given (i) the absence of an assessment for short-fin mako shark in the IOTC area, (ii) the high vulnerability to the longline fleet indicated by the PSA and (iii) evidence that short-fin mako shark may be a target species, STECF recommends the adoption of a precautionary approach, so the annual catch of the short-fin mako shark should not increase above recent levels (2007-2010 average) in any FPA areas within the IOTC area until more reliable stock assessment results are available. STECF recommends that more comprehensive species-specific catch and biological data for sharks are needed to support the assessment of population status, to model the effects of fishing and to model the effects of alternate management options, especially in the Madagascar FPA area. For the Madagascar FPA area, STECF recommends that the recommendations on data collection relating to sharks provided by the IOTC WPEB are followed. To facilitate data collection and accurate documentation and reporting of catches, STECF recommends that any sharks caught in FPA fisheries should be retained and landed whole (with fins wholly or partly attached to their respective carcass)	Not applicable to MS

VIII LIST OF ACRONYMS AND ABBREVIATIONS

AR	Annual Report
EC	European Community
EU	European Union
DCF	Data Collection Framework
GFCM	General Fishery Commission for the Mediterranean
GSA	Geographical Sub Areas
ICCAT	International Commission for the Conservation of Atlantic Tunas
MEDIAS	Pan-Mediterranean pelagic survey
MEDITS	Mediterranean International Trawl Survey
MS	Member State
NP	National Programme
PGMED	Mediterranean Planning Group for Methodological Development
RCM MED&BS	Regional Coordination Meeting for the Mediterranean and Black Sea
RDB	Regional data Base
SGRN SUB	Group on Research Needs
STECF	Scientific, Technical and Economic Committee for Fisheries

IX. COMMENTS, SUGGESTIONS AND REFLECTIONS

None

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XI. ANNEXES

ANNEX I: PILOT STUDY FOR THE EEL 2012

National Program for the collection of fishing data

"Pilot study for the Eel 2012"

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Reporting Period. The present technical report was completed in February of 2013 and includes data that were gathered during the year of 2012.

Structure of report. For the structure of the present report, the proposed structure from the Working Group on Eels, ICES which was also used from all the European countries for the submission of the yearly reports, was used.

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1 Introduction

1.1 GENERAL INFORMATION FOR GREECE.

The population of European eel (*Anguilla anguilla* (L.)) has been reduced and the current fishery is considered to be outside the limits of sustainability. Factors contributing to the decline include the fishing activity, and also other anthropogenic interferences (habitat loss, migration barriers, pollution) and physical factors (e.g. cormorants). Further assessment of the eel's biological status requires additional and continuous data (Dekker, 2005).

For this purpose, the eel was included in the regulations for the data collection of the E.U. (Council Regulation 1543/2000 and Commission Regulations 1639/2001, 1581/2004). According to the new EU Regulation 199/08 (Article 3) the monitoring of the commercial and recreational fishery of the eel in inland waters must be included in the national program of each Member State. The estimates must refer to the total production, effort and biological efforts of the landings.

The fishery for European eel in Greece is limited to the capture of adults during their migration to the Atlantic for reproduction. In Western Greece there is limited fishery of yellow eels, as part of the local tradition (influences from Italy) of consuming younger eels, a practice that is not found elsewhere in Greece.

Fishery of glass eels is not performed despite efforts that were made in the past with the purpose to use them in aquaculture units. It has to be mentioned that the fishery of glass eels is prohibited, and requires special permission from the regional authorities. Also there are no scientific data for eel recreational fishing until now.

The majority of eels are caught in the lagoons. Most of the lagoons are found in North Greece (estuarine systems of Evros, Nestos and Lake Vistonis) and in Western Greece (Messolonghi and Amvrakikos lagoons). The regional authorities are responsible for the management of the lagoons, while some belong to the Ministries of Development and Economics and some belong to local municipalities. In any case, the economic exploitation of the lagoons is performed for a certain period of time by fishing cooperatives, which lease the lagoons (in most cases for 10 years). The local fishing cooperatives have the exclusive right to exploit the fishes of the lagoons (Koutrakis *et al.*, 2007).

Eel fishing is usually performed with traditional traps designed to catch the eels alive during their migration period to the sea for reproduction which takes place from September to January every year. Fyke nets are also used in certain lagoons where no permanent traps are installed, or during the rest of the year, outside the period of migration. The fishing cooperatives usually have adequate infrastructures to store the eels alive up to their sale (most of the eels are exported to other European countries, such as Italy and Germany). The total landings of eels must be reported to the local authorities every month, along with the fish catches of the other species that are caught.

Some of the catches are made in the lakes and in river estuaries but there is no eel fishing in the rivers. In the lakes, fishermen use special traps for eels (fyke nets). However, due to the fact that catches have declined significantly during the last decades, this fishing method is nowadays nearly abandoned. Eel fishing in estuaries is practiced mainly by professional fishermen who also use fyke nets. These catches are

usually reported as marine landings, although the fishing is practiced in transitional waters.

The total eel landings in Greece are decreasing continuously, starting from the early 1980's (Zompola *et al.*, 2001). According to data of the Hellenic Statistical Authority, eel landings for the period 2002-2006, mainly originated from aquaculture units (500 t / year) and secondly from fishery, both marine and freshwater (21-24 t / year). However, fish catches from lagoons and estuaries are usually reported as coming from "aquaculture" because these areas are characterized as "areas of extensive or semi-intensive aquaculture" (even though there is no form of interference in the life cycle of the fishes). These catches are estimated to be about 52 – 85 t for the period 2003-2004. Therefore the total catch for all the areas for the period 2002-2006 ranged from 75 to 110 t / year.

1.2 ORGANIZATION OF THE EEL MANAGEMENT UNITS

The Hellenic Eel Management Plan defines four Eel Management Units (EMU). Their definition is based on the main climatic characteristics, on the spatial distribution of lagoons, lakes and rivers, on the existing Water Districts (Directive 2000/60/EC), on the distribution of the eel fisheries and on the location of the main authorities involved in water and eel management.

The management measures concerning fishing restrictions and environmental aspects are applied to all EMUs. The nature and scale of the proposed specific actions, like stocking or pilot studies, respect the relative importance of the EMUs.

1.3 DESCRIPTION OF THE EEL MANAGEMENT UNITS

Greece is located close to the easternmost limit of the eel distribution and the country presents an extreme Mediterranean Hydrologic profile very different from the majority of the European countries. The total annual precipitation (about 700 mm) increases from southeast to northwest. 91 rivers have been recorded representing 4268 km, with deltas covering approximately 72,300 ha. The main characteristic of Greek rivers is their torrential flow that is caused by the uneven seasonal rainfall distribution, the mountainous terrain with large slopes, and the erosion of the ground. The total surface of Hellenic lakes is about 85,000 ha (30% are artificial). The total surface of the Hellenic lagoons is estimated to about 35,000 ha. The majority (75%) is located along the western coast.

EMU-01 (7 Prefectures, 3 Regions) is located on the North Western Greece. It comprises 70% of the total Hellenic lagoons surface and 45% of the lakes surface. Despite the considerable decrease of the EMU-01 landings (180 t in mid 1980's, 50 t the recent years), the unit remains the most important eel producer. EMU-02 (5 Prefectures, 2 Regions) is located on the Western Peloponnesus. It comprises 5% of the total Hellenic lagoons surface and 3% of the lakes. The eel landings of this EMU increased since the mid-1980's, contrary to the general pattern and now represents about 40% of the Hellenic lagoon landings (about 40 t). EMU-03 (4 Prefectures, 1 Region) is located on the North Eastern part of the country. It comprises 24% of the total Hellenic lagoons surface and 9% of the lakes surface. The landings dropped from 70 t in early 1980's to less than 10 t. EMU-04 covers the rest of the country, mainly central eastern continental Greece and the islands of the Aegean Sea (35 Prefectures and 8 Regions). The landings of the EMU-04 are almost zero.

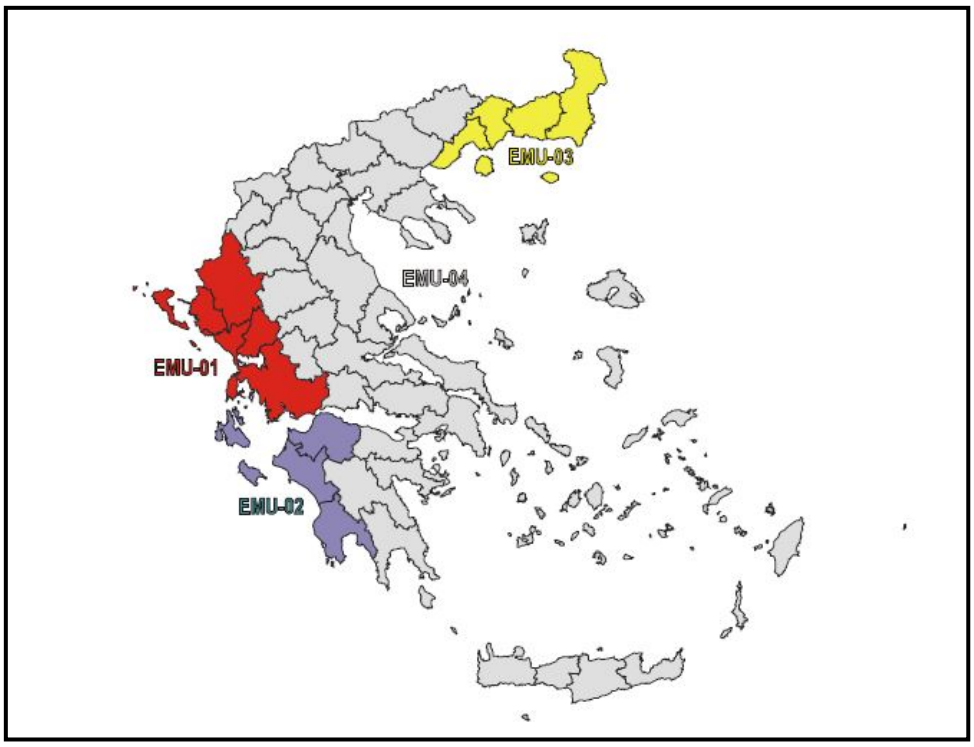

Figure 1.3.1. Geographical distribution of the Hellenic Eel Management Units (HEMU).

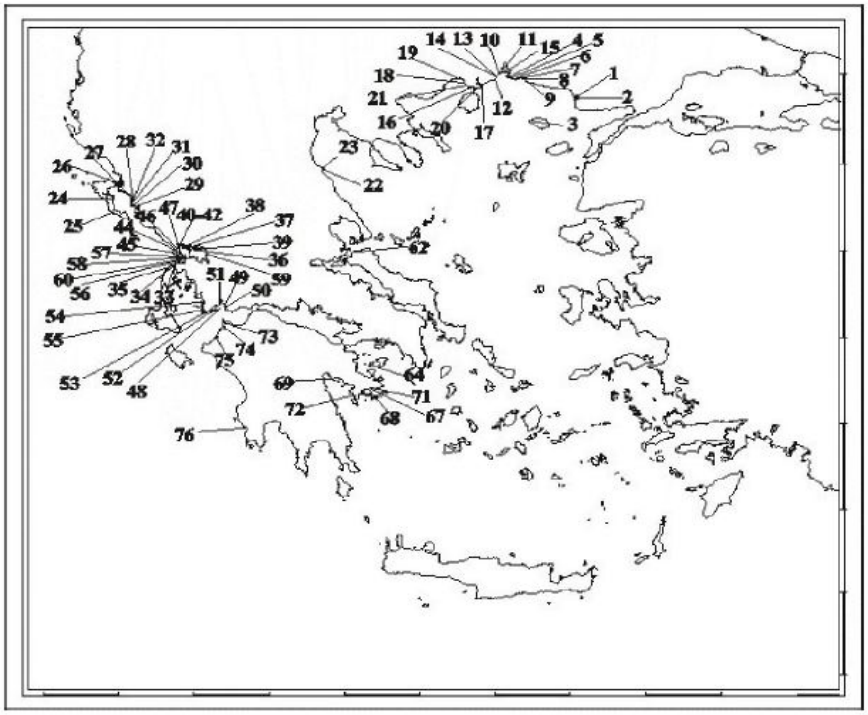

Figure 1.3.2. Geographical distribution of the Greek lagoons.

1.4 FISHING ACTIVITY

Fishing in the lagoons is based on the use of fixed barrier traps, which catch fishes during their seasonal or ontogenic offshore migration. Barrier traps (V-shape traps) are passive, fixed gears and are part of the fence installed at the interface between the lagoon and the sea (for more details see Ardizzone *et al.*, 1988). The traps are covered by a nylon or PVC net (mesh size 14 mm). The traditional barrier fish traps used to be wooden installations, consisting of wooden sticks hammered into the lakebed sustaining a net of reeds. Most of these installations were replaced after 1980 with cement installations (modern barrier fish trap) copied from the Italian "vallicultura" capture systems (Figure 1.4.1). The last two years an effort to increase the selectivity of the traps was made in the Mesolonghi-Aitoliko Lagoons (EMU-1, 40% of total surface of the Hellenic lagoons).

Figure 1.4.1. Modern barrier fish traps in the lagoon of Eratino (a) and in the Vassova Lagoon (b).

The exploitation of eel concerns only individuals larger than 30 cm. The law (RD/142/1971) states clearly that fishing and commercialization of eels less than 30 cm is totally prohibited. The bulk of eel landings are provided by the lagoon fisheries. The analysis of the monthly landings of the Messolonghi-Aitoliko lagoons (EMU-01) showed that 92% of the total annual eel catches were recorded between November and January (Katselis *et al.*, 2003).
As the number of barrier traps is constant we can consider that the fishing effort remains stable. The reported catches dropped from 250 t in mid 1980's to 50-70 t in the recent years. Individually operating fishermen around the lagoons and in lakes also catch eels (about 70 t in mid-1980's). Some catches are also reported from coastal areas mainly from static gears used in small scale fisheries (15 t). No official elements on recreational fisheries exist but their production was estimated about 15 t in mid 1980's. Only 20% of the surface of the freshwater ecosystems in which the presence of eel is reported is exploited.

