Final Report

EnviEFH

Environmental Approach to Essential Fish Habitat Designation

PRIORITY 8.1
Task 13.3- Identification and mapping of Mediterranean habitats

implemented as

Specific Support Action

Contract number: *022466*

Project Co-ordinator: *Vasilis Valavanis*

Project website: *http://arch.her.hcmr.gr/enviefh*

Reporting period: from *01/12/2005* to *29/02/2008*

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under the "Structuring the European Research Area" Specific Programme
Research Infrastructures action

A. ACTIVITY REPORT

1. Progress report

1.1 Summary of the activities and major achievements

During the first 12 months of the project (December 2005 - November 2006), the EnviEFH Consortium carried out works in all WPs of the Project, organized its overall kick-off meeting and several other working group meetings. An extensive inventory of available environmental and fisheries datasets was performed and acquired data were organized in a commonly georeferenced GIS database (Geographic Information Systems). Specifically, environmental data, including time series of satellite imagery for the whole Mediterranean basin (e.g. sea surface temperature, chlorophyll-a, photosynthetically active radiation, altimetry, salinity and bathymetry) as well as fisheries surveyed data, including data on small pelagic (e.g. sardine, anchovy), large pelagic (e.g. swordfish, small tuna), demersal species (hake, shrimp) and certain egg-feeding parasites (e.g. *Mnemiopsis*) were uniformly processed under GIS.

The oceanographic part of the GIS database was used to derive time series maps of certain oceanic processes that affect species distribution (e.g. mesoscale thermal fronts, marine productivity hotspots, gyres). The biological part of the GIS database was combined with the environmental data and each fishery surveyed point from acoustic, plankton, and trawl surveys was linked to each of the assembled environmental parameters. Joined fisheries-environmental datasets were used to develop GAMs (Generalized Additive Models) in order to extract minimum and maximum environmental ranges that are preferred by the surveyed species. The extracted environmental ranges were applied in satellite images and those areas that included the extracted environmental ranges of all environmental parameters were mapped as EFH (Essential Fish Habitat) maps based on habitat environmental descriptors.

Initial analysis produced interesting results revealing the spatiotemporal distribution of EFH of various species and life stages. Points of interest include the EFH mapping between Western and Eastern Mediterranean for small pelagic species where, although different areas from the oceanographic perspective, EFH environmental descriptors were very similar in both areas. In addition, the EFH mapping of *Mnemiopsis* anchovy egg-feeding parasite for the whole Mediterranean basin was based on surveyed data from the NE Mediterranean but it revealed the main anchovy spawning areas in W. Mediterranean, as well. Finally, verification of GAMs-extracted anchovy habitat environmental descriptors based on NE Mediterranean surveys for 2003-2005 were applied during the 2006 survey and the forecasted EFH map was very similar with the surveyed data, a case that applies to various species groups.

During the second period of the project (December 2006 - February 2008), EFH mapping was finalized using fishermen input and other statistical techniques (e.g. Generalized Additive Mixed Models, Maximum Entropy, etc.) and including data from recent surveys while the EnviEFH Consortium produced a Special Issue on Essential Fish Habitats in the Mediterranean through the international journal of aquatic sciences *Hydrobiologia* (including a publication series of 21 contributions). During the final project meeting, the EnviEFH Consortium agreed and organised this special issue that includes species review and related methodology papers including EFH maps for cephalopods, shrimp, hake, anchovy, sardine, sardinella, swordfish and a number of other coastal species.

1.2 Consortium management activities

Participant number[1]	1	2	3	4	
Participant short name[2]	HCMR	UNIABDN	CSIC	CNRS	**Total**
Person-months[3] **(Dec05-Nov06)**	1.0	0.2	1.4	2.0	**4.6**
Person-months (Dec06-Feb08)			0.6	2	

Management tasks during the whole period of the project included the organisation of kick-off, several working and final meetings, the establishment of the project's electronic communication list and the preparation of publications for conferences and scientific journals. HCMR organised the kich-off, a working and final meetings, CSIC organised a working meeting and UNIABDN and CNRS contributed to these meetings. Also, there have been 2 working meetings between HCMR Crete and HCMR Athens. In addition, the Project Presentation Leaflet (D2) and Final Plan for using and disseminating knowledge (D4) were produced. Specifically:

HCMR employed several employees through the EnviEFH project in order to develop the EFH map products, the EFH Designation Tool and part of the dissemination products included at the project's dissemination plan. In addition, HCMR acquired 3 computer units (2 desktop computers and 1 laptop computer) to carry out the project's work. Other expenses include costs for the organization of the EnviEFH kick-off and final meetings held in Heraklion Crete (GR), travels from Heraklion to Barcelona (SP) for a working group meeting and travels between Heraklion and Athens (GR) for national working group meetings. Other supported personnel include 10 HCMR scientists (fisheries biologists, physical and biological oceanographers, GIS experts, multimedia experts) and administrative personnel, many of which attended a number of related conferences.

CSIC/ICM has been involved in five workpackages from the first month of the project, and contributed 30.8 person-months during the duration of the project. In the first year CSIC/ICM participated in the EnviEFH kick-off meeting and organised a working meeting on methodology in Barcelona. The tasks undertaken under WP2 included assemble existing environmental data from plankton surveys; fisheries production data (western Mediterranean, Catalonia and Valence); and life history data of the main commercial species. A GIS database was developed. Comparison among environmental data from different sources was also done. Preliminary EFH maps were produced for spawning areas (anchovy and hake), based on data from plankton surveys off the western Mediterranean; and presence of anchovy adults, based on the environmental conditions during the season with highest landings. During the second reporting period CSIC/ICM participated in the EnviEFH meeting in Iraklion in May 2007. The objective of this meeting was a follow-up of the advances of each participant on the use of the previously agreed methodologies and the definition of the contents of the Hydrobiologia Special Issue. The tasks undertaken under WP2 included the preparation of the specific environmental and fishing data used in the articles submitted to the EnviEFH Special Issue. Environmental data were extracted from the database developed in the frame of the project, through an ad hoc protocol designed in ArcGIS 9.2, and also from other sources when

[1] Lead participant first

[2] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[3] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

necessary (river flow rates). Fishing Statistics of the Fishing Department of the Catalan Government were the data source for landings and fishing fleets. WP4 works focused on two species: squid and anchovy. A model was proposed for the definition of the potential EFH for squid paralarvae recruitment, based on the best environmental conditions, which was found to be consistent with the higher landings per unit of effort observed four months later. As for anchovy, the processes affecting species abundance at different life stages (conditions preceding reproduction, larvae growth and survival, recruits growth) were characterized. Research was also devoted to the characterization and mapping of EFH (WP5) of different commercial species (e.g. hake and anchovy spawning areas; sardine and axillary seabream fishing grounds). CSIC/ICM contributes to the Hydrobiologia special issue (WP6). Direct costs include labour costs and travel costs. The CSIC provided the necessary infrastructure to develop the tasks foreseen in the project (indirect costs). Software and informatics consumables are considered indirect cost.

CNRS (1 person) & GIS Posidonie (1 person, as sub-contractor of CNRS) were involved in participation to kick-off meeting of EnviEFH organized by partner 01 (HCMR/IMBR) in Iraklion Crete, Greece during March 13-15, 2006. The meeting involved 20 scientists and students participated from the EnviEFH consortium and DG-FISH. This leaded to the "MEETING REPORT of EnviEFH 1st Participant Working Meeting; Iraklion Crete, Greece, March 13 -15, 2006" (5 pp) sent to each contributor and put on EnviEFH web site. CNRS & GIS Posidonie were involved in preparation of local participant-stakeholder workshops at national and regional level at the beginning of the 2nd year of the project. Those local participant-stakeholder workshops are made to present current works and gather local stakeholder knowledge from fishers, divers, local managers and scientists. Those one have been plan in February and March regarding French case-studies (2.5 person-month, including 0.5 not charged to ENVI-EFH project). The collation of existing data involved 16 person month, including 6 not charged to ENVI-EFH project. A 1st draft of analysis based on data from Western French Mediterranean Coast order have been realise by Jessica GARCIA in order to map species-preferred areas for spawning/nursing and feeding aggregations and identify species-environment interactions. This first draft, in French version, is in annexe 1 (see activity report). CNRS is in charge to prepare a 1st draft on a peer review paper concerning a first analysis based on data from Western French Mediterranean Coasts. This paper is "in preparation" for a submission in "Marine Biology" (2 person-month, including 2 not charged to ENVI-EFH project).

University of Aberdeen (ABDN) has been involved in four workpackages from the first month of the project, and contributed 19.51 person-months during the project period. During the first project year, Dr. Graham J. Pierce, Dr. Jianjun Wang and Ms. Jennifer M. Smith attended the 1st Co-ordination Meeting in Iraklion, Crete, Greece, (March 13-15, 2006). The team have been in regular contact with the project coordinator and participants regarding data acquisition and technical issues. The main tasks that have been carried out during the first year are data assembly, data processing, detecting oceanic circulation features based on remotely sensed SST data, designing and developing an ArcView-based EFH tool. We have also carried out some related fish habitat modelling work. The project team comprised Dr. Graham Pierce (Team leader), Dr. Jianjun Wang (PDRA), Ms. Jennifer M. Smith (PhD student), Dr Elena Mente (PDRA), Ms. Gema Hernandez (research assistant) and Dr. Alain Zuur (Highland Statistics, subcontractor). Additional work, not directly funded by the project, was contributed by: Dr. Colin MacLeod (PDRA), Dr. Ignacio Sobrino (Visiting Research Fellow), Dr. Jose Bellido (Honorary PDRA), Ms. Isidora Katara (PhD student), Mr. Alex Brown (Masters student), Ms. Mafalda Viana (Honorary research assistant). During the second project year, data processing and analysis continued and several manuscripts were

prepared. Graham Pierce, Jianjun Wang and Jennifer Smith attended the second project co-ordination meeting in Hereklion in May 2007. Alain Zuur provided statistical advice to all partners and contributed to some of the publications. Throughout the second year, analysis of local and regional oceanic circulation dynamics was carried out. Weekly remotely sensed sea surface temperature data (2001 – 2006) for recent years were downloaded from NASA web site. Data processing was carried out to transform the remotely sensed data into GIS readable format. The data were input into GIS as grids. Calculation of local and regional oceanic circulation feature indices was carried out to extract SST gradients and local variability in SST (SST RV). Statistical analysis and modelling were carried out based on these indices (SST gradients and local SST RV). Seasonal spatial classification of oceanic circulation was carried out. The Mediterranean Sea was classified into 3 areas according to the seasonal oceanic circulation pattern and strength. The relationship between oceanic calculation and climate change was also investigated. The research results were presented at the International Conference On Marine Data and Information Systems (IMDIS 2008, Athens, Greece, March 31- April 2, 2008. Related analysis has been presented as a paper by Katara et al., to be published in the forthcoming Special Issue of *Hydrobiologia*. A manuscript for publication was produced as a result from a cooperative work between Jose Mª Bellido (researcher at Instituto Español de Oceanografía, Spain and Aberdeen University, UK) and the EnviEFH project, on EFH for small pelagics in Spanish Mediterranean waters. Two review papers were completed in collaboration with EnviEFH project partners and other colleagues, on environmental relationships for cephalopods and on habitat modelling methods. A further manuscript compared the use of several habitat modelling methods applied to data on cetacean distribution. All four of these papers will appear in the forthcoming special issue of Hydrobiologia. We have also worked on two papers that apply the EnviEFH methodology from outside the Mediterranean. The first of these addresses interactions of large fish (swordfish, sharks, and tunids) fisheries and marine mammals, making use of environmental variables (i.e. SST, water depth, and moon phase) to attempt to predict catches, presence of marine mammals and occurrence of depredation. The results were summarized as a manuscript that will appear in *Hydrobiologia*. Habitat analysis for the squid Loligo forbesi in UK waters was conducted to determine preferences over its life cycle (e.g., according to maturation stages) among different ecogeographical variables (EGVs) including SST, seabed sediment composition, and seabed slope. This analysis is not yet finalised but will form part of the project output.

List of all EnviEFH meetings during the project's duration:

Date	Title/subject of meeting	Location	Number of attendees	Website address
March 13-15, 2006	Kick-off EnviEFH Meeting	Heraklion Crete, Greece	17	http://arch.her.hcmr.gr/enviefh
May 12-15, 2006	1st Short-Group EnviEFH Working Meeting	Barcelona, Spain	6	http://arch.her.hcmr.gr/enviefh
May 17-22, 2006	2nd Short-Group EnviEFH Working Meeting	Heraklion Crete, Greece	5	http://arch.her.hcmr.gr/enviefh
October 16-17, 2006	3rd Short-Group EnviEFH Working Meeting	Athens, Greece	5	http://arch.her.hcmr.gr/enviefh
May 10-11, 2007	Final EnviEFH Meeting	Heraklion Crete, Greece	23	http://arch.her.hcmr.gr/enviefh

List of deliverables achieved during the project's duration:

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Subtask No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D1	Dedicated Internet node (draft)	6	HCMR	1	1
D2	Project Presentation Leaflet (final)	1	HCMR	3	3
D3	Inventory of relevant data sources (final)	2	HCMR	3	3
D4	Final Plan for using and disseminating knowledge (draft)	1	HCMR	3	3
D5	GIS oceanographic and fisheries database for the Mediterranean Sea (draft)	2	CNRS	12	12
D6	Time series maps of upwelling, thermal fronts and marine productivity hotspots (draft)	3	HCMR	12	12
D7	Time series of Essential Fish Habitats maps (draft)	4	CSIC	12	12
D8	EFH Designation Tool (draft)	5	UNIABDN	12	12
D9	Year1 Project Report	1	HCMR	12	12
D10	GIS oceanographic and fisheries database for the Mediterranean Sea (final)	2	CNRS	24	27
D11	Time series maps of upwelling, thermal fronts and marine productivity hotspots (final)	3	HCMR	24	27
D12	Time series of Essential Fish Habitats maps (final)	4	CSIC	24	27
D13	EFH Designation Tool (final)	5	UNIABDN	24	27
D14	Dedicated Internet node (final)	1	HCMR	24	27
D15	Report on Stakeholder-Validation National Workshops	1	HCMR	24	27
D16	Final Project Report	1	HCMR	24	27

1.3 Other specific activities (Design Study/Construction activities)

D1-D14 (Dedicated Internet Node) were established using HyperText Macro Language (HTML) and Javascript programming. The node includes all EnviEFH components and is under continuing update and enrichment even after the termination of the project on February 29, 2008. D2 (Project Presentation Leaflet) includes major information about the EnviEFH project on a 3-page cumulative information document. D3 (Inventory of Relevant Data Sources) includes a table of assembled and organized information on species, their life stages and environmental parameters that are available to the EnviEFH project. D4 (Final Plan for Using and Disseminating Knowledge) includes the activities of the project towards dissemination of research outputs to stakeholders and the general public. D5-D10 (GIS Oceanographic and Fisheries Database for the Mediterranean Sea) include all datasets available to the project in a GIS database. The database was developed on ESRI's ArcGIS software and includes commonly geo-referenced fisheries and oceanographic datasets and derived products. D6-D11 (Time series Maps of Upwelling, Thermal Fronts and Marine Productivity Hotspots) includes a series of major ocean processes digital maps that influence the distribution of marine species. Maps were derived through combined analysis of several satellite imagery products. D7-D12 (Time series of Essential Fish Habitat Maps) were derived through statistical and GIS techniques applied on fisheries and environmental datasets. D8-D13 (EFH Designation Tool) includes a combined set of 4 tools developed in ESRI ArcGIS (offline) ESRI ArcView (offline), ESRI ArcServer (online) and ESRI MapObjects (offline) technologies. These tools are combined under one integrated tool and target a variety of users, and it is freely distributed through the EnviEFH website.

1.3.1 WP2 Collate Existing Data

Participant number[4]	1	3	4	

Participant short name[5]	HCMR	CSIC	CNRS	**Total**
Person-months[6] **(Dec05-Nov06)**	3	10	12	**25**
Person-months (Dec06-Feb08)		4	6	

WP2 works for the duration of the project included the assembly of: a) benthic habitat maps and satellite data, b) fisheries production data, c) species life history data, d)quantification of stakeholder input and d) the development of a GIS database. Participants 1, 2 and 3 were involved in WP2 and assembled data from previous projects and national research surveys. Assembled data were organised in a commonly georeferenced GIS database that covers all study sites while satellite data cover the whole Mediterranean. No deviations from initial plans were made. Specifically, benthic habitat maps for all study sites were digitised and satellite data were downloaded from online archives and processed under GIS. Stakeholder input (e.g. bottom substrate maps offered by local fishing communities and based on local knowledge) were digitised and commonly georeferenced and used as input in EFH models. Fisheries production survey data (mostly acoustic and trawling data) were georeferenced into GIS and species life history data on environmental preferences were used as constraint parameters in various analyses. Finally, the overall GIS database was developed using ESRI's ArcGIS software.

List of deliverables achieved during the reporting period (all in draft format):

Deliverable/ Milestone No	**Deliverable/Milestone Name**	**Workpackage /Subtask No**	**Lead Contractor(s)**	**Planned (in months)**	**Achieved (in months)**
D3	Inventory of relevant data sources	2	HCMR	3	5
D5-D10	GIS oceanographic and fisheries database for the Mediterranean Sea	2	CNRS	24	27

List of EnviEFH meetings during the reporting period:

Date	**Title/subject of meeting /workshop**	**Location**	**Number of attendees**	**Website address**
March 13-15, 2006	Kick-off EnviEFH Meeting	Heraklion Crete, Greece	17	http://arch.her.hcmr.gr/enviefh

1.3.2 WP3 Map Ocean Processes

Participant number[7]	1	2	4	
Participant short name[8]	HCMR	UNIABDN	CNRS	**Total**
Person-months[9] **(Dec05-Nov06)**	4	2.4		**9**
Person-months (Dec06-Feb08)		4.0	2.0	

WP3 works for the duration of the project included the mapping of a) productive upwelling, b) productive thermal fronts, and c) marine productivity hotspots. Participants 1, 2, and 4 were involved in WP3 and carried out modelling work with satellite data in order to map these ocean processes. The mapping involved the development of sophisticated GIS routines that perform combined analysis in various satellite data for the mapping of spatial extent of ocean processes and the measurement of their satellite signal. Specifically, upwelling and marine productivity hotspots were mapped as those areas that are characterised by simultaneous positive chlorophyll-a and negative temperature anomalies while thermal fronts were mapped as those linear features where there is an abrupt and sudden decrease in temperature distribution as compared to more homogeneous distribution in surrounding area.

List of deliverables achieved during the reporting period (all in draft format):

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Subtask No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D6-D11	Time series maps of upwelling, thermal fronts and marine productivity hotspots	3	HCMR	24	27

All related communication between participants 1 and 4 was carried out electronically. Related literature includes the following articles and announcements:

Katara I, Wang J, Pierce GJ, Valavanis VD, 2008. Discovering surface oceanic circulation dynamics in the Mediterranean from remotely sensed data. Proceedings of IMDIS 2008: Int'l Conference on Marine Data and Information Systems. March, 31-April 3, 2008, Athens, Greece.

Valavanis VD, Katara I, Palialexis A (2005). Marine GIS: Identification of mesoscale oceanic thermal fronts. *International Journal of Geographical Information Science* **19(10)**, 1131-1147.

Valavanis VD, Kapantagakis A, Katara I, Palialexis A (2004). Critical regions: A GIS-based model of marine productivity hotspots. *Aquatic Sciences* **66(1)**, 139-148.

1.3.3 WP4 Map Essential Fish Habitats

Participant number[10]	1	2	3	4	
Participant short name[11]	HCMR	UNIABDN	CSIC	CNRS	**Total**
Person-months[12] **(Dec05-Nov06)**	4.0	1.0	5.7	2.2	**12.9**
Person-months (Dec06-Feb08)			2.6	7.8	

WP4 works for the duration of the project included the identification and mapping of: a) species-environment interactions, b) spawning/nursery grounds, and c) feeding aggregation areas. All participants contributed in WP4 and derived maps included the identification of essential species habitats through species-environment interactions for adult and

larvae/juvenile life stages. The mapping of feeding aggregation areas were based on the relation between species-preferred environmental conditions and ocean processes. Works were based on the project's GIS database and participants tested various data analysis methods with contribution from subcontractors (GIS Posidonie and Highland Statistics). Through meetings and electronic communication, participants agreed in the use of Generalized Additive Models for the processing of biological and environmental data and GIS for the production of maps while extensive testing of other statistical techniques was carried out.

List of deliverables achieved during the reporting period (all in draft format):

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Subtask No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D7-D12	Time series of Essential Fish Habitats maps	4	CSIC	24	27

List of EnviEFH meetings during the reporting period:

Date	Title/subject of meeting	Location	Number of attendees	Website address
March 13-15, 2006	Kick-off EnviEFH Meeting	Heraklion Crete, Greece	17	http://arch.her.hcmr.gr/enviefh
May 12-15, 2006	1st Short-Group EnviEFH Working Meeting	Barcelona, Spain	6	http://arch.her.hcmr.gr/enviefh
May 17-22, 2006	2nd Short-Group EnviEFH Working Meeting	Heraklion Crete, Greece	5	http://arch.her.hcmr.gr/enviefh
October 16-17, 2006	3rd Short-Group EnviEFH Working Meeting	Athens, Greece	5	http://arch.her.hcmr.gr/enviefh
May 10-11, 2007	Final EnviEFH Meeting	Heraklion Crete, Greece	23	http://arch.her.hcmr.gr/enviefh

1.3.4 WP5 Develop the EFH Designation Tool

Participant number[13]	1	2	3	4	
Participant short name[14]	HCMR	UNIABDN	CSIC	CNRS	**Total**
Person-months[15] **(Dec05-Nov06)**	7	3	2.8	2	**14.8**
Person-months (Dec06-Feb08)			1.2	6	

WP5 works for the duration of the project included the development of an essential fish habitat GIS-based tool for the mapping of: a) overfished areas, and b) alternative fishing grounds. All participants contributed to WP5 and after considerations of user needs, participants decided to develop 1 integrated tool based on JAVA multi-platform technology. The tool is available through the project's website.

