



**Development, Evaluation & Implementation of a
Standardised Fish-based Assessment Method for the
Ecological Status of European Rivers (FAME)- A Contribution to the
Water Framework Directive (WFD)**

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**Transfer into water management
(WP11/D18 Applied Partners)**

FINAL REPORT

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A project under the 5th Framework Programme Energy, Environment and Sustainable Management. Key Action 1: Sustainable Management and Quality of Water

Contract n°: EVK1 -CT-2001-00094

December 2004

The FAME group



SUMMARY

The main objective of FAME was to develop, evaluate and implement a new fish-based assessment method for the ecological status of European rivers. The new method should be cost efficient, transferable to different river basins and regional conditions and it should be easily handled by the end-users. This was in direct support of the WFD to encourage and facilitate a coherent monitoring of the ecological status in all Member Countries. To secure an effective transfer from the academic arena into the water management sector, an “Applied Partner” (AP) representing authorities involved in the implementation of the WFD worked with their country’s “Scientific Partner” (SP) throughout the project. In total 12 APs, representing 12 countries contributed to FAME. The AP group appeared to be a very diverse group with different local, regional or national tasks and responsibilities. They represented environmental, water management or fisheries agencies and institutions. The tasks of AP were two fold. On the National level they supported the relevant scientific partner in completing the work for WPs 1-3 and especially for WP 4 and WP9. On the consortium level, work focused on the integration of the requirements of the applied partners, dissemination activities and testing the new method, the PC software and the manual.

A positive effect of the FAME project is that the contact between AP and SP on the national level was, in some cases, established for the first time or, in more or less all instances, became closer during the project. Most of the time contact was very good but SPs had their own time schedule during the project. SP was more project bound in time and issues while AP were more WFD oriented. The strict time schedule of the FAME project forced the work to continue. In many cases the AP experienced this as a lack of feedback on information provided with very little time to respond to and adjust newly developed procedures and methods. The national and regional applicability and consequences of decision were not all taken into account. Little or no attention was paid to sampling aspects like temporal and spatial variability. Cost efficiency, one of the pre-requests of FAME from the APs point of view, was not taken into account either during the evaluation of the sampling procedure nor during the selection and evaluation of metrics. After the field testing there was no optimisation nor were changes made to the statistically chosen metrics, the sampling procedures, sampling effort or the collection of environmental data.

Although at the start of the project most APs were sceptical about the outcome, in April 2004 APs became more optimistic that FAME would provide an appropriate method. There are, however, still some concerns regarding the acceptability of the EFI method. The software worked, but some APs did not agree with the final status classification of certain sites. It was therefore recommended that the initial use of the software be to restricted group prospective users. From the AP point of view the following recommendations can be given for the follow up to FAME:

- Because too little time was available to adjust and test the new developed method Brussels should be asked to permit/arrange this by way of follow up (FAME2)
- All countries should test EFI in 2006, during the first WFD monitoring exercise and report on this to Brussels for FAME2
- Maintenance of FIDES, to include missing info and new information on a national level
- Develop guidance on how to help/inform new EU countries or non-FAME countries
- Help desk facility is needed for EFI and FIDES and training is needed for field teams and authorities
- Development of type specific rehabilitation measurement packages are required
- APs should put pressure on the EU through their governments to achieve these objectives.

CONTENTS

SUMMARY	1
1. Introduction	3
1.1. Objectives.....	3
1.2. The Applied Partner (AP) group and its issues.....	3
1.2.1. Diversity Roles and responsibilities.....	3
1.2.2. Expectations.....	4
1.3. Time schedules and working process.....	5
1.3.1. Maastricht, Netherlands January 2002.....	6
1.3.2. Nässlingen Sweden May 2002.....	7
1.3.3. Stuttgart, Germany January 2003.....	8
1.3.4. Rhodes, Greece June 2003.....	10
1.3.5. Wierzba, Poland April 2004.....	10
1.3.6. St. Georgen am Langsee, Austria 2004.....	11
2. Opinions on assessment methods and monitoring	11
2.1. Existing methods and opinions.....	11
2.2. Pros and Cons of using Fish as a biological quality element in the WFD.....	14
2.3. Monitoring.....	15
2.4. Costs and effort for fish stock assessment.....	16
2.5. Framework for dissemination strategies.....	17
3. End users perspective by Work Package	18
3.1. River typology and fish species classification (WP1).....	18
3.2. Defining reference conditions (WP2).....	19
3.3. Screening of national data and filling gaps (WP4).....	19
3.4. Establishment and operation of the central database (WP5).....	19
3.5. Developing an integrated system to assess ecological status (WP8).....	19
3.6. Field evaluation (WP9).....	19
3.7. Comparison with existing methods (WP10).....	20
3.8. Development of a user-friendly PC-software (WP12).....	20
3.9. Dissemination.....	20
4. End users perspective of FAME	22
4.1. Co-operation between AP and SP.....	22
4.2. Will FAME be used?.....	23
4.3. Conclusions and recommendations.....	26
5. References	27
6. Appendices to WP 11	28
6.1. Table of Applied Partners and Scientific Partners involved in FAME.....	28
6.2. The Applied Partners institutes profile and expectations.....	29
6.3. Questionnaires.....	32
6.4. Results of the questionnaires.....	35

1. INTRODUCTION

1.1. Objectives

The main objective of FAME was to develop, evaluate and implement a new fish-based assessment method for the ecological status of European rivers. This was in direct support of the WFD to guarantee and encourage/facilitate a coherent monitoring of the ecological status in all Member Countries. To secure an effective transfer from the academic arena into the water management sector, an “Applied Partner” (AP) representing authorities involved in the implementation of the WFD worked with their country’s “Scientific Partner” (SP) throughout the project.

It was expected that the AP would contribute to the project by:

- Assisting “Scientific Partners” with basic information on river typologies used in the various countries (WP1);
- Integrating experience to define reference conditions (WP2);
- Providing data for the central database (WP4);
- Supporting the completion of the central database by providing access to missing environmental data (WP5);
- Helping the scientific consortium to develop the new method (WP8);
- Assisting with the setting up of the evaluation network (WP9) and the comparative analyses with existing methods (WP10). Additionally, testing the applicability of the new method outside the framework of the project;
- Testing the PC-software (WP12);
- Supporting the dissemination of project results (WP14).