1.5 LIFE CYCLE OF THE SPECIES *A. ANGUILLA*

The European eel (*Anguilla anguilla* L., 1758) is a highly migratory amphihaline species. The geographic distribution (Figure1.5.1) of *A. anguilla* comprises most of Europe, ranging from Northern Scandinavia to Northern Africa, and from the Eastern Mediterranean region to the Azores Islands.

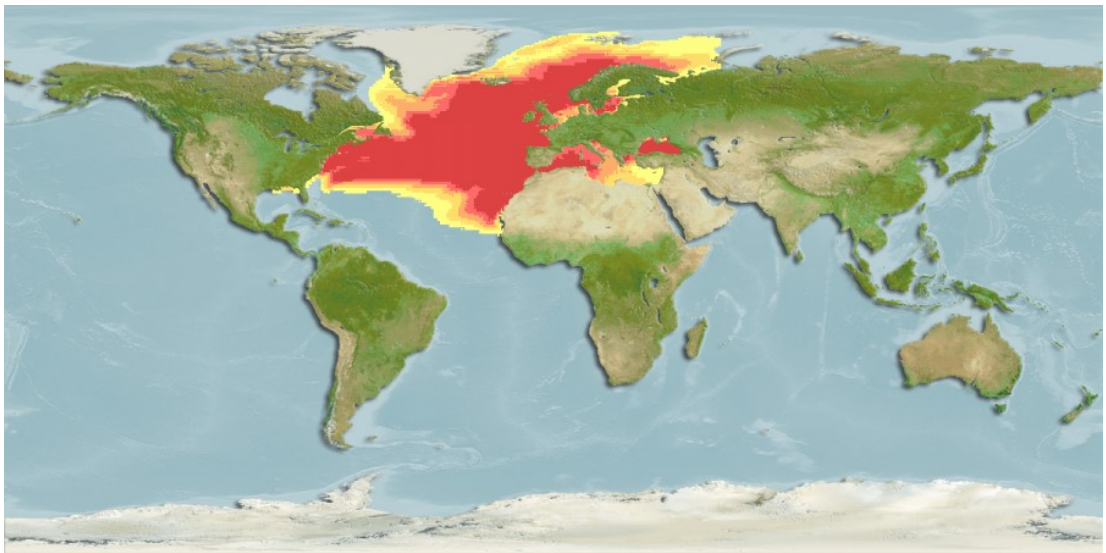

Figure 1.5.1. Map indicating the geographical distribution of the species *Anguilla anguilla* (www.Fishbase.org).

Its life cycle was elucidated in the 1920's by Schmidt. Spawning takes place in the Sargasso Sea, in the Atlantic Ocean. After hatching, leptocephali (small larvae) are probably driven eastwards by the Gulf Stream. The duration of this migration may range from a few months (Lecomte-Finiger, 1994) to a few years (Schmidt, 1925; Kettle and Haines, 2006). On the continental shelf, leptocephali metamorphose into glass eels (small unpigmented eels), which colonize coastal and inland waters of the Atlantic and Mediterranean coasts. Once the glass eels have entered this new environment, they undergo a series of physiological and behavioral changes, develop

pigmentation, and become able to swim actively, thus entering the "elver" stage (small yellow eel). Yellow eels grow and feed in continental waters in this pre-reproductive stage for a variable number of years, ranging from about 3 to 8 years for males and from about 5 to 20 years for females, until they reach maturation size (around 400 mm for males and 600 mm for females). Eels eventually undergo metamorphosis to the silver stage, begin sexual maturation and migrate back to the spawning areas where they complete their maturation processes (van Ginneken et al. 2007), spawn and die. While eels are commonly believed to colonize inland waters, recent analysis shows that a fraction of eels might develop their full life cycle in coastal waters (Tsukamoto, 1998; Daverat et al.; 2006).

2 Time-series data

2.1 LANDINGS

2.1.1 Glass Eel landings

The RD/142/1971 states clearly that fishing and commercialization of eels less than 30 cm is totally prohibited. Thus there is no fishing of glass eels and young yellow eels in Greece so it is not necessary to ensure price control, as required by Article 7(5) of the Regulation No. 1100/2007. Fishing activities targeting individuals less than 30 cm is allowed with a specific authorization only for restocking purposes (RD/142 art. 1/1971).

2.1.2 Yellow eel landings

2.1.2.1 Commercial fisheries

There are no commercial fisheries for larger 'yellow' eel recruits, and therefore no time series data.

2.1.2.2 Recreational fisheries

There are no recreational fisheries for larger 'yellow' eel recruits, and therefore no time series data.

2.2 SILVER EEL LANDINGS

2.2.1 Commercial fisheries

More than 80% of the landings are provided by lagoon fisheries. Figure 2.2.1.1 indicates the lagoon landings from the late 1970's. Few data are available before this period but those are limited to specific zones and their quality is doubtful. The figure shows a clear decreasing trend since late 1980's. The EMU-1 (Western Greece) provided the majority of the landings until mid 1990's. The decreasing trends are obvious on the annual lagoon landings of the EMU-01 and EMU-03 after 1990, while the annual lagoon eel landings of the EMU-02 showed a noticeable increase. The mean eel annual production of lagoons of the EMU-01 and EMU-03 decreased from 10 kg/ha during the period before 1980 to 2.4 kg/ha in recent years. On the other hand, the eel annual production of lagoons of the EMU-02 increased from 10 kg/ha during the period before 1985 to 20-25kg/ha during the period after 1990. The origin of this inverse pattern of the EMU-2 is not identified. In any case the total landings decreased considerably despite the fact that the fishing effort was maintained stable at least since the installation of "modern fishing traps" in the 1980's.

In several areas of the EMU-01, individually operating fishermen who do not belong to a particular fishing cooperative, (often from the coast) target eels with catches varying from 200 kg to 1000 kg per period (Koutsikopoulos *et al.*, 2001). The number of those fishermen remains unknown along with their spatial distribution and their

gears. Individually operating fishermen also appear in lagoons, lakes and deltas of EMU-02 but no elements exist on their activity. The same information exists for EMU-03 and finally the few elements for EMU-04 suggest that the intense eel fishing activities in some rivers stopped at the late 1970's as a result of the severe degradation of the corresponding ecosystems.

The so-called independent fishermen that fish inside the Greek lagoons are allowed only in 8.3% of them, using nets and longlines, irrespective of the species caught. The lagoons with legal independent fishing activity are all recorded in EMU-01, representing 50% of the total surface of the Greek lagoons and belong mainly to the most important deltas of Acheloos and Arachthos systems (Figure 1.3.2). The independent eel fishery is carried out using eel traps, fyke nets, lights, spears, longlines and other localized traditional fishing gears. The HEMP proposed the prohibition of fyke net fishing in the lagoons and also spatial and temporal closures for eel fishing in rivers and lakes.

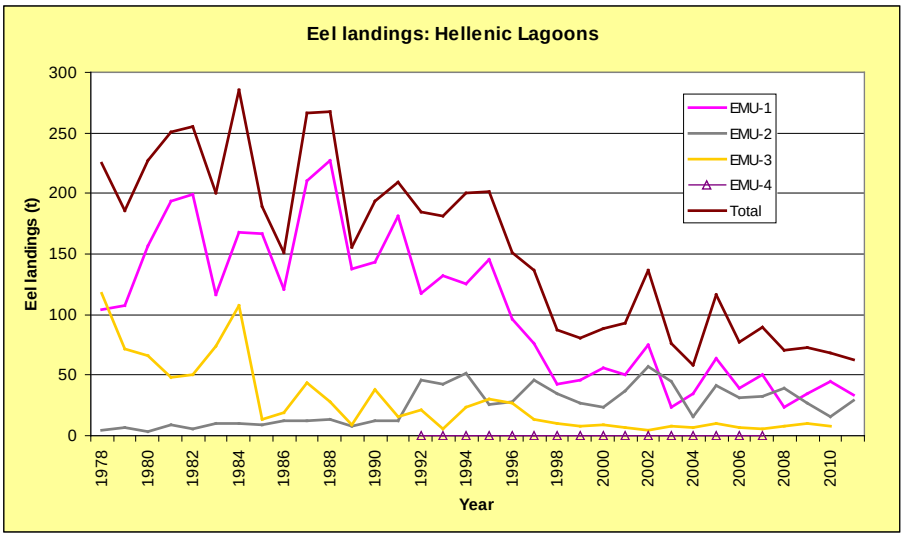

Figure 2.2.1.1. Eel landings in the Greek lagoons since the late 1970's until today in total and per Management Unit.

2.2.1.1 <u>Region of East Macedonia and Thrace</u>

As mentioned earlier, the fishing cooperatives that manage the lagoons in Eastern Macedonia and Thrace are required to submit their monthly productions to the Fisheries Department of the Regional Authority of East Macedonia and Thrace. When gathering data from previous years, the monthly productions from 1974 - 2011 for Lake Vistonida (Figure 2.2.1.1.1 - 2.2.1.1.3) were found, while for other cooperatives, such as those found in Nestos Delta, Komotini and Evros the total annual eel production (Figure 2.2.1.1.4 and 2.2.1.1.5 for Nestos, 2.2.1.1.6 to 2.2.1.1.7 for Komotini and Evros) were gathered.

Table 2.2.1.1.1. Pivot Table of annual eel production in the Region of East Macedonia and Thrace.

	Fishing cooperative of Vistonida	Fishing cooperative of Lafri-Lafrouda	Fishing cooperative of Erasmio	Fishing cooperative of Nestos	Fishing cooperative of Fanari	Fishing cooperative of Mesi	Fishing cooperative of Maronia	Fishing cooperative of Evros Delta
Year	**Production (tn)**	**Production (tn)**	**Production (tn)**	**Production (tn)**	**Production (tn)**	**Production (tn)**	**Production (tn)**	**Production (tn)**
1974	45,52							
1975	52,58							
1976	61,77							
1977	21,59							
1978	117,11							
1979	71,50							
1980	66,28							
1981	47,91							
1982	50,26	0,06			0,21	595,00	9,82	
1983	73,95	0,05			1,10	1098,20	5,98	
1984	107,04				0,08	86,00	7,72	
1985	13,76		0,82		0,44	510,00	5,44	
1986	18,79	0,24	0,94		0,90	972,00	6,90	
1987	43,18	0,01			0,29	290,00	1,81	
1988	27,79				0,53	650,50	8,24	
1989	9,30		0,04		0,34	369,50	3,91	
1990	38,55	0,02	0,03		0,39	511,00	5,21	
1991	15,76	0,01				8,00	2,43	
1992	16,28		0,03		0,29	350,00	3,26	
1993	2,09				0,26	305,00	0,48	
1994	18,07						2,12	
1995	25,27			4,37			3,82	
1996	22,80		0,25	1,65		3,00	3,46	
1997	7,02			2,34			2,17	
1998	7,77		0,05	2,04			1,84	3,64
1999	6,47			1,40				2,89
2000	9,22		0,01	0,03			0,18	
2001	5,20			0,61			0,04	1,59
2002	2,55						0,01	3,62
2003	6,73	0,002					0,20	2,38
2004	5,62			0,23			0,54	1,11
2005	7,90			0,55			0,62	2,41
2006	4,37			0,11	0,02	17,00	0,43	1,48
2007	5,60			0,07	0,02	20,00		2,99
2008	7,25			0,09			0,32	1,90
2009	10,32	0,003		0,13			0,07	1,60
2010	8,16							0,22
2011	2,40							0,12

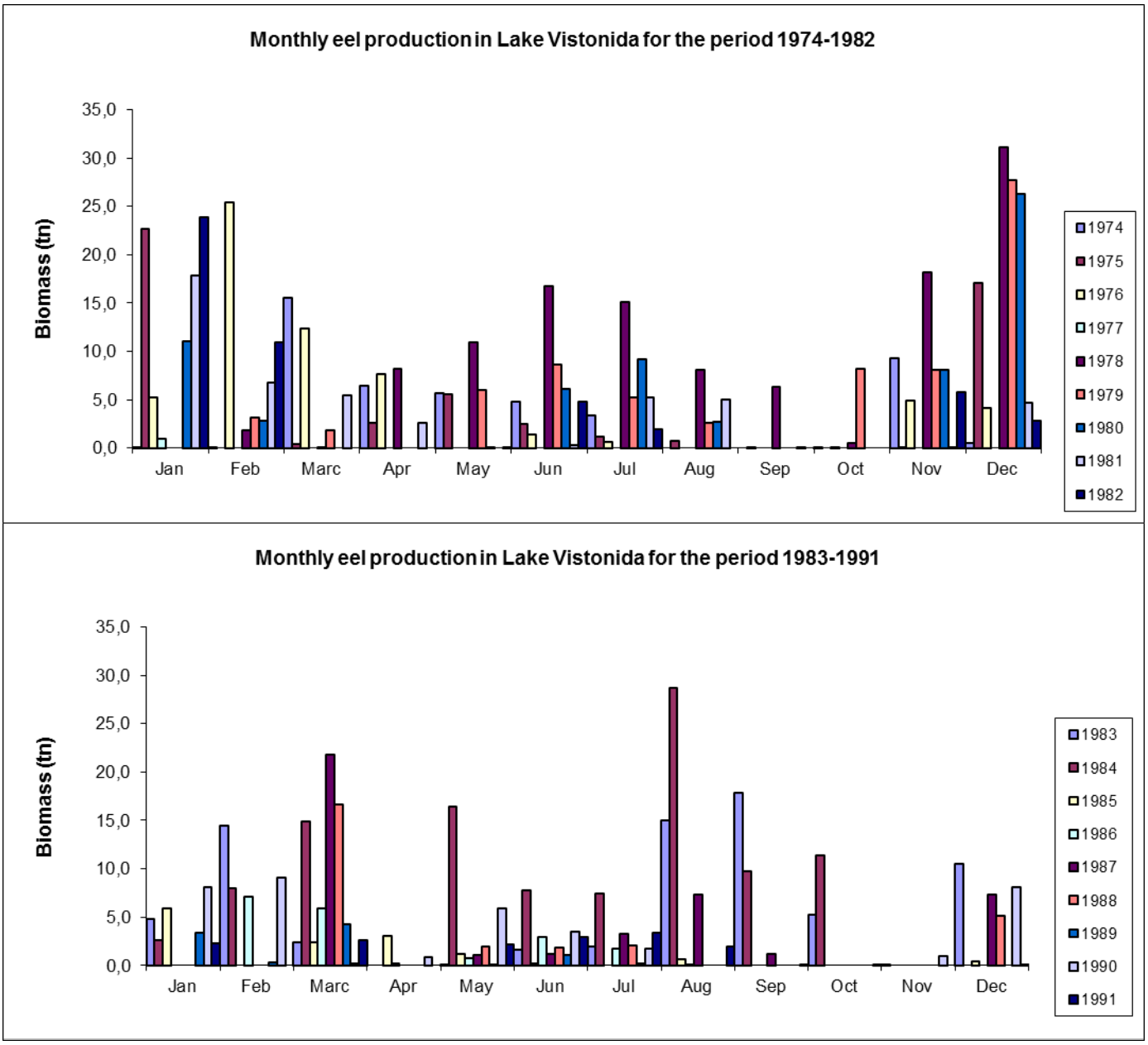

Figure 2.2.1.1.1. Monthly production of eels in Lake Vistonida for the years 1974-1991.