List of deliverables achieved during the reporting period (all in draft format):

Deliverable/ Milestone No	**Deliverable/Milestone Name**	**Workpackage /Subtask No**	**Lead Contractor(s)**	**Planned (in months)**	**Achieved (in months)**
D8-D13	EFH Designation Tool	5	UNIABDN	24	27

List of EnviEFH meetings during the reporting period:

Date	**Title/subject of meeting**	**Location**	**Number of attendees**	**Website address**
May 12-15, 2006	1st Short-Group EnviEFH Working Meeting	Barcelona, Spain	6	http://arch.her.hcmr.gr/enviefh
May 17-22, 2006	2nd Short-Group EnviEFH Working Meeting	Heraklion Crete, Greece	5	http://arch.her.hcmr.gr/enviefh
October 16-17, 2006	3rd Short-Group EnviEFH Working Meeting	Athens, Greece	5	http://arch.her.hcmr.gr/enviefh
May 10-11, 2007	Final EnviEFH Meeting	Heraklion Crete, Greece	23	http://arch.her.hcmr.gr/enviefh

1.3.5 WP6 Disseminate Output

Participant number[16]	1	2	3	

Participant short name[17]	HCMR	UNIABDN	CSIC	**Total**
Person-months[18] **(Dec05-Nov06)**	3	1	1.4	**5.4**
Person-months (Dec06-Feb08)			1	

WP6 works for the duration of the project included the establishment of the project's Internet node, the dissemination of hardcopy maps, and the production of scientific publications. Essentially, all participants contributed in WP6. Specifically, the project's Internet node has been established during the first months of the project and hardcopy maps were disseminated to several related organisations. Preparations for scientific output included the organisation of a special issue for the scientific journal *Hydrobiologia*. The special issue is completed (including 21 articles) and will be printed by Springer-Verlag in autumn 2008.

List of deliverables achieved during the reporting period (all in draft format):

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Subtask No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D1-D14	Dedicated Internet node	6	HCMR	1	1

All related communication and data exchange among EnviEFH participants for the enrichment of the Internet node and the organisation of the special issue were carried out electronically.

1.4 Update of the non-confidential Project information

Reporting Period: EnviEFH Final Activity Report

Project Objectives:

Fishery management goals cannot be achieved if the managed species do not have sufficient suitable habitat. The identification and spatiotemporal mapping of EFH represents the main scientific task of the spatial component of fisheries management. The habitat utilized by a species changes with life history stage, abundance, competition from other species and

environmental variability in time and space. The role of habitat in supporting the productivity of organisms has been thoroughly documented in the ecological literature and the linkages between habitat availability, fishery productivity and environmental change have been widely recognized through related current research for a number of commercially important fishery species. Towards this end, the main objective of the EnviEFH project is to facilitate the spatial component of fisheries management by applying an environmental approach to the mapping and designation of essential fish habitats in the Mediterranean Sea. The specific objectives are as follows:

1. To collate and use existing environmental and biological data in order to develop the basis for an Essential Fish Habitat Designation Tool that will facilitate the spatial component of fisheries management;

2. To identify and map the spatiotemporal distribution of ocean production processes that affect species distribution and create favouring habitats throughout the various stages of species life cycles;

3. To introduce species life history information to the description of environment-species interactions in order to identify spawning, nursery and feeding aggregation regions as well as over-exploited areas and alternative fishing grounds;

4. To validate and disseminate project research results to fisheries managers and scientists as well as to coastal fishing communities through the Internet, hardcopy habitat maps and stakeholder workshops.

Project Achievements:

EnviEFH outputs provide detailed maps of essential fish habitats of commercially-important species of the Mediterranean and adjacent areas as well as maps of biologically important areas. The impact of such products will further enhance the spatial component of fisheries management and will provide base data maps for the design of spatial measures, such as marine protected areas and no take zones. For this purpose, EnviEFH output communication will be carried out through related meetings, workshops and conferences.

2. List of deliverables

Consolidated list of all deliverables achieved during the duration of the EnviEFH Project:

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Subtask No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D1	Dedicated Internet node (draft)	6	HCMR	1	1
D2	Project Presentation Leaflet	1	HCMR	3	3

	(final)				
D3	Inventory of relevant data sources (final)	2	HCMR	3	3
D4	Final Plan for using and disseminating knowledge (draft)	1	HCMR	3	3
D5	GIS oceanographic and fisheries database for the Mediterranean Sea (draft)	2	CNRS	12	12
D6	Time series maps of upwelling, thermal fronts and marine productivity hotspots (draft)	3	HCMR	12	12
D7	Time series of Essential Fish Habitats maps (draft)	4	CSIC	12	12
D8	EFH Designation Tool (draft)	5	UNIABDN	12	12
D9	Year1 Project Report	1	HCMR	12	12
D10	GIS oceanographic and fisheries database for the Mediterranean Sea (final)	2	CNRS	24	27
D11	Time series maps of upwelling, thermal fronts and marine productivity hotspots (final)	3	HCMR	24	27
D12	Time series of Essential Fish Habitats maps (final)	4	CSIC	24	27
D13	EFH Designation Tool (final)	5	UNIABDN	24	27
D14	Dedicated Internet node (final)	1	HCMR	24	27
D15	Report on Stakeholder-Validation National Workshops	1	HCMR	24	27
D16	Final Project Report	1	HCMR	24	27

D1 and D14 (Dedicated Internet Node)

The EnviEFH dedicated Internet node was established and placed online on January 15, 2007 at: http://arch.her.hcmr.gr/enviefh/

HyperText Marckup Language (HTML) and Javascript programming were used for the development of the EnviEFH website. The website includes information about the project, the participants and the study sites as well as separate documents on project's methodology and products. The EnviEFH website will be under continuing development and enrichment throughout the duration of the project. Figures D1a-c shows some of the main context of the EnviEFH website:

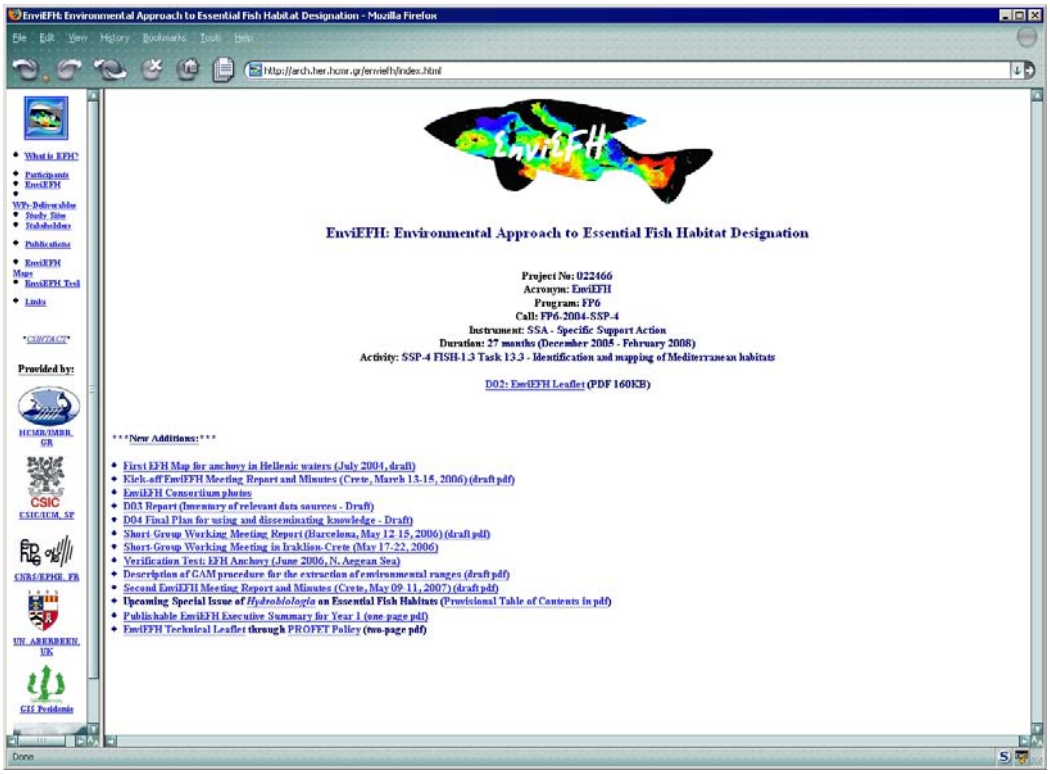


Fig. D1a. The main framed webpage of the EnviEFH project (http://arch.her.hcmr.gr/enviefh/)

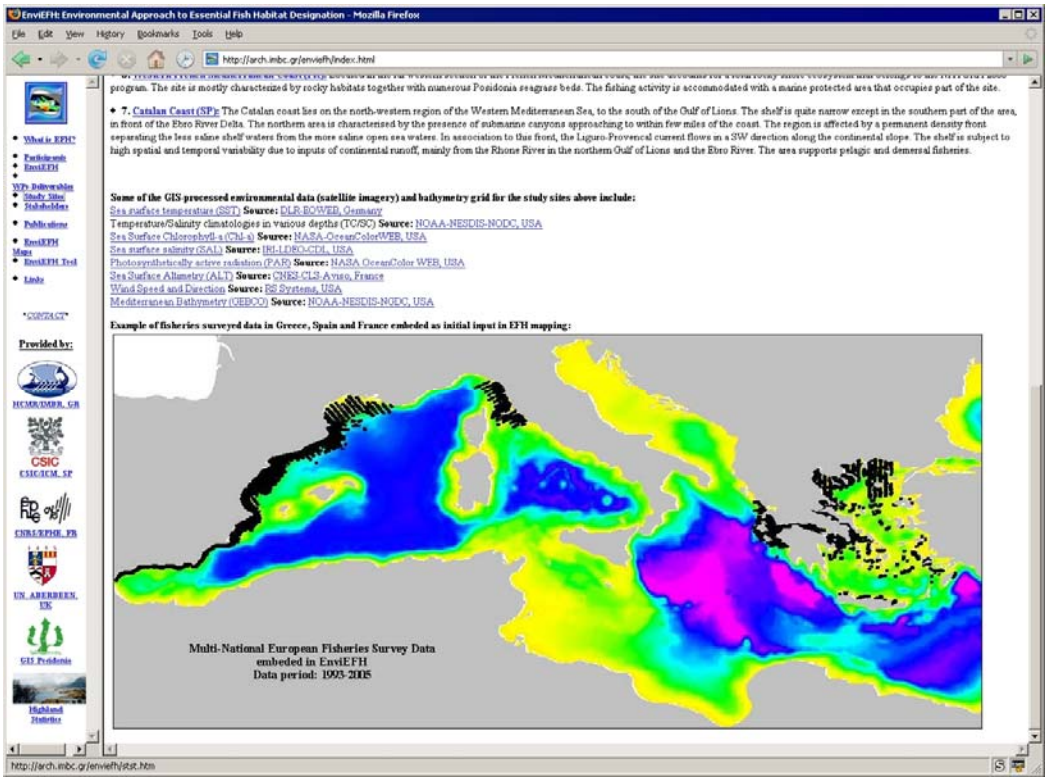


Fig. D1b. EnviEFH webpage showing fisheries biological surveyed datasets available to EnviEFH.

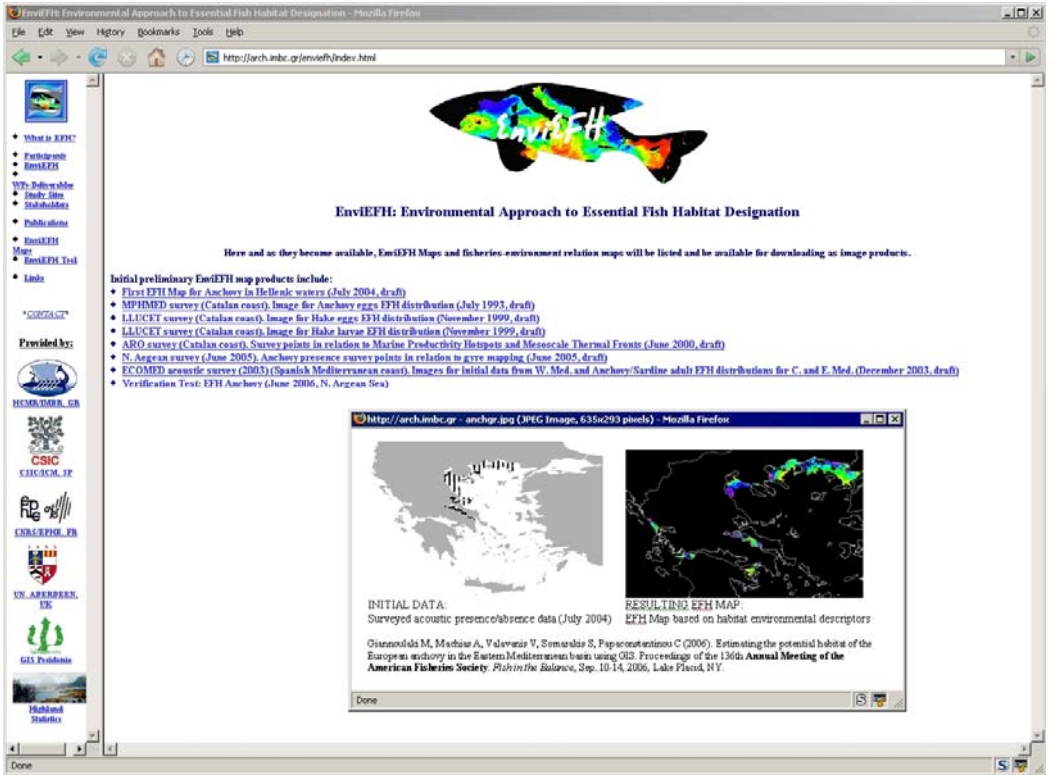


Fig. D1c. EnviEFH webpage showing initial fisheries biological surveyed dataset on anchovy and corresponding EFH map product for North Aegean Sea (Eastern Mediterranean).

D02. Project Presentation Leaflet (see Annex2)

D03. Inventory of relevant data sources

An inventory of data sources applicable to the EnviEFH action was carried out during the first 3 months of the project (December-February 2006) and finalized during the kick-off EnviEFH meeting (March 13-15, 2006, Crete Greece). Identified data providers include international and national online archives of satellite imagery and modeled environmental data as well as databases and datasets of surveyed biological and fisheries data including species life history data.

The inventory was based on the EnviEFH objectives that include the mapping of commercial species essential fish habitats (EFH) in the Mediterranean, in general, and in 7 study sites, in particular. Identified data sources and datasets available to the project are listed in the following tables.

Table 1 lists the environmental datasets that will be used as base data for the mapping of ocean processes as well as the identification of species EFH environmental descriptors. Environmental data were processed under a common georeference system in the EnviEFH GIS database and currently, they cover the whole Mediterranean Sea (including the 7 study sites) for the period 1998-2005.

Table 2 lists surveyed species/fisheries-related datasets that will be used for the identification of species distributions during various stages of their life cycle. Surveyed datasets were processed under a common georeference system in the EnviEFH GIS database and describe the distribution of the major commercial species in the 7 EnviEFH Mediterranean study sites.

Table 3 lists data sources of species life history data that will be used for the identification of certain EFH environmental descriptors, such as species ecology characteristics, spawning preferences, optimum living environmental ranges, bathymetry ranges, etc. In addition to these life history data, EFH environmental descriptors will be extracted from analysis of environmental and surveyed fisheries-related datasets.

Additionally, the identified datasets that will be used in the EnviEFH works include sediment and benthic biological assemblage data for several NATURA 2000 marine areas in the Aegean and Ionian Seas, which sustain extensive *Posidonia oceanica* beds that are important spawning habitats for many species.

Table1. A list of datasets, their description and source that they are commonly used in marine species habitat modeling. The listed datasets are commonly georeferenced in a GIS database under the EnviEFH Project requirement (world-wide and/or Mediterranean coverage, weekly and/or monthly resolutions for the period 1997-current).

PARAMETER	SENSOR/MODEL	UNITS	RESOLUTIONS	SOURCE
Sea Surface Chlorophyll-a (CHLO)	SeaWiFS	mg/m³	0.0833333°	oceancolor.gsfc.nasa.gov
Sea Surface Chlorophyll-a (CHLO)	MODISA	mg/m³	0.0833333° and 0.0416667°	oceancolor.gsfc.nasa.gov
Sea Surface Temperature (SST)	AVHRR	°C	0.0128748°	eoweb.dlr.de:8080
Sea Surface Temperature (SST)	MODISA	°C	0.0833333° and 0.0416667°	oceancolor.gsfc.nasa.gov
Photosynthetically Active Radiation (PAR)	SeaWiFS	einstein/m²/day	0.0833333°	oceancolor.gsfc.nasa.gov
Sea Surface Wind Speed and Direction (WIND)	QSCAT	m/sec and ° from N	0.25°	www.ssmi.com
Sea Surface Current Speed and Direction (SSC)	Merged T/P, Jason-1, ERS-2, Envisat	cm/sec and ° from N	0.125°	www.jason.oceanobs.com
Mean Sea Level Anomaly (MSLA)	Merged Jason-1, Envisat, ERS-2, GFO, T/P	cm	0.2942888°	www.jason.oceanobs.com
Sea Surface Salinity (SAL)	CARTON-GIESE SODA, CMA BCC GODAS, and NOAA NCEP EMC CMB GODAS models	psu	0.3333309°	iridl.ldeo.columbia.edu
Euphotic Depth (ZEU)	SeaWiFS (Lee and/or Morel)	m	0.0833333° and 0.0416667°	oceancolor.gsfc.nasa.gov
Bathymetry (BATH)	GEBCO	m	0.0166666°	www.ngdc.noaa.gov
Bathymetry (BATH)	Geosat and ERS-1	m	0.0280322°	ibis.grdl.noaa.gov/SAT/

Table 2. Inventory of surveyed species/fisheries-related datasets for the 7 Mediterranean EnviEFH study sites.

EnviEFH STUDY SITE	SPECIES (SURVEYED DATASET)	LIFE STAGE or EFH map	DATA HOLDER
1. North Aegean Continental Shelf (GR)	European Anchovy, *Engraulis encrasicolus* (acoustic and ichthyoplankton survey)	adults + spawning	HCMR/IMBR (GR)
	European Sardine, *Sardina pilchardus* (acoustic survey)	adults	
	Broadtail short-fin squid, *Illex coindettii* (MEDITS)	adults + recruits + nurseries	
	Red mullet, *Mulus barbatus* (MEDITS)	adults	
	Hake, *Merluccius merluccius* (MEDITS)	adults + recruits + nurseries	
	Deep-water rose shrimp, *Parapenaeus longirostris* (MEDITS)	adults + recruits + nurseries	
2. Cyclades Plateau (GR)	Broadtail short-fin squid, *Illex coindettii* (MEDITS)	adults + recruits + nurseries	HCMR/IMBR (GR)
	Deep-water rose shrimp, *Parapenaeus longirostris* (MEDITS)	adults + recruits + nurseries	
	Red mullet, *Mulus barbatus* (MEDITS)	adults	
	European Anchovy, *Engraulis encrasicolus* (ichthyoplankton survey)	spawning	
	Atlantic bluefin tuna, *Thunnus thynnus* (SWOMED)	adults	
	Swordfish, *Xiphias gladius* (SWOMED)	adults	
3. Cretan Continental Shelf (GR)	Broadtail short-fin squid, *Illex coindettii* (MEDITS)	adults + recruits + nurseries	HCMR/IMBR (GR)
	Hake, *Merluccius merluccius* (MEDITS)	adults + recruits + nurseries	
	Deep-water rose shrimp, *Parapenaeus longirostris* (MEDITS)	adults + recruits + nurseries	
	Red mullet, *Mulus barbatus* (MEDITS)	adults	
	Atlantic bluefin tuna, *Thunnus thynnus* (SWOMED)	adults	
	Swordfish, *Xiphias gladius* (SWOMED)	adults	
4. Ionian Sea (GR)	Hake, *Merluccius merluccius* (DISCARDS/MEDITS)	adults + recruits + nurseries	HCMR/IMBR (GR)
	Red mullet, *Mulus barbatus* (DISCARDS/MEDITS)	adults	
	Deep-water rose shrimp, *Parapenaeus longirostris* (MEDITS)	adults + recruits + nurseries	
	European Anchovy, *Engraulis encrasicolus* (acoustic and ichthyoplankton survey)	adults + spawning	
	European Sardine, *Sardina pilchardus* (acoustic and ichthyoplankton survey)	adults + spawning	
	Broadtail short-fin squid, *Illex coindettii* (MEDITS)	adults + recruits + nurseries	
5. Eastern French Mediterranean Coast (FR)	*Solea* *Merluccious* Best data in Carry (west of Marseille)	spawning areas conservation areas	(FR)
6. Western French Mediterranean Coast (FR)	Common Pandora, *Pagellus erythrinus* (BIOMEX, coastal survey)	adults	(FR)
	Spiny Lobster, *Palinurus elephas* (BIOMEX, coastal survey)	adults adults + recruits	
	White Seabream, *Diplodus sargus* (BIOMEX, coastal survey)	adults	
	Benthic species groups (*Scorpaena scrofa*, *Uranoscopus faber*) (BIOMEX, coastal survey)		
7. Catalan Coast (SP)	Anchovy	spawning + larvae	(SP)
	Hake	spawning + fishing grounds + nurseries	
	Red Mullet	spawning + fishing grounds + nurseries	
	Loligo + *Eledone*	adults	
	A. antennatus		
Mediterranean Sea (as a whole)	Atlantic bluefin tuna, *Thunnus thynnus* Swordfish, *Xiphias gladius*		

Table 3. Inventory of species life history data sources for the Mediterranean Sea that are available to EnviEFH action.

DATABASE	SPECIES LIFE HISTORY PARAMETERS	DATA PROVIDER	DATA SOURCE WEBSITE
Atlas of Tuna and Billfish Catches Fisheries Global Information System CephBase FishBase	▪ Species type (e.g. benthic, pelagic, etc.) ▪ Optimum living temperature tolerance ▪ Optimum living salinity tolerance ▪ Preferred spawning temperature range ▪ Preferred spawning salinity range ▪ Preferred spawning sediment types ▪ Migration type (e.g. inshore, offshore) ▪ Occurrence bathymetry range	FAO/Fisheries Department FAO/Fisheries Department National Resource Center for Cephalopods/University of Texas WorldFish Center/FAO	www.fao.org www.fao.org www.cephbase.utmb.edu www.fishbase.org

D4 Final Plan of using and disseminating knowledge
(see 3. Use and Dissemination of Knowledge section)

D5 and D10 (GIS Oceanographic and Fisheries Database for the Mediterranean Sea)
The EnviEFH Oceanographic and Fisheries Database for the Mediterranean Sea is consisted by GIS-ready vector and raster time-series datasets, which are geo-referenced under a common reference system in a GIS database. Specifically, all data are processed under the geographic projection system with units on decimal degrees. The GIS software that is used for the development of the database is ESRI's ArcGIS with its ARC, GRID, TABLES, ARCPLOT and ARCEDIT modules. All programming routines are developed in Arc Macro Language (AML).

