



Project no. 044168

Project acronym AFRAME

Project title A framework for fleet and area based fisheries management

Instrument

Thematic Priority

Final progress report (month 24)

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Actual submission date: 15 June 2009

Start date of project: 1 April 2007

Duration: 24 months

Organisation name of lead contractor for this deliverable: AZTI-Tecnalia

Revision [draft, 1]

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Executive Summary

During the durations of the AFRAME project, actions have been directed to the execution of the tasks described in the technical annex of the contract. Main tasks deployed during this period have been:

Internal & External coordination of task: meetings have been held at the beginning and at the 6 months from the starting date of the project. The nature of the meetings was different and so work deployed in each of them. The kick-off meeting deployed in Sukarrieta had the aim of getting together all partners of the AFRAME Project and the Commission to establish clearly the objectives of the project, time table and compromise of work for each of the partners. Also, guidelines in relation to reporting periods and contents of the management and activities reports were received from the Commission. The first methodological meeting was organised with the aim of making familiar all partners with the basic formulation of Fcube and how this methodology is to be applied, improved and complemented along the remaining time of the project from each of the Case Study - Work Packages. Meeting deployed in Athens in April 2008 and in Copenhagen in October 2008 had the aim of getting together the main outcomes of the different workpackages, look for common research lines between them having the Fcube as the general methodological frame of work and also to plan activities to be covered in the following phases of the project. Last meeting hold in Derio (Spain) was directed to summarise and compile main result of the different methodological and Case Study Work packages. Also, from the management task, deadlines for submission of the required reports to the Commission were established as well as task responsibilities for each of the partners were stated.

Case studies work and framework development: Case study data bases were compiled at country level and in an aggregated format. Data deficiencies and strengths were identified. Characteristics of each of the Case Studies were also identified and commented and main issues to be worked out in the CS were detected, discussed and priorities were given. This work was stated as the basis of the knowledge for the posterior work developed in the Fcube application to each of the Case Studies. Further work to be developed in the development of the framework was carry out during the second year of the project, specially in the improvement of the Fcube framework in relation to its inclusion in FLR and in the development of management mixed fisheries indicators for each of the Case Studies.

During the second year of the project the analysis and research on the Stakeholders perceptions was carry out successfully and results have been related to all Case Study Work Packages.

Communication has been deployed and approached in two ways:

Scientific communication within project partners and the scientific community in general, and a more general communication to Stakeholders and Administrations have been also achieved.

GLOSSARY

ACFM: Advisory Committee for Fisheries and Management

BECAUSE: Critical Interactions BEtween Species and their Implications for a PreCAUTIONary FiSheries Management in a variable Environment - a Modelling Approach

CAFE: Capacity, F and Effort

COMMIT: Creation Of Multiannual Management Plans for Commitment

DCR: Data Collection Regulation

EFIMAS: Scientific, Technical and Economic Committee for Fisheries

EIAA: Model for Economic Interpretation of the ACFM Advice

FAO: Fisheries and Agriculture Oragnisation

FLR: Fisheries Library in R

GFCM: General Fishery Commission for the Mediterranean

HCR: Harvest Control Rules

ICES: International Committee for the Explorations on the Sea

MSE: Management Strategy Evaluation

PROTECT: Marine Protected Areas as a Tool for Ecosystem Conservation and Fisheries Management

RAC: Regional Advisory Councils

SGMixMan: Study Group on Mix Fisheries Management

STECF: Scientific, Technical and Economic Committee for Fisheries

TECTAC: Technical development and tactical adaptations of important EU fleets. EU-funded FP5 project

WGNSSK: Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak.

Section 1 – Project objectives and major achievements during the reporting period.

Basing advice on fleets or fisheries requires switching focus from a biological unit (a fish stock) to a social one (a fleet or fishery). This is a major shift away from the current TAC-dominated, stock-based approach.

The general objective of the AFRAME project was to develop an area- and fleet-based framework that integrates single-species assessment and advice. The framework must be robust to uncertainty caused by, for instance, lack of discard data. Work also included development of indicators as a basis for setting management targets. Case studies comprise regions in the Northeast Atlantic (e.g. the North Sea), Western Atlantic Waters and the Mediterranean, more precisely fisheries in the North Sea, ICES areas VII & VIII (the channel to the Bay of Biscay), and the Mediterranean, focusing on areas where the need for a fleet-based management is most urgent.”

The research areas in the AFRAME project were the development of a framework for fleet and area-based management advice; the basis for the scientific advice; and the analysis of stakeholder perspective in relation to these developments.

Fleet and area framework

The first step in this task was to define fleets and fisheries which operate in the area covered by the study. In its simplest form a fishery consists of one fleet exploiting a single stock of a single species in a single area. However, the reality is that fisheries are more complex. In the AFRAME project, Case Studies in which the development of the frame work is based are of very different nature and complexity.

From Northern to more Southern Case Studies, the complexity of the fisheries, in terms of number of fleets, areas and species, increases.

The first task in this research area was the common classification of fishing vessels into fleets and their trips into fisheries for fleets and areas to be considered in management. Thus, all partners with fleets operating in the geographical areas supplied fisheries data to build up a Common Data Base by Case Study. Joint catch, effort data and spatial distribution of catches from different countries allowed to carry out common analysis of fleet and fishery definition by Case Study. Fleets and fisheries were identified following methodologies established in previous research project (TECTAC, CAFÉ...) and also, based on the recent EU data collection programmes guidelines for fisheries and fleets definition Fleets and fisheries for the case studies were defined at level established in the Nantes Matrix. Thus, scientific validation of these definitions has already carried out.

Once fleets and fisheries were defined, the complexity of numerous fisheries and stocks exploited were incorporated into the proposed integrated approach or method (Fcube) for managing this heterogeneity in the advice. The so-called Fleet and Fisheries Forecast (Fcube) method, was initiated based on the latest development of the multi-fleet multi-species bio-economic simulation framework TEMAS, used within TECTAC and the Danish national project TEMAS (Ulrich et al., in prep, Marchal et al., 2006).

The basics of the Fcube model, based on TEMAS, are the explicit description of fleets' flexibility, allowing vessels within one fleet to share their activity across several métiers.

The fleets are then linked to their target stocks through the catchability of each of their métiers.

In this regards, various modelling hypotheses area tested, in order to best capture future effort allocation schemes under changing TAC conditions. In the ICES fora, it was consider that this approach could provide a useful framework for future development of fleet and fishery-based management advice. That was the reason to start using Fcube as a starting point as a mixed fleet and stock management tool. During this reporting period the Fcube has been used in the North Sea Case Study and the Western Waters Case Study for investigating possible minimum and maximum effort scenarios of fleets operating in those areas, as well as optimum value scenarios for those same fleets. Also during this period, developments in the coding of the method and its inclusion in the FLR context have been achieved. Further developments in relation to the own Fcube methodology are also being achieved. in the context of the AFRAME project. In particular, more socio-economic about driving forces in fishermen behaviour and effort allocation are being considered, following up the work undertaken in project as TECTAC, EFIMAS and COMMIT. Actually and for the Western Waters CS a new socio-economic scenario based on a more social or more firm profitable approach have been carried out. And for the North Sea and Mediterranean CSs fishermen behaviour (allocation of effort) has been modelled via profit maximisation for the total fleet, thus also taken into consideration that fisheries management has an impact on human behaviour as well as on stock development, and as such management should be based on solutions that take into account the behaviour and economic interest of humans as well.

Within the Fcube framework, fleets are linked to their target stocks through the catchability of their fisheries. In some extent, catchability is dependent upon the selectivity of the gear in use. A synthesis of the actual selectivity data is being carried out in the North Sea CS to make use of it in a management context. In the Western Waters were more species with no TAC and Quotas are exploited and when no assessment data is available, work on how to include this species in the Fcube has been approached and presented in a joint meeting with SGMIXMAN in January 2008.

Another research area and development in the Fcube method is the development of models of fisher behaviour. These models attempt to represent how fishers choose, for example, when and where to fish, and these choices can be modelled using data on, for instance, economic factors and previous fishing activity (Andersen et al, 2006; Mardle & Hutton, 2006). In the North Sea and Western Waters the possibility of using RUMs (Random Utility Models) for modelling fishers behaviour is being explored. Another possible application is in the effort allocation component of the Economic Impact of ACFM Advice (EIAA) model currently used by STECF and planned to be applied to the North Sea CS.

Assessments, indicators and advice

An important research area of the AFRAME is to develop advice on a fishery rather than solely on a stock basis. As a first step this would involve assessing the relative impacts of each fishery on the stocks of interest. Taking into account on the amount of fisheries and stocks in which this should be required and the effects of possible management actions on each fishery, the problem involves the presentation of lots of information in a synthesised way. The objective is to use a set of indicators to guide management actions, with advice that is much more adaptive in nature.

The application of such indicator approaches to giving fishery-based management advice in a European context is being explored during this first year of the project. The

challenge is to develop an indicator-based approach for fisheries management advice in a European building. Also this approach will be based on the work already done in relation to the ecosystem approach to fisheries management. Indicators being explored have a relatively close and clear link between the state being measured (e.g. fish abundance) and the pressure on that quantity (e.g. fishing mortality), particularly in cases where estimates of abundance and fishing mortality are available from stock assessments. Once the review task of indicators is finished, these ones will be incorporated to the framework.

Social science and interaction with stakeholders

The development of mixed fisheries-based advice necessarily introduces social science types of issues. Thus, a rigorous social science perspective into the research areas of the project is important if changes in fisheries management are to be based in fisheries definitions. Fisheries defined in our models need to be able to be justified to stakeholders and to reflect their common sense. Classifications are driven by social rather than biological concerns, and so social issues become more important in the discussion.

The methodology chosen to come at the various stakeholder perspectives on the definition of fisheries is through interviews and focus groups. Thus, systematically the different groups are covered and comparative methods to identify the areas of potential agreement as well as potential problems are used. Ports within Case Studies have been identified to carry out these focus groups and interviews. The design of the interviews has been also completed. Ports have been chosen due to their heterogeneity but also due to their medium size so stakeholders know each other and can easily classify other vessels.

Summarising:

Despite the short duration of the project itself (2 years), we have not faced substantial delays in the finalization of some of the scientific work, although the work load has been overwhelming lately.