“Applied Partners” interacted with the scientific consortium in three different ways:

- Direct communication at the national level;
- Participation at six project workshops;
- Continuous communication with the consortium via e-mail within an INTRANET discussion forum.

In this report an overview is given of the applied partners group, the working process, the discussions and issues raised during the project and an end users perspective on the outcome of the FAME project.

1.2. The Applied Partner (AP) group and its issues

1.2.1. *Diversity Roles and responsibilities*

In total 12 APs, representing 12 countries contributed to FAME. The AP group appeared to be a very diverse group with different local, regional or national tasks and responsibilities. They represented environmental, water management or fisheries agencies and institutions (Table 1, appendix 6.1).

Applied partners of the FAME project are involved in water management on one hand and in fisheries on the other hand. Only a few are responsible for country wide fish monitoring activities. Not every partner in the FAME project represents the whole country or region covered by their scientific partner e.g. in the United Kingdom the Environment Agency only covers England and Wales, in Germany the Applied Partner covers the Federal State of Baden Württemberg, Austria is divided into nine districts

and Belgium was represented by different Applied Partners for Flanders and Wallonia separately. Some partners participate as both Applied Partner and Scientific Partner (NBF-Sweden and RIZA Netherlands).

Table 1: The diverse roles and responsibilities of the AP. See appendix 6.1 for further details. ® = With regional representative in FAME

Applied Partners	Governmental Ministerial	National	Regional	Local	Policy making	Research	Integrated water management	Monitoring	Ecology	Fish only
Austria (AU)	X	X				X	X	?	X	
Belgium (BF) Wallonia	X		X			X		X	X	
Belgium (BV) Flanders	X		X		X		X	X		
France (FR)	X	X	X					X		X
Germany (DL)	X®		X			X		X®		X
Greece (GR)	X	X							X	
Lithuania (Li)	X	?			X		X	?		
Poland (PL) *			X							
Portugal (PO)	X	X				X		?		?
Sweden (SW)	X	X				X		X		X
Netherlands (NL)	X	X	X		X	X	X	X	X	X
England/Wales (UK)	X	X			X	X	X	X	X	

* Not involved in fish monitoring, only chemical

1.2.2. Expectations

Referring to the original project description, the newly developed method should:

- Enable the assessment of the ecological status of rivers in all eco-regions of Europe as it will have been
 - Developed and tested in 16 of the 25 eco-regions
 - And the project will provide guidelines for the adaptation of the method to other eco-regions
- Follow a river-type-specific approach, according the WFD, to allow consistent assessment under varying environmental conditions
- Precisely describe river-type-specific reference conditions of undisturbed fish communities
- Quantify the level of degradation based on a multi-metric index
- Enable a distinction between the various types of human impacts
- Fulfil requirements of end-users
- Be cost efficient
- Be validated in field tests for its practicability
- Represent an integrated assessment system enabling end-users to follow a standardised procedure: standardised field sampling protocols, PC-programme, manual.

At the start of the project, using questionnaires, the AP were asked to give their expectations again. In appendix 6.2 these expectations are listed. Expectations of the

FAME project were to develop a scientifically sound working method or methods for fish sampling and a standardised fish-based assessment method as required by the WFD that can be used in common by member states in the same river basin. The new method should be cost efficient, transferable to different river basins and regional conditions and it should be easily handled by the end-users. There was also the hope that it should be possible to use the method for fisheries management too. Building an international expertise framework for the use of fish in WFD is an additional expectation mentioned by the end users.

1.3. Time schedules and working process

During the FAME project the AP met during 6 plenary meetings (Table 2). The co-ordinator was present during all plenary and workshop meetings. Partners contributed by participating in FAME workshops and by replying to questionnaires prepared by RIZA (partner 12) who was also the co-ordinator for WP 11. It was the task of partner 12 to prepare and to chair the AP meetings, which were organized during each FAME workshop. Partner 12 also prepared and updated the progress report for WP 11. Because of the long time lag between the Rhodes and Wierzba meetings a selected group of AP was invited to two working group meetings, one in Sesimbra and one in Namur, in order that their opinions could directly feed into the process of method development. The meeting dates, main activities and discussion points are listed in table 2.

Table 2 Meetings and activities of Applied Partners during the FAME project

Meetings		Date	Activities and discussion
Plenary	Working group		
		01-01-02	Preliminary questionnaire
Maastricht		16-01-02	Additional questionnaire Existing methods fish monitoring Pro/cons fish based assessment Timetable WFD Roles and responsibilities AP
Nässlingen		05-05-02	Results of first questionnaire Diversity of the AP group Different time schedule AP/ SP Sampling costs Data format and availability Communication / dissemination
	Lyon	20-10-02	FIDES* filling and collecting missing data
Stuttgart		19-01-03	Update status implementation WFD Fame vs national activities Sampling strategy (CEN?) and costs Dissemination strategy of FAME results Preparation for WP8 – WP10
Rhodes		06-06-03	Experiences since last meeting WP9 and monitoring WFD FAME <-> national <-> international Time table FAME and test results

			Dissemination and exploitation of results
	Sesimbra	19-10-03	Field test Adaptation of method
	Namur	14-02-04	Contact with SP and information exchange Lack of test time field, software and manual End users point of view
Wierzba		19-04-04	Gaps between national and FAME methods Same issues since Stuttgart are coming back
St. Georgen am Längsee		30-10-04	Lack of time to test software and manual Training staff on new method Limitations of the new method Missing reports and info (expectations)

*FIDES = Fish database for European Streams

The tasks of AP were two fold and can be divided into contributions at a national level and on a consortium level. On the National level they supported the relevant scientific partner in completing the work for WPs 1-3 and especially for WP 4 and WP9. In some cases (Germany and United Kingdom), applied partners had the main responsibility for the preparation of the data, for populating the national databases and for the field testing. On the consortium level, work focused on the integration of the requirements of the applied partners, dissemination activities and testing the new method, the PC software and the manual.

On a meeting-by-meeting basis, the main questions are outlined below, together with the discussion of that time.