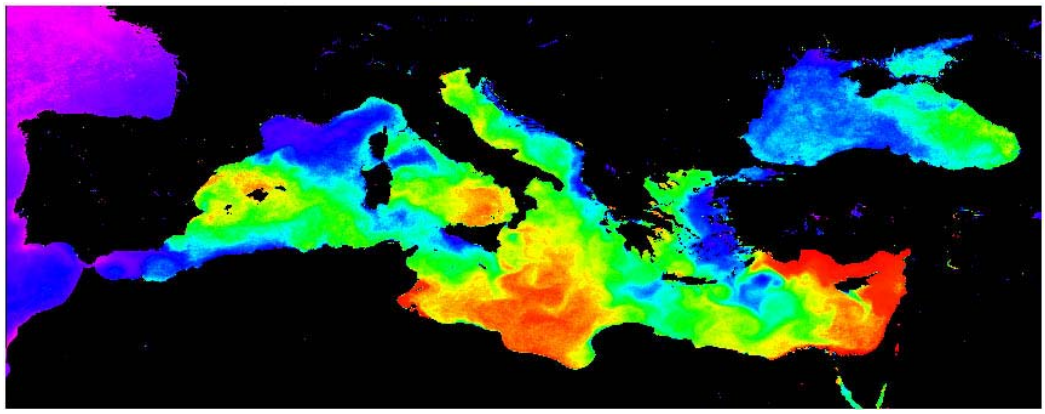
Data are categorized into two main types: a) raster data including satellite imagery and model data on several environmental parameters and b) vector data including fisheries biological data (acoustic, egg surveys, etc) on a number of commercially important species. Raster data were downloaded from online satellite data archives in various data distribution formats (e.g. TIFF images, HDF files, compressed ASCII text files) and they were processed through GIS as ArcGIS geo-referenced regular grids. Vector data were assembled by project participants in simple MS Excel format (LAT,LON,PARAMETER) and they were processed as ArcGIS point coverages (spatial information) and associated point attribute tables (surveyed parameters). All datasets and their sources are listed in Table D5 while images of several data are shown Figure D5.

The environmental data of the GIS database include eight parameters, which cover the whole Mediterranean Sea for the period January 1998 – current on monthly basis. In addition, several monthly environmental data prior to 1998 were included in the database in order to accompany fisheries surveys contacted prior to 1998.

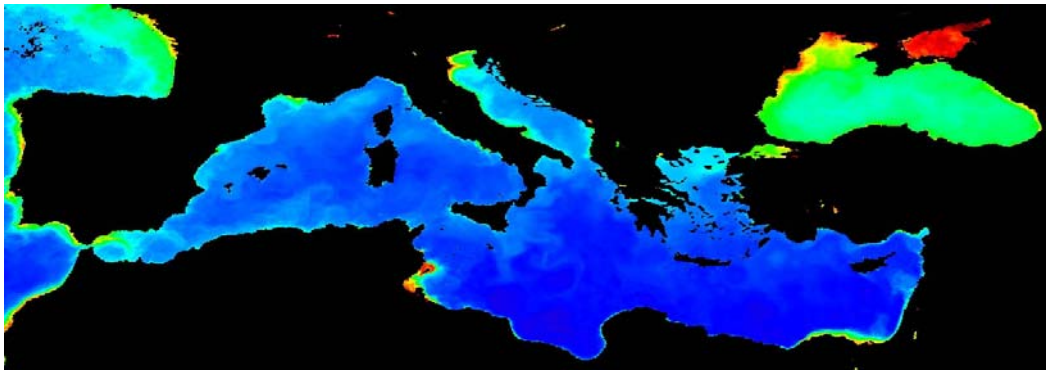
Table D5. Data and data sources organized in EnviEFH Oceanographic and Fisheries Database for the Mediterranean Sea

ENVIRONMENTAL DATA		
PARAMETER	**SOURCE AGENCY**	**SOURCE WEBSITE**
Sea Surface Temperature (SST)	EOWEB/DLR, Germany	eoweb.dlr.de:8080/
Sea Surface Chlorophyll (Chl-a) and Sea Surface Photosynthetically Active Radiation (PAR)	OCEANCOLORWEB NASA, USA	oceancolor.gsfc.nasa.gov/
Sea Surface Altimetry (ALT)	CNES-CLS-AVISO, France	www.aviso.oceanobs.com/
Sea Surface Salinity (SAL)	IRI-LDEO-CDL, USA	ingrid.ldeo.columbia.edu/
Wind Speed and Direction (WS/WD)	RS Systems, USA	www.ssmi.com/
Bathymetry (BATH)	NESDIS-NGDC-NOAA, USA	www.ngdc.noaa.gov/
FISHERIES DATA		
DATASET	**HOLDING AGENCY**	**CONTACT EMAIL**
Acoustic small pelagic winter-summer surveys 1998-2006 (Ionian and Aegean Seas)	HCMR-GR	amachias@her.hcmr.gr
Egg-Larvae small pelagic summer surveys 2001-06 (Aegean Sea)	HCMR-GR	amachias@her.hcmr.gr
Multi-species MEDITS Trawl data 1998-2005 (Ionian and Aegean Seas)	HCMR-GR	c-y@ath.hcmr.gr
MPHMED anchovy egg survey – July 1993 (Catalan Coast)	CSIC-SP	paloma@cmima.csic.es
LLUCET hake egg and larvae surveys – November 1999 (Catalan Coast)	CSIC-SP	paloma@cmima.csic.es
ECOMED small pelagic acoustic surveys 2003-05 (Spanish Mediterranean coast)*	IEO-SP*	josem.bellido@mu.ieo.es

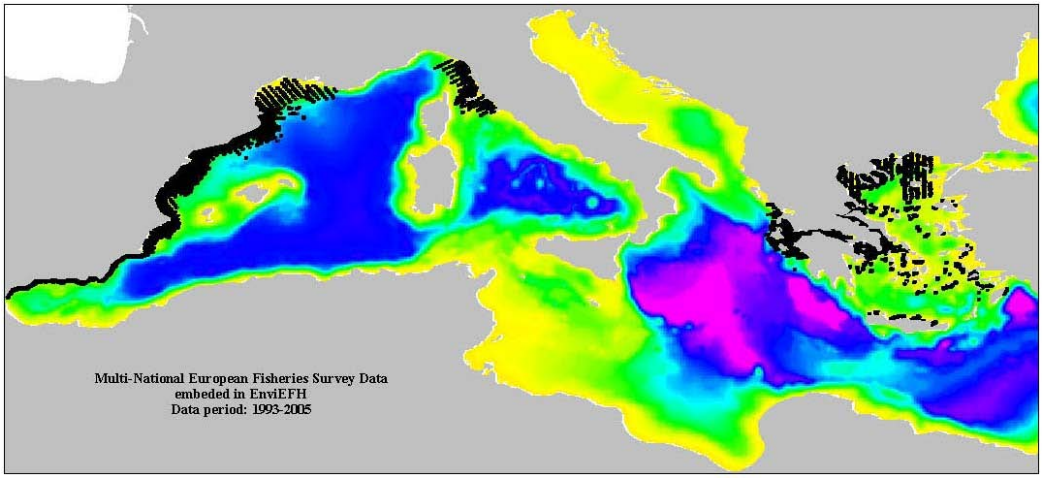
*Dataset provided to EnviEFH by IEO for testing purposes



Sea Surface Temperature (SST)



Sea Surface Chlorophyll (Chl-a)



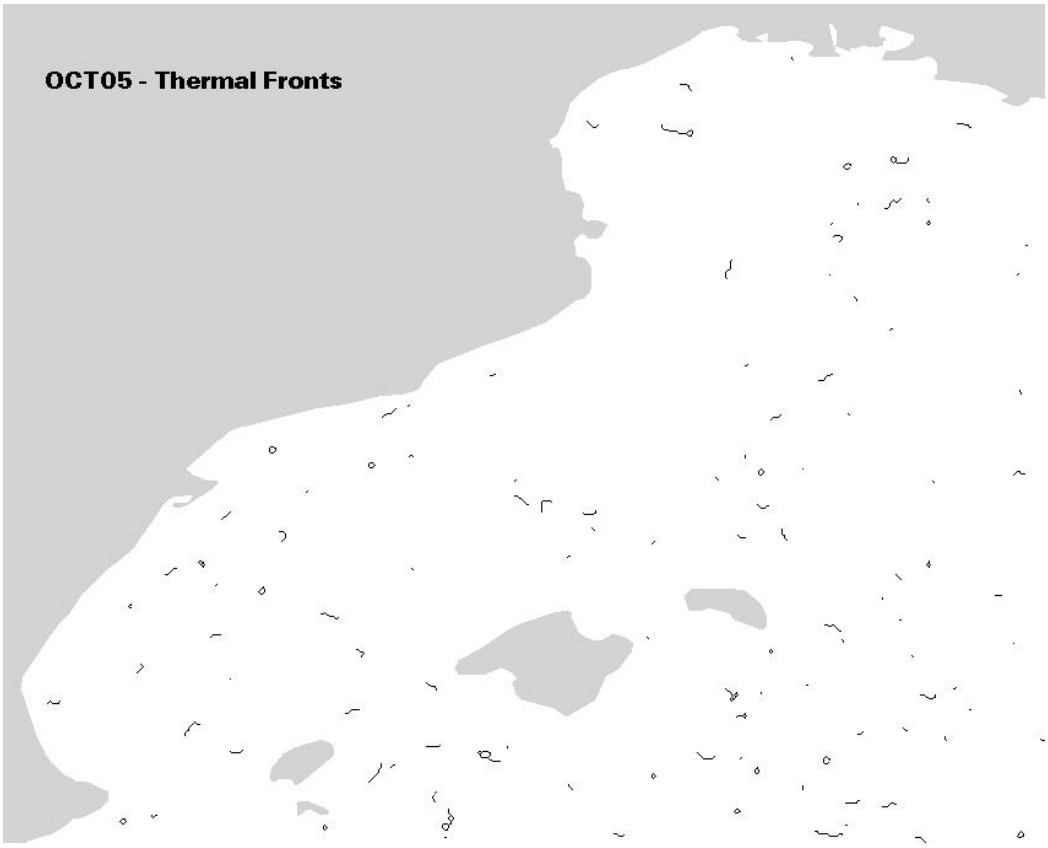
Fisheries biological survey points overlaid on bathymetry

Fig. D5. Environmental and fisheries biological data available through EnviEFH project's GIS Database.

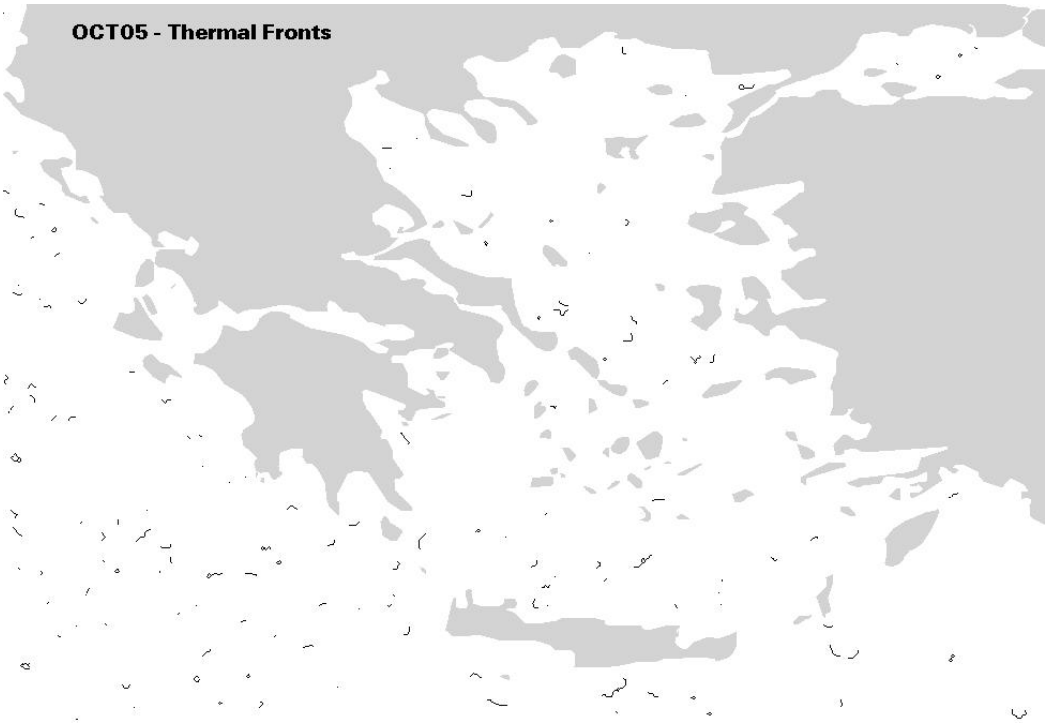
D6 and D11 (Time series Maps of Major Ocean Processes)

Major oceanic processes include 3 productivity-enhancing processes: a) mesoscale ocean thermal fronts (MTF), b) marine productivity hotspots (MPH) and c) ocean gyres (GYR). These processes are mapped on a monthly basis using GIS-ready environmental parameters and are stored as digital products (MTF as ArcGIS line coverages, MPH as ArcGIS grids and GYR as ArcGIS polygon coverages) in EnviEFH GIS database. MTF are characterized as abrupt changes in SST distribution observed in SST imagery accompanied by positive Chl-a pattern inside the front area. MPH are regions where simultaneous positive Chl-a and negative SST anomaly patterns are observed (MPH are indicators of upwelling). Finally, GYR are generally cyclical patterns (closed contour lines) observed in altimeter anomaly (ALT) images. Measurements for all processes include SST, Chl-a and ALT levels inside and outside the spatial extend of the process.

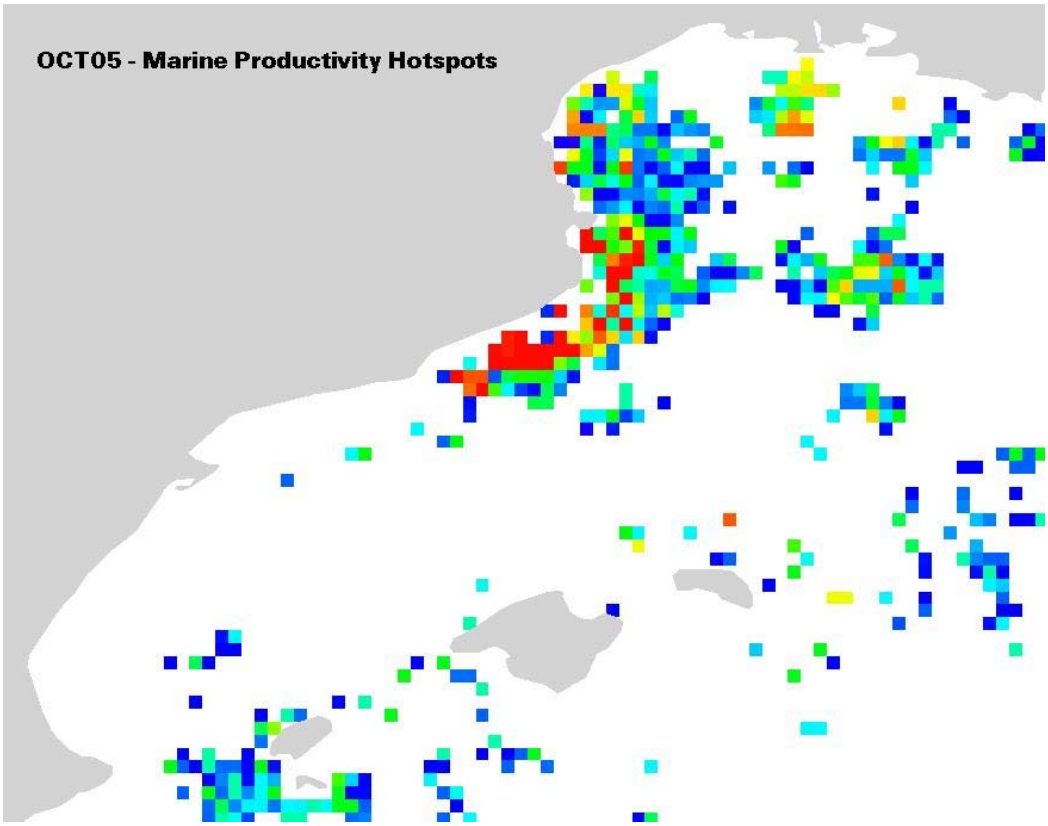
Figures D6a-e represent examples of maps of major ocean processes mapped through the EnviEFH project.



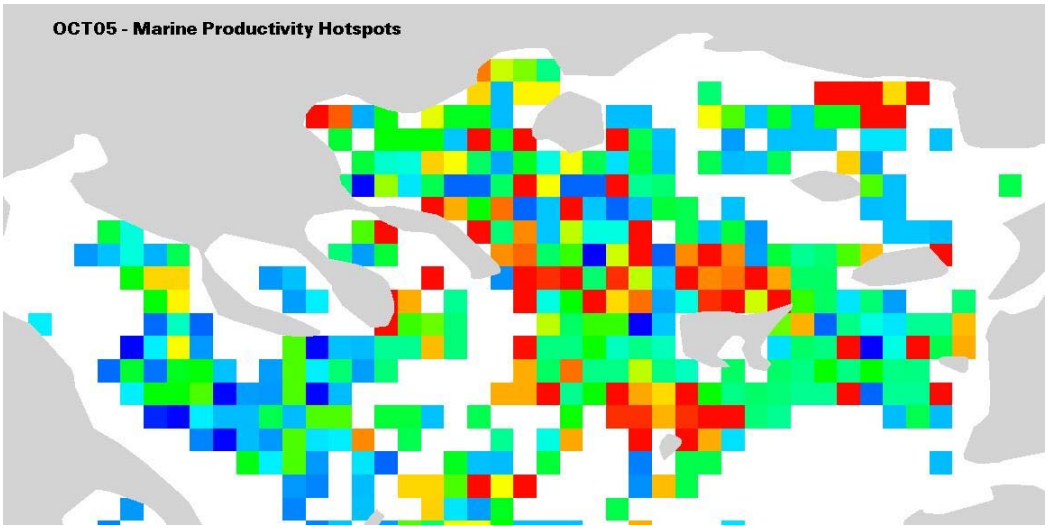
Mesoscale thermal fronts (MTF) in Spanish Mediterranean coast and Gulf of Lions during October 2005.



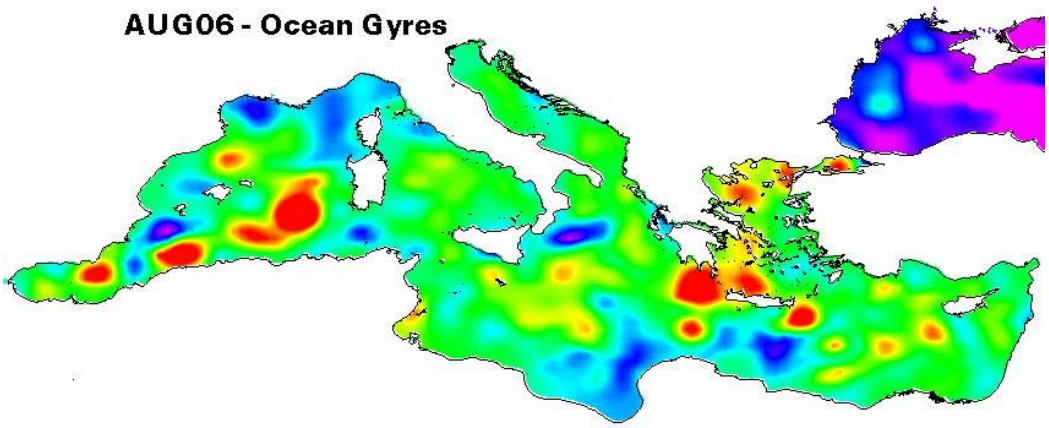
Mesoscale thermal fronts (MTF) in Hellenic Seas (Eastern Mediterranean) during October 2005.



Marine productivity hotspots (MPH) in Spanish Mediterranean coast and Gulf of Lions during October 2005.



Marine productivity hotspots (MPH) in North Aegean Sea (Eastern Mediterranean) during October 2005.



Ocean gyres in the Mediterranean Sea during August 2006 as depicted in satellite altimeter products of altimetry anomaly.

D7 and D12 (Time series of Essential Fish Habitat Maps)

A description of the GAMs methodology and EFH GIS mapping is described here, followed by a series of EFH final maps.

Development of Generalized Additive Models (GAMs) in EnviEFH

1. Introduction

The US Congress defined Essential Fish Habitats (EFH) as 'those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity', a definition that includes the physical, chemical and biological properties of marine areas and the associated sediment and biological assemblages that sustain fish populations throughout their full life cycle (DOC, 1997).

Generalized Additive Models (GAMs) are a powerful tool for modelling fisheries data with other data that characterise species EFH areas. GAMs (Hastie *et al*., 2001) are straightforward extensions of additive modelling with differences on (i) the way the response variable is linked with the explanatory variables, and (ii) the distribution function of the data (Zuur *et al*., In press).

The general GAM formula is:

$$g(\mu_i) = \mu + \sum_{j=1}^{p} f_j(\mathbf{x}_i)$$

where g is the differentiable and monotonic link function, $\mu i = E(Yi)$ is the expectation of the response, is a $\sum_{j=1}^{p} f_j(\mathbf{x}_i)$ function called additive predictor

where fj is a smooth function (such as a spline or a loess smoother). The degree of smoothness achieved is balanced against the deviance by a tuning constant, often chosen by cross-validation, so that estimation is by the method of maximum 'penalized' likelihood rather than of maximum likelihood. This gives GAMs a partially non-parametric aspect (Maunder and Punt, 2004).

Here, the GAM development process in EnviEFH is explained on step-by-step basis.

2. Data selection

A GAM model for EFH is generally described as:
Response variable = s(explanatory var.1) + s(explanatory var.2) … + s(explanatory var.i), where s is a smoother.

Different types of fisheries data can be used as response variables (e.g. biomass index, sonar data etc). The selection of the proper explanatory data based on those parameters that describe more efficient an EFH, according to information on species life history. As explanatory data, environmental parameters are used including environmental satellite and model data, such as sea surface temperature, chlorophyll-a concentration, salinity, altimetry, photosynthetically active radiation, substrate types, bathymetry, etc.

3. Exploration

The exploration process is very important because the next step of the analysis require the data to comply with several assumptions before any valid conclusions can be made (Zuur *et al*., In press). Exploration routines that provide a clear graphical idea of each dataset are described below (Fig. 1):

Boxplots is a tool for identifying outliers. A boxplot visualises the mean and spread for a univariate variable. Normally, the midpoint of a boxplot is the median, but it can also be the mean. The 25% and 75% quartiles define the hinges and the difference between the hinges is called the spread. Lines are drawn from each hinge to 1.5 times the spread or to the most extreme value of the spread, whichever is the smaller. Any point outside these values is normally outlier.

Dotplots or Cleveland dotplots (Cleveland, 1985) are useful to identify outliers and homogeneity. Homogeneity means that the variance of the data does not change along the gradient.

QQ-plots or Quantile-Quantile plots are graphical tools used to determine whether the data follow a particular distribution.

Coplots are conditional scatterplots that show relationship between x and y, for different values of a third variable z. Coplots are useful for detecting interactions between the explanatory variables.

Pairplots are multiple pair-wise scatterplots in one graph and can be used to detect relationships between variables and to detect collinearity.