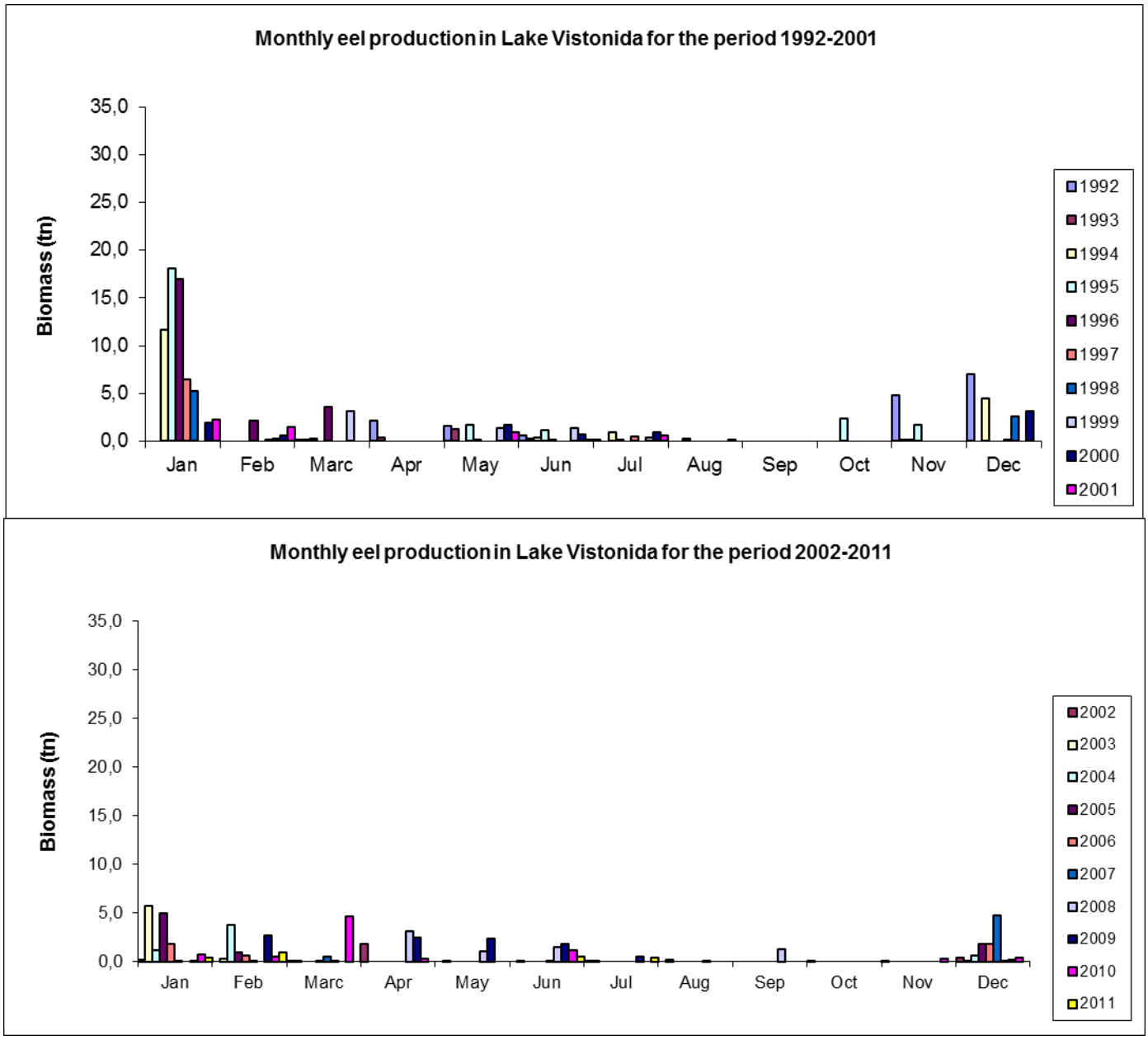

Figure 2.2.1.1.2. Monthly production of eels in Lake Vistonida for the years 1992-2011.

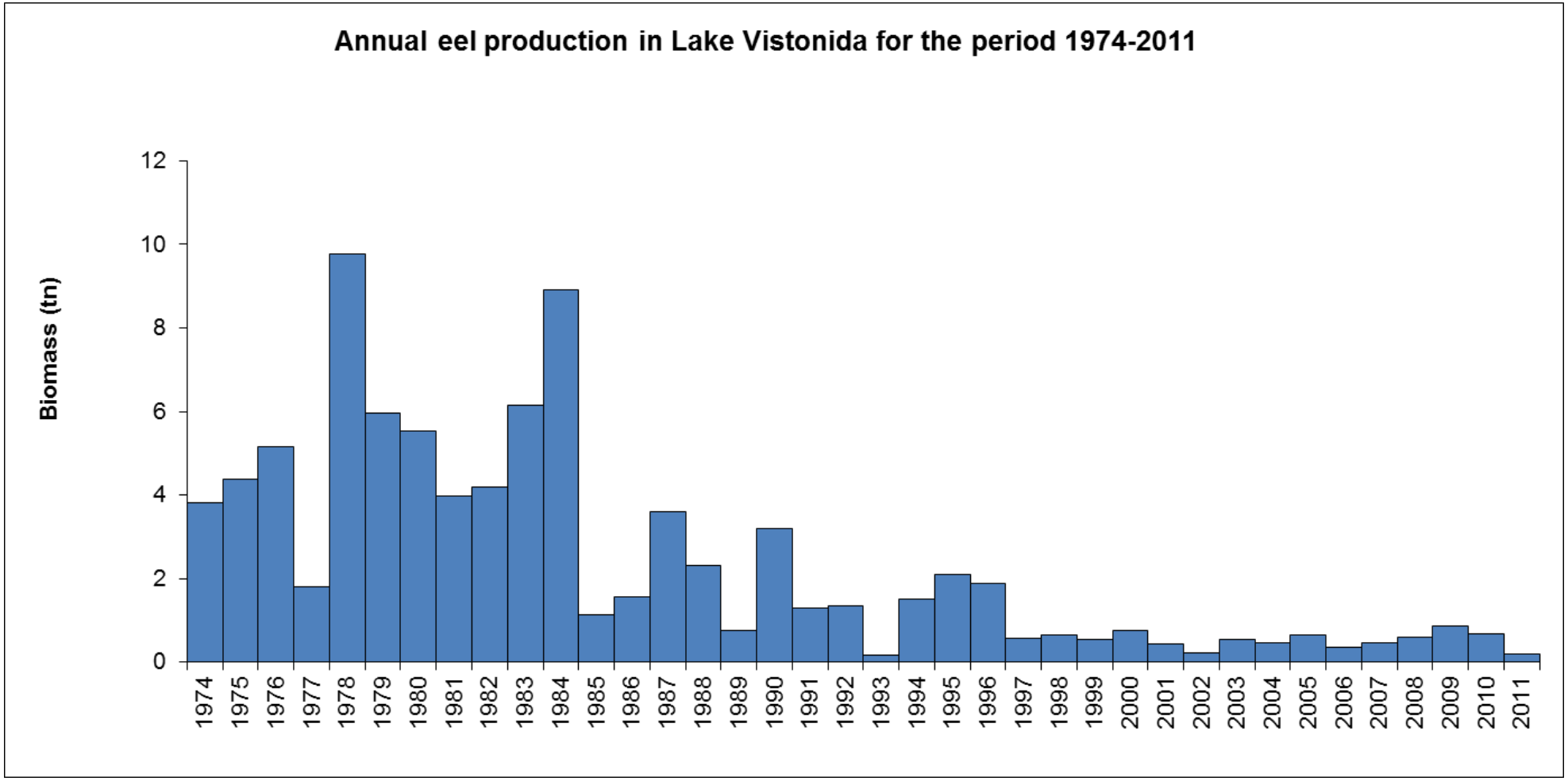

Figure 2.2.1.1.3. Annual production for the same period as reported by the fishing cooperative of Lake Vistonida.

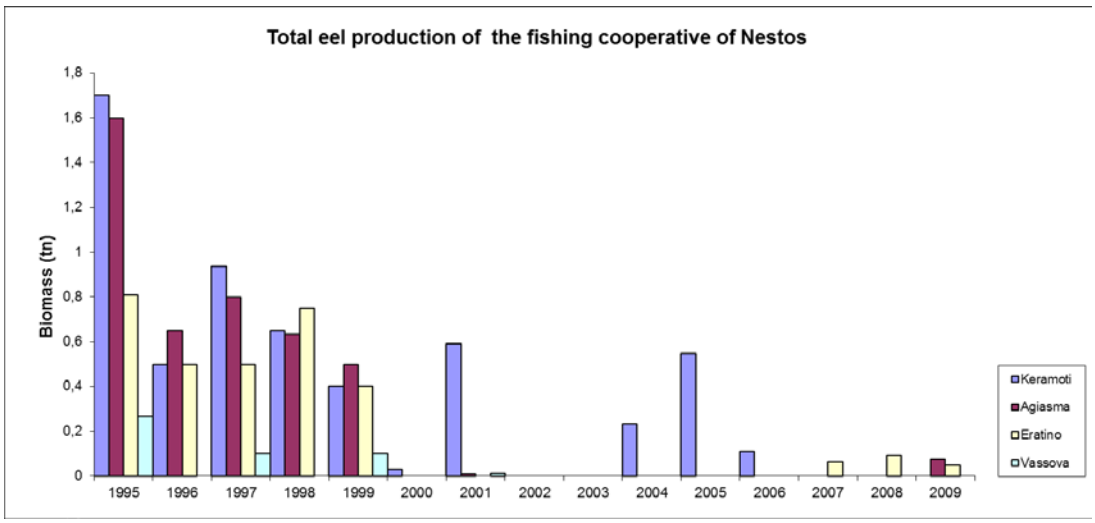

Figure 2.2.1.1.4. Annual production of eels per lagoon (Keramoti, Agiasma, Erateino and Vassova) for the years 1995-2009 as declared by the fishing cooperative.

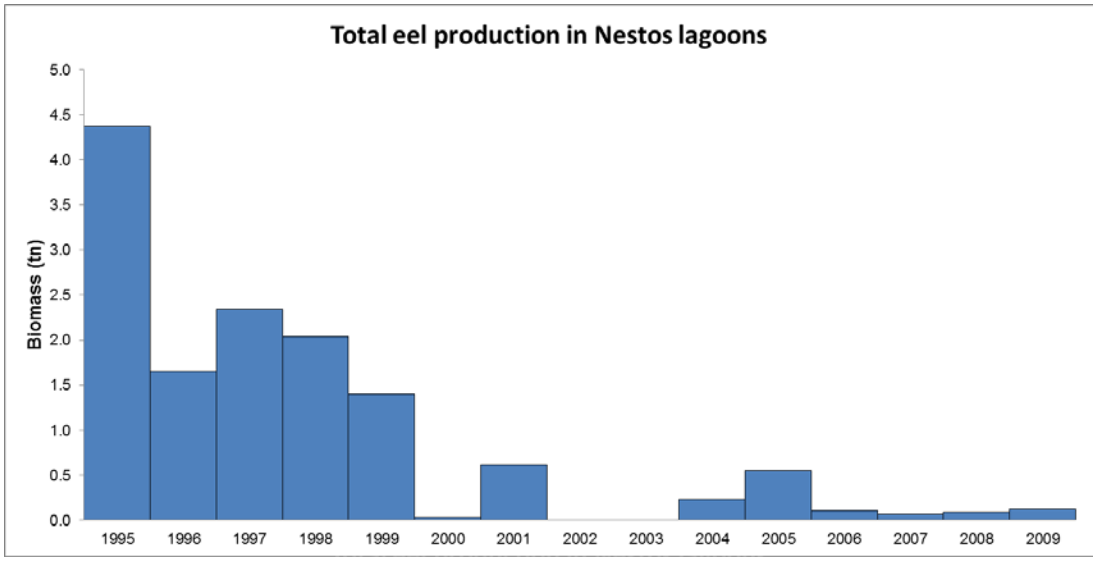

Figure 2.2.1.1.5. Annual production of eels per lagoon (Keramoti, Agiasma, Erateino and Vassova) for the years 1995-2009 as declared by the fishing cooperative.

