Project no	:	SSP8-CT-2003-502516
Project acronym	:	EFIMAS
Project title	:	Operational Evaluation Tools for Fisheries Management Options
Instrument	:	PRIORITY 8, Scientific Support to Policy (SSP)
Thematic Priority	:	Area 1.3 Modernisation and sustainability of fisheries, incl. aquaculture-based production systems

Final Publishable Activity Report

Period covered: 1 April 2007 – 31 March 2008

Date of preparation: June-Sept 2008

Start date of project: 1 April 2004

Duration: 48 month

Project coordinator: J. Rasmus Nielsen

Project coordinator organisation: DIFRES

Revision: Final

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EFIMAS: Operational evaluation tools for fisheries management options

INTRODUCTION
European fisheries are under pressure at the moment. Not only are many commercially important stocks declining, so are the number of fishing boats and people employed within the fishing industry. At the same time, the management and regulation of the fisheries becomes more complicated every year. Stakeholder confidence in existing assessment and management models has been shaken, since these models currently only consider the effects of fishing on single fish stocks and the ecosystem, and do not take into account the social and economic impacts of fisheries management decisions as well as mixed fisheries and long term management strategy evaluation. In response to this situation, managers such as the European Commission and national authorities are working to develop alternative management evaluation tools and management regimes that take a broader, more long-term perspective and consider not only the biological consequences of managing fish stocks, but also social and economic impacts, for instance on the fishing industry.

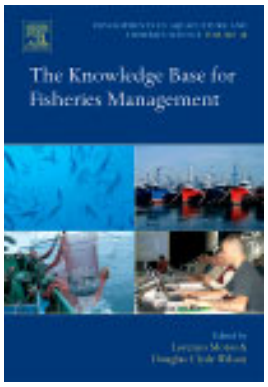
WHY EFIMAS?
To facilitate the development of better fisheries management regimes, a large European research project, 'EFIMAS' was launched to develop and integrate a set of new tools into a robust evaluation framework within which to simulate and evaluate the biological, social and economical consequences of a range of fishery management options and objectives within different management regimes.

The project involves cooperation between 30 research institutions from all over Europe covering the disciplines of fisheries biology, economy and sociology, and is coordinated by the Technical University of Denmark, National Institute for Aquatic Resources.

VIRTUAL FISHERIES MANAGEMENT
Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders: In the same way that a pilot might fly in a simulator before flying for real, the simulation tool evaluates the robustness of alternative management strategies and options to give more holistic management advice before implementation. The EFIMAS and sister projects has developed software tools and simulation models within an evaluation frame that can predict and compare the outcomes of different management options on European fish stocks and fisheries. And instead of only looking at the impact of these virtual regimes on the fish stocks, the project also looks at the social and economic outcomes in a broader, more holistic context. This will provide managers a better idea of the consequence of a given management intervention before opting for a particular management approach.

PROJECT STRATEGY
One of the major challenges is to ensure that the best possible knowledge is synthesized and made available to decision-makers. To this extent, some of the project participants have under the project reviewed the state-of-the-art knowledge base for fisheries systems including their institutional set-up and consequently published this in a book, "The Knowledge Base for Fisheries Management", which is available from Elsevier. Such information provides the background to draw conclusions of what is needed to improve fisheries management, and has been used to make the evaluation framework flexible enough to include a broad range of options under alternative fishery management systems.

"The state-of-the-art knowledge base for fisheries systems has been reviewed by EFIMAS and consequently published in a book"



The tools that are being developed take account of the dynamics in the fisheries systems in Europe (including policy priority areas such as fleet and mixed fisheries interactions and fisheries behavior) as well as effects of using e.g. alternative stock and fishery assessment models, economic based fishery models, and also consider uncertainties in the dynamics of the case stocks and fisheries. Importantly, emphasis is placed on many kinds of uncertainties including those found in the data collection, assessment, modelling, advisory, management and implementation processes. By being capable of evaluating the relative performance of multiple alternative management options the evaluation framework has strong capacity in performing sensitivity and risk analyses of the consequences of the various options.

EFIMAS develops and integrates a variety of modeling tools into a robust framework within which to simulate and evaluate a range of fishery management objectives and options. In particularly the project:

- Use and develops computer based models that will run stochastic simulations incorporating data from selected EU fisheries taking into account fleet interactions.
- Compares a range of management options generated with the current management of the stocks and fisheries.
- Compares the performance of a range of management options under alternative management systems and objectives.

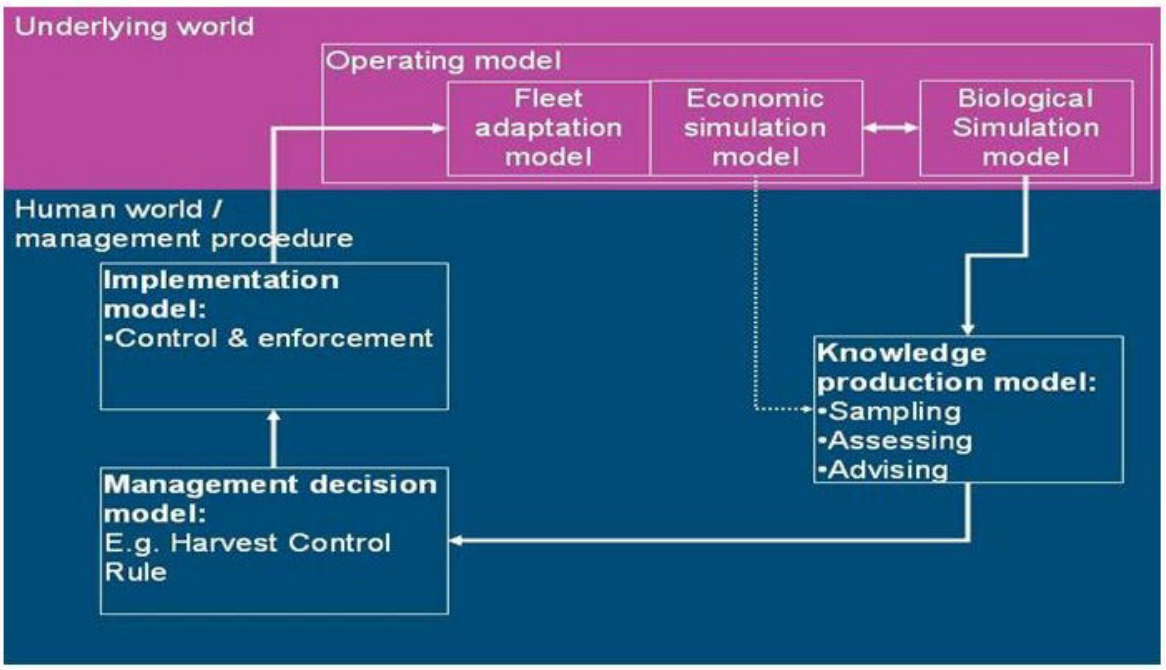
The framework and simulation models are tested in selected case studies covering different types of EU fisheries in different areas, e.g. in the North Sea, Baltic Sea and Mediterranean:

- Mixed flatfish fisheries, North Sea
- Mixed roundfish fisheries, North Sea
- Salmon fisheries, Baltic Sea
- Mixed nephrops fisheries, East Atlantic
- Mixed northern Hake fisheries, East Atlantic (ICES areas VI-VIII)
- Swordfish fisheries, Mediterranean
- Mixed hake fisheries, Mediterranean
- Cod fisheries, Baltic Sea

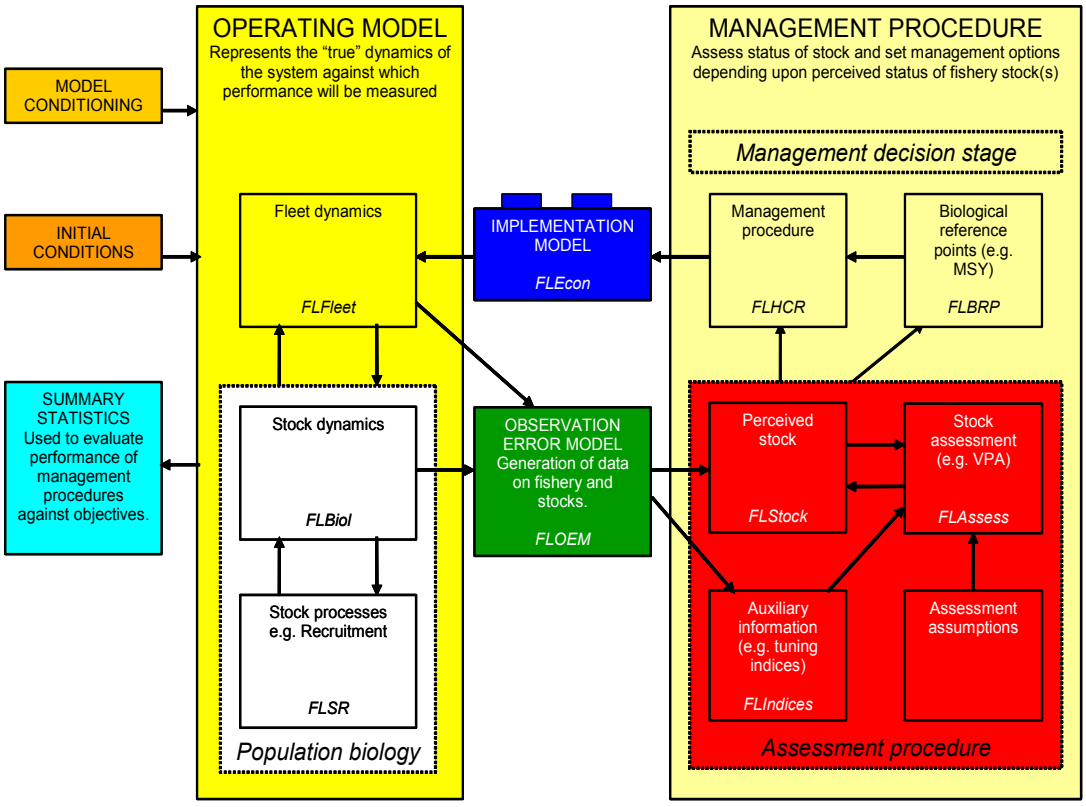
An overview of the simulation module of EFIMAS is given in the conceptual box flow diagrams below. The input data to module are generated by a descriptive model (operating model), which is assumed to represent the "true/real" system. The input data are then processed by a traditional or an alternative fish stock or fisheries assessment model (knowledge production model), which is used to generate management advice. By simulating the effect that the resulting management actions would have on the "true/real" system it is possible to generate a range of performance measures, covering the resource as well as the fishery (such as minimum mesh size, minimum landing size, TAC

constraints, closed areas, closed seasons, and effort regulations). These performance measures will then enable the comparison of a range of management options under alternative management systems and objectives.

EFIMAS Conceptual Evaluation Framework: Operating Models and Management Procedures



Simulation module of the EFIMAS Project



Consequently, the objective of EFIMAS has been fulfilled to develop and build a Management Strategy Evaluation (MSE) framework that allows test of plausible hypotheses about the dynamics of the stocks and fleets before implementation, and which can appraise the biological, social and economic effects of the existing fisheries management measures in EU. An MSE framework includes an operating model which simulates the system to be managed, and management procedures applied on it, which include parameters and outputs from methods for monitoring and assessing the status of the system as well as relevant management options. The evaluation framework is able to simulate and evaluate different management options continuously using output parameters and results from scientifically based tests of hypotheses and analyses performed in case specific implementations, with relevant descriptive models addressing main fisheries advisory and management problems. Consequently, this can be and has been used to evaluate results and output generated from other software packages (descriptive fisheries/stock assessment models as well as other evaluation and analysis tools), analyses, and existing databases being used for production of advice to management bodies, and can be applied to important EU fisheries.

The overall approach uses simulation models which are based on stochastic simulation techniques and take account of uncertainties (parametric as well as structural uncertainty) and include risk assessments. It include simulated data collections using existing databases and calculated variance in data, performs assessment of the system (with use of output from currently applied descriptive models and analysis tools, alternative existing models/tools, or modified existing (alternative) models/tools for fisheries/stock evaluation), and provide advice according to harvest control rules, management options and objectives. Simulations are and can be mainly performed using an integrated suite of software facilities with implementation of a common language (e.g. R/FLR) and interface, i.e. a common simulation frame, which can handle output and results from a variety of descriptive models and tools for analyzing different management scenarios, options and objectives.

STAKEHOLDER PARTICIPATION

European fisheries management is rapidly changing toward a more responsive and efficient system and increasing stakeholder participation in decision making is an important part of that. Participation brings about changes in the role of science, as well, and the EFIMAS project has contributed significantly to the development of the FLR (and other) suite of tools for facilitating science-based decision making in a participatory context. The classic role played by science in fisheries is to set limits on exploitation according to objective criteria. Under conditions of high stakes and high uncertainty this traditional role is undermined as stakeholders use the political flexibility that uncertainty creates and managers try to make their own decisions easier by turning political problems into technical ones.

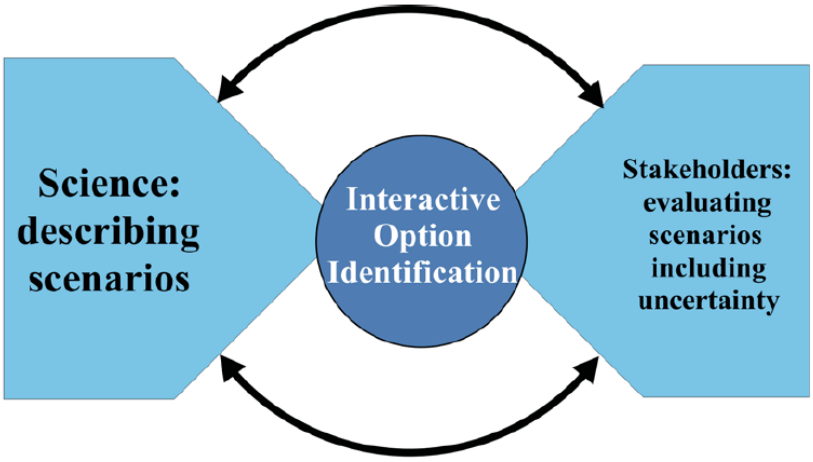
With the right tools, science can play a helpful role even when uncertainty is high. One strategy is participatory modelling which has been practised in EFIMAS. The approach uses scenario-based models to evaluate different options. Participatory modelling can involve managers, the fishing industry, conservation NGOs and any other groups concerned with developing good, science-based policy. Participatory modelling is not a substitute for using science to set limits. But when limits are needed, this technique can focus on crafting strategies to meet them in efficient ways. Modelling can force stakeholders to clarify their objectives and explicitly address the trade-offs implied by various strategies.

The common management evaluation framework and tools developed under EFIMAS for evaluating management strategies is a key tool for participatory modelling. It facilitates collaboration across disciplines, ensures that models and software once developed are easily validated, and widely available. In particular it details how to implement a variety of fishery, biological and economic models and software in a common framework so that alternative management strategies and procedures can be evaluated for their robustness to uncertainty before implementation. The design of the framework, including the adoption of object-orientated

programming can be extended to new processes and new management approaches – for example ecosystem-based approaches. The management evaluation frameworks developed in EFIMAS and sister projects is open source, which is important for promoting transparency and allowing technology transfer between disciplines and researchers.

> Models have to help resolve problems in all sectors, including with the fishermen, in order for them to be a useful tool. ... We need to manage the whole fishery, not just the fish! It is important to look at the whole picture. We forget this sometimes as biologists.
>
> Spanish fisheries scientist

> ... from a few cases [of partnerships between science and the fishing industry], a lot of fishermen have a better relationship with scientists as a result and vice versa. You really do see that building a trust.
>
> UK women in fisheries focus group



Participatory Modelling: Science Promoting Transparency

> Science, if we look at the definition should be objective; at the very least, it should try to be objective through use of methodologies. But fortunately or unfortunately science isn't independent from the society which is producing it.
>
> Greek Conservation NGO focus group

> ... just to trust a mathematical model isn't enough and I would not understand the mathematics, but I would understand the basic assumptions and that is where the link between the modeller and the man on the street is important. You have got to make the model understandable to me and to others.
>
> Irish managers' focus group

PROJECT OUTPUTS

The evaluation framework established through EFIMAS and its sister projects is open source simulation tools and is made available from www.efimas.org and http://flr-project.org/. The evaluation framework has been used in ICES (www.ices.dk) stock assessment and mixed fisheries working groups, in EU STECF (http://europa.eu/-scadplus/leg/en/cha/c11127.htm) working groups and EU RACs (Regional Advisory Councils), in NAFO Scientific Council working groups (www.nafo.int), and by IWC (www.iwcoffice.org), and presented through a long row of scientific papers, conferences, user courses and workshops produced under EFIMAS. By incorporating a wider range of variables and their uncertainty to illuminate the decision process and allowing for stakeholder feed-back in the evaluation process, fisheries management will be made more accessible to all kinds of stakeholders.

Contributing to policy development

- EFIMAS has produced and provided a specific Policy Brief / Policy Implementation Plan / Project Implementation Plan in relation to the management evaluation framework developed which details the application of the evaluation framework at the EU fishery management level.
- EFIMAS provides more holistic scientific management advice to fishery managers, including a robust management evaluation tool and framework driven by numerically defined harvesting rules.
- The project has developed an evaluation framework of existing and new interactive fishery advice and management models that identify the socio-economic, as well as the biological, consequences of given management decisions.
- EFIMAS has implemented the developed management evaluation framework(s) and the tools hereunder in important and typical EU fisheries systems representing different types of fisheries and management systems.
- The project has helped to restore the somewhat shaken trust of stakeholders by incorporating a wider range of variables to illuminate the decision-making process and make it more accessible to them.

Some specific project deliverables

- Review of global management systems and decision-making processes relevant for EU fisheries published in a book by Elsevier.
- Project Flyer and two project Technical Leaflets.
- Two public websites related to EFIMAS and a project DocuWiki web site with the management evaluation framework, the toolbox and simulation models including documentation available, as well as with the case specific implementations of the management framework available (October 2004 – June 2008).
- Preliminary software package and toolbox of operational models to compare alternative fisheries management options, objectives and regimes (October 2006 / February 2007).
- Preliminary case specific implementation of the software package of operational models and tools (by October 2006 / February 2007)
- Final software package in R/FLR as well as modifications and implementations of alternative Management Evaluation Frameworks (Evaluation Frame/TEMAS and the ISIS-Fish simulation tool) with high level of documentation - and aiming at a high level of *user-friendliness* when experts are implementing it in cooperation with stakeholders (by March 2008).
- Final case specific implementation of the software package of operational models and tools (by March 2008).

- Policy Brief / Policy Implementation Plan detailing the application of the evaluation framework at the EU fishery management level (by March 2008).
- A comprehensive row of specific project deliverables, technical reports, scientific paper and book publications, and popular outreach publications have been produced under EFIMAS which combined have been listed in the attached "EFIMAS List of Dissemination, Products and Activities" by June 2008 (up-dated May-June 2008).

Outputs from establishment of the EFIMAS Fisheries Management Evaluation Framework and the case study specific implementation of the framework are fully reported and available from the EFIMAS DokuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas) as well as delivered through the technical reports and dissemination reporting associated to the project deliverables. The Deliverables submitted so far have been approved by the EU Commission (see also "EFIMAS List of Dissemination, Products and Activities" by March-April 2008 (updated May-June 2008).

LINKAGES WITH OTHER FISHERIES MANAGEMENT INITIATIVES

EFIMAS is the largest among a string of recent and ongoing EU supported projects that aim to evaluate and improve management of European fish stocks. EFIMAS has worked closely with a range of national and international projects, including related EU FP5 and FP6 research projects. For further details of specific linkages, please see list of relevant linkages at www.efimas.org (under Links) as well as especially the EFIMAS DocuWiki under WP3 http://wiki.difres.dk/efimas/doku.php?id=efimas where linkages to other projects, ICES, STECF, ICCAT, NAFO, Stakeholders, etc. are described - and the WP3 technical report.

LEARN MORE:

For more details on specific project components, ongoing activities, partners, progress and outputs, please visit the EFIMAS project website (see below), the EFIMAS project DocuWiki (see below), the Project Flyer and Technical Leaflets, the Policy Implementation Plan, or contact the project coordinating team at:

Web: www.efimas.org and http://flr-project.org/
DocuWiki: http://wiki.difres.dk/efimas/doku.php?id=efimas
Email: efimas@efimas.org

DISSEMINATION OF THE PROJECT:

Project presentation	
Poster	EUROCEANS: Nielsen, J.R., Sparre, P.J., Kell, L., Degnbol, P., Pascoe, J., Pastoors, M., Motos, L (editors on behalf of EFIMAS consortium): Operational Evaluation Tools for Fisheries Management Options (EFIMAS). Poster and Extended Abstract, EUROCEAN 2004, 10-13 May 2004, Galway, IRE.
Policy brief	Policy Implementation Plan (PIP) / Project Implementation Plan / Policy Brief detailing the application of the evaluation framework at the EU fishery management level. EFIMAS Project Policy Brief Flier. Report to EU Commission, Sept. 2008. www.efimas.org and http://wiki.difres.dk/efimas/doku.php?id=efimas.
News brief	External Forum, Danish Ministry of Food, Agriculture & Fisheries, news article on EFIMAS (in Danish).
Popular articles	News brief on EFIMAS in fisheries stakeholder journal (in Danish). ICES/CIEM Newsletter 2005 – 'Virtual Fisheries Management' Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks – conceptual change in European Fisheries Management advice. Implementing fisheries management evaluation tools capable of comprehending both the biological, economic, sociological and spatial dynamics of the fisheries system. WORLD FISHING, February 2009. (In Press). (EFIMAS Summary Article)
Public project web-site	www.efimas.org and input to http://flr-project.org/

Project DocuWiki	http://wiki.difres.dk/efimas/doku.php?id=efimas
Fiches	Fiches presenting fisheries and aquaculture research projects in support of the Policies (SSP) of the Sixth Framework Programme (http://europa.eu.int /comm/research/fp6/ssp)
Leaflet / Flyer	EFIMAS Flyer / EFIMAS Folder: 'Virtual Fisheries Management'. EFIMAS Flyer, October 2005. EFIMAS Technical Leaflet 1 Project Month 36: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders". (PROFET Policy, Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01). EFIMAS Technical Leaflet 2 Project Month 48: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" version 2. (PROFET Policy, Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01). Policy Implementation Plan (PIP) / Project Implementation Plan / Policy Brief detailing the application of the evaluation framework at the EU fishery management level. EFIMAS Project Policy Brief Flier. Report to EU Commission, Sept. 2008. www.efimas.org and http://wiki.difres.dk/efimas/doku.php?id=efimas.
Book	The Knowledge Base for Fisheries Management. ELSEVIER Publishers, August 2006.
Logo	EFIMAS Logo Produced. 2004. See front page.
ICES Working Groups	Presentation and Executive Summary of EFIMAS. ICES Working Group on Fisheries Systems (**ICES WGFS**). April 2006. Specific workshop dedicated to the use of FLR for fish stock assessment, **ICES WKFLR**, 29 Jan – 2 Feb 2007, ICES Headquarters, Copenhagen, DK. (WKFLR). Use of FLR in a long row of assessment working groups, initiated in 2006 on few stocks only, and widely spread in 2007 and 2008, for example: **ICES WGNSSK** (2006-2008) (WGNSSK), **ICES WGHMM** (2007-2008) (WGHMM), **WGNEAMAC** 2007-2008; **ICES WGBFAS** 2008; A specific example of this is the May 2008 WGNSSK use of FLR in Machiels et al. 2008; For example has the generic OM and the MSE developed under Case Study 6 been being used in the ICES Working Group **WGHMM**07 (May 2007) WGHMM and has been the main methodology to the STECF on Long-term harvest plans for Northern Hake (June 2007). AMAWGC: Demonstration of FLR to the ICES working groups chairs in **ICES AMAWGC** 2007 (AMAWGC). Presentation of FLR and of EFIMAS project to ICES Working Group on Fisheries Systems 2007 (**ICES WGFS**) (ICES Working Group on Fisheries Systems). Examples of management strategies evaluations presented in **ICES SGMAS** 2007. (SGMAS). Developement of mixed-fisheries models using FLR for Management Strategy evaluaton of mixed North Sea roundfish and Nephrops fisheries in **ICES MIXMAN** 2006, 2007, 2008 (ICES MIXMAN 2006, 2007, 2008) . Use of FLR tools for risk analysis under **ICES SGRAMA** 2007. (SGRAMA). Use of FLR tools in **ICES WKNEPHSEL** 2007. (ICES WKNEPHSEL 2007)
STECF Work Groups	Use of FLR and EFIMAS Work in a several EU STECF Work Groups in 2006, 2007 and 2008: Flatfish management plan evaluation: STECF 2006. SGBRE-07-03 (June 2007) and follow-up SGBRE-07-05 (December 2007) Northern Hake long-terms management plans SGMOS-07-07 Evaluation of Harvest Control (September 2007). See the specific details under this working group's wiki page. Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008). STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.

RACs

Examples of work evaluated in the RACs is the work on North Sea flatfish to the North Sea RAC |Poos et al. (2006) and Pastoors et al. (2006).
The North Sea Regional Advisory Council (NS RAC), the ICES Working Group on the North Sea and Skagerrak (ICES WGNSSK), as well as DG MARE's Scientific Technical and Economic Committee on Fisheries (STECF) were provided with advice in relation to development of a management plan for the North Sea plaice stock. Different management options were evaluated with integration of biological and economic based management evaluation tools in R/FLR developed under EFIMAS.
MSE Tools for Long Term Management Evaluation of Northern Hake presented to: RAC SWW: Santigao de Compostela, 23 oct 2008, and to RAC NWW: Bruselas, 31 Oct 2008.
Management strategy evaluations were done for the North Sea haddock fishery including the implications of recruitment, discards, and the sliding-F exploitation rule and reported to the North Sea RAC, 2007.

Examples of Dissemination and Implementaton

Pietikäinen, L. 2005. Cod fishery of the European Union and Russia at the Baltic Sea - a game theoretic analysis. Department of Economics and Management, Working Papers no 30, University of Helsinki
Levontin, P., McAllister, M. (2005). Evaluating management options for Baltic salmon (Salmo Salar) using bio-economic operating models in a generic simulation framework. Proceedings of the ICES Annual Science Conference, Aberdeen. ICES CM 2005/W:00
Under a special request to ICES from DG MARE the merits of DNA analysis for stock assessment purposes and monitoring of fisheries impact on individual wild salmon stocks was carried out for the Baltic Sea.
Evaluation of NSRAC advice for North Sea flatfish management plan, January 2006
Evaluation of EC proposal for North Sea flatfish management plan, presented to STECF SGECA-SGRST-06-05, September 2006
Evaluation of North Sea haddock management plan and North Sea cod recovery plan, ICES WGNSSK 2006, section 16 (see also below).
Needle, C. L. (2006a). Evaluating harvest control rules for North Sea haddock using FLR. Working Paper for the ICES Working Group on Methods of Stock Assessment, Galway, Ireland, 21-26 June 2006.
Needle, C. L. (2006c). Revised FLR-based evaluation of candidate harvest control rules for North Sea haddock. Working paper for the ICES Advisory Committee for Fisheries Management, Copenhagen, October 2006.
ICES, 2007(a). Results of the evaluation of the biological effects of North Sea cod recovery plans in relation to various management measures using the modelling FLR to evaluate management plans under the umbrella of current North Sea cod recovery plans are presented in ICES WGNSSK (2006), section 16 and Working Document 18: ICES WGNSSK 2006, section 16 and Working Document 18
ICES, 2007(b). Results of the evaluation of North Sea haddock management plan in relation to various management measures using modelling in F/RLR is presented in ICES WGNSSK Report (2006), section 16: ICES WGNSSK 2006, section 16 and Working Document 18. ICES C.M. 2007/ACFM:35
Kronbak, L., Lindroos M. 2006. An Enforcemen-Coalition Model:Fishermen and Authorities Forming Coalitions. Environmental and Resource Economics, 35: 169-194
Horbowy, J. 2006. Management of the eastern Baltic cod with stock-production or difference models. Poster to ICES Symposium on evaluation of management strategies. SFMS 44, Dublin 2006
Machiels, M.A.M., Kraak, S.B.M., van Beek, F.A. 2007. Evaluation of a management plan as proposed by the European Commission in 2006 for fisheries exploiting stocks of plaice and sole in the North Sea. IMARES report C011/07

J. Haralabous, CD Maravelias, G. Tserpes & C. Papaconstantinou. 2007. Developing a *FLR* operational model for evaluation of fisheries management strategies: an application to Mediterranean hake fishery. 38th CIESM Congress, 9-13 April 2007, Istanbul, Turkey

Evaluation of management strategies for the mixed North Sea roundfish fisheries with the FLR framework Presentation to AFH (French Association of Fisheries Science) Conference, 19-21 June 2007, La Rochelle, France

Clarke, E. D. 2007. Evaluating the West of Scotland cod recovery plan using computer simulations, FISHupdate, June 2007.

Clarke E.D. 2007. ROAME MF0352: The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 2: Model parameter estimation. Fisheries research Services internal Report, No ##. 10pp.

Holmes, S.J. 2007. ROAME MF0352: The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 3: Discards model parameter estimation and validation. Fisheries research Services internal Report, No ##. 20pp.

Clarke E. D. and Holmes, S. J. 2007. The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 4: Evaluation of the west of Scotland cod recovery plan. Fisheries research Services internal Report, No ##. 29pp.

Evaluation of management strategies for the mixed North Sea roundfish fisheries with the FLR framework Presentation to MODSIM07 Conference, 10-13 december 2007, Christchurch, New Zealand with Hamon et al. peer-review publication in conference proceedings

Needle, C. L. (2007a). Management strategy evaluation for North Sea haddock, *Fisheries Research*, doi:10.1016/j.fishres.2008.03.004

Needle, C. L. (2007b). Management strategy evaluation for North Sea haddock (poster). Haddock 2007, Sheraton Harborside Hotel, Portsmouth NH, USA. 25 October 2007

Hoff, A. and Frost, H. 2007. Modelling Economic Response to Combined Harvest and Effort Control in Fishery. http://www.univ-brest.fr/gdr-amure/eafe/eafe_conference 2007: Hoff and Frost 200.

Tserpes, G. and Peristeraki, P., 2007. Effects of a seasonal closure of the Mediterranean swordfish fisheries on the stock production levels. ICCAT Collective Volume of Scientific Papers, 60: 2059-2062 (see also below).

Exploratory management strategy evaluation (MSE) for Greenland halibut using the FLR framework was presented to the NAFO Scientific Council in 2007. Fisheries managers and industry representatives were invited to provide input in the formulation of the MSE and there was obtained feed-back from those on the performed evaluations.

Workshop BEIME at IFOP headquarters in Valparaiso-Chile. Implementation of Management Strategy Evaluation frameworks (MSE) and Management procedures (MP) in fisheries management, by Martin Aranda. Presentation on implementation of MSE systems. Starting point for the introduction of the MSE system in the Chilean fisheries of orange roughy and Patagonian tooth fish. 6-7 June 2007. Valparaiso-Chile.

The ICES MIXMAN Working Group has in 2007 and 2008 performed Management Strategy Evaluations (MSE) for the international mixed North Sea Roundfish and Nephrops consume fisheries considering different harvest control rules using a special application of R/FLR developed in cooperation with the EFIMAS and sister EU projects.