1.3.1. Maastricht, Netherlands January 2002

In January 2002 the workshop ‘River fish monitoring and the EU Water Framework Directive’ was organised at the request of two International River Commissions namely those for the Rhine and Meuse. The workshop preceded the kick-off meeting of the FAME project. The introductory deliberations and discussions at the workshop together formed a good starting point and overview for the first FAME meeting.

Key-note speakers addressed the following topics: i) Ecological assessment using fish as part of the implementation of the WFD, ii) Fish-based methods to evaluate river conditions, iii) A fish-based index for the River Meuse, iv) Modelling fish assemblages in French rivers, v) Ecological assessment of Swedish running waters, vi) Fish-based methods for Mediterranean rivers, and vii) CEN standardisation of fish sampling methods. In subsequent sessions three topics were discussed: i) The ‘pros and cons’ using fish as a quality element to assess the ecological status of rivers, ii) Monitoring & methodology, and iii) Reference conditions.

Participants were asked to fill out a questionnaire (see appendix 6.3) regarding fish-based monitoring in rivers in their country beforehand. All the basic information in these questionnaires, for each country or river basin, is presented in the workshop report (Buijse et al. 2002).

During the 1st FAME meeting the objectives and activities of WP 11 “Transfer into water management applications”, were presented and discussed. The need for a questionnaire was discussed because questionnaires were also used by the River Fish Monitoring workshop, the STAR project and the REFCON project. To avoid duplication of effort it was decided to focus on some specific questions such as:

- Current status of the implementation of the WFD in your country related to assessment of the ecological status
- Sampling costs
- General expectations from the FAME project

During the meeting and discussion the APs had already mentioned some specific points:

- Mismatch in timing. Results of assessment methods are needed now, not in three years time;
- The status and time table within countries is not always known, therefore AP should try to find out the time tables in their country
- Papers related to WFD are very extensive. In some countries there are many commissions and subgroups, both of which makes it difficult to obtain an overview
- APs of FAME should involve and inform other people in their country
- FAME has to take into account that countries have already made decisions on some topics (like reference conditions or typology). APs should transfer this information to the WP-leaders.
- It was recommended to the APs that they be pro-active and ask themselves:
How to implement the new method successfully?
How to give feedback?
How to inform and involve other parties in the dissemination of the FAME results.

1.3.2. *Nässlingen Sweden May 2002*

During the AP meeting in Sweden the following items were discussed:

- Questionnaire – number of responses
- Results of the Questionnaire
- Time table, current status of and responsibilities for the implementation of the WFD
- Related activities and projects
- Experiences with WP11 to date
- Exchange of information with SP to date (how to report on advice and input in WP's)
- Communication - national and international
- Sampling standards vs. field experience
- Consequences of changes to existing national procedures
- Costs for monitoring
- Database and data format
- Highlight the particular features of national water systems in the international arena
- Develop national views on subjects like costs, the natural state of waters and monitoring. Make these views publicly known by means of handbook, website and project newsletters
- Link with WP14+WP15: Activities for publication and presentation of the work to the public (start 2004) and Intranet

As a result of the questionnaires and of the workshop it was concluded that:

- As of year 2002, not all countries have national working or expert groups or participate in international groups guiding the implementation of the WFD. It was not always clear how information is transferred between scientists and the

diverse stakeholders in the field. This could cause problems during the development and implementation of a new method.

- More Information about the WFD and the implementation should be available through the FAME homepage. In addition, presentations by working groups, like the Heavily Modified Water Bodies group or Transitional Water Bodies group (which, of course, are not part of the FAME objective) were requested for the next FAME meeting. Some partners emphasized the information “overload”, resulting from the number of reports and papers related to the WFD and its implementation.
- In line with the results of the questionnaire from the River fish-monitoring workshop, the answers to the FAME questions showed that the present practice concerning the use of fish-based data in ecological quality assessment both within countries and between the various countries is widely different.
- The REFCOND and FAME questionnaire results clearly show that the choice of a typology is still an open question for most Member States. Few of them have established national typologies. Those typologies that have already been established are not specifically aimed at the WFD and need to be adapted to meet its requirements. WP1 dealt with this within FAME.
- Monitoring methods and technology are far from standardised. This means that much effort has to be expended to give a useful and research supported meaning to the fish-based metrics in ecological assessment.
- Further activities: Currently sampling procedures, as well as the calculated sampling costs, differs among FAME countries. The sampling method as it will be proposed by the FAME project will probably change the costs and require costs for training and adaptation of current standards. Applied partners are obliged to focus on the cost factor. Moreover they shall start “information”-activities for the FAME project.
- In most countries there is no national budget for fish stock assessment and monitoring.
- Clustering with other projects (like STAR) and raising national awareness of the project and its results are useful suggestions.
- It is proposed that we should focus WP11 on supporting the dissemination of the project results and on communication. It was suggested that this could be done on the national level by improved communication between AP, SP and national stakeholders and on the international level by clustering with other projects and informing international working groups and national representatives in these groups about the outcome of the FAME project.

1.3.3. Stuttgart, Germany January 2003

Main topics discussed during the meeting in Stuttgart in January 2003 were:

- Update information regarding the status of the implementation of the WFD and sampling strategy and costs
- Dissemination strategy of FAME results
- Preparation for WP8 - WP10

Update info

Applied partners were asked to reconsider and update the answers to the Maastricht questionnaire from January 2002 on the current status of WFD implementation with special emphasis on: Typology, Sampling method and regular monitoring according to WFD and the timetable of implementation. Additional questions were:

- Are you a representative of an organisation responsible for the implementation of the Water Framework Directive: a) in general; b) in respect of fish; c) at the national level d) at the regional/provincial level?
- Are you involved in national research projects related to the implementation of the Water Framework Directive focusing on the development of fish-based assessment methods or other topics?
- What is discussed about the value of fish as indicator in your country compared to well established indices (like Macrozoobenthos).
- Related to the FAME method:
Is the sampling strategy as developed in FAME (D4 par 3b.2) applicable?
Is the sampling strategy cost efficient?
Are environmental variables as required for the FIDES-database already surveyed in your country? Which variables have to be collected in addition?
Is additional data-collection necessary due to “regional conditions” (with respect to sampling strategy)

Dissemination strategy of FAME results Discussion and decision of a strategy

The APs considered the following:

Individual or combined FAME action?