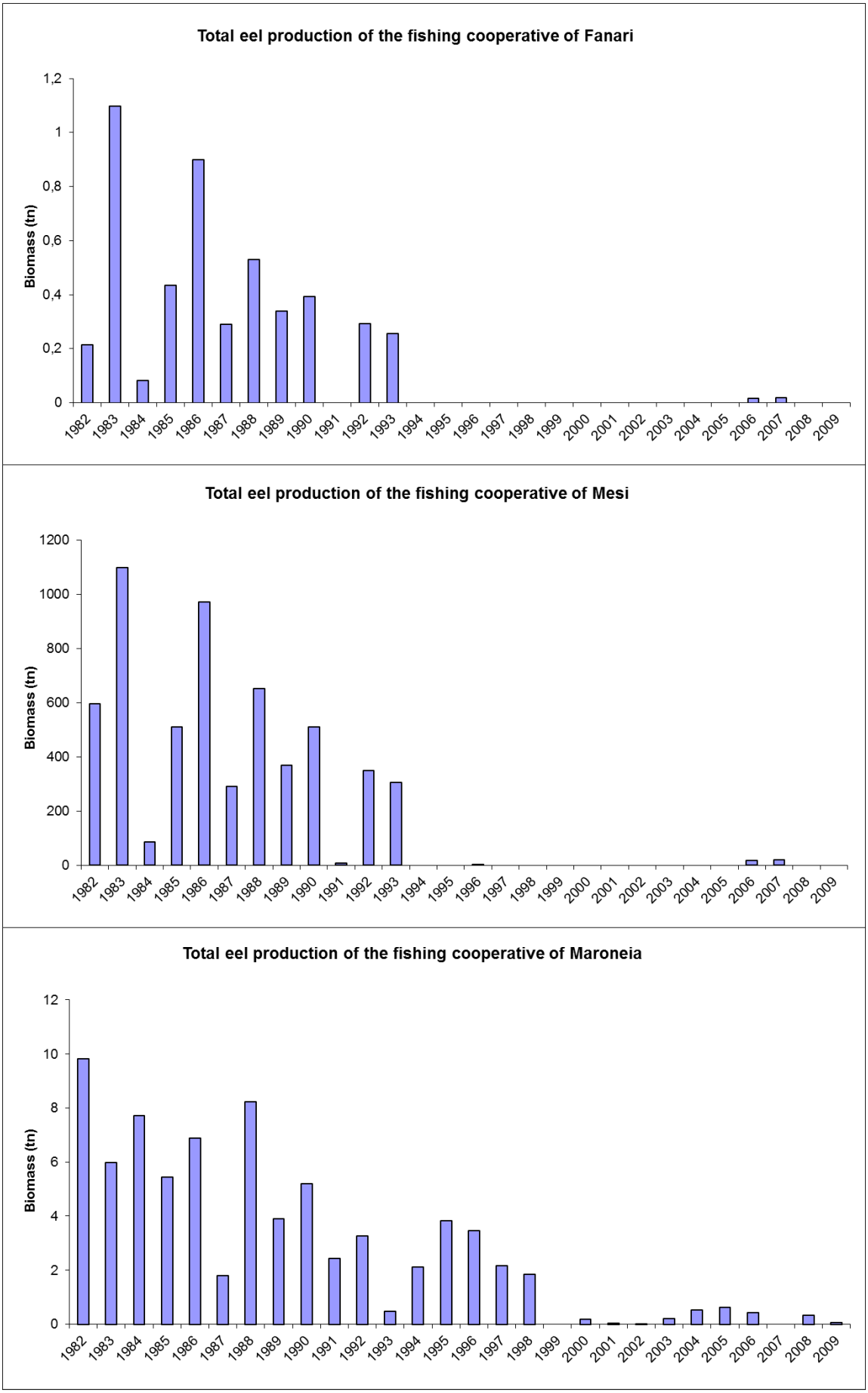

Figure 2.2.1.1.6. Annual eel production of Rhodopi's fishing cooperatives.

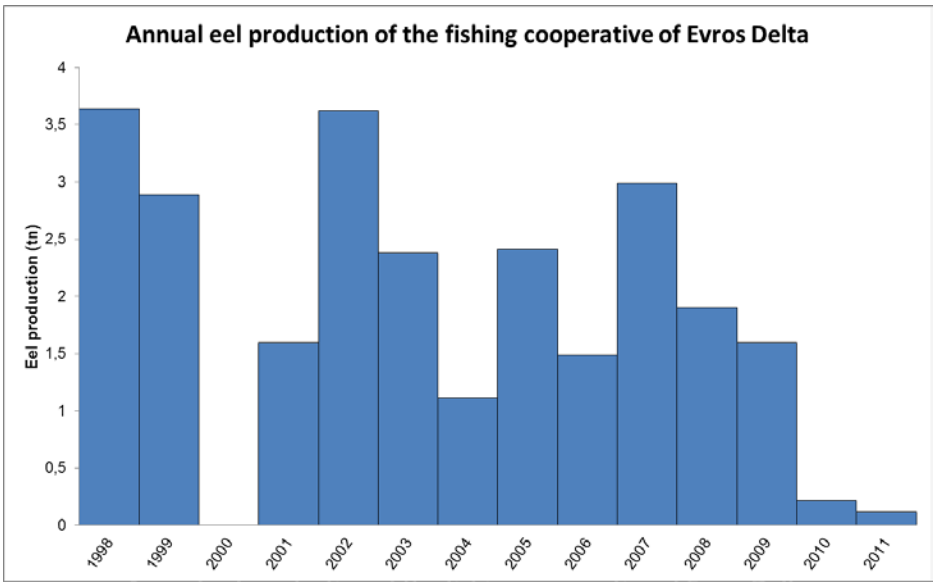

Figure 2.2.1.1.7. Annual eel production of Evros Delta fishing cooperatives.

2.2.1.2 <u>Western Greece</u>

2.2.1.2.1 Messolonghi - Aitoliko Lagoons

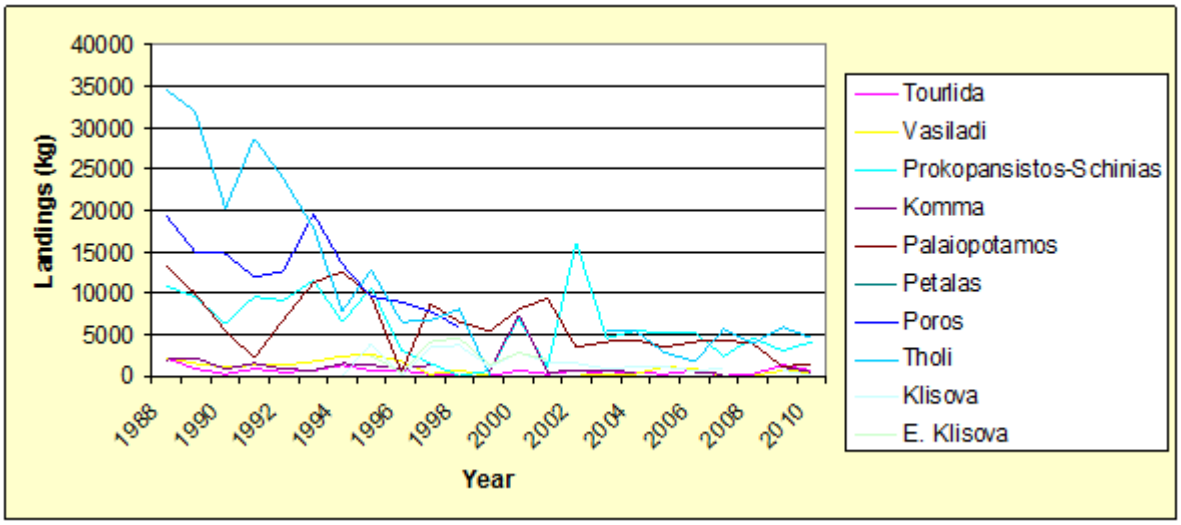

Figure 2.2.1.2.1.1. Annual eel production of Messolonghi - Aitoliko Lagoons. From the above diagram it is obvious a simultaneous decline of eel production in the most productive lagoons (Figure 2.2.1.2.1.1).

2.2.1.2.2 Lagoons of Amvrakikos, Preveza and Lefkada

Table 2.2.1.2.2.1 and Figure 2.2.1.2.2.1 show the annual eel production (in Kg) of Logarou and Tsoukalio lagoons for the time period from 1974 to 2001.

Figure 2.2.1.2.2.1. Annual eel production of Logarou and Tsoukalio lagoons from 1974 to 2001.

Year	**Total Biomass (kg)**	
	Logarou	Tsoukalio
1974	56.023	61.313
1975	38.547	61.730
1976	21.997	53.533
1977	29.405	36.080
1978	37.400	60.851
1979	49.869	86.222
1980	87.412	87.991
1981	98.296	75.973
1982	65.218	76.591
1983	71.368	65.317
1984	65.829	67.123
1985	46.850	69.011
1986	73.749	47.415
1987	63.211	99.351
1988	22.270	45.021
1989	22.286	28.101
1990	14.158	32.742
1991	17.500	21.302
1992	21.198	25.326
1993	29.717	22.014
1994	25.337	33.943
1995	12.110	39.248
1996	8.251	13.856
1997	6.708	9.369
1998	449	55
1999	619	11.872
2000	3.300	13.120
2001	5.300	21.800

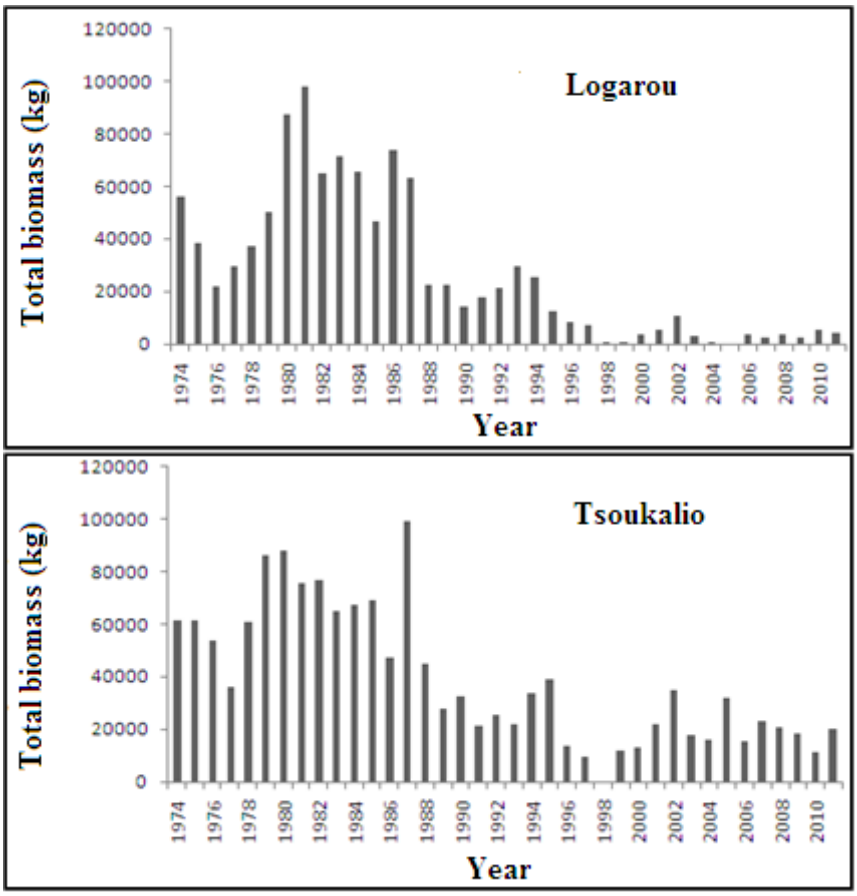

Figure 2.2.1.2.2.1. Annual eel production of Logarou and Tsoukalio lagoons from 1974 to 2001.

For the two smaller lagoons Agrilos and Koftra, the total annual biomass is showed in Table 2.2.1.2.2.2 and Figure 2.2.1.2.2.2.

Table 2.2.1.2.2.2. Annual eel production in Agrilos and Koftra lagoons from 2000 to 2011.