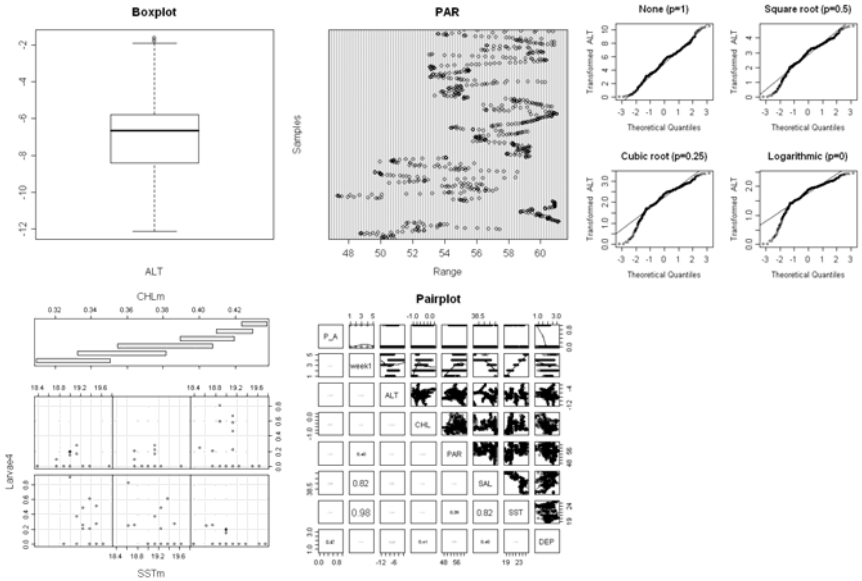


Fig. 1: From left to right: boxplot, dotplot, QQ-plot, coplot and pairplot data exploration routines.

The spread of the variables and the outliers are factors that can affect a GAM model. In some cases, data transformation is required because it provides a better data fit in the model. Both response and explanatory variables are transformed, and different types of transformations are applied to different variables within the same dataset.

Inclusion of explanatory variables that are themselves correlated, the so-called problem of 'collinearity' is avoided. This can make the model fitting process numerically unstable or lead to problems similar to those of over-fitting (Maunder and Punt, 2004).

4. Create a model

The next step is the composition of a primary submodel. This contains the response variable, the explanatory un-correlated variables, the proper distribution and a link factor. Spline is used as smoother in EFH. In the first submodel the same degrees of freedom are used between all the explanatory factors. For count data, Poisson distribution with log link is suggested. If the data are presence-absence, the binomial distribution with logit link should be used. Table 1 shows distributions and related links for some commonly used models.

Table 1: Distributions and related links for commonly used models (Hastie and Tibshirani, 1990).

Distribution	link
Normal	Identity
Binomial	Logit
Gamma	Reciprocal
Gamma	Log
Poisson	Log
Inverse Gaussian	μ^{-2}

The first submodel is a 'control' model that provides the 'best' fitted model through a selection process.

5. Model Selection

In a model's numerical output different factors provide several information about it (Fig. 2). P-values for smoothing terms show the significance of the terms in the model. Different nested models are possible to be compared with ANOVA test. A non significant variable can take part in a model. An alternative way to compare different models (not necessarily nested) is the Akaike information criterion (AIC, Akaike, 1973; Burnham and Anderson, 2002). Lower AIC characterize a better fitted model. Another value that provides crucial information about the model is the deviance explained. At last, over-dispersion (not over 1) must be considered and sometimes, it must be corrected by using a quasi-distribution.

	Df	Npar	Df	Npar	Chisq	**P(Chi)**
(Intercept)	1					
s(ALT, 5)	1		4		15.0322	**0.0046**
s(PAR, 5)	1		4		12.5302	**0.0138**
s(DEP, 3)	1		2		31.0024	**1.851e-07**

Dispersion parameter = 1
Deviance = 504.93
n (null degrees of freedom) = 718
df.residual (residual degrees of freedom) = 701
df (n-df.residual) = 17

Overdispersion (Deviance/df.residual) = 0.72

AIC according to formula: -2log(Likelihood) + 2*df = 540.93

Fig. 2: Example of GAM numerical output.

After the selection of the significant smoothing terms, we have to choose the best combination of the degrees of freedom for the explanatory variables. Step-wise search is a way that gives the 'best' model. Any final model must be validated. We have to verify the assumptions of homogeneity and normality and check for potential influential observations. If the fitted values against the residuals (Fig. 3) show a clear spatial pattern then the model is not valid. In this case, another model selection is required, with the use of different terms and perhaps transformations of the initial data.

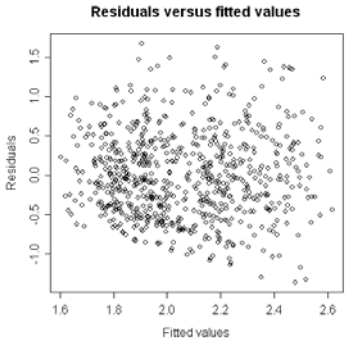


Fig. 3: Example fitted values against the residuals.

6. Ranges

The partial plots (Fig. 4) for the explanatory variables are the model output that provides environmental ranges for EFH mapping. We get the range, from each plot, that has a positive effect on the fitted values (e.g. range of environmental parameter that is over the zero axis).

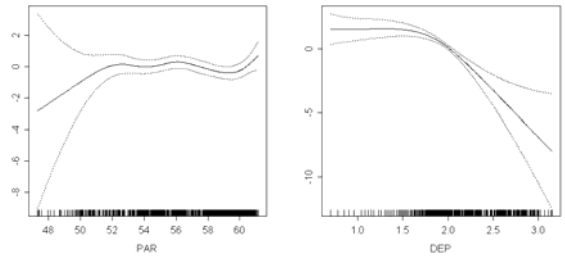


Fig. 4: Example partial plots of two explanatory variables.

7. EFH maps

By applying those ranges on GIS grids, we map areas where these ranges are simultaneously met and imply potential essential fish habitats (Fig. 5). Environmental ranges extracted from a specific surveyed area (e.g. North Aegean Sea in Eastern Mediterranean) is applied to satellite data that cover the whole Mediterranean basin, thus providing EFH maps for the whole Mediterranean Sea.

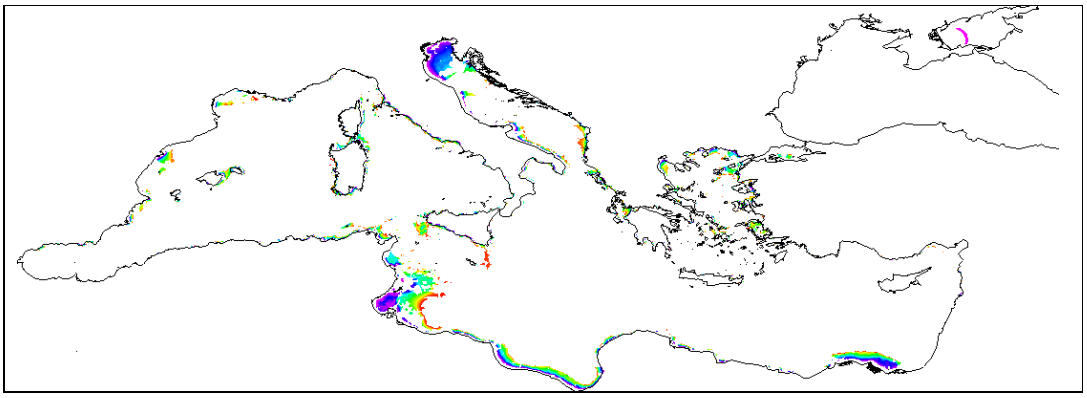
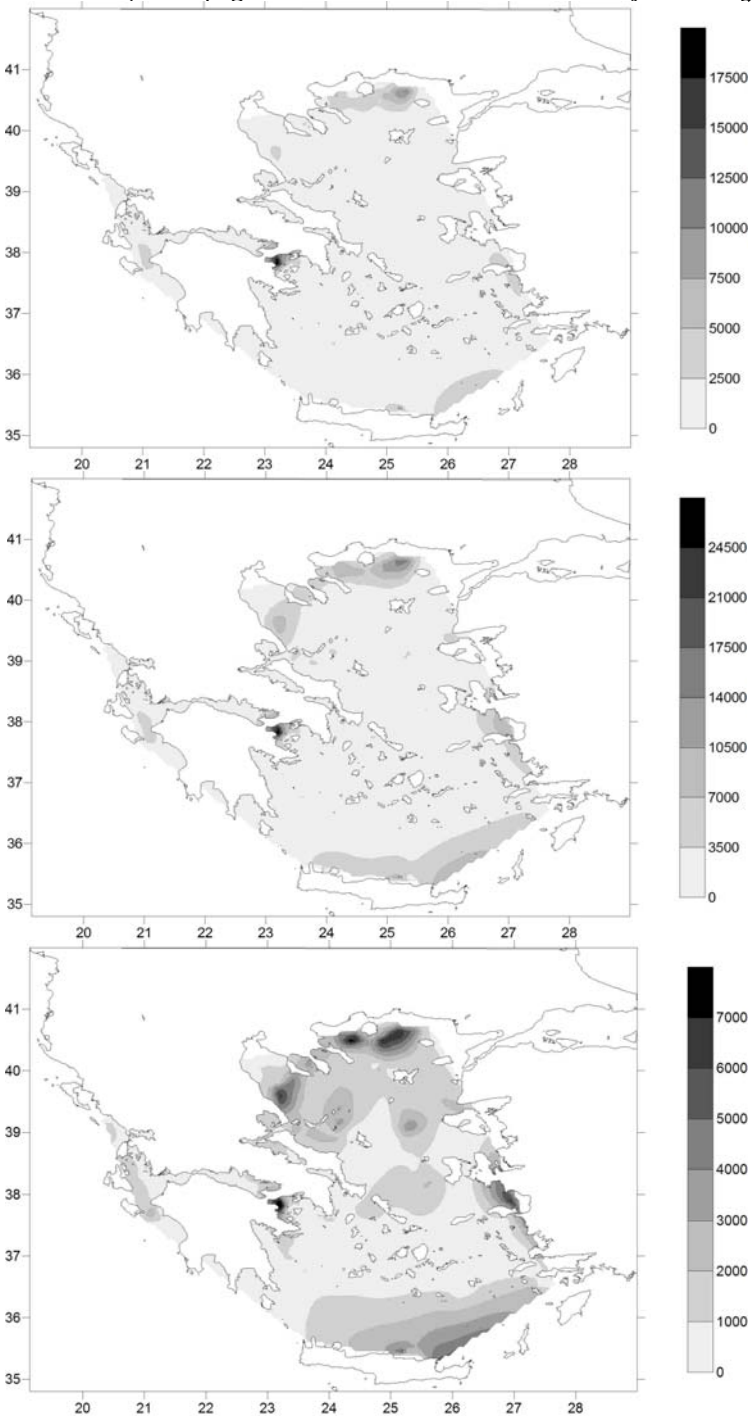


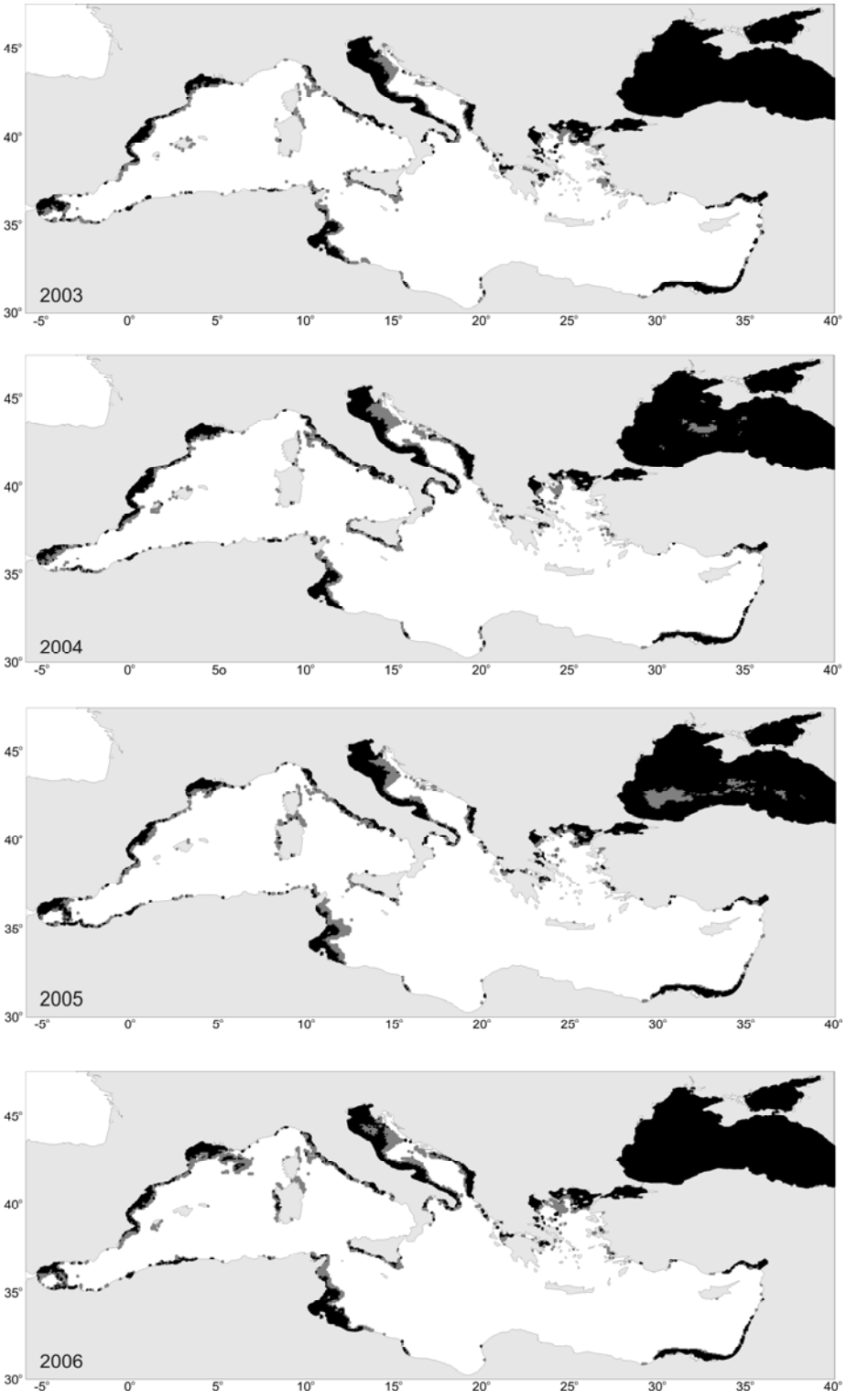
Fig. 5: Example EFH map in Mediterranean Sea.

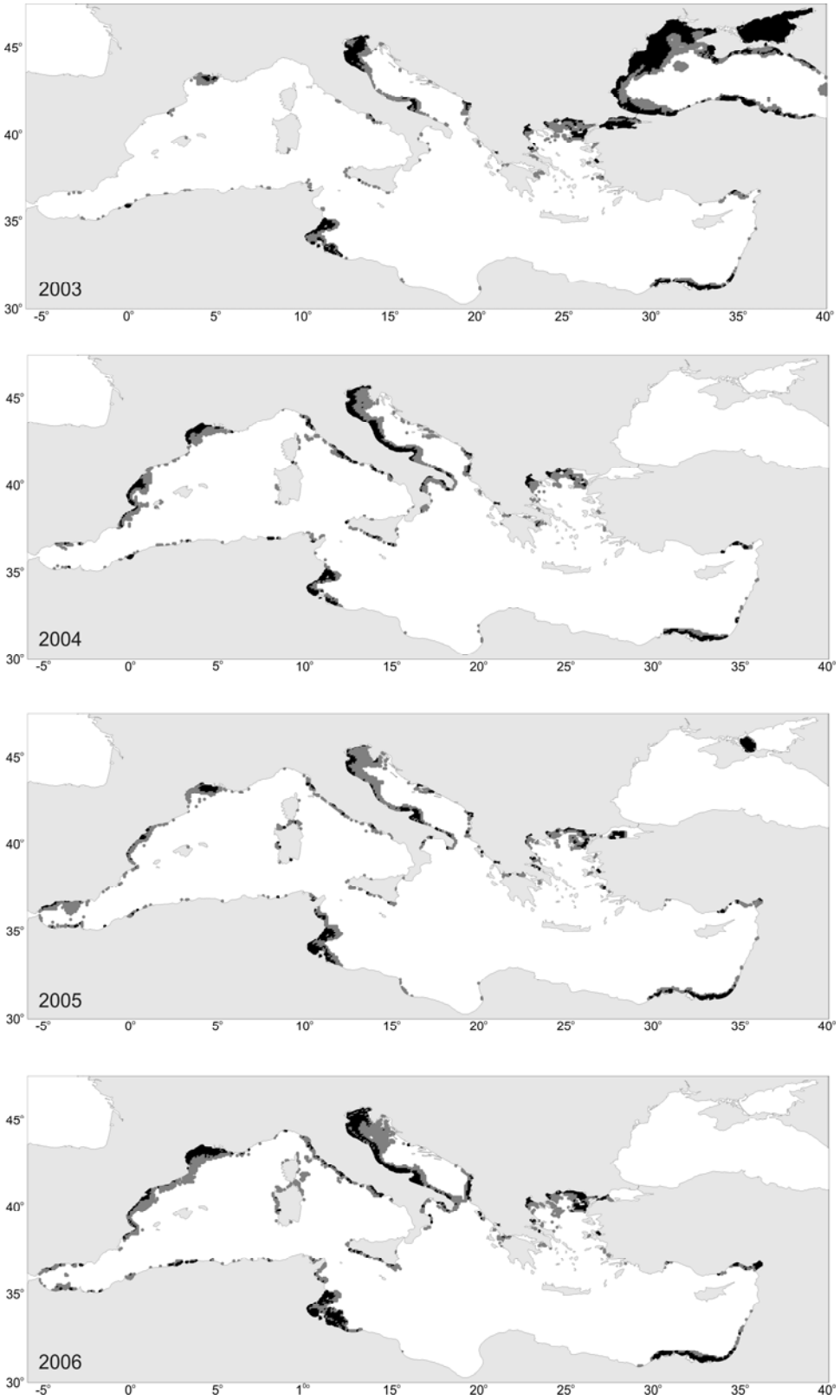
Final Essential Fish Habitats Maps developed through the EnviEFH Project:

An extensive amount of work has been done, both methodological and regarding the definition of EFHs, and thus, results of the project are presented in a special issue, which is in its final phase of editing and to be published by Springer-Verlag by late summer-early fall 2008. The figures presented here are shown as example to illustrate the project achievements, and have been selected from contributions to this volume (see in page 45 the Table of Contents of the *Hydrobiologia* Special Issue).

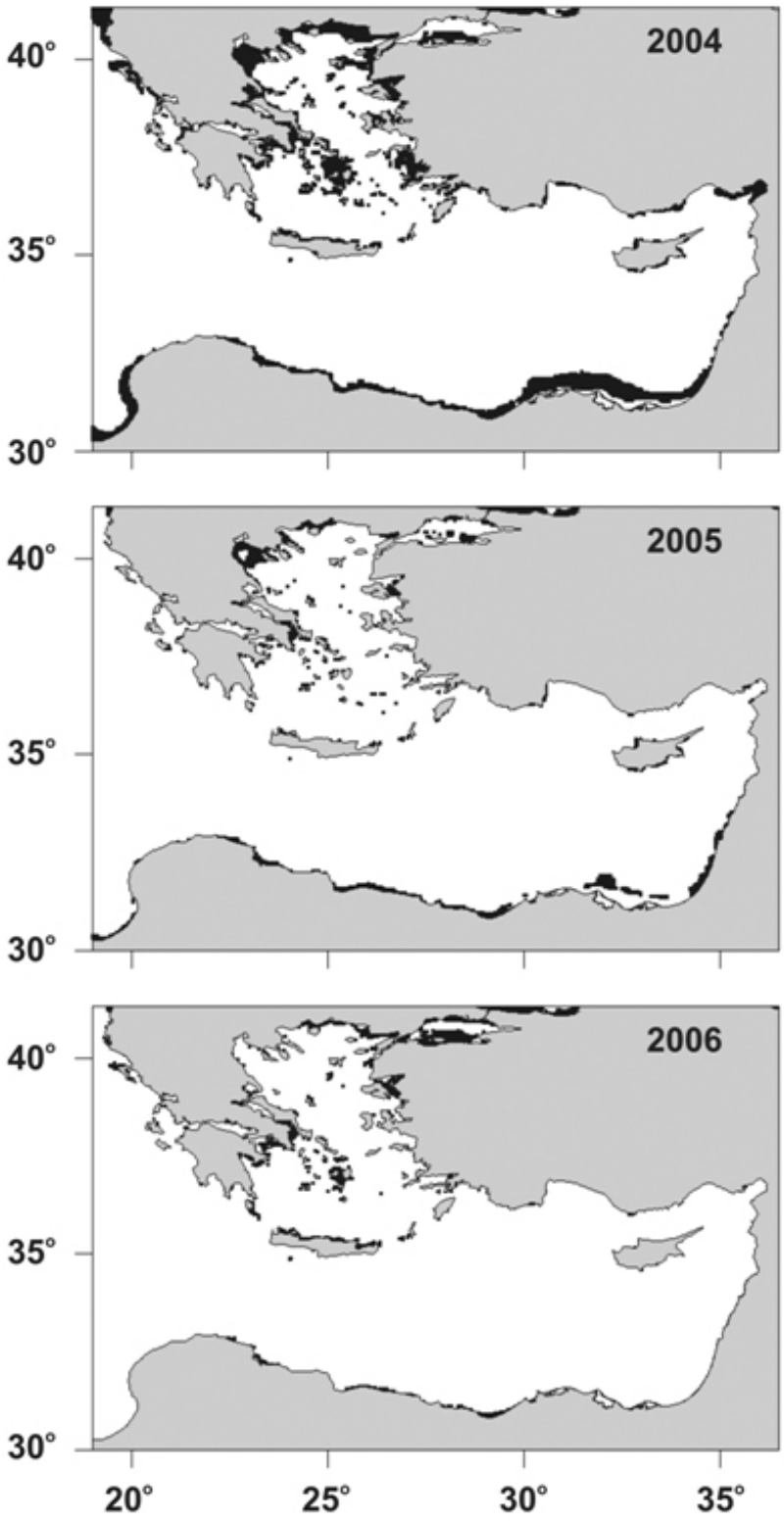


Maps of total (top), adult (middle), and juvenile (bottom) pink shrimp (*Parapenaeus longirostris*) distribution in SE Mediterranean. Density indices are expressed in terms of n/km^2.


2003
2004
2005
2006
45°
40°
35°
30°
-5°
0°
5°
10°
15°
20°
25°
30°
35°
40°



Mediterranean Sea: Map of areas representing (top) anchovy (*Engraulis encrasicolus*) and (bottom) round sardinella (*Sardinella aurita*) potential spawning habitat based on the GAM model from the North Aegean Sea Grey colour: >25%; black colour: >50% probability of spawning.