What are particular features of your national water systems?

Develop national view on subject like cost recovery, the natural state of waters and monitoring

Make these views publicly known by means of handbook, website, newsletters

What are the requirements on a understandable report; translations?

Name national institutions that have to be informed

Have you already started information dissemination activities?

Preparation for WP8 - WP10

WP 8 – 10 will be carried out in close cooperation between the Scientific Partners and the Applied Partners. To be prepared the following questions were discussed again:

WP 8: Development of the new Fish-based Assessment Method for European rivers based on results of WP6 and WP7:

Expectations for the new method?

Who will do the testing?

What is the optimal cost-benefit relationship?

Is it practicable?

WP 9: Field-testing and evaluation of the new method developed in WP8:

To set up an evaluation network prepare map of sites which are already sampled regularly or suggestions for sites to be sampled during WP 9

Is proper sampling equipment available?

Who will do the sampling?

Is fieldwork included in the field roster?

What is the role of the SP?

WP10: Comparison of the new method with existing methods and adjustment to regional conditions

Are regional conditions well known so adaptations can be made?

Who will do the comparison?

What is the existing method to compare with?

1.3.4. Rhodes, Greece June 2003

Since the start of Fame AP were asked several times to update information about the state of the art and implementation of the WFD and cost for monitoring. This discussion was closed and the final results at that moment are reported (appendix 6.4). Further experiences on the field-testing were exchanged and the compatibility of the FAME standards on national standards and principles were discussed. AP were asked to report on problems and questions that needs attention or remained unanswered.

1.3.5. Wierzba, Poland April 2004

Almost one year had passed since Rhodes when the APs last met together. This meeting was the last opportunity/ to update information and very little time was left to disseminate and finalise the FAME project results. On the other hand much had still to be done and Poland was the last opportunity to exchange information and experiences.

Furthermore, the AP's were asked several additional questions to update the existing information before the meeting in Poland and thus make best use of the time in Wierzba:

- Update questionnaires
- Dissemination activities
- What remains unanswered
- End users perspective

Update the answers on the questionnaires

All APs should focus on the following aspects because this info probably will have changed since we met last time:

- Current status of the implementation of the WFD and responsibilities
- Costs of sampling

Dissemination of the FAME results

Especially needed is an overview on the national ongoing dissemination activities. APs were asked to compile a list of national organisations responsible for:

- Legal implementation of the WFD on national level
- Implementation on regional/local level
- Monitoring and fish stock assessment
- Potential end-users of the FAME results
- Other national organisations involved

Note: Actually this should mean all the organisations and institutes to whom the FAME brochure was sent already!! Further APs were asked to report any information on earlier proposed activities, such as updates to the presentation – website – translations of the FAME information, leaflets, publications in applied national journals and organising training for end-users on national level.

What remains unanswered?

Perhaps some important issues still remain unanswered or are not clear yet with respect to the new method and especially with respect to the applicability of the new method. Applied Partners were asked to provide information about this so this could be discussed.

Chapter FAME book: End-users perspective

A first layout of the proposed book chapter was presented and discussed. Applied Partners were asked to:

- Contribute and co-author
- Express their opinion about the suggested items and what is missing
- Identify which item or items they would like to contribute to
- Provide written text suggestions (abstracts, key words) for those items

1.3.6. *St. Georgen am Langsee, Austria 2004*

At the last official FAME meeting the following issues were discussed:

- Further use of the fish data provided by the FAME group
- Final FAME method and software
- Dissemination
- Unfinished work packages

All AP agreed that data can be further used within the FAME group but, at least for some partners, a formal request is necessary. With respect to dissemination of the method it should be decided what and how we send information to water managers. Finally, the importance of a testing phase for the European Fish Index (EFI) was stressed several times. It was also suggested that there should be a contact address for feedback and to maintain FIDES for a longer period. At the end of the meeting SP asked the AP their opinion about a proposed combination of classes in the assessment method: from a 5 class to a 4-class system, i.e. combining the first two classes or combination of 1 / 2. Most applied partners wanted, however, to keep 5 classes, in line with the WFD.

2. OPINIONS ON ASSESSMENT METHODS AND MONITORING

In this chapter results are presented from the start-up workshop and outputs of the additional questionnaires viz. those, which are not directly addressed in the following chapter on the end users perspective for each work package.

2.1. Existing methods and opinions

The start-up workshop in Maastricht, January 2002 on fish-based ecological quality assessment in rivers, brought together fish biologists from 22 countries. The meeting was the first international meeting dealing with the implementation of fish-based criteria in the European Water Framework Directive. The workshop generated awareness among fish biologists of the fish-based criteria and procedures for the assessment of ecological quality for the European Water Framework Directive (WFD). Moreover, it created awareness for the need to co-operate between and within EU-countries and EU-accession countries on fish-based quality assessment methods and techniques.

The workshop dealt with several questions on the process of implementation of fish-based assessment criteria in the Water Framework Directive (figure 1).