Regulations for Baltic Cod including TAC management, and direct and indirect effort management including the “F-adaptive approach” all suggested and implemented by EU / DG MARE and considered in the ICES Baltic Fisheries Assessment Working Group (ICES WGBFAS) for the recovery of the Baltic Cod was bio-economically evaluated by development of a spatio-temporal dis-aggregated simulation frame within R/FLR:

Bastardie, F., Nielsen, J.R., and Kraus, G. 2008. A spatially-explicit fishing effort re-allocation modelling framework using FLR – Application to the Baltic cod fishery under selected environmental and management regimes. Report DTU-Aqua, Danish Technical University, Charlottenlund, Denmark, March 2008: 50 pp. (Submitted). report Baltic Case Study 9 Approach 2a

Hoff, A., Frost, H. (2008). Modelling economic response to harvest and effort control in the North Sea cod fishery. Aquat. Living Resour., 2(forthcoming)

Kraus, G., Pelletier, D., Dubreuil, J., Moellmann, C., Hinrichsen, H.H., Bastardie, F., Vermard, Y., and Mahevas, S. 2008. A model-based evaluation of marine protected areas for fishery management in the case of strong environmental forcing – the example of Eastern Baltic cod (Gadus morhua callarias L.). (Accepted ICES J. Mar. Sci.). Paper with results

DG MARE and the North Western Waters RAC were provided with a bio-economic analysis of the consequences of the long term management plan for Northern Hake.

García D., Prellezo R. & Marina Santurtún. 2008. Update on EFIMAS Project: Evaluation tool for Alternative scenarios for Northern Hake fisheries management (Management Strategies Evaluation (MSE)) NWW RAC Focus Group on Northern Hake Long Term Management 21st February 2008, Bilbao

Biological and economic implications of different management measures (e.g. temporary fishing closures) for the Mediterranean swordfish stock was evaluated based on discussions with scientific groups at the International Commission for the Conservation of Atlantic Tunas. The evaluations were done by means of biological and economical based simulations performed under the FLR framework.

Tserpes, G., Tzanatos, E., Peristeraki, P., Placenti, V. and Kell, L., 2008. A bioeconomic evaluation of different management measures for the Mediterranean swordfish. ICCAT SCRS/2008/026

Machiels, M.A.M. Kraak, S.B.M., Poos, J.J. 2008. Biological evaluation of the first stage of the management plan for fisheries exploiting the stocks of plaice and sole in the North Sea according to Council Regulation (EC) no 676/2007 IMARES report C031/08

NAFO Study Group in February 2008 in Vigo (Spain), and it was considered a useful exercise. Results were presented to the NAFO Scientific Council (*NAFO SCS Doc*. 08/13)

Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008). STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.

Conferences

EUROCEANS Conference, Galway, Ireland 2004 (Poster and Extended Abstract)

ICES Symposium on Fisheries Management Strategies, Galway, Ireland 2006 (Several Presentations and Scientific Papers and Posters to the conference and several papers published in symposia proceedings in ICES J. Mar. Sci. 2007 vol. 64 (4))

Presentation of FLR in UseR Symposium 2006, 15/17 june, Wienna, Austria

PROFET Policy Conference: Baltic Fisheries Science, Vilnius, Lithuania, April 2007 (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).

Some of the economic studies have been presented at the EAFE Conference (2007) (see ECONOWS Report).

Presentation of FLR together with WP4-CS2 application at MODSIM conference, Christchurch, New Zealand, 10-13 december 2007

Presentation of EFIMAS and FLR at 6FP workshop, DGFish DG-RTD, Brussels, 26 october 2007.

EFIMAS Conference, Bruxelles, Belgium, March 2008. A long row of EFIMAS Presentations. Special arranged Conference by EFIMAS with participation and representation of EU Commission, EU Managers, National Managers, International and national fishing industry and fishermen associations, NGOs (e.g. WWF), experts and scientists (fisheries biologists, economists, and sociologists).

Oceanology 2008 Conference, London, UK, March 2008. General Presentation of EFIMAS.
PROFET Policy Conference, North Sea Fisheries Science, Copenhagen, DK, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).
PROFET Policy Conference, Mediterranean Fisheries Science, Marseille, France, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).

Scientific Publications

A long row of scientific publications under EFIMAS has been produced and published which are listed in the "EFIMAS List of Dissemination, Products and Activities" by June-September 2008.

Courses

Anonymous 2005-2008. FLR teaching courses. A number of FLR teaching courses have been held throughout the project, and in collaboration with other projects involved in FLR development. Programs and courses outlines are available on http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:3-7:main and on the FLR website. Those specifically or partly related to EFIMAS were :

- 25-26 april 2005, **Salerno**, Italy: 2-days FLR introductory workshop (audience: EFIMAS participants).
- 23-25 November 2005, **IJMuiden**, the Netherlands: 3-days Introductory course on evaluation of management strategies using FLR (audience: EFIMAS case studies participants).
- 17-18 January 2006, **Helsinki**, Finland: 2-days FLR course (audience: Finnish assessment scientists).
- 24-25 January 2006, **Sukarrieta**, Spain: 2-days FLR course (audience: Spanish assessment scientists).
- 01 February 2006, **ICES**, Denmark: 1-day Demonstration of FLR to the ICES AMAWGC (audience: ICES Working Groups Chairs).
- 15 February 2006, **IJMuiden**, the Netherlands: 1-day course on evaluation of management strategies using FLR (audience: Dutch assessment scientists).
- 10-11 November 2006, **Charlottenlund**, Denmark: 2-days FLR course (audience: Danish-German assessment scientists).
- 11-15 December 2006, **Ottawa**, Canada: 5-days FLR Course (audience: Canadian assessment scientists).
- 29 Jan - 02 Feb 2007, **ICES**, Denmark : 5-days WKFLR (audience: ICES assessment scientists).
- 29 Jan - 02 Feb 2007, **Vigo**, Spain: 5-days FLR course (audience: Spanish-Portuguese assessment scientists).
- 28th Jan 2008: Introductory course FLR/MSE for Masters - Agrocampus Rennes, France
- 31 March 2008 - 03 April 2008: Introductory course FLR - JRC Ispra, Italy

Workshops

- 21-22 December 2004, **Sevilla**, Spain: 2-days workshop for fisheries economists. The aim of this meeting was to consider 'economic' input into the bioeconomic models being developed for both EFIMAS and COMMIT projects, that is, specifically elements of fleet dynamics, price dynamics and cost dynamics. See the Sevilla ECONOWS Meeting report.
- 25-26 January 2005, **Charlottenlund**, Denmark: 2-days Workshop on development of Operating Models
- 4-5 April 2006, **Nantes**, France: 2-days Workshop on conditioning of Operating Models with FLR.
- 4-5 april 2006, **Nantes**, France: 2-days Workshop on modelling fleet dynamics. Read more on both workshops in the general Meeting minutes, London-Nantes, Feb-April 2006
- 15-17 January 2007, **Copenhagen**, Denmark: 3-days ECONOWS Workshop the report has been compiled from reports of previous meetings ECONOWS

report, Copenhagen, Jan 2007 This report provide a comprehensive overview of the different models in use.

- 24-25 april 2007, **Lisbon**, Portugal: 2-days Workshop from WP4 to WP3 on learning from case-studies implementation to generic tools, and vice-versa.
- Apríl 2007, **Lisbon**, Portugal: 2-days ECONOWS Workshop (see reporting under ECONOWS Workshop, Copenhagen January 2008)
- 28-30 January 2008, **Copenhagen**, Denmark: 2-days Final ECONOWS Work Shop Final report ECONOWS_June2008. The major equations concerning a number of economic issues are implemented in relation to the core object of flr and FLECON. The description of the equations can be found in the final report and here ECONOWS_Matrix_Jan2007, and an extensive description of the package content is available on the package page on flr wiki

Furthermore, the development of the core FLR framework and the release cycle for new versions every 6 months (following the release cycle of the R environment) were insured by regular FLR Team meetings, which were partly supported by EFIMAS WP3. The following meetings took place during the project:

- FLR meeting. Goddards, December 2007
- FLR meeting. Lisbon, April 2007
- FLR Meeting. Goddards, January 2007
- FLR Meeting. Lisbon, July 2006
- FLR Meeting. Amsterdam, March 2006
- FLR Meeting. London, December 2005
- FLR Meeting. Lisbon, July 2005
- FLR Weekend. Mundaka, March 2005

General

See "EFIMAS List of Dissemination, Products and Activities" by June 2008 (updated by June-September 2008)

Progress of Project

General and Work Package 1

The EFIMAS Project has progressed as planned, and constituted the project organisation, project bodies and project composition and contents as described in the Project Contract and Technical Annex to this as well as the up-dates of those. Project management has been conducted as planned according to the contract. The planned Deliverables have been produced, submitted and approved, and furthermore, an additional deliverable in relation to the project milestone M5 has been produced and delivered. Additionally, a book made under EFIMAS WP2 has been published by ELSEVIER Science Publishers with a review and evaluation of "The Knowledge Basis for Fisheries Management".

The multi-disciplinary project participation and input as well as the necessary project organisation have been ascertained through a Project Consortium Agreement. The project aims, deliverables and milestones have been fulfilled, as well as the project work planned during the project period. Full and up-dated reporting of the progress, results and produced deliverables for all work packages and case studies can be found at the EFIMAS DocuWiki **http://wiki.difres.dk/efimas-/doku.php?id=efimas** as well as in the technical reports, and in the dissemination reporting associated to the project to the deliverables produced (and approved) so far which all are available from the EFIMAS DocuWiki**.** Deliverables submitted so far have been approved by the EU Commission (see also "EFIMAS List of Dissemination, Products and Activities" by March-April 2008 (updated May-June 2008). The project has established communication structures internally and externally, as well as delivery processes and (cyclic) feed-back processes between work packages and case studies and stakeholders. Project web sites (both internal and external) and public dissemination publications have been produced for the project (see Dissemination section below as well as the EFIMAS List of Dissemination, Products and Activities, vers. May-June 2008 (updated June 2008). This has among other included a Policy Implementation Plan, Policy Brief, Project Web Sites, Project Flyer / Folder, Technical Leaflets, A full Book published by Elsevier, a Project Logo, Project Fiches, A long row of Scientific Peer Reviewed Papers in well recognized scientific journals, Popular Scientific Articles, Presentations and Posters and Abstracts to several Conferences and Symposia, Performing a full International Conference under EFIMAS in Bruxelles with participation of scientists and stakeholders and managers, Workshops, Courses in the produced Management Evaluation Framework, implementation of the Management Evaluation Framework in ICES Assessment Working Groups, EU STECF Work Groups, RACs (Regional Advisory Councils), and NAFO Scientific Council Working Groups.

Work Package 2

Work package 2 has reviewed the available knowledge base for fisheries systems, and compiled and described it for use by WP 3-5, review existing frameworks for evaluation of the performance of fisheries management systems, as well as explored and described how the present fisheries management systems perform and how the management decision making processes are using knowledge to inform decisions. The evaluation tool developed is a mechanism to synthesize complex knowledge, to communicate this synthesis, and to use it as the information base for management decisions. The project therefore included a review of the knowledge to be synthesized and communicated, and a description of how knowledge can be communicated and used to inform decision making processes. Work package 2 categorizes fisheries management systems and describes the adequacy of the present management systems and present management decision processes in terms of their use of knowledge. This has lead to identification of the context in which fisheries/stocks evaluation tools for production of advice to management bodies are to be used, which problems they are to assist in solving, as well as of the knowledge which the tools are to communicate. The information has been integrated into the work of EFIMAS WP 3-5.

EFIMAS WP2 has been concluded and finally reported in Technical Reports for Deliverables 2.1 and 2.2 as well as in a Book under EFIMAS WP2 published by ELSEVIER Publishers (see below). These deliverables have been accepted and approved by the EU Commission. The reports and books have further been used directly in the work under WP3, WP4 and WP5 in a cyclic feedback and knowledge exchange and use between the EFIMAS work packages according to the Project Technical Annex to the EFIMAS Project Contract.

Work Packages 3-4

Under EFIMAS WP3 and WP4 (and WP5) the EFIMAS project has aimed to develop an operational and generic fisheries management evaluation framework that can be used for evaluating different types of management measures, i.e. that allows evaluation of the trade-off between different management objectives when choosing between different management options. In the Technical Annex of the EFIMAS Project Contract the process of developing the evaluation framework has been described as an iterative, cyclic feed-back process of developing the methodology (WP3-WP4) and then applying these methods in different case studies (WP4). The overall usefulness as well as the process and technical evaluation of the management evaluation framework has been addressed in WP5 - also through a cyclic feed-back process between WP5, WP3 and WP4. Consequently, the general aspects of the evaluation framework have been developed in cooperation between EFIMAS WP3-5 in order to inform an exploratory, adaptive decision-making process. The analytical tools developed utilize stochastic simulation techniques. These tools can simulate the complete fishery management system, including the fish resources and fleets, through data collection, assessment and management, and the response of the system to management.

In the process of developing a Fisheries Management Evaluation Framework EFIMAS has in collaboration with the EU FP6 COMMIT Project established a simulation framework FLR in R. This is based on experiences and models from a variety of EU and National projects, e.g. the EU FEMS Project and the Danish National TEMAS Project and the French National ISIS-Fish Project. The present version of the FLR framework is available at the EFIMAS DokuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas in association with the http://flr-project.org/ including compiled packages, full documentation, tutorials and source code. Operating Models and assumptions used to describe the fishery systems has been developed. Following this, the FLR framework (and associated additional management evaluation frameworks) has been established and modified to ensure that relevant bio-economic processes can be incorporated as required. The final generic management evaluation framework(s) in their latest versions have been finally reported with full documentation through the EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku-.php?id=efimas1:wp3:main and associated web sites www.efimas.org and http://flr-project.org/ as well as through the final technical report under WP3 associated to Deliverable 3.3 and 3.5 (Final Software Package with documentation, project month 48).

The planned technical reports under WP3 and WP4 has been delivered, i.e. EFIMAS Deliverables 3.1, 3.3 and 3.4 (Preliminary and Final Software Package by project month 30-33 and 48) and Deliverables 3.2 and 3.4 / 4.1 and 4.2 (Preliminary and Final Technical Reports by Case Study by project month 30-33 and 48) which are available from the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:main) as well as in hard copy reports to the EU Commission.

The evaluation tools have been applied to a variety of case studies in order to appraise the biological, social and economic effects of fisheries management measures in the EU. These case studies were chosen as they to a large extent reflected the full scope of the management system currently in operation in Europe, as well as widely varying biological, economic, technical and environmental conditions. The presented simulations through these implementations also cover the

current and potentially alternative management tools that are being used or considered in European fisheries management.

A key feature of the case studies is not only that they address different management systems and issues, but that they are also used in several instances to test the implications of alternative assumptions about the fishery on the robustness of management decision making. These include for example the effects of ignoring discarding in stock assessments, uncertainty about natural mortality levels, the impact of different assessment methods on management advice, and the effect of implementation of various technical management measures, as well as implementation of fleet based effort management either directly or indirectly.

For each case study the existing management system and main management problems have been described including the purpose of the management measures. For relevant case studies this has included identification of alternative management systems and instruments which have not yet been implemented, but are relevant and deemed likely to emerge for this given fishery system. The Knowledge Basis for each management system as well as the relevant management systems for European fisheries management in general has in 2006 been published in a book produced under EFIMAS WP2 which has helped in this description and evaluation.

Key management issues and objectives addressed and evaluated by case study have been formulated. Specific hypotheses about the key management issues and of the dynamics of the case specific systems analyzed with descriptive models and analytical tools were identified and produced. This included necessary adaptation of the generic fisheries management evaluation framework to comprehend these.

Appropriate descriptive models and analytical tools necessary to evaluate these hypotheses and specific management issues were selected. This was done in relation to specific management procedures and strategies which includes methods for monitoring and assessing the status of the system. The relevant descriptive models and analytical tools have been made available and have been applied and used in the scientific analysis of the systems which is completed under the different case studies. This has involved further development, modification or re-organization of existing descriptive models and analytical tools, and a long row of these have been formulated into R/FLR being con-current input to development of the generic evaluation framework in relation to this. In this implementation process identification of key parameters and processes has also been performed.

The collection of the key information necessary for the construction of the simulation models of each fishery has been completed both for the biological and economical parts and operating models (see e.g. the EFIMAS ECONOWS Final Report). Existing national and international case specific data (e.g. ICES and STECF data) have been made available according to the needs. This includes making appropriate choices in relation to specific use of data and data processing in relation to quality and necessary aggregation and dis-aggregation that are central in order to make high quality parameterization, modeling, and analysis for the different case studies. This process has also identified sensitive parameters and indicators as well as identified central and necessary components of the evaluation framework.

In relation to this, the dimensions and processes of both the biological and economical operating models (and linkages between those) in the case studies have been developed and have in all case studies been completed. The biological and technical/eocnomical OM's have as planned been implemented in the case studies, and the parameterization of the OMs has in that respect been finalized. The planned simulations have been performed in all case studies in order to test and implement the established generic management evaluation framework. Dissemination of the

established management evaluation framework among other through case specific dissemination in ICES, STECF, ICCAT and RAC's have been performed, and the results have been published.

The general progress, results and conclusions from the case specific work is presented at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main) as well as in the WP4 Technical Reports with EFIMAS Deliverables 4.1 and 4.2 and 3.2 and 3.4.

In practice, there has been a very close link between the development of the general management evaluation framework and the application of this into the case studies. Much of the WP3 work on actual development of the general fisheries management evaluation framework has been performed under and in direct, running cooperation with the case specific implementation of this. Particularly, deliverable D3.2 and D4.1 as well as D3.4 and D4.2 have a high degree of overlap and integration as well as a common platform which is also evident from their titles. All this is a direct result of the fully integrated nature of the working process between the WP3 generic framework and model development and the WP4 case study implementation, i.e. the case specific development, performed through running communication and cyclic-feed back processes between the WP3 group and the WP4 case study groups. Much of the generic evaluation framework and its model development have been performed through the case specific implementation and development. This cyclic feed-back process was also originally planned for the project as described in the Technical Annex 1 to the Contract. In fact, these collaboration processes have actually succeeded more than originally expected, resulting in a very high degree of overlap in products.

All generic biological and economic FLR objects have been developed, documented and tested. Biological and economic operating models have been implemented and parameterized in FLR and full scenario evaluations developed from base-cases have been implemented / applied for all case studies. The most recent development work has focussed on generic fisheries and economical FLR objects. For example, is FLEcon functional, and contains general equations for the various relevant economic processes. The economist meeting and workshops - also with participation of biological OM experts - in Copenhagen January 2007, Lisbon in April 2007 and Copenhagen January 2008 (ECONOWS) – as well as the preparation of these – have produced a full economic report summarizing the previous economist meetings in Sevilla, London and Nantes (see List of Dissemination, Products, and Activities attached to this report) and also produced generic mathematical equations used for different relevant processes in the economical OMs. This is now completed and formulated into R/FLR, and into FLEcon with full documentation. The generic evaluation framework and the case specific implementation have as expected been completed in direct cyclic feed-back process and cooperation between WP3 and WP4 (and WP5).

The dissemination of the established management evaluation framework and the case specific implementation of this has been successfully conducted and demonstrated through a long row of products and activities, and this has even been more extensive than originally planned: extensive implementation in ICES, STECF, ICCAT and NAFO working groups, presentations and feed-back discussions in RACs, discussion and feed-back in stakeholder focus groups, several conferences including the EFIMAS Stakeholder Conference, many user courses and workshops, many peer reviewed scientific papers, several posters, a full book published under EFIMAS, News briefs and popular scientific publications, fiches, a project flyer and two technical leaflets, a policy brief and policy implementation plan, as well as a public web site and a connected project DocuWiki (see attached list of Dissemination, Products and Activities).

Work Package 5:

In relation to the above work WP5 has produced a delivery framework for information to guide management decisions by 1) evaluating the technical performance and the effectiveness of the operational management evaluation tool as a means to inform decision making processes, and 2)

developing a framework for the use of the management evaluation tool in decision making processes. As such work package 5 evaluates the operational evaluation tools and has provided iterative feed back for Work Packages 3 and 4 so that tool development and implementation were and are modified according to these evaluations.

With respect to evaluating the technical performance and the effectiveness of the operational management evaluation framework:
The overall approach uses simulation models which are based on stochastic simulation techniques, which take account of uncertainties (parametric as well as structural uncertainty) as well as include sensitivity and risk analysis and assessment. The established management evaluation framework considers uncertainties in the dynamics of the case stocks and fisheries, and emphasis is placed on many kinds of uncertainties including those found in the data collection (calculating variance in input data), assessment, modelling, advisory, management and the implementation processes. By being capable of evaluating the relative performance of multiple alternative management options the evaluation framework has strong capacity in performing sensitivity and risk analyses of the consequences of the various options. This is done by running different scenarios with changed input values based on the scenario analysis and evaluation methodology. The trade-offs implied by various strategies and options can be evaluated through scenario analysis, i.e. be evaluated for their robustness to uncertainty before implementation. As such the facilities and capabilities for the technical evaluation of the established evaluation framework is implicitly build into in the developed framework.

This (the technical evaluation) is described in a special section under WP3 at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:main) as well as under the section WP 5.1 at the DocuWiki ((http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main), and in the technical reports associated to WP3 (e.g. Deliverable 3.4, Report of Final Software Package with documentation). Consequently, this constitutes the general aspect of the technical evaluation capability and facilities of the established generic management evaluation framework under EFIMAS. The technical evaluation associated to each case study is described on case specific basis in Deliverable 4.2, 3.4 and at the EFIMAS DocuWiki under WP4 (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main. As such Deliverable 5.2 Technical Evaluation Reports is included in the above reporting and deliverables. Deliverable 5.2 is reflecting task 5.1, the technical/parametric evaluation, which is covered under Deliverable 3.3, 3.4 and 4.2 (by project month 48) with respect to describing how to evaluate uncertainty, sensitivity, robustness, and to perform risk analysis within the evaluation framework.

Aspects of Task 5.2.1, Proof Reading, has been (and are) implicitly included in the whole process of development and the structure of the evaluation framework and the project. This is a part of the cyclic feed back process between WP3, WP4 and WP5 concerning the different persons sitting together and developing the framework generically and case specific. The interactions established under the project have ascertained this. There is an internal evaluation of transparency of the technical tools here. EFIMAS scientists have been involved in the technical evaluation in case studies where they were not participants and case specific input have been evaluated by the WP3 group and the FLR Core Group.

With respect to process evaluation of the evaluation framework and the use of it and delivery process mechanisms:
There have been held a long row of interviews and focus groups meetings during 2006 to 2008 with stakeholders. A preliminary stakeholder evaluation (seen from fisheries management and policy maker perspective) was made for EFIMAS in autumn 2006 (see reporting below) as input to the comming stakeholder workshops as well as the ongoing focus group meetings. A reallocation of Work Package 5 work tasks and budget extended the coverage of fisheries and case studies under WP5.2 ‘Process evaluation of the evaluation framework’. In addition to the three original

geographic areas covered under the existing budget (North Sea roundfish fisheries, Denmark; Nephrops fisheries, England; and northern hake mixed fisheries, Spain), stakeholder interviews and focus groups are implemented in Ireland (Nephrops fisheries) and Greece (Mediterranean hake fisheries). Scientists working in WP3 and WP4 have participated in the WP5 focus groups. A time in each group was set aside for these scientists to ask their own questions to stakeholders. The final form of the stakeholder workshops was identified in preparation of and at the EFIMAS meeting in Lisbon April 2007. The interviews and focus groups meetings have been finally reported in a row of technical reports under EFIMAS as well as through the EFIMAS Conference Technical Report (see below), which together constitute the Deliverable 5.1, and which are available at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main). A list of focus group held and interviews conducted representing different European fisheries systems are given in the EFIMAS List of Dissemination, Products and Activities May-June 2008.

With respect to the Stakeholder Workshops, EFIMAS has with agreement of the EU Commission re-conceptualized this where the planned four regional stakeholder workshops were combined into the more broad and general EFIMAS Conference successfully conducted in Bruxelles 11-12 March 2008 with participation of more broader stakeholder groups as well as EFIMAS scientists. On basis of this EFIMAS Conference there has been produced a EFIMAS Conference Report with general and case specific stakeholder feed-back covering many management, advisory, industry, fisheries associations, and NGO bodies been introduced or involved in the management evaluation framework produced under EFIMAS.

In association with Deliverable 5.3 the evaluation process manual this has (according to the revised) Technical Annex 1 to the Contract (by Feb. 2008) been condensed into a policy brief, i.e. the Policy Implementation Plan (or Project Implementation Plan or Policy Brief) which has been produced under EFIMAS, describing the best practices in the use of quantitative evaluation tools in compelex, multi-stakeholder policy environments. This Policy Implementation Plan is available at the EFIMAS DocuWiki main page (http://wiki.difres.dk/efimas/doku.php?id=efimas) as well as under WP5 here. By condensing the evaluation process manual into a Policy Brief it is assured that it will reach as broad an audience and stakeholders as possible, and also be understandable for a broad audience within the European Communities.

The classic role played by science in fisheries is to set limits on exploitation according to objective criteria. Under conditions of high stakes and high uncertainty this traditional role is undermined as stakeholders use the political flexibility that uncertainty creates and managers try to make their own decisions easier by turning political problems into technical ones.

With the right tools, science can play a helpful role even when uncertainty is high. One strategy is participatory modelling which has been practised in EFIMAS. The approach uses scenario-based models to evaluate different options. Participatory modelling can involve managers, the fishing industry, conservation NGOs and any other group concerned with developing good, science-based policy. Participatory modelling is not a substitute for using science to set limits. But when limits are needed, this technique can focus on crafting strategies to meet them in efficient ways. Modelling can force stakeholders to clarify their objectives and explicitly address the trade-offs implied by various strategies. ¨

The common management evaluation framework and tools developed under EFIMAS for evaluating management strategies is a key tool for participatory modelling. It facilitates collaboration across disciplines, ensures that models and software once developed are easily validated, and widely available. In particular it details how to implement a variety of fishery, biological and economic models and software in a common framework so that alternative management strategies and procedures can be evaluated for their robustness to uncertainty before implementation. The design of the framework, including the adoption of object-orientated

programming, can be extended to new processes and new management approaches – for example ecosystem-based approaches. The management evaluation frameworks developed in EFIMAS and sister projects is open source, which is important for promoting transparency and allowing technology transfer between disciplines and researchers.

1. Project objectives and major achievements during the reporting period

1. Objectives and overall project approach:

To facilitate the development of better fisheries management regimes, a large European research project, 'EFIMAS' was launched to develop and integrate a set of new tools into a robust evaluation framework within which to simulate and evaluate the biological, social and economical consequences of a range of fishery management options and objectives within different management regimes. The project involves cooperation between 30 research institutions from all over Europe covering the disciplines of fisheries biology, economy and sociology, and is coordinated by the Technical University of Denmark, National Institute for Aquatic Resources.

Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders: In the same way that a pilot might fly in a simulator before flying for real, the simulation tool evaluates the robustness of alternative management strategies and options to give more holistic management advice before implementation. The EFIMAS and sister projects has developed software tools and simulation models within an evaluation frame that can predict and compare the outcomes of different management options on European fish stocks and fisheries. And instead of only looking at the impact of these virtual regimes on the fish stocks, the project also looks at the social and economic outcomes in a broader, more holistic context. This will provide managers a better idea of the consequence of a given management intervention before opting for a particular management approach.

The tools that are being developed take account of the dynamics in the fisheries systems in Europe (including policy priority areas such as fleet and mixed fisheries interactions and fisheries behavior) as well as effects of using e.g. alternative stock and fishery assessment models, economic based fishery models, and also consider uncertainties in the dynamics of the case stocks and fisheries. Importantly, emphasis is placed on many kinds of uncertainties including those found in the data collection, assessment, modelling, advisory, management and implementation processes. By being capable of evaluating the relative performance of multiple alternative management options the evaluation framework has strong capacity in performing sensitivity and risk analyses of the consequences of the various options.

EFIMAS develops and integrates a variety of modeling tools into a robust framework within which to simulate and evaluate a range of fishery management objectives and options. In particularly the project:

- Use and develops computer based models that will run stochastic simulations incorporating data from selected EU fisheries taking into account fleet interactions.
- Compares a range of management options generated with the current management of the stocks and fisheries.
- Compares the performance of a range of management options under alternative management systems and objectives.

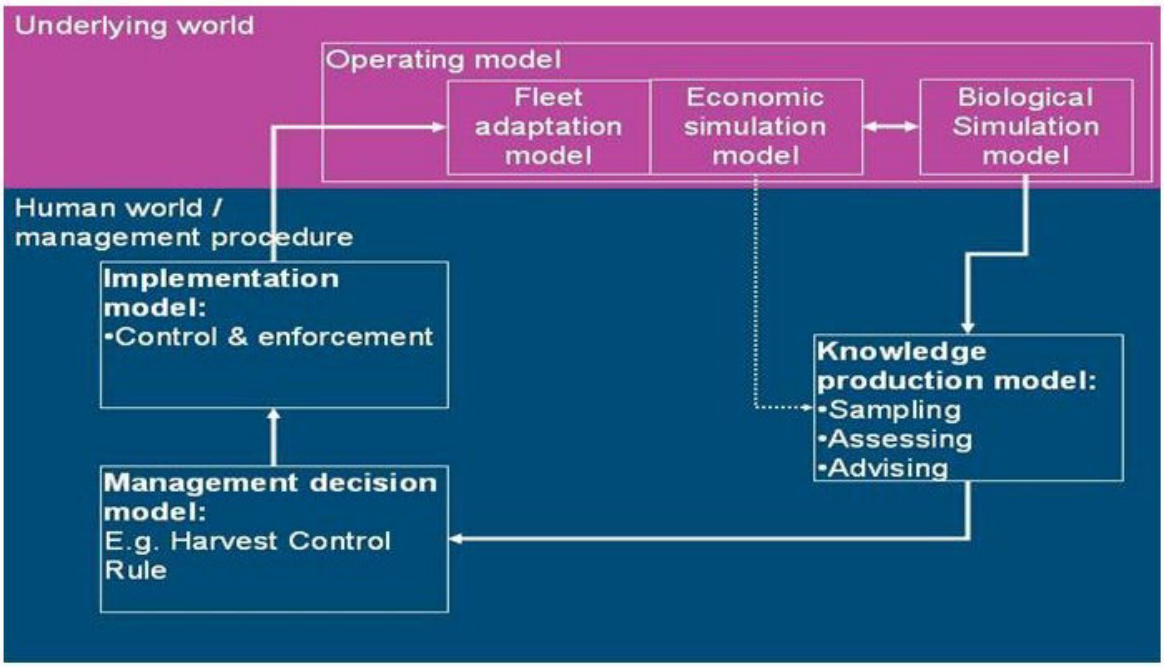
One of the major challenges is to ensure that the best possible knowledge is synthesized and made available to decision-makers. To this extent, some of the project participants have under the project reviewed the state-of-the-art knowledge base for fisheries systems including their institutional set-up and consequently published this in a book, "The Knowledge Base for Fisheries Management", which is available from Elsevier. Such information provides the background to draw conclusions of what is needed to improve fisheries management, and has been used to make the evaluation framework flexible enough to include a broad range of options under alternative fishery management systems.