2004
2005
2006
40°
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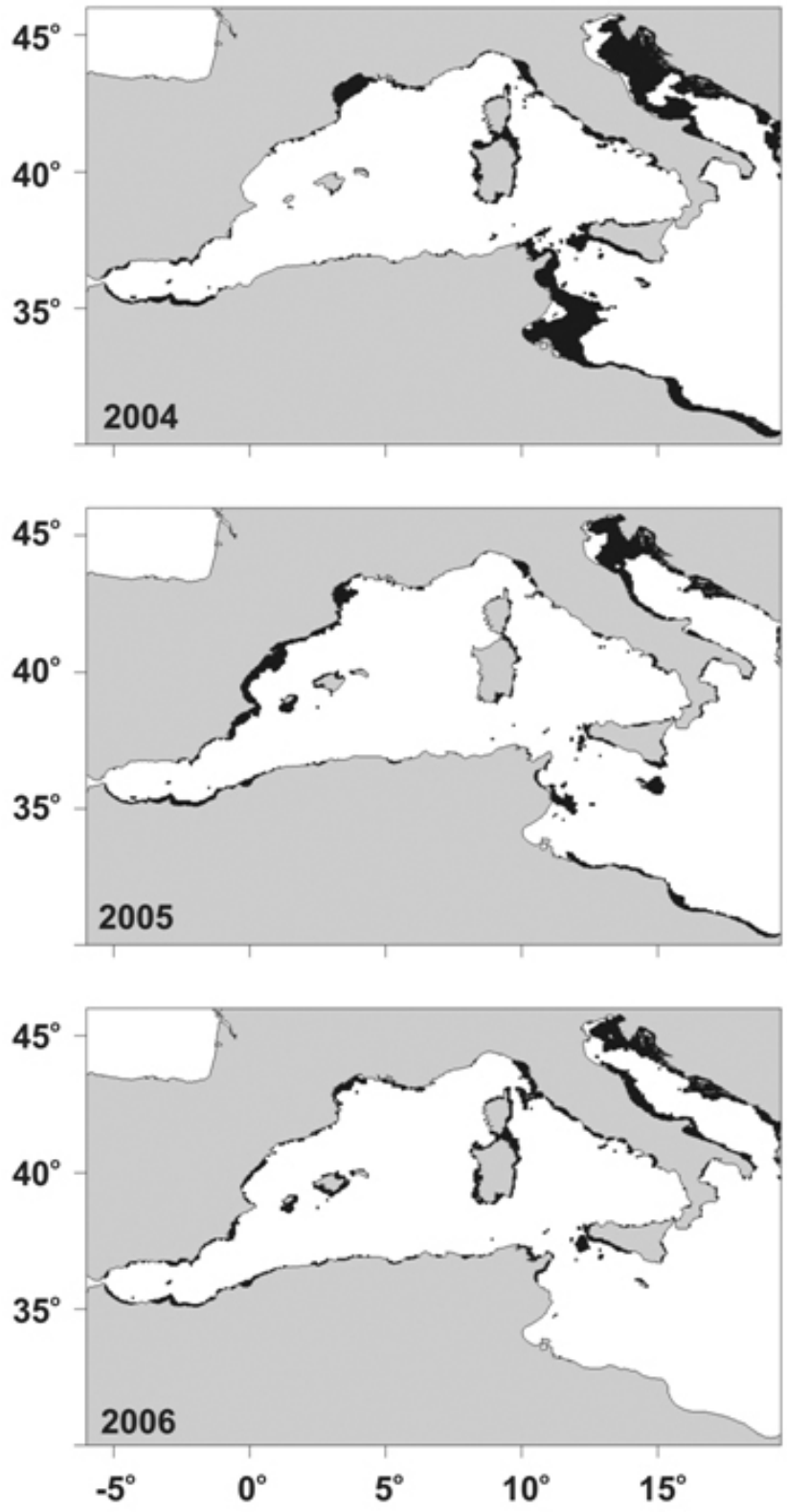
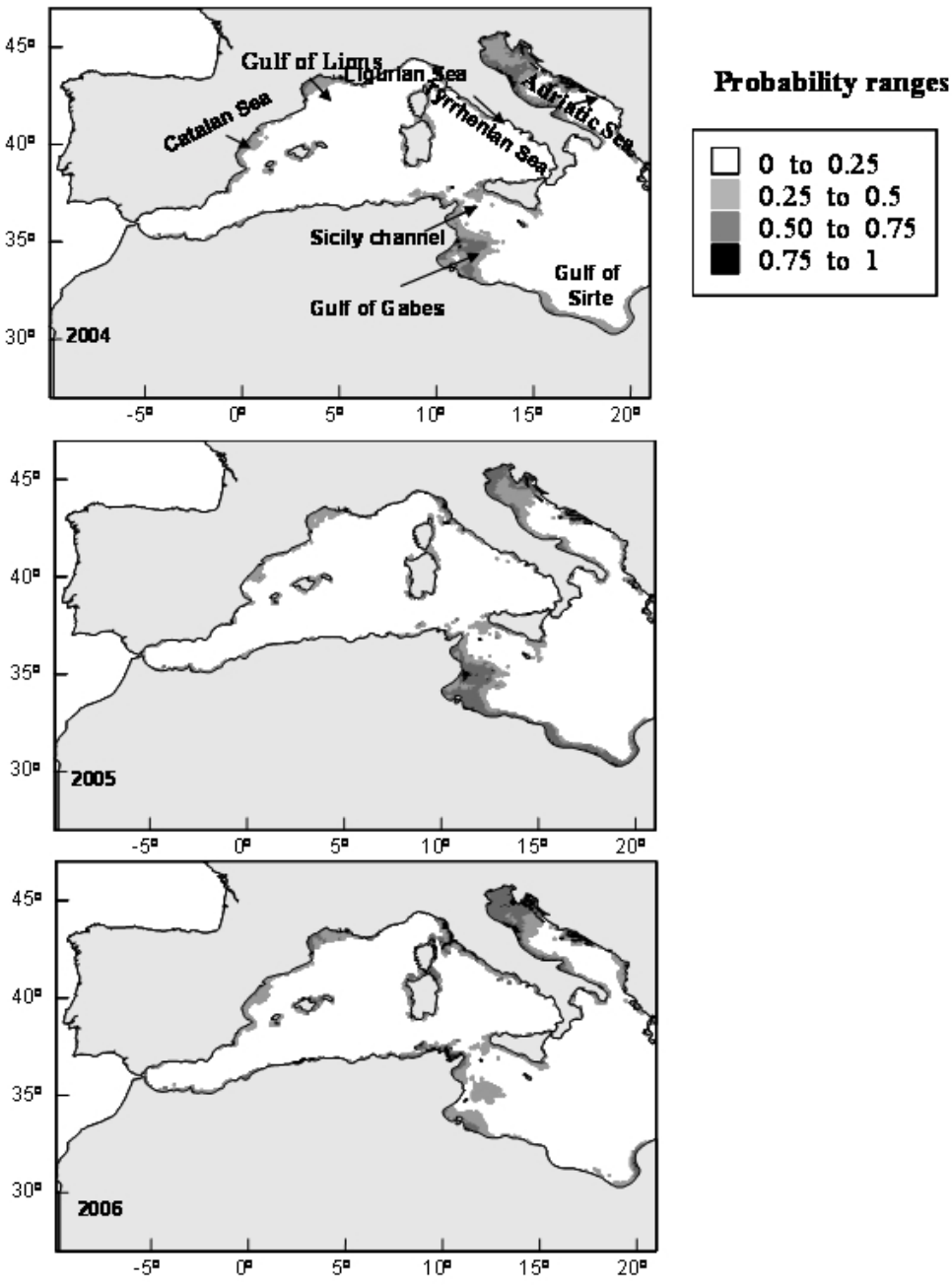
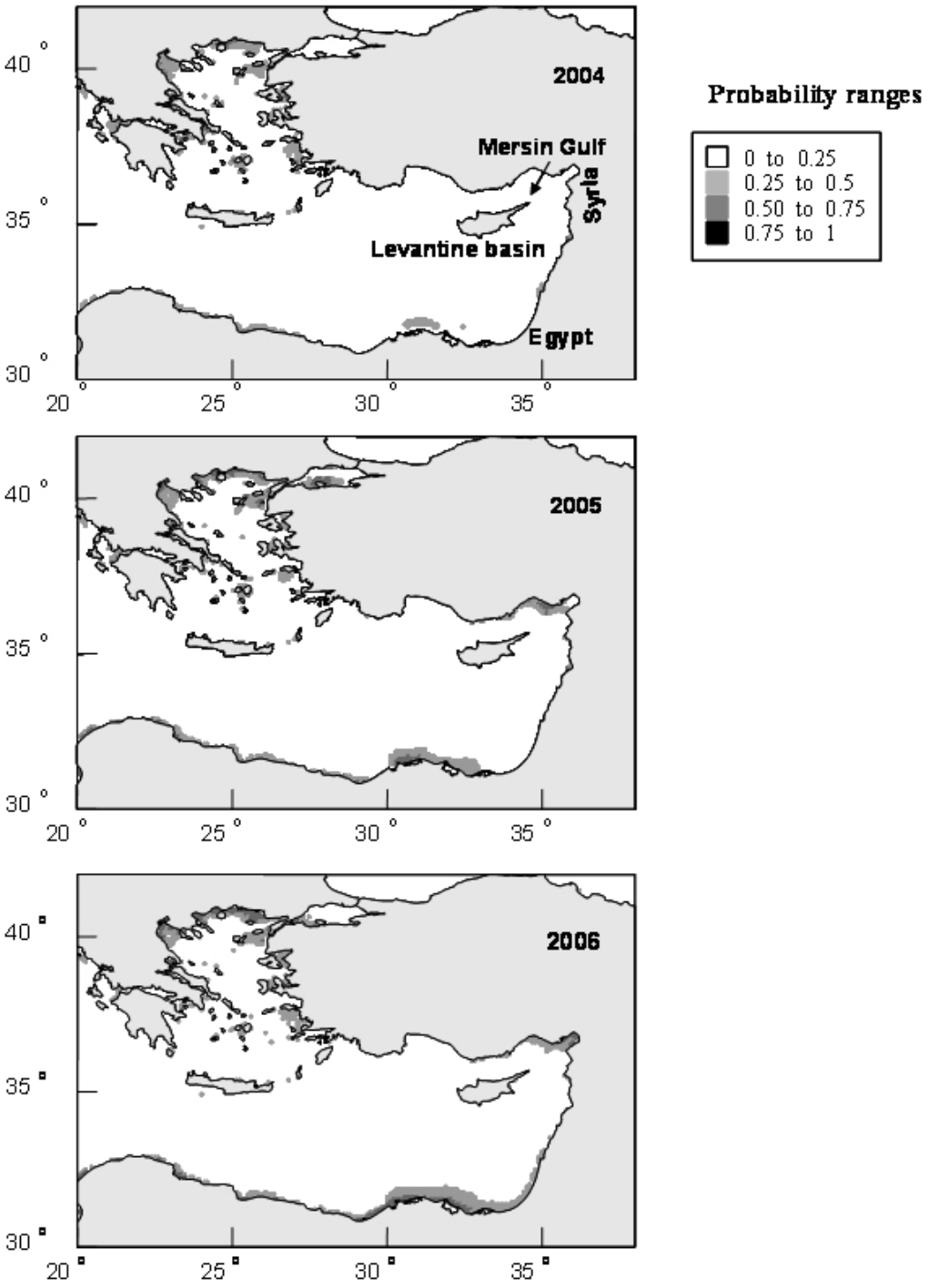
35°

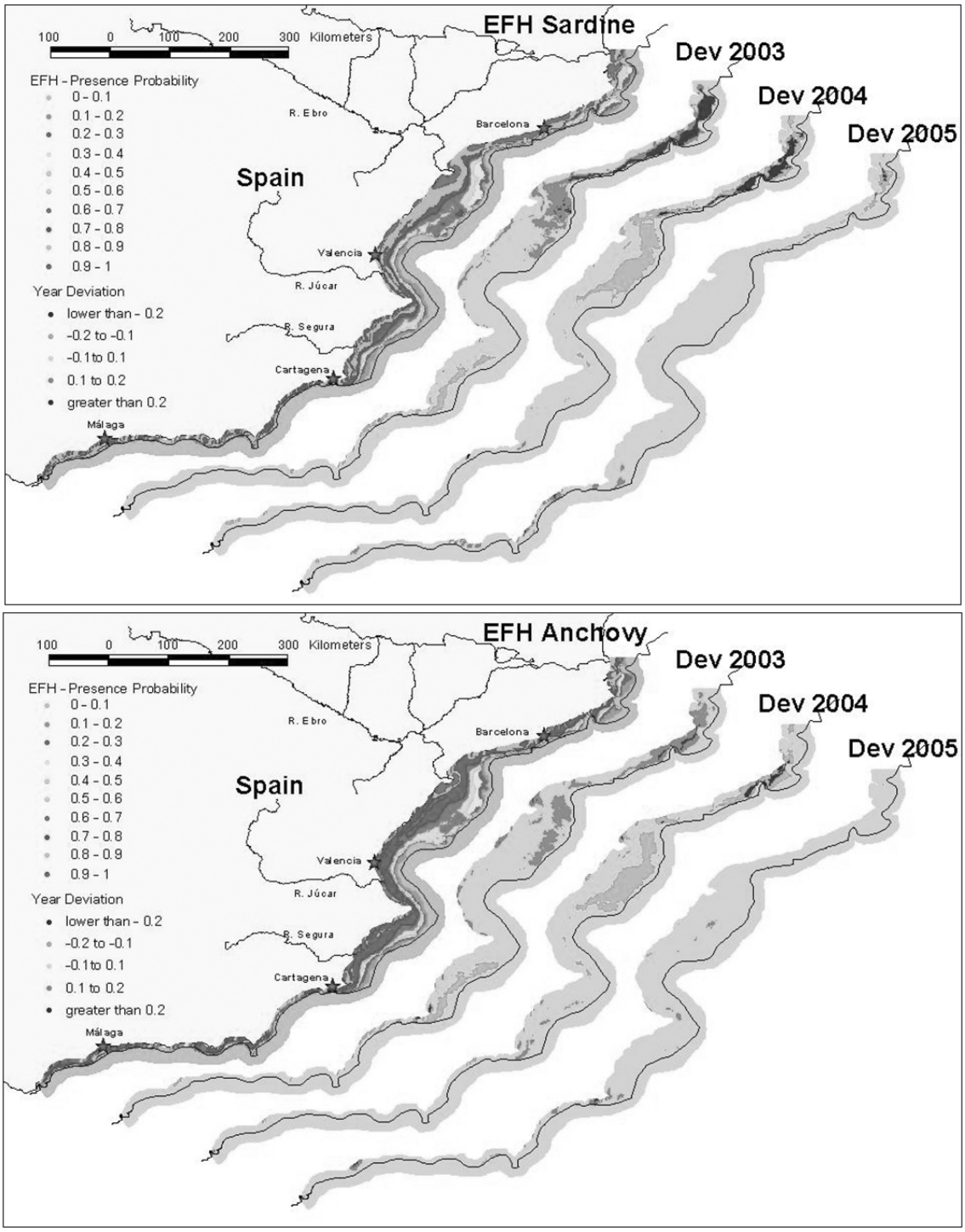


Geographic distribution of regions post-classified as “juvenile” sardine areas (*Sardina pilchardus*) by applying the Discriminant Function Analysis for a grid of spots within the Eastern (top) and Western (bottom) Mediterranean Sea, for June 2004-2006.

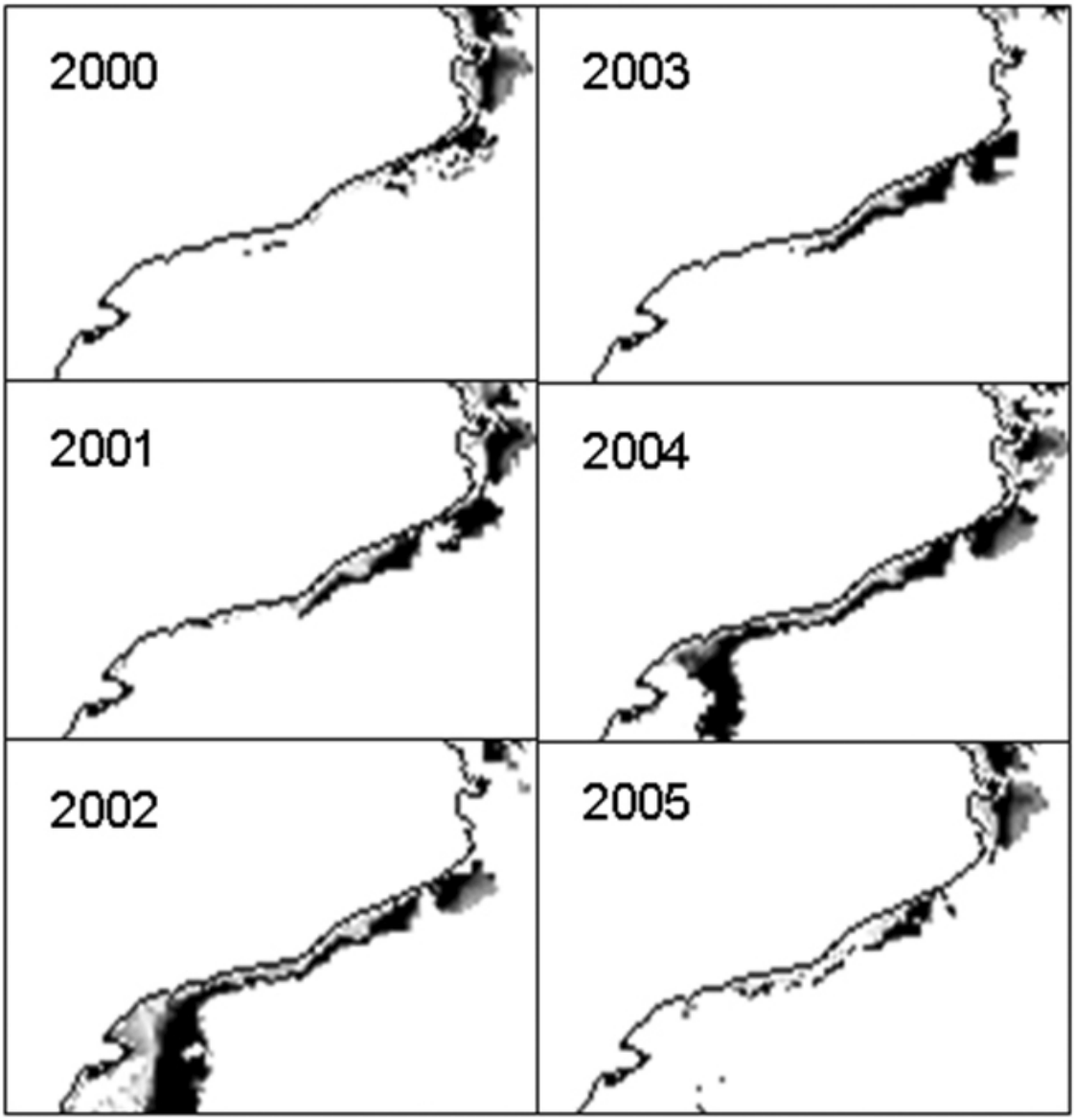

Gulf of Lions
Ligurian Sea
Tyrrhenian Sea
Adriatic Sea
Catalan Sea
Sicily channel
Gulf of Gabes
Gulf of Sirte
2004
2005
2006
45°
40°
35°
30°
-5°
0°
5°
10°
15°
20°
Probability ranges
0 to 0.25
0.25 to 0.5
0.50 to 0.75
0.75 to 1



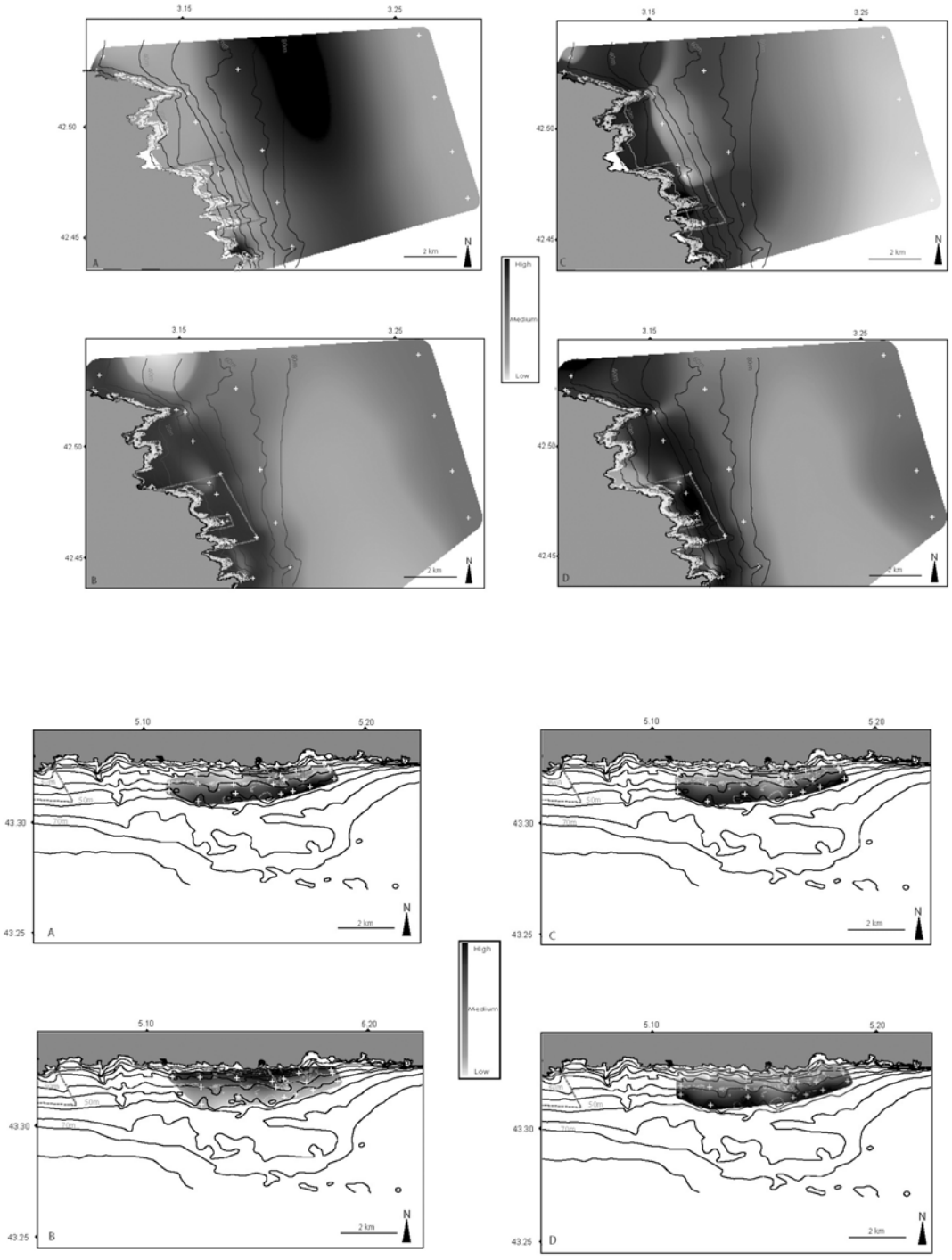
Western (top) and Eastern (bottom) Mediterranean Sea: Map of the probability for anchovy (*Engraulis encrasicolus*) potential presence based on GAM model from Aegean Sea. GIS resolution used for prediction was 4 km of mean monthly satellite values from June 2004, 2005 and 2006.