Year	**Total Biomass (Kg)**	
	Agrilos	Koftra
2000	250	1.180
2001		
2002	570	
2003	320	
2004	530	370
2005		2.800
2006	200	2.920
2007	550	
2008		1.375
2009		1.000
2010		1.000
2011		580

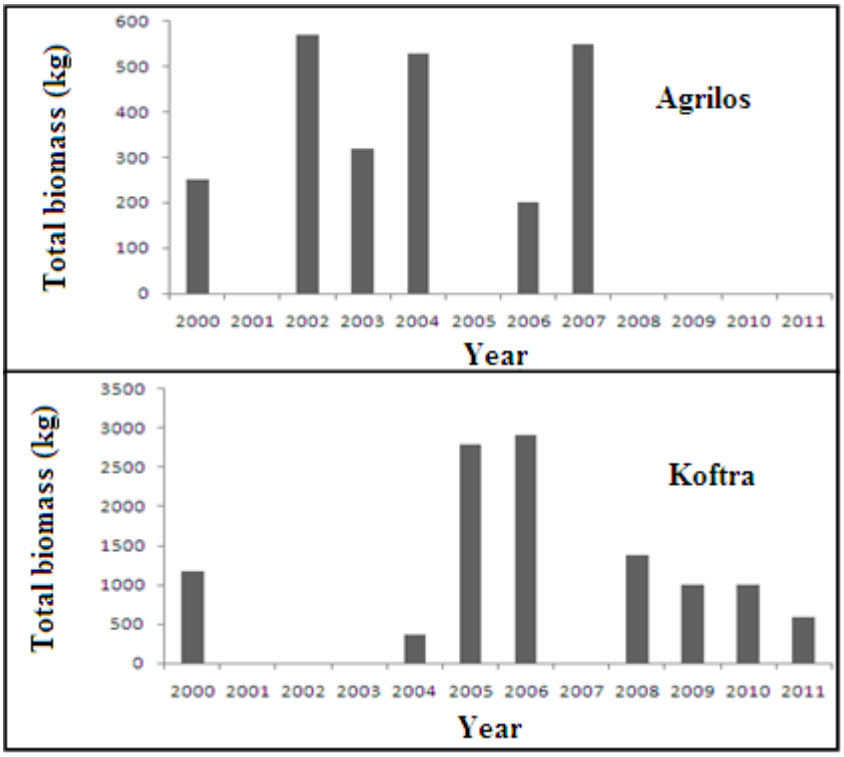

Figure 2.2.1.2.2.2. Annual eel production in Agrilos and Koftra lagoons from 2000 to 2011.

Table 2.2.1.2.2.3 and Figure 2.2.1.2.2.3 show the annual eel captures in Kg in Lefkada Island from 1997 to 2011.

Table 2.2.1.2.2.3. Annual eel captures in Kg in Lefkada Island from 1997 to 2011.

Year	Total Biomass (Kg)
1997	7.380
1998	2.150
1999	3.675
2000	3.720
2001	2.269
2002	2.464
2003	2.560
2004	1.340
2005	1.930
2006	941
2007	2.101
2008	2.930
2009	2.020
2010	1.368
2011	1.380

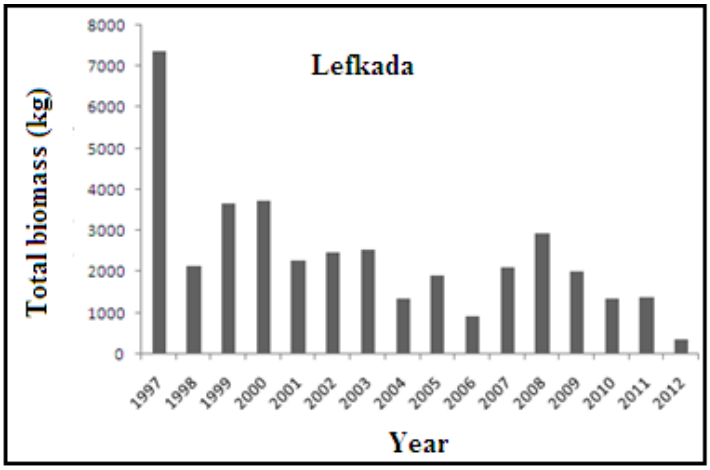

Figure 2.2.1.2.2.3. Annual eel captures in Kg in Lefkada Island from 1997 to 2012.

The information attained from the Thesprotia region concerns the mature individuals from Loutsa-Papadia lagoon and are given in Table 2.2.1.2.2.4 and Figure 2.2.1.2.2.4. After personal communication, for the time period from 1980 to1986 the fish stocks of *A. anguilla* for the regions of Richos, Vatatsa and Kalaga have shown a declining trend.

Table 2.2.1.2.2.4. Annual eel captures in Kg from Thesprotia region (Loutsa-Papadia) from 2003 to 2011.

Year	Total Biomass (Kg)
2003	550
2004	50
2005	0
2006	296
2007	90
2008	0
2010	30
2011	1.380

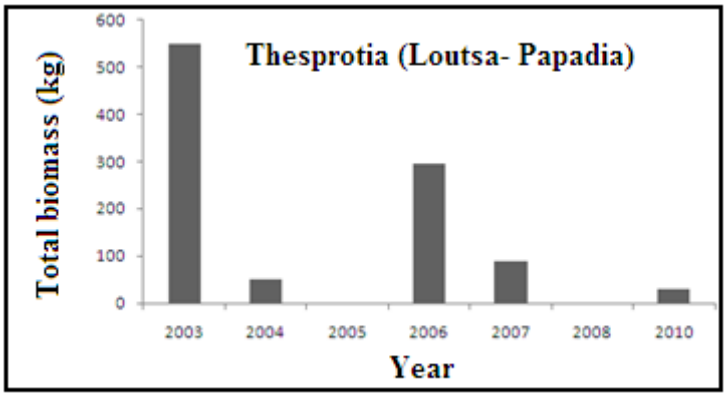

Figure 2.2.1.2.2.4. Annual eel captures in Kg from Thesprotia region (Loutsa-Papadia) from 2003 to 2011.

2.2.2 Recreational fisheries

There are no quantitative data available for recreational fishing for eel in Greece. Some scarce, disperse and rather qualitative information on this activity exists. Recreational eel fishing occurs on a local basis and is seasonal. It is more frequent in lakes and coastal lagoons, but no information on the level of catches exist. Expert estimates presented in the Hellenic Eel Management Plan (HEMP) suggest that recreational fishing varied between 3% and 5% of the total catches over the period 1980-2010. Moreover, the HEMP suggested the prohibition of recreational eel fishing. Due to administrative reasons the enforcement of this measure was delayed, but in the Mesolonghi-Aitoliko lagoons (representing 40% of total Hellenic lagoons surface) and in the river deltas and lakes, recreational eel fishing was prohibited in 2012 by decision of the Regional Council of the Western Greece Region, while there is consideration on continuing the ban from 2013 onwards.

2.3 AQUACULTURE UNITS' EEL PRODUCTION

2.3.1 Supply of glass eels

There are very few eel aquaculture units in Greece, as eel consumption is very limited. The majority of the production is exported to other European countries or is used for enrichments. The glass eels used by the farms are mostly imported from the United Kingdom.

2.3.2 Production

Eel aquaculture in Greece has been developed from the late 1980's (Fig. 2.3.2.1.). Aquaculture production data, which are provided by the Ministry of Rural Development and Food, have shown that until 1997 the mean production reached 166 tons (123.9 SD), whereas afterwards there was a three-fold increase (mean production 538 tons, 109.6 SD). The market size is larger than 130 g (up to 220 g) however it is variable, in accordance with market demands. Hellenic farmers are supplied glass eels or elvers mainly from the Great Britain and/or France. During the period from 2002 to 2007 an approximate number of $17x10^6$ elver individuals has been imported to the Greek eel farming (source: MRDF).

In the context of the EMP, the supply of farms with elvers fished in specific ecosystems of the country can be examined. The main idea is to collect elvers in high natural mortality ecosystems and rear them. A part of the produced eels in a healthy condition will be used to enhance specific ecosystems (linked to the sea).

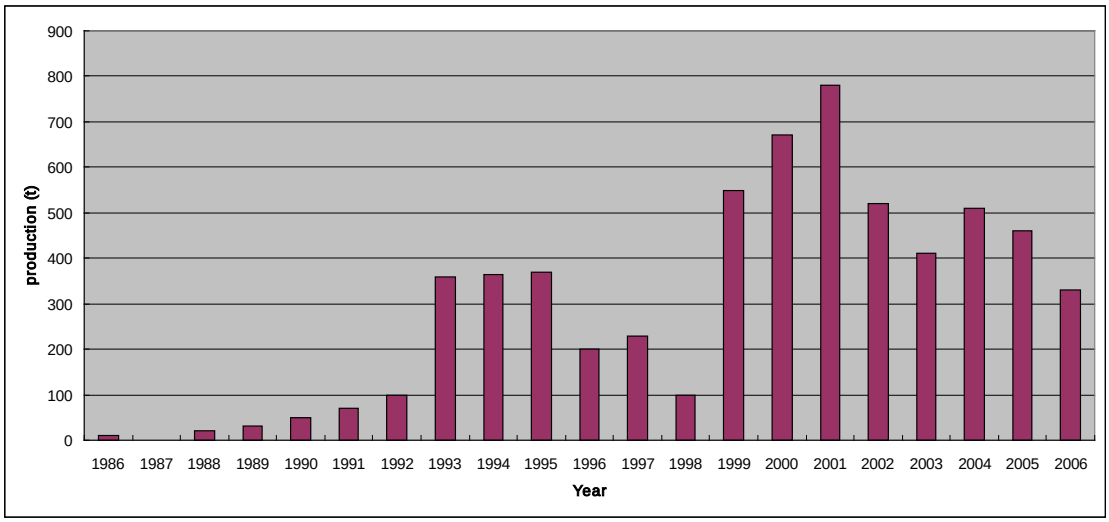

Figure 2.3.2.1. Production of eels in aquaculture units in Greece

2.4 STOCKING

2.4.1 Quantities of glass eels used in stockings

In the past some scarce, empirical and small scale attempts were undertaken with the aim of improving local fisheries. Glass eel stocking was used in the lake Pamvotida and the Kalama's delta and young reared eels were introduced in the lake Pamvotida and at the area of the estuary of W. Greece rivers (Economidis, 1991 and Economidis *et al.*, 2000). There is no information concerning the number of eels or their characteristics, and no data exists about the results of these experiments. Only one, indirect, reference on eel-restocking was found (Ragias, 1997) suggesting that the introduction of the non-indigenous parasite of the eel swim bladder Anguillicolacrassus in the area of Xanthi (Thrace, EMU3) was probably caused by a release of reared juvenile eels.

The two known stocking actions following the protocols suggested by the HEMP are:

- About 40000 individuals of 100g mean weight provided by a local farm were released in the Mesolonghi-Aitoliko lagoons (EMU 1) in December 2010.

- One stocking action was carried out in 2012 (30th of October) in the Acheron river (EMU -1). It concerned about 40000 individuals having 0.5g mean weight provided by a local eel farm.

Table 2.4.1.1 and Figure 2.4.1.1 show the annual releases of eels in Lake Pamvotis. After Fisheries Directory recordings it is estimated that the annual fishing of eel ranges from 5 to 10 tons with a mean of 7 tons.

Table 2.4.1.1. Eel releases in lake Pamvotis per year.

Year	Number of individuals	Origin
2005	60.000	Helpa, Psathotopi, Arta
2006	20.000	Helpa, Psathotopi, Arta
2007	18.640	Preveza
2008	11.000	Preveza
2009	18.320	Preveza
2010	113.500	Mornos, Preveza

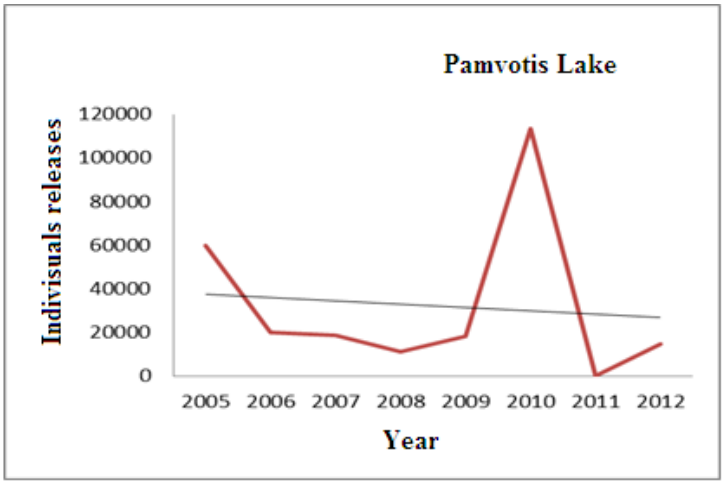

Figure 2.4.1.1. Eel releases in Lake Pamvotis per year.

2.4.2 Catch of eel <12 cm and proportion retained for restocking

RD/142/1971clearly mentions that both fishing and the commercial exploitation of eels smaller than 30 cm, is entirely prohibited. Therefore there is no glass eel and young yellow eel fishing in Greece and it is not necessary to ensure price control, as provided by Article 7 (5) of Regulation No 1100/2007. Fishing activities targeting individuals smaller than 30 cm are allowed by special authorization only for restocking purposes (RD/142, Article 1/1971).

2.5 PROCESSING

In Greece, there are six companies in total which are involved in processing eel catches. Two of these companies import eels from abroad, while the rest either have their own eel breeding infrastructures, or they are supplied by aquaculture units and lagoons. The total value of the catches processed by these companies in 2011 amounts to 944,392 € which corresponds to 132,623 kg of eels.
Eels imported from countries within the European Union in 2011 had a total weight of 40,465 kg and a value of 266,556 €. The 6 companies produced in total 86,483 kg of smoked products, with a total value of 1,169,031 €.

3 Fishing Effort

3.1 GLASS EELS

As already mentioned, glass eel fishing is prohibited according to RD/142/1971.

3.2 YELLOW EELS

RD/142/1971 clearly mentions that both fishing and the commercial exploitation of eels smaller than 30 cm, is entirely prohibited. Therefore there is no glass eel and young yellow eel fishing in Greece.

3.3 SILVER EELS

Most of the eels are caught in the lagoons using fixed barrier fish traps. The lagoons are leased and operated by co-operatives of fishermen. Individual fishermen operating around the lagoons and in lakes also catch eels (fishing in rivers and river Deltas is prohibited). Small catches have also been recorded in coastal areas, mainly through the use of static fishing equipment used in coastal fisheries, but some quantities are also fished by trawls and purse seines. Specialists estimate that 70% of the eel catches come from fishing in the lagoons.