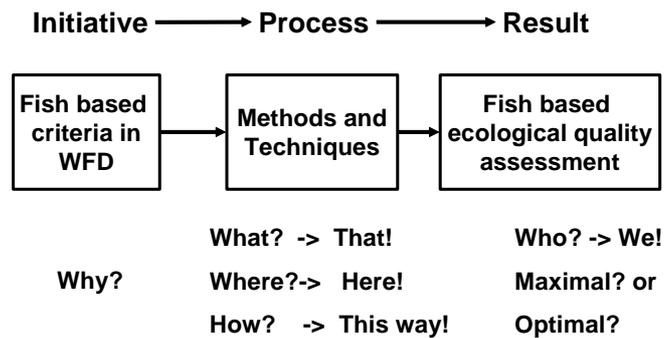


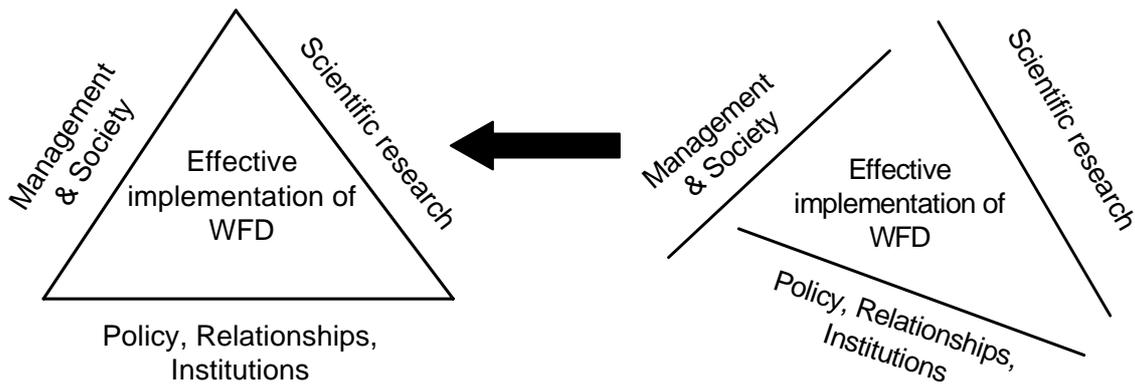
Figure 1: Topics of the Workshop

In the workshop's report (Buijse et al. 2002) it is shown that:

- The present fish-based methods and techniques for ecological quality assessment differ widely between countries.
- In some countries the effort is already part of the monitoring at a country-level. In other countries fish-based assessment of rivers is based on ad-hoc projects. An overview of methods used is given in FAME report WP3, Buijse et al. (2002) and appendix 6.4.
- A gap existed between the ambitions of fish biologists to furnish scientifically based methods, techniques and tools and the short-term need of water managers to implement fish-based assessment in their water quality programmes before 2004.
- Effective fish-based quality assessment is not only a problem for fish biologists. It was noted that they have to operate within a framework created by other institutions and organisations which have their own vested interests and experiences possibly in quality assessment, policy directives, financial resources, management responsibilities and/or the interests of other stakeholders.
- Consequently, fish-based methods and techniques have to be practicable and must aim at an optimum output within the given situation without losing scientific integrity.

The Workshop concluded:

1. That effective implementation of fish-based ecological quality assessment of the EU Water Framework Directive is a challenge for fish biologists in EU- and EU-accession countries alike. Effective implementation means that the diverse aims of the stakeholders in the field must be balanced and addressed.



2. Indices of Biotic Integrity (IBI) provide a valuable framework for fish-based assessment, for evaluating the status and following the restoration of aquatic communities. These indices encompass the structure, composition and functional organisation of the biological community and can be applied to a variety of aquatic taxa. IBI's formulate an expected condition for the biota in the absence of substantial environmental degradation and take into account inherent natural sources of variation in community characteristics.

3. In Europe a diversity of metrics are used in fish-based quality assessment of rivers: species richness and composition, indicator species, trophic function, reproductive function, abundance and fish condition. Metrics may, for example, be based on numbers of individuals or biomass.

4. Low precision assessment using simple information based, for example, on the length structure of the population (0-group, juveniles, adults) and information on the species composition is adequate for some metrics. Metrics based on these criteria supply information on the diversity of species and the potential for intra- and interspecific interactions.

5. High precision assessment biomass-based metrics may also be needed. These reflect the interactions between trophic levels and functional groups in the sampled river section.

6. The Workshop showed that the methods currently being used to generate a typology for rivers in the European countries are mainly based on hydrological and hydromorphological characteristics. Fish-based criteria are absent in many assessment procedures. A fish-based typology of rivers should be based on hydromorphological condition supported by abiotic data.

7. Historical data on fish captures can supply information about species composition, distribution and relative density of fish species in earlier times that may be useful in defining reference condition. Maps and photographs may supply additional supporting historic information about the hydromorphological condition of sites in a river.

2.2. Pros and Cons of using Fish as a biological quality element in the WFD

During the start-up workshop-working groups addressed the both the ‘cons’ and the ‘pros’ of using fish as a biological quality element to assess the ecological status of rivers, as required by the WFD. Every WG was allowed to produce up to a maximum of 10 statements on which they were asked to reach a consensus within that WG.

It was concluded that fish-based quality assessment raises many questions that will have to be solved using scientific research. It was also concluded, that at the management level fish-based monitoring and assessment supplies very useful additional quality information that is not otherwise available.

It was concluded that fish-based data supply:

- Longer term information than that of other biotic data,
- Information on environmental degradation of habitats,
- Information about connectivity, associated with fish migration in river systems,
- Information about quality changes in space and time.

The Pros and Cons, as mentioned during the workshop, are listed below.

The ‘Cons’ mentioned during the FAME kick off workshop:

1. Sampled fish may have been previously stocked
2. Possible slow response, in time, of fish to changes e.g. due to plasticity
3. Temporal aspects: fish are migratory. They may not be there at the time a sample is taken
4. Low species number/richness – a problem for some indices
5. Representative sampling may be difficult in large rivers
6. High costs, lots of manpower
7. Natural variability of recruitment may influence appraisal.
8. Sampling problems: costs, methodology, variability in time and space
9. Confounders: movements, stocking, seasonal factors, historical factors
10. Reference condition
11. Ecological status and knowledge of species. Species-poor sites e.g. headwaters, arid waters
12. Choice of metrics
13. Species number and its sensibility
14. Fish biology: difficulties with comparison across Europe. Exotic species
15. Methodology has no long tradition. Lack of historical data. Spatial and temporal data. How to combine with each other for comparison
16. Socio-economic factors: ethic. Threatened fish species may become extinct due to sampling

The ‘Pros’ mentioned during the FAME kick off workshop:

Fish are:

1. multiparameter integrators (e.g. of water quality, habitat quality, trophic disturbances, toxic presence, connectivity).
2. Indicators of various scales of degradation (from small to large scale degradations, including spatial and temporal degradations)
3. Indicators of functional aspect of the river (connectivity, migration, river continuum)