In any case, this work has already given major results, and in consequence the Advisory Committee of ICES (International Council for the Exploration of the Sea) decided to launch a new workshop for mixed-fisheries advice, WKMIXFISH, to be held for the first time on August 2009 at ICES Headquarters. The chair of the workshop will be Dr. Clara Ulrich Rescan from DTU-Aqua, leader of AFRAME WP4. The ToRs of this workshop build explicitly and directly on AFRAME findings, to deliver timely and operational mixed fisheries management advice for 2010. This is considered a major decision, since ICES has never delivered mixed-fisheries advice before.

As a pilot trial for the workshop will only deal with the North Sea in 2009, but it is expected that if this workshop is successful, similar advice will be provided, in the future, to other eco-regions.

This, of course, is a very positive sign that the project has led to useful and operational results. We consider that such advances could not have been possible in such a reduced time-frame without the financial support of EU, and this is gratefully acknowledged.

Considering that, this new workshop is a clear and direct follow-up of the work undertaken within AFRAME, and considering its importance for delivering operational mixed-fisheries advice to management, we consider already a main achievement of

this project the ICES acknowledgement of having a dedicated Working Group on the advice of mixed fisheries.

As AFRAME is a policy-orientated research project, it is critical to provide scientifically robust results in terms of direct and applied mixed-fisheries advice for management. The Policy Implementation Plan (PIP) to be delivered, at the end of the project, and jointly to this Activity Report, on the application of the results at the fishery policy management level is including so far the potential application of results within policy frameworks (legislation, control, potential cost savings and economic impacts).

Section 2 – Work package progress of the period

A summary of the activities carried out during the AFRAME project is presented in this section by Work Package and partner in relation to the achievement of Deliverables and Milestones of the AFRAME project.

These are included in the following Table:

Table 1. AFRAME Deliverables title, date nature and dissemination level

Deliverable No¹	Deliverable title	Delivery date²	Nature³	Dissemination level⁴
D0.1	Mid term progress report (month 12)	14	R	PU
D0.2	End term Final AFRAME project report	24	R	PU
D0.3	Consortium Agreement	14	O	CO
D0.4	AFRAME Newsletter	12	O	PU
D0.5	AFRAME Newsletter	24	O	PU
D0.6	PIP (Policy Implementation Plan)	24	R	CO
D1.1	A report of the fleet & fishery structure of the case study	12	R	PU
D1.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area	22	R	PU
D2.1	A report of the fleet & fishery structure of the case study	12	R	PU
D2.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area.	22	R	PU

¹ Deliverable numbers in order of delivery dates: D1 – Dn

² Month in which the deliverables will be available. Month 0 marking the start of the project, and all delivery dates being relative to this start date.

³ Please indicate the nature of the deliverable using one of the following codes:

R = Report

P = Prototype

D = Demonstrator

O = Other

⁴ Please indicate the dissemination level using one of the following codes:

PU = Public

PP = Restricted to other programme participants (including the Commission Services).

RE = Restricted to a group specified by the consortium (including the Commission Services).

CO = Confidential, only for members of the consortium (including the Commission Services).

D3.1	A report of the fleet & fishery structure of the case study	12	R	PU
D3.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area.	22	R	PU
D4.1	Report on the identification of fleet and fisheries using national databases, including a critical validation of the reliability of those databases	24 (changed to Month 24 see deviations of the Work Plan)	R	PU
D4.2	A peer-reviewed article on the F3 versatile method for fleet-based HCR	18	R	PU
D4.3	Report on data quality issues in relation to the fleet and fishery categories defined in EU data collection regulation	24 (changed to Month 24 see deviations of the Work Plan)	R	PU
D4.4	A peer-reviewed article on the analysis of the fleet selectivity data	24	R	PU
D5.1	A literature review of applications of indicator approaches in the provision of fisheries management advice	6	R	PU
D5.2	A peer-reviewed research paper describing the development and implementation of the indicator framework	24	R	PU
D6.1	Pile sort analysis	20	R	PU
D6.2	Report on perceptions of relevant data and behaviour	24	R	PU
D6.3	Report of institutional analysis	24	R	PU

Table 2. AFRAME Milestones name, corresponding WP and date due.

Milestone no.	Milestone name	WP. No.	Date due
M0.1.	Kick-off meeting	0	Month 1
M 0.2	1st Coordination meeting (Methodological meeting)	0	Month 6
M0.3.	2 nd Coordination meeting	0	Month 12
M.0.4	3rd Coordination meeting	0	Month 18
M.0.5	Final meeting	0	Month 22
M1.1.1	Relevant data compiled	1	Month 4
M1.1.2	Data checked and reviewed	1	Month 6
M1.2.1	Appropriate indicators identified	1	Month 4
M1.3.1	Fleets and fisheries identified	1	Month 6
M1.4.1	Indicators summarised in provisional framework	1	Month 15
M 2.1.1	Relevant data compiled	2	Month 4
M 2.1.2	Data checked and reviewed	2	Month 6
M 2.2.1	Appropriate indicators identified	2	Month 4
M 2.3.1	Fleets and fisheries identified	2	Month 6
M 3.1.1	Relevant data compiled	3	Month 4
M 3.1.2	Data checked and reviewed	3	Month 6
M 3.2.1	Appropriate indicators identified	3	Month 4
M 3.3.1	Fleets and fisheries identified	3	Month 6
M 3.3.2.	Indicators summarised in provisional framework	3	Month 15
M 4.1.1	Initial identification of fleets and fisheries to be used in the model using standard methods	4	Month 4
M 4.1.2.	Critical analysis of national data and possible improvements	4	Month 15
M 4.1.3.	Alternative fleets and fisheries definition and aggregation levels for model robustness trials.	4	Month 18
M 4.2.1	Development of the versatile fleet-based HCR rule	4	Month 9
M 4.2.2	Initial HCR runs	4	Month 12
M 4.3.1	Setting of the simulation framework base case	4	Month 12
M 4.3.2	Robustness trials	4	Month 12
M 4.4.1	Collation of available selectivity data	4	Month 6
M. 4.5.	Report and deliverables writing	4	Month 24
M5.1.	Completion of literature review	5	Month 6
M 5.2.	Completion of initial indicator framework development	5	Month 12
M 6.1.	Completion of stakeholder interviews	5	Month 18
M 6.2.	Completion of initial indicator framework development	5	Month 20

WP 0 Project Management

• Objectives and starting point of work at beginning of reporting period

The objective of this work package was to manage properly and in a participative way, the research project.

The main objectives, at the starting point of this work package, were to coordinate the work flow as well as the exchange of expertise in and among Methodological and Case Study WPs.

Thus, the AFRAME management body was composed by the project co-ordinator and the Work Package-leaders. Structured in the following hierarchy structure to grant a proper and stringent management and operation of the project:

1) AFRAME Project co-ordinator

- Project co-ordinator (Marina Santurtún-AZTI) had the highest internal decision power. She ensured that deadlines are on time and deliverables are met to the satisfaction of EU, as well as ensure proper management of WPs and CSs and minimize conflicts between partners.

2) Implementation co-ordinator

- Implementation co-ordinator (Stuart Reeves-CEFAS) ensured proper internal work flow between Methodological (WP 4-6) and Case Study (WP 1-3) work packages.

3) Work Package co-ordinators:

- They ensured proper internal work flow in the respective Work Packages.

WP No	Work Package Title	Lead contractor No	Start month ⁵	End month ⁶
0	Project Management	AZTI	1	24
1	North Sea case study	IMARES	1	24
2	Western area case study	IFREMER	1	24
3	Mediterranean case study	HCMR	1	24
4	The fleet and area framework	DTU-Aqua	1	24
5	Indicator Approaches	CEFAS	1	24
6	Stakeholder Perceptions and Institutional Implications	AAU	1	24
TOTAL				

- They communicate informally to the project co-ordinator every 3 month to ensure a proper bottom up communication flow, to realize and solve potential problems at early stage.

4) Steering committee:

⁵ Relative start date for the work in the specific workpackages, month 1 marking the start of the project, and all other start dates being relative to this start date.

⁶ Relative end date, month 1 marking the start of the project, and all ends dates being relative to this start date.

- Consists of a team of the Work Package coordinators and it is co-chaired by the project co-ordinator and the implementation co-ordinator.
- It grants proper coordination between WP
- It grants fair and mutual beneficial treatment of potential conflicts.

• Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved

To achieve the objectives stated at the beginning of the project in relation to the good management practices, the following actions were undertaken:

a) Project coordinator worked on the agreement of contractual issues within the consortium and with the Commission. Consortium agreement was delivered after the first year of the project. All contractors participated in the success of this agreement.

b) During the first reporting period of the project, activity, Management and deliverables were delivered on the 20/06/2008 and all deliverables were met to the satisfaction of EU, as it was communicated by the Commission on the letter of acceptance of the AFRAME first periodic report in October 2008. All partners contributed in the elaboration of the Technical (Activity) and Management reports of this first reporting period.

c) The evaluation of the project progress in the different work packages was valued at every 6 months meetings through the collaboration of the WP leaders. Meetings are the focus time to report, organise and plan the work already deployed and to be carry out

During meetings, progress on the WP activities from the last meeting was presented. During the meetings, and if necessary, actions were specified to be adopted to achieve objectives stated in each WP. After this, a working plan for the next 6 month period was established for each WP. These tasks were deployed at each project meeting. Minutes are available at <http://wiki.azti.es/aframe/doku.php?id=start>, under Section Project meetings. Meetings agenda, and Minutes were regularly delivered to the Project Officer.

At that time is when deviations from what has been planned and the actual work deployed are identified. If deviations are of no consequences in the normal development of the project no corrective actions are implemented. However, when deviations can affect the fluent progress of the project, actions are proposed, firstly actions are agreed between partners and the Steering Committee and afterwards these are proposed to the Commission.

d) Co-ordinator and hosting contractor were in charge of the meeting facilities as described in the Table below: Hosting and facilitators were established in the planning phase of the project.

Type of Meeting	Agenda	Month	Facilitated by Participant
Kick-off Meeting	Start	1	AZTI
1 st Coordination Meeting	Methodological development meeting	6	IMARES
2 nd Coordination Meeting	Mid Term Activity Report	12	DTU-AQUA
3 rd Coordination Meeting	Case study implementation meeting	18	HCMR
Final Project Meeting	Final Activity Report	22	AZTI

Meetings were organised in a way that travel and subsistence costs were kept at a minimum in relation to expenses and time. Meeting were 3 days long including half a day for travelling. Agendas were worked in advance to cover all issues to be worked during those meetings. To assure the efficient interaction between the contractors and the Commission, this, was informed about the meetings in advance. AZTI-Tecnalia was in charge of these tasks.