The number of the fishing traps in the lagoons remained unchanged in the last 2-3 decades. Therefore the main fishing dynamics and effort can be considered stable.

It is characteristic that fishing dynamics and effort in the Messolonghi-Aitoliko lagoons during 2012 remained stable despite an increase of the mesh size in fishing traps. This took place in an attempt to decrease the discards of this type of fishing. Smaller eels are expected to escape these traps, but there are no quantitative data available.

4 Catches and landings for year 2012

4.1 GLASS EELS

As already mentioned there is no glass eel fishing in Greece.

4.2 YELLOW EELS

RD/142/1971clearly mentions that both fishing and the commercial exploitation of eels smaller than 30 cm, is entirely prohibited. Therefore there is no glass eel and young yellow eel fishing in Greece.

4.3 SILVER EELS

As presented in the paragraph regarding the fishing effort, the vast majority of the catches come from the lagoons with the use of fixed barrier fish traps. It is important to point out the way in which eels are fished and marketed. Eels are fished continuously during their main migration period (November – January) in small daily quantities, and in large quantities when certain meteorological conditions (storms, heavy rain) occur. The eels are kept alive in special cages until sufficient quantities are gathered, and then are sold and usually exported alive to countries in Western Europe. Thus there are no available data of the daily landings, since the landings are recorded every 10 to 20 days.

4.3.1 Prefecture of Eastern Macedonia & Thrace

For the year 2012, the quantities of eels declared to the fisheries offices of the regional administration were almost zero, with the exception of the production of Lake Vistonida and Evros Delta. Total eel production in the prefecture of Eastern Macedonia and Thrace was 2.65t. The cooperative of Lake Vistonida declared 2,45t of eels in 2012, a quantity similar to the one declared in 2011 (Figure 4.3.1.1), which amounts to 1.2% of the total production of the cooperative, while the cooperative of Evros for 2012 declared 0.19t (Figure 4.3.1.2). Also in the cooperatives of Lafri – Lafrouda and Mesi, the production was almost zero. In the lagoons of Lafri and Lafrouda, only 3 specimens were caught weighting a total of 2.1kg (Lafrouda lagoon), while in Mesi 12 specimens were caught, weighting a total of 8.1kg (Arogi lagoon).

As regards to the other cooperatives, the cooperatives of the prefecture of Rhodopi (namely that of Fanari and that of Maroneia) declared zero productivity. It has to be noted though, that the cooperative of Maroneia encountered a problem with the facilities, resulting in the loss of the whole production of the year.

Also the eel production of the cooperative of River Nestos Delta for the year 2012 according to the data declared, was zero.

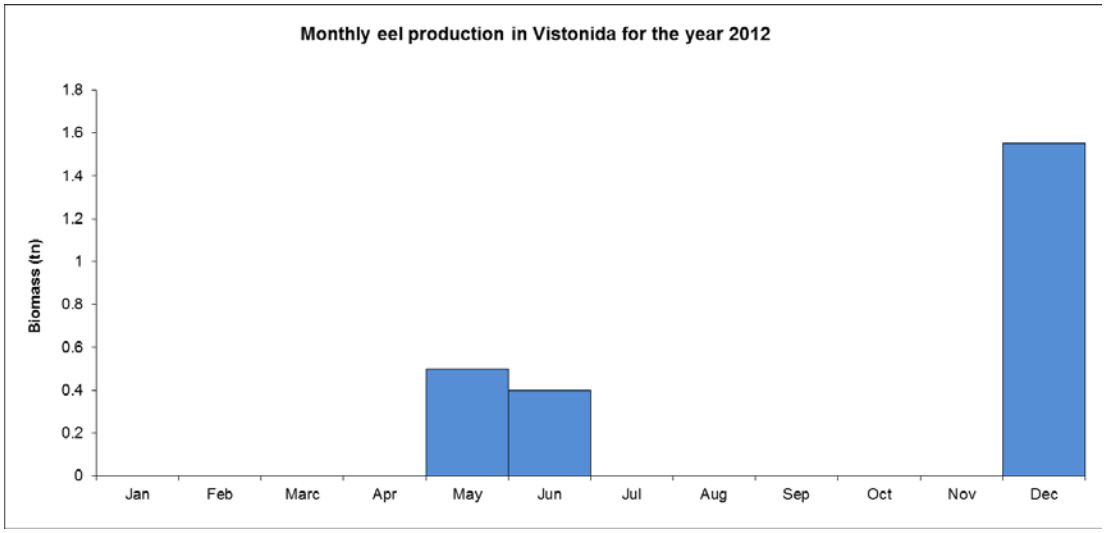

Figure 4.3.1.1. Monthly eel production in Lake Vistonida for 2012.

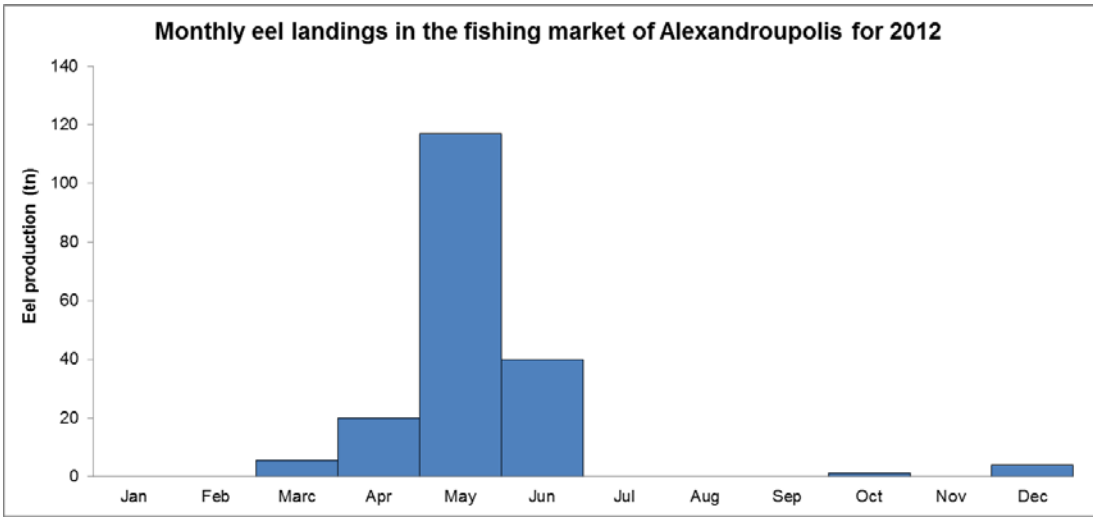

Figure 4.3.1.2. Monthly eel landings in the fishing market of Alexandroupolis for 2012.

4.3.2 Western Greece

4.3.2.1 <u>Messolonghi - Aitoliko Lagoons</u>

The recorded 2012 eel catches in the Mesolonghi-Aitoliko lagoons represent 16,678 kg. The period during which the catches were made is from mid-November to late December (in some cases the first days of January). Both the timing and the quantities of the catches are site-specific.

Figure 4.3.2.1.1 presents the spatiotemporal pattern of the catches.

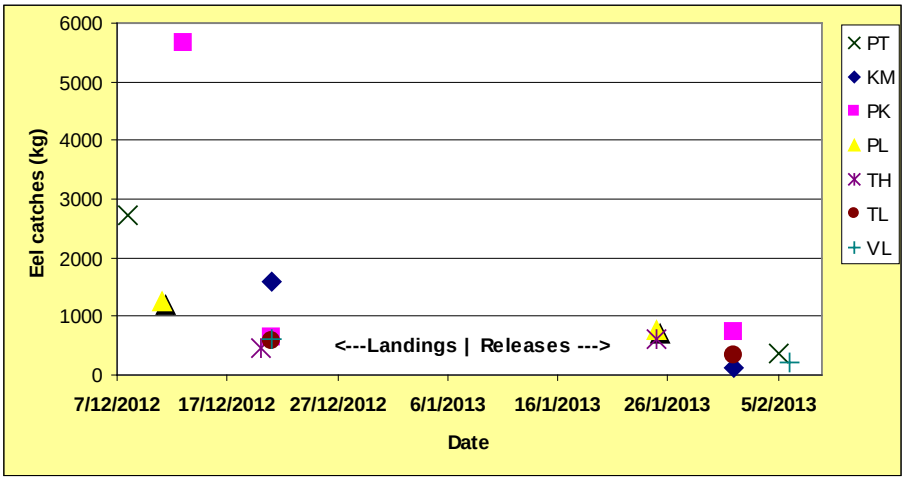

Figure 4.3.2.1.1. Eel catches by Lagoon and date (PT:Petalas, KM: Komma-Schinias, PK: Prokopanistos, PL: Paleopotamos, TH: Tholi, TL: Tourlida, VL: Vasiladi).

The late December and early January catches were released to the open sea (3143 kg, 19% of the total catches of the area) as the HEMP requires. This quantity is lower than the 30% suggested by the HEMP but this is due to the fact that this is the first time the process was carried out, and specific technical and administrative aspects had to be adjusted.

4.3.2.2 <u>Lagoons of Amvrakikos, Preveza and Lefkada</u>

The production which has been recorded by the Fishing Cooperative in Lefkada Island for 2012 was 375 kg. For the same year, in the Preveza region lagoons (Mazoma and Tsopeli) the total reached 2.070 tons of eels (Mazoma: 1125 kg and Tsopeli: 945 kg, respectively).

4.4 Marine fisheries

There are no data for marine eel fisheries.

5 Catch composition by age and length for 2012

5.1 LENGTH-FREQUENCY DISTRIBUTION

Eels caught in Northern Greece have higher average length than eels caught in other parts of Greece. Moreover, eels caught in Lake Vistonida are longer than those of all the other areas (Figure 7.1.1.1). The mean length was 88.2 cm, with specimens up to 111.0 cm, and the size classes of 90-100cm dominated the length-frequency distribution. In the Nestos Delta lagoons, length classes of 65-75 cm dominate, with a highest length of 76.1 cm, and a mean length of 65.5 cm.

5.1.1 Eastern Macedonia and Thrace

As was mentioned earlier, eels that are caught are kept alive in special cages until sufficient quantities are gathered and sold, so the landings are recorded every 10 to 20 days. Thus, only total biomass of the catches is recorded, while the biometric characteristics of the fishes are not recorded. Therefore very scarce data regarding the morphometric characteristics of the fish catches are available. The length-frequency distribution from the catches originating from Lake Vistonida in December 2012 are presented in Figure 7.1.1.1 while in Figure 7.1.1.2 the length-frequency distribution of specimens collected from the Nestos Delta lagoons in 2008, are shown.

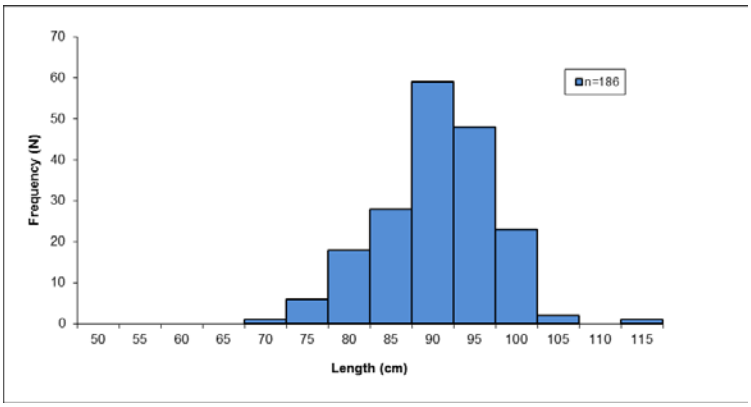

Figure 7.1.1.1. Length-frequency distribution of eels from the area of Lake Vistonida for the year 2012.

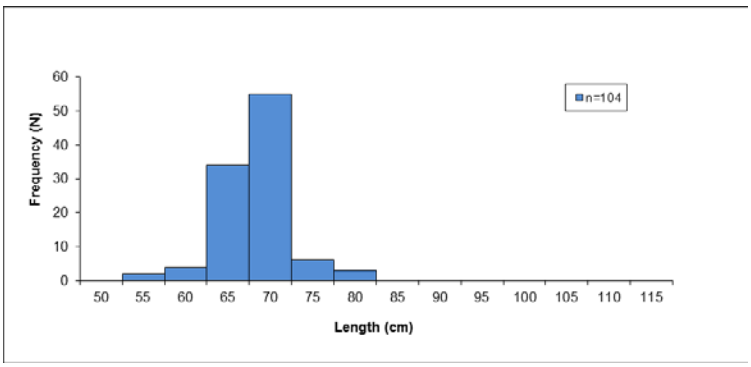

Figure 7.1.1.2. Length-frequency distribution of eels from the area of the Nestos Delta lagoons for the year 2008.

5.1.2 Western Greece

5.1.2.1 <u>Messolonghi - Aitoliko Lagoons</u>

It is important to point out that very limited past data on the biometric characteristics of the catches exist. The length-frequency distribution of the total catches from the entire area of the Mesolonghi-Aitoliko lagoons is presented in the following figure (Figure 7.1.2.1.1). The composition of the catches by lagoon is also presented in order to detect possible inter-lagoon differences.
The age classes dominating in the sample were those of 51-62 cm.