The framework and simulation models are tested in selected case studies covering different types of EU fisheries in different areas, e.g. in the North Sea, Baltic Sea and Mediterranean:

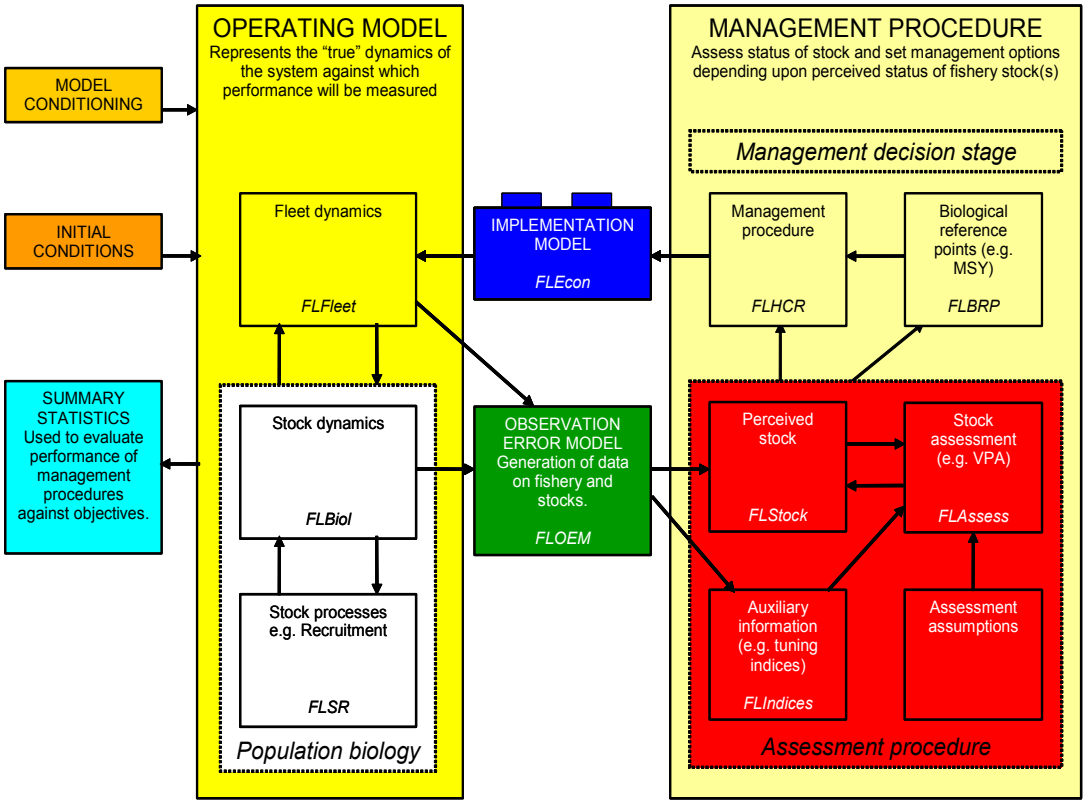
- Mixed flatfish fisheries, North Sea
- Mixed roundfish fisheries, North Sea
- Salmon fisheries, Baltic Sea
- Mixed nephrops fisheries, East Atlantic
- Mixed northern Hake fisheries, East Atlantic (ICES areas VI-VIII)
- Swordfish fisheries, Mediterranean
- Mixed hake fisheries, Mediterranean
- Cod fisheries, Baltic Sea

An overview of the simulation module of EFIMAS is given in the conceptual box flow diagrams below. The input data to module are generated by a descriptive model (operating model), which is assumed to represent the "true/real" system. The input data are then processed by a traditional or an alternative fish stock or fisheries assessment model (knowledge production model), which is used to generate management advice. By simulating the effect that the resulting management actions would have on the "true/real" system it is possible to generate a range of performance measures, covering the resource as well as the fishery (such as minimum mesh size, minimum landing size, TAC constraints, closed areas, closed seasons, and effort regulations). These performance measures will then enable the comparison of a range of management options under alternative management systems and objectives.

EFIMAS Conceptual Evaluation Framework: Operating Models and Management Procedures



Simulation module of the EFIMAS Project



Consequently, the objective of EFIMAS has been fulfilled to develop and build a Management Strategy Evaluation (MSE) framework that allows test of plausible hypotheses about the dynamics of the stocks and fleets before implementation, and which can appraise the biological, social and economic effects of the existing fisheries management measures in EU. An MSE framework includes an operating model which simulates the system to be managed, and management procedures applied on it, which include parameters and outputs from methods for monitoring and assessing the status of the system as well as relevant management options. The evaluation framework is able to simulate and evaluate different management options continuously using output parameters and results from scientifically based tests of hypotheses and analyses performed in case specific implementations, with relevant descriptive models addressing main fisheries advisory and management problems. Consequently, this can be and has been used to evaluate results and output generated from other software packages (descriptive fisheries/stock assessment models as well as other evaluation and analysis tools), analyses, and existing databases being used for production of advice to management bodies, and can be applied to important EU fisheries.

The overall approach uses simulation models which are based on stochastic simulation techniques and take account of uncertainties (parametric as well as structural uncertainty) and include risk assessments. It include simulated data collections using existing databases and calculated variance in data, performs assessment of the system (with use of output from currently applied descriptive models and analysis tools, alternative existing models/tools, or modified existing (alternative) models/tools for fisheries/stock evaluation), and provide advice according to harvest control rules, management options and objectives. Simulations are and can be mainly performed using an integrated suite of software facilities with implementation of a common language (e.g. R/FLR) and interface, i.e. a common simulation frame, which can handle output and results from a variety of descriptive models and tools for analyzing different management scenarios, options and objectives.

Projects current relation to state of the art

European fisheries management is under pressure and in a process of reform. While several important stocks are depleted and fleets are facing reduced catch options there are increasing demands for management decisions to be more inclusive for stakeholders and to include fleet interactions, environmental effects on fisheries and the effects of fisheries on the environment and the ecosystem in decision making. There is, thus, both a pressure for better informed and more inclusive decisions and an expanding scope and inclusion of an expanding range of objectives for management. The challenge is to ensure that the best available knowledge is synthesized and made available to the decision making process in a way which informs and assists decisions and communicates complex insights effectively to the increasing number of stakeholders involved in these decisions.

Fisheries management pursues various objectives through a range of management measures. Decisions about management measures are choices between different sets of expected outcomes which relate to these objectives. It is important that such decisions are informed by the best possible assessment of expected outcomes for a multitude of objectives for the various management options. Decision making should therefore be based on explorations of options informed by an evaluation tool which compares expected outcomes relative to management objectives for various management options. Although the effects of some specific management options may be relatively easy to predict, others are more difficult to envisage due to uncertainty in the dynamical processes, our limited ability to monitor, assess and control natural systems and because the adaptations of fishing fleets to management measures and the efficiency of management implementation are difficult to predict. This creates a difficult situation for managers and stakeholders alike when debating different management options (e.g. TACs, effort control, technical measures and on the longer term recovery plans and harvest control rules). There is, thus, a need for an evaluation framework to be available to structure and communicate existing knowledge in terms of data and knowledge about processes, enable exploration of options within specific management procedures with an evaluation of trade-offs between various objectives and of the robustness of the options (to assumptions, model and data error) and risks involved.

It is increasingly recognized that management strategies can only be developed in a close dialogue between stakeholders and science, where the role of science will be both to evaluate proposed strategies, but also to advice on which kinds of strategies that can be worth considering. The interaction between science and management or policy decisions is not trivial and there has been a range of studies of the conditions for a constructive interaction. The effectiveness of any given policy is determined not only by the scientific validity of its modeling tools but by the processes by which policies are identified and implemented. Simply designing an accurate modeling alone does not ensure effective policy. If the tool is not carefully presented and used, it might have an un-intended impact on the attempt to achieving overall policy goals. Good models can give decision makers a better handle on the risks of decisions, but the public perceptions more often focus on how decisions are made than they do about questions of risk. Research has shown that the public can perceive experts as overly confident about their data, having narrow definitions of problems, and hence overlook important information, and these perceptions can undermine or even work against a rational public reception of the decision. Complex models can potentially exacerbate these problems. Distrust of scientists and scientific information is particularly acute in fisheries. The role that quantitative models play in these issues of perception has only recently begun to receive attention as a distinction subject within studies of effective communication of science-based policy. The research proposed here will not only seek to ensure that the evaluation tool that is created take issues of stakeholder perception into account, but it will also make direct attention to scientific

communication in other fields.

The framework proposed here will be based on the use of computer-based simulation to explore options through a comparison of the expected performance of candidate management and assessment strategies relative to the management objectives. The development and use of such frameworks was pioneered by the International Whaling Commission which used this approach to test the potential future performance of alternative proposals for new whaling management procedures.

Scenario modeling is not yet implemented on a routine basis in Europe but there are examples where scenario simulations have been used to evaluate management strategies before implementation. The present project will build on these experiences.

2. Major achievements during the reporting period:

The major achievements in this project period are connected to and described under the different work packages (chapter 2 of this EFIMAS Project 48 month Activity Report) as well as summarised in the executive summary of the project and project status in the present report. The achievements are in accordance with the EFIMAS Project Contract and the Technical Annex 1 of the Project Contract including Amendments to this. Full and up-dated reporting of the progress, results and produced deliverables for all work packages and case studies can be found at the EFIMAS DocuWiki **http://wiki.difres.dk/efimas/doku.php?id=efimas** as well as in the Technical Reports associated to the Deliverables produced and approved so far also available from the DocuWiki**.**

The evaluation framework established through EFIMAS and its sister projects is open source simulation tools and is made available from www.efimas.org and http://flr-project.org/. The evaluation framework has been used in ICES (www.ices.dk) stock assessment and mixed fisheries working groups, in EU STECF (http://europa.eu/-scadplus/leg/en/cha/c11127.htm) working groups and EU RACs (Regional Advisory Councils), in NAFO Scientific Council working groups (www.nafo.int), and by IWC (www.iwcoffice.org), and presented through a long row of scientific papers, conferences, user courses and workshops produced under EFIMAS. By incorporating a wider range of variables and their uncertainty to illuminate the decision process and allowing for stakeholder feed-back in the evaluation process, fisheries management will be made more accessible to all kinds of stakeholders.

Contributing to policy development

- EFIMAS has produced and provided a specific Policy Brief / Policy Implementation Plan in relation to the management evaluation framework developed which details the application of the evaluation framework at the EU fishery management level.
- EFIMAS provides more holistic scientific management advice to fishery managers, including a robust management evaluation tool and framework driven by numerically defined harvesting rules.
- The project has developed an evaluation framework of existing and new interactive fishery advice and management models that identify the socio-economic, as well as the biological, consequences of given management decisions.
- The project has helped to restore the somewhat shaken trust of stakeholders by incorporating a wider range of variables to illuminate the decision-making process and make it more accessible to them.

Some specific project deliverables

- Review of global management systems and decision-making processes relevant for EU fisheries published in a book by Elsevier.
- Project Flyer and two project Technical Leaflets.
- Two public websites related to EFIMAS and a project DocuWiki web site with the management evaluation framework, the toolbox and simulation models including documentation available, as well as with the case specific implementations of the management framework available (October 2004 – June 2008).
- Preliminary software package and toolbox of operational models to compare alternative fisheries management options, objectives and regimes (October 2006 / February 2007).
- Preliminary case specific implementation of the software package of operational models and tools (by October 2006 / February 2007)
- Final software package in R/FLR as well as modifications and implementations of alternative Management Evaluation Frameworks (Evaluation Frame/TEMAS and the ISIS-Fish simulation tool) with high level of documentation - and aiming at a high level of *user-friendliness* when experts are implementing it in cooperation with stakeholders (by March 2008).
- Final case specific implementation of the software package of operational models and tools (by March 2008).
- Policy Brief / Policy Implementation Plan detailing the application of the evaluation framework at the EU fishery management level (by March 2008).
- A comprehensive row of specific project deliverables, technical reports, scientific paper and book publications, and popular outreach publications have been produced under EFIMAS which combined have been listed in the attached "EFIMAS List of Dissemination, Products and Activities" by June 2008 (up-dated May-June 2008).

Outputs from establishment of the EFIMAS Fisheries Management Evaluation Framework and the case study specific implementation of the framework are fully reported and available from the EFIMAS DokuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas) as well as delivered through the technical reports and dissemination reporting associated to the project deliverables. The Deliverables submitted so far have been approved by the EU Commission (see also "EFIMAS List of Dissemination, Products and Activities" by March-April 2008 (updated May-June 2008).

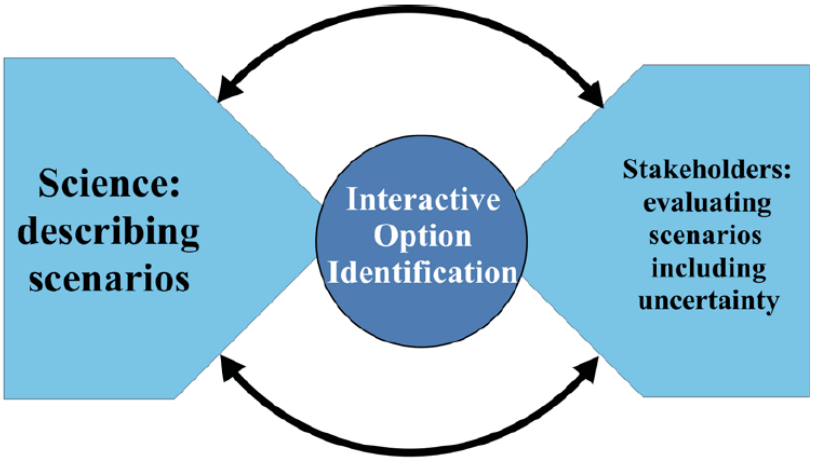
Stakeholder participation

European fisheries management is rapidly changing toward a more responsive and efficient system and increasing stakeholder participation in decision making is an important part of that. Participation brings about changes in the role of science, as well, and the EFIMAS project has contributed significantly to the development of the FLR (and other) suite of tools for facilitating science-based decision making in a participatory context. The classic role played by science in fisheries is to set limits on exploitation according to objective criteria. Under conditions of high stakes and high uncertainty this traditional role is undermined as stakeholders use the political flexibility that uncertainty creates and managers try to make their own decisions easier by turning political problems into technical ones.

With the right tools, science can play a helpful role even when uncertainty is high. One strategy is participatory modelling which has been practised in EFIMAS. The approach uses scenario-based models to evaluate different options. Participatory modelling can involve managers, the fishing industry, conservation NGOs and any other groups concerned with developing good, science-based policy. Participatory modelling is not a substitute for using science to set limits. But when limits are needed, this technique can focus on crafting strategies to meet them in efficient ways. Modelling can force stakeholders to clarify their objectives and explicitly address the trade-offs implied by various strategies.

> Models have to help resolve problems in all sectors, including with the fishermen, in order for them to be a useful tool. ... We need to manage the whole fishery, not just the fish! It is important to look at the whole picture. We forget this sometimes as biologists.
>
> Spanish fisheries scientist

> ... from a few cases [of partnerships between science and the fishing industry], a lot of fishermen have a better relationship with scientists as a result and vice versa. You really do see that building a trust.
>
> UK women in fisheries focus group



Participatory Modelling: Science Promoting Transparency

> Science, if we look at the definition should be objective; at the very least, it should try to be objective through use of methodologies. But fortunately or unfortunately science isn't independent from the society which is producing it.
>
> Greek Conservation NGO focus group

> ... just to trust a mathematical model isn't enough and I would not understand the mathematics, but I would understand the basic assumptions and that is where the link between the modeller and the man on the street is important. You have got to make the model understandable to me and to others.
>
> Irish managers' focus group

The common management evaluation framework and tools developed under EFIMAS for evaluating management strategies is a key tool for participatory modelling. It facilitates collaboration across disciplines, ensures that models and software once developed are easily validated, and widely available. In particular it details how to implement a variety of fishery,

biological and economic models and software in a common framework so that alternative management strategies and procedures can be evaluated for their robustness to uncertainty before implementation. The design of the framework, including the adoption of object-orientated programming, can be extended to new processes and new management approaches – for example ecosystem-based approaches. The management evaluation frameworks developed in EFIMAS and sister projects is open source, which is important for promoting transparency and allowing technology transfer between disciplines and researchers.

Linkages with other fisheries management initiatives

EFIMAS is the largest among a string of recent and ongoing EU supported projects that aim to evaluate and improve management of European fish stocks. EFIMAS has worked closely with a range of national and international projects, including related EU FP5 and FP6 research projects. For further details of specific linkages, please see list of relevant linkages at www.efimas.org (under Links) as well as especially the EFIMAS DocuWiki under WP3 http://wiki.difres.dk/efimas/doku.php?id=efimas where linkages to other projects, ICES, STECF, ICCAT, NAFO, Stakeholders, etc. are described - and the WP3 technical report.

Specific results and outcomes (learn more):

For more details on specific project components, ongoing activities, partners, progress and outputs, please visit the EFIMAS project website (see below), the EFIMAS project DocuWiki (see below), the Project Flyer and Technical Leaflets, the Policy Implementation Plan, or contact the project coordinating team at:

Web: www.efimas.org and http://flr-project.org/
DocuWiki: http://wiki.difres.dk/efimas/doku.php?id=efimas
Email: efimas@efimas.org

Dissemination of the project (overview):

Project presentation	
Poster	EUROCEANS: Nielsen, J.R., Sparre, P.J., Kell, L., Degnbol, P., Pascoe, J., Pastoors, M., Motos, L (editors on behalf of EFIMAS consortium): Operational Evaluation Tools for Fisheries Management Options (EFIMAS). Poster and Extended Abstract, EUROCEAN 2004, 10-13 May 2004, Galway, IRE.
Policy brief	Policy Implementation Plan (PIP) / Project Implementation Plan / Policy Brief detailing the application of the evaluation framework at the EU fishery management level. EFIMAS Project Policy Brief Flier. Report to EU Commission, Sept. 2008. www.efimas.org and http://wiki.difres.dk/efimas/doku.php?id=efimas.
News brief	External Forum, Danish Ministry of Food, Agriculture & Fisheries, news article on EFIMAS (in Danish).
Popular articles	News brief on EFIMAS in fisheries stakeholder journal (in Danish). ICES/CIEM Newsletter 2005 – 'Virtual Fisheries Management' Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks – conceptual change in European Fisheries Management advice. Implementing fisheries management evaluation tools capable of comprehending both the biological, economic, sociological and spatial dynamics of the fisheries system. WORLD FISHING, February 2009. (In Press). (EFIMAS Summary Article)
Public project web-site	www.efimas.org and input to http://flr-project.org/
Project DocuWiki	http://wiki.difres.dk/efimas/doku.php?id=efimas
Fiches	Fiches presenting fisheries and aquaculture research projects in support of the Policies (SSP) of the Sixth Framework Programme (http://europa.eu.int/comm/research/fp6/ssp)
Leaflet / Flyer	EFIMAS Flyer / EFIMAS Folder: 'Virtual Fisheries Management'. EFIMAS Flyer, October 2005. EFIMAS Technical Leaflet 1 Project Month 36: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to

	stakeholders". (PROFET Policy, Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01). EFIMAS Technical Leaflet 2 Project Month 48: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" version 2. (PROFET Policy, Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01). Policy Implementation Plan (PIP) / Project Implementation Plan / Policy Brief detailing the application of the evaluation framework at the EU fishery management level. EFIMAS Project Policy Brief Flier. Report to EU Commission, Sept. 2008. www.efimas.org and http://wiki.difres.dk/efimas/doku.php?id=efimas.
Book	The Knowledge Base for Fisheries Management. ELSEVIER Publishers, August 2006.
Logo	EFIMAS Logo Produced. 2004. See front page.
ICES Working Groups	Presentation and Executive Summary of EFIMAS. ICES Working Group on Fisheries Systems (**ICES WGFS**). April 2006. Specific workshop dedicated to the use of FLR for fish stock assessment, **ICES WKFLR**, 29 Jan – 2 Feb 2007, ICES Headquarters, Copenhagen, DK. (WKFLR). Use of FLR in a long row of assessment working groups, initiated in 2006 on few stocks only, and widely spread in 2007 and 2008, for example: **ICES WGNSSK** (2006-2008) (WGNSSK), **ICES WGHMM** (2007-2008) (WGHMM), **WGNEAMAC** 2007-2008; **ICES WGBFAS** 2008; A specific example of this is the May 2008 WGNSSK use of FLR in Machiels et al. 2008; For example has the generic OM and the MSE developed under Case Study 6 been being used in the ICES Working Group **WGHMM**07 (May 2007) WGHMM and has been the main methodology to the STECF on Long-term harvest plans for Northern Hake (June 2007). AMAWGC: Demonstration of FLR to the ICES working groups chairs in **ICES AMAWGC** 2007 (AMAWGC). Presentation of FLR and of EFIMAS project to ICES Working Group on Fisheries Systems 2007 (**ICES WGFS**) (ICES Working Group on Fisheries Systems). Examples of management strategies evaluations presented in **ICES SGMAS** 2007. (SGMAS). Developement of mixed-fisheries models using FLR for Management Strategy evaluaton of mixed North Sea roundfish and Nephrops fisheries in **ICES MIXMAN** 2006, 2007, 2008 (ICES MIXMAN 2006, 2007, 2008) . Use of FLR tools for risk analysis under **ICES SGRAMA** 2007. (SGRAMA). Use of FLR tools in **ICES WKNEPHSEL** 2007. (ICES WKNEPHSEL 2007)
STECF Work Groups	Use of FLR and EFIMAS Work in a several EU STECF Work Groups in 2006, 2007 and 2008: Flatfish management plan evaluation: STECF 2006. SGBRE-07-03 (June 2007) and follow-up SGBRE-07-05 (December 2007) Northern Hake long-terms management plans SGMOS-07-07 Evaluation of Harvest Control (September 2007). See the specific details under this working group's wiki page. Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008). STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.
RACs	Examples of work evaluated in the RACs is the work on North Sea flatfish to the North Sea RAC |Poos et al. (2006) and Pastoors et al. (2006). The North Sea Regional Advisory Council (NS RAC), the ICES Working Group on the North Sea and Skagerrak (ICES WGNSSK), as well as DG MARE's Scientific Technical and Economic Committee on Fisheries (STECF) were provided with advice in relation to development of a management plan for the North Sea plaice stock. Different management options were evaluated with integration of biological and economic based management evaluation tools in R/FLR developed under EFIMAS.

MSE Tools for Long Term Management Evaluation of Northern Hake presented to: RAC SWW: Santigao de Compostela, 23 oct 2008, and to RAC NWW: Bruselas, 31 Oct 2008.
Management strategy evaluations were done for the North Sea haddock fishery including the implications of recruitment, discards, and the sliding-F exploitation rule and reported to the North Sea RAC, 2007.

Examples of Dissemination and Implementaton

Pietikäinen, L. 2005. Cod fishery of the European Union and Russia at the Baltic Sea - a game theoretic analysis. Department of Economics and Management, Working Papers no 30, University of Helsinki
Levontin, P., McAllister, M. (2005). Evaluating management options for Baltic salmon (Salmo Salar) using bio-economic operating models in a generic simulation framework. Proceedings of the ICES Annual Science Conference, Aberdeen. ICES CM 2005/W:00
Under a special request to ICES from DG MARE the merits of DNA analysis for stock assessment purposes and monitoring of fisheries impact on individual wild salmon stocks was carried out for the Baltic Sea.
Evaluation of NSRAC advice for North Sea flatfish management plan, January 2006
Evaluation of EC proposal for North Sea flatfish management plan, presented to STECF SGECA-SGRST-06-05, September 2006
Evaluation of North Sea haddock management plan and North Sea cod recovery plan, ICES WGNSSK 2006, section 16 (see also below).
Needle, C. L. (2006a). Evaluating harvest control rules for North Sea haddock using FLR. Working Paper for the ICES Working Group on Methods of Stock Assessment, Galway, Ireland, 21-26 June 2006.
Needle, C. L. (2006c). Revised FLR-based evaluation of candidate harvest control rules for North Sea haddock. Working paper for the ICES Advisory Committee for Fisheries Management, Copenhagen, October 2006.
ICES, 2007(a). Results of the evaluation of the biological effects of North Sea cod recovery plans in relation to various management measures using the modelling FLR to evaluate management plans under the umbrella of current North Sea cod recovery plans are presented in ICES WGNSSK (2006), section 16 and Working Document 18: ICES WGNSSK 2006, section 16 and Working Document 18
ICES, 2007(b). Results of the evaluation of North Sea haddock management plan in relation to various management measures using modelling in F/RLR is presented in ICES WGNSSK Report (2006), section 16: ICES WGNSSK 2006, section 16 and Working Document 18. ICES C.M. 2007/ACFM:35
Kronbak, L., Lindroos M. 2006. An Enforcemen-Coalition Model:Fishermen and Authorities Forming Coalitions. Environmental and Resource Economics, 35: 169-194
Horbowy, J. 2006. Management of the eastern Baltic cod with stock-production or difference models. Poster to ICES Symposium on evaluation of management strategies. SFMS 44, Dublin 2006
Machiels, M.A.M., Kraak, S.B.M., van Beek, F.A. 2007. Evaluation of a management plan as proposed by the European Commission in 2006 for fisheries exploiting stocks of plaice and sole in the North Sea. IMARES report C011/07
J. Haralabous, CD Maravelias, G. Tserpes & C. Papaconstantinou. 2007. Developing a *FLR* operational model for evaluation of fisheries management strategies: an application to Mediterranean hake fishery. 38th CIESM Congress, 9-13 April 2007, Istanbul, Turkey
Evaluation of management strategies for the mixed North Sea roundfish fisheries with the FLR framework Presentation to AFH (French Association of Fisheries Science) Conference, 19-21 June 2007, La Rochelle, France
Clarke, E. D. 2007. Evaluating the West of Scotland cod recovery plan using computer simulations, FISHupdate, June 2007.

Clarke E.D. 2007. ROAME MF0352: The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 2: Model parameter estimation. Fisheries research Services internal Report, No ##. 10pp.
Holmes, S.J. 2007. ROAME MF0352: The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 3: Discards model parameter estimation and validation. Fisheries research Services internal Report, No ##. 20pp.
Clarke E. D. and Holmes, S. J. 2007. The evaluation of fisheries management strategies using simulation. Case study: the West of Scotland cod recovery plan. Part 4: Evaluation of the west of Scotland cod recovery plan. Fisheries research Services internal Report, No ##. 29pp.
Evaluation of management strategies for the mixed North Sea roundfish fisheries with the FLR framework Presentation to MODSIM07 Conference, 10-13 december 2007, Christchurch, New Zealand with Hamon et al. peer-review publication in conference proceedings
Needle, C. L. (2007a). Management strategy evaluation for North Sea haddock, *Fisheries Research*, doi:10.1016/j.fishres.2008.03.004
Needle, C. L. (2007b). Management strategy evaluation for North Sea haddock (poster). Haddock 2007, Sheraton Harborside Hotel, Portsmouth NH, USA. 25 October 2007
Hoff, A. and Frost, H. 2007. Modelling Economic Response to Combined Harvest and Effort Control in Fishery. http://www.univ-brest.fr/gdr-amure/eafe/eafe_conference 2007: Hoff and Frost 200.
Tserpes, G. and Peristeraki, P., 2007. Effects of a seasonal closure of the Mediterranean swordfish fisheries on the stock production levels. ICCAT Collective Volume of Scientific Papers, 60: 2059-2062 (see also below).
Exploratory management strategy evaluation (MSE) for Greenland halibut using the FLR framework was presented to the NAFO Scientific Council in 2007. Fisheries managers and industry representatives were invited to provide input in the formulation of the MSE and there was obtained feed-back from those on the performed evaluations.
Management Strategy Evaluation frameworks (MSE) and Management procedures (MP) in fisheries management, by Martin Aranda. Presentation on implementation of MSE systems. Starting point for the introduction of the MSE system in the Chilean fisheries of orange roughy and Patagonian tooth fish. 6-7 June 2007. Valparaiso-Chile.
The ICES MIXMAN Working Group has in 2007 and 2008 performed Management Strategy Evaluations (MSE) for the international mixed North Sea Roundfish and Nephrops consume fisheries considering different harvest control rules using a special application of R/FLR developed in cooperation with the EFIMAS and sister EU projects.
Regulations for Baltic Cod including TAC management, and direct and indirect effort management including the "F-adaptive approach" all suggested and implemented by EU / DG MARE and considered in the ICES Baltic Fisheries Assessment Working Group (ICES WGBFAS) for the recovery of the Baltic Cod was bio-economically evaluated by development of a spatio-temporal dis-aggregated simulation frame within R/FLR:
Bastardie, F., Nielsen, J.R., and Kraus, G. 2008. A spatially-explicit fishing effort re-allocation modelling framework using FLR – Application to the Baltic cod fishery under selected environmental and management regimes. Report DTU-Aqua, Danish Technical University, Charlottenlund, Denmark, March 2008: 50 pp. (Submitted). report Baltic Case Study 9 Approach 2a
Hoff, A., Frost, H. (2008). Modelling economic response to harvest and effort control in the North Sea cod fishery. Aquat. Living Resour., 2(forthcoming)
Kraus, G., Pelletier, D., Dubreuil, J., Moellmann, C., Hinrichsen, H.H., Bastardie, F., Vermard, Y., and Mahevas, S. 2008. A model-based evaluation of marine protected areas for fishery management in the case of strong environmental forcing

– the example of Eastern Baltic cod (Gadus morhua callarias L.). (Accepted ICES J. Mar. Sci.). Paper with results
DG MARE and the North Western Waters RAC were provided with a bio-economic analysis of the consequences of the long term management plan for Northern Hake.
García D., Prellezo R. & Marina Santurtún. 2008. Update on EFIMAS Project: Evaluation tool for Alternative scenarios for Northern Hake fisheries management (Management Strategies Evaluation (MSE)) NWW RAC Focus Group on Northern Hake Long Term Management 21st February 2008, Bilbao
Biological and economic implications of different management measures (e.g. temporary fishing closures) for the Mediterranean swordfish stock was evaluated based on discussions with scientific groups at the International Commission for the Conservation of Atlantic Tunas. The evaluations were done by means of biological and economical based simulations performed under the FLR framework.
Tserpes, G., Tzanatos, E., Peristeraki, P., Placenti, V. and Kell, L., 2008. A bioeconomic evaluation of different management measures for the Mediterranean swordfish. ICCAT SCRS/2008/026
Machiels, M.A.M. Kraak, S.B.M., Poos, J.J. 2008. Biological evaluation of the first stage of the management plan for fisheries exploiting the stocks of plaice and sole in the North Sea according to Council Regulation (EC) no 676/2007 IMARES report C031/08
NAFO Study Group in February 2008 in Vigo (Spain), and it was considered a useful exercise. Results were presented to the NAFO Scientific Council (*NAFO SCS Doc*. 08/13)
Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008).
STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.

Conferences

EUROCEANS Conference, Galway, Ireland 2004 (Poster and Extended Abstract)
ICES Symposium on Fisheries Management Strategies, Galway, Ireland 2006 (Several Presentations and Scientific Papers and Posters to the conference and several papers published in symposia proceedings in ICES J. Mar. Sci. 2007 vol. 64 (4))
Presentation of FLR in UseR Symposium 2006, 15/17 june, Wienna, Austria
PROFET Policy Conference: Baltic Fisheries Science, Vilnius, Lithuania, April 2007 (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).
Some of the economic studies have been presented at the EAFE Conference (2007) (see ECONOWS Report).
Presentation of FLR together with WP4-CS2 application at MODSIM conference, Christchurch, New Zealand, 10-13 december 2007
Presentation of EFIMAS and FLR at 6FP workshop, DGFish DG-RTD, Brussels, 26 october 2007.
EFIMAS Conference, Bruxelles, Belgium, March 2008. A long row of EFIMAS Presentations. Special arranged Conference by EFIMAS with participation and representation of EU Commission, EU Managers, National Managers, International and national fishing industry and fishermen associations, NGOs (e.g. WWF), experts and scientists (fisheries biologists, economists, and sociologists).
Oceanology 2008 Conference, London, UK, March 2008. General Presentation of EFIMAS.
PROFET Policy Conference, North Sea Fisheries Science, Copenhagen, DK, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).
PROFET Policy Conference, Mediterranean Fisheries Science, Marseille, France, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).

Scientific Publications

A long row of scientific publications under EFIMAS has been produced and published which are listed in the "EFIMAS List of Dissemination, Products and Activities" by June-September 2008.