Project evaluation, compilation of minutes from the meetings was carried out by AZTI-Tecnalia as Project Coordinator. and distributed to all partners for their contributions, corrections and feed- back. Final minutes of the meetings are also distributed to the Commission by means of the AFRAME WikiPage. The Steering Committee was in charge of the organisation of the dissemination of results jointly with all contractors.

Communication between Coordinator, Steering Committee and partners is assured by the frequent and fluent communication existing in the Consortium.

e) The work flow and communication between participants was basically assured by the WP coordinators as the objectives of each WP, at each period of the project, had to be covered.

f) Within the project and at scientific level, the coordination and enhanced communication activities of the project was realised through an interactive Wiki Page (<http://wiki.azti.es/aframe/>) allowing access to information. The idea is to have a semi-public wiki that can be accessed by anyone through Internet but only the project partners have rights to edit, add and delete things. Also, closed or on the contrary, totally public zones have been easily implemented. Being a very dynamic tool, changes, improvements and constant movements of information are being deployed at that site. All partners have a login and password to access the Wiki.

To allow the exchange of large files or data sets, AZTI-Tecnalia, as coordinator, decided to provide a private password protected FTP server (<ftp.azti.es>).

g) To assure social communication of the research project and final results, a web Page (www.azti.es/aframe) was designed for the project. This web page has to be considered as a brief presentation of AFRAME scope and contents for the general public. Web will be updated and translated into a vulgarised

language when deliverables and dissemination products will be approved by the Commission.

All AFRAME partners supported the organization of the work flow for the planned activities and performed the required administrative tasks. .

• *Deviations from the project work programme, and corrective actions taken/suggested: Identify the nature and the reason for the problem, identify contractors involved*

During the first period of the project, April 2007-March 2008, some actions were taken to adjust resources and tasks to reality of that moment when the project was taking place, in relation to deliverables contents and dates. Thus, during the second meeting carried out from 8-10 October in IJmuiden (The Netherlands) a proposal of changes in the Technical Annex of the proposal were presented by some of the participants and accepted by the project team.

These changes were:

IFREMER: a shift in the months allocation was proposed from WP2 (Western waters Case Study) to WP5 (Indicators Approaches).

In the Technical Annex of the AFRAME proposal it was assumed that IFREMER would dedicate 16.5 man_month to WP2. However, due to the new situation in IFREMER as Paul Marchal has left the Institute for one year and the substitution contract for the new researcher is being delayed, no possibility of dedication of such amount of man_months in WP2 was identified and so, a shift of 10 man_ months to WP5 was proposed by this partern.

The rest of the partners agreed on that.

WP4 Coordinator (DTU-Aqua proposed to move the delivery date of D 4.1 (Report on methods for the identification of fleets and fisheries and their data requirements) & 4.3 (Report on data quality issues in relation to the fleet and fishery categories defined in EU data collection regulation) from month 12 to month 24.

It was commented the no relevance of this task at this time. When the AFRAME proposal emerged, standardised fisheries definition, as we know them right now based on the Nantes matrix, was still in its first stage of gestation. However, since them, much work has been deployed to identify and define fisheries by country and eco-region. Thus, it was decided that not much dedication should be directed to this section as previous (TECTAC and CAFÉ) and future work (Call for Tenders: Lot 5) have and will be developed on this line.

Thus, the proposal from the AFRAME consortium was to delay the submission of D 4.1 and 4.3 (Report on data quality issues in relation to the fleet and fishery categories defined in EU data collection regulation) both due by month 12 to the end of the project (24 month) when results from the most recent projects would be already available and could be summarised for the completion of these deliverables. However, we want to clarify that in AFRAME no redefinition of fisheries will be attempted. The framework will be use to check how robust the Fcube method is if fisheries defined by the Nantes Matrix or by any other aggregation are used.

The rest of the partners agreed on that.

The Commission accepted these changes (official letter dated on the 22 /11 /2007) and recognised the no need of change the Technical Annex of the proposal as this is something minor that can be included in an annex or in an amended of the proposal.

During the second period of the Project, no major deviations of the working plan were deployed.

Some minor changes occurred in the management of the project in relation to change of name of one contractor. The change of name from IFM to AAU required of a corrigendum of the amendment already done and accepted by the Commission in August 2008 to address [the merge of IFM into AAU. This involved some actions:](#)

1. Agreement that IFM will not participate in the project as from 1/07/2007
2. Justification for this change
3. to provide Forms C and the audit certificate of AAU for the costs included before 1/07/2007 (the official documents should be sent to the coordinator and a copy of these documents should be sent to the Commission)
4. For the new contractor AAU: The completed A2A, A2B and A2C (Already sent in the first amendment)
5. a new completed, signed and stamped Form B (Already sent in the first amendment)
6. For the above mentioned contract: a list of personnel transferred to AAU including the new additional staff employed by AAU, the date of change, a copy of AAU and AAU employment contracts, a copy of the last payroll of AAU and the first payroll of AAU.

Contractor HCMR changed responsible research scientist. Thus, with effect from the 1st February 2009, Dr. Christos Maravelias was established as the new responsible scientist for the AFRAME project relieving Celia Vassilopoulou from this task.

In relation to the economic justification of the first reporting period, Commission informed the consortium that, according to Article 8.2(d) third paragraph, the second payment of the AFRAME will not be paid as the total accepted costs (436.490,47) was less than 70% of the first payment ($648.437 \times 70\% = 453906$).

According to this Article and to facilitate the tasks, The Commission proposed to send an additional management report (including management report, summary financial report and Form C of a part of the second period) including only costs of one contractor in order to reach the 70%.

However, AFRAME Steering Committee hold during the project meeting in October 2008 in Copenhagen decided that being so close to the end of the project (March 2009) it was not worth to do another Financial and Management report. The Steering Committee consulted all partners through mail whether they agreed on this resolution. The AFRAME consortium decided finally to wait to the final payment of the project, at the end of it (probably in October 2009).

• ***List of deliverables, including due date and actual/foreseen submission date***

Table 0.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Del. Name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D0.1	Mid term progress report (month 12)	0	Month 14 (May 2008)	June 2008			AZTI-Tecnalia
D0.2	End term Final AFRAME project report	0	Month 24 (March 2009)	June 2009			AZTI-Tecnalia
D0.2	End term Final AFRAME project report	0	Month 12 (March 2008)	June 2008			AZTI-Tecnalia
D0.3	Consortium Agreement Month 14	0	Month 14 (May 2008)	June 2008			AZTI-Tecnalia
D0.4	AFRAME Newsletter Month 12 (Attached)	0	Month 12 (March 2008)	31-05-2008			AZTI-Tecnalia
D0.5	AFRAME Newsletter	0	Month 24 (March 2009)	June 2009			AZTI-Tecnalia
D0.6	PIP (Policy Implementation Plan)	0	Month 24 (March 2009)	June 2009			AZTI-Tecnalia

• *List of milestones, including due date and actual/foreseen achievement date*

Table 0.2: Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Facilitated by participant
M0.1.	Kick-off meeting	0	Month 1 (April 2007)	2-4 April 2007 (Sukarrieta, Spain)	AZTI-Tecnalia
M 0.2	1st Coordination meeting (Methodological meeting)	0	Month 6 (September 2007)	9-10 October (IJmuiden, The Netherlands)	IMARES
M0.3.	2 nd Coordination meeting	0	Month 12 (March 2008)	1-3 April 2008	HCMR
M.0.4	3 rd Coordination meeting		Month 18 (September 2008)	8-10 October 2008	DTU-Aqua

M.0.5	Final meeting		Month 22 (January 2009)	2-4 February 2009	AZTI-Tecnalia
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WP1 North Sea case study

• *Objectives and starting point of work at beginning of reporting period*

To apply the framework for fleet and area fisheries management to selected fisheries in area IV

• *Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved*

First reporting period (April 2007- March 2008):

The primary task of WP1 has been in aiding WP4 (the fleet and area framework methodical work). To this extent, all partners in this WP, have collaborated on delivering data on relevant fleets and fisheries for the purposes of methodical development of the Fcube framework. The primary goal within the second reporting period has been in applying and extending Fcube framework in the north sea area. This has led to not only decisive improvements in the development of the generic framework itself, but also to significant progresses in the development of knowledge strictly related to the North Sea area, regarding data collection of biological and economic data at the international level, analysis of main fishery patterns and implementation of operational modeling framework for this area. The consequence of this successful integration of regional knowledge is the selection of the North Sea as case study for the first operational mixed-fisheries advice to be provided by ICES in 2009 (ICES WKMIXFISH see <http://www.ices.dk/reports/ACOM/2008/SGMIXMAN/> for report and executive summary) , Workshop for Mixed Fisheries Advice, 26-28 august 2009) on the basis of AFRAME WP1 and WP4 outcomes.

Partner 4. FRS. All the work carried out during the year was for Work Package No 1 – North Sea Case Study. This work has taken much longer to complete than originally intended, but is essential to the other work packages which are involved within this contract.

Partner 10. UCPH-UCPH has dedicated time for preparatory work in this WP collecting and describing Danish data, and planning the economic modelling in the fleet and area based framework, which will be performed in the second reporting period.

Partners 8. IMR has contributed in this WP in the following tasks:

- Estimate / deliver Norwegian catch and effort data on the Nantes matrix
- Literature studies (to get familiar with the Nantes matrix and previous projects important for the AFRAME project, like e.g. EFIMAS)
- Meetings (the project and internal meetings)
- In addition, economic data (like e.g. profitability) for the Norwegian fleet have been revised to see whether these can be improved compared to that data supplied in the EAR-report. This work is still in progress and subject to be discussed with other partners.

Partner 3. DTU-Aqua has a major role in Deliverables 1.1:

Recently, a new national fishery database (DFAD) has been implemented for the Danish fisheries. The many modifications and improvements have contributed to a new EFLALO data format being set up (the EFLALO format has been agreed as common fishery data format in AFRAME). To the database was added the definitions of fleet and fisheries for the North Sea demersal fisheries. A description of the classification produces and fleet structures is reported in the activity report under WP1. Data from 2003 to 2006 was applied.