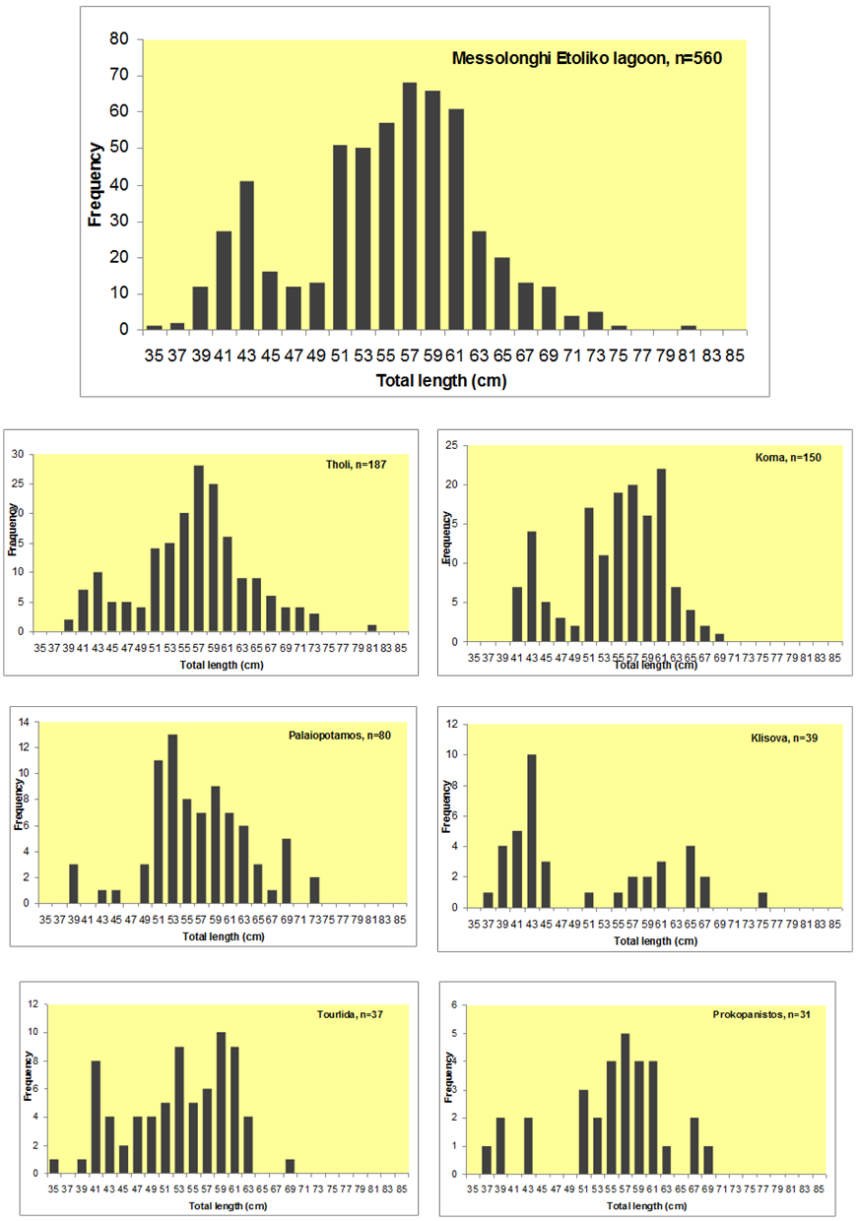

Figure 7.1.2.1.1. Length composition of eels from the whole area of the Messolonghi-Aitoliko lagoons and length composition of the eels per lagoon for the year 2012.

5.1.2.2 Lagoons of Amvrakikos, Preveza and Lefkada

Preveza and Lefkada catchments are characterized by individuals with total body length ranging between 50-60 cm (maximum length 84 cm and mean length 52 cm).

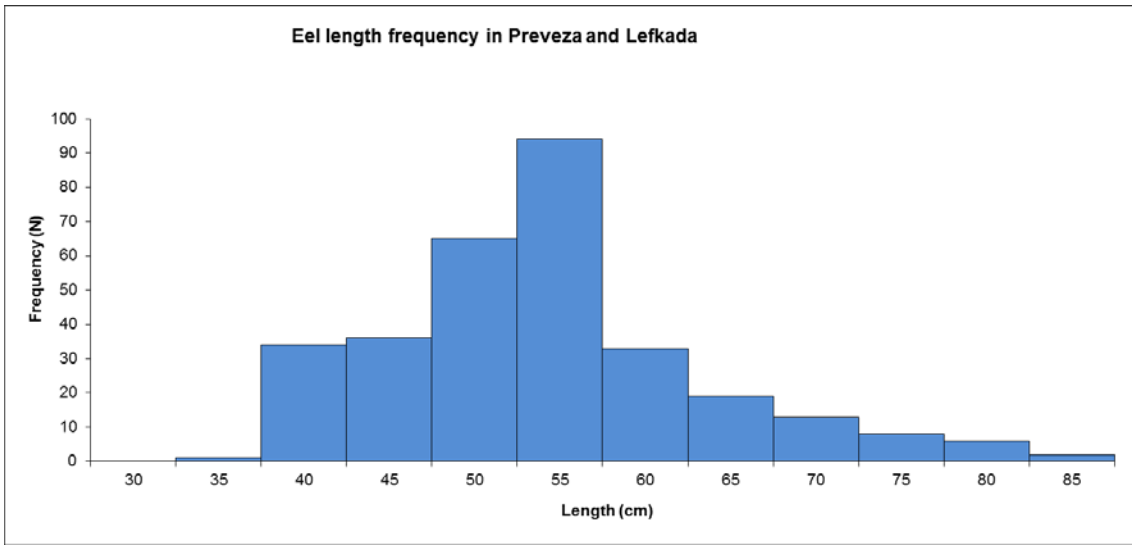

Figure 7.1.2.2.1. Body Size frequency of eels in Preveza and Lefkada lagoons for 2012.

5.2 AGE-FREQUENCY DISTRIBUTION

5.2.1 Eastern Macedonia and Thrace

The process of reading the otoliths and determining the age of the eels had not been completed at the time of the preparation of the technical report.

5.2.2 Western Greece

5.2.2.1 Messolonghi - Aitoliko Lagoons

The age composition of the same area is presented in Figure 7.2.2.1.1. The majority of the individuals are silver eels. A limited number did not have typical 'silver' characteristics (color, lateral line). The mean age of the catches is estimated at 6.51 years with an important SD= 1.83 which is due to both age reading uncertainties and to the environmental heterogeneity since the environmental features of the different lagoons are site-specific (including the fresh water ecosystems linked to them). The mean age of the silver eel catches is in the range suggested by the HEMP (5 to 10 years) based on geographic and environmental considerations.

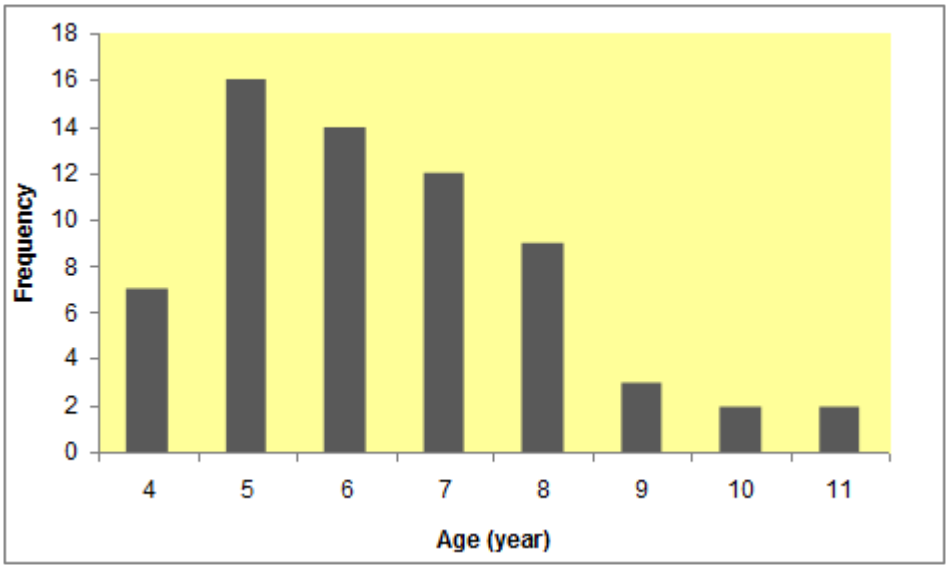

Figure 7.2.2.1.1. Age composition of the eel samples in the area of Messolonghi and Aitoliko Lagoons for the year 2012.

5.2.2.2 <u>Lagoons of Amvrakikos, Preveza and Lefkada</u>

The process of reading the otoliths and determining the age of the eels had not been completed at the time of the preparation of the technical report.

6 Other biological samplings

6.1 LENGTHS, WEIGHTS AND GROWTH

6.1.1 Eastern Macedonia and Thrace

The length-weight relationships for the total samples of the lagoons of the Prefecture of Eastern Macedonia and Thrace are presented in the following graph (Figure 8.1.1.1).

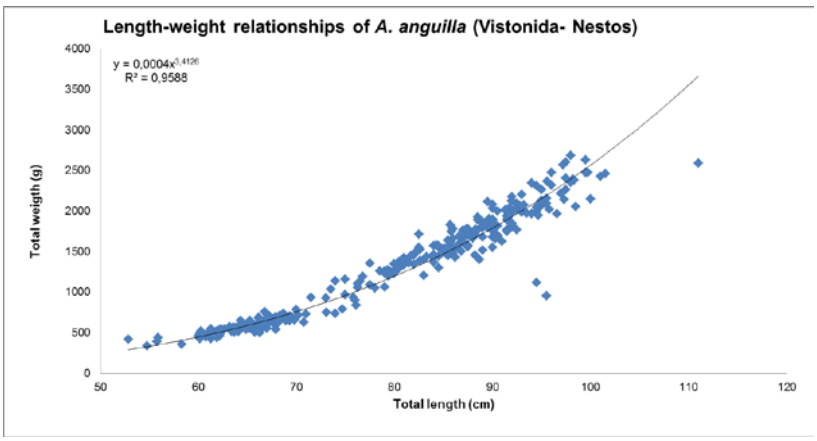

Figure 8.1.1.1. Length-weight relationships for the total samples of the lagoons of the Prefecture of Eastern Macedonia and Thrace.

6.1.2 Western Greece

6.1.2.1 <u>Messolonghi - Aitoliko Lagoons</u>

The length-weight relationship for the total sample of the Mesolonghi - Aitoliko samples is presented in the following figure (Figure 8.1.2.1.1).

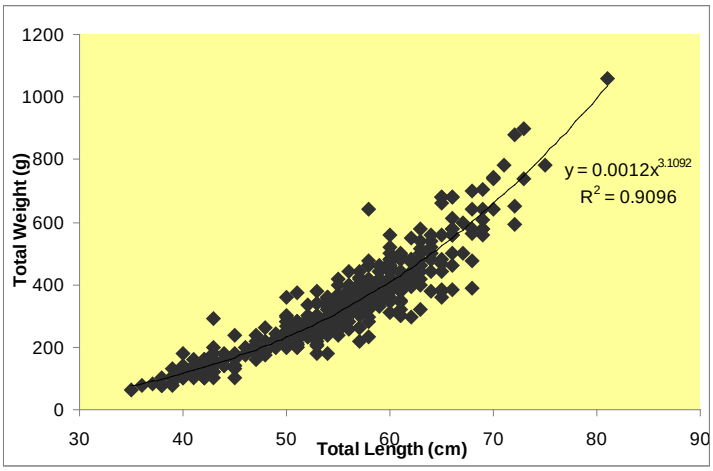

Figure 8.1.2.1.1. Length – Weight relationship of the total sample from the Mesolonghi - Aitoliko lagoons.

6.1.2.2 Lagoons of Preveza and Lefkada

Length-weight relationship for eel individuals for Preveza and Lefkada regions are shown in Figure 8.1.2.2.1.

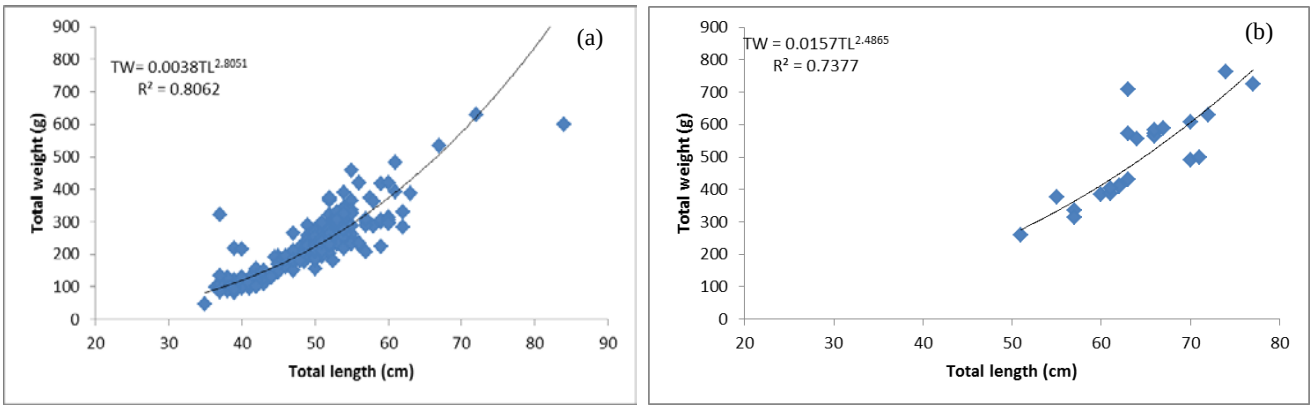

Figure 8.1.2.2.1. Length-weight relationships for eel individuals for Preveza (a) and Lefkada (b) regions.

6.2 PARASITES AND OTHER DISEASES

6.2.1 Eastern Macedonia and Thrace

During the examination of the samples of eels collected from Lake Vistovida, a large number of parasites was found on 3 eels in a total of 186 samples. These parasites were identified as the parasite *Anguillicoloides crassus*, which mainly affects the swim bladder of the eels (Figure 8.2.1).

Figure 8.2.1. Parasite found in the abdomen of an eel. The parasite is visible in the bottom right of the photo, while the main part of the photo shows a cyst, probably created due to the presence of the parasite.