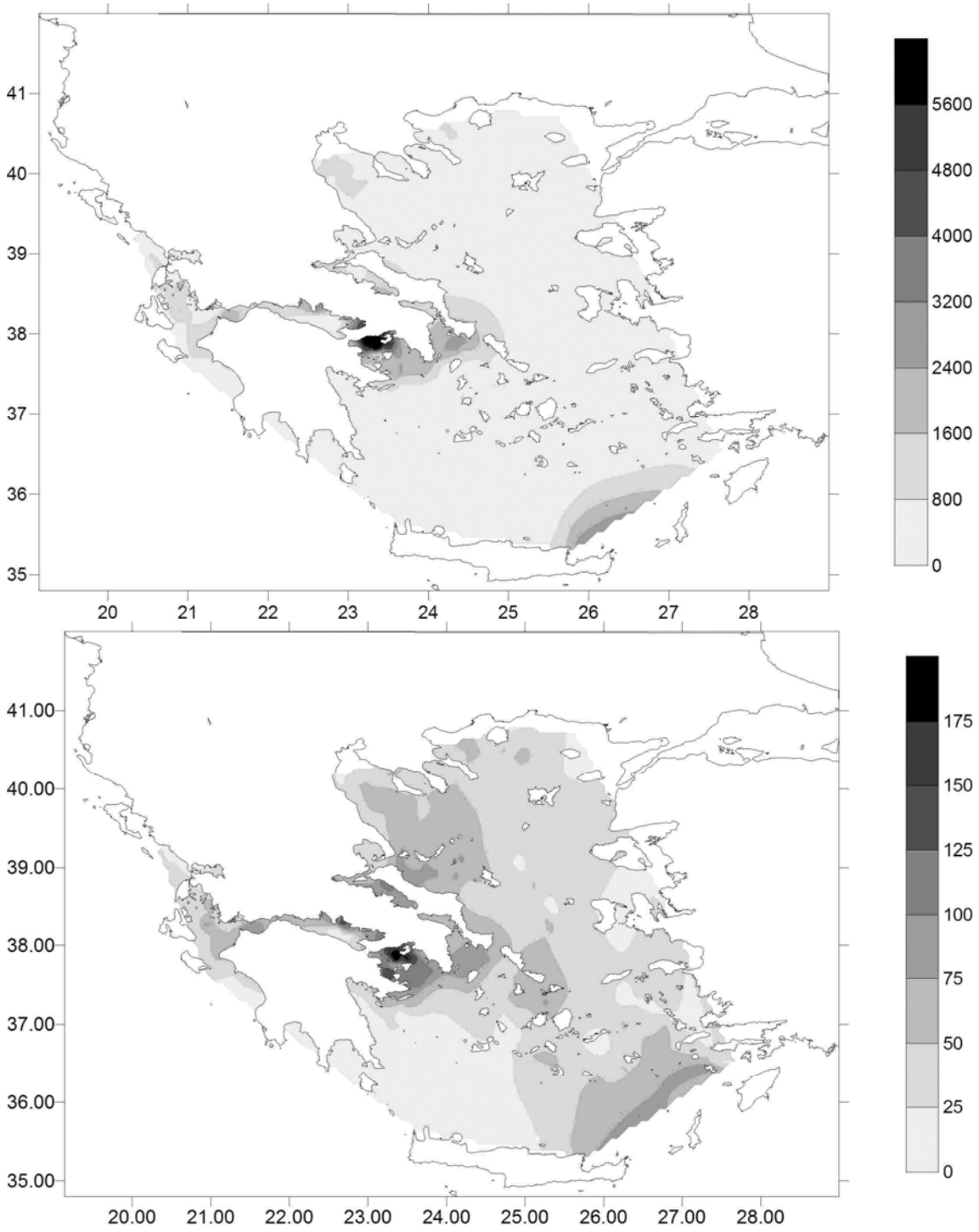
Spanish Mediterranean waters: EFH maps showing the predicted probability of presence of sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) and inter-annual deviation from the general EFH model.



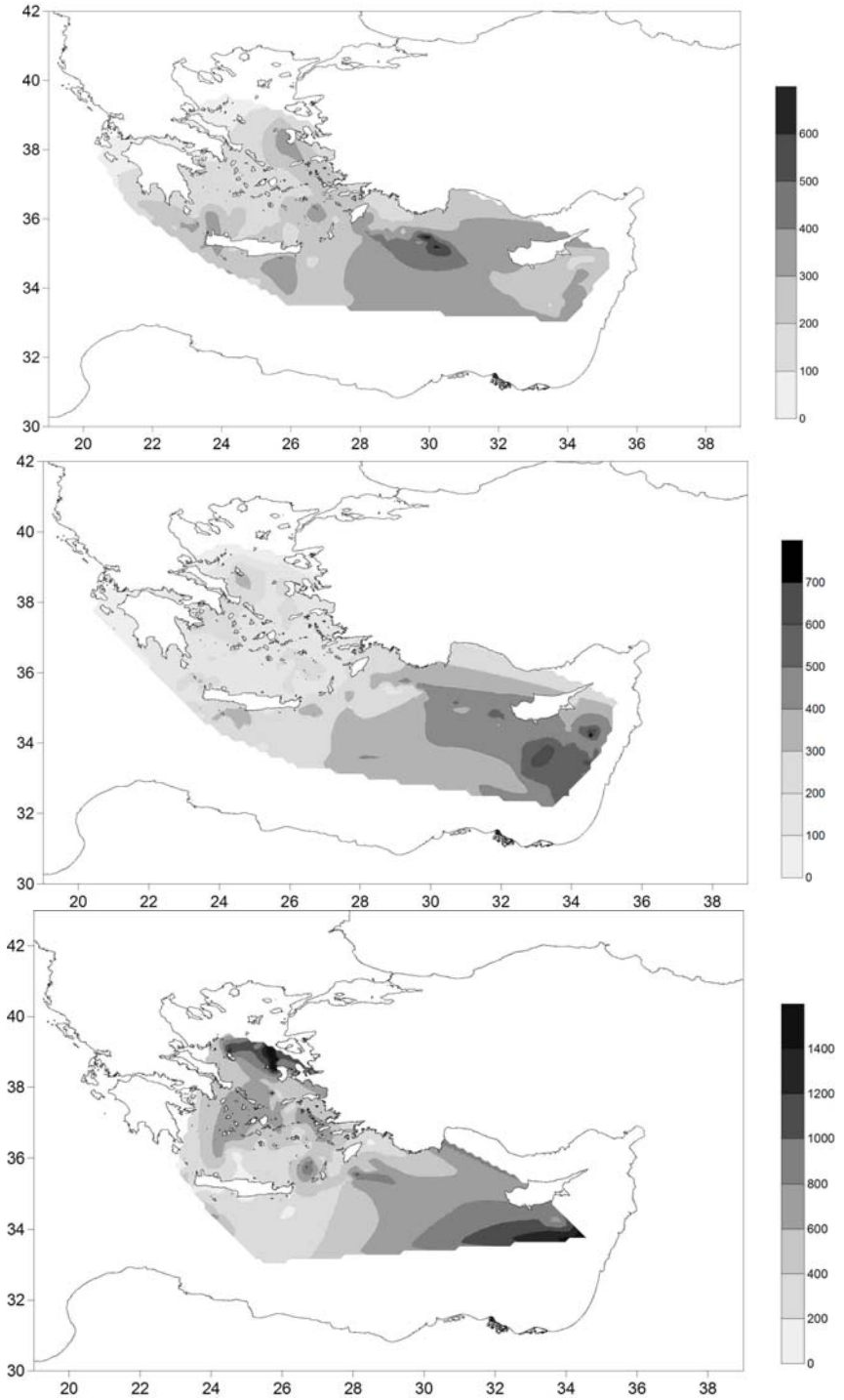
Spanish Mediterranean waters: GIS-based EFH maps of paralarvae *Loligo vulgaris* in Catalan coast (NW Mediterranean) in May 2000-2005.



Suitable Habitats in Marine Reserve of Cerbère-Banyuls (top) and in “Côte Bleue” Marine Park (bottom) for Sparid larvae and Scorpaenids larvae.



Map of the juvenile (top) and total (bottom) hake distribution (*Merluccius merluccius*). Abundance is expressed in terms of n/km^2.



Eastern Mediterranean: Maps of swordfish (*Xiphias gladius*) distribution during the peak spawning period (top), during the migration period (middle), and during the winter feeding period (bottom). Abundance is expressed in terms kg/1000 hooks.

D8 and D13 (EFH Designation Tool)

The EnviEFH Designation Tool will be developed on a 4-fold approach. Targeting different potential user groups of this tool, developments include one off-line ArcGIS-based tool for testing purposes and three stand-alone applications based on ArcServer (on-line, web-based tool), ArcView (for ESRI ArcView users, see also activity report) and MapObjects (runtime application without a specific software required by the user). Currently the later 3 tools are merged into one JAVA multi-platform tool available for downloading through the EnviEFH website. The user interface of the ArcGIS-based testing tool was presented at the EnviEFH kick-off meeting and it is shown in Fig. D8. This tool is a customization of an ArcInfo environment based on Arc Macro Language (AML) menus and corresponding routines. The user interface consists the user communication mean with the corresponding EnviEFH GIS database.

Fig. D8-13a. The main user interface of the ArcInfo-based testing tool that provides the user communication mean with the EnviEFH GIS database.

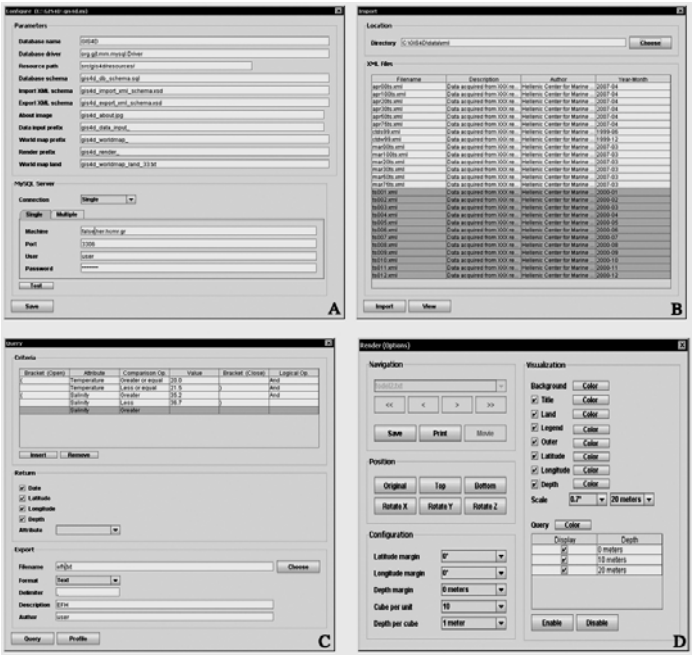


Fig. D8-13b. Fig. 2. The four main user interface menus of the JAVA tool: Configuration of single or multiple data servers (A), import of multiple XML-formatted data files (B), 3D query with multiple variables and range values of interest (C), and rendering-visualization capabilities (D).

3. Use and dissemination of knowledge

Publications resulting from the project:

Several publications are in preparation among project participants targeting related conferences. EnviEFH participants organised the production of a special issue of *Hydrobiologia* that will be circulated during autumn 2008. The Table of Contents of this special issue is listed in the next page.

Web-based activities:

The establishment of EnviEFH dedicated Internet website is online since January 2006 and it is continually updated and enriched with new information derived by the project. The website is available at: arch.her.hcmr.gr/enviefh

Contacts with potential users outside the consortium:

Project participants communicated with research scientists outside the consortium for ideas and data exchange and processing of related data. Specifically, Alex Brown and Jose Bellido provided small pelagic acoustic data from Western Mediterranean through a MSc project.

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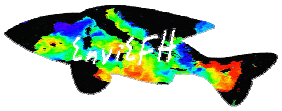
Special Issue *Hydrobiologia*: Essential Fish Habitat Mapping in the Mediterranean and Adjacent Seas
(to be published by Spriger-Verlag, late summer)

FINAL PLAN FOR USING AND DISSEMINATING KNOWLEDGE



Abstract

One of the key areas of EnviEFH is disseminating knowledge. In order for the project to be successful, it is important to proactively raise awareness about providing interconnection facilities in the Mediterranean European countries among the various stakeholders, e.g. governments, fisheries scientists, fisheries organisations and the general public.

The Final Plan for Using and Disseminating Knowledge will summarise the dissemination activities planned by the EnviEFH participants during the project. The deliverable consists of three iterations: the current version is a communication strategy and a working dissemination guide for all EnviEFH participants. A second version will be produced at month 12 of the project and will contain an overview of the dissemination activities carried out in the first 12 months of the project as well as plans for the remaining project period. The third final version will be produced at the end of the project (month 24) and will provide a summary of what was achieved during the project with regard to dissemination.

The EnviEFH Action and the EC SSP Priority

The main objective of the EnviEFH Project is to facilitate the spatial component of fisheries management by applying an environmental approach to the mapping and designation of Essential Fish Habitats in the Mediterranean Sea. The specific objectives are as follows:

- To collate existing datasets for the development of an Essential Fish Habitat Designation Tool
- To map the distribution of ocean production processes
- To introduce species life history data to the description of environment-species interactions
- To validate and disseminate project research results to fisheries managers and scientists as well as to coastal fishing communities through the Internet, hardcopy habitat maps and stakeholder workshops

The objectives of the EnviEFH project target the responsible and sustainable fisheries activities that contribute to healthy marine ecosystems by allowing the growth of an economically viable and competitive fisheries industry. EnviEFH objectives are related to SSP Priority objectives and the CFP in 3 main ways:

- Use new concepts in fisheries management (those based on the ecosystem approach)
- Make extensive use of new scientific developments (GIS and Remote Sensing)
- Enhance technical measures (as described by the revised Common Fisheries Policy)

The EnviEFH Consortium

Main Participants:

►Hellenic Centre for Marine Research (HCMR), Institute of Marine Biological Resources (IMBR)
Crete/Athens, Greece

►Consejo Superior de Investigaciones Cientificas (CSIC), Instituto de Ciencias del Mar (ICM)
Barcelona, Spain

►Centre National de la Recherche Scientifique (CNRS), Laboratoire d'Ecologie Aquatique Tropicale et Mediterraneenne (EPHE)
Perpignan, France

►University of Aberdeen (UNIABDN), School of Biological Sciences
Aberdeen, United Kingdom

Subcontractors:

►GIS Posidonie (NGO), Perpignan, France

►Highland Statistics, Ltd, Aberdeen, United Kingdom

Contributors:

►National fishing communities and fishers, government fisheries managers and fisheries scientists

The integration of important knowledge from local fishing communities and fishers, divers, managers and scientists will be assembled and used as input in EnviEFH final deliverables and products through the organization of stakeholder workshops at national level (Hellenic, Spanish and French).

INTRODUCTION

The EnviEFH project builds on the results and associated datasets of previous EC-funded projects and initiatives (e.g. MEDITS, DISCARDS, NATURA 2000) as well as on associated datasets produced from national fisheries surveys and biological data monitoring systems. Under the ecosystem approach to the management of marine living resources, EnviEFH aims to combine results and datasets with a variety of environmental data and derived ocean processes in order to produce Essential Fish Habitat (EFH) maps for several commercially important species of the Mediterranean.

Disseminating knowledge and results is a crucial part of a project like EnviEFH, as in order to be successful it is important to raise awareness about the objectives, the scientific works and results of the project and attract interest and important input from various scientific communities, vendors and governments.

The main importance of disseminating knowledge in the EnviEFH action is to comfort the revision of the Common Fisheries Policy (CFP) and to bridge the gap between revised CFP objectives and the targeted audiences, including national governments and local fishing communities.

AUDIENCES AND MESSAGES

The targeted audiences for the dissemination of EnviEFH output are of three main categories:

- ► Governmental fisheries authorities
- ► Local fishing communities
- ► The general public with an emphasis to elementary school children

This 3-fold knowledge dissemination approach will function on a ‘give-and-take’ basis. Draft EnviEFH results will be presented and discussed with national fishing communities in order to assemble, organize and introduce local empirical knowledge to the project’s final scientific works. Ultimately, all receptors of the final EnviEFH products will have access to integrated species-specific habitat maps that will be produced based on both scientific and empirical knowledge. Finally, the dissemination of knowledge to the general public and young children in particular, will put the first seed of what the new generation has to expect regarding the state of marine environment and its resources as well as to familiarize themselves with current ways to improving marine resources management. General messages include the underline of the importance of spatiotemporal component of fisheries management to governmental fisheries authorities and local fishing communities as well as the familiarization of the general public with the interlinked relations among the marine environment and its living resources.

PUBLICITY MATERIAL

The publicity materials for the dissemination of EnviEFH products will include:

- ► Essential Fish Habitat (EFH) maps
- ► Ocean processes maps
- ► EFH designation GIS tool manual
- ► Dedicated internet node
- ► EnviEFH leaflet
- ► Scientific publications

Map and tool products will be disseminated towards the middle and end of the project (around months 12 and 24). Specifically, governmental fisheries authorities and local fishing communities will receive map and tool products twice (draft and final versions). The EnviEFH leaflet will be widely distributed through the website and direct mailing

immediately after its finalization during the first meeting of the project (March 13-15, 2006). The EnviEFH website is located at: http://arch.her.hcmr.gr/enviefh/ since January 2006 and it is updated regularly with new material as it becomes available. Scientific output of the project will be organized during the first participant meeting and it will include publications on referred journals, conference proceedings as well as production of a special scientific volume.

OTHER DISSEMINATION ACTIVITIES

An important dissemination activity targeting the general public and elementary school children, in particular, is the production of a short (15-20 minutes) documentary movie based on general knowledge and EnviEFH output.

- ► Production of short documentary movie
- ► Dissemination to marine aquaria and TV stations

Specifically, this movie will present in a friendly way the major dynamic mechanisms of marine ecosystem functioning and their effect in marine population dynamics. The title of the movie is planned to be 'The Geography of the Sea and the Geography of Fish'. The movie will include several animated images of satellite data that will explain the dynamics of marine environment and several animated EnviEFH output. Animations and related audiovisual material will target elementary school children while they will be presented by elementary school children. The movie will be translated into major European languages and it will be disseminated to marine aquaria and national TV stations. For example, the new marine aquarium established in Iraklion Crete, Greece (CretAquarium) will be used for both the production and dissemination of the short documentary movie.

CONCLUSION

Dissemination activities of the EnviEFH products include a variety of approaches while the target dissemination audiences are multifaceted. As of month 3 of the project, the EnviEFH website is online since the beginning of January 2006 (Fig. 1) while a draft version of EnviEFH leaflet has been circulated among participants, it will be finalized during the first meeting and it will be disseminated around late March 2006 to governmental fisheries authorities and local fishing communities.

Annexes

Annex 1 – Summaries and main conclusions of the General Meetings

HCMR/IMBR<->CSIC/ICM<->CNRS/EPHE<->UNIABDN<->GIS Posidonie<->Highland Statistics
GR SP FR UK FR UK

MEETING REPORT

EnviEFH 1st Participant Working Meeting

Iraklion Crete, Greece, March 13 -15, 2006

Working Meeting Agenda

15-20' Coffee Discussions: 11:00 and 16:00 – Lunch Breaks: 13:00-15:00 – Dinners: 20:30

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Monday March 13

Project Presentation 9:30..
Study Sites
Data/Methods ..13:00
Intro to the project, presentation of each site
with initial reference on data/methods/species
that are planned to be mapped
Deliverables 15:00..
Finalization of D1-D4
Discussion on D5-D6 ..18:00
Intro to deliverables, assembly of material for
D1-D4 draft reports, presentation of D5-D6

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Tuesday March 14

Demersals 9:30..
Small Pelagics
Large Pelagics
Crustaceans
Cephalopods ..13:00
Detailed discussion on which species, which life stages and how will they be mapped for each study site (also, inclusion of existing data/maps, works already completed, etc). Already prepared EFH maps to be presented.
EFH Maps 15:00..
EnviEFH Tool, Stakeholder Meetings ..18:00, Finalization of the number of maps that will be produced per species/site, map format. Intro to EnviEFH tool, national stakeholder input

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Wednesday March 15

Dissemination 9:30..
Meeting Synthesis
Next Meeting ..13:00
Discussion on dissemination material, exchange of data (fisheries/environmental), organisation of project's e-mail list. We could use the rest of the day if the 2.5 days are not enough.