Courses

Anonymous 2005-2008. FLR teaching courses. A number of FLR teaching courses have been held throughout the project, and in collaboration with other projects involved in FLR development. Programs and courses outlines are available on http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:3-7:main and on the FLR website. Those specifically or partly related to EFIMAS were :

- 25-26 april 2005, **Salerno**, Italy: 2-days FLR introductory workshop (audience: EFIMAS participants).
- 23-25 November 2005, **IJMuiden**, the Netherlands: 3-days Introductory course on evaluation of management strategies using FLR (audience: EFIMAS case studies participants).
- 17-18 January 2006, **Helsinki**, Finland: 2-days FLR course (audience: Finnish assessment scientists).
- 24-25 January 2006, **Sukarrieta**, Spain: 2-days FLR course (audience: Spanish assessment scientists).
- 01 February 2006, **ICES**, Denmark: 1-day Demonstration of FLR to the ICES AMAWGC (audience: ICES Working Groups Chairs).
- 15 February 2006, **IJMuiden**, the Netherlands: 1-day course on evaluation of management strategies using FLR (audience: Dutch assessment scientists).
- 10-11 November 2006, **Charlottenlund**, Denmark: 2-days FLR course (audience: Danish-German assessment scientists).
- 11-15 December 2006, **Ottawa**, Canada: 5-days FLR Course (audience: Canadian assessment scientists).
- 29 Jan - 02 Feb 2007, **ICES**, Denmark : 5-days WKFLR (audience: ICES assessment scientists).
- 29 Jan - 02 Feb 2007, **Vigo**, Spain: 5-days FLR course (audience: Spanish-Portuguese assessment scientists).
- 28th Jan 2008: Introductory course FLR/MSE for Masters - Agrocampus Rennes, France
- 31 March 2008 - 03 April 2008: Introductory course FLR - JRC Ispra, Italy

Workshops

- 21-22 December 2004, **Sevilla**, Spain: 2-days workshop for fisheries economists. The aim of this meeting was to consider 'economic' input into the bioeconomic models being developed for both EFIMAS and COMMIT projects, that is, specifically elements of fleet dynamics, price dynamics and cost dynamics. See the Sevilla ECONOWS Meeting report.
- 25-26 January 2005, **Charlottenlund**, Denmark: 2-days Workshop on development of Operating Models
- 4-5 April 2006, **Nantes**, France: 2-days Workshop on conditioning of Operating Models with FLR.
- 4-5 april 2006, **Nantes**, France: 2-days Workshop on modelling fleet dynamics. Read more on both workshops in the general Meeting minutes, London-Nantes, Feb-April 2006
- 15-17 January 2007, **Copenhagen**, Denmark: 3-days ECONOWS Workshop the report has been compiled from reports of previous meetings ECONOWS report, Copenhagen, Jan 2007 This report provide a comprehensive overview of the different models in use.
- 24-25 april 2007, **Lisbon**, Portugal: 2-days Workshop from WP4 to WP3 on learning from case-studies implementation to generic tools, and vice-versa.
- Apríl 2007, **Lisbon**, Portugal: 2-days ECONOWS Workshop (see reporting under ECONOWS Workshop, Copenhagen January 2008)
- 28-30 January 2008, **Copenhagen**, Denmark: 2-days Final ECONOWS Work Shop Final report ECONOWS_June2008. The major equations concerning a number of economic issues are implemented in relation to the core object of flr and FLECON. The description of the equations can be found in the final report and here ECONOWS_Matrix_Jan2007, and an extensive description of the package content is available on the package page on flr wiki

Furthermore, the development of the core FLR framework and the release cycle for new versions every 6 months (following the release cycle of the R environment) were insured by regular FLR Team meetings, which were partly supported by EFIMAS WP3. The following meetings took place during the project:

- FLR meeting. Goddards, December 2007
- FLR meeting. Lisbon, April 2007
- FLR Meeting. Goddards, January 2007
- FLR Meeting. Lisbon, July 2006
- FLR Meeting. Amsterdam, March 2006
- FLR Meeting. London, December 2005
- FLR Meeting. Lisbon, July 2005
- FLR Weekend. Mundaka, March 2005

General See "EFIMAS List of Dissemination, Products and Activities" by June 2008 (updated by June-September 2008)

2. Work package progress during the period

Overview of the actions carried out, based on the work packages.

Work Package 1: Project Coordination & Management (DIFRES, J. Rasmus Nielsen)

1. Progress towards objectives:
The EFIMAS Project started up as planned in April 2004, and constituted the project organisation, project bodies and project composition and contents as described in the Project Contract and the Technical Annex 1 of the contract. The project has been finalized by project month 48, March 2008, according to the plan.

To meet the objectives of WP1 the project coordination and management team has during the project period from month 1 to 48 implemented and conducted the following tasks, in accordance with the original plan: i) performing the overall EFIMAS project management and coordination; ii) establishment of and conducting (constitute) the hierarchical project organisation and decision making structure; iii) planned and organized project meetings; iv) ascertained that the project aims, deliverables and milestones have been fulfilled and delivered (including all deliverables, activity reports, popular outreach products, scientific publications, etc.) as well as the project work planned during this project period has been conducted according to the project plan; and v) planned, monitored and ascertained progress of the project through the steering group and leading of the steering group; vi) ascertained development and establishment of project communication structures, delivery processes and (cyclic) feed-back processes between work packages and case studies through meetings, workshops, e-mail communication and external and internal project web sites and project publications; vii) ascertained that project participants with multi-disciplinary expertise and specific and generic skills have been grouped together within work package and case study meetings, and that the project has taken advantage of state of the art, and experiences and knowledge from relevant similar international approaches and fisheries (management) systems in accordance with the scope of the project; viii) developed cooperation and communication between EFIMAS and other relevant EU FP6 Projects (e.g. COMMIT, PROTECT, CEVIS, BECAUSE, UNCOVER, FISBOAT, etc.); ix) production of a EFIMAS Project Consortium Agreement and signing of this by all project partners; and finally x) established budget overviews, performed economical project management and reporting, and allocated resources through advanced payments from the EU Commission to project partners enabling them to work on the project, as well as allocated resources to conduct the project management and coordination meetings by the Steering Group.

The work has been finalized according to the Project Contract and the Technical Annex 1 of the Project Contract and Amendments to this. Further details of Deliverables and Milestones completed during this project period are given above as well as in Chapter 3 and Annex 1 and Annex 2 of this Final Activity Report for project month 48 as well as in the Interim Management Report for project month 48 including the EFIMAS List of Project Dissemination, Products and Activities by May-June 2008. Full and up-dated reporting of the progress, results and produced deliverables for all work packages and case studies can be found at the EFIMAS DocuWiki **http://wiki.difres.dk/efimas/doku.php?id=efimas** as well as in the Technical Reports associated to the Deliverables produced and approved so far also available from the DocuWiki**.**

Project management has included costs for performing auditing certification of accounting for each project contractor performed once (by month 48) during the whole project contract period. This has been completed as planne.

2. Deviations from work programme and corrective actions taken/suggested:
There has been a change of the project management in WP3, WP4, and WP5: One of the WP3 coordinators (Per Sparre, DIFRES) has been replaced by Clara Ulrich-Rescan, DIFRES. The case study coordinator of Case Study 4 (Nephrops Fisheries) has upon request and for personal reasons been replaced by Andrew Revill (CEFAS) which is also the overall project coordinator of the NECESSITY Project (EU FP6). One of the case study coordinators of WP4 (Sean Pascoe, CEMARE) has in the first place been replaced by Simon Mardle, CEMARE, and later by J. Rasmus Nielsen, DTU-Aqua. This replacement has been because both Sean Pascoe and later Simon Mardle have left CEMARE. The WP5 coordinator (Poul Degnbol, IFM) has been replaced by Doug Wilson, IFM, because Poul Degnbol left IFM for a position in the EU Commission. These replacements have accordingly resulted in the same replacements in the EFIMAS Steering Group and STEPFORward Group. The replacements have all been made in agreement and accordance with the EFIMAS Steering Group.

An Addendum No. 1 to Contract SSP8-CT-2003-502516 (EFIMAS) by date: 24.05.2006, which is approved by the EU Commission, gives a list of changes in relation to i) the project coordination, ii) case study work, membership, and responsibilities (CS4 and CS2), iii) revised terms of reference for CS4, iv) according change of work tasks by certain individual partners and case study membership, v) dissemination of WP2 Deliverables, vi) revised work tasks, work plan and terms of reference for WP5, vii) change of cost model for certain partners, viii) and according to all this revised budgets in the EFIMAS Project. The background, actual changes and consequences of these have been thoroughly described in the Addendum No. 1 to the EFIMAS Project Contract (see EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas)

An Addendum No. 2 to Contract SSP8-CT-2003-502516 (EFIMAS) including revised Technical Annex 1 to the Contract by date: February 2008, which has been approved by the EU Commission, gives a list of changes in relation to i) Limited resource allocations between partners, ii) change in some participants names and status, and iii) modification of deliverables associated to WP5.

3. List Deliverables and Milestones completed during the period:
The following Deliverables have been delivered for the project (see further Annex 1 and Annex 2, Table 1 and the EFIMAS web page and the EFIMAS DocuWiki):

D1.1: Coordination and management meetings (every 6th month of the whole duration of the project period; see Annex 2, Table 1)

D1.2: Short implementation Report (month 12): EFIMAS Interim Activity Report 12 Months

D1.3: Midterm Report, Midterm Review, and Reported Costs (month 18): Interim Activity Report month 18 and Interim Management Report month 18.

Midterm Report, Midterm Review, and Reported Costs (month 36): Interim Activity Report month 36 and Interim Management Report month 36.

D.1.4 Final Reports to the EU Commission (final activity report, reported costs, and audit certificates (month 48):
Month 48 Final Activity Report (for the third and last project period)
Month 48 Final Consolidated Activity Report (for the full project period)
Month 48 Final Management Report (for the third and last project period)
Month 48 Final Consolidated Management Report (for the full project period)
Audit Certificates: an audit certificate for each project participant covering the full project period.

D1.5: Project Web Site(s) (month 6)
Internal Web Site: Established July 2004.
Internal DocuWiki Web Site: Established November-December 2006
External, Public Web Site: Established April 2005.
These have been completed and fully reported by the end of the project.

D1.6 Project Flyer / Folder (month 18): Delivered by October 2005 (see project web sites)
Technical Leaflet / Flyer (month 36): Technical Leaflet by April 2007 associated to the EU PROFET Workshop in Vilnius, Lithuania, April 2007 (see project web sites)
Technical Leaflet / Flyer version 2 (month 48): Technical Leaflet by April-May 2008 associated to the EU PROFET Workshops in Copenhagen in June 2008 and in Marseille, June 2008 (see project web sites)

D.1.7 Policy Implementation Plan (month 48): Policy Implementation Plan / Policy Brief and Project Implementation Plan by May-June 2008.

The following project milestones under EFIMAS WP1 have been obtained within the reporting period: Project coordination meetings and implementation reports as well as establishment of the project web sites, production of leaflets / flyers / policy implementation plan, and the other publications mentioned in the Technical Annex 1 to the Contract are also a kind of milestones assuring that the project has been continuously monitored and evaluated, progress continued, project finalized, as well as ensured continuous interactions, communication and cyclic feed back systems between work packages and case studies to be established, functioning and followed up on.

Work Package 2: Review of Knowledge Basis (AZTI, Lorenzo Motos)

Review and exploration of knowledge basis and performance of fisheries management as well as of management decision processes

1. Progress towards objectives:
Work package 2 has reviewed the available knowledge base for fisheries systems, and compiled and described it for use by WP 3-5, review existing frameworks for evaluation of the performance of fisheries management systems, as well as explored and described how the present fisheries management systems perform and how the management decision making processes are using knowledge to inform decisions. The evaluation tool developed is a mechanism to synthesize complex knowledge, to communicate this synthesis, and to use it as the information base for management decisions. The project therefore includes a review of the knowledge to be synthesized and communicated, and a description of how knowledge can be communicated and used to inform decision making processes. Work package categorizes fisheries management systems and describes the adequacy of the present management systems and present management decision processes in terms of their use of knowledge. This has lead to identification of the context in which fisheries/stocks evaluation tools for production of advice to management bodies are to be used, which problems they are to assist in solving, as well as of the knowledge which the tools are to communicate. The information is integrated in WP 3-5.

Purpose:
- review of available knowledge base for fisheries systems
- review existing frameworks for evaluation of the performance of fisheries management systems
- explore and describe the performance of existing fisheries management systems
- review and describe how management decision making processes are informed by knowledge and the limitations in communicating knowledge

EFIMAS WP2 has been concluded and finally reported in Technical Reports for Deliverables 2.1 and 2.2 as well as in a Book under EFIMAS WP2 published by ELSEVIER Publishers (see below). These deliverables have been accepted and approved by the EU Commission. The reports and books are further used directly in the work under WP3, WP4 and WP5 in a cyclic feedback and knowledge exchange and use between the EFIMAS work packages according to the Project Technical Annex to the EFIMAS Project Contract.

The review cover the following topics:

Knowledge in natural resources management institutions

- Worldwide management systems of relevance to European fisheries
- International Resource allocation for shared stocks
- Operational management procedures
- Rigth based regimes
- Co-management regimes
- Financial Instruments (taxes, subsidies)
- Command and control quota based regimes
- Command and control effort based regimes (capacity and activity)
- The requirements of an ecosystem approach to fisheries management

The European management system

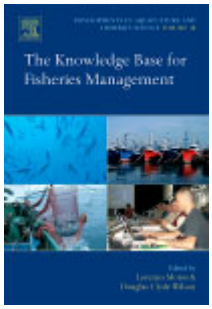
- The institutional setup and production and use of knowledge
- Issues of concern
- Participation
- Ecological side effects
- Fisheries based advice
- Delivering complex scientific advice to multiple stakeholders
- Compliance (COMMIT)

Documents, Reports and Publications :

EFIMAS WP2 Book:

The review is published in a book produced under EFIMAS titled : "The Knowledge Base for Fisheries Management", Editors: Lorenzo Motos (AZTI) and Doug Wilson (IFM), Developments in Aquaculture and Fisheries Science, Volume 36 (454 pp), ELSEVIER, Aug 2006.

EFIMAS WP2 Book List of Contents and Authors



The review of the Knowledge Basis for Fisheries Management to be performed within EFIMAS WP2 have been organized in the following way: Based on the contents of the Technical Annex of EFIMAS, an index of contents was developed and adopted during the starting meeting in Heraklion

in April 2004, which was reviewed during the specific WP2 meeting held in Vigo on 25 September 2004. A common Table of Contents was completed with detailed outlines for each chapter and assignments for responsibilities on both authorship coordination and internal review. It was also agreed that the results of this review would be delivered as 1) a book to be published by Elsevier, and 2) a technical report combining deliverable 2.1 and 2.2. This document would form the platform for the work in WP2 in order to achieve the goals of WP2 of informing WP3-WP5 of EFIMAS the best possible way. A guideline document was prepared for focusing the contents on how knowledge is used in fisheries management. A specific report was produced to cover the list of models, data and software used in the different Management Systems described in the main report.

Accordingly, the individual chapters were written. During the EFIMAS meetings in April 2005 in Salerno the status and progress of the work was assessed. During the meeting, short summaries on the status of works and completion prospects were provided by each person responsible for coordinating the individual chapters. Afterwards, presentations were made on each Chapter, followed by discussions on contents and structure. The different chapters have gone through an internal review process before being delivered to the publisher for external review.

A Publisher (Elsevier) was contacted and accepted to publish the book for the series entitled "Developments in Aquaculture and Fisheries Science". After a first review of the chapter outlines and short author's CVs, a Book Questionnaire was filled and sent to Elsevier, including extended outlines and sample chapters. The book was accepted by Elsevier on 13th September 2005. A Publishing Agreement has been signed between the Editors (Dr. Motos and Dr. Wilson) and Elsevier. This publishing Agreement includes a copyright (section 3: Rights) whereby it establishes that the book should not, be reproduced or posted by any other than the publisher. Given that the book is largely based, at least part of them, on the deliverables of WP2, and that these were considered as public, and in order to avoid any copyright problems, a specific requirement was sent to the Commission Services asking for an exception from the public availability in the EFIMAS web page and for not publishing them as a technical report, which was accepted by the EU Commission. The deliverable should be considered as Confidential (only for members of the EFIMAS Consortium, including the Commission Services). A direct link to Elsevier's Science Direct was set up on the EFIMAS public web, where the book was advertised. On the other hand, Elsevier has agreed on clearly acknowledging the support from the EU through the book in its standard format: "This study has been carried out with financial support from the Commission of the European Communities, specific RTD programme "Specific Support to Policies", SSP-2003-502516 "EFIMAS- Operational Evaluation Tools for Fisheries Management Options". It does not necessarily reflect its views and in no way anticipates the Commission's future policy in this area".
The book has been sent to the EU Commission.

ATTENTION With respect to Deliverables 2.1 and 2.2: - EFIMAS WP2 Book published by ELSEVIER "The knowledge base for fisheries management" - Overview of models, data, and software used in contrasting Fisheries Management Systems

WARNING: The Contributions to the book "The knowledge base for fisheries management" are under a copyright agreement with ELSEVIER. They are made available in the access-limited EFIMAS WIKI for internal use only in the EFIMAS project for EFIMAS partners only in order to draw upon and refer to the material contained in the Contributions in preparing material and deliverables under other work packages of the project. The Technical Reports and the Book must not be submitted further and to anyone or any institute not being a partner of the project.

EFIMAS WP2 Technical Reporting:

- EFIMAS List of Dissemination, Products and Activities (Jan-Feb 2007 and September 2007)
- EFIMAS WP2: Annex Report - Overview of models, data and software used in contrasting Fisheries Management Systems

- EFIMAS WP2: Annex Report (pdf-format)
- EFIMAS Month 12 Interim Activity Report
- WP2_Letter_EU Commission_1
- EFIMAS Month 18 Interim Activity Report
- WP2_Letter_EU_Commission_2
- Technical Report Deliverables 2.1 and 2.2 under Work Package 2, The Knowledge Base for Fisheries Management: "Review and compilation of published evaluations of management systems (world wide), and review and description of present management and management decision-making process (EU)". EFIMAS WP2 Technical Report to Deliverable 2.1 and 2.2 to the EU Commission, vers. 2 by 20th August 2006, 481 pp.
- Annex Report for EFIMAS Work Package 2, The Knowledge Base for Fisheries Management: Overview of models, data and software used in contrasting Fisheries Management Systems - Annex Report to main WP2 technical report, "The Knowledge Base for Fisheries Management". EFIMAS WP2 Technical Annex Report to Deliverable 2.1 and 2.2 to the EU Commission by 15th August 2006; 28 pp.
- EU Commission Letter with approval of Deliverables 2.1 and 2.2 (including Annex and Book) by 19th June 2007 (and preparation of this by March-April 2007)).
- EFIMAS Month 36 Interim Activity Report

Full and up-dated reporting of the progress, results and produced deliverables for this work package can be found at the EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas as well as in the Technical Reports associated to the Deliverables produced and approved so far also available from the DocuWiki**.**

2. Deviations from work programme and corrective actions taken/suggested:

An Addendum No. 1 Contract SSP8-CT-2003-502516 (EFIMAS) by date: 24.05.2006, which is approved by the EU Commission, gives a list of changes in relation to dissemination of WP2 Deliverables. The background, actual changes and consequences of these have been thoroughly described in the Addendum No. 1 to the EFIMAS Project Contract (see EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas)

The original set up of the WP2 was changed during the EFIMAS starting meeting. However, the basic contents remain similar and a substantial improvement on the quantity and quality of information was delivered. The final version of the Chapters and sections of the book are included in Deliverables 2.1 and 2.2 in a combined report, sent to the Commission. It was delivered to EFIMAS WP3-5, as planned in the project.

A Technical Annex to the WP2 report has been produced and delivered to the EU Commission. This annex is giving overview information (in form of tables) on typical models used in different relevant management systems covered in WP2, with major data types, typical outputs and other characteristics (see above). This information is additional to the detailed information given in the different chapters of the WP2 Book.

There has been put a large effort (both intellectual and in personnel) devoted to the main WP2 deliverable, which in many areas is delivering much more than anticipated by the EFIMAS Contract Technical Annex 1 for WP2. In addition, new Chapters, which were not anticipated in the project technical plan, were included after discussion during the first meetings of the project.

3. List Deliverables and Milestones completed during the period: Details of selected productions, subgroup reports and draft publications under WP2

The following Deliverables have been delivered for the project (see further Annex 2, Table 1):

D2.1: Report from WP 2.1: Review and compilation of published evaluations of management systems (combined report with del. no. 2.2).

D.2.2: Report from WP 2.2: Review and description of present management and management decision making process (combined report with del. no. 2.1).

- Technical Report Deliverables 2.1 and 2.2 under Work Package 2, The Knowledge Base for Fisheries Management: "Review and compilation of published evaluations of management systems (world wide), and review and description of present management and management decision-making process (EU)". EFIMAS WP2 Technical Report to Deliverable 2.1 and 2.2 to the EU Commission, vers. 2 by 20th August 2006, 481 pp.

- Annex Report for EFIMAS Work Package 2, The Knowledge Base for Fisheries Management: Overview of models, data and software used in contrasting Fisheries Management Systems - Annex Report to main WP2 technical report, "The Knowledge Base for Fisheries Management". EFIMAS WP2 Technical Annex Report to Deliverable 2.1 and 2.2 to the EU Commission by 15th August 2006; 28 pp.

- EU Commission Letter with approval of Deliverables 2.1 and 2.2 (including Annex and Book) by 19th June 2007 (and preparation of this by March-April 2007).

Deliverable 2.1 and 2.2 given as two separate sections in one combined report has been published in a book by Elsevier Press. This book is a further deliverable:

Milestones:

M1 Results from WP2 to be used in WP3, WP4 and WP5

M2 Categorization of fisheries management systems

Both the above milestones have been reached within the EFIMAS Project.

Work Package 3: Operating model (CEFAS, L. Kell and DTU Aqua, C. Ulrich-Rescan)

Development of operating model (OM) within the fisheries management evaluation framework

1. Progress towards objectives:

General Progress towards objectives for WP3-WP4

Under EFIMAS WP3 and WP4 (and WP5) the EFIMAS project has aimed to develop an operational and generic fisheries management evaluation framework that can be used for evaluating different types of management measures, i.e. that allows evaluation of the trade-off between different management objectives when choosing between different management options. In the Technical Annex of the EFIMAS Project Contract the process of developing the evaluation framework has been described as an iterative, cyclic feed-back process of developing the methodology (WP3-WP4) and then applying these methods in different case studies (WP4). The overall usefulness as well as the process and technical evaluation of the management evaluation framework has been addressed in WP5 - also through a cyclic feed-back process between WP5, WP3 and WP4. Consequently, the general aspects of the evaluation framework have been developed in cooperation between EFIMAS WP3-5 in order to inform an exploratory, adaptive

decision-making process. The analytical tools developed utilize stochastic simulation techniques. These tools can simulate the complete fishery management system, including the fish resources and fleets, through data collection, assessment and management, and the response of the system to management.

In the process of developing a Fisheries Management Evaluation Framework EFIMAS has in collaboration with the EU FP6 COMMIT Project established a simulation framework FLR in R. This is based on experiences and models from a variety of EU and National projects, e.g. the EU FEMS Project and the Danish National TEMAS Project and the French National ISIS-Fish Project. The present version of the FLR framework is available at the EFIMAS DokuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas in association with the http://flr-project.org/ including compiled packages, full documentation, tutorials and source code. Operating Models and assumptions used to describe the fishery systems has been developed. Following this, the FLR framework (and associated additional management evaluation frameworks) has been established and modified to ensure that relevant bio-economic processes can be incorporated as required. The final generic management evaluation framework(s) in their latest versions have been finally reported with full documentation through the EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku-.php?id=efimas1:wp3:main and associated web sites www.efimas.org and http://flr-project.org/ as well as through the final technical report under WP3 associated to Deliverable 3.3 and 3.5 (Final Software Package with documentation, proj. month 48).

The planned technical reports under WP3 and WP4 has been delivered, i.e. EFIMAS Deliverables 3.1, 3.3 and 3.4 (Preliminary and Final Software Package by project month 30-33 and 48) and Deliverables 3.2 and 3.4 / 4.1 and 4.2 (Preliminary and Final Technical Reports by Case Study by project month 30-33 and 48) which are available from the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:main) as well as in hard copy reports to the EU Commission.

The evaluation tools have been applied to a variety of case studies in order to appraise the biological, social and economic effects of fisheries management measures in the EU. These case studies were chosen as they to a large extent reflected the full scope of the management system currently in operation in Europe, as well as widely varying biological, economic, technical and environmental conditions. The presented simulations through these implementations also cover the current and potentially alternative management tools that are being used or considered in European fisheries management.

A key feature of the case studies is not only that they address different management systems and issues, but that they are also used in several instances to test the implications of alternative assumptions about the fishery on the robustness of management decision making. These include for example the effects of ignoring discarding in stock assessments, uncertainty about natural mortality levels, the impact of different assessment methods on management advice, and the effect of implementation of various technical management measures, as well as implementation of fleet based effort management either directly or indirectly.

For each case study the existing management system and main management problems have been described including the purpose of the management measures. For relevant case studies this has included identification of alternative management systems and instruments which have not yet been implemented, but are relevant and deemed likely to emerge for this given fishery system. The Knowledge Basis for each management system as well as the relevant management systems for European fisheries management in general has in 2006 been published in a book produced under EFIMAS WP2 which has helped in this description and evaluation.
Key management issues and objectives addressed and evaluated by case study have been formulated. Specific hypotheses about the key management issues and of the dynamics of the case

specific systems analyzed with descriptive models and analytical tools were identified and produced. This included necessary adaptation of the generic fisheries management evaluation framework to comprehend these.

Appropriate descriptive models and analytical tools necessary to evaluate these hypotheses and specific management issues were selected. This was done in relation to specific management procedures and strategies which includes methods for monitoring and assessing the status of the system. The relevant descriptive models and analytical tools have been made available and have been applied and used in the scientific analysis of the systems which is completed under the different case studies. This has involved further development, modification or re-organization of existing descriptive models and analytical tools, and a long row of these have been formulated into R/FLR being con-current input to development of the generic evaluation framework in relation to this. In this implementation process identification of key parameters and processes has also been performed.

The collection of the key information necessary for the construction of the simulation models of each fishery has been completed both for the biological and economical parts and operating models (see e.g. the EFIMAS ECONOWS Final Report). Existing national and international case specific data (e.g. ICES and STECF data) have been made available according to the needs. This includes making appropriate choices in relation to specific use of data and data processing in relation to quality and necessary aggregation and dis-aggregation that are central in order to make high quality parameterization, modeling, and analysis for the different case studies. This process has also identified sensitive parameters and indicators as well as identified central and necessary components of the evaluation framework.

In relation to this, the dimensions and processes of both the biological and economical operating models (and linkages between those) in the case studies have been developed and have in all case studies been completed. The biological and technical/eocnomical OM's have as planned been implemented in the case studies, and the parameterization of the OMs has in that respect been finalized. The planned simulations have been performed in all case studies in order to test and implement the established generic management evaluation framework. Dissemination of the established management evaluation framework among other through case specific dissemination in ICES, STECF, ICCAT and RAC's have been performed, and the results have been published.

The general progress, results and conclusions from the case specific work is presented at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main) as well as in the WP4 Technical Reports with EFIMAS Deliverables 4.1 and 4.2 and 3.2 and 3.4.

In practice, there has been a very close link between the development of the general management evaluation framework and the application of this into the case studies. Much of the WP3 work on actual development of the general fisheries management evaluation framework has been performed under and in direct, running cooperation with the case specific implementation of this. Particularly, deliverable D3.2 and D4.1 as well as D3.4 and D4.2 have a high degree of overlap and integration as well as a common platform which is also evident from their titles. All this is a direct result of the fully integrated nature of the working process between the WP3 generic framework and model development and the WP4 case study implementation, i.e. the case specific development, performed through running communication and cyclic-feed back processes between the WP3 group and the WP4 case study groups. Much of the generic evaluation framework and its model development have been performed through the case specific implementation and development. This cyclic feed-back process was also originally planned for the project as described in the Technical Annex 1 to the Contract. In fact, these collaboration processes have actually succeeded more than originally expected, resulting in a very high degree of overlap in products.

All generic biological and economic FLR objects have been developed, documented and tested. Biological and economic operating models have been implemented and parameterized in FLR and full scenario evaluations developed from base-cases have been implemented / applied for all case studies. The most recent development work has focussed on generic fisheries and economical FLR objects. For example, is FLEcon functional, and contains general equations for the various relevant economic processes. The economist meeting and workshops - also with participation of biological OM experts - in Copenhagen January 2007, Lisbon in April 2007 and Copenhagen January 2008 (ECONOWS) – as well as the preparation of these – have produced a full economic report summarizing the previous economist meetings in Sevilla, London and Nantes (see List of Dissemination, Products, and Activities attached to this report) and also produced generic mathematical equations used for different relevant processes in the economical OMs. This is now completed and formulated into R/FLR, and into FLEcon with full documentation. The generic evaluation framework and the case specific implementation have as expected been completed in direct cyclic feed-back process and cooperation between WP3 and WP4 (and WP5).

The dissemination of the established management evaluation framework and the case specific implementation of this has been successfully conducted and demonstrated through a long row of products and activities, and this has even been more extensive than originally planned: extensive implementation in ICES, STECF, ICCAT and NAFO working groups, presentations and feed-back discussions in RACs, discussion and feed-back in stakeholder focus groups, several conferences including the EFIMAS Stakeholder Conference, many user courses and workshops, many peer reviewed scientific papers, several posters, a full book published under EFIMAS, News briefs and popular scientific publications, fiches, a project flyer and two technical leaflets, a policy brief and policy implementation plan, as well as a public web site and a connected project DocuWiki (see attached list of Dissemination, Products and Activities).

2. Deviations from work programme:

Change of one of the WP3 Coordinators from Per J. Sparre (DIFRES) to Clara Ulrich-Rescan (DIFRES).
Combine delivery dates for Deliverable 3.2 and Deliverable 4.1 to project month 33 (accepted by the EU Commission);
Combine delivery dates for Deliverable D3.3, D3.4 and D4.2 to month 48 (accepted by the EU Commisson).
Re-organising coordination of the economic work under EFIMAS into broader ECONOWS and FLEcon groups.
Re-allocation of minor project resources between project partners according to Amendment 2 to the EFIMAS Contract in relation to the ECONOWS work and reporting of EFIMAS.

3. List Deliverables and Milestones completed during the period:

D3.1: Delivery of preliminary software package with documentation (milestone as well) (month 30-33)

EFIMAS 2007b. Preliminary Software Package with Documentation. EFIMAS Technical Report and Deliverable 3.1, EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 154 pp.

D3.2: Technical reports of input/results by case study, for use in regional workshops and in WP4-5 (milestone as well) (month 30-33).

EFIMAS 2007c. Technical Reports of input / results by Case Study. EFIMAS Technical Report and Deliverable 3.2 and 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 5 pp / 209 pp.

Which is overlapping with:

EFIMAS 2007d. Preliminary Technical Reports by Case Study. EFIMAS Technical Report and Deliverable 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 209 pp.

The EU Commission has accepted combined delivery of Deliverables 3.2 and 4.1 by EFIMAS Project month 33.

D3.3: Delivery of final software package with documentation (milestone as well) (month 48)

EFIMAS 2008. Final Software Package with Documentation. EFIMAS Technical Report and Deliverable 3.3, EFIMAS SSP-CT-2003-502516, September 2008.

D3.4: Final Technical WP reports of results and input by case study (month 48).

EFIMAS 2008. Final Technical Reports by Case Study. EFIMAS Technical Report. EFIMAS SSP-CT-2003-502516, September 2008.

The EU Commission has accepted to combine Deliverable 3.4 and 4.2 by EFIMAS Project month 48 as well as delivery of Deliverable D3.3 by project month 48.

Milestones:

M3: Provide a software package with the operating simulation model with full documentation (month 30-33 and month 48).

M4: Technical reports of input/results by case study (month 30-33 and month 48)

Both milestones have been reached within the EFIMAS Project.

Work Package 4: Application of the management evaluation framework to selected Case Studies (IMARES, Martin Pastoors and DTU AQUA, J. Rasmus Nielsen)

Application of the management evaluation framework to selected case studies

1. Progress towards objectives:

The purpose of this work package (WP4) is to apply, test, and refine the evaluation tools that are developed in work package 3 (WP3) on selected case studies. Also the purpose is to apply appropriate analytical tools within the evaluation framework in each of the case studies with the aim to evaluate different management strategies. This has involved further development or modification or re-organisation of existing descriptive, analytical tools by implementation in representative case studies to analyse dynamics of the fisheries systems. The main purpose in this has been to ensure that the software developed in WP3 is capable of being adapted to a wide range of fishery situations, and is able to be used to analyse a wide range of management issues. The case studies have been selected to ensure that such heterogeneity in fishery and management issues is captured and assessed within the project.