Second reporting period (April 2008-March 2009)

Partner 9. IMARES built a generic full feed back simulation model to investigate the impact of alternative management measures on a fisheries with mixed species harvests, taking into account the spatio-temporal dynamics of the fish populations interacting with fleets through fishers behavior in response to applied management measures. The model is based on the interplay and interactions between the biological dynamics of the fish stocks as resources, and consists of an age structured population model, which includes the stock dynamics and other biological characteristics of two fish stocks with population dynamics characteristics from the North sea plaice- and sole stock. In addition the model includes the economic dynamics of fleets and fisher behavior, the perceived information on state of stocks and fisheries and the implementation of harvest control rules based on management regulations or policies. The incorporation of the Fcube approach in the application of the harvest control rule in the long-term management procedure for the north sea was implemented and tested. Many simulation runs, examining the projection of Fcube harvest control rules into the future, and effects on TAC, discards, landings and recruitment for plaice and sole were performed.

Partner 2. CEFAS work in relation to the WP1 has been on the investigation of potential indicators to link fishing activity to the impacts of that fishing activity. The North Sea makes a useful case study to investigate such effects as there have been substantial changes in fishing effort and fishing mortality in recent years, at least partly in response to management measures introduced as part of the cod recovery plan. The work used the key Fcube parameters of effort and catchability in order to investigate whether a metric of total fleet effort corrected for the catchability of the metier to which that effort was allocated, could be used as a proxy for fishing mortality that was independent of stock assessment information. While the time series of effort data for this work was short, the results show some promise in this direction. The work was closely linked with work in relation to WP5.

Partner 3. DTU-Aqua has had a major role in the various stages of WP1 throughout the project. During the second reporting period in particular, DTU Aqua has performed extensive work for D1.2, conducting the biological data analyses and Fcube exploratory runs leading to major results and an operational model to be used in ICES WK MIXFISH in august 2009, of which Clara Ulrich from DTU Aqua will be the chair person. This work is detailed in D1.1 and D1.2, as well as D4.1 and D4.3 and will be summarised in a manuscript to be submitted for publication. Simulations included 16 national fleets from six countries, from 2003 to 2006. These fleets engage in one to seven different fisheries, resulting in 52 metiers (combination of country*fleet*fishery) catching cod, haddock, whiting, saithe, plaice, sole and *Nephrops* in various proportions.

Fleet-based Management Strategies Evaluation frame have been developed both for the North Sea demersal fishery for cod and haddock using FLR framework (Hamon et

al., 2007), and the modelling of demersal fishery for plaice and sole using TEMAS software was finalised (Andersen et al., subm).

Finally, the model described in Hamon et al. (2007) has been updated and extended to include the six demersal fish stocks, and to include Fcube in the step of fleet effort modelling. This allows to test the potential long-term consequences of F-cube based management scenarios at the whole regional scale. This very comprehensive work is not fully completed yet and is still ongoing.

Partner 4. FRS

Individual-haul estimates of haddock size-selection parameters obtained by Marine Scotland (formerly Fisheries Research Services) from 32 trials between 1991 and 2005 were collated. Models were developed to describe how the selection parameters changed with gear design. The 50% retention length depended on codend mesh size, codend twine diameter, the number of meshes round, the presence of a lifting bag, the presence and position of a square mesh panel, and the codend catch. The selection range depended on codend mesh size and codend twine diameter. The meta-analysis provided a predictive model, based on empirical data, of haddock trawl selection that can inform management decisions.

Partners 8. IMR.

Data on catches and effort (days and kWDays) from Norwegian vessels fishing in the North Sea has been estimated in the Nantes matrix format and included in the North Sea database. The data were quality checked, and a problem with the Norwegian catch and effort data (related to the amount of effort) was fixed in 2009.

IMR made some effort to try to get better data on the economic data from Norwegian fisheries in the North Sea, as every year a quite detailed report concerning the economics of the different Norwegian fleets is published (see <http://www.fiskeridir.no/fiskeridir/fiske-og-fangst/statistikk/loennsomhetsundersokelse-for-fiskeflaaten/endelige-resultater-2007> <<http://www.fiskeridir.no/fiskeridir/fiske-og-fangst/statistikk/loennsomhetsundersokelse-for-fiskeflaaten/endelige-resultater-2007>>, but only summary in English). This report is, however, not split by fishing area, and it was thus not possible to separate the economic data valid for the North Sea fisheries from the fisheries in other areas, as many fleets fish both in the North Sea and in other areas.

Partner 10. UCPH

UCPH has contributed to WP1 in two ways. Firstly by collecting economic data for the North Sea database, and secondly by providing the original Fcube framework with economic assessment indicators and developing an economic extension to the Fcube framework and applying this to the North Sea data.

The economic data has been collected by UCPH according to the requirements of the data collection regulation EC reg. 1639/2001. The collected economic data comprise variable and fixed costs together with total investment per vessel, all aggregated at fleet level. The variable costs have subsequently been disaggregated down to métier level in proportion to the métier effort shares. The fixed fleet costs are the sum of the depreciation of and the interest on the fleet capital. The variable fleet costs are the sum of the fuel costs, other running costs (expenditures on ice, provisions, unloading, transport etc.). The vessel costs are the sum of semi fixed costs (maintenance of hull, engine, gear, electronics, administration etc.). The share to the crew is recorded in the

accounts and is in most cases a function of the landing value. The investment price per vessel is represented by the invested capital for the total fleet divided by the number of vessels in the fleet. All these costs are recorded on an annual basis.

As said above UCPH has provided the original Fcube framework with economic assessment indicators and developed an economic extension of the Fcube framework (the FcubeEcon model), thus acknowledging that fisheries management has an impact on human behaviour as well as on stock development, and as such management should be based on solutions that take into account the behaviour and economic interest of humans as well. The economic indicators firstly makes it possible to analyse the economic outcome of the various biological exploratory runs. And secondly the FcubeEcon module allocates effort according to economic optimisation, allowing effort to be re-distributed among métiers in an economic optimal way. FcubeEcon has been applied to the North Sea database and various economic exploratory runs have been performed.

• **List of deliverables, including due date and actual/foreseen submission date**

Table 1.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	Workpackage no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D1.1	A report of the fleet & fishery structure of the case study	1	Month 12	June 2008			IMARES
D1.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area	1	Month 22	June 2009			IMARES

• **List of milestones, including due date and actual/foreseen achievement date**

Table 1.2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M1.1.1	Relevant data compiled	1	Month 4	Month 4	IMARES
M1.1.2	Data checked and reviewed	1	Month 6	Month 6	IMARES

M1.2.1	Appropriate indicators identified	1	Month 4		IMARES
M1.3.1	Fleets and fisheries identified	1	Month 6	Month 6	IMARES
M1.4.1	Indicators summarised in provisional framework	1	Month 15	Month 15	IMARES

- ***Deviations from the project work programme, and corrective actions taken/suggested: identify the nature and the reason for the problem, identify contractors involved***

First reporting period (April 2007-March 2008)

No major deviations from the project work program have occurred.

Second reporting period (April 2008-March 2009)

The work of updating and extending up to the six demersal fish stocks in the model described by Hamon et al. (2007) is not fully completed yet and is still ongoing. This would allow to test the potential long-term consequences of F-cube based management scenarios at the whole North Sea regional scale.

WP2 Western Waters Area Case study

- ***Objectives and starting point of work at beginning of reporting period***

To apply the framework for fleet and area fisheries management to selected fisheries in the Western area (Channel, Celtic Sea, Bay of Biscay).

- ***Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved***

First reporting period (April 2007-March 2008)

An international (England, Basque Country, Spain, France) dataset was built up for Western areas (Channel, Celtic Sea, Bay of Biscay). Fleets and métiers definitions were standardised across countries (milestones M2.1.1 & M2.1.2). The main stocks to be considered in the Western areas have been listed. In addition, the stocks for which biomass estimates are available and the stocks for which TAC management has been restrictive have been identified. One major outcome of WP2 has been to identify and characterise the main fleets, métiers, species/stocks and the level of technical interaction between these (milestone M2.3.1). In addition, the main métiers and target species have been identified. Some economics are available, on an aggregated basis.

More details on the Western areas fishery system may be found in deliverable D2.1, which is provided along with this report.

The Western area dataset has already been used by AZTI-Tecnalia to apply the F-cube approach (WP4). So far, the analyses included only stocks subject to analytical assessments (see Table 3a in deliverable D2.1). The next step will be to apply F3 to all stocks, including those not subject to analytical assessments.

Partner 1. AZTI-Tecnalia presented a first approximation of how to include or treat in the data bases and also, as a final objective, in the Fcube method those species with no analytical assessment and with or without some kind of management, at the join meeting with the WGMIXMAN (Working Group on Managing in January 2008 and also during the 2nd plenary meeting in Athens.

A literature review on indicators is being carried out, and appropriate indicators will be identified in the context of fisheries management, under the auspices of WP5, expectedly around month 15 (M2.2.1). Some of these indicators will be applied to the Western case study to provide a diagnostic using the F-cube method (M.2.4.1).

By the end of the 2nd Plenary meeting a final compiled Data Base for all countries and partners (Partner 1. AZTI-Tecnalia, Partner 2. CEFAS, Partner 7. IFREMER and Partner 11. IEO) was obtained. Partner 1. AZTI-Tecnalia worked actively to deploy the Fcube trials to be carried out on these common data base.

Second reporting period (April 2008-March 2009)

The Western area dataset provided during the first year of the project has been processed to fit the requirements of WP4 (in relation to the application of the Fcube programme) and WP5 (in relation to the development of fisheries indicators). All partners (AZTI, IFREMER, CEFAS and IEO) participate in the building up of the Databases for the requirements

AZTI was the partner in charge of the exploratory analysis and the application of the Fcube to the Case Study. Also has led the construction, contents and discussion process in relation to D.2.2. IEO has also largely participated in the discussion of the Fcube application to the Case Study. An exploratory analysis of the Western dataset was carried out to identify the most salient technical interactions across stocks and fisheries. Two raising procedures have been applied to ensure that the landing data derived from the Western area dataset match up with the landing data used for stock assessment purposes (see details in D. 2.2). Also, the less important fleets and métiers were aggregated based on a landings threshold. Different thresholds were applied. Then, catchability estimates by fleet and metier have been processed for the stocks subject to a regular stock assessment.

In relation to the application of Fcube to the Western area mixed fisheries (WP4), a number of management strategies have been investigated and sensitivity analyses to both the raising and the aggregation procedures have been carried out. The less important fleets and metiers were aggregated based on a landings threshold. The full results of these investigations are available in Deliverable 2.2.