4. Biology of fish is relatively well known, so a multiparametric index may be developed, based on various biological features (biodiversity, abundance, trophic equilibrium, migration, reproduction)
5. Fish populations are relatively stable (long lived animals) so infrequent sampling may suffice (every two years or more), making it a cost-effective method (do less need for specialist for taxonomic determination c.f. other taxa)
6. Economic value (professional and recreational fisheries, cultural value)
7. Fish are popular and well known by the public, so a fish based method can be easily understood by the public (easier to justify restoration of degraded rivers based on fish than macro invertebrates and diatoms, programme of salmon or sturgeon restoration)
8. Existing national databases / existing historical information
9. Fish are present in all ecosystems
10. Sampling is generally not destructive
11. Easy to communicate to public and politicians
12. Internationally accepted indicator
13. Economic value is linked to ecological value
14. Integrates a wide range of information on the ecosystem
15. Availability of historical data as compared to other biological quality elements
16. Migration activities are reflected
17. Links environmental institutions with fisheries
18. It provides quick answers to the decision makers
19. Enhances pan-European co-operation

2.3. Monitoring

As an introduction, a brief overview of river fish monitoring in various European countries based on the first impressions of the returned inquiries (at that stage 19 out of 22 participating countries had replied) was given at the kick off workshop. Monitoring practises varied among and within countries from none, privately - funded project monitoring to national monitoring programmes not yet in line with the WFD. In the WP3 report and the workshop report more detailed information on monitoring practises by country is given. Based on this information a standardised sampling procedure was developed.

In general it can be concluded that fishing with electricity is the predominant representative sampling technique. The inquiry indicates a preference for sampling in late summer and early autumn except for Salmonids. This methodology was widely recognised to be species- and size - selective and dependent on environmental conditions. Very few partners address age structure (0+ and older; 0+, juvenile & adult; length - frequency).

Tolerant/dominant species are easy to sample, but probably not reacting to river degradation or restoration. In most countries habitat parameters are collected, but these vary between countries. Very limited information was available on the costs for monitoring at the start of FAME.

The Workshop on sampling methodology concluded that there is a need to apply similar techniques in similar water types. Depending on the geographical position of the river and its typology, the timing of the sampling can be different. In wadeable streams data

relating to the entire fish assemblage is collected by a single technique, usually the relatively rapid electrofishing method. The need to standardise the approach and method of use was identified. The recent developed CEN standard on sampling fish with electricity can be used as starting point for assessment. It supplies a minimum standard for action that is obligatory for sampling with electricity. In wadeable streams, fish sampling with electrofishing must aim at low resolution per site and high coverage of the various habitats.

Large rivers have more complex habitats and a single sampling method like electrofishing cannot adequately characterise the entire fish assemblage. Here different habitat types are likely to require different sampling methods.

2.4. Costs and effort for fish stock assessment

As concluded during the kick off meeting very little information on the cost for monitoring was available at the start of FAME. Applied Partners were asked to provide information in a spreadsheet based on a format used by Harold et al. (2002). The results of this inventory are listed in table 3. More detailed information on fixed and variable costs are given in appendix 6.4.

Table 3: Expected number of electro fish samples per country (N), the maximum number of sites able to be sampled per day (N/day) and the sample costs (n.a. = no info available)

	N	# Samples/day	Total sample costs		Cost/sample
			Fixed	Variable	
Austria	400	2	4750	96000	1679
Belgium Wallonia					
Begium Flanders	200	5	14500	60500	375
France	675	2	41700	97900	2945
Germany					1250
Greece	180	2	59000	5000	1837
Lithuania	80	3	2030	5820	1000
Poland	540	3	25200	55000	149
Portugal	80		4600	61425	943
Sweden	252	2	5975	251700	512
The Netherlands	120	15	47242	15158	520
United Kingdom	1333	2			821

The total budget for monitoring fish in rivers varies between the countries due to differences in the number expected samples, the number of samples that can be sampled per day and costs for equipment (fixed costs) and personnel (variable costs). Highest are the expected costs in Sweden (250000 €) and lowest in Lithuania (8000 €) although it is not clear whether these proposed sampling programs are consistent with the requirements of the WFD. There are large differences in the total number of samples expected with a minimum of 80 in Lithuania and a maximum of 675 in France. Costs per sample were highest (€2945,-) in France not because of the high number of samples but due to the relative low number of samples which can be fished per day and the high number of persons needed to perform the sampling (average 13 persons). In Poland the cost per sample was lowest (€149,-). Unfortunately no further analyses and standardisation was carried out to make the performance of the field sampling more

uniform. Furthermore, the data submitted to FIDES included multiple run depletion catch data whereas the final FAME method suggests that only one run may suffice. This was not known when the above data were submitted and this may significantly change the above estimates.

2.5. Framework for dissemination strategies

Dissemination means spreading a message (subject of dissemination) among groups of persons or organisations (the target groups) via one or more channels with a view to achieving a certain impact. The initiators of dissemination are the project partners. Within FAME these are the Applied Partners (APs) as well as the Scientific Partners (SPs). A dissemination strategy should be planned and a good dissemination plan should contain the following points in particular.

A continuing process

Dissemination should not be considered as the last phase of the project but should be conceived and planned from the very outset. As soon as the partnership is set up, it is useful to pinpoint those members who can contribute particularly effectively to the dissemination of results. It is also useful to combine partners from different professional sectors and institutions and which represent potential users of the project results. Furthermore, it would be useful to associate organisations specialising in the areas of information and marketing with the partnership.

Dissemination is not restricted to the final phase of the project, but is an ongoing process taking place throughout the project, which may continue beyond the life of the project itself.

Dissemination implemented in the course of the project, associated with activities to evaluate and, where appropriate, test the interim and final results of the project, represents a valuable management tool making it possible to compare ongoing achievements with the needs of the target groups, to validate them or, alternatively, to show the need to improve them.

A shared responsibility

The main responsibility for dissemination lies with the partnership as the repository/owner of those results. The members of the partnership are required to take an active part under a clearly defined dissemination strategy, which is geared to the target group(s) and to the target sector(s) concerned by the project, as well as to the users of its results.

There must be a timetable for such dissemination activities and part of the budget must be reserved for this purpose.