The case study fisheries examined using the simulation evaluation framework has been:

CS1: Demersal flatfish fisheries in the North Sea
CS2: Demersal roundfish fisheries in the North Sea
CS3: Salmon fisheries in the Baltic Sea

CS4: Nephrops fisheries in the East Atlantic
CS6: Northern hake mixed species fisheries in Area VI, VII and VIII
CS7: Swordfish fisheries in the Mediterranean
CS8: Hake fisheries in the Mediterranean
CS9: Cod fisheries in the Baltic Sea

Accordingly, the purpose of this WP has been to (1) apply and test the evaluation framework and simulation models developed in WP3 on selected case studies, (2) further develop or modify existing models in the case studies, and (3) to assist in developing the documentation and user-interface of the software toolbox (evaluation framework). This has been done through a cyclic feedback process between WP4, WP3, and WP5 including feedback from regional stakeholder workshops.

General Progress, Results, and Conclusions from Case Specific Work and Analyses

The general progress, results and conclusions from the case specific work is presented at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main) as well as in the WP4 (and WP3) Technical Reports associated with EFIMAS Deliverables 4.1 (by month 18 and 33), 4.2 (by project month 48). These deliverables have been concluded and delivered.

General progress of case specific analyses

The general progress and conclusion of the case specific implementation of the established generic management evaluation framework has been described above under WP3 as a continuous and cyclic feed-back development process and product development between WP3 and WP4. In practice, there has been a very close link between the development of the management evaluation framework and the application in case studies.

For each case study the existing management system and main management problems have been described including the purpose of the management measures. For relevant case studies this has included identification of alternative management systems and instruments which have not yet been implemented, but are relevant and deemed likely to emerge for this given fishery system. The Knowledge Basis for each management system as well as relevant management systems for European fisheries management in general has in 2006 been published in a book produced under EFIMAS WP2 which has helped in this description and evaluation.

A key feature of the case studies has not only been to address different management systems and issues and compare those in different fisheries systems, but also to be used in several instances to test the implications of alternative assumptions about the fishery on the robustness of management decision making. These include among other the effects of ignoring discarding in stock assessments, uncertainty about natural mortality levels, the impact of different assessment methods on management advice, and the effect of differerent technical measures.

Key management issues and objectives addressed and evaluated by case study have been formulated. Specific hypotheses about the key management issues and of the dynamics of the case specific systems to be analysed with descriptive models and analytical tools have been identified and produced. This includes necessary adaptation of the generic fisheries management evaluation framework to comprehend these.

Appropriate descriptive models and analytical tools necessary to evaluate these hypotheses and specific management issues have been selected. This has been done in relation to specific management procedures and strategies which have included methods for monitoring and assessing the status of the system. The relevant descriptive models and analytical tools have been made available and have been applied and used in the scientific analysis of the systems which is

completed in all the case studies. This has involved further development, modification or re-organization of existing descriptive models and analytical tools, and a long row of these have been formulated into R/FLR being con-current input to development of the generic evaluation framework in relation to this. In this process identification of key parameters and processes was also made.

The collection of the key information necessary for the construction of the operating simulation models (OM) of each fishery has been concluded for both the biological and economical / technical part. Existing national and international (e.g. ICES and STECF data) case specific data has been made available according to needs. This has included appropriate choices in relation to specific use of data and data processing in relation to quality and necessary aggregation and dis-aggregation that has been central in order to make high quality parameterization, modeling and analysis for the different case studies. This process has also identified sensitive parameters as well as identified central and necessary components of the evaluation framework.

In relation to this the dimensions and processes of both the biological and economical operating models (and linkages between those) in the case studies have been developed and completed in all case studies, and the parameterization of the OMs has been finalized. Simulations have been performed in all case studies. The results have been presented contributing with quantitative and qualitative management evaluations (the latter where simulation trials are not feasible due to lack of data) in the process of scenario evaluation of the performance of the candidate management options as well as making recommendations on further research and proposals of alternative management options. Also the simulation work has included and integrated evaluation of uncertainties in the dynamics and in the data collection, assessment, and advisory processes under different management systems as well as in examples of the ICES advisory process.

The overall usefulness of the evaluation framework has been addressed in WP5 - also through a cyclic feed-back process between WP5, WP3 and WP4. Consequently, the general aspects of the evaluation framework are being developed in cooperation between EFIMAS WP3-5 in order to inform an exploratory, adaptive decision-making process. The analytical tools developed have utilized stochastic simulation techniques, and they are capable of simulating the complete fishery management system, including the fish resources and fleets, through data collection, assessment and management, and the response of the system to management.

Cooperation with international organisations and other EU Projects in the work

General contribution by EFIMAS in relation to the evaluation framework development and the case specific implementation as well as cooperation with other projects and work in international organisations in relation to this development as well as implementation of the developed evaluation framework in other related projects:

The described work has been done in cooperation and through communication with different international advisory organisations and bodies (ICES, ICCAT, EU STECF, NAFO, etc.). This has covered partly use of data bases and results, application of the developed fisheries management evaluation tools for relevant management scenarios (e.g. management in relation to stock recovery plans and comparison of the performance of alternative management systems such as TAC-systems, effort regulation systems, ITQ systems, stakeholder participatory management, etc.), as well as implementation of widely used assessment models in the evaluation framework and case specific implementation. Similar cooperation with relevant and associated EU FP5 and FP6 Projects has been an important part of the EFIMAS work and progress.

The bio-economic and socio-economic fisheries management evaluation framework(s) have been developed in common between especially two EU Projects so far: the EU FP6 EFIMAS and COMMIT Projects as well as the case specific implementation of this. For example has parts of the R/FLR framework with respect to initial parts of the biological OM on single stock basis (mainly the FLXSA and parts of FLStock) been developed under the EU FP5 FEMS Project. The budget allocation in EFIMAS in relation to development of the Fisheries Management Evaluation Frameworks and the case specific application and implementation of these as well as both the qualitative and quantitative performance evaluation of the evaluation frameworks has been carried out through a continuous cyclic feed-back processes between the EFIMAS WP3, WP4 and WP5. The overall budgetary EU Contribution to EFIMAS WP3-5 has been around 3.9 million EURO (excl. coordination costs). Similarly, the general development and case specific implementation of the FLR Evaluation Framework in COMMIT has been covered by WP2, WP3, WP4 and WP5 in COMMIT which covers a budgetary EU Contribution of around 1.1 million EURO. The three cases in COMMIT have been overlapping with three of the in total eight cases in EFIMAS. A series of meetings have been held jointly between the EFIMAS and the COMMIT projects. The development work, application and implementation work has been carried out as an integrated cooperation process between the two projects.

Similarly, parts of the development and implementation of the TEMAS and ISIS-Fish fisheries management evaluation tools (Case Study 6 and Case Study 9) have been carried out under other projects besides the major development and implementation in relation to those in EFIMAS. This has among other been done through the EU FP5 TECTAC Project, the EU FP6 PROTECT Project, as well as through certain Danish and French National Projects.

The cooperation and integration of EFIMAS as a platform in respect of the evaluation framework development with other EU FP6 projects has in overview been given at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main). In general, the use of data bases, results, and descriptive analysis tools from other projects and international advisory organisations, as well as the development and implementation of the case specific analyses and the establishment and use of the generic management evaluation framework, has been further described under the specific approaches under the case studies at the EFIMAS DocuWiki as well as in the Technical Reports for WP3 and WP5.

Case specific progress toward objectives (report up-dated to this point) (Maybe only refer to the WP4 Technical report for all of the following)

The status, progress and completion of the work, analyses and modelling performed under EFIMAS WP4 in each specific case study (in relation to development of the established fisheries management evaluation framework(s) and implementation in case studies) has by the end of the project (month 48) been reported in the

- "EFIMAS WP4 Final Technical Reports by Case Studies" and at the
- EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php), as well as through the
- Final List of Dissemination, Products and Activitties (Month 48).

This reporting also includes delivery of EFIMAS Deliverables 4.2 and 3.4 as well as Deliverable 4.3, and reaching of Milestones M3 and M4 (by month 48). Furthermore, it has in cooperation with WP5 reached the Milestones M5 and M6.

With respect to the case specific activity reporting by month 48 there is made direct reference to the contents of these reports and the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php) for detailed and thorough reporting. Especially the EFIMAS DocuWiki gives an efficient overview of the comprehensive reporting under WP4 for each of the case studies and the different approaches hereunder.

All case studies including the case specific analyses and simulations as well as dissemination of the results have been completed for all approaches under each of the case studies. Many presentations of the developed models have been made to scientific and advisory groups, conferences, symposia, etc. including evaluation of management plans to ICES, ICCAT, STECF, RACs, etc. Also, many manuscripts have been prepared to scientific peer reviewed journals, covering the use of the evaluation framework to analyse the main issues on the specific case studies (see Final List of Dissemination, Products and Activitties (Month 48) in Annex 1 of the present report.

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Much of the development of the established management evaluation framework(s) has been established or tested using the development of the research questions in the different case studies. The case studies have been used to give a number of model formulations to analyse harvest control rules in proposed management plans and to evaluate a range of other management options and issues. The management issues have been dealt with by the development of spatio-temporal models that included the economics of fishing fleets as well as economic functions of the fisheries system. The case studies have contributed to the development of the framework structures to model fishing fleets, including the economic indicators that are used to measure the performance of these fleets.

For each case study both biological and technical/economical operating models have been developed. The operating models have been developed that are multi-dimensional with respect to including several stocks, fleets and fisheries. The complete and functional dynamic OM is populated by probabilistic estimates of life history and fisheries parameters. This includes the development of the economic equations for the bio-economic OM. The operating models have been successfully conditioned (calibrated) to recent historical ICES or ICCAT (or NAFO) stock and catch (landings) estimates. The evaluation framework and the operating models have through the case studies been shown to among other be capable of evaluating different harvest control rules (MSE), stock recovery plans, and technical management measures in e.g. mixed fisheries. Also, they are capable of evaluating different fleet behavior models, among other the Random Utility Models (RUM), as well as different stock assessment methods such as length based methods and less data demanding population dynamics models (e.g. stock production models and survey based assessment methods). Furthermore, the case specific implementations have proven the established management evaluation frameworks to be capable of evaluating and comparing different fisheries management systems such as the TAC system, effort regulation systems including spatial (geographical) and seasonal closures (i.e. both direct and indirect effort regulation), ITQ-systems, participatory management systems, etc.

The case studies have among other used the established management evaluation framework(s) to evaluate the fleet-based effects of stock-based management procedures in e.g. a mixed-fisheries context and in relation to gear selectivity and discard. Here, extensive effort has been put on (i) description of the international fleets and metiers, and their technical interactions, (ii), linkages with economic modelling of the dynamic of these fleets and (iii) implementation of the complex HCR which form the current and future basis of proposals for management plans in the European Commission. Recent emphasis has been put on developing realistic biological OMs.

The conditioned management evaluation framework(s) have been used to evaluate the relative performance of alternative management approaches including potential long term, medium term, and short term management strategies with regard to management objectives. This includes analysis of impacts of different sources of uncertainty on the choice. This has been done in particular to identify those combinations of assessment and management actions that are robust to uncertainty taking into account relevant fisheries system drivers and environmental variables.

There have been performed case specific simulations with the biological (and fleet) based operating models, and the results have been presented at the EFIMAS DocuWiki and in a row of scientific

peer reviewed papers and in ICES, ICCAT, NAFO and EU STECF Working Groups as well as presented to Stakeholders and RACs.

2. Deviations from work programme and corrective actions taken/suggested:

There has during the EFIMAS Project been changes in the overall work package coordination. Sean Pascoe, CEMARE, was first replaced by Simon Mardle, CEMARE, and then by J. Rasmus Nielsen, DTU AQUA due to the two former left CEMARE for other postions.

The case study coordinator of Case Study 4 (Nephrops Fisheries) has upon request and for personal reasons been replaced by Andrew Revill (CEFAS) which has also been involved in coordination of the NECESSITY Project (EU FP6).

An Addendum No. 1 Contract SSP8-CT-2003-502516 (EFIMAS) by date: 24.05.2006, which is approved by the EU Commission, gives a list of changes in relation to i) the project coordination, ii) case study work, membership, and responsibilities (CS4 and CS2), iii) revised terms of reference for CS4, iv) according change of work tasks by certain individual partners and case study membership, v) dissemination of WP2 Deliverables, vi) revised work tasks, work plan and terms of reference for WP5, vii) change of cost model for certain partners, viii) and according to all this revised budgets in the EFIMAS Project. The background, actual changes and consequences of these have been thoroughly described in the Addendum No. 1 to the EFIMAS Project Contract (see EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas).

There have been minor changes in the WP4 budget between partners according to Amendment 2 of the EFIMAS Contract.

The EU Commission has accepted combined delivery of Deliverables 3.2 and 4.1 by EFIMAS Project month 33.

The EU Commission has accepted to combine Deliverable 3.4 and 4.2 by EFIMAS Project month 48 as well as delivery of Deliverable D3.3 by project month 48.

***3. List Deliverables and Milestones completed during the period*:**

The below Deliverables and mile

D4.1: Preliminary technical reports by case study (month 18): Delivered by month 18.

Month 18 Preliminary Technical Report by Case Study (http://wiki.difres.dk/efimas/lib/exe/fetch.-php?id=efimas1%3Awp4%3Acs2%3Amain&cache=cache&media=efimas1:wp4:cs2:efimas_wp4_technical_report_month_18_case_studies_v6_nov20051.doc)

D4.1: Preliminary technical reports by case study (month 36): Delivered by month 36.

EFIMAS 2007d. Preliminary Technical Reports by Case Study. EFIMAS Technical Report and Deliverable 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 209 pp.

Which is overlapping with:

D3.2: Technical reports of input/results by case study, for use in regional workshops and in WP4-5 (milestone as well) (month 30-33).

EFIMAS 2007c. Technical Reports of input / results by Case Study. EFIMAS Technical Report and Deliverable 3.2 and 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 5 pp / 209 pp.

The EU Commission has accepted combined delivery of Deliverables 3.2 and 4.1 by EFIMAS Project month 33.

D4.2: Final technical reports by case study (month 48)

EFIMAS 2008. Final Technical Reports by Case Study. EFIMAS Technical Report. EFIMAS SSP-CT-2003-502516, September 2008. xx pp.

The EU Commission has accepted to combine Deliverable 3.4 and 4.2 by EFIMAS Project month 48 as well as delivery of Deliverable D3.3 by project month 48.

D4.3: Various scientific publications, popular articles, newspaper articles addressing specific hypotheses and investigations included in the project (during the project period and after completion of the project)

A list of all the delivered scientific publications are given in detail in the the EFIMAS Final List of Dissemination, Products and Activities by Project Month 48 (see Annex 1 below).

Milestones:

M4: Technical reports of input/results by case study, for use in regional workshops and WP4-5 (month 30-33 and 48)

M5: Evaluation of technical reports on inputs and results by case study (among other by WP3, WP4, WP5and regional stakeholder workshops connected to the last project midterm report).

Both milestones have been reached during the EFIMAS Work.

Additional to milestone M5 (project month 24) there has been made a Technical Report in relation to the cyclic feedback process between WP4 and WP5:

EFIMAS 2006. Evaluation of technical reports and other by WP3-4 and stakeholders. Additional EFIMAS Technical Report to M5 and Project Working Document. EFIMAS SSP-CT-2003-502516, November 2006, 18 pp.

Work Package 5: Effectiveness of evaluation tools (IFM, Doug Wilson)

1. *Progress towards objectives*:

In relation to the above work WP5 has produced a delivery framework for information to guide management decisions by 1) evaluating the technical performance and the effectiveness of the operational management evaluation tool as a means to inform decision making processes, and 2) developing a framework for the use of the management evaluation tool in decision making processes. As such WP5 evaluates the operational evaluation tools and has provided iterative feed back for WP's 3-4 so that tool development and implementation were and are modified according to these evaluations. An effective overview and detailing of the EFIMAS WP5 Reporting can be found

at the EFIMAS DocuWiki under WP5 http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main. A WP5 summary Report has additionally been produced:

Anon. 2008. Effectiveness of Evaluation Tools. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 10 pp.

Task 5.1 Technical tool evaluation

***With respect to evaluating the technical performance and the effectiveness of the operational management evaluation framework*:**

The overall approach uses simulation models which are based on stochastic simulation techniques, which take account of uncertainties (parametric as well as structural uncertainty) as well as include sensitivity and risk analysis and assessment. The established management evaluation framework considers uncertainties in the dynamics of the case stocks and fisheries, and emphasis is placed on many kinds of uncertainties including those found in the data collection (calculating variance in input data), assessment, modelling, advisory, management and the implementation processes. By being capable of evaluating the relative performance of multiple alternative management options the evaluation framework has strong capacity in performing sensitivity and risk analyses of the consequences of the various options. This is done by running different scenarios with changed input values based on the scenario analysis and evaluation methodology. The trade-offs implied by various strategies and options can be evaluated through scenario analysis, i.e. be evaluated for their robustness to uncertainty before implementation. As such the facilities and capabilities for the technical evaluation of the established evaluation framework is implicitly build into in the developed framework.

This (the technical evaluation) is described in a special section under WP3 at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:main) as well as under the section WP 5.1 at the DocuWiki ((http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main), and in the technical reports associated to WP3 (e.g. Deliverable 3.4, Report of Final Software Package with documentation). Consequently, this constitutes the general aspect of the technical evaluation capability and facilities of the established generic management evaluation framework under EFIMAS. The technical evaluation associated to each case study is described on case specific basis in Deliverable 4.2, 3.4 and at the EFIMAS DocuWiki under WP4 (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main. As such Deliverable 5.2 Technical Evaluation Reports is included in the above reporting and deliverables. Deliverable 5.2 is reflecting task 5.1, the technical/parametric evaluation, which is covered under Deliverable 3.3, 3.4 and 4.2 (by project month 48) with respect to describing how to evaluate uncertainty, sensitivity, robustness, and to perform risk analysis within the evaluation framework.

Aspects of Task 5.2.1, Proof Reading, has been (and are) implicitly included in the whole process of development and the structure of the evaluation framework and the project. This is a part of the cyclic feed back process between WP3, WP4 and WP5 concerning the different persons sitting together and developing the framework generically and case specific. The interactions established under the project have ascertained this. There is an internal evaluation of transparency of the technical tools here. EFIMAS scientists have been involved in the technical evaluation in case studies where they were not participants and case specific input have been evaluated by the WP3 group and the FLR Core Group.

Anon. 2008. Technical Evaluation Summary Report. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 20 pp.

Mosquera, I. 2008. Validation, verification and testing of software and models in FLR. EFIMAS WP5 Report. CEFAS 2008, 9 pp.

Sparre, P. J. 2008a. User's Manual for the EXCEL Application "TEMAS" or "Evaluation Frame". DTU-Aqua Report 190-08: 182 pp. ISBN 978-87-7481-077-3.

Task 5.2 Process evaluation of the evaluation framework and the use of it and delivery process mechanisms

***With respect to process evaluation of the evaluation framework and the use of it and delivery process mechanisms*:**

There have been held a long row of interviews and focus groups meetings during 2006 to 2008 with stakeholders. A preliminary stakeholder evaluation (seen from fisheries management and policy maker perspective) was made for EFIMAS in autumn 2006 (see reporting below) as input to the comming stakeholder workshops as well as the ongoing focus group meetings. A reallocation of Work Package 5 work tasks and budget extended the coverage of fisheries and case studies under WP5.2 'Process evaluation of the evaluation framework'. In addition to the three original geographic areas covered under the existing budget (North Sea roundfish fisheries, Denmark; Nephrops fisheries, England; and northern hake mixed fisheries, Spain), stakeholder interviews and focus groups are implemented in Ireland (Nephrops fisheries) and Greece (Mediterranean hake fisheries). Scientists working in WP3 and WP4 have participated in the WP5 focus groups. A time in each group was set aside for these scientists to ask their own questions to stakeholders. The final form of the stakeholder workshops was identified in preparation of and at the EFIMAS meeting in Lisbon April 2007. The interviews and focus groups meetings have been finally reported in a row of technical reports under EFIMAS as well as through the EFIMAS Conference Technical Report (see below), which together constitute the Deliverable 5.1, and which are available at the EFIMAS DocuWiki (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main). A list of focus group held and interviews conducted representing different European fisheries systems are given in the EFIMAS List of Dissemination, Products and Activities May-June 2008.

Focus Groups

The WP5 group held interviews and focus groups meetings with stakeholders during 2006 and 2007. Many focus group meetings have been held and they have been fully reported (see also EFIMAS List of Dissemination, Products and Activities, Month 48. (Annex 1)):

Degnbol, D., Eustace, B., Frangoudes, K., Hatchard, J., Hegland, T.J., Pitchon, A., Jacobsen, R.B., Stead, S.M., and Wilson, D. 2008. Stakeholder perspectives on fisheries science and modelling. Focus group discussions in Spain, Greece, UK, Denmark and Ireland. EFIMAS WP5 Report. 184 pp.

Degnbol, D., Eustace, B., Frangoudes, K., Hatchard, J., Hegland, T.J., Pitchon, A., Jacobsen, R.B., Stead, S.M., and Wilson, D. 2008. Summary of focus group report, EFIMAS WP5. Stakeholder perspectives on fisheries science and modelling. EFIMAS WP5 Report. 2 pp.

García D., Prellezo R. & Marina Santurtún. 2008. Update on EFIMAS Project: Evaluation tool for Alternative scenarios for Northern Hake fisheries management (Management Strategies Evaluation (MSE)) NWW RAC Focus Group on Northern Hake Long Term Management 21st February 2008, Bilbao

Hatchard, J.L., and Stead, S.M. 2006, "The EFIMAS modelling framework: Focus group discussions in Northeast England". Report, Newcastle University, 2006.

During the WP5 focus group meetings there have been participation also by scientists working in EFIMAS WP 3 and WP 4. A time in each group was set aside for these scientists to ask their own questions to stakeholders.

Focus groups meetings have been held with managers, fishermen association and fishermen as well as NGO's in Denmark (Charlottenlund, Hirtshals), Ireland (Dublin, Killybegs), United Kingdom, Greece, Spain, EU Level (Managers), Manager and Scientist level outside Europe (Canada, Iceland).

Stakeholder Workshop(s)

With respect to the Stakeholder Workshops, EFIMAS has with agreement of the EU Commission re-conceptualized this where the planned four regional stakeholder workshops were combined into the more broad and general EFIMAS Conference successfully conducted in Bruxelles 11-12 March 2008 with participation of more broader stakeholder groups as well as EFIMAS scientists. On basis of this EFIMAS Conference there has been produced a EFIMAS Conference Report with general and case specific stakeholder feed-back covering many management, advisory, industry, fisheries associations, and NGO bodies been introduced or involved in the management evaluation framework produced under EFIMAS.

Anon. 2008. Fisheries Management Evaluation Frameworks in Action. EFIMAS Conference Report. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 40 pp.

Policy Implementation Plan / Policy Brief / Project Implementation Plan

In association with Deliverable 5.3 the evaluation process manual this has (according to the revised) Technical Annex 1 to the Contract (by Feb. 2008 associated with EFIMAS Amendment 2 to the Contract) been condensed into a Policy Brief, i.e. to a Policy Implementation Plan (or Project Implementation Plan) which has been produced under EFIMAS, describing the best practices in the use of quantitative evaluation tools in compelex, multi-stakeholder policy environments. This Policy Implementation Plan is available at the EFIMAS DocuWiki main page (http://wiki.difres.dk/efimas/doku.php?id=efimas) as well as under WP5 here (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main). By condensing the evaluation process manual into a Policy Brief it is assured that it will reach as broad an audience and stakeholders as possible, and also be understandable for a broad audience within the European Communities.

The classic role played by science in fisheries is to set limits on exploitation according to objective criteria. Under conditions of high stakes and high uncertainty this traditional role is undermined as stakeholders use the political flexibility that uncertainty creates and managers try to make their own decisions easier by turning political problems into technical ones.

With the right tools, science can play a helpful role even when uncertainty is high. One strategy is participatory modelling which has been practised in EFIMAS. The approach uses scenario-based models to evaluate different options. Participatory modelling can involve managers, the fishing industry, conservation NGOs and any other group concerned with developing good, science-based policy. Participatory modelling is not a substitute for using science to set limits. But when limits are needed, this technique can focus on crafting strategies to meet them in efficient ways. Modelling can force stakeholders to clarify their objectives and explicitly address the trade-offs implied by various strategies. ¨

The common management evaluation framework and tools developed under EFIMAS for evaluating management strategies is a key tool for participatory modelling. It facilitates collaboration across disciplines, ensures that models and software once developed are easily validated, and widely available. In particular it details how to implement a variety of fishery, biological and economic models and software in a common framework so that alternative management strategies and procedures can be evaluated for their robustness to uncertainty before implementation. The design of the framework, including the adoption of object-orientated programming, can be extended to new processes and new management approaches – for example ecosystem-based approaches. The management evaluation frameworks developed in EFIMAS and sister projects is open source, which is important for promoting transparency and allowing technology transfer between disciplines and researchers.

Contractors involved:

- Danish Technical University – National Institute for Aquatic Resources, DTU-Aqua, DK (International Project Coordinator)
- The Secretary of State f. Environment Food & Rural Affairs act. thr. Centre f. Environment, Fisheries and Aquaculture Science, CEFAS UK, England.
- Wageningen Institute for Marine Resources & Ecosystem Studies, IMARES, NL
- Institut Francais de Recherche pour l'Exploitation de la Mer, IFREMER F
- The Scottish Ministers act. thr. Fisheries Research Services Marine Laboratory, FRS UK, Scotland
- Finnish Game and Fisheries Research Institute, FGFRI, SF
- Instituut voor Landbouw - en Visserijonderzoek, ILVO, B
- National Research Institute for Agriculture and Fisheries, IPIMAR, P
- Centre of Marine Research (Crete Branch), HCMR – Crete, GR
- Centre of Marine Research (Athens Branch), HCMR – Athens, GR
- Marine Institute, Mar. Inst., IRE
- Institute of Marine Research, IMR-N, N
- Institute of Marine Research, National Board of Fisheries Sweden, IMR-S, S
- Swedish Nat. Board of Fisheries, Institute of Freshwater Research, NBF, S
- Sea Fisheries Institute, SFI, PL
- Fundación AZTI AZTI Fundazioa, AZTI, E
- Aalborg University – Innovative Fisheres Management, AAU, DK
- University of Portsmouth Higher Education Corporation UoP, CEMARE, UK
- LEI, b.v.LEI, NL
- University of Copenhagen, Institute for Food and Resource Economics, UCPH, DK
- Institute f. Research in Economics & Business Administration, SNF, N
- IREPA ONLUS – Istituto Ricerhe Economiche Pesa e Aquacoltura, IREPA, I
- Imperial College of Science, Technology and Medicine, IC, UK
- Consejo Superior de Investigaiones Cientificas, CSIC, E
- Universitat de Barcelona, U. Barcelona, E
- Universidad de País Vasco / Euskal Herriko Unibertsitatea, U. Basque C., E
- Departamento de Economía y Empresa. University Pablo de Olavide, UPO, E
- University of Helsinki, U. Helsinki, UH. DEM, SF
- University of Newcastle, UNEW, UK

2. *Deviations from plan*:

There has been a change of the project management in WP5: The WP5 coordinator (Poul Degnbol, IFM) has been replaced by Doug Wilson, IFM, because Poul Degnbol left IFM for a position in the EU Commission.

An Addendum No. 1 Contract SSP8-CT-2003-502516 (EFIMAS) by date: 24.05.2006, which is approved by the EU Commission, gives a list of changes in relation to i) the project coordination, ii) change of work tasks by certain individual partners, iii) revised work tasks, work plan and terms of reference for WP5. The background, actual changes and consequences of these have been thoroughly described in the Addendum No. 1 to the EFIMAS Project Contract (see EFIMAS DocuWiki http://wiki.difres.dk/efimas/doku.php?id=efimas).

It has in Amendment 2 to the EFIMAS Contract been accepted to transform the four regional stakeholder workshops into the more broad stakeholder EFIMAS Conference held in March 2008.

3. *Deliverables and Milestones completed during the period*:

D5.1: Report(s) from evaluations from regional stakeholder workshops

Anon. 2008. Effectiveness of Evaluation Tools. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 10 pp.

Anon. 2008. Fisheries Management Evaluation Frameworks in Action. EFIMAS Conference Report. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 40 pp.

Degnbol, D., Eustace, B., Frangoudes, K., Hatchard, J., Hegland, T.J., Pitchon, A., Jacobsen, R.B., Stead, S.M., and Wilson, D. 2008. Stakeholder perspectives on fisheries science and modelling. Focus group discussions in Spain, Greece, UK, Denmark and Ireland. EFIMAS WP5 Report. 184 pp.

Degnbol, D., Eustace, B., Frangoudes, K., Hatchard, J., Hegland, T.J., Pitchon, A., Jacobsen, R.B., Stead, S.M., and Wilson, D. 2008. Summary of focus group report, EFIMAS WP5. Stakeholder perspectives on fisheries science and modelling. EFIMAS WP5 Report. 2 pp.

.

García D., Prellezo R. & Marina Santurtún. 2008. Update on EFIMAS Project: Evaluation tool for Alternative scenarios for Northern Hake fisheries management (Management Strategies Evaluation (MSE)) NWW RAC Focus Group on Northern Hake Long Term Management 21st February 2008, Bilbao

Hatchard, J.L., and Stead, S.M. 2006, "The EFIMAS modelling framework: Focus group discussions in Northeast England". Report, Newcastle University, 2006.

- Preliminary Stakeholder Evaluation Report September 2006
- EFIMAS - UK Focus Group Report, Jenny Hatchard and Selina Stead, Univ. Newcastle, Dec 2006
- Hellas Focus Group Report, Katia Frangoudes
- EFIMAS 2006. Evaluation of technical reports and other by WP3-4 and stakeholders. Additional EFIMAS Technical Report to M5 and Project Working Document. EFIMAS SSP-CT-2003-502516, November 2006, 18 pp.

D5.2: Technical evaluation reports (month 48).

Anon. 2008. Technical Evaluation Summary Report. EFIMAS Work Package 5 Report. EFIMAS SSP-CT-2003-502516. 20 pp.

Mosquera, I. 2008. Validation, verification and testing of software and models in FLR. EFIMAS WP5 Report. CEFAS 2008, 9 pp.

Sparre, P. J. 2008a. User's Manual for the EXCEL Application "TEMAS" or "Evaluation Frame". DTU-Aqua Report 190-08: 182 pp. ISBN 978-87-7481-077-3.

EFIMAS DocuWiki:
(http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:main)
(http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp4:general:main)
(http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main)

D5.3: Evaluation process manual. A policy brief describing best practices in the use of quantitative evaluation tools in complex, multi-stakeholder policy environments (month 48).

This Policy Implementation Plan is available at the EFIMAS DocuWiki main page (http://wiki.difres.dk/efimas/doku.php?id=efimas) as well as under WP5 (http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp5:main

Milestones:

M5: Evaluation of technical reports on inputs and results by case study (among other by WP3, WP4, WP5 and regional stakeholder workshops connected to the last project midterm report).

M6: Evaluations from 4 regional stakeholder workshops (month 36 and 48).

Regional Focus Group Meetings have completed and reported, as input for subsequent regional stakeholder workshop. Evaluations from four regional stakeholder workshops" have been integrated with the broader EFIMAS Conference.

Accordingly, the two above milestones have been reached through the cyclic, iterative feed-back work processes and results between WP5, WP4 and WP3.

Additional to milestone M5 (project month 24) there has been made a Technical Report in relation to the cyclic feedback process between WP4 and WP5:

EFIMAS 2006. Evaluation of technical reports and other by WP3-4 and stakeholders. Additional EFIMAS Technical Report to M5 and Project Working Document. EFIMAS SSP-CT-2003-502516, November 2006, 18 pp.