IFREMER was in charge of the development and testing of the indicators to be used in the Case Study. A set of indicators has been developed and tested to assess, at the scale of both the stock and the fishery, the achievement of Western area management objectives, the gains/losses in yield, and also the sensitivity of Fcube outcomes to the various underlying assumptions. The development and the evaluation of the statistical performances of the different indicators has been the subject of a Ph.D. thesis. These indicators are fully detailed in Deliverable D2.2.

CEFAS had only a limited role in the Western Waters case study, and this largely involved the provision of data, and responding to questions and problems identified by

other partners in relation to the analysis performed during the case study specially in relation to the English fleets which are part of the Case Study.

Some other minor but significant contributions to the Western Waters Case Study has been DTU Aqua. It has significantly contributed through methodological support from WP4. Ongoing contact and exchange of R codes and scripts have ensured full consistency between the work performed within case study 1 (North Sea) and case study 2 (Western waters). WP4 coordinator from DTU Aqua will be co-author of some of the papers produced under WP2.

• **List of deliverables, including due date and actual/foreseen submission date**

Table 2.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D2.1	A report of the fleet & fishery structure of the case study	2	Month 12	June 2008			IFREMER
D2.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area.	2	Month 22	June 2009			AZTI

(*) if available

• **List of milestones, including due date and actual/foreseen achievement date**

Table 2.2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M 2.1.1	Relevant data compiled	2	Month 4	Month 6	IFREMER
M 2.1.2	Data checked and reviewed	2	Month 6	Month 6	IFREMER
M 2.2.1	Appropriate indicators identified	2	Month 4	Month 15	IFREMER
M 2.3.1	Fleets and fisheries identified	2	Month 6	Month 6	IFREMER

M2.4.1	Indicators summarized in provisional framework	2	Month 15		IFREMER
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- ***Deviations from the project work programme, and corrective actions taken/suggested: identify the nature and the reason for the problem, identify contractors involved***

First reporting period (April 2008-March 2009)

The only deviation from the project work programmed is the delay in the achievement of milestone M2.3.1 (identification of appropriate milestones). The work relevant to this milestone is being carried out by a Ph.D. student, in tight relation with WP5, and results will be expected in month 15.

The comparative run of Fcube to be carried out based on fleet/fisheries defined at lower resolution than in the Nantes Matrix, at country level (Spain proposal of analysis by Partner 1. AZTI-Tecnalia & Partner 11. IEO), will be carried out during months 14-18 and presented at the next AFRAME meeting.

Summarising, no major deviations from the project work program have occurred.

Second reporting period (April 2008-March 2009)

A bit more than half of the initial budget allotted to IFREMER has been used in relation to the AFRAME project. The main reason for not spending all the available funding was that Paul Marchal was on secondment between the 1 August and the 31 January 2009. Paul Marchal was initially due to have substantial inputs in AFRAME, and particularly in relation to the incorporation of data-poor species in the different WPs of the project. Paul Marchal could eventually not be replaced during his secondment, and the parts of the project he was initially involved in could not be carried out.

WP3 Mediterranean case study

- ***Objectives and starting point of work at beginning of reporting period***

To apply the framework for fleet and area fisheries management to selected fisheries in Mediterranean FAO/GFCM Management Units 22 & 23

- ***Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved***

First reporting period (April 2008-March 2009)

Partner 5. HCMR exerted a considerable manpower allocation to compile and review the available data on fleets, fisheries and targeted stocks in the study area, a great deal of which were derived from previous sporadic surveys and fragmented sources. Unlike other Case Studies, this was the first time that such a task was undertaken in the north-eastern Mediterranean EU waters. This task required to compile, check, validate, integrate, review and polish all available data that have been sporadically acquired under various sampling schemes in the past. The significant manpower

allocated in the particular WP is a reflection of that. Then, on the basis of the fleet/fisheries landings dataset that was constructed, an analysis using multivariate techniques took place for the first time in the study area. This analysis allowed the evaluation of the definitions of the respective fleets and fisheries as identified in the frame of the Data Collection Regulation (DCR) Program, and provided the fishing activity matrix to be used in the frame of the AFRAME project in close collaboration with activities carried out under WP4. Furthermore, the main targeted stocks by the aforementioned fishing activities were identified. Since routine analytical estimations do not take place in the study area, assessments of the biological/exploitation parameters of these stocks were also conducted. In addition, a significant effort was also directed, in close collaboration with activities conducted under WP5, towards gathering the appropriate data and information that would enable the identification of potential indicators to be used for management advice in the provisional framework of the Mediterranean case study. Total effort: 23.44 person-months.

Second reporting period (April 2008-March 2009)

During the second reporting period HCMR completed the development of the demersal fleet and fishery framework in the Aegean Sea, which was created in line with its better responsiveness to local needs and concerns. Then, the working group proceeded to testing of this framework for describing fleet activity by implementing the Fcube approach aiming to model optimum effort allocation among conflicting fleets and the implications this would have on main target species. In relation to the economic parameters and their adaptation to the model complementary activities with UCPH were ideally suited to support respective actions. The whole effort addressing potential changes in the focus of fisheries management into a more fleet- and area based framework concentrates on formulating the best possible advice for the better management of the demersal fleet and fisheries in the study area on an annual basis. Such an attempt was made for the first time in Mediterranean waters and hence it involved a considerable allocation of man power and was developed in close collaboration with activities carried out under WP4 while developing model trials. Then, in cooperation with activities under WP5, appropriate candidate indicators capturing biological, fishery and economic dimensions were identified and incorporated in the Mediterranean case study framework.

DTU Aqua has a minor but significantly contributed to this WP3 through methodological support from WP4. Ongoing contact and exchange of R codes and scripts have ensured full consistency between the work performed within case study 1 (North Sea) and case study 3 (eastern Mediterranean waters). WP4 coordinator from DTU Aqua will be co-author of some of the papers produced under WP2.

• List of deliverables, including due date and actual/foreseen submission date

Table 3.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor

D3.1	A report of the fleet & fishery structure of the case study	3	Month 12	June 2008			HCMR
D3.2	A research paper on the implementation of the fleet/fishery and indicator frameworks in the case study area. y	3	Month 22	June 2009			HCMR

(*) if available

- *List of milestones, including due date and actual/foreseen achievement*

Table 3.2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M 3.1.1	Relevant data compiled	3	Month 4	Month 4	HCMR
M 3.1.2	Data checked and reviewed	3	Month 6	Month 6	HCMR
M 3.2.1	Appropriate indicators identified	3	Month 4	Month 14	HCMR
M 3.3.1	Fleets and fisheries identified	3	Month 6	Month 6	HCMR
M 3.3.2.	Indicators summarised in provisional framework	3	Month 15	Month 15	HCMR

- *Deviations from the project work programme, and corrective actions taken/suggested: Identify the nature and the reason for the problem, identify contractors involved*

First and second reporting period (April 2008-March 2009)

No major deviations from the project work program have occurred. An extra 4 person months were required for implementing the F-cube framework in the Mediterranean case study (WP3). This was due to a number of reasons that emerged in the course of the project:

- The fact that F-cube was initially developed for TAC regulated fisheries. In order to modify the methodology to fit no-TAC regulated fisheries (i.e. most Mediterranean and Greek fisheries) and therefore expand its applicability and general use, an extensive person month power was required. This had the advantage of making the methodology available to effort-controlled fisheries.

b) The Mediterranean Sea is a relatively data poor case study, at least compared to more northern EU waters (e.g. North Sea). As a result and since this was the first time ever that the F-cube methodology was implemented in the Med, a considerable man power effort was directed in understanding data requirements and collating the necessary input for the method.

c) Unlike the ICES working groups' assessments, in the Mediterranean Sea routine analytical stock assessments are not carried out. This applies even to the most economically important fish stocks in Greece. Therefore apart from the work on data compilation, filtering, error handling, integration and standardization, an additional task was required that was not initially considered. A significant effort was exerted towards estimating parameters describing the status of the stocks, which were crucial for the F-cube runs. Detailed information regarding the stocks (total number of individuals, total biomass, survival rates, natural losses, fishing mortalities) were obtained applying stock assessment methods (VPA – Virtual Population Analysis) on the catch data. Vectors of fishing mortalities (F) by age were estimated and used as input to the F-cube implementation. Natural mortality was not assumed constant (as is the case in most studies) but we used a variable vector of values derived from the Chen-Watanabe equation (Chen & Watanabe, 1989) for red mullet and striped red mullet and from Caddy and Abella (1999) for hake (a detailed description is given in WP3 Annex). The extraction of this info required a significant amount of effort and the stock status parameters derived were calculated within this project using the original raw data from the EC-National Data Collection Programme samplings and were not obtained from available stock assessments conducted in the past. Such stock assessment studies have been conducted already (only for hake) within the framework of other EU funded projects (BECAUSE, EFIMAS), but the age structure followed there was different by the one adapted here and therefore not used. More precisely, the STECF's SubGroup on Mediterranean demersal stocks held in Athens during April 2008 decided that future hake assessments should be performed using the growth parameters according to the French tagging experiments (de Pontual *et al.*, 2003; 2006). It was decided to follow this STECF decision for our analysis in order to obtain more reliable stock estimates.

d) The basic F-cube runs involved 3 main scenarios which in turn included 7 sub-scenarios. In the Mediterranean Case Study it was decided to implement a further sub-scenario which is considered perhaps to be the most plausible for the Mediterranean, i.e. the DAS_reduction sub-scenario (partial reduction of effort on certain fleets).

e) Initially and before concluding to the aforementioned final version of our F-cube implementation, the first approach conducted was based on an earlier version of F-cube (created 4-10-2007). Results of these runs were presented at the 3rd AFRAME Coordination Meeting in Copenhagen (October 2008) and are incorporated in the Annex of deliverable 3.2. This version of F-cube assumed that the relationship between the fishing mortality and corresponding catch was linear, leading to erroneous estimations. As soon as the newer F-cube version became available ('d' above), we shifted to it and re-estimated the fleets' behavior according to the proposed quotas and various scenarios.

f) A separately implemented economic optimization scenario further enhanced the WP3 Mediterranean Case Study F-cube framework. The difference between the "val" sub-scenario (val: value) of the basic F-cube runs and the separately estimated "optimization" scenarios is that the "val" scenario gives an effort weighted by the most valuable species, which in some cases may give lower profit than even the "max" scenario. Instead the "optimization" scenarios give the optimal effort based on economic considerations - i.e. the effort that gives the highest profit. This was considered beneficial in trying to

understand fleet response and fishers' behavior to future management measures. It was decided to explore both these in an attempt to acquire an improved insight for the main drivers of the fishing activities.