Meeting Participant List
~~~~~~

No	NAME1	NAME2	EMAIL	ORGANIZATION	
1	Snorri-Runar	Palmason	Snorri-Runar.PALMASON@cec.eu.int	DG	FISH
2	Jose-Perez	Mauriz	Jose.PEREZ-Y-MAURIZ@cec.eu.int	DG	FISH
3	Romain	Crechriou	crecrom@univ-perp.fr	CNRS/EPHE,	FR
4	Patrick	Bonhomme	bonhomme@com.univ-mrs.fr	GIS Posidonie	FR
5	Paloma	Martin	paloma@cmima.csic.es	CSIC/ICM,	SP
6	Pilar	Sanchez	pilar@icm.csic.es	CSIC/ICM,	SP
7	Graham	Pierce	g.j.pierce@abdn.ac.uk	UNIABDN,	UK
8	Jianjun	Wang	nhi791@abdn.ac.uk	UNIABDN,	UK
9	Jennifer	Smith	jennifer.smith@abdn.ac.uk	UNIABDN,	UK
10	Chrissi-Yianna	Politou	c-y@ath.hcmr.gr	HCMR/IMBR,	GR
11	Apostolos	Siapatis	siapatis@ath.hcmr.gr	HCMR/IMBR,	GR
12	John	Dokos	gdokos@ath.hcmr.gr	HCMR/IMBR,	GR
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17	Costas	Papakonstantinou	pap@ath.hcmr.gr	HCMR/IMBR,	GR
18	Vasilis	Valavanis	vasilis@her.hcmr.gr	HCMR/IMBR,	GR
19	Andreas	Palialexis	andreaspal@pathfinder.gr	MSc	Student
20	Isidora	Katara	isidora10@yahoo.com	MSc	Student

Meeting Minutes

The kick-off meeting of EnviEFH was organized in Iraklion Crete, Greece during March 13-15, 2006. A total number of 20 scientists and students participated from the EnviEFH consortium and DG-FISH. The overall objectives of the meeting were: a) to present the environmental approach to essential fish habitat (EFH) designation and discuss/agree to common EFH mapping methodologies, b) to discuss/finalize a number of deliverables, and c) to discuss the stakeholder approach and dissemination products (Fig. 1).

During the first day of the meeting, the overall presentation of EnviEFH project was carried out by V. Valavanis (HCMR-Greece, Project coordinator) in order to disseminate the specific objectives of the project to meeting participants, summarize the work carried out by the EnviEFH consortium during the first 3 months of the project and present the Hellenic study sites. The following 2 presentations were carried out by P. Sanchez and P. Martin (CSIC/ICM, Spain) who disseminated the available biological data and presented the Spanish site. Similarly, the following 2 presentations were carried out by R. Crechriou (CNRS/EPHE, France) and P. Bonhomme (GIS Posidonie, France) who disseminated the available biological data and presented the French sites. The set of the above presentations provided a clear picture of the variety among study sites (coastal, continental shelves and offshore), the addressed species and their life stages as well as the associated datasets. Discussions included the finalization of D1 (EnviEFH website), D2 (EnviEFH Project Leaflet) and D03 (Inventory of relevant data sources) where a comprehensive table of species, life stages and associated data for each study site was assembled and completed. Specifically on the Hellenic study sites, it was mentioned that EFH maps will be produced for each study site separately as well as the Hellenic Seas as a whole, depending on the data spatial extent for some species.

The following 2 presentations were carried out by the EnviEFH Scientific EC Officer S.-R. Palmason (DG FISH) and the EnviEFH Financing EC Officer J.-P. Mauriz (DG FISH), who disseminated to the consortium the detailed EC approach to Scientific Support to Polices and their financial requirements. EC Officers provided a clear picture of EC's Specific Support Actions and their financial management that will greatly help and direct EnviEFH work

throughout the duration of the project. Discussions included the identification of differences between previous FP and FP6- SSP in the organization of scientific, management and financing regimes. During the second day of the meeting, 2 presentations were carried out by C.-Y. Politou (HCMR, Greece) and A. Siapatis (HCMR, Greece) who disseminated the biological data and associated maps for a number of species and life stages in the Hellenic study sites. A following presentation by A. Kapantagakis (HCMR, Greece) disseminated the Hellenic fisheries data collection system that will be used towards the stakeholder approach. Another 2 presentations by G. Pierce and J. Wang (UNIABDN, UK) disseminated methodologies and data requirements for the mapping of spawning grounds and ocean processes. Discussions included the finalization of common methodologies for species- and life stage-specific EFH mapping. The consortium agreed to exchange spatial attributes of surveyed biological data as well as corresponding environmental data for all study sites. The consortium underlined that within this unique approach, a wide data exploration among study sites will be ensured while allowing important comparisons of habitats occupied by the same species in distant study sites within Mediterranean. The following discussion included the architecture of the EFH Tool (D8), which will be a user-friendly GIS application to a variety of users. The consortium underlined the variety of user needs and decided to develop a 3-fold approach towards the implementation of the EFH Tool. The 3-fold approach includes the development of an ESRI ArcView-based tool (J. Wang, UNIABDN), a Map Objects-based tool (J. Dokos, HCMR-Greece) and a web-based tool (Y. Cosmopoulou, HCMR-Greece). These set of tools will feature similar capabilities and will include several environmental data and several EFH environmental descriptors and provide the ability to users to create EFH maps through web-based and stand-alone applications. HCMR plans to link these tools to other developed fisheries management-aid tools through HCMR's database development and support personnel headed by S. Kavadas (HCMR, Greece). The meeting work was concluded with a discussion on the D4 (final dissemination plan) as well as on the stakeholders approach at national level. Fishermen organizations will be approached through a variety of methods including workshop meetings, questionnaires and established fisheries sampling networks. The aim of the stakeholders approach is to assemble and use as much of local knowledge as possible concerning sensitive species habitats and any known changes to these habitats. The consortium will show to fishermen draft EFH and ocean processes maps in order to follow a give-and-take approach. Finally, the consortium will use a variety of dissemination means including joined scientific publications in related scientific journals in the form of special issues as well as the development of a short 15' documentary movie entitled 'The Geography of the Sea and the Geography of Fish'. The Director of HCMR's Institute of Marine Biological Resources, Dr. C. Papaconstantinou will present initial results for anchovy EFH mapping in North Aegean Sea to the 136th Annual Meeting of the American Fisheries Society (Sep. 10-14, Lake Placid, NY, USA) (Giannoulaki *et al*. 2006). The overall outcome of the meeting was highly productive. All participants contributed to the project in a highly positive atmosphere that created the appropriate ground for collaborative work. As needs arise, the consortium agreed to future short meetings among small teams dealing with similar tasks. Finally, the EnviEFH consortium attended an organised visit to Knossos and the Iraklion Archaeological Museum during the third day of the meeting.

Reference:

Giannoulaki M, Machias A, Valavanis V, Somarakis S, Papaconstantinou C (2006). Estimating the potential habitat of the European anchovy in the Eastern Mediterranean basin using GIS. Proceedings of the 136th Annual Meeting of the American Fisheries Society: Fish in the Balance, Sep. 10-14, 2006, Lake Placid, NY.

Working Meeting on Methodology

Barcelona, 12-15 May 2006

CSIC- Instituto de Ciencias del Mar
The meeting focused on the use of GAMs and agreement among partners on the criteria to consider when using GAMs. First results allowed a preliminary characterization of anchovy and hake spawning areas, for eggs and larvae separately. Input data for the response variables were presence/absence data.
Maps were produced on other potential spawning areas, by expanding the selected environmental ranges to other western Mediterranean areas. Maps were done using the routine for the final EFH mapping design by HCMR.
Further analyses regarding anchovy and hake spawning areas will be performed. All available data dealing with each case study will be pooled (data collected at the beginning of spawning, during the peak, and at the end of spawning, when possible).
Thus, the possibility to define the conditions, not only during the peak of spawning (the most favourable ones), but also those triggering spawning, and at the end of spawning, will be tested. The environmental ranges defining each EFH will be mapped against the conditions in different years, so as to determine the extension of a given EFH accordingly.
Other case studies envisaged relate to experimental bottom trawl surveys, and the analysis of monthly landings series along the Catalan Coast, by species and port. The environmental database included monthly and weekly satellite data, and other surveyed environmental data.

Data used in the analyses were as followed:
LLUCET survey- autumn 1998 to summer 1999.
Study area: Catalan coast
CTD data: temp, salinity, density (sigma-t), fluorescence
Other data: monthly temp, chlorophyll, and salinity; weekly temp, sea level anomaly, chlorophyll, photosynthetically active radiation.
Response variable: number of hake eggs; number of hake larvae
Project: EC Contract FAIR CT-97-3522.
"Impact of fishery and environment on hake recruitment in the Northwestern Mediterranean".
ARO survey- June 2000
Study area: Southern of Gulf of Lions to Central Catalan Coast.
CTD data: temp, salinity, density (sigma-t), fluorescence
Other data: weekly temp, sea level anomalies, chlorophyll, salinity
Response variable: number of anchovy eggs; number of anchovy larvae
Project: CICYT (MAR99-1202). "Estudio de la adveccion de aguas del Rodano hacia la costa Catalana a finales de primavera y sus implicaciones en el transporte de larvas de anchoa y comunidades planctonicas asociadas (2000-2001)".
MPHMED survey- July 1993
Study area: western Mediterranean (Gulf of Valence and Gulf of Lions) and Ligurian Sea
CTD data: surface (5m depth)- temp, salinity, fluorescence
Other data: monthly temp and salinity; weekly temp, sea level anomaly
Response variable: number of anchovy eggs
Project: EC DG XIV. Fisheries. Research Contract n MA 3730 (1992-1994). "Northwestern Mediterranean Anchovy : Distribution, Biology, fisheries and biomass estimation by different methods".

15-20' Coffee Discussions: 11:00 and 16:00 – Lunch Breaks: 13:00-15:00 – Dinners: 20:30

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Wednesday May 09

Statistical Consulting	10:00.. ..13:00	Testing of existing methods in EFH mapping as well as presentation of recent new methods, analysis of real data

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Thursday May 10

Project Progress	9:30.. ..13:00	Overall progress of the project, presentation of works for each site/species with reference on data and methods
Deliverables	15:00.. ..18:00	Deliverables presentations and current status of their development

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Friday May 11

Stakeholder Input EFH Tools	9:30.. ..13:00	Types of stakeholder input and presentation of EFH Tools
Dissemination	15:00.. ..18:00	Discussion on planned publications per participant as well as organisation of joined publications, special issue.

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Venue: **Galaxy Hotel** (http://www.galaxy-hotel.com.gr/)

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Meeting Participant List Meeting Minutes

No	NAME	EMAIL	ORGANIZATION
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1	Romain Crechriou	crecrom@univ-perp.fr	CNRS/EPHE, FR
2	Paloma Martin	paloma@cmima.csic.es	CSIC/ICM, SP
3	Pilar Sanchez	pilar@icm.csic.es	CSIC/ICM, SP
4	Graham Pierce	g.j.pierce@abdn.ac.uk	UNIABDN, UK
5	Jianjun Wang	nhi791@abdn.ac.uk	UNIABDN, UK
6	Jennifer Smith	jennifer.smith@abdn.ac.uk	PhD Candidate
7	Chrissi-Yianna Politou	c-y@ath.hcmr.gr	HCMR/IMBR, GR
8	Eugenia Lefkaditou	teuthis@ath.hcmr.gr	HCMR/IMBR, GR
9	George Tserpes	gtserpes@her.hcmr.gr	HCMR/IMBR, GR
10	Nota Peristeraki	notap@her.hcmr.gr	HCMR/IMBR, GR
11	Apostolos Siapatis	siapatis@ath.hcmr.gr	HCMR/IMBR, GR
12	John Dokos	gdokos@ath.hcmr.gr	HCMR/IMBR, GR
13	Athanasios Machias	amachias@her.hcmr.gr	HCMR/IMBR, GR
14	Marianna Giannoulaki	marianna@her.hcmr.gr	HCMR/IMBR, GR
15	Andreas Palialexis	andreaspal@pathfinder.gr	PhD Candidate
16	Alain Zuur	highstat@highstat.com	Highland Statistics Ltd, UK
17	Vasilis Valavanis	vasilis@her.hcmr.gr	HCMR/IMBR, GR

Meeting Minutes

The EnviEFH 2nd plenary working meeting was a dynamic and productive meeting with all participants taking important part in the discussions, which clarified many different issues dealing with

data analysis and final products. Input and noting from G. Pierce was very important to the general outcome of the meeting while all participants' input and suggestions were focused and greatly helped the joint effort of producing results with integration of data and knowledge from different areas of the Mediterranean.

During May 9th, a consulting meeting was organised with Highland Statistics where testing of existing GAM (Generalized Additive Models) development was performed and new, recent GAMM (Generalized Additive Mixed Models) development were presented by Alain Zuur and discussed with EnviEFH Consortium.

During May 10th, a presentation of the current status of the project was presented by V. Valavanis as well as a short briefing was carried out on the status of the project's 1st-year reporting to the Commission. An official announcement of the production of the Special Issue of *Hydrobiologia* was introduced to all participants. Presentations and related discussion were made by all project participants. Specifically, R. Crechriou presented EFH maps for the French study sites (data and species life-stages included) and announced the production of 2 papers as contribution to the planned special issue. Also, a stakeholder meeting is planned with French fishermen organizations in September 2007. Following, P. Martin and P. Sanchez presented works for the Spanish study area with produced species EFH maps and mention that work on time-lagged effects needs to be completed. Additionally, C-Y. Politou, A. Siapatis, E. Lefkaditou and A. Palialexis presented works from the Greek study sites with included data, species life stages and EFH maps. Following, A. Palialexis explained the methods of using biological and environmental data on various species to extract species-preferred environmental ranges. A general discussion on the existing and recent methods on EFH mapping was carried out including issues such as using presence and/or abundance data as well as analysing biological-environmental data on a 2-stage GAMs/GAMMs (presence modelling, then abundance given presence) for a more detailed EFH maps production.

During May 11th, the general methods discussion re-initiated with issues on using bio-environmental data from multiple years (multiple models, pooled years, introduce 'year' effect in analysis and time as explanatory variable). Following, the discussion was focused on the choice of explanatory variables for demersal fish species (depth slope-aspect, slope variability, distance from coast, substrate types, latitude and longitude and surface oceanographic patterns). Also, time-lagged or teleconnected environmental effects were discussed, introducing spatial and temporal autocorrelation in data analysis. Following, biological validation methods for the model outputs (choice of validation datasets, observed/predicted comparisons and visual and statistical tests) were discussed. A. Palialexis presented a live R session using a real dataset and showed step-by-step programming routines using BRODGAR for GAMs before using R for GAMMs. J. Wang and J. Dokos presented the current developments for the ArcView-based and MapObject-based GIS EFH tools. A comprehensive discussion on the organisation of *Hydrobiologia* special issue was carried out and several joint publications were agreed among EnviEFH participants.

Concluding, the EnviEFH Consortium decided to enhance the existing GAM method with more recent data (2006 and 2007), test the recent-new GAMM method with latest data and organise a 3rd plenary meeting for the finalisation of the *Hydrobiologia* special issue. Thus, a 3-month extension to the project was decided and a related request was made to the Commission.

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Annex 3 – CD-ROM with the deliverables produced during the reporting period

CD-ROM is included in the reporting envelope
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B. MANAGEMENT REPORT (FINANCIAL INFORMATION)

1. Justification of the resources deployed

HCMR employed several employees through the EnviEFH project in order to develop the EFH map products, the EFH Designation Tool and part of the dissemination products included at the project's dissemination plan. In addition, HCMR acquired 3 computer units (2 desktop computers and 1 laptop computer) to carry out the project's work. Other expenses include costs for the organization of the EnviEFH kick-off and final meetings held in Heraklion Crete (GR), travels from Heraklion to Barcelona (SP) for a working group meeting and travels between Heraklion and Athens (GR) for national working group meetings. Other supported personnel include 10 HCMR scientists (fisheries biologists, physical and biological oceanographers, GIS experts, multimedia experts) and administrative personnel, many of which attended a number of related conferences.

CSIC/ICM participated in the EnviEFH meeting in Iraklion in May 2007. The objective of this meeting was a follow-up of the advances of each participant on the use of the previously agreed methodologies and the definition of the contents of the Hydrobiologia special issue. The tasks undertaken under WP2 include the preparation of the specific environmental and fishing data used in the articles submitted to the EnviEFH special issue. Environmental data were extracted from the database developed in the frame of the project, through an ad hoc protocol designed in ArcGIS 9.2, and also from other sources when necessary (river flow rates). Fishing Statistics of the Fishing Department of the Catalan Government were the data source for landings and fishing fleets. WP3 work focused on two species: squid and anchovy. A model was proposed for the definition of the potential Essential Fish Habitat (EFH) for squid paralarvae recruitment, based on the best environmental conditions, which consistent with the higher landings per unit of effort observed four months later. As for anchovy, the processes affecting species abundance at different life stages (conditions preceding reproduction, larvae growth and survival, recruits growth) were characterized. Research was also devoted to the characterization and mapping of EFH of different commercial species (e.g. hake and anchovy spawning areas; sardine and axillary seabream fishing grounds). Scientific publications: CSIC-ICM contributes to the Hydrobiologia special issue. Direct costs include labour costs and travel costs. The CSIC has provided the necessary infrastructure to develop the tasks foreseen in the project (indirect costs). Software and informatics consumables are considered indirect cost.

University of Aberdeen (ABDN) has been involved in four workpackages from the first month of the project, and contributed 19.51 person-months during the project period. During the first project year, Dr. Graham J. Pierce, Dr. Jianjun Wang and Ms. Jennifer M. Smith attended the 1st Co-ordination Meeting in Iraklion, Crete, Greece, (March 13-15, 2006). The team have been in regular contact with the project coordinator and participants regarding data acquisition and technical issues. The main tasks that have been carried out during the first year are data assembly, data processing, detecting oceanic circulation features based on remotely sensed SST data, designing and developing an ArcView-based EFH tool. We have also carried out some related fish habitat modelling work. The project team comprised Dr. Graham Pierce (Team leader), Dr. Jianjun Wang (PDRA), Ms. Jennifer M. Smith (PhD student), Dr Elena Mente (PDRA), Ms. Gema Hernandez (research assistant) and Dr. Alain Zuur (**Highland Statistics**, subcontractor). Additional work, not directly funded by the project, was contributed by: Dr. Colin MacLeod (PDRA), Dr. Ignacio Sobrino (Visiting Research Fellow), Dr. Jose Bellido (Honorary PDRA), Ms. Isidora Katara (PhD student), Mr. Alex Brown (Masters student), Ms. Mafalda Viana (Honorary research assistant). During the second project year, data processing and analysis continued and several manuscripts were prepared. Graham Pierce, Jianjun Wang and Jennifer Smith attended the second project co-ordination meeting in Hereklion in May 2007. Alain Zuur provided statistical advice to all partners and contributed to some of the publications.

CNRS (1 person) & **GIS Posidonie** (1 person, as sub-contractor of CNRS) were involved in participation to kick-off meeting of EnviEFH organized by partner 01 (HCMR/IMBR) in Iraklion Crete, Greece during March 13-15, 2006. The meeting involved 20 scientists and students participated from the EnviEFH consortium and DG-FISH. This leaded to the "MEETING REPORT of EnviEFH 1st Participant Working Meeting; Iraklion Crete, Greece, March 13 -15, 2006" (5 pp) sent to each contributor and put on EnviEFH web site. CNRS & GIS Posidonie were involved in preparation of local participant-stakeholder workshops at national and regional level at the beginning of the 2nd year of the project.

Those local participant-stakeholder workshops are made to present current works and gather local stakeholder knowledge from fishers, divers, local managers and scientists. Those one have been plan in February and March regarding French case-studies (2.5 person-month, including 0.5 not charged to ENVI-EFH project). The collation of existing data involved 16 person month, including 6 not charged to ENVI-EFH project. A 1st draft of analysis based on data from Western French Mediterranean Coast order have been realise by Jessica GARCIA in order to map species-preferred areas for spawning/nursing and feeding aggregations and identify species-environment interactions. This first draft, in French version, is in annexe 1 (see activity report). CNRS is in charge to prepare a 1st draft on a peer review paper concerning a first analysis based on data from Western French Mediterranean Coasts. This paper is “in preparation” for a submission in “Marine Biology” (2 person-month, including 2 not charged to ENVI-EFH project).

2. Forms C - Financial Statements

Form C - Model of Financial Statement per Activity (to be filled by each contractor)

Type of Instrument	Specific Support Action	**Type of Action** (if necessary)	N.A
Project Title (or Acronym)	EmsEFH	**Contract n°**	22486
Contractor's Legal Name	Hellenic Centre for Marine Research		
Legal Type	Other		
Contact Person	S. Kastrinakis	**Telephone**	+30 2810 337802
Telecopy	+30 2810 337822	**E-mail**	kastri@her.hcmr.gr
Cost model used (AC/FC or FCF)	FCF	**Indirect costs** (fixed or Flat Rate of 20% of Direct costs, except subcontracting)	Flat rate (up to 20% of direct costs, excluding subcontracting)
		Flat rate	20
Period from	1/12/2008	**To**	29/02/2008

1. Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No) — No

If Yes, please provide the following information

Third Party 1 (Y1) Legal Name		**Cost model used**	
Third Party 2 (Y2) Legal Name		**Cost model used**	
Third Party 3 (Y3) Legal Name		**Cost model used**	
Third Party 4 (Y4) Legal Name		**Cost model used**	

Add Third Party

2. Declaration of eligible costs (in €)

Please complete only the activity covered by the relevant instrument (and type of action) indicated above and as mentioned in Article II.25 and/or in Annexes I and III of the contract.
If you are a contractor using the additional cost model (AC):
- indicate only your additional eligible costs, except for Management of the Consortium Activity for which you may indicate your full eligible costs;
- do not declare eligible direct additional costs specifically covered by contributions from third parties as mentioned in Articles II.20 and II.23.a and b of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate your full eligible costs.
The costs declared should distinguish between direct and indirect costs.
If necessary, adjustments to previous period(s) may be included where appropriate.

Type of Activity	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							2000.00		212008.04		214008.04	0.00
Of which subcontracting											0.00	0.00
Indirect costs									42401.60		42401.60	0.00
Adjustments (+ or -) previous period(s)											0.00	0.00
Total costs	0.00	0.00	0.00	0.00	0.00	0.00	2000.00	0.00	254409.64	0.00	256409.64	0.00

3. Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.
If a receipt is not allocated to an activity

Type of Activity	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts											0.00	0.00

4. Declaration of interest generated by the pre-financing (in €)

To be completed only by the coordinator.

Did the pre-financing (advance) you received by the Commission for this period earn interests? (Yes / No) — No

If yes, please mention the amount (in €)

5. Request of FP6 Financial contribution (in €)

For this period, the FP6 Community financial contribution requested is equal to (amount in €) — 130204.82

6. Audit certificates

According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No) — Yes

If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No) — Yes

If No, what is the periodicity covered by this(those) audit certificate(s)? — From – To

What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?

Audit certificate of the contractor (X)			
Legal name of the audit firm	SOL S.A.	**Cost of the certificate**	1200.00