3. Consortium Management

(Work Package 1: DTU AQUA, J. Rasmus Nielsen, Per J. Sparre, Elisabith Friis Larsen, Lars Dyrløv Madsen, Ole Vestergaard)

A. Summary of status of progress:

- Consortium management has been performed successfully according to Project Contract and Technical Annex 1 of the Project Contract.

- All contributions from contractors have been delivered as requested in the Contract and the Technical Annex 1 of the Contract.

- There have been no changes in Consortium Partners. However, there have been replacement and restructuring of persons allocated to work packages and case studies internally according to among other the Amendments No. 1 and No. 2 to the EFIMAS Contract approved by the EU Commission and available from the EFIMAS DocuWiki.

B. Specific management activities/outcomes:

i. Consortium management
Establishment and consolidation of structure and composition of Network, Steering and STEPFORward Group and its activities according to the project Contract and the Technical Annex 1 of the project contract has been done. This work has been lead by the Project Coordinator.

ii. Consortium Agreement
A comprehensive and detailed Consortium Agreement outlining technical, administrative and legal aspects related to the EFIMAS project including implementation and dissemination of project findings has been developed by the Project Coordinator, in consultation with Consortium Partners. The Consortium Agreement was adopted and signed by all project partners in January 2005, and has been submitted in original form (with original signatures) to all partners and to EU DG FISH.

iii. Project Manager recruited
In December 2004, a FP6 Project Manager was recruited by DIFRES (later DTU AQUA) to assist organise, implement and communicate scientific, technical and administrative matters related to EFIMAS in close contact with the International Scientific Project Coordinator at DIFRES, as well as assist project outreach and liaison with project partners, the EU Commission, as well as relevant stakeholders.

In beginning of 2008 a second EFIMAS project manager (Elisabeth N. Larsen) from DTU Aqua was replacing the first project manager.

iv. Change in responsibilities, work packages / case studies
There has been a change of the project management in WP3, WP4, and WP5: One of the WP3 coordinators (Per Sparre, DTU AQUA) has been replaced by Clara Ulrich-Rescan, DTU AQUA. The case study coordinator of Case Study 4 (Nephrops Fisheries) has upon request and for personal reasons been replaced by Andrew Revill (CEFAS) which is also involved in the project coordination of the NECESSITY Project (EU FP6). One of the work package coordinators of WP4 (Sean Pascoe, CEMARE) has in the first place been replaced by Simon Mardle, CEMARE, and later by J. Rasmus Nielsen, DTU AQUA. This replacement has been because both Sean Pascoe and later Simon Mardle have left CEMARE. The WP5 coordinator

(Poul Degnbol, IFM) has been replaced by Doug Wilson, AAU (IFM), because Poul Degnbol left IFM for a position in the EU Commission. These replacements have accordingly resulted in the same replacements in the EFIMAS Steering Group and STEPFORward Group. The replacements have all been made in agreement and accordance with the EFIMAS Steering Group. This has had no impact of the project progress, finalization and results.

The Amendment No. 1 Contract SSP8-CT-2003-502516 (EFIMAS) by date: 24.05.2006, which is approved by the EU Commission, gives a list of changes in relation to i) the project coordination, ii) case study work, membership, and responsibilities (CS4 and CS2), iii) revised terms of reference for CS4, iv) according change of work tasks by certain individual partners and case study membership, v) dissemination of WP2 Deliverables, vi) revised work tasks, work plan and terms of reference for WP5, vii) change of cost model for certain partners, viii) and according to all this revised budgets in the EFIMAS Project. The background, actual changes and consequences of these have been thoroughly described in the Addendum No. 1 to the EFIMAS Project Contract (see EFIMAS DocuWiki http://wiki.difres.dk/efimas/-doku.php?id=efimas).

The Amendment No. 2 Contract SSP8-CT-2003-502516 (EFIMAS) by date: 28th Februrary 2008, which is approved by the EU Commission, gives a list of changes in relation to names and entities of a few project partners, as well as change of delivery dates for the Final Software Package with Documentation and Final Reporting by Case Studies, which was moved to the end of the project by month 48.

C. Internal project communication

i. Project electronic workspaces

Public project web site:

A public project website was launched by DIFRES in April 2005 to serve as the official window for disseminating project outputs and informing on project progress and upcoming events to stakeholders and the wider public (figure 1 below). The website has been updated regularly by the Project Manger with input from Consortium partners, and has by the end of the project been completed.

Public address: http://www.efimas.org.

EFIMAS internal project web sites including a Docu-Wiki system established

A password-protected website for project partners was launched shortly after the Kick-off meeting in April 2004. The site contains background and technical project documents; contract and budgets; overviews on work packages and case studies; work plans, progress reports and meeting agendas and meeting minutes; draft working papers; information and links to related projects and new initiatives. The website is being updated regularly by the Project Manager with input from network partners.

Address: ftp://efimasuser:ab.efi@ftp.dfu.min.dk/efimas/index.htm

This internal project web site has been taken over by an internal project DocuWiki web site in November-December 2006:

Internal Project (and EU Commission) address: http://wiki.difres.dk/efimas

An internal password-protected project Docu-Wiki system and website was launched and established by DIFRES (later DTU AQUA) in November-December 2006 to serve as the internal project platform for development, cooperation, and reporting of the EFIMAS work packages and the generic fisheries management evaluation framework as well as the case specific implementation and analyses. This includes a platform for simulation tools and analytical models established under EFIMAS and in partly cooperation with other projects. The DocuWiki function as an internal communication platform as well as communication between the project and the EU Commission (and certain stakeholders).The DocuWiki is set up also to communicate with the EFIMAS Public Web Site www.efimas.org. A full reporting of the EFIMAS Project has been given at the EFIMAS DocuWiki which will be made public, when the EU Commission have accepted the final deliverables of the project.

ii.Communication Strategy
A EFIMAS Project Communication Strategy and associated work plan has been developed and finalized in DTU AQUA in consultation with DTU AQUA communication officers and various project partners, outlining type and timing for information products.

iii. Leaflets and flyers
A leaflet and flyer has been developed by project month 18 as well as a two Technical Leaflets by project month 36 and project month 48 as presented on the EFIMAS Web Sites. This is a part of the main communication strategy developed for EFIMAS under DTU AQUA.

iv. EFIMAS logo
A project logo has been developed (presented on the front cover of this report).

v. EFIMAS Policy Brief / Policy Implementation Plan / Project Implementation Plan

A Policy Brief and a Policy Implementation Plan has been produced under EFIMAS by the end of the project. This Policy Brief is available at the project web sites as well as attached to the final reporting of the project.

D. Project meetings held

Project meetings have been held as planned in the Contract and the Technical Annex 1 of the contract. A full listing of project meetings held by work package is given in the 'EFIMAS List of Dissemination, Products and Activities' (Annex 1, Table 1). Furthermore, the main results obtained from the different project meetings held in relation to each Work Package and Case Study are described under section 2 as well as in the Project Reports associated to the project Deliverables and at the EFIMAS DocuWiki.

E. List of project activities

All planned activities as listed in the EFIMAS Contract and the Technical Annex 1 of the contract have been conducted as planned. A full listing of project activities by work package is given in the 'EFIMAS List of Dissemination, Products and Activities' (Annex 1, Table 1) by March-September 2008. Furthermore, the main activities performed in relation to each of the different Work Packages and Case Studies are described under section 2 as well as in the Project Reports associated to the Deliverables and at the EFIMAS DocuWiki.

. 4. Other issues

A. Corporation with other projects/programmes

- COMMIT (FP6): Development of a ***common*** Fisheries Management Evaluation Framework between the two projects and shared case study work for shared case studies between the projects. A series of meetings has been held jointly between EFIMAS and the COMMIT project, including project kick-off meetings, April 2004, Crete; steering group meetings, September 2004, Vigo; 12-month Network meeting, April 2005, Salerno, Steering Group meeting, September 2005, Aberdeen; - as well as a series of meetings and workshops under Work Package 3 'Evaluation Framework Development' and case specific meetings of WP4 for shared case studies (CS1: North Sea Flatfish Fisheries; CS3: Baltic Salmon Fisheries; CS6: Northern Hake Mixed Fisheries). As a result of this a row of shared products have been obtained between the two projects. The collaboration as well as the sharing and distinguishing between tasks of the two projects have been thoroughly described at the EFIMAS DocuWiki, in the present report as well as in the EFIMAS Technical Reports associated to the Deliverables under WP3 and WP4.

- TECTAC (FP5): Direct integration of results from TECTAC into EFIMAS.

- FEMS (FP5): Integration of FEMS model aspects and preliminary version of FLR in EFIMAS and FLR developed under EFIMAS and COMMIT.

- PKFM (FP5): Direct integration of results from PKFM into EFIMAS.

- EASE (FP5): Contribution from EFIMAS to EASE in form of Knowledge Basis Review.

- BEMMFISH (FP5): Integration of results from BEMMFISH in EFIMAS.

- BECAUSE (FP6): Discussion meetings on model development and on Evaluation Models design and software use to be incorporated in the cooperation between EFIMAS and BECAUSE have been held and is further ongoing.

- ICES: Contribution to and from ICES Working Group on Fisheries Systems (WGFS) and ICES Methods Working Group as well as other relevant ICES working groups.

- TEMAS: Integration of the TEMAS Model and Evaluation Framework and parts of this in the EFIMAS Fisheries Management Evaluation Framework development and case specific work in relation to this (from national Danish project TEMAS).

- EMMFID (Economic Management Model for Fisheries in Denmark), national Danish project: Use of relevant results and experiences gained from this project in EFIMAS.

- EIAA (Economic interpretation of ACFM Advice) model and model calculations: Use of relevant results and experiences gained from this work.

- Stakeholder consultations: Attendance at North Sea Regional Advisory Council (RAC) meeting, May 2005.

Annex 1. Use and Dissemination

Dissemination of knowledge: List of Dissemination, Products and Activities (Mth. 48)

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
2004 - 2008	**Management Evaluation Framework (MEF) and Software Packages with Full Documentation**	Scientists, Scientific Advisors, Managers and Policy Makers, All Stakeholders e.g. Industry, Fisheries, RACs, NGO's	EU Member States	Several thousands	EFIMAS Consortium
2004-2008	**Case Specific Implementation** of the Developed MEF and the Software Packages for important and typical EU Fisheries Systems and Stockc	Scientists, Scientific Advisors, Managers and Policy Makers, All Stakeholders e.g. Industry, Fisheries, RACs, NGO's	EU Member States	Several thousands	EFIMAS Consortium
May 2004	**Conference Poster + extended abstract: EUROCEANS** Nielsen, J.R., Sparre, P.J., Kell, L., Degnbol, P., Pascoe, J., Pastoors, M., Motos, L (editors on behalf of EFIMAS consortium): Operational Evaluation Tools for Fisheries Management Options (EFIMAS). Poster and Extended Abstract, EUROCEAN 2004, 10-13 May 2004, Galway, IRE.	Research, fisheries management, policy makers	EU Member States	300	Steering Group in communication with full project network
Sep 2004	**Presentation:** Presentation of the EFIMAS Project to EU to the **EU EFARO Group, DG Fisheries**, and EU Commission Representatives Bruxelles, September 2004	Research, fisheries management, policy makers	EU Member States	30-50	Prepared by J.R. Nielsen, P.J. Sparre, L.Kell, P. Degnbol, S. Pascoe, M. Pastoors, & L. Motos (behalf of EFIMAS Consortium); presented by N.A. Nielsen. .
Nov 2004	**News brief : External Forum**, Danish Ministry of Food, Agriculture & Fisheries, news article on EFIMAS (in Danish)	Managers, policy makers	Denmark	1000	DIFRES
Dec 2004	**Popular articles** News brief on EFIMAS in fisheries stakeholder journal (in Danish)	Managers, policy makers	Denmark	1000	DIFRES

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
April 2005	**Public project web-site: EFIMAS Public Web Site** (www.efimas.org) further expanded	Research, industries, fisheries management, policy makers	All project partner countries	Multiple (Difficult to assess)	DIFRES
Sept 2005	**Popular article ICES/CIEM Newsletter** – 'Virtual Fisheries Management'	Research, industries, fisheries management, policy makers	Northeast Atlantic, North sea, Baltic states	3000	Project Coordinator (Steering Group)
Sept 2005	**Fiches** presenting fisheries and aquaculture research projects in support of the Policies (SSP) of the Sixth Framework Programme (http://europa.eu.int /comm./research/fp6/ssp	Research, industries, fisheries management, policy makers	EU	Multiple	DG FISH, EU, DIFRES
Nov 2005	**Leaflet / Flyer: EFIMAS Flyer** 'Virtual Fisheries Management'	Research, industries, fisheries management, policy makers	All project partner's countries + whole EU	2000	DIFRES plus Steering Group
April 2006	**ICES Working Group and EU FP5 Project Informal Cluster Meeting Report** (Executive Summary for EFIMAS) (ICES Working Group on Fisheries Systems)	Research, Fisheries Industry, Fisheries Management (EU)	ICES and EU level	30	Several EFIMAS Partners
June 2006	**Conference: ICES Symposium on Fisheries Management Strategies, Galway, 2006** (List of all EFIMAS based and relevant presentations given below)	Research, fisheries management	ICES and EU level	300	Steering Group
Aug 2006	**Book: EFIMAS WP2 Book publication: Review of knowledge base for fisheries management (ELSEVIER)**	Research, industries, fisheries management, policy makers	International	2000	WP2 partners
Nov / Dec 2006	**Internal and EU Project Web Site: Establishment of the EFIMAS wiki http://wiki.difres.dk/efimas**	Project Partners, Fisheries Stakeholders (Industry, NGO's etc) and fisheries Management (EU Commission)	International within project network	100-200	Project Coordinator (DIFRES) and all Project Partners
March - April 2007	**Leaflet / Flyer: PROFET Conference** EFIMAS-PROFET Technical Leaflet: "EFIMAS – Managing	Research, industries, fisheries management, policy makers; EU and Russian Ma-	All project partner's countries + whole EU;	1000	Project Coordinator

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
	fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01 (2 pp).	nagement, Scientific advisers (ICES, STECF), All stake-holders;			
March – April 2007	**Conference:** PROFET Conference: Baltic Fisheries Workshop, Vilnius, Lithuania; Presentation + Extended Abstract	EU and Russian Management, Scientific advisers (ICES, STECF), All stakeholders;	Baltic EU Countries and Russia	150	Project Coordinator
March 2008	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation.	Project Partners, EU Commission, A very broad group of international stakeholders including managers, industry and NGO's, Scientific Advicers and Science	EU Countries	300-500	EFIMAS Steering Group and STEPFORward and WP5 Groups
April-June 2008	**Leaflet / Flyer: PROFET Conference** EFIMAS-PROFET Technical Leaflet 2: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01 (2 pp).	Research, Industries, Fisheries, EU Management, Policy Makers, Scientific advisers (ICES, STECF), Project Partners.	EU Countries	1000	Project Coordinator
June 2008	**Conference:** PROFET Conference: North Sea Fisheries Workshop, Cph. Denmark; Presentation + Extended Abstract	EU Management, Scientific advisers (ICES, STECF), All stakeholders including Industry, NGOs, etc.;	EU Countries	150	Project - Coordinator
June 2008	**Conference:** PROFET Conference: Mediterranean Fisheries Workshop, Marseille, France; Presentation + Extended Abstract	EU Management, Scientific advisers (ICCAT, STECF), All stakeholders including Industry, NGOs, etc.;	EU Countries and Mediterranean neighbour countries	150	IMBC (NCMR)
June 2008	**Conference:** Oceanology 2008 Conference, London, June 2008. EU Stand and Extended Abstract	Scientists, Scientific Advisers, EU Com., Int. stakeholders including managers, industry and NGO's.	EU Countries, North America, Others	2-500	NMCR and DTU Aqua

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
June – September 2008	**Policy Brief / Policy Implementation Plan / Project Implementation Plan:** PROFET Conference: Mediterranean Fisheries Workshop, Marseille, France; Presentation + Extended Abstract	Scientists, Scientific Advisors, International Stakeholders: Managers, Policy makers, EU Commission, Industry, NGO's, etc.	Worldwide through Web Site	1000 – Several thousands through web site	DTU Aqua, CEFAS, IFM
Communication & Outreach	**EFIMAS Summary Paper:** Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks. WORLD FISHING, February 2009. (In Press).	Scientists, Scientific Advisors, International Stakeholders: Managers, Policy makers, EU Commission, Industry, NGO's, etc	Worldwide through WORLD FISHING Magazine audience	Several thousands (World Fishing Magazine audience)	DTU Aqua, World Fishing Magazine
2006 – 2008	**ICES Working Groups** Pres. + Execut. Summary of EFIMAS. ICES WGFS April 2006. Specific ICES workshop on use of FLR for fish stock assessment, ICES WKFLR, 29 Jan – 2 Feb 2007. Use of FLR in a long row of assessment working groups, initiated in 2006 on few stocks only, and widely spread in 2007 and 2008, for example: ICES WGNSSK (2006-2008), ICES WGHMM (2007-2008), WGNEAMAC 2007-2008; ICES WGBFAS 2008; A specific example of this is the May 2008 WGNSSK use of FLR in Machiels et al. 2008. For example has the generic OM and the MSE developed under Case Study 6 been being used in the ICES Working Group WGHMM07 (May 2007) and has been the main methodology to the STECF on Long-term harvest plans for Northern Hake (June 2007). Demonstration of FLR to the ICES working groups chairs in ICES AMAWGC 2007.	ICES and EU STECF; EU and ICES Countries Managers	ICES and EU Countries	500-1000	Project Partners

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
	Presentation of FLR and of EFIMAS project to ICES WGFS 2007. Examples of management strategies evaluations presented in ICES SGMAS 2007. (SGMAS). Developement of mixed-fisheries models using FLR for Management Strategy evaluaton of mixed North Sea roundfish and Nephrops fisheries in ICES MIXMAN 2006, 2007, 2008. Use of FLR tools for risk analysis under ICES SGRAMA 2007. Use of FLR tools in ICES WKNEPHSEL 2007.				
2006 -2008	**STECF Work Groups** Use of FLR and EFIMAS Work in a several EU STECF Work Groups in 2006, 2007 and 2008: Flatfish management plan evaluation: STECF 2006. SGBRE-07-03 (June 2007) and follow-up SGBRE-07-05 (December 2007) Northern Hake long-terms management plans SGMOS-07-07 Evaluation of Harvest Control (September 2007). See the specific details under this working group's wiki page. Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008). STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.	EU STECF; EU Managers	EU Countries	200	Project Partners
2006 – 2008	**RACs** Examples of work evaluated in the RACs: North Sea flatfish MSE to the North Sea RAC |Poos et al. (2006) and Pastoors et al. (2006), ICES WGNSSK, and STECF	Fishers, Fishing Industry, Scientific Advisers, Managers within EU	EU Countries	200	Project Partners

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
	MSE Tools for Long Term Management Evaluation of Northern Hake presented to: RAC SWW: Santigao de Compostela, 23 oct 2008, and to RAC NWW: Bruselas, 31 Oct 2008. Management strategy evaluations were done for the North Sea haddock fishery including the implications of recruitment, discards, and the sliding-F exploitation rule and reported to the North Sea RAC, 2007.				
2004 – 2007	**Conferences:** EUROCEANS Conf., Galway, Ireland 2004 (Poster and Extended Abstract); ICES Symposium on Fisheries Management Strategies, Galway, Ireland 2006 (Several Presentations and Scientific Papers and Posters to the conference and several papers published in symposia proceedings in ICES J. Mar. Sci. 2007 vol. 64 (4)) Presentation of FLR in UseR Symposium 2006, 15/17 June, Wienna, Austria; PROFET Policy Conference: Baltic Fisheries Science, Vilnius, Lithuania, April 2007 (Presentation and Extended Abstract and Technical Leaflet for EFIMAS); Some of the economic studies have been presented at the EAFE Conference (2007) (see ECONOWS Report); Presentation of FLR together with WP4-CS2 application at MODSIM conference, Christchurch, New Zealand, 10-13 December 2007; Presentation of EFIMAS and FLR at 6FP	Scientists, scientific advicers, fishing industry and stakeholders, managers: EU Commission, EU Managers, National Managers, International and national fishing industry and fishermen associations, NGOs (e.g. WWF), experts and scientists (fisheries biologists, economists, and sociologists).	EU and ICES Countries	3-400	Project Coordinator, Steering Group, STEPFOR-ward, Project Partners

Planned/actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible / involved
	workshop, DGFish DG-RTD, Brussels, 26 October 2007. EFIMAS Conference, Bruxelles, Belgium, March 2008. A long row of EFIMAS Presentations. Special arranged Conference by EFIMAS with participation and representation; Oceanology 2008 Conference, London, UK, March 2008. General Presentation of EFIMAS. EU PROFET Policy Conference, North Sea Fisheries Science, Copenhagen, DK, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS). PROFET Policy Conference, Mediterranean Fisheries Science, Marseille, France, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).				
2004 – 2008	**Scientific Publications:** A long row of scientific publications under EFIMAS has been produced and published which are listed in the "EFIMAS List of Dissemination, Products and Activities" by June-September 2008. See also below.	Scientists and scientific advicers and scientific consultants	EU and ICES Countries; Worldwide	Several thousands	Project Partners
2008	**Full Developed and updated EFIMAS Public Web Site** (www.efimas.org)	Research, industries, fisheries, management, policy makers, other stakeholders	Worldwide	Multiple (Difficult to assess)	DTU Aqua
2008-2009	**Public Access to the full developed and up-dated EFIMAS wiki http://wiki.difres.dk/efimas**	Research, industries, fisheries, management, policy makers, other stakeholders	Worldwide	Multiple (Difficult to assess)	DTU Aqua

Detailed list of publications, outreach and working documents

A. Publications

Scientific peer reviewed papers / reports

1. Motos, L. and Wilson, D. (Eds.). 2006. The Knowledge base for Fisheries Management". Developments in Aquaculture and Fisheries Science 36: 454 pp. ELSEVIER Publishers, ISBN-13: 978-0-444-52850-6. Review of knowledge base for fisheries management co-authored by EFIMAS participants in WP2. WP2 book covering EFIMAS Deliverable 2.1 and 2.2. (together with the WP2 Technical Annex Report (listed above).

   Chapters / Papers written in the published Book by ELSEVIER under EFIMAS WP2:

   THE KNOWLEDGE BASIS FOR FISHERIES MANAGEMENT by Lorenzo Motos and Douglas Clyde Wilson (Editors)

   Chapter 1: Introduction: The Knowledge Base as Process by Doug Wilson, Ikerne del Valle, Renée Jessen and Lorenzo Motos

   Section One - GLOBAL EXPERIENCES WITH MANAGEMENT SYSTEMS RELEVANT TO EUROPE

   Chapter 2: International Management of Shared Stocks by Martin Aranda, Arantza Murillas and Lorenzo Motos

   Chapter 3: Rights Based Fisheries Management by Ikerne del Valle, Ellen Hoefnagel, Kepa Astorkiza and Inma Astorkiza

   Chapter 4: The Knowledge Base of Co-Management by Ellen Hoefnagel, Amy Burnett and Doug Clyde Wilson

   Chapter 5: Financial Instruments by Inma Astorkiza, Kepa Astorkiza, Hans Frost, Erik Lindebo and Ikerne del Valle

   Chapter 6: Command-and-Control Quota-Based Regimes by Martin Aranda, Arantza Murillas and Lorenzo Motos

   Chapter 7: Effort and Capacity-Based Fisheries Management by J. Rasmus Nielsen, Per J. Sparre, Holger Hovgaard, Hans Frost, George Tserpes

   Section Two – ISSUES RELEVANT TO THE EUROPEAN LEVEL

   Chapter 8: Fisheries Policy-Making and Production and Use of Knowledge by Troels Jacob Hegland

   Chapter 9: Participation by Kepa Astorkiza, Ikerne Del Valle, Inma Astorkiza, Sean Pascoe

   Chapter 10: Ecological Side-Effects of Fishing from the Fisheries Management Perspective by George Tserpes, Panagiota Peristeraki, J. Rasmus Nielsen

   Chapter 11: Fisheries-Based Management and Advice in Europe by Wim Demaré

Chapter 12: The Requirements of an Ecosystem Approach to Fisheries Management by Henrik Gislason

Chapter 13: Delivering Complex Scientific Advice to Multiple Stakeholders by Doug Clyde Wilson and Sean Pascoe

Chapter 14: Non- Compliance with Fishery Regulations by Aaron Hatcher and Sean Pascoe

Section Three – SCENARIO MODELLING AS SUPPORT FOR FISHERIES MANAGEMENT SYSTEM EVALUATION

Chapter 15: Operational Management Procedures: An Introduction to the use of Evaluation Frameworks by Laurence Kell, Jose De Oliveira, Andre E. Punt, Murdoch K. MacAllister and Sakari Kuikka

Chapter 16: Management Strategy Evaluation (MSE) and Management Procedure (MP) Implementations in Practice: A Review of Constrains, Roles and Solutions by Martin Aranda and Lorenzo Motos

Section Four – SUMMARY AND CONCLUSIONS

Chapter 17: The Role of Science within Modern Management Processes with the Development of Model-Based Evaluation Tools by Lorenzo Motos and Doug Clyde Wilson

Galway symposium papers and posters produced in relation to EFIMAS:

2. Del Valle, I. and Astorkiza. 2006. Institutional designs to face the dark side of total allowable catches. ICES Journal of Marine Science 64: 851-857.

3. Horbowy, J. 2006. Management of the eastern Baltic cod with stock-production or difference models. Poster to ICES Symposjum on evaluation of management strategies. SFMS 44, Dublin 2006

4. Kell, L., Mosqueria, I., Grosjean, P., Fromentin, J-M, Garcia, D., Hillary, R., Jardim, E., Mardle, S., Pastoors, M., Poos, J.-J., Scott, F., Scott, R.D. 2007. FLR: An open source framework for the evaluation and development of management strategies. ICES Journal of Marine Science 64: 640-646.

5. Pastoors, M. A., Poos, J. J., Kraak, S. B. M., Machiels, M.A.M. 2007. Validating management simulation models and implications for communicating results to stakeholders. ICES Journal of Marine Science, 64: 818-824.

6. Ulrich, C., Andersen, B.S., Sparre, P.J., and Nielsen, J.R. 2007. TEMAS: Fleet-based bioeconomic simulation software to evaluate management strategies accounting for fleet behaviour. ICES Journal of Marine Science 64: 647-651.

Other scientific peer reviewed papers:

7. Aranda M., Murillas A., Motos L., 2006.A base do coñecemento na xestión de pesqueiras: o caso do sistema de mandato e control da Union Europea Revista Galega de Economía, 15 (1): 35-54, junio 2006 (This is the "Galician Journal of Economy", in Spanish/Galician).

8. Aranda M., Murillas A., Motos L., 2007. Aspectos Sociales en la Generación del Conocimiento en la Gestión de Pesquerías. Zainak, 29, 65-79.

9. Bastardie, F., Pelletier, D., Mahevas, S., Guyder, O., Thebaud, O., Santurtun, M., and Prellezo, R. (Submitted). ISIS-FLR: a spatially and seasonally bioeconomic model for mixed fisheries. Application to the Northern hake / Nephrops fisheries of the Bay of Biscay (and Celtic Sea). (In revision ELSEVIER).

10. Bastardie, F., Nielsen, J.R., and Kraus, G. 2008. Management Strategy Evaluation framework for the Eastern Baltic cod fishery to test robustness of management against environmental conditions and fleet response scenarios. (Submitted ICES J. Mar. Sci.)

11. Catchpole, T.L., Tidd, A.N., Kell, L.T., Revill, a, A.S. and Dunlin, G., 2007. The potential for new Nephrops trawl designs to positively effect North Sea stocks of cod, haddock and whiting. Fisheries Research 86 (2007) 262–267.

12. Clarke, E. D. 2007. Evaluating the West of Scotland cod recovery plan using computer simulations, FISHupdate, June 2007.

13. del Valle, I. & Astorkiza, K. (2007): Institutional designs to face the dark side of total allowable catches. ICES Journal of Marine Science, Vol 64(4) pags 851-857.

14. del Valle, I., Astorkiza, K. and Astorkiza, K. : Basque inshore skippers' long term behaviour: a logit approach. Aquatic and Living Resources.(Forthcoming).

15. Eustace B., Kelly, C., Jackson, E., Rihan,D., 2007 (submitted).Technical measures can be shown by experiment to reduce the capture of unwanted fish, but can we see the effect on the stock in a stochastic world? (Submitted to Fisheries Research).

16. Hamon, K., Ulrich, C., Hoff, A. and Kell, L. 2007. Evaluation of management strategies for the mixed North Sea roundfish fisheries with the FLR framework Presentation to MODSIM07 Conference, 10-13 December 2007, Christchurch, New Zealand with Hamon et al. peer-review publication in conference proceedings.

17. Hoff, A., Frost, H. 2008. Modelling combined harvest and effort regulations: the case of the Dutch beam trawl fishery for plaice and sole in the North Sea. ICES J. Mar. Sci. (In press).

18. Hoff, A., Frost, H. 2008. Modelling economic response to harvest and effort control in the North Sea cod fishery. Aquat. Living Resour., 2. (In press).

19. Kraus, G., Pelletier, D., Dubreuil, J., Moellmann, C., Hinrichsen, H.H., Bastardie, F., Vermard, Y., and Mahevas, S. 2008. A model-based evaluation of marine protected areas for fishery management in the case of strong environmental forcing – the example of Eastern Baltic cod (Gadus morhua callarias L.). (In Press ICES J. Mar. Sci.).

20. Kronbak, L., and Lindroos M. 2006. An Enforcement-Coalition Model:Fishermen and Authorities Forming Coalitions. Environmental and Resource Economics, 35: 169-194.

21. McCay, B. J., Johnson, T.R., St. Martin, K., and Wilson, D.C. 2006. Social, Cultural, and Economic Impacts of Working Cooperatively: How is Fishermen's Knowledge Incorporated?" The proceedings of Partnerships for a Common Purpose: Cooperative Fisheries Research and Management the 4th Sea Grant Sponsored American Fisheries

Society Symposium Anchorage Alaska: September 13-14, 2005. The American Fisheries Society Bethesda, Maryland, 2006.

22. Mäntyniemi, S. Romakkaniemi, A. and Arjas. (Submitted). Bayesian estimation of the number of individuals in a sample with a known weight. (Submitted).

23. Mäntyniemi, S. (Submitted). Bayesian population dynamics modelling: model specification, model checking and posterior computation. (Submitted).

24. Michielsens, C.G.J., Mäntyniemi, S. and Vuorinen, P.J. (2006). Estimation of annual mortality rates caused by Early Mortality Syndromes (EMS) and their impact on salmonid stock-recruit relationships. Canadian journal of fisheries and aquatic sciences, 63: 1968-1981.

25. Michielsens, C.G.J., Dahl, J., Romakkaniemi, A., Pulkkinen, H., Karlsson, L. and Mäntyniemi, S. Precautionary biological reference points for Atlantic salmon (Salmo salar) stocks within the Baltic Sea. (to be submitted).

26. Needle, C. L. (2007a). Management strategy evaluation for North Sea haddock, *Fisheries Research*, doi:10.1016/j.fishres.2008.03.004.

27. Nielsen, J.R., Sparre, P.J., Kell, L., Degnbol, P., Pascoe, J., Pastoors, M., Motos, L (editors on behalf of EFIMAS consortium). 2004. Operational Evaluation Tools for Fisheries Management Options (EFIMAS). Poster and Extended Abstract, EUROCEAN 2004, 10-13 May 2004, Galway, Ireland.

28. Nielsen, J.R, Bastardie, F., Nabe-Nielsen, J., and E M Pedersen. (In revision). Whole fishery selectivity, fishing patterns, and fleet catchability dynamics in international Baltic Sea cod fisheries – from observed spatio-temporal patterns in resource availability and fleet specific selection, relative fishing power, and fisherman sorting behaviour. (In revision, ICES Journal of Marine Science).

29. Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks – conceptual change in European Fisheries Management advice. Implementing fisheries management evaluation tools capable of comprehending both the biological, economic, sociological and spatial dynamics of the fisheries system. WORLD FISHING, February 2009. (*In Press*).

30. Pilling et al. (Submitted). Can economic and biological management objectives be achieved by the use of MSY-based reference points? A North Sea plaice (Pleuronectes platessa L.) and sole (Solea solea L.) case study. Submitted.

31. Tserpes, G. and Peristeraki, P., 2007. Effects of a seasonal closure of the Mediterranean swordfish fisheries on the stock production levels. ICCAT Collective Volume of Scientific Papers, 60: 2059-2062

32. Wilson, D.C., and Delaney, A.E. 2006. "Scientific Knowledge and Participation in the Management of Fisheries in the North Sea". In Gray, T.S. (Ed) Participation in Fisheries Governance. Dordrecht, The Netherlands Amsterdam: Springer.

Popular articles / Outreach

1. EFIMAS 2004. Project flyer / brochure: 'Virtual Fisheries Management', for wide public dissemination. EFIMAS Project Flyer / Brochure / Leaflet

2. EFIMAS Project 2004. European Service Network (on behalf of EU Commission), SSP Sheet: EFIMAS - Modelling decision-making processes that are responsive to risk and uncertainty, Dec. 2004. Address: *http://europa.eu.int/comm/research/fp6/ssp/efimas_en.htm*

3. EFIMAS 2004. Fiskeribladet (Fishery Journal) v. Claus Jacobsen: 'Nu skal der tænkes nyt i Europas fiskeriforvaltning', Fiskeribladet, Vol. 48, Dec 2004 (news brief for fisheries industries on EFIMAS in Danish).

4. EFIMAS 2004. "Forskningsprojekt skal skaffe bedre fiskeriforvaltning i Europa", Externt Forum: Vol. 46 November 2004, Ministry of Food, Agriculture and Fisheries, Denmark, Online Newsletter (*in Danish*). Summary article prepared by DIFRES.

5. EFIMAS 2004. Presentation of the EFIMAS Project to EU in the EU EFARO Group/Project, DG Fisheries, Bruxelles, September 2004, prepared by J.R. Nielsen, P.J. Sparre, L.Kell, P. Degnbol, S. Pascoe, M. Pastoors, and L. Motos (on behalf of Consortium partners) and presented by Niels Axel Nielsen, DIFRES.

6. EFIMAS. European Fisheries and Agriculture Organisation, Priority 8 Index of Task: EFIMAS Short Summary, Web: *http://www.efaro.org/eu_sp_fp6_1_index.php*.

7. EFIMAS 2004. EU Project Information Sheet. December 2004 *http://europa.eu.int/comm/research/fp6/ssp/efimas_en.htm*

8. EFIMAS. Fiches presenting fisheries and aquaculture research projects in support of the Policies (SSP) of the Sixth Framework Programme. EU and DIFRES. Available at the web site: http://europa.eu.int /comm/research/fp6/ssp.

9. EU PROFET Policy Conferences. 2007-2008. Baltic Sea Sea Fisheries Science, Vilnius, Lithuania, April 2007. North Sea Fisheries Science, Copenhagen, DK, June 2008. Mediterranean Fisheries Science, Marseille, France, June 2008. Presentation and Extended Abstract and Technical Leaflet for EFIMAS to each of the Conferences.

10. Nielsen, J.R., Sparre, P.J., Kell, L., Degnbol, P., Pascoe, J., Pastoors, M., Motos, L (editors on behalf of EFIMAS consortium). 2004. Operational Evaluation Tools for Fisheries Management Options (EFIMAS). Poster (and Extended Abstract), EUROCEAN 2004, 10-13 May 2004, Galway, Ireland.

11. Nielsen, J.R. (on behalf of the EFIMAS Consortium), 2005. ICES CIEM Newsletter September 2005: 'Virtual Fisheries Management', News Article, ICES. ICES CIEM, 42: 31.

12. Nielsen, J.R. 2007. EFIMAS Technical Leaflet and Flyer 1. 2007. " EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders". EFIMAS Technical Leaflet (Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01) April 2007.

13. Nielsen, J. R. 2008. ”EFIMAS Technical Leaflet and Flyer 2”, pp. 86-87. In: PROFET POLICY Transnational Workshops: Compilation of Technical Leaflets; North Sea Fisheries; Copenhagen, Denmark 23rd & 24th June 2008. http://www.profetpolicy.info

14. Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks – conceptual change in European Fisheries Management advice. Implementing fisheries management evaluation tools capable of comprehending both the biological, economic, sociological and spatial dynamics of the fisheries system. WORLD FISHING, February 2009. (*In Press*).

15. Presentations and Abstracts, ICES Symposium on Fisheries Management Strategies, 27th – 30th June 2006, Galway, Ireland

Titles of scientific presentations and abstracts at the ICES Symposium on Fisheries Management Strategies produced (fully or partly) through financial support from the EU FP6 project EFIMAS, ‘Operational Evaluation Tools for Fisheries Management Options’:

a. Whole fishery selectivity and fishing patterns in international Baltic Sea cod fisheries - from observed spatio-temporal patterns in effort allocation, resource availability, fleet selection, relative fleet fishing power, and fisherman sorting behaviour. *J. Rasmus Nielsen, Jacob Nabe-Nielsen and Eva Maria Pedersen*.)

b. From stock-based to fleet-based short-term advice in mixed fisheries – The F^3 approach. *Clara Ulrich, Bo S. Andersen, Holger Hovgaard, Per J. Sparre*.

c. Integrating fleets tactical behaviour in bioeconomic simulation models for the evaluation of management strategies: Influence of effort allocation in the performance of the current management procedures for the North Sea flatfish fishery. *Bo Sølgaard Andersen, Youen Vermard, Clara Ulrich, Holger Hovgaard, Dave Bromley, Simon Mardle, Jan-Jaap Poos, Per J. Sparre, Hans von Oostenbrugge*.

d. (Bio-)Economic Modeling in a Generic Simulation Framework: The FLR Concept. *Simon Mardle, Laurie Kell, Trevor Hutton, Rob Scott and Jan-Jaap Poos.*

e. Validating operating models in simulations of management plans and the implications for how the results can be communicated. *Martin Pastoors, Jan Jaap Poos, Sarah Kraak and Marcel Machiels.*

f. FLR: An Open Source Fisheries Library or Framework for the Evaluation of Management Strategies. *Laurence Kell, Philippe Grosjean, Iago Mosqueria, Jean-Marc Fromentin, Ernest Jardim, Richard Hillary, Simon Mardle, Jan-Jaap Poos, Robert Scott.*

g. A generic extendable multi-fleet fisheries operational model in FLR with two example aplication. *Dorleta García, and Iago Mosqueira, I. 2006*.

h. A generic extendable multi-fleet fisheries operational model in FLR with two example applications. *Dorleta García and Iago Mosqueira*

i. Evaluating Management Options for Baltic salmon (Salmo Salar). *Polina Levontin and Murdoch McAllister*

j. The Role of Science within Modern Management Processes with the Development of Model-Based Evaluation Tools. *Motos, L., and D. Wilson.*

k. Evaluating fisheries management options for Atlantic salmon stocks (Salmo salar) in the Baltic Sea. Symposium on management strategies: case studies of innovation. *Levontin, P., Kulmala, S., Lindroos, M., Michielsens, C. and McAllister, M.*

l. Incentives and Behaviours under an ITQ system: towards the liberalisation of management-oriented fisheries research. *del Valle, I. Hoefnagel. E., Astorkiza, K. and Astorkiza, I.*

m. Finantial Instruments. Comunication. *Astorkiza, I. Astorkiza, K., Frost, H., Lindebo, E. and del Valle. I.*

n. Participation. *Astorkiza, K. del Valle, I., Astorkiza, I., Hegland, T.J., and Pascoe, S. (2006):*

The individual Power Point Presentations (and abstracts) are available through the ICES home page: http://www.ices.dk/indexfla.asp

16. **ICES Working Groups**

Presentation and Executive Summary of EFIMAS. ICES Working Group on Fisheries Systems (**ICES WGFS**). April 2006.
Specific workshop dedicated to the use of FLR for fish stock assessment, **ICES WKFLR**, 29 Jan – 2 Feb 2007, ICES Headquarters, Copenhagen, DK. (WKFLR).
Use of FLR in a long row of assessment working groups, initiated in 2006 on few stocks only, and widely spread in 2007 and 2008, for example: **ICES WGNSSK** (2006-2008) (WGNSSK), **ICES WGHMM** (2007-2008) (WGHMM), **WGNEAMAC** 2007-2008; **ICES WGBFAS** 2008; A specific example of this is the May 2008 WGNSSK use of FLR in Machiels et al. 2008; For example has the generic OM and the MSE developed under Case Study 6 been being used in the ICES Working Group **WGHMM**07 (May 2007) WGHMM and has been the main methodology to the STECF on Long-term harvest plans for Northern Hake (June 2007).
AMAWGC: Demonstration of FLR to the ICES working groups chairs in **ICES AMAWGC** 2007 (AMAWGC).
Presentation of FLR and of EFIMAS project to ICES Working Group on Fisheries Systems 2007 (**ICES WGFS**) (ICES Working Group on Fisheries Systems).
Examples of management strategies evaluations presented in **ICES SGMAS** 2007. (SGMAS).
Developement of mixed-fisheries models using FLR for Management Strategy evaluaton of mixed North Sea roundfish and Nephrops fisheries in **ICES MIXMAN** 2006, 2007, 2008 (ICES MIXMAN 2006, 2007, 2008)
Use of FLR tools for risk analysis under **ICES SGRAMA** 2007. (SGRAMA).
Use of FLR tools in **ICES WKNEPHSEL** 2007. (ICES WKNEPHSEL 2007)

17. **STECF Work Groups**

Use of FLR and EFIMAS Work in a several EU STECF Work Groups in 2006, 2007 and 2008:
Flatfish management plan evaluation: STECF 2006.
SGBRE-07-03 (June 2007) and follow-up SGBRE-07-05 (December 2007) Northern Hake long-terms management plans

SGMOS-07-07 Evaluation of Harvest Control (September 2007). See the specific details under this working group's wiki page.
Final_Report SGRST-08-02_Harvest_Control_Rules (Helsinki, July 2008). STECF SGRST-08-02. Final HCR Report including the STECF opinion expressed during the plenary meeting in Helsinki.

18. RACs

Examples of work evaluated in the RACs is the work on North Sea flatfish to the North Sea RAC |Poos et al. (2006) and Pastoors et al. (2006).
The North Sea Regional Advisory Council (NS RAC), the ICES Working Group on the North Sea and Skagerrak (ICES WGNSSK), as well as DG MARE's Scientific Technical and Economic Committee on Fisheries (STECF) were provided with advice in relation to development of a management plan for the North Sea plaice stock. Different management options were evaluated with integration of biological and economic based management evaluation tools in R/FLR developed under EFIMAS.
MSE Tools for Long Term Management Evaluation of Northern Hake presented to: RAC SWW: Santigao de Compostela, 23 oct 2008, and to RAC NWW: Bruselas, 31 Oct 2008.
Management strategy evaluations were done for the North Sea haddock fishery including the implications of recruitment, discards, and the sliding-F exploitation rule and reported to the North Sea RAC, 2007.

19. Conferences

EUROCEANS Conference, Galway, Ireland 2004 (Poster and Extended Abstract)
ICES Symposium on Fisheries Management Strategies, Galway, Ireland 2006 (Several Presentations and Scientific Papers and Posters to the conference and several papers published in symposia proceedings in ICES J. Mar. Sci. 2007 vol. 64 (4))
Presentation of FLR in UseR Symposium 2006, 15/17 June, Wienna, Austria
PROFET Policy Conference: Baltic Fisheries Science, Vilnius, Lithuania, April 2007 (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).
Some of the economic studies have been presented at the EAFE Conference (2007) (see ECONOWS Report).
Presentation of FLR together with WP4-CS2 application at MODSIM conference, Christchurch, New Zealand, 10-13 December 2007
Presentation of EFIMAS and FLR at 6FP workshop, DGFish DG-RTD, Brussels, 26 october 2007.
EFIMAS Conference, Bruxelles, Belgium, March 2008. A long row of EFIMAS Presentations. Special arranged Conference by EFIMAS with participation and representation of EU Commission, EU Managers, National Managers, International and national fishing industry and fishermen associations, NGOs (e.g. WWF), experts and scientists (fisheries biologists, economists, and sociologists).
Oceanology 2008 Conference, London, UK, March 2008. General Presentation of EFIMAS.
PROFET Policy Conference, North Sea Fisheries Science, Copenhagen, DK, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).
PROFET Policy Conference, Mediterranean Fisheries Science, Marseille, France, June 2008. (Presentation and Extended Abstract and Technical Leaflet for EFIMAS).

20. Courses

Anonymous 2005-2008. FLR teaching courses. A number of FLR teaching courses have been held throughout the project, and in collaboration with other projects involved in FLR development. Programs and courses outlines are available on

http://wiki.difres.dk/efimas/doku.php?id=efimas1:wp3:3-7:main and on the FLR website. Those specifically or partly related to EFIMAS were :

- 25-26 april 2005, **Salerno**, Italy: 2-days FLR introductory workshop (audience: EFIMAS participants).
- 23-25 November 2005, **IJMuiden**, the Netherlands: 3-days Introductory course on evaluation of management strategies using FLR (audience: EFIMAS case studies participants).
- 17-18 January 2006, **Helsinki**, Finland: 2-days FLR course (audience: Finnish assessment scientists).
- 24-25 January 2006, **Sukarrieta**, Spain: 2-days FLR course (audience: Spanish assessment scientists).
- 01 February 2006, **ICES**, Denmark: 1-day Demonstration of FLR to the ICES AMAWGC (audience: ICES Working Groups Chairs).
- 15 February 2006, **IJMuiden**, the Netherlands: 1-day course on evaluation of management strategies using FLR (audience: Dutch assessment scientists).
- 10-11 November 2006, **Charlottenlund**, Denmark: 2-days FLR course (audience: Danish-German assessment scientists).
- 11-15 December 2006, **Ottawa**, Canada: 5-days FLR Course (audience: Canadian assessment scientists).
- 29 Jan - 02 Feb 2007, **ICES**, Denmark : 5-days WKFLR (audience: ICES assessment scientists).
- 29 Jan - 02 Feb 2007, **Vigo**, Spain: 5-days FLR course (audience: Spanish-Portuguese assessment scientists).
- 28th Jan 2008: Introductory course FLR/MSE for Masters - Agrocampus Rennes, France
- 31 March 2008 - 03 April 2008: Introductory course FLR - JRC Ispra, Italy

21. Workshops

- 21-22 December 2004, **Sevilla**, Spain: 2-days workshop for fisheries economists. The aim of this meeting was to consider 'economic' input into the bioeconomic models being developed for both EFIMAS and COMMIT projects, that is, specifically elements of fleet dynamics, price dynamics and cost dynamics. See the Sevilla ECONOWS Meeting report.
- 25-26 January 2005, **Charlottenlund**, Denmark: 2-days Workshop on development of Operating Models
- 4-5 April 2006, **Nantes**, France: 2-days Workshop on conditioning of Operating Models with FLR.
- 4-5 april 2006, **Nantes**, France: 2-days Workshop on modelling fleet dynamics. Read more on both workshops in the general Meeting minutes, London-Nantes, Feb-April 2006
- 15-17 January 2007, **Copenhagen**, Denmark: 3-days ECONOWS Workshop the report has been compiled from reports of previous meetings ECONOWS report, Copenhagen, Jan 2007 This report provide a comprehensive overview of the different models in use.
- 24-25 april 2007, **Lisbon**, Portugal: 2-days Workshop from WP4 to WP3 on learning from case-studies implementation to generic tools, and vice-versa.
- Apríl 2007, **Lisbon**, Portugal: 2-days ECONOWS Workshop (see reporting under ECONOWS Workshop, Copenhagen January 2008)
- 28-30 January 2008, **Copenhagen**, Denmark: 2-days Final ECONOWS Work Shop Final report ECONOWS_June2008. The major equations concerning a number of economic issues are implemented in relation to the core object of flr and FLECON. The description of the equations can be found in the final report and here ECONOWS_Matrix_Jan2007, and an extensive description of the package content is available on the package page on flr wiki

Furthermore, the development of the core FLR framework and the release cycle for new versions every 6 months (following the release cycle of the R environment)

were insured by regular FLR Team meetings, which were partly supported by EFIMAS WP3. The following meetings took place during the project:

- FLR meeting. Goddards, December 2007
- FLR meeting. Lisbon, April 2007
- FLR Meeting. Goddards, January 2007
- FLR Meeting. Lisbon, July 2006
- FLR Meeting. Amsterdam, March 2006
- FLR Meeting. London, December 2005
- FLR Meeting. Lisbon, July 2005
- FLR Weekend. Mundaka, March 2005

Reports, Project Reports, Working Documents, Conference Proceedings

1. Anonymous, 2004. WP3 subgroup report, EFIMAS/COMMIT: Economist meetings, Sevilla, Spain, December, 2004 + Copenhagen, Denmark Jan 2005 (*Simon Mardle, Amy Burnett, Sean Pascoe*).

2. Anonymous 2005. EFIMAS Interim activity report 12 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: 20 pp.

3. Anonymous 2005. EFIMAS Interim Management Report 18 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: 45 pp.

4. Anonymous 2005. EFIMAS Interim Activity Report 18 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: 40 pp.

5. Anonymous 2005. EFIMAS Interim Technical Report WP4, Deliverable 4.1. Preliminary Technical Reports by Case Study Month 18. Report to the EU Commission Project no. SSP8-CT-2003-502516: 109 pp.

6. Anonymous 2005. WP2 Technical Report, Deliverables 2.1 and 2.2 (version Nov. 2005). Combined Report on the Knowledge Basis for Fisheries Management. Report to the EU Commission Project no. SSP8-CT-2003-502516: 402 pp.

7. Anonymous, 2005. WP3 subgroup report, EFIMAS/COMMIT evaluation framework development: Review of Biological (and to some extent bio-economic) Operating Models: Methods to estimate parameters and account for uncertainty (*Murdoch McAllister (rapporteur), Laurence Kell, Clara Ulrich-Rescan, J. Rasmus Nielsen*), Jan 2005

8. Anonymous, 2005. WP3 subgroup report, EFIMAS/COMMIT: Review of Biological (and to some extent bio-economic) Operating Models, Murdoch McAllister, Jan 2005.

9. Anonymous, 2005. WP3 subgroup report, EFIMAS/COMMIT evaluation framework development: Generic features of the biological operating model (*Coby Needle (rapporteur), Sarah Kraak (rapporteur), John Casey*), Jan. 2005.

10. Anonymous, 2005. WP3 subgroup report, EFIMAS/COMMIT evaluation framework development: How economic components interact with biological components in operating model and structuring this into FLR (*Jan Jaap Poos (rapporteur), Per J. Sparre, Hans Frost, Erik Buismann, Amy Burnett, Liz Clarke, Graham Pilling, Ole Vestergaard*), Jan 2005.

11. Anonymous, 2005. WP3 Updated Delivery Matrix for the WP3 Work (DIFES), November 2004 and April/May 2005. (Available from EFIMAS DocuWiki).

12. Anonymous 2006. Updated WP2 Technical Report, Deliverables 2.1 and 2.2 (version 20th Aug 2006). Review and compilation of published evaluations of management systems (world wide), and review and description of present management and management decision-making processes (EU). Report to the EU Commission Project no. SSP8-CT-2003-502516: 481 pp.

13. Anonymous 2006. Evaluation of technical reports and other by WP3-4 and stakeholders. Additional EFIMAS Technical Report to M5 and Project Working Document. EFIMAS SSP-CT-2003-502516, November 2006, 18 pp.

14. Anonymous 2006. WP2 Follow-up Report to the EU Commission on Deliverables 2.1 and 2.2 in response to external evaluation (24th August 2006). Report to the EU Commission Project no. SSP8-CT-2003-502516: 14 pp.

15. Anonymous, 2006. Executive EFIMAS Project Summary. ICES Working Group for Fisheries Systems. ICES C.M. 2006/ACFM: XX.

16. Anonymous, 2006. WP4. Updated Delivery Matrix by each Case Study, Last and final version by April 2006, (Available from EFIMAS DocuWiki).

17. Anonymous, 2006. WP4. Updated Gantt charts by each Case Study, Last and final version by April 2006, (Available from EFIMAS DocuWiki).

18. Anonymous 2007. EFIMAS Interim Activity Report 36 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: xx pp.

19. Anonymous 2007. EFIMAS Interim Management Report 36 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: 40 pp.

20. Anonymous 2007. Preliminary Software Package with Documentation. EFIMAS Technical Report and Deliverable 3.1, EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007,154 pp.

21. Anonymous 2007. Technical Reports of input / results by Case Study. EFIMAS Technical Report and Deliverable 3.2 and 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 5 pp / 209 pp.

22. Anonymous 2007. Preliminary Technical Reports by Case Study. EFIMAS Technical Report and Deliverable 4.1 (project month 33), EFIMAS SSP-CT-2003-502516, Oct.2006 - Jan.2007, 209 pp.

23. Anonymous, 2007. WP3 ECONOWS Subgroup Report, 2007: Report from Economist Meetings, ECONOWS, Copenhagen, Denmark, January 2007.

24. Anonymous, 2007. WP3 ECONOWS Subgroup Report, 2007: Report from Economist Meetings, ECONOWS, Lisbon, Portugal, April 2007.

25. Anonymous, 2008. EFIMAS ECONOWS Final Report, 2008: Report from Economist Meetings, ECONOWS 2004-2008. EFIMAS Report June 2008. Available at EFIMAS DocuWiki, http://wiki.difres.dk/efimas

26. Anonymous 2008. EFIMAS Activity Report 37-48 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: xx pp.

27. Anonymous 2008. EFIMAS Consolidated Activity Report Months 48 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: xx pp.

28. Anonymous 2008. EFIMAS Management Report 37-48 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: xx pp.

29. Anonymous 2008. EFIMAS Consolidated Management Report 48 Months. Report to the EU Commission Project no. SSP8-CT-2003-502516: xx pp.

30. Anonymous 2008. Final Software Package with Documentation. EFIMAS Technical Report and Deliverable 3.3, EFIMAS SSP-CT-2003-502516. xx pp.

31. Anonymous 2008. Technical Reports of input / results by Case Study. EFIMAS Technical Report and Deliverable 3.4 and 4.2 (project month 48), EFIMAS SSP-CT-2003-502516. 5 pp / 209 pp.

32. Anonymous 2008. Final Technical Reports by Case Study. EFIMAS Technical Report and Deliverable 4.2 (project month 48), EFIMAS SSP-CT-2003-502516. xx pp.

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B. Public and internal project websites and DocuWiki Platform

Public address: http://www.efimas.org.

A public project website was launched by DIFRES in April 2005 to serve as the official window for disseminating project outputs and informing on project status and progress to the public and the stakeholders. The website has been fully updated and finalized in 2008. This has been done by the Project Manger with input from Consortium partners.

EFIMAS Docu-Wiki system established:

An internal password-protected project Docu-Wiki system and website was launched and established by DIFRES in November-December 2006. The site contains a full reporting of the EFIMAS work, products and dissemination by work package and by case study. The EFIMAS DocuWiki will be made public after the approval of the final project reporting. There is link to the EFIMAS DocuWiki from the public EFIMAS web site.

EFIMAS DocuWiki: http://wiki.difres.dk/efimas

Initially, before launching the EFIMAS DocuWiki, a password-protected website for project partners and the EU Commission was launched shortly after the Kick-off meeting in April 2004.

Address: ftp://efimasuser:ab.efi@ftp.dfu.min.dk/efimas/index.htm

C. List of Project Activities and Productions

Table 1: Production / Activity List of the EFIMAS Project by project month 12 (the listed outputs, reports and working documents, e.g. Delivery Matrixes and Gantt charts, are available from the internal EFIMAS project website: ftp://efimasuser:ab.efi@ftp.dfu.min.dk/efimas/index.htm)

Work Package	Activity / Type	Product /Title	Contributor	Status	Date, location
WP1	Meeting / Workshop	Network Project Kick-off Meeting	Full network	Done	17-22 April 2004 Crete, Greece
	Meeting	Steering Group meeting	Steering Group	Done	April 2004 Crete, Greece
	Meeting	STEPFORward Group meeting (Draft templates of Delivery Matrices)	Steering Group and CS Coordinators (STEPFORward Group)	Done	April 2004 Crete, Greece
	Meeting minutes	Network Kick-off meeting, Steering Group, STEPFORward Group meeting minutes	DIFRES	Done	July 2004
	Meeting	Steering Group Meeting	Steering Group	Done	Sept 2004 Vigo, Spain
	Meeting minutes	Steering Group meeting minutes	DIFRES	Done	Oct 2004
	Meeting	STEPFORward Group	STEPFORward Group	Done	2-3 Nov 2004, Ijmuiden, Holland
	Meeting minutes	STEPFORward Group meeting minutes (CS Delivery Matrices revised and Gantt Charts)	DIFRES	Done	November 2004
	Meeting	Steering Group and STEPFORward Group Meeting	Steering Group and STEPFORward Group	Done	28-29 april 2005, Salerno, Italy
	Meeting minutes	12-month Network meeting, meeting minutes	Steering Group and STEPFORward Grp.	Done	Aug 2005
	Meeting minutes	Steering group & STEPFORward group meeting minutes, Salerno	DIFRES, Steering Group	Done	July 2005
	Meeting	Steering group & STEPFORward group meeting minutes, Aberdeen	Steering Group and STEPFORward Group	Done	22 Sept 2005, Aberdeen, Scotland Oct 2005
	Meeting minutes	Steering group & STEPFORward group meeting minutes, Aberdeen	DIFRES, Steering Group	Done	Oct 2005
	Meeting and meeting minutes	Annual EFIMAS Network meeting, 4-7 April 2006, Nantes. Meeting Minutes.	EFIMAS Network	Done	May 2006

	Meeting and meeting minutes	Steering group & STEPFORward group, 6 April 2006, Nantes. Meeting Minutes.	DIFRES, Steering Group and STEPFORward Group	Done	May 2006
	Meeting and meeting minutes	Steering group & STEPFORward group, 19 Sept. 2006, Maastricht. Meeting Minutes.	DIFRES, Steering Group and STEPFORward Group	Done	October 2006
	Meeting and meeting minutes	Annual EFIMAS Network meeting, 23-27 April 2007, Lisbon. Meeting Minutes.	EFIMAS Network	Done	April 2007
	Meeting and meeting minutes	Steering group & STEPFORward group, 26 April 2007, Lisbon. Meeting Minutes.	DIFRES, Steering Group and STEPFORward Group	Done	April 2007
	Meeting and meeting minutes	Steering group & STEPFORward group, 18 Sept. 2007, Helsinki. Meeting Minutes.	DIFRES, Steering Group and STEPFORward Group	Done	September 2007
	Meeting and EFIMAS Conference and Conference Reporting	Final Steering Group and STEPFORward Group Meeting associated with the EFIMAS Conference in Bruxelles March 2008.	DTU Aqua, Steering Group and STEPFORward Group and WP5 Group	Done	March 2008
	Subgroup Reporting with comments on EFIMAS Web site and flr-org wiki web site	Internal Subgroup Commenting Report	International EFIMAS Subgroup	Done	Nov 2006
	Consortium Management	Consortium Agreement (Signed Contracts)	DIFRES, with input from Network	Done	Jan 2005
	WP1 Summary Progress Report	12-month Interim Activity Report	DIFRES	Done	May 2005
	Consortium Management	12-month Interim Activity Report	DIFRES with input from Network	Done	May 2005
	WP1 Summary Progress Report	18-month Interim Activity Report	DIFRES	Done	Nov 2005
	Consortium Management	18-month Interim Activity Report	DIFRES with input from Network	Done	Nov 2005
	Consortium Management	18-month Interim Management Report	DIFRES with input from Network	Done	Nov 2005
	Consortium Management	Contract amendment 1, incl. revised budget submitted to the EU Commission	DIFRES with input from Network	Done	May 2006
	Consortium Management	36-month Interim Activity Report	DIFRES with input from Network	Done	Aug 2007
	Consortium Management	36-month Interim Management Report	DIFRES with input from Network	Done	July 2007
	Consortium Management	Contract amendment 2, incl. revised budget and Technical Annex 1 to EFIMAS Conract.	DIFRES with input from Network	Done	March 2008

	Communication & Outreach	External Forum, Danish Ministry of Food, Agriculture & Fisheries, news article on EFIMAS (*in Danish*)	DIFRES	Done	Nov 2004
	Communication & Outreach	News brief on EFIMAS in fisheries stakeholder journal (*in Danish*)	DIFRES	Done	Dec 2004
	Communication & Outreach	DG FISH Project Information Sheet *http://europa.eu.int/comm/research/fp6/ssp/efimas_en.htm*	DG FISH, DIFRES	Done	Dec 2004?
	Communication & Outreach	Internal Project Web Site launched	DIFRES	Done	July 2004
	Communication & Outreach	Public Project Website launched, www.efimas.org	DIFRES	Done	April 2005
	Communication & Outreach	Popular article: ICES/CIEM Newsletter – 'Virtual Fisheries Management'	DIFRES with input from Steering Group	Done	September 2005
	Communication & Outreach	**Fiches** presenting fisheries and aquaculture research projects in support of the Policies (SSP) of the Sixth Framework Programme (http://europa.eu.int/comm/research/fp6/ssp	DG FISH EU, DIFRES	Done	September 2005
	Communication & Outreach	Flyer: 'Virtual Fisheries Management'	DIFRES	Done	Nov 2005
	Communication & Outreach	EFIMAS Docu-Wiki System and communi-cation platform establis-hed http://wiki.difres.dk/efimas (see details above)	DIFRES	Done	Nov.-Dec 2006
	Communication & Outreach	**Leaflet / Flyer 1: PROFET Conference** EFIMAS-PROFET Technical Leaflet: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01 (2 pp).	DIFRES	Done	April 2007

	Communication & Outreach	**Conference:** PROFET Conference: Baltic Fisheries Workshop, Vilnius, Lithuania; Presentation + Extended Abstract	DIFRES	Done	April 2007
	Communication & Outreach	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5 Group	Done	March 2008
	Communication & Outreach	**Leaflet / Flyer 2: PROFET Conference** EFIMAS-PROFET Technical Leaflet version 2: "EFIMAS – Managing fisheries in a virtual environment in order to provide more reliable scientific advice to stakeholders" Policy-relevant issues in Aquaculture and Fisheries, Ref. No. FF-All-Advice-01 (2 pp).	DTU Aqua	Done	April-June 2008
	Communication & Outreach	**Conference:** PROFET Conference: North Sea Fisheries Workshop, Cph. Denmark; Presentation+Extended Abstract	DTU Aqua	Done	June 2008
	Communication & Outreach	**Conference:** PROFET Conference: Mediterranean Fisheries Workshop, Marseille, France; Presentation + Extended Abstract	IMBC (NCMR)	Done	June 2008
	Communication & Outreach	**Policy Brief / Policy Implementation Plan / Project Implementation Plan**	DTU Aqua, CEFAS, IFM	Done	June-September 2008
	Communication & Outreach	**Conference:** Oceanology 2008 Conference, London, June 2008. EU Stand and Extended Abstract	NCMR & DTU Aqua	Done	June 2008
	Communication & Outreach	EFIMAS Public Website and EFIMAS Docu-Wiki Completed and Final EFIMAS Results, Products, Activities and Reporting included.	DTU AQUA	Done	Mar.-Dec 2008