WP4 The fleet and area framework

• Objectives and starting point of work at beginning of reporting period

The objectives of this WP are:

- To review and develop methods for improving the definitions of fleets and fisheries with particular regard to their data requirements
- To develop and test a robust framework for management advice, addressing explicitly the various fleets and fisheries operating within an area.

At the beginning of the second reporting period, the following was achieved: The Base Case Fcube run was completed and made operational. It was presented and used during ICES SGMixMan in January 2008. It included the full compatibility of the method with the general FLR framework. In return, the Fcube approach had also been a major driver for the general development of FLR with regards to fleet-based objects and methods. In particular, the design of the FLFleet object had been modified during 2007, to account for the metier/fishery level, which did not exist before.

In addition, a number of other tasks were started and in progress, including the development of economic scenarios and MSE approaches.

• Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved

First reporting period (April 2007-March 2008)

During the first period, the first development of the Fcube framework was undertaken. The method was distributed and initially used in the three case studies. Finally, it was extensively tested during ICES SGMixMan in January 2008. Detailed work by partner was as follows :

Partner 3. DTU-AQUA is responsible for coordinating WP4 and leading the contribution for D4.1, D4.2, D4.3, whereas D4.4 is lead by FRS. All deliverables DTU Aqua was involved in were in progress and followed the proposed milestones.

DTU Aqua has developed a fleet/fishery based HCR framework (Fcube). Code has been developed in R. Preliminary simulations including 18 national fleets from six countries, from 2003 to 2006, have been done. These fleets engage in one to seven different fisheries, resulting in 64 metiers (combination of country*fleet*fishery) catching cod, haddock, whiting, saithe, plaice, sole and Nephrops in various proportions. 4. Several management scenarios was simulated. Additional work to do with data collection (see WP1), code development and testing has taken place in close collaboration with several ICES working groups (WGNSSK 2006, SGMixMan 2007-2008). In addition, A Management Strategies Evaluation framework has been applied and published for the North Sea demersal fishery for cod and haddock (Hamon et al., 2007), which should be compatible with Fcube in the future.

Partner 1. AZTI-Tecnalia carried out explicit development and further adaptation of the Fcube method to the Western Waters CS. Results of the Fcube adaptation were presented at the ICES WGMIXMAN- AFRAME joint meeting in January 2008 and at the AFRAME meeting in Athens in April 2008.

AZTI-Tecnalia developed an economic scenario named as optimum value and has been included in the development of the Fcube possible effort allocations and run for the Basque fleets. Two more scenarios were developed as a first step of a common base of analysis for all case studies. These scenarios would refer to the optimization of a social objective such as employment (through Gross Value Added, GVA) and of that of a more private-oriented one (Full Equity Profit, FEP). This conceptual framework was presented outside Fcube, expanding on other possible foci of analysis and testing it for two Basque métiers. Further developments on these economic scenarios are expected for the next period of the project.

Partner 5. HCMR supported the planned activities, coordinating accordingly the efforts conducted in WP3, aiming to make the appropriate adaptations that will permit during the second year of the project testing of the possibility to implement the Fcube approach in the Mediterranean case study, as well as of the further development and application of the generic framework built in previously EU funded projects (e.g. EFIMAS, CAFÉ), to incorporate the multispecies/multifleet management approach tackled under the AFRAME project.

Partner 7. IFREMER has contributed applying the Fcube method to the Western case study. For the Western case study, IFREMER has contributed to the discussions around the application of F3 to the commercial fisheries harvesting stocks subject to analytical assessments, which has been run by AZTI. The next step will be to apply F3 to all stocks, including those not subject to analytical assessments.

Partner 9. IMARES work started on a model to evaluate the effects of Fcube on stocks, fleets and fishers. The coupling of Fcube to a spatially explicit model of north sea fish dynamics, involving dynamic fishers has been made, by extending models developed under PROTECT. In the next months this model will be further developed.

Partner 10. UCPH will start work on coupling a more realistic economic model to Fcube from month 15 onwards.

Partner 11. IEO has actively participated in the application of the Fcube to the Western Waters Case Study for the Spanish fleet segment.

Second reporting period (April 2008-March 2009)

During the second period, tremendous work was done by all partners in order to achieve the objectives for the WP, and significant results were obtained. In particular, following tasks were achieved : 1) completion of the development of the operational Fcube framework, including various exploratory and sensitivity analyses and final frame for ICES mixed-fisheries advice, 2) coupling of Fcube with a full feed-back MSE approach 3) extension of Fcube to include additional economic scenarios and analyses and 4) completion of selectivity analyses for haddock. Detailed by partner is as follow.

Partner 3 DTU-Aqua has completed deliverables D4.1, D4.2 and D4.3 in time and have followed the agreed workplan and milestones. DTU Aqua's contribution to this WP has lead to considerable methodological development, including the development of the Fcube methods fully consistent with the FLR framework, the development of extensive R scripts for data analyses, graphical outputs, exploratory runs and management

scenarios, the direct application of these to case study 1 (WP1), and the methodological support to case studies 2 and 3 (WP2 & 3). The common database and modelling framework developed in WP4 has ensured a high level of consistency between the three case studies. Beside, DTU Aqua has pursued some research activities dealing with technological creeping in the Danish demersal fisheries (Eigaard, 2009). Both these analyses on gear technologies have not been linked to the general Fcube methodology. However, they are of key importance for a better understanding of the linkage between fishing effort and fishing mortality, and should be accounted for in further fleet-based models.

Partner 1 : AZTI-Tecnalia supported and followed the planned activities of this WP to be engaged to those activities been developed and planned in WP2 by means of developing Rcode for the extraction of main results of the analysis performed in the Western Waters Case Study (WP2). The application of the Fcube in the Western Waters by AZTI permitted, due to the nature of this Case Study, to carry out some extra analysis included in the work of this methodological WP. Some of the activities deployed by AZTI were the comparison between different methods of raising for the basic data, the methodology to establish thresholds and the graphical/visual methods facilitation for election of these thresholds based on the number of fleet/metiers reduction and the balance between these and the catch losses in generic variables (see D.4.1. and D.4.3 for methodological description & D.2.2. for application of the method to the Western Waters Case Study). Also, methodologies in relation to the q sensitivity to different fleet/metier aggregations were carry out based on the use in the Fcube of mean values or yearly q values. Graphical comparisons of the results were also proposed.

Partner 4. FRS has fully achieved deliverable D4.4 about Meta-analysis of haddock size-selection data (over both reporting periods).

Haddock selectivity data collected between 1991 and 2005, on Scottish whitefish vessels was collated. The relationship between the selection parameters (L_{50} and $\log SR$) and the explanatory variables was investigated using linear mixed models in a backwards and forwards stepwise selection process. Nonlinear effects were also investigated by fitting cubic smoothing splines or by binning a continuous variable and treating it as a categorical variable. The significance of the fixed (linear) effects were assessed by Wald tests; the significance of the random effects and of the cubic smoothing splines were assessed by analysis of deviance. The meta-analysis provided a predictive model, based on empirical data, of haddock trawl selection that can inform management decisions.

Partner 5. HCMR supported the planned activities; coordinating accordingly the efforts conducted in WP3, and made the appropriate adaptations permitting the application of the Fcube approach in the Mediterranean case study. A focal point of the work elaborated herein is the critical analysis of the applicability of the CS model trials, discussing weaknesses in data used, results obtained and future possible improvements.

Partner 7. IFREMER has contributed the determination of the different management strategies simulated by the Fcube model. IFREMER has also proceeded to the interpretation of the Fcube outcomes pertaining the French fleets and métiers. Note that because of the departure of one scientist initially involved in the AFRAME project, IFREMER has not developed a procedure aiming at accounting for those stocks not subject to an analytical assessment.

Partner 8. IMR has contributed to the quality assurance of the Fcube model and associated deliverables. However, because of the departure of one scientist initially involved in the AFRAME project, IMR has not been involved in the analysis of selectivity data as initially planned, and has therefore not reported any hours under WP4. All hours were reported under WP1 instead.

Because of the departure of one scientist initially involved in the AFRAME project, Partner 8 (IMR) has not been involved in the analysis of selectivity data as initially planned, and has therefore not reported any hours under WP4, but under WP1 instead.

Partner 9. IMARES developed a full feed-back model with integration of Fcube method. Details of IMARES contribution under this is reported in the activity report for WP1.

Partner 10. UCPH has contributed to WP4 by developing an economic extension of the Fcube framework (the FcubeEcon model), thus acknowledging that fisheries management has an impact on human behaviour as well as on stock development, and as such management should be based on solutions that take into account the behaviour and economic interest of humans as well. The Fcube framework includes a value scenario, assuming that the fishermen target the most valuable species first. This will, however, not lead to economic optimality (highest possible profit), and does as such not reflect the economically optimal fisherman behaviour, as reallocation of fishing effort and costs are not taken into account. The FcubeEcon model, on the other hand, goes the step further and finds the economically optimal allocation of effort between fleets and métiers, given certain pre-determined constraints (e.g. that the catches must not exceed the quotas), in such a way that the total fleet profit is maximised. The FcubeEcon does as such not assume a constant distribution of efforts between métiers, and as it furthermore allows a number of different constraints to be included in the optimisation it is a very flexible framework which is a valuable contribution to Fcube. The FcubeEcon framework has been implemented in Excel as FLR does not at present include strong optimisation tools.

Partner 11. IEO has actively participated in the application of the Fcube to the Western Watters Case Study for the Spanish fleet segment.

• **List of deliverables, including due date and actual/foreseen submission date**

Table 4.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor

D4.1	Report on the identification of fleet and fisheries using national databases, including a critical validation of the reliability of those databases	4	Month 12	June 2008			DTU-Aqua
D4.2	A peer-reviewed article on the F ³ versatile method for fleet-based HCR	4	Month 24 (*)	November 2008			DTU-Aqua
D4.3	Report on data quality issues in relation to the fleet and fishery categories defined in EU data collection regulation	4	Month 24	June 2009			DTU-Aqua
D4.4	A peer-reviewed article on the analysis of the fleet selectivity data	4	Month 12 (*)	June 2009			FRS

(*) see WP0 decision and justification for delaying these two deliverables.