6.3 CONTAMINANTS

No analysis for contaminants was undertaken, and therefore there are no data available for the presence of contaminants affecting eel populations in Greece.

6.4 PREDATORS

There is insufficient information about the presence of predators or about the impacts that their presence could induce to the populations of eels. The only large predator is the Great Cormorant (*Phalacrocorax carbo*), a fish eating bird that consumes about 400-500 g of fish per day.

In Greece the Great Cormorant breeds in at least 4 different regions (Axios and Evros Deltas, in Lake Kerkini and in Lake Prespa), and its population amounts to approximately 4,300 pairs. Their population increases during the winter period (ranging from 12,000 to 22,000 individuals) due to individuals traveling to Greece for wintering from Northern countries. The majority of the travelling birds are distributed in major wetlands (Evros, Porto Lagos, Amvrakikos, Messolonghi).

The great increase of cormorant population caused the concern of many professional and amateur fishermen throughout Europe, who believe that the decrease in populations of certain fish species, especially in fresh waters, is partly caused by cormorant predation. Many European countries researched this issue, and verified that cormorant populations indeed have a negative impact on fish production, especially in lakes and rivers where fishing is practiced intensively. According to studies in Scotland, it is regarded that eel predation by cormorants can amount to 10t per year.

7 Standardization and harmonization of methodology

Biological and commercial samplings were conducted during the course of the program.

In particular, as regards the biological sampling, samples of eels were collected and transferred to the labs for further processing. The number of samples taken per region was determined by the directives of SGRN (STECF). The SGRN (STECF) accepted in 2007 the recommendation of Dekker (2005) for eel biological samplings, who in a thorough analysis suggests the collection of 15 samples for every development stage per Management Unit. Thus SGRN (STECF) suggests the collection of 200 specimens per 20t of production. This number corresponds to the minimum number of specimens required for the examination of the external morphometric characteristics. For internal organs (gonads, liver, digestive system, otoliths) and for small productions a sample of 30 specimens is the minimum required. For the measurement of external characteristics, an ichthyometer specially designed for measuring eels (Fig. 9.1) and accuracy of 1 mm, was used. For the measurement of the body weight, a digital precision scale (± 0.1 gr) (Fig. 9.2) was used. Also, a precision digital caliper was used (± 0.01 mm) was used to measure the eye of the fish (Fig. 9.3). This in an important biometric measurement usually associated with other biological and ecological parameters of the species.

Figure 9.1. The ichthyometer used for the measurement of the total length of the eels.

Figure 9.2. Measurement of the Total body weight of an eel, in digital precision scales

Figure 9.3. Measurement of the diameter of the eye of an eel.

Finally, the method of age determination was by otolith reading. The otoliths were removed from each individual through an incision made in the midline of the palate, and after the cerebellum of the fish is uncovered (Figures 9.4, 9.5 and 9.6).

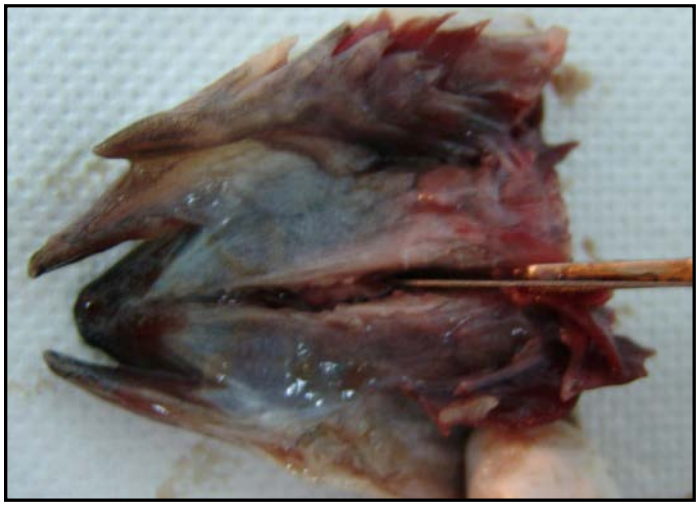

Figure 9.4. Incision in the midline of the palate of an eel

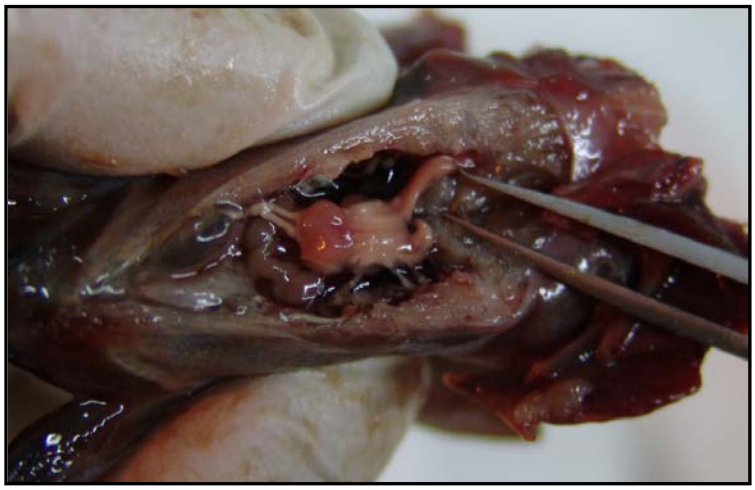

Figure 9.5. Disclosure of brain tissue and otolith position.

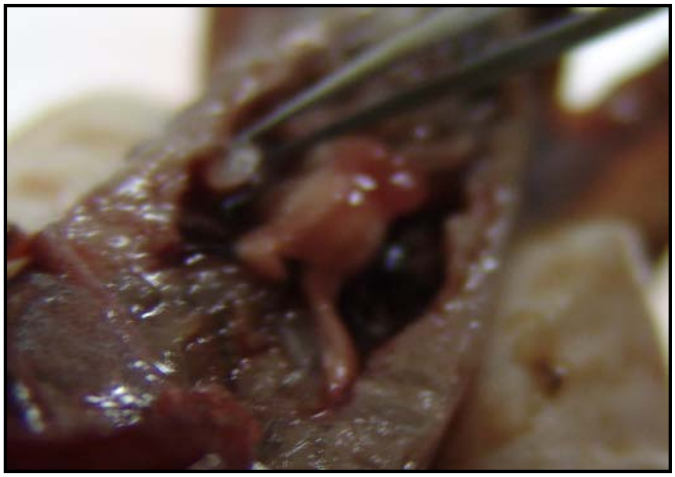

Figure 9.6. Otolith removal from each side of the brain, using forceps.

8 Other anthropogenic impacts.

8.1 DAMS

The movement of several fish species living in the Nestos river ecosystem including eels is limited by the presence of many barriers. One example is the irrigation dam of Toxotes, about 17 km from the river estuary, and also the 2 hydroelectric plants of the Public Electricity Company.

The irrigation dam of Toxotes was constructed during the period 1960-1966. It is a spillway dam made of concrete with a total length of 280 m, and spillway length of about 240 m. Its height is 4.0 m which allows overflooding of Q = 3000 m^3 / s, with an overflooding height of H = 2.95 m (data from Paraskevopoulos & Georgiadis, 2001).

The hydroelectric dam of Platanovrisi came into operation in1999. It is located at an altitude of 230.5 m above sea level, while the height difference created by the dam is 95 m (dam height). The artificial lake created covers a total area of 3.25 km^2. Energy productivity of the units can reach about 248 GWh.

The hydroelectric dam of Thisavros came into operation in1997. It is located at an altitude of 390 m above sea level, while the height difference created by the dam is 175 m (dam height). The artificial lake created covers a total area of 18 km^2. Energy productivity of the units can reach about 426 GWh.

Based on the above, the probability of a fish overcoming the obstacles during the downstream migration is determined by its ability to overcome, bypass or cross an obstacle as well as from the impacts that this would have to its physiology (health) and its survival. The probability of successful surpassing is therefore the product of the two probabilities (probability of overcoming the obstacle x probability of survival). For downstream migration, a crucial factor is the mortality of the fish caused by their passage through obstacles (Lelievre & Steinbach, 2008). Unfortunately in Greece there are no data or studies on the subject of the mortality (natural or anthropogenic) of eels.

There are also no data or studies regarding the abundance evaluation of the species on specific ecosystems. The GMPE realizes this absence, and thus bases the whole quantification approach on indices deriving from fishing production. The only available reports are reports of presence-absence and their validity (especially for absence) is limited. Consequently the assessment of the barriers will inevitably be based on the physical and technical characteristics in relation to the ecology of the species.

According to Larinier *et al.* (2006) successful escapement rates of eels display heterogeneity depending on the barriers, as not every eel can pass through the turbines of a dam. Also the rate of escapement depends on the presence of facilitation equipment, and on the hydrological conditions prevailing at the time of the migration.

So according to international experience, accessibility through a barrier, and also its impact to eel population depends on:

- The height of the barrier (higher barriers decrease the possibility of successful upstream or downstream migration, and/or increase mortality during transit.

- The distance from the sea (eel abundance decreases further from the coastal zone).
- Altitude (we have higher abundances in lowland areas with an altitude lower than 200 m since there we have lower flows, wider riverbeds, higher temperatures and milder flow fluctuations)
- Last but not least, a crucial factor for the evaluation of barriers is their relative position. The probability of successful surpassing of a series of consecutive barriers is the product of the successful surpassing of each one of them. Both in downstream and upstream migration, the last and the first barriers (towards the sea) are the most important, at least with regards to taking measures for the improvement of fish accessibility through barriers.

The criteria for barrier assessment and evaluation should follow the main objective of the regulation 1100/2007. The regulation aims to increase the numbers of genetically mature eels (silver eels) that migrate to the sea to reproduce and complete their life cycle. The successful downstream migration is therefore a priority. Since the 1970's, many acts in Europe and America have intended to enhance eel populations in inland waters through technical interventions and enrichments. Their main aim was the enrichment of local stock to support fisheries, while their successful migration to the sea during adulthood only concerned researchers to a lesser extent. But nowadays, given the alarming state of eel stocks, migration for reproduction is the main objective. Thus, any evaluation of barriers and ecosystems must be done under this consideration.
The peculiarities of Greek ecosystems lead to the construction of projects "insurmountable" for eels, and renders technical approaches for improving the accessibility through barriers difficult, highly expensive, and of doubtful results. Interventions in lowland ecosystems near the estuaries will be significantly more effective, as suggested in the Greek Management Plan for the Eel.

9 Scientific studies for the restoration of the fish stock.

It is important to point out that there are very scarce data regarding the population dynamics of eel in Greece.
The results of this pilot study and mainly the length-frequency distributions and the age structure of the catches are the first and very important elements that will gradually allow the use of the models that the ICES working groups and also the regulation 1100/2007 suggest for the assessment of fish stocks during the implementation of the management plan.

10 Overview, conclusions and recommendations

Under the National program for the fisheries data collection, a pilot study for eels was conducted in 2012. For the purpose of this study, eel populations were monitored in the lagoons of Northern Greece (River Nestos'Delta and Lake Vistonida's lagoons) and in Western Greece (Messolonghi-Aitoliko lagoons, Amvrakikos, Preveza and Lefkada lagoons).

During the monitoring and data collection regarding fisheries and fish stock evaluation, two main categories of actions took place: 1) recording of landings and 2) the collection of biological material and data, which will contribute to the further understanding of the eel stock status in Greece.
Furthermore, historical data on eel fisheries in Greece were collected, the fishing effort was evaluated and other factors and predators were studied.
From the data collected from the three eel Management Units (EMU 1, EMU 2 and EMU 3), a long and steady decline of the fish stock is shown, as is evident from the eel catches declared by the fishing cooperatives that operate in the lagoons. Furthermore, in the area EMU 2, where recreational eel fishing had been observed in the past, now no longer takes place.
At the time of the preparation of the present technical report, the analysis of all the biological data and mainly the determination of the age of the samples had not been completed. The process of preparing and "reading" the otoliths is a fairly difficult process that requires careful handling because of the friability of the otoliths.
The pilot program contributed to the standardization and harmonization of the methodology between the elaborating groups according to the international literature and the standards set by the European Working Group for Eels (WGEEL).
For future monitoring of eel stocks in Greece under the National fisheries data collection program, it is proposed:

1. Recording of landings

1.1 Recording of landing in each lagoon, as mentioned previously. The aim is to record total fishing production which will be expressed in kilograms per hectare of the lagoon (kg/ha).

1.2 Furthermore in regular intervals (e.g. 15 days), in situ recording of total length (TL) and total weight (W_{total}) for a sample of 50-100 eels will be conducted. The aim is by the end of the year to gather data on the temporal distribution of lengths in eel catches per area for a total sample of 400 individuals.

1.3 Data on the productions of eel aquaculture units for each area.

2. Biological sampling

For the purposes of the biological sampling, eels from each cooperative will be collected (about 100 eels per system). The samples will be taken to the lab were measurements of the following will be kept.

2.1 total length,
2.2 total weight,
2.3 sex (when possible),
2.4 eye diameter,
2.5 parasite recording and identification and
2.6 lastly the otoliths will be kept in order to determine the age of the samples.

In order to complete the above actions of monitoring and recording the eel populations, the same organizations that participated in the implementation of the pilot program in 2012 will participate. In particular:

1. the Hellenic Agricultural Organization “Demeter” – Fisheries Research Institute, in the area of Northern Greece (Scientific responsible. Dr Manos Koutrakis),

2. the Department of Biology of the University of Patra, in the area of Messolonghi and Aitoliko (Scientific responsible. Prof. Konstantinos Koutsikopoulos),

3. the Department of Biological Applications and Technologies of the University of Ioannina, in the area of the Amvrakikos gulf (Scientific responsible Prof. Ioannis Leonardos)

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