A conceptual framework for dissemination is developed and presented to support partnerships and projects with their dissemination strategies, consisting of the following elements:

- The *subject of dissemination*, as a rule course programmes, course products or process expertise;

- The *planning of dissemination* in which attention is devoted to the context in which the dissemination takes place, the structure of the activities to be carried out, the preferred type of processing, the responsibilities of the project partners, the schedule, the costs and the multiplier effects which are aimed at;
- The *target group(s)* to be addressed;
- The *dissemination channels* that might be used;
- The *effects of dissemination* that can only be optimal when certain barriers are avoided;
- And the *evaluation of dissemination*, also dealt with in chapter 3 on evaluation strategies.

In order to provide some information on dissemination channels the following list of channels was provided:

1. Internet
2. Manuals, readers, reports, publications, papers, documents
3. CD-Rom
4. Seminars, conferences, meetings, symposia, workshops
5. Videos
6. Handbooks, books
7. Networks of experts
8. Multi-media presentations
9. Expositions, exhibitions
10. Magazine articles

In section 3.9 more details on dissemination activities are given.

3. END USERS PERSPECTIVE BY WORK PACKAGE

The following paragraphs will give, work package by work package, the most important experiences and viewpoint from the APs. This is based upon the original objectives (outlined in the boxes), the discussions during the meetings and the discussions on a national level between the AP and SP.

3.1. River typology and fish species classification (WP1)

WP1a River typology

The characterisation of river types will be based on the guidelines of the Water Framework Directive (Annex II) and existing national classifications (mainly provided by the “Applied Partners”).

WP1b Species classification

The objective of WP1b will be to review fish classification schemes, harmonise them across the various eco-regions and countries, and compile standardised classification lists. Information will be collected from technical and grey literature, existing databases (e.g. Fish Base) and knowledge provided by the “Scientific” and “Applied Partners”.

3.2. Defining reference conditions (WP2)

The main questions to be answered (subject to change within WS1c):

- What type of data is used to characterise the reference condition?
- How are reference sites defined: undisturbed sites, nearly undisturbed, least affected, best available, and what are the criteria for reference site selection?
- What is the availability of historical data for various river types; what is the quality of information with respect to species occurrence and abundance; and what is the time frame to which these data refer?
- What kind of data is used for reference models; what is the statistical background of these models?

3.3. Screening of national data and filling gaps (WP4)

The objective of WP4 is to screen national data sets provided by partners in order to standardize selected data, which will be incorporated into a central database in WP5.

3.4. Establishment and operation of the central database (WP5)

The objective of WP5 is to design and develop a central database. National data screened and selected in WP4 according to criteria defined in WP1-3 will be incorporated into the central database, resulting in a consistent quality of information. The central database (based on an ORACLE-server connected to MS-ACCESS clients via ODBC) will be placed on an INTERNET server and password-protected access will be provided for all partners.

3.5. Developing an integrated system to assess ecological status (WP8)

Based on the experience gathered in the preceding WP the best suitable metrics, identified in WP6 and WP8, will be combined to an integrated assessment system in close collaboration between the “Scientific Partners” and the “Applied Partners” by:

- Evaluating relevant literature and recent experience on this subject and identifying methodological procedures and algorithms of index computation;
- Proposing 2-4 preliminary assessment algorithms;
- Testing the various algorithms with data from the central database;
- Optimising the algorithms;
- Identifying the best algorithms.

3.6. Field evaluation (WP9)

The method developed in W8 is evaluated using standardised sampling (WP3) and assessment procedures (WP2, WP6, WP7, WP8) in different eco-regions and river types (WP1). Sample sites will be selected in close co-operation between “Scientific Partners” and “Applied Partners”.

3.7. Comparison with existing methods (WP10)

The new method will be compared with existing methods applied in the different countries in Europe to analyse strengths and weaknesses of the new approach. “Scientific partners” select, in co-operation with “Applied Partners”, the most common method for each country to be compared with the new method. This method is applied by each “Scientific Partner” to the eco-regions of concern according to the 180 evaluation sites of WP9

3.8. Development of a user-friendly PC-software (WP12)

The objective of WP12 is to develop user-friendly PC-software for routine assessment of the ecological status of rivers and to make it available to all Member Countries. The software will serve as a practical, technical tool for conducting standardised and cost-effective assessments and, hence, support the adoption and implementation of the new method. The input for the software will be a data set for a single site; the output will be an index ranging from 1 to 5 in accordance to the 5 levels of water quality in the WFD. The software will be developed in close co-operation with “Applied Partners” and tested by the consortium.

UK: If at all possible the system needs to be incorporated into one Environment Agency system for entry of fish survey data. A lot of effort and expenditure has recently gone into development and adoption of NFPD as the standard fisheries tool in England & Wales (see 4.1 above). NFPD is an Oracle database using an Access front-end for data entry. PLEASE NOTE: Only Agency supported software may be installed and used on Agency machines. Our current standard is, for example, Word 97, Excel 97 Access 97 etc and **no other version** can be used!

3.9. Dissemination

As outlined in section 2.5 a framework for dissemination was presented during the meeting. In table 4 and 5 the AP’s dissemination activities are reported in detail. More information on dissemination will be presented in WP14. During the meetings the following dissemination activities were mentioned by the APs:

- Information sent to potential end-users
- Presentations to water managers on the national level
- Publications in national fisheries journals
- Education and training of field staff
- Info put on home pages of the institute
- Leaflets, brochures, newspapers etc
- Information sent to other authorities, NGO’s , public and policy makers
- Translations in national languages
- Feed back to data and info providers

Table 4: National institutions and organisations involved in the WFD and fish stock assessment, which should be informed about the outcome of FAME

Applied Partners	Involved in WFD	Involved in fish bases assessment and monitoring
Austria (AU) BAW-IGF Belgium (BF) CRNFB Belgium (BV) VMM	CIW (ex VIWC)	IBW (Institute for Forestry and Game management)
France (FR) CSP	Ministry of Environment Water Agencies	CSP (national/regional)
Germany (DL) FFS Greece (GR) CRES	LAWA Ministry of Agriculture and Food Production, Dept. of Fisheries; Minsitry of Environment, Physical Planning and Public Works, Dept. of Waters.	FFS HCMR, Institute of Inland Waters; University of Thessaloniki, Dept of Zoology.
Lithuania (Li) JRC Poland (PL) VIEP	Department of Water resources Ministry of Environment	Chief Inspectorate for Environmental Protection
Portugal (PO) DGF Sweden (SW) NBF Netherlands (NL) RIZA/RIVO	STOWA UvW RIKZ	RIVO OVB
England/Wales (UK) EA-NCFC UK TAG	SEPA, FRS, SNH CCW, DARDNI CFB (RoI)