• *List of milestones, including due date and actual/foreseen achievement date*

Table 4.2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M 4.1.1	Initial identification of fleets and fisheries to be used in the model using standard methods	4	Month 4	Month 4	DTU-Aqua

M 4.1.2.	Critical analysis of national data and possible improvements		Month 15	Month 24	DTU-Aqua
M 4.1.3.	Alternative fleets and fisheries definition and aggregation levels for model robustness trials.		Month 18	Month 24	DTU-Aqua
M 4.2.1	Development of the versatile fleet-based HCR rule	4	Month 9	Month 9	DTU-Aqua
M 4.2.2	Initial HCR runs	4	Month 12	Month 10	DTU-Aqua
M 4.3.1	Setting of the simulation framework base case	4	Month 12	Month 12	DTU-Aqua
M 4.3.2	Robustness trials		Month 12	Month 24	DTU-Aqua
M 4.4.1	Collation of available selectivity data	4	Month 6	Month 6	DTU-Aqua
M. 4.5.	Report and deliverables writing		Month 24	Month 24	DTU-Aqua

• *Deviations from the project work programme, and corrective actions taken/suggested: identify the nature and the reason for the problem, identify contractors involved*

First reporting period (April 2008-March 2009)

Partner 1: AZTI-Tecnalia. Further processes are still to be considered, including capacity fleet behaviour as effort allocation models (RUMS...). Further development will be given to the economic analysis of the fleet behaviour in an article for the ICES 2008 Annual Scientific Committee.

D4.1 & D4.3 has been postponed to month 24. As the current fleet and fisheries categories in the EU data collection regulation will soon be modified, it has been agreed to postpone this deliverable to the end of the project period. DTU-Aqua has currently not undertaken any activity within this deliverable. See details in section WP0. Coordination.

D.4.4 : A key issues in the fleet based Fcube framework is the selectivity of the fishing gear (catchability). Initial work to collect information of available selectivity data for applied fleets has been started.

Summarising, no major deviations from the project work program have occurred.

Second reporting period (April 2008-March 2009)

Because of the departure of one scientist initially involved in the AFRAME project, IFREMER has not developed a procedure aiming at accounting for those stocks not subject to an analytical assessment.

Because of the departure of one scientist initially involved in the AFRAME project, Partner 8 (IMR) has not been involved in the analysis of selectivity data as initially planned, and has therefore not reported any hours under WP4, but under WP1 instead.

WP5 Indicator Approaches

• Objectives and starting point of work at beginning of reporting period

To identify and test approaches to giving fishery management advice at the fleet and fishery level based on stock assessment information and other indicators.

The intention of this work package was to draw on experience elsewhere with the application of indicator approaches to develop an approach to using indicators as a way of guiding the management of mixed fisheries. This approach reflected both the need for fishery-based advice, and hence the need to quantify the extent to which different species are caught together, and the much greater information needs for management, if measures are to be implemented at the fishery, as well as the stock level. Indicator approaches offer away of dealing with this complexity through, for instance, summarising indicators of the state of the resource (e.g. stock biomass from stock assessments), and the pressure on it (e.g. fishing mortality by fleet and fishery).

• Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved

First reporting period (April 2008-March 2009)

The absence of documented applications of indicator approaches has necessitated an alternative, and much more widely focussed approach. This has involved reviewing a much wider range of literature relating to indicators, in order to identify features of indicators and indicator frameworks that might be of direct application in the context of European mixed-fisheries. One product of this work was a conference paper (Reeves & Ulrich 2007) that discusses how, in terms of the information required for management, a multi-fleet, multi-gear, mixed-species fishery can be considered as being intermediate between a single stock fishery and the ecosystem approach to fisheries management. This implies that the implementation of an indicator approach for a mixed-species fishery could be approached either from the starting point of a single stock fishery, or from the literature on indicators in the context of the ecosystem approach to fisheries management. The two partners in the AFRAME project with the most input to this work are Partner 2. CEFAS and Partner 7. IFREMER. Broadly speaking, the Partner 2. CEFAS work involves the practical implementation of an indicator approach starting from current single-species approaches, whereas the Partner 7. IFREMER work takes the broader indicator literature as its starting point. Information on economic indicators

is also available from the work of another partner, Partner 10. UCPH, and it is intended that the review will also draw on this expertise. Partner 3. DTU-Aqua only has a minor role in this WP. Initial work has been done.

Partner 7. HCMR supported the planned activities to provide a review of the literature concerning the development, selection and application of indicator approaches in a fisheries management context for the Mediterranean. A substantial manpower allocation was also required for this activity since most of the relevant information is sporadic and fragmented and is derived from grey literature (e.g. project reports) so the pertinent sources had to be traced (contribution can be found in the AFRAME Wiki Page) Then the review focused particularly on the features and characteristics of indicators which are necessary for successful implementation in the Mediterranean Case study framework. The initial indicator framework is still under development and will be completed by the end of month 14 since it was considered prerequisite for the successful accomplishment of this task to complete first the works conducted under WP3 and referring to the identification of fleets and fisheries, as well as target stocks parameter estimations, and these activities were concluded in month 12. Outcomes from the latter activities will contribute to the clarification of the indicators which include information that captures the context of the three dimensions (stock, fishery, and fleet) and the links between them, and hence can be applied more effectively to the Mediterranean case study framework.

Partner 9. IMARES The bulk of the work will be in the latter part of 2008

Second reporting period (April 2008-March 2009)

While there is an extensive scientific literature on indicators in relation to the ecosystem approach, the intention of this work package was to review implementations of indicator approaches in the narrower context of management of target species. In practice the review highlighted that there are few, if any, practical implementations of indicator approaches in this context. There are a handful of papers on indicator approaches to fisheries management but they do not address the key question of how signals in indicators are translated in to management actions. As a result, work on indicator approaches has had to be based on a wider range of literature which has provided less of a platform to build-on. The focus of the work has been on practical implementation of an approach which is coherent with the Fcube approach. Fcube has been developed and used in a forecast mode, but within the framework that has been developed, the approaches key parameters of effort and catchability also serve as indicators which can be used to follow trends in the fishery and develop appropriate management actions. Cefas have led this activity.

In WP5 (Indicator approaches) the HCMR supported the planned activities referring to the completion of the development of the indicator outline and its implementation in the Mediterranean case study framework.

DTU-Aqua has only have had a minor role in this WP, and has mostly participated to the discussion and provided the data collected under WP1.

AZTI has only had a minor role in this WP, and has mostly participated to the discussion, recompilation of ideas and minutes of the discussions and provided the data required from CEFAS in relation to main features identified under WP2 to be summarised in the Indicators Matrix designed by the WP5 coordinator. The actual

application of WP2 Indicators has been developed by IFREMER and summarised under D2.2.

UCPH has contributed to WP5 by outlining relevant economic indicators and implementing these in the Fcube and FcubeEcon frameworks in the case-study areas. The choice of indicators is based on an earlier review (Hoff A., Andersen J. L., Buisman E., Frost H., Murillas A., Powell J. P. (2009). CEVIS Economic Efficiency of Fisheries Management Measures in an Innovative Evaluation Framework Perspective. University of Copenhagen, Institute of Food and Resource Economics Report no. 199) of economic indicators in relation to fisheries management assessment.

Background material for WP5. Indicators

Chong, K-C (2000) Using sustainability indicators to manage fisheries: experiences in the Bay of Bengal. *Marine & Freshwater Research*, 51, 523-527.

Raakjaer, J, Son, D M, Staehr, K-J, Hovgaard, H., Thuy, N T D, Ellegard, K., Riget, F., Thi, D.V and Hai, P.G. (2007) Adaptive fisheries management in Vietnam; The use of indicators and the introduction of a multi-disciplinary Marine Fisheries Specialist Team to support implementation. *Marine Policy*, 31, 143-152

Reeves, S., and Ulrich, C. 2007. Bridging the gap: fleets, fisheries and the Ecosystem Approach. *ICES CM 2007/R:02*.

• List of deliverables, including due date and actual/foreseen submission date

Table 5.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D5.1	A literature review of applications of indicator approaches in the provision of fisheries management advice.	5	Month 6	June 2008			CEFAS
D5.2	A peer-reviewed research paper describing the development and implementation of the indicator framework	5	Month 24	June 2009			CEFAS

(*) if available

First and second reporting period (April 2008-March 2009 & April 2008 to March 2009)

The primary deliverable of the WP is D5.1, a literature review of applications of indicator approaches in the provision of fisheries management advice. This was scheduled for completion by month 6. It has not been completed as the initial work identified that while there is a limited scientific literature on the implementation of indicator approaches for fisheries management in other areas, (e.g. Chong, 2000; Raakjaer et al, 2006), these papers do not address the key point of how signals from indicators would be translated in to management actions. As a result the literature on this topic is not very informative for the development of such a system for European fisheries.

• ***List of milestones, including due date and actual/foreseen achievement date***

Table 5. 2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M5.1.	Completion of literature review	5	Month 6	June 2009	CEFAS
M 5.2.	Completion of initial indicator framework development	5	Month 12	June 2009	CEFAS

• ***Deviations from the project work programme, and corrective actions taken/suggested: identify the nature and the reason for the problem, identify contractors involved***

First reporting period (April 2008-March 2009)

While the revised approach taken to the indicator review has led to a substantial delay in delivery, it is anticipated that the end result will be much more comprehensive than what was originally planned, and as a result should merit publication. The review is now planned for completion by month 18 of the project. The work will be closely co-ordinated with that of the area case-studies in order that the work of the latter is not delayed.

Second reporting period (April 2008-March 2009)

The absence of any practical implementations of indicator approaches that could serve to inform the development of the framework within the current project meant that there was little literature on that topic to review, hence the material reviewed is included within deliverable 5.2, rather than as a separate deliverable in its own right. It also means that subsequent work on the work-package was delayed due to the need to develop approaches to the problem rather than build on existing approaches.

WP6 Stakeholder Perceptions and Institutional Implications. Still to be reviewed by partners to include its participation.

• Objectives and starting point of work at beginning of reporting period

To evaluate perceptions of fleet, fishery and métier definitions among local stakeholders.

To ground truth assumptions about fleet and fishery related data and behaviour.

To outline the institutional implications of a shift toward fleet and area based fisheries management for the effective use of scientific advice.