Audit certificate(s) of the third party(ies) (Ys) (if necessary)			
Y1: Legal name of the audit firm		**Cost of the certificate**	
Y2: Legal name of the audit firm		**Cost of the certificate**	
Y3: Legal name of the audit firm		**Cost of the certificate**	
Y4: Legal name of the audit firm		**Cost of the certificate**	
Add Audit Firm		**Total (Z) = (X) + (Ys)**	1200.00

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".
The required audit certificate(s) is(are) attached to this Financial Statement.

7. Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party(ies) (if necessary)	
Third Party 1 (Y1)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 2 (Y2)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 3 (Y3)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 4 (Y4)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No

Add Third Party

8. Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission, and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	Name of the Person responsible of the work	Name of the duly authorised Financial Officer
	V. Valavanis	S. Kastrinakis
	Date	**Date**
	Signature	**Signature**

Form C - Model of Financial Statement per Activity (to be filled by each contractor)

Type of Instrument	Specific Support Action	**Type of Action** *(if necessary)*	
Project Title (or Acronym)	EMFETH	**Contract n°**	22466
Contractor's Legal Name	CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS		
Legal Type	Other		
Contact Person	Paloma Martin Martin	**Telephone**	0034 93 230 9500
Telecopy		**E-mail**	paloma@icm.csic.es
Cost model used (AC/FC or FCF)	FC	**Indirect costs** *(Real or Flat Rate of 20% of Direct costs, except subcontracting)*	Real indirect cost
Period from	1/12/2006	**To**	29/02/2008

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No
If Yes, please provide the following information	

Third Party 1 (Y1) Legal Name		**Cost model used**	
Third Party 2 (Y2) Legal Name		**Cost model used**	
Third Party 3 (Y3) Legal Name		**Cost model used**	
Third Party 4 (Y4) Legal Name		**Cost model used**	

Add Third Party

2- Declaration of eligible costs (in €)

Please complete only the activity covered by the relevant instrument (and type of action) indicated above and as mentioned in Article II.25 and/or in Annexes I and III of the contract.
If you are a contractor using the additional cost model (AC):
- indicate only your additional eligible costs, except for Management of the Consortium Activity for which you may indicate your full eligible costs;
- do not declare eligible direct additional costs specifically covered by contributions from third parties as mentioned in Articles II.20 and II.23.a and b of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate your full eligible costs.
The costs declared should distinguish between direct and indirect costs.
If necessary, adjustments to previous period(s) may be included where appropriate.

	Type of Activity											
	Research and Technological Development / Innovation (A)		**Demonstration (B)**		**Training (C)**		**Management of the Consortium (D)**		**Other Specific Activities (E)**		**Total (F) = (A)+(B)+(C)+(D)+(E)**	
	Contractor	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**
Direct costs							1075.20		40472.47		41547.67	0.00
Of which subcontracting							1075.20				1075.20	0.00
Indirect costs									56423.74		56423.74	0.00
Adjustments to previous period(s)									238.01		238.01	0.00
Total costs	0.00	0.00	0.00	0.00	0.00	0.00	1075.20	0.00	97134.22	0.00	98209.42	0.00

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.
If a receipt is not allocated to an activity:

	Type of Activity											
	Research and Technological Development / Innovation (A)		**Demonstration (B)**		**Training (C)**		**Management of the Consortium (D)**		**Other Specific Activities (E)**		**Total (F) = (A)+(B)+(C)+(D)+(E)**	
	Contractor	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**	**Contractor**	**Third Party(ies)**
Total receipts											0.00	0.00

4- Declaration of interest generated by the pre-financing (in €)

To be completed only by the coordinator.

Did the pre-financing (advance) you received by the Commission for this period earn interests? (Yes / No)	No
If yes, please mention the amount (in €)	

5- Request of FP6 Financial contribution (in €)

For this period, the FP6 Community financial contribution requested is equal to (amount in €)	49880.17

6- Audit certificates

According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			Yes
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			No
If No, what is the periodicity covered by this(those) audit certificate(s)?		**From – To**	1/12/2005 29/2/2008
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			
Audit certificate of the contractor (X)			
Legal name of the audit firm	AudiHispana Grant Thorton, S.L.	**Cost of the certificate**	1247.23
Audit certificate(s) of the third party(ies) (Ys) (if necessary)			
Y1: Legal name of the audit firm		**Cost of the certificate**	
Y2: Legal name of the audit firm		**Cost of the certificate**	
Y3: Legal name of the audit firm		**Cost of the certificate**	
Y4: Legal name of the audit firm		**Cost of the certificate**	
Add Audit Firm		**Total (Z) = (X) + (Ys)**	1247.23

Remainders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".
The required audit certificate(s) is(are) attached to this Financial Statement.

7-Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party(ies) (if necessary)	
Third Party 1 (Y1)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 2 (Y2)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 3 (Y3)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 4 (Y4)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No

Add Third Party

8- Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex II and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible of the work**	**Name of the duly authorised Financial Officer**
	Paloma Martin Martin	MAR GARCIA FERRER
	Date	**Date**
	Signature	**Signature**

Form C - Model of Financial Statement per Activity (to be filled by each contractor)

Type of instrument	Specific Support Action	**Type of Action (if necessary)**	
Project Title (or Acronym)	EnviEFH	**Contract n°**	22466
Contractor's Legal Name	Centre National de la Recherche Scientifique		
Legal Type	Other		
Contact Person	Serge Planes	**Telephone**	+33 4 68 66 17 11
Telecopy	+33 4 68 50 36 86	**E-mail**	planes@univ-perp.fr
Cost model used (AC//FC or FCF)	FCF	**Indirect costs** *(Real or Flat Rate of 20% of Direct costs, except subcontracting)*	Flat rate (up to 20% of direct costs, excluding subcontracting)
		Flat rate	20
Period from	1/12/2006	**To**	29/02/2008

1. Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No) — No

If Yes, please provide the following information

Third Party 1 (Y1) Legal Name		**Cost model used**	
Third Party 2 (Y2) Legal Name		**Cost model used**	
Third Party 3 (Y3) Legal Name		**Cost model used**	
Third Party 4 (Y4) Legal Name		**Cost model used**	

Add Third Party

2. Declaration of eligible costs (in €)

Please complete only the activity covered by the relevant instrument (and type of action) indicated above and as mentioned in Article II.25 and/or in Annexes I and III of the contract.
If you are a contractor using the additional cost model (AC):
- indicate only your additional eligible costs, except for Management of the Consortium Activity for which you may indicate your full eligible costs;
- do not declare eligible direct additional costs specifically covered by contributions from third parties as mentioned in Articles II.20 and II.25.a and b of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate your full eligible costs.
The costs declared should distinguish between direct and indirect costs.
If necessary, adjustments to previous period(s) may be included where appropriate.

	Type of Activity											
	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							4048.15		96742.38		100790.53	0.00
Of which subcontracting									2500.00		2500.00	0.00
Indirect costs							809.63		18848.47		19658.10	0.00
Adjustments to previous period(s)											0.00	0.00
Total costs	0.00	0.00	0.00	0.00	0.00	0.00	4857.78	0.00	116590.85	0.00	120448.63	0.00

3. Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.
If a receipt is not allocated to an activity

	Type of Activity											
	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts											0.00	0.00

4. Declaration of interest generated by the pre-financing (in €)

To be completed only by the coordinator

Did the pre-financing (advance) you received by the Commission for this period earn interests? (Yes / No) — No

If yes, please mention the amount (in €)

5. Request of FP6 Financial contribution (in €)

For this period, the FP6 Community financial contribution requested is equal to (amount in €) — 62653.21

6. Audit certificates

According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No) — Yes

If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No) — Yes

If No, what is the periodicity covered by this(those) audit certificate(s)? — From – To

What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?

Audit certificate of the contractor (X)			
Legal name of the audit firm	Pierre ROURA, Agent Comptable Secondaire du CNRS	**Cost of the certificate**	288.15
Audit certificate(s) of the third party(ies) (Yx) (if necessary)			
Y1: Legal name of the audit firm		**Cost of the certificate**	
Y2: Legal name of the audit firm		**Cost of the certificate**	
Y3: Legal name of the audit firm		**Cost of the certificate**	
Y4: Legal name of the audit firm		**Cost of the certificate**	
Add Audit Firm		**Total (Z) = (X) + (Yx)**	288.15

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".
The required audit certificate(s) is(are) attached to this Financial Statement.

7. Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party(ies) (if necessary)	
Third Party 1 (Y1)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 2 (Y2)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 3 (Y3)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 4 (Y4)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No

Add Third Party

8. Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex II and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	Name of the Person responsible of the work	Name of the duly authorised Financial Officer
	Serge Planes	Bernard Jollans
	Date	**Date**
	Signature	**Signature**

Form C : Model of Financial Statement per Activity (to be filled by each contractor)

Type of instrument	Specific Support Action	**Type of Action** *(if necessary)*	
Project Title (or Acronym)	EmcEFH	**Contract n°**	22466
Contractor's Legal Name	The University Court of the University of Aberdeen		
Legal Type	Non-Commercial		
Contact Person	Mrs Gillian Hewison	**Telephone**	00 44 1224 273420
Telecopy	00 44 1224 273297	**E-mail**	g.hewison@abdn.ac.uk
Cost model used (AC/FC or FCF)	AC	**Indirect costs** *(Real or Flat Rate of 20% of Direct costs, except subcontracting)*	Flat rate (up to 20% of direct costs, excluding subcontracting)
		Flat rate	20
Period from	1/12/2008	**To**	29/02/2008

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No) — No

If Yes, please provide the following information

Third Party 1 (Y1) Legal Name		**Cost model used**	
Third Party 2 (Y2) Legal Name		**Cost model used**	
Third Party 3 (Y3) Legal Name		**Cost model used**	
Third Party 4 (Y4) Legal Name		**Cost model used**	

Add Third Party

2- Declaration of eligible costs (in €)

Please complete only the activity covered by the relevant instrument (and type of action) indicated above and as mentioned in Article II.25 and/or in Annexes I and III of the contract.
If you are a contractor using the additional cost model (AC):
- indicate only your additional eligible costs, except for Management of the Consortium Activity for which you may indicate your full eligible costs,
- do not declare eligible direct additional costs specifically covered by contributions from third parties as mentioned in Articles II.20 and II.23.a and b of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate your full eligible costs.
The costs declared should distinguish between direct and indirect costs.
If necessary, adjustments to previous period(s) may be included where appropriate.

	Type of Activity											
	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs									58806.08		58806.08	0.00
Of which subcontracting											0.00	0.00
Indirect costs									10675.52		10675.52	0.00
Adjustments to previous period(s)									667.38		667.38	0.00
Total costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70148.98	0.00	70148.98	0.00

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.
If a receipt is not allocated to an activity

	Type of Activity											
	Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the Consortium (D)		Other Specific Activities (E)		Total (F) = (A)+(B)+(C)+(D)+(E)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts											0.00	0.00

4- Declaration of interest generated by the pre-financing (in €)

To be completed only by the coordinator.

Did the pre-financing (advance) you received by the Commission for this period earn interests? (Yes / No)	No
If yes, please mention the amount (in €)	

5- Request of FP6 Financial contribution (in €)

For this period, the FP6 Community financial contribution requested is equal to (amount in €)	70148.98

6- Audit certificates

According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)	Yes
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)	Yes
If No, what is the periodicity covered by this(those) audit certificate(s)? — **From – To**	
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?	

Audit certificate of the contractor (X)			
Legal name of the audit firm	Anderson, Anderson & Brown A2B	**Cost of the certificate**	755.24
Audit certificate(s) of the third party(ies) (Ys) (if necessary)			
Y1: Legal name of the audit firm		**Cost of the certificate**	
Y2: Legal name of the audit firm		**Cost of the certificate**	
Y3: Legal name of the audit firm		**Cost of the certificate**	
Y4: Legal name of the audit firm		**Cost of the certificate**	
Add Audit Firm		**Total (Z) = (X) + (Ys)**	755.24

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".
The required audit certificate(s) is(are) attached to this Financial Statement.

7-Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party(ies) (if necessary)	
Third Party 1 (Y1)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 2 (Y2)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 3 (Y3)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No
Third Party 4 (Y4)	
- Conversion rate of the Date of incurred actual costs?	Yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement?	No

Add Third Party

8- Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible of the work**	**Name of the duly authorised Financial Officer**
	Dr Graham Pierce	Mrs Gillian Hewison
	Date	**Date**
	Signature	**Signature**

3. Summary financial report

Summary Financial Report

Type of Instrument	SSA	Project Title (or Acronym)	EnviEFH	Contract N°	22466
Reporting period number	1	From (dd/mm/yyyy)	1/12/2006	To (dd/mm/yyyy)	29/02/2008	Page	1/1

Contractor n°	Organisation Short Name	Cost model used	Eligible costs (in €)	Type of activities: Research and Technological Development / Innovation (A)		Demonstration (B)		Training (C)		Management of the consortium (D)		Other Specific Activities (E)		Total eligible costs (F)=(A)+(B)+(C)+(D)+(E)		Receipts		EC contribution	
				Contractor	Third party(ies)	Contractor	Third party(ies)	Contractor	Third party(ies)	Contractor	Third party(ies)	Contractor	Third party(ies)	Contractor	Third party(ies)	Contractor	Third party(ies)	Maximum	Requested
1	Hellenic Centre for Marine Research	FCF	Direct eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	2,000.00	0.00	212,008.04	0.00	214,008.04	0.00	0.00	0.00	256,409.64	130,204.82
			of which direct eligible costs of subcontracting	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*				
			Indirect eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42,401.60	0.00	42,401.60	0.00				
			Adjustment on previous period(s)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Total eligible costs	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,000.00*	*0.00*	*254,409.64*	*0.00*	*256,409.64*	*0.00*				
2	CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	FC	Direct eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	1,075.20	0.00	40,472.47	0.00	41,547.67	0.00	0.00	0.00	49,880.17	49,880.17
			of which direct eligible costs of subcontracting	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1,075.20*	*0.00*	*0.00*	*0.00*	*1,075.20*	*0.00*				
			Indirect eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56,423.74	0.00	56,423.74	0.00				
			Adjustment on previous period(s)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.01	0.00	238.01	0.00				
			Total eligible costs	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*1,075.20*	*0.00*	*97,134.22*	*0.00*	*98,209.42*	*0.00*				
3	Centre National de la Recherche Scientifique	FCF	Direct eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	4,048.15	0.00	96,742.38	0.00	100,790.53	0.00	0.00	0.00	120,448.63	62,653.21
			of which direct eligible costs of subcontracting	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,500.00*	*0.00*	*2,500.00*	*0.00*				
			Indirect eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	809.63	0.00	18,848.47	0.00	19,658.10	0.00				
			Adjustment on previous period(s)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			Total eligible costs	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*4,857.78*	*0.00*	*115,590.85*	*0.00*	*120,448.63*	*0.00*				
4	The University Court of the University of Aberdeen	AC	Direct eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50,806.00	0.00	50,806.00	0.00	0.00	0.00	70,148.98	70,148.98
			of which direct eligible costs of subcontracting	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*				
			Indirect eligible costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10,675.52	0.00	10,675.52	0.00				
			Adjustment on previous period(s)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	667.38	0.00	667.38	0.00				
			Total eligible costs	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*70,148.98*	*0.00*	*70,148.98*	*0.00*				
Total eligible costs				0.00	0.00	0.00	0.00	0.00	0.00	7,932.98	0.00	537,283.69	0.00	545,216.67	0.00	0.00	0.00	496,887.42	312,887.18
					0.00		0.00		0.00		7,932.98		537,283.69		545,216.67		0.00		
Maximum calculated EC contribution for the reporting period (in €) without taking into account receipts				0.00	0.00	0.00	0.00	0.00	0.00	7,932.98	0.00	488,954.44	0.00	496,887.42					
					0.00		0.00		0.00		7,932.98		488,954.44						
Amount of the financial interests generated by the prefinancing														0.00					
Requested EC contribution for the reporting period (in €)														312,887.18					

C. REPORT ON THE DISTRIBUTION OF THE COMMUNITY FINANCIAL CONTRIBUTION

Report on the distribution of Community financial contribution among contractors will be submitted after the payment of the 2nd and final contribution to HCMR.

Table 3: Budget vs. Actual Costs

Cost Budget Follow-up Table

*) total budget figures - not EC funding

Contract N°: 22466		Acronym: EnviEFH					Date: 02/06/08		
PARTI-CIPANTS	TYPE of EXPENDITURE (as defined by participants)	BUDGET	ACTUAL COSTS (EUR)					Pct. spent	Remaining Budget (EUR)
			Period 1	Period 2	Period 3	Period 4	Total	Total	
		e	a1	b1	c1	d1	e1	a1+b1+c1+d1/e	e-e1
Part. 1 HCMR	**Total Person-month**	**50**	20	30			**50**	100%	**0**
	Personnel costs	**300000**	122318.42	177525.43			**299843.85**	100%	**156.15**
	Overheads	**69304**	27670.95	42401.6			**70072.55**	101%	**-768.55**
	Travel and substistance	**18000**	5913.68	7852.27			**13765.95**	76%	**4234.05**
	Other costs ('the rest')	**37522**	10122.65	28630.34			**38752.99**	103%	**-1230.99**
	Total Costs	**424826**	**166025.7**	**256409.64**	**0**	**0**	**422435.34**	**99%**	**2390.66**
Part. 2 CSIC*	**Total Person-month**	**30**	21.4	9.4			**30.8**	103%	**-0.8**
	Personnel costs		88604.53	35711.23			**124315.76**		
	Travel and subsistence		2632.47	4761.24			**7393.71**		
	Indirect costs		131134.7	56423.74			**187558.44**		
	Other costs ('the rest')			1313.21			**1313.21**		
	Total Costs	**100000**	**222372**	**98209.42**	**0**	**0**	**320581.12**	**105%**	**-4724.35**
Part. 3 CNRS	**Total Person-month**	**38**	16	22			**38**	100%	**0**
	Personnel costs	**138703**	49146	89376.8			**138522.8**	100%	**180.2**
	Subcontracting	**10000**	7500	2500			**10000**	100%	**0**
	Overheads	**31741**	13636.5	19658.11			**33294.61**	105%	**-1553.61**
	Other costs ('the rest')	**20000**	19035.45	8913.73			**27949.18**	140%	**-7949.18**
	Total Costs	**200444**	**89317.95**	**120448.64**	**0**	**0**	**209766.59**	**105%**	**-9322.59**
Part. 4 ABDN	**Total Person-month**	**26**	7.5	12.01			**19.51**	75%	**6.49**
	Personnel costs	**70880**	31800	49388.8			**81188.8**	115%	**-10308.8**
	Travel	**15909**	3057	3583.21			**6640.21**	42%	**9268.79**
	Subcontracting	**2727**		2428.46			**2428.46**	89%	**298.54**
	Other costs ('the rest')	**26722**	11598	14748.51			**26346.51**	99%	**375.49**
	Total Costs	**116238**	**46455**	**70148.98**	**0**	**0**	**116603.98**	**100%**	**-365.98**
TOTAL	**Total Person-month**						**0**	0%	**0**
	Personnel costs						**0**	0%	**0**
	Major cost item 'x'						**0**	0%	**0**
	Major cost item 'y'						**0**	0%	**0**
	Other costs ('the rest')						**0**	0%	**0**
	Total Costs	**0**	**0**	**0**	**0**	**0**	**0**	**0%**	**0**

*Partner 2: CSIC
Contract Preparation Forms: Budget was estimated with Indirect Costs= Flat Rate of 20% of Direct Costs
Form C was completed using FC, as the CSIC has a general agreement with the EC regarding the participation in the Framework Programme, so that the costs in a given period are presented in terms of real costs. Because of the different way of presenting the budget in the CPFs and in Form C, percentage spent and remaining budget refer to EC contribution.
Total requested EC contribution (EUR)= 54796,57 (period 1)+49927,78 (period 2)= 104724,35
Actual costs in this table are the same as in the audit certificate.

Table 4a: Person-Months Status Table (Period 1)[19] (1/12/05 – 30/11/06)

Person-Month Status Table

CONTRACT N°: 22466		Partner - Person-month per Workpackage															AC - own staff	
ACRONYM: EnviEFH																		
PERIOD: 1/12/2005-30/11/2006		TOTALS	Coord.	HCMR	CSIC	CNRS	UABDN										AC TOTALS	UABDN
Workpackage 1:	**Actual WP total:**	**4.6**		1.0	1.4	2.0	0.2										**1**	1
COORDINATION	**Planned WP total:**	**8**		3.0	2.0	2.0	1.0										**0**	
Workpackage 2:	**Actual WP total:**	**25**		3.0	10.0	12.0											**0**	
COLLATE EXISTING DATA	**Planned WP total:**	**41**		9.0	14.0	18.0											**0**	
Workpackage 3:	**Actual WP total:**	**6.4**		4.0		0.0	2.4										**0**	
MAP OCEAN PROCESSES	**Planned WP total:**	**18**		10.0		0.0	8.0										**0**	
Workpackage 4:	**Actual WP total:**	**13**		4.0	5.7	2.2	1.0										**0**	
MAP ESSENTIAL FISH HABITATS	**Planned WP total:**	**36**		10.0	8.0	10.0	8.0										**0**	
Workpackage 5:	**Actual WP total:**	**11**		5.0	2.8	0.0	2.9										**0**	
DEVELOP AN EFH DESIGNATION TOOL	**Planned WP total:**	**32**		13.0	4.0	6.0	9.0										**0**	
Workpackage 6:	**Actual WP total:**	**4.4**		3.0	1.4	0.0											**0**	
DISSEMINATE OUTPUTS	**Planned WP total:**	**9**		5.0	2.0	2.0											**0**	
Workpackage 7: Title	**Actual WP total:**	**0**															**0**	
	Planned WP total:	**0**															**0**	
Workpackage 8: Title	**Actual WP total:**	**0**															**0**	
	Planned WP total:	**0**															**0**	
Workpackage 9: Title	**Actual WP total:**	**0**															**0**	
	Planned WP total:	**0**															**0**	
	Actual total:	**64**	**0**	**20**	**21.4**	**16.2**	**6.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1 0 0 0**
Total Project Person-month	**Planned total:**	**144**	**0**	**50**	**30**	**38**	**26**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0 0 0 0**

Table 4b: Person-Months Status Table (Period 2)[20] (1/12/06 – 29/2/08)

Person-Month Status Table

CONTRACT N°: 22466		Partner - Person-month per Workpackage														AC - own staff	
ACRONYM: EnviEFH																	
PERIOD: 1/12/2006-29/02/2008		TOTALS	Coord.	HCMR	CSIC	CNRS	UABDN									AC TOTALS	UABDN
Workpackage 1:	**Actual WP total:**	**4.6**		2.0	0.6	2.0	0.0									**0**	
COORDINATION	**Planned WP total:**	**8**		3.0	2.0	2.0	1.0									**0**	
Workpackage 2:	**Actual WP total:**	**16**		6.0	4.0	6.0	0.0									**0**	
COLLATE EXISTING DATA	**Planned WP total:**	**41**		9.0	14.0	18.0	0.0									**0**	
Workpackage 3:	**Actual WP total:**	**12**		6.0	0.0	2.0	4.0									**1**	1
MAP OCEAN PROCESSES	**Planned WP total:**	**20**		10.0	0.0	2.0	8.0									**0**	
Workpackage 4:	**Actual WP total:**	**19**		6.0	2.6	7.8	2.3									**0**	
MAP ESSENTIAL FISH HABITATS	**Planned WP total:**	**36**		10.0	8.0	10.0	8.0									**0**	
Workpackage 5:	**Actual WP total:**	**17**		8.0	1.2	6.0	1.3									**0**	
DEVELOP AN EFH DESIGNATION TOOL	**Planned WP total:**	**32**		13.0	4.0	6.0	9.0									**0**	
Workpackage 6:	**Actual WP total:**	**7.4**		2.0	1.0	0.0	4.4									**0**	
DISSEMINATE OUTPUTS	**Planned WP total:**	**7**		5.0	2.0	0.0	0.0									**0**	
Workpackage 7: Title	**Actual WP total:**	**0**														**0**	
	Planned WP total:	**0**														**0**	
Workpackage 8: Title	**Actual WP total:**	**0**														**0**	
	Planned WP total:	**0**														**0**	
Workpackage 9: Title	**Actual WP total:**	**0**														**0**	
	Planned WP total:	**0**														**0**	
	Actual total:	**75**	**0**	**30**	**9.4**	**23.8**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1** **0** **0** **0**
Total Project Person-month	**Planned total:**	**144**	**0**	**50**	**30**	**38**	**26**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0** **0** **0** **0**