	Communication & Outreach	**EFIMAS Summary Paper:** Nielsen, J.R., and Limborg, M. 2009. Managing fleets and fisheries rather than single stocks. WORLD FISHING, February 2009. (In Press).	DTU Aqua	Done	September 2008 (- February 2009)
WP2	Meeting / Workshop	Initial planning meeting	All WP2 partners	Done	17-22 April 2004, Crete, Greece
	Meeting / Workshop	Coordination meeting	All WP2 partners	Done	Sept 2004, Vigo, Spain
	Meeting minutes	Book composition plan	AZTI, IFM, RIVO; DIFRES, CEMARE	Done	April + Sept 2004, Vigo, Spain
	Review, working strategy	Guidelines for WP2 review on how knowledge is used in fisheries management.	IFM	Done	Sept 2004
	Review, book production	Book publisher identified and contacted	AZTI	Done	Autumn 2004
	Meeting / Workshop	Chapter presentations, progress, and review	All WP2 partners	Draft	25-26 April, 2005 Salerno, Italy
	Meeting minutes	Updated list of book content / workplan	AZTI with contributions from all WP2 partners	Done	25-26 April, 2005 Salerno, Italy
	Review, book production	Questionnaire for production of book by Elsevier prepared and submitted	AZTI + WP2 Partners	Done by Elsevier	April-May-June 2005
	Draft chapters delivered	Book title: "The knowledge base for fisheries management"	WP2 Partners	Done	April-Oct 2005
	Internal review	Internal review of different book chapters	WP2 Partners	Done	April-Nov 2005
	WP2 Summary Progress Report	12-month Interim Activity Report	AZTI	Done	May 2005
	Acceptance of Book for Publication	Letter from Elsevier Publishers	Elsevier, WP2 Partners	Done	September 2005
	WP2 Summary Progress Report	18-month Interim Activity Report	AZTI, DIFRES, WP2 Partners	Done	Nov 2005
	Final draft of chapters for external review of book ready for copy-editing	Book title: "The knowledge base for fisheries management"	All WP2 partners	Done	Nov 2005
	WP 2 Report / Deliverable	WP 2 Report: 2.1: Review and compila-tion of published evalu-ations of management systems (combined report with 2.2)	WP2 partners	Done	Nov 2005 (Updated August 2006)
	WP 2 Report / Deliverable	WP 2 Report 2.2: Review and description of present management and management decision making process (combined report with 2.1).	WP2 partners	Done	Nov 2005 (Updated August 2006)

	Letter to EU Commission	Letter to EU Commission on publishing issues and acknowledgement of the EU Commission in the published book	EU Commission, AZTI	Done	Nov 2005
	WP Deliverable	Technical Annex Table and extra book chapters	WP2 Partners	Done	Ultimo 2005 – Jan 2006
	WP Milestones	M1: Results from WP2 to be used in WP3, WP4 and WP5 M2: Categorization of Fisheries Management Systems	WP2 Partners	Done	2005-2006
	Meeting	WP2 Meeting, Nantes April 2006. Meeting Minutes.	WP2 Partners and SG- and STEPFOR-ward Group	Done	May 2006.
	WP Deliverable and Milestones	Technical Annex Report to WP2 (final version) included in Deliverables 2.1 and 2.2: Overview of models, data, and software used in contrasting Fisheries Management Systems	WP2 Partners	Done	August 2006
	Letter to EU Commission	Response to external review of WP2 Book	AZTI, IFM, DIFRES	Done	August 2006
	WP Deliverable and Milestones	EFIMAS WP2 Book published by ELSEVIER	WP2 Partners	Done	August 2006
	Communication & Outreach	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5 Group	Done	March 2008
WP3	Meeting / Workshop: Evaluation Framework development	Conceptual Box Flow Diagram of Evaluation Framework developed + Template Delivery Matrix and Gantt Charts per case study	All WP3 partners	Done	17-22 April 2004, Crete, Greece
	Evaluation Framework development	Final Conceptual Box Flow Diagram of Evaluation Framework developed + Final Structure of CS Delivery Matrices & Gantt charts developed	DIFRES, RIVO, CEFAS	Done	Oct/Nov 2004
	Evaluation Framework development	List of Requirements of Case Studies, updated	DIFRES	Done	Copenhagen, Oct 2004
	Meeting/workshop: Evaluation Framework development,	WP3 meeting discussion on evaluation framework development	All WP3 partners	Done	2-3 Nov 2004, IJmuiden, Holland

	Evaluation Framework development	WP3 Delivery Matrix & Gantt chart produced	DIFRES (with contributions from all WP3 partners)	Done	Copenhagen, Nov 2004,
	Meeting / Workshop: Economist sub-group	WP3 subgroup: Economical Operating Models	All partners	Done	Sevilla, Spain, December, 2004
	Meeting / Workshop	Evaluation framework development	All WP3 partners	Done	25-26 Jan 2005, Copenhagen, DK
	Meeting / Workshop: Sub-group Report under Operating Models	FLR Core overview (Presentation)	CEFAS	Done	25-26 Jan 2005, Copenhagen, DK
	Sub-group Report under Operating Models	Biological Operating Model Review (and presentation)	IC with contributions from various WP3 partners	Done	25-26 Jan 2005, Copenhagen, DK
	Sub-group Report under Operating Models	Review of biological OM: Methods to estimate parameters and account for uncertainty	IC, DIFRES, CEFAS	Done	25-26 Jan 2005, Copenhagen, DK
	Sub-group Report under Operating Models	Generic features of biological OM (definitions)	All WP3 partners	Draft	25-26 Jan 2005, Copenhagen, DK
	Sub-group Report under Operating Models	Economic-biological OM components interaction	All WP3 partners	Draft	25-26 Jan 2005, Copenhagen, DK
	Evaluation Framework development	Delivery Matrix and Gantt Chart updated	All WP3 partners	Done	25-26 Jan 2005, Copenhagen, DK
	Meeting minutes	Evaluation framework development	DIFRES, CEFAS	Done	Feb 2005
	Sub-group Report under Operating Models	Subgroup report: Economical Operating Models	CEMARE	Done	March 2005
	Meetings / Workshops: FLR CORE-Group Meeting	FLR Meeting	FLR-CORE-Group	Done	March 2005. London
	Meeting / Workshop, FLR Development	2-day FLR training workshop	All WP3 partners	Done	25-26 April 2005, Salerno, Italy
	Meeting / Workshop, Website, Training Notes and Tutorials FLR Development	FLR training notes and tutorials (available on website: http://flr-project.org)	FLR Evaluation Framework Development Group	Done	April 2005 (runningly up-dated)
	WP3 Summary Progress report	12-month Interim Activity report	CEFAS, DIFRES	Done	May 2005
	FLR CORE-Group Meeting	FLR Meeting	FLR-CORE-Group	Done	July 2005, Lisbon
	2 Reports under Operating Models	2 Working Documents,	FOI	Done	Sept 2005

	Meeting / Workshop, Meeting Minutes	Progress reporting and planning of: a) Finalization of reviews of OM's; b) Workshop on OM development and implementation in CSs, individual parameters of OM's, etc.; c) Development of CS specific OM's; d) Report of measures of performance; e) CS and FLR course to assist CS representatives	Steering Group and STEPFORward Group	Done	Sept 2005, Aberdeen, Scotland
	WP3 Summary Progress report	18-month Interim Activity report	DIFRES, CEFAS	Done	Nov 2005
	Meeting / Workshop: 3-days Introductory course on evaluation of management strategies using FLR	Course	EFIMAS Case Study participants	Done	Nov 2005, Ijmuiden
	FLR CORE-Group Meeting	FLR Meeting	FLR-CORE-Group	Done	Dec 2005, London
	Meeting / Workshop: 2-days FLR course	Course	EFIMAS FLR Developers and Finnish Assessment Scientists	Done	Jan 2006, Helsinki
	Meeting / Workshop: 2-days FLR course	Course	EFIMAS FLR Developers and Spannish Assessment Scientists	Done	Jan 2006, Sukkarieta, Spain
	Meeting / Workshop: 1-day Demonstration of FLR to the ICES AMAWGC	Course	EFIMAS FLR Developers and ICES AMAWG (ICES Working Group Chairs)	Done	Feb 2006, ICES Denmark
	Meeting / Workshop: 1-day course on evaluation of management strategies using FLR	Course	EFIMAS FLR Developers and Dutch Assessment Scientists	Done	Feb 2006
	FLR CORE-Group Meeting	FLR Meeting	FLR-CORE-Group	Done	March 2006, Amsterdam
	WP3 Meeting / Workshop, London 27 Feb – 2 Mar 2006	Management Evaluation Framework Development. Meeting and Workshop Minutes and Presentations	WP3 Partners	Done	May 2006
	WP3-WP4 Workshop on behavioural models: Evaluation of fisherman's response in application of management alternatives., Nantes April 2006.	Workshop Summary and Presentations	WP3-WP4 Partners	Done	May 2006

	WP3-WP4 Workshop on on full feedback simulation modeling in case studies and conditioning of operating models, including application of parameters / functions to models, Nantes April 2006.	Workshop Summary and Presentations	WP3-WP4 Partners	Done	May 2006
	WP3-WP4: ICES Symposium on Fisheries Manage-ment Strategies, Galway, June 2006	Presentations and Abstracts as well as production of scientific papers in relation to this.	WP3-WP4 Partners	Done	June 2006
	FLR CORE-Group Meeting	FLR Meeting	FLR-CORE-Group	Done	July 2006, Lisbon
	Meeting / Workshop: 2-days FLR course	Course	FLR Developers and Danish and German Assessment Scientists	Done	Nov 2006, Copenhagen
	Subgroup Reporting with comments on EFIMAS Web site and flr-org wiki web site	Internal Subgroup Commenting Report	International EFIMAS Subgroup	Done	Nov 2006
	Meeting / Workshop: 5-days FLR Course	Course	FLR Developers and Canadian Assessment Scientists	Done	Dec 2006, Ottawa, Canada
	WP3-WP4 Prelimenary Manage-ment Evaluation Software Package with documentation available	Milestone M3	WP3-WP4 Partners	Done	Dec 2006
	Meeting / Workshop, FL-CORE-Group Meeting, UK, January 2007	Summary flr-web site	FL-CORE Group	Done	Jan 2007, Goddards
	Meetings / Workshops. EFIMAS Economist Workshop, Copen-hagen, 15-17 January 2007	EFIMAS Fisheries Economics Summary Report	WP3 – WP4 Partners	Done	Jan – Feb 2007, Copenhagen, Denmark
	Meetings / Workshops : 5-days WKFLR	Course	FLR Developers and ICES Assessment Scientists	Done	Jan – Feb 2007, ICES Copenhagen
	Meetings / Workshops: 5-days FLR course	Course	FLR Developers and Spanish and Portugese Assessment Scientists	Done	Jan – Feb 2007, Vigo Spain
	WP3 Technical Report of Generic Management Evalu-ation Framework	Deliverable 3.1	WP3 – WP4 Partners	Done	Jan – Feb 2007

	WP3 Technical Report on implementation of framework by case studies	Deliverable 3.2	WP3 – WP4 Partners	Done	Jan – Feb 2007
	Meetings / Workshops: WP3/WP4 Workshop on feed-back learning between case studies implementations and generic framework	Workshop	WP3-WP4 Partners	Done	(March-) April 2007. Lisbon, Portugal
	Meetings / Workshops: ECONOWS Workshop	Workshop	WP3-WP4 Partners	Done	(March-) April 2007. Lisbon, Portugal
	Meetngs / Workshops: Subgroup meetings of economists within WP3 and WP4	Subgroup Meetings	WP3 – WP4 Partners	Done	(March-) April 2007. Lisbon Portugal
	Meetings / Workshops: FLCORE Group Meeting	Meeting	FLCORE Group	Done	(March-) April 2007, Lisbon, Portugal
	Meetings / Workshops: FL-CORE-Group Meeting	Meeting and release of FLR 2.0	FLCORE Group	Done	December 2007 Goddards, UK
	Course	Introductory course FLR/MSE for Masters	FLCORE Group	Done	28th Jan 2008: Agrocampus Rennes, France
	Course	Introductory course FLR - JRC	FLCORE Group	Done	31 March 2008 - 03 April 2008: Ispra, I.
	Workshop	2-days Final ECONOWS Work Shop. The major equations concerning a number of economic issues are implemented in relation to the core object of flr and FLECON.	ECONOWS Group	Done	28-30 January 2008, Copenhagen, Denmark
	Report	ECONOWS Final Report.	ECONOWS Group	Done	Final report ECONOWS_June 2008. ECONOWS_Matrix_Jan2007, and an extensive description of the package content is available on the package page on flr wiki

	Report and Deliverable and Milestone	Report of Final Software Package with Documentation (also on the EFIMAS DocuWiki). Deliverable 3.3 and Milestone M3 by month 48	WP3 (and WP4) Group	Done	March-September 2008
	Report and Deliverable and Milestone	Technical Reports of input / results by Case Study (also on the EFIMAS DocuWiki). Deliverable 3.4 and 4.2 by month 48	WP3 (and WP4) Group	Done	March-September 2008
	Report	Technical Evaluation Summary Report with attachments (WP5 and WP3)	WP5 and WP3 Group	Done	March-September 2008
	Communication & Outreach	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5 Group	Done	March 2008
WP4	Meeting / Workshop	Template Delivery Matrix and Gantt Charts per case study developed + Conceptual Box Flow diagram of Evaluation Framework	All WP4 partners	Done	April 2004, Crete, Greece
	Meetings / Workshops	Draft Delivery Matrix by CS developed	All WP4 partners	Done	April 2004, Crete, Greece
	Meetings / Workshops	Gantt Charts by CS developed	All WP4 partners	Done	April 2004, Crete, Greece
	Meeting / Workshop	STEPFORward and CS meetings (all CS's), updated Delivery Matrix / Gantt Chart by CS (final templates agreed upon)	All WP4 partners including CS Coordinators	Done	2-3 Nov 2004, Ijmuiden, Holland
	Meeting / Workshop	CS1: List of features for modelling developed & distributed	All CS1 partners	Done	Jan 2005
	Meeting / Workshop	CS2: Delivery Matrix / Gantt charts updated	All CS2 partners	Done	26 Jan. 2005, Copenhagen, DK
	Meeting / Workshop	CS4 Meeting: First plan for re-organising the CS4 work	CS4 partners	Done	Jan 2005, ICES Secretariat, Copenhagen, DK
	Meeting / Workshop	CS3: Delivery Matrix & Gantt chart updated	All CS3 partners	Done	Feb 2005, Helsinki, Finland
	Meeting / Workshop	CS7 + CS8: Delivery Matrix & Gantt chart updated	All CS7 + CS8 partners	Done	16-17 Feb 2005, Barcelona, Spain
	Meetings / Workshops	Delivery Matrix by CS updated (all CS's); Final versions	All WP4 partners	Draft	27-29 April 2005, Salerno, Italy

	Meetings / Workshops	Gantt Chart by CS updated (all CS's); Final versions	All WP4 partners	Draft	27-29 April 2005, Salerno, Italy
	Meetings / Workshops	Short summary by CS (all CS's)	CS Coordinators	Done	27-29 April 2005, Salerno, Italy
	WP4 Combined Work Package and Case Study Summary Progress Reports (all Case Studies)	12-month Interim Activity report	RIVO, CEMARE, DIFRES and all CS Coordinators	Done	May 2005
	Meetings / Workshops	STEPFORward Group agreement on coordination and revised work program focus areas for CS4 (Nephrops)	STEPFORward Group incl. Steering Group	Done	Sept 2005, Aberdeen, Scotland
	Meetings / Workshops	CS9: Progress and agreements on near future analyses and OM's to be used in the case study work	CS9 Coordinator and CS9 modelling representatives	Done	Sept 2005, Aberdeen, Scotland
	CS6 Meeting for interaction between Hake CS partners and FLR developers	Minutes of the CS6 meeting	All Hake CS6 partners	Done	October 2005, Spain
	WP4 Technical Report: WP4 Combined Work Package and Case Study Summary Progress Reports	Technical Report by Case Studies, Deliverable 4.1	All WP4 and all CS partners	Done	October 2005
	WP4 Summary Progress Report	18-month Interim Activity Report	RIVO, CEMARE, DIFRES and all CS Coordinators	Done	Nov 2005
	WP4 Technical Report by Case Study	18-month Interim Activity report	RIVO, CEMARE, DIFRES and all CS Coordinators	Done	Nov 2005
	WP4 CS1 and CS2 Meetings, London, 27 Feb – 2 Mar 2006	Meeting Minutes	CS1 and CS2 Partners	Done	May 2006
	Meetings / Workshops: CS4 Meeting, London, 2 Mar 2006	Meeting Minutes Addendum to EFIMAS Contract Workplan	CS4 Partners	Done	May 2006
	Meetings / Workshops, STEPFORward Group Meeting, Nantes April 2006	Meeting Minutes	STEPFORward Group incl. Steering Group	Done	May 2006
	WP4-WP3 Workshop on behavioural models: Evaluation of fisherman's response in application of management alternatives, Nantes April 2006.	Workshop Summary and Presentations	WP3-WP4 Partners	Done	May 2006

	WP4-WP3 Workshop on on full feedback simulation modeling in case studies and conditioning of operating models, including application of parameters / functions to models, Nantes April 2006.	Workshop Summary and Presentations	WP3-WP4 Partners	Done	May 2006
	Meetings / Workshops: WP4 CS1 – CS9 Meetings (all Case Studies), Nantes, April 2006	Meeting Minutes	WP4 Partners	Done	May 2006
	CS6 Meeting for interaction between Hake CS partners and FLR developers	Minutes of the CS6 meeting	All Hake CS6 partners	Done	April 2006, Nantes
	WP4-WP3: ICES Symposium on Fisheries Management Strategies, Galway, June 2006	Presentations and Abstracts as well as production of scientific papers in relation to this.	WP3-WP4 Partners	Done	June 2006
	Meetings / Workshops: CS 3 Meeting, Helsinki, June 2006	Meeting Minutes	CS3 Partners	Done	June 2006
	Meetings / Workshops, STEPFORward Group Meeting, Maastricht, Sep 2006	Meeting Minutes	STEPFORward Group incl. Steering Group	Done	October 2006
	Reports WP Progress Reports on EFIMAS wiki	WP Progress Reports on EFIMAS wiki	WP4 Partners	Done	Oct 2006 – Feb 2007
	Meetings / Workshops: CS7 and CS8 Meetings, Athens, October 2006	Meeting Minutes	CS7 and CS8 Partners	Done	October 2006, Athens, Greece
	Meetings / Workshops: CS6 Meetings, Bilbao, Oct., 2006	Meeting Minutes	CS6 Partners	Done	October 2006, Bilbao, Spain
	Meetings / Work-shops: CS2 Meeting, Copenhagen 18 January 2007	Progress reports on EFIMAS wiki	CS2 Partners	Done	Jan 2007
	Meetings / Workshops, CS9 Meeting, Copenhagen 19 January 2007	Progress reports on EFIMAS wiki	CS9 Partners	Done	Jan 2007

	WP4 Technical Report by case studies, month 33	Deliverable 4.2	WP4 partners	Done	Jan - Feb 2007
	Meetings / Workshops: WP3/WP4 Workshop on feed-back learning between case studies implementations and generic framework	Workshop	WP3-WP4 Partners	Done	(March-) April 2007. Lisbon, Portugal
	Meetings / Workshops: ECONOWS Workshop	Workshop	WP3-WP4 Partners	Done	(March-) April 2007. Lisbon, Portugal
	Meetngs / Workshops: Subgroup meetings of economists within WP3 and WP4	Subgroup Meetings	WP3 – WP4 Partners	Done	(March-) April 2007. Lisbon Portugal
	Meetings / Workshops: FLCORE Group Meeting	Meeting	FLCORE Group	Done	(March-) April 2007, Lisbon, Portugal
	Meetings / Workshops: FL-CORE-Group Meeting	Meeting and release of FLR 2.0	FLCORE Group	Done	December 2007 Goddards, UK
	Course	Introductory course FLR/MSE for Masters	FLCORE Group	Done	28th Jan 2008: Agrocampus Rennes, France
	Course	Introductory course FLR - JRC	FLCORE Group	Done	31 March 2008 - 03 April 2008: Ispra, Italy.
	Workshop	2-days Final ECONOWS Work Shop. The major equations concerning a number of economic issues are implemented in relation to the core object of flr and FLECON.	ECONOWS Group	Done	28-30 January 2008, Copenhagen, Denmark
	Report	ECONOWS Final Report.	ECONOWS Group	Done	Final report ECONOWS_June 2008. ECONOWS_Matrix_Jan2007, and an extensive description of the package content is available on the package page on flr wiki

	Report and Deliverable	Final Technical Reports by Case Study. (also on the EFIMAS DocuWiki). Deliverable 4.2 and 3.4 by month 48	WP4 (and WP3) Group	Done	March-September 2008
	Report	Technical Evaluation Summary Report with attachments (WP5 and WP3 and WP4)	WP5 and WP3 and WP4 Group	Done	March-September 2008
	Communication & Outreach	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5 Group	Done	March 2008
WP5	WP5 Summary Progress Report	12-month interim activity report	IFM	Done	May 2005
	Meeting / Workshop	Stakeholder input from RAC-meeting	IFM	Done	Sept 2005
	WP Summary note on stakeholder discussion topics	18-month Steering Group meeting	IFM	Done	Sept 2005
	WP5 Summary Progress Report	18-month interim activity report	IFM, DIFRES	Done	Nov 2005
	Meetings / Workshops: WP5 Meetings and Workshop, Nantes April 2006	1. Meeting and Workshop Minutes 2 The steering committee in Nantes decided that we would do four workshops in the cases where the WP 5 interviews are being carried out 3. The steering committee, project and WP coordination devised a budget reallocation to facilitate stakeholder interviews in Ireland and Greece 4. WP 5 meeting created topic guidelines for the individual and focus group interviews and identified appropriate stakeholder groups to target	WP5 Partners and Steering Group	Done	May 2006

	Milestone and Additional Technical Report WP5: Evaluation of technical reports and other by WP3-4 and Stakeholders	Milestone M5 and Additional Technical Report	WP5 and WP3-4 Partners and Stakeholders	Done	September 2006
	Interviews / Report: UK Focus Group interviews	Report on UK Focus Groups, fisheries stakeholders in northeast England	UNEW, IFM	Done	Aug – Dec 2006, York
	Interviews / Report: UK individual interviews	Report in process	IFM	Done	Feb 2007, Edinburgh, London
	Interviews / Report: Spanish Focus Group and individual interviews	Report in Process (Interviews complete, report in process)	IFM, AZTI	Done	Nov 2006 - Jan 2007
	Interviews / Report: Ireland Focus Group interviews	Interviews and Report complete	IFM, MI	Done	December 2006
	Interviews / Report: Greece Focus Group and individual Interviews	Report in Process (Interviews complete, report in process)	IFM, IMBC	Done	November 2006
	Interviews / Report: Iceland manager interviews	Report in Process (Interviews complete, report in process)	IFM	Done	January 2007
	Interviews / Report: Denmark Focus Group interviews	Report in Process (Interviews complete, report in process)	IFM, DIFRES	Done	(March-) April / May 2007
	Meetings / Workshop: WP5 Workshop on Focus Groups and Stakeholder Consultations	Minutes and Month 36 Activity Reporting	WP5 Participants	Done	(March-) April 2007
	Working Document: Summary note on Prospectus on EFIMAS Stakeholder Workshops and Conference	Summary note and Prospectus	WP5 Coordinator, Project Coordinator and WP5 Participants	Done	March-August 2007
	Communication & Outreach and Report and Milestone	**Conference:** EFIMAS Conference: Bruxelles, March 11-12 2008. Conference Report and Program, Conference Abstract and Invitation. Milestone M6.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5 Group	Done	March 2008
	Communication & Outreach and Report and Milestone	Fisheries Management Evaluation Frameworks in Action. EFIMAS Conference Report. EFIMAS Work Package 5 Report. Milestone M6.	EFIMAS Steering and STEPFORward Groups, EFIMAS WP5, WP3 and WP4 Groups	Done	March-September 2005

	Communication & Outreach and Report and Milestone	Effectiveness of Evaluation Tools. EFIMAS Work Package 5 Report. Milestone M6.	EFIMAS WP5 Group	Done	March-September 2008
	Communication & Outreach and Report	Technical Evaluation Summary Report. EFIMAS including sub-reports	EFIMAS WP5 and WP3 and WP4 Group	Done	March-September 2008
	Communication & Outreach and Report and Milestone	Stakeholder perspectives on fisheries science and modelling. Focus group discussions in Spain, Greece, UK, Denmark and Ireland. Milestone M6.	EFIMAS WP5 Group lead by IFM	Done	March-September 2008
	Communication & Outreach and Report and Milestone	Summary of focus group report, EFIMAS WP5. Stakeholder perspectives on fisheries science and modelling. Milestone M6	EFIMAS WP5 Group lead by IFM	Done	March-September 2008
	Communication & Outreach	Policy Brief / Policy Implementation Plan / Project Implementation Plan	DTU Aqua, CEFAS, IFM	Done	June-September 2008

Annex: 2

Annex 2, Table 1: Deliverables List **(completed in reporting period 3)**

Del. no.	Deliverable name	Workpackage no.	Date due (month)	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
1.1	Coordination and managements meetings	WP1	1, 6, 12, 18, 24, 30, 36, 42, 48	April 04 Sept 04 April 05 Sept 2005 April 2006 Sept 2006 April 2007 Sept 2007 Jan 2008 Mar 2008	1	3	DTU AQUA (1)
1.3	Midterm report + midterm review + reported costs	WP1	18, 36	Nov. 2005 Sep 2007 Mar-Sept 2008	1	2.5	DTU AQUA (1)
1.5	Project Web Sites + DocuWiki	WP1	6	a) Internal website, July 2004 b) Public website, April 2005 c) EFIMAS DocuWiki, Nov. 2006	0.7	2	DTU AQUA (1)
1.6	Leaflet / flyer	WP1	18, 36, 48	a) First Leaflet, Oct 2005 b) Second Technical Leaflet, April 2007 Third Technical Leaflet, April 2008	0.5	2	DTU AQUA (1)
1.7	Policy Brief / Policy Implementation Plan / Project Implementation Plan	WP1	48	Policy Brief / Policy Implement. Plan / Project Implement. Plan, Mar-Sept 2008	0.5	2	DTU AQUA (1)

2.1	Report from WP 2.1: Review and compilation of published evaluations of management systems (combined report with del. no. 2.2).	WP2	18	Nov 2005 (Final version Aug 2006)	0	0	AZTI (17)
2.2	Report from WP 2.2: Review and description of present management and management decision making process (combined report with del. no. 2.1).	WP2	18	Nov 2005 (Final version Aug 2006)	0	0	AZTI (17)
3.3	Final Software Package with Documentation (report)	WP3	48	Mar-Sept 2008	30	35	CEFAS (2) DTU AQUA (1)
3.4	Final Technical Reports on input/results by Case Study	WP3	48	Mar-Sept 2008	31.5	40.4	DTU AQUA (1) CEFAS (2)
4.2	Final Technical Reports by Case Study	WP4	48	Mar-Sept 2008	127.9	171.4	DTU AQUA (1) IMARES (3)
5.1	Reports from Evaluations of 4 Regional Workships	WP5	48	(Partly by April 2007); Applied to be by end of project in Addendum 2 to the EFIMAS Contract	22.1	22.9	AAU (IFM) (18)
5.2	Technical evaluation reports	WP5	48	Technical evaluation reports, Mar-Sept 2008	20	20	AAU (IFM) (18)
5.3	Evaluation process manual	WP5	48	Evaluation process manual (in form of the Policy Brief)	10	10	AAU (IFM) (18)

***) if available**

Annex 2, Table 1: Deliverables List **(completed in reporting period 2)**

Del. no.	Deliverable name	Workpackage no.	Date due (month)	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
1.1	Coordination and managements meetings	WP1	1, 6, 12, 18, 24, 30, 36, 42, 48	April 04 Sept 04 April 05 Sept 2005 April 2006 Sept 2006 April 2007 Sept 2007	2	2	DIFRES (1)
1.3	Midterm report + midterm review + reported costs	WP1	18, 36	Nov. 2005 Sep 2007	2	2.1	DIFRES (1)
1.5	Project Web Sites + DocuWiki	WP1	6	a) Internal website, July 2004 b) Public website, April 2005 c) EFIMAS DocuWiki, Nov. 2006	1	1	DIFRES (1)
1.6	Leaflet / flyer	WP1	18, 36, 48	a) First Leaflet, Oct 2005 b) Second Technical Leaflet, April 2007	0.5	0.5	DIFRES (1)
2.1	Report from WP 2.1: Review and compilation of published evaluations of management systems (combined report with del. no. 2.2).	WP2	18	Nov 2005 (Final version Aug 2006)	0	6.1	AZTI (17)
2.2	Report from WP 2.2: Review and description of present management and management decision making process (combined report with del. no. 2.1).	WP2	18	Nov 2005 (Final version Aug 2006)	0	7	AZTI (17)

3.1	Preliminary Software Package with Documentation (report)	WP3	30 (33)	Feb 2007 (Milestone in relation to this delivered Oct 2006 over FLR and EFIMAS DocuWiki's)	70	52.6	CEFAS (2) DIFRES (1)
3.2	Technical Reports on input/results by Case Study	WP3	30 (33)	Feb 2007	51.1	50.0	DIFRES (1) CEFAS (2)
4.1	Preliminary Technical Reports by Case Study	WP4	18, 33	Nov 2005 Feb 2007	206.6	216.3	DIFRES (1) IMARES (3)
5.1	Reports from Evaluations of 4 Regional Workships	WP5	36	(Partly by April 2007); Applied to be by end of project in Addendum 2 to the EFIMAS Contract	26.1	26.8	IFM (18)

***) if available**

Annex 2, Table 1: Deliverables List **(completed in reporting period 1)**

Del. no.	Deliverable name	Workpackage no.	Date due (month)	Actual/Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
1.1	Coordination and managements meetings	WP1	1, 6, 12, 18	April 04 Sept 04 April 05 Sept 2005	-	-	DIFRES (1)
1.2	Short Implementation report	WP1	12	1 June 2005	-	-	DIFRES (1)
1.3	Midterm report + midterm review + reported costs	WP1	18, 36	Nov. 2005	1	1	DIFRES (1)
1.5	Project Web Site	WP1	6	a) Internal website, July 2004 b) Public website, April 2005	0.5	0.5	DIFRES (1)
1.6	Leaflet / flyer	WP1	18, 36, 48	Oct 2005	0.5	0.5	DIFRES (1)
2.1	Report from WP 2.1: Review and compilation of published evaluations of management systems (combined report with del. no. 2.2).	WP2	18	Nov 2005	16.3	24	AZTI (17)
2.2	Report from WP 2.2: Review and description of present management and management decision making process (combined report with del. no. 2.1).	WP2	18	Nov 2005	15	20	AZTI (17)
4.1	Preliminary technical reports by case study.	WP4	18	Nov 2005	139.1	114.9	CEMARE(19) + RIVO (3)

***) if available**

Annex 2, Table 2: Milestones List **(NB. No Milestones due in reporting period 3 and full project period by month 48)**

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
M1	Results from WP2 to be used in WP3, WP4 and WP5	WP2	18	Nov 2005 (Final vers. August 2006)	AZTI (17)
M2	Categorization of Fisheries Management Systems	WP2	18	Nov 2005 (Final vers. August 2006)	AZTI (17)
M3	Preliminary and Final Software Package with Documentation	WP3	30 (33), 48	Oct 2006, Mar-Sept 2008	CEFAS (2) DTU AQUA (1)
M4	Preliminary and Final Technical Reports on Input/Results by Case Study	WP3 (& WP4)	30 (33), 48	Feb 2007, Mar-Sept 2008	DTU AQUA (1) CEFAS (2) IMARES (3)
M5	Evaluation of Technical Reports	WP4 (& WP3 & WP5)	24, 36, 48	April 2006, Feb 2007, Mar-Sept 2008	DTU AQUA (1), IMARES (3), AAU (IFM) (18)
M6	Stakeholder Evaluation from 4 regional workshops (EFIMAS Conference, Bruxelles, Mar 2008)	WP5 (& WP4 & WP3)	36, 48	April 2007, Mar-Sept 2008	IFM (18)