• Progress towards objectives – tasks worked on and achievements made with reference to planned objectives, identify contractors involved

WP6 involved two major research efforts. The largest one was a visit to 12 fishing ports to interview fishers about how they see issues of fleet definitions in mixed fisheries. This effort led to Deliverables 6.1 and 6.2. The second involved visits to three meetings of Regional Advisory Councils and a series of interviews with RAC members about governance issues around mixed fisheries.

First reporting period (April 2008-March 2009)

Partner 6. AAU is the leader of this WP and consequently its main project assignment.

Activities deployed by Partner 6. AAU consists of intellectual preparation and research design, travelling to fishing ports, interviewing fishers and analyzing the results.

Partner 1. AZTI-Tecnalia will host the AAU-AAU partners to carry out the interviews to relevant stake holders at Basque Ports, specifically Ondarroa. Visits will occur during June-July 2008. In the mean time, Partner 1. AZTI-Tecnalia will inform in advance the interviews and the final objective of the WPs to the stakeholders involved in this task.

Partner3. DTU-Aqua only has a minor role in this WP. Initial work has been done in collaboration with Partner 6. AAU to identify Danish vessel for interviews

Partner 7. HCMR initiated contacts with fishers from candidate ports where the planned interviews will take place. The main aim was to familiarize fishers with the whole process, which is novel for the area, to enable better work flow since the first set of interviews in one of the selected ports was decided to take place in the beginning of month 13.

Partner 9. IMARES initiated search for a suitable harbour for interviews of fisherman

Second reporting period (April 2008-March 2009)

Research Activities producing Deliverables 6.1 and 6.2

During the port-level research, four ports in each case study area were visited We sought ports that compromised two demands: They needed to have a wide presentation of different fisheries and boat sizes in order to 'capture' what could hypothetically count as different fleets. But at the same time, the port should be small

enough for the fishermen to know each other's boats. The following ports were chosen based on the advice of our AFRAME partners from the countries in question:

Bay of Biscay	Mediterranean	North Sea
La Turballe, France	Alymos, Greece	Peterhead, Scotland
Lorient, France	Nea Pereamos, Greece	North Shields, England
Le Guilvinec, France	Nea Michanionia, Greece	Hanstholm, Denmark
Ondarroa, Basque Country	Salamina, Greece	Texel, Holland

Having chosen a port, the next step was to pick twenty boats from each port which were to be presented to the respondents to group 'in whatever way it made sense to them' (pile sort analysis). We received boat lists from our AFRAME partners including their classifications. We then deliberately tried to 'hit' as many categories as possible in terms of gear, size, engine power and metier, which were the most common categories in these boat lists.

Finding respondents was done differently in different ports. In Ondarroa, the AZTI AFRAME partner had contacts to the trawler skippers and a meeting with 6 skippers was arranged ahead of time during the summer holiday of the skippers. In Peterhead, AAU researcher, Alyne Delaney, already had some contacts from earlier fieldwork which were used.

HCMR conducted the planned interviews of fishers involved in fisheries studied under the Mediterranean CS framework in four selected ports of Greece. This activity was quite time consuming both in relation to the part of the actual interviews since greek fishers are not familiar with similar types of practices and questionnaires, but mainly while carrying out debriefing of interview recordings in a suitable way to be used in the subsequent analysis by the AAU. Ten individual fishermen in 4 different Greek ports were interviewed summing up to a total of 40 fishers.

DTU-Aqua only has a minor role. Some work was done in collaboration with AAU to identify Danish vessel for interviews.

Otherwise, we did not make use of any established contacts, and finding respondents relied on very flexible and informal methods. It was often a question of simply going down to the quay or auction and asks skippers, auction workers and fishermen for an interview. It is obvious, that while targeting skippers, the ensemble of informants is still very much the result of coincidences and timing (which boat came in when, who were at the auction when, who knew each other etc.). The final composition of informants are made up of mostly active skippers and to a lesser extent of auction workers, buyers, fishermen's representatives, fishermen and retired skippers.

The discussions that followed the pile sorts were carried out as semi-structured interviews. The scientist entered the discussion with a thematic interview guide which was exactly only this: a guide. It sat the outer framework for the discussion, leaving room for the conversation to follow, the themes taken up by respondent, with the interviewer trying to understand and pursue the importance of these 'new' themes. The interviewer would then return to the next theme on the interview guide once the previous theme had been explored in the direction chosen by the stakeholder. The thematic interview guide evolved around these points:

- Descriptions of the sorted groups of boats
- Seasonal changes of group of boats
- Historical changes in the group of boats
- The experience and impacts of boats being categorized in management

- Other themes relevant to understanding groups of boats.

The open-ended approach resulted in stakeholders bringing in many different themes relevant to understanding the conditions of different groups of boats, many of which helped illuminate further the logic of their initial sorting.

The pile sort methodology and quantitative cluster analysis was chosen in order to gain a systematic and comparative understanding of how fishermen group boats within one port. This methodology allowed us to compare the groups of individual fishermen and calculate an average of the categories made. First a diagonal matrix is created for every respondent in which each possible pair of boats is assigned a value. The value is 0 if they are not in the same group and the surprisal value of the group for pairs in the same group. Then comparisons can be made between different respondents by averaging together matrices of some set of respondents. Afterwards we used a combination of multi-dimensional scaling and cluster analysis to present the port-level results. We averaged all the information on a given boat on a port basis. The output matrix was then subjected to multidimensional scaling using the SPSS Proxcal procedure with which we reduced the matrix information to the smallest number of dimensions that the data could fit based on the model stress. Three to four dimensions normally yielded the ideal compromise between the stress level and smallest number of dimensions. These results were then displayed through a cluster analysis of the multidimensional distances among the boats. The cluster procedure allowed us to display these distances using the dendrograms that are reported in each chapter. The boats are represented as numbers and the lines in the dendrogram indicate the distance between the boats.

AZTI, HCMR and DTU-Aqua contributed to the discussion of the results obtained, as well their inclusion and use in the general framework.

Research Activities producing Deliverable 6.3

During February and March 2009 visits were made two three RAC working group meetings, one each for the Baltic, North Sea, and South West Waters RAC. Twelve short interviews were also carried out with RAC members, with one exception the short interviews with RAC members were carried out through an email questionnaire. The information was entered into a Nud*ist data base, which also included information on mixed fisheries governance from interviews carried out in other projects. Nud*ist was used to organize the material, to identify the main themes around mixed fisheries governance of concern to stakeholders, and prepare the report for Deliverable 6.3

- ***Deviations from the project workprogramme, and corrective actions taken/suggested: identify the nature and the reason for the problem, identify contractors involved***

First reporting period (April 2008-March 2009)

No major deviations from the project work program have occurred.

Second reporting period (April 2008-March 2009)

No major deviations from the project work program have occurred.

- ***List of deliverables, including due date and actual/foreseen submission***

Table 6.1: Deliverables List

List all deliverables, giving date of submission and any proposed revision to plans.

Del. no.	Deliverable name	WP no.	Date due	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D 6.1	Pile sort analysis	5	Month 20	June 2009			AAU
D 6.2.	Report on perceptions of relevant data and behaviour		Month 24	June 2009			AAU
D 6.3	Report of institutional analysis		Month 24	June 2009			AAU

• *List of milestones, including due date and actual/foreseen achievement date*

Table 6. 2: Milestones List

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M 6.1.	Completion of stakeholder interviews	5	Month 18	June 2009	AAU
M 6.2.	Completion of initial indicator framework development	5	Month 20	June 2009	AAU

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Section 3 – Consortium management

In this section the status of the project and its management activity is presented.

• Consortium management tasks and their achievement; problems which have occurred and how they were solved

Consortium Management tasks are carried out by Partner 1. AZTI –Tecnalia straightforwardly as the consortium of the AFRAME project is composed by persons and Institutions with a long trajectory of collaborations between them. AFRAME coordinator is greatly supported by WP leaders.

From the AFRAME Consortium a big effort is being deployed to try to accomplish with the dates of delivery of reports and deliverables compromised with the Commission.

No major problems in the management of activities of the Consortium have been occurred.

Changes have been proposed to the standard Consortium Agreement (CA). When changes have affected the basic content of the Consortium Agreement, this is modify the actual meaning of the contract contents, actions have been taken to assure that all changes are agreed and accepted between the Steering Committee and after this, partners.

• Contractors: Comments regarding contributions, changes in responsibilities and changes to consortium itself if any

A new partner was added to the Consortium through an amendment which was approved by the Commission. This new partner, Instituto Español de Oceanografía (IEO) is participating without perceiving any funds. For this reason, no financial statement or any other economic justification has been included.

On the other hand, three partners have changed their name during this reporting period. These changes are:

- Partner 3 has changed from DIFRES to DTU (Technical University of Denmark)
- Partner 6 has changed from IFM to AAU (University of Aalborg)
- Partner 10 has changed from FOI to UCPH (University of Copenhagen)

Amendments have been initiated to address these changes but in the meantime, both former and current names have been used in the report to facilitate reading.

Changes in the work plan and their justification have been specified in Section 2. WP0. Project Management. Summarising, the two main changes approved by all partners and the Commission (official letter dated on the 22 /11 /2007) were: _

Partner 7. IFREMER: shift of 10 months in the months allocation from WP2 (Western waters Case Study) to WP5 (Indicators Approaches).

Partner 3. DTU-Aqua (WP4 Coordinator) change in delivery date of D. 4.1 and D. 4.3 from month 12 to month 24.

Partner 5. HCMR changed the responsible person from Celia Vassilopoulou to Christos Maravelias in February 2009.

• *Short comments and information on co-ordination activities in the period, such as communication between partners, project meetings, possible co-operation with other projects/programmes etc.*

Communication between partners has been fluent. Communication tools deployed during the project have facilitated and enhanced exchange of information, specially the constant update of the WiKi Page and the use of a dedicated ftp facility for exchange of large databases. Thus, communication between Coordinator, Steering Committee and partners was assured by the tools made available by the partners .

Coordination activities deployed every 6 months with bse on the coordination meetings were the most important milestones to assure the accomplishing of the working plan of such a short project. Two partners took advantages of International Conferences such as the ICES Annual Science Conference to disseminate the results and progress of their research. Meetings were reduced in time to maximise agreement in reporting about the work deployed and organising task to be deployed in the future.

Section 4 – Other issues to be completed by AZTI

No other noticeable issues are to be included in this section.