Table 5 Dissemination activities of the Applied Partners in FAME (nag. = no answer received)

Applied Partners	Presentations at national level	Presentations international level	Education/training staff	Info on home page institute	Info sent to national authorities and NGO's	Translations in national languages	Feed back to data providers
Austria (AU) BAW-IGF							
Belgium (BF) CRNFB							
Belgium (BV) VMM	x	x			x	x	x
France (FR) CSP	x	x					x
Germany (DL) FFS	x			x	x		x
Greece (GR) CRES	x	x	x		x		x
Lithuania (Li) JRC							
Poland (PL) VIEP	x			x	x	x	x
Portugal (PO) DGF							
Sweden (SW) NBF							
Netherlands (NL) RIZA/RIVO	x	x		x	x	x	x
England/Wales (UK) EA-NCFC	x	x	x	x	x	x	x

4. END USERS PERSPECTIVE OF FAME

4.1. Co-operation between AP and SP

A positive effect of the FAME project is that the contact between AP and SP on the national level was, in some cases, established for the first time or, in more or less all instances, became closer during the project. Most of the time contact was very good but SPs had their own time schedule during the project, which was not always optimised to the AP-issues and activities. During the evaluation of the co-operation the following was mentioned:

- Differences in responsibility and planning between AP and SP: SP was more project bound in time and issues while AP were more WFD oriented.
- It was difficult to know how much and when the SP expected input from the AP.
- Many APs have been overwhelmed with extra time needed - especially for acquisition of environmental data in too short a time period. Environmental data were not always available and APs were not made aware at the start that they had to provide these environmental data. Although a lot of time was invested in data provision and formatting, more data could have been made available if more time was planned in from the start. There was no extra money for additional data collection.
- The strict time schedule of the FAME project forced the work to continue. In many cases the AP experienced this as a lack of feedback on information provided with very little time to respond to and adjust newly developed procedures and methods. The sampling standard, the results of the field-test and the evaluation of national methods deserve especial mention in this context.

- Methods for large rivers and Mediterranean Rivers will be available only after the completion of FAME. Also other WP are yet to deliver their final reports -which makes it hard to give an end-users perspective. It is also causing a delay in the production report of WP11 too.

4.2. Will FAME be used?

The FAME project was expected to develop scientifically sound working methods for fish sampling and a standardised fish-based assessment method as required by the WFD that can be used in common by member states of the same river basin. In addition to scientific soundness and accuracy the new method should, however, also be practicable, cost efficient, end-user friendly and adjustable to different river basins and regional conditions. Although at the start of the project most APs were sceptical about the outcome, in April 2004 APs became more optimistic that FAME will provide an appropriate method.

During the FAME project it was still necessary in some countries (viz. Greece) to convince the government that fish based assessment methods work. In other countries, already working with national standardised methods and procedures, responsibilities only became clear during the FAME project.

There are, however, still some concerns regarding the proposed sampling procedure and the adaptation and acceptability of the EFI method. These are discussed below.

Sampling procedure and field test

In WP3 (Kestemont & Goffaux, 2004) the FAME field sampling procedure was described. This procedure was tested in WP9 in order that, if necessary, it could be modified. During an evaluation of the sampling procedure by the APs the following remarks were made:

- It was proposed that the CEN standard for fishing with electricity be used. However, the national and regional applicability and consequences of this decision were not all taken into account. APs reported back to SPs that: equipment as described by CEN was not available; fishing in rain was carried out although not accepted by CEN; fishing in autumn causes problems because some rivers have no water at that time; groups were used to fishing during the hours of darkness; the number of anodes was not in accordance with national procedures and sampling was forbidden below certain temperatures which makes it un-usable in northern countries or mountain areas. For some countries, the length of stations (20 to 30 times the river width) and the sampled area (minimum sampling effort of 1000 m²) could be too high to be really used for routine work, since this increases the difficulties in the field and the cost for monitoring. The cost effectiveness of this CEN recommendation should be evaluated. Although these issues were raised they remain unresolved at the time of writing, which could reduce the acceptability of this standard at the national and regional level.
- The CEN procedure was tested in the field (WP9). However, not all remarks made by the APs after the field test were adequately considered by the SPs including preclassification and not all info (field samples) were used. No feedback was given, for example, on questions like “Why is ER14 left out of the analysis?” and “Why are sites with 0 fish were classified as 3 and 4?”.

- One of the limitations to use the newly developed method is the minimum number of fish caught (> 30 specimens are needed). No analysis was carried out to optimise the sampling effort in respect of this limitation. Moreover low density could be natural or due to anthropogenic influences; in the latter case, what is the interest of the index if it cannot be used to assess degraded sites?
- Metric selection was not analysed and evaluated to best fit the sampling procedure. Fishing with electricity is, according to the APs, not very reliable for catching long distance migrants - species like Salmon and Shad. During the discussions on this a better definition of connectivity was requested, because there appeared to be no correlation between connectivity and the FAME results.
- Little or no attention was paid to sampling aspects like temporal and spatial variability. Analysis of available time series in the FIDES database, to optimise metric selection and select metrics expressing physical and water quality disturbances separately, was not carried out.
- Cost efficiency was one of the pre-requests of FAME from the APs point of view. This was not taken into account either during the evaluation of the sampling procedure nor during the selection and evaluation of metrics. After the field testing there was no optimisation nor were changes made to the statistically chosen metrics, the sampling procedures, sampling effort or the collection of environmental data.
- Finally, there are the unanswered questions remaining of how to sample large rivers and how to sample at the water body level (a WFD requirement). FAME developed and evaluated its method on a site level. Water bodies are not segments or sites. APs need to know how many sites to sample to properly represent a water body and what to do about the situation where, for example, one or more sites in the same water body are good and others, are bad.

Consequences and constraints of methodological decisions

The newly developed FAME method is considered to be scientific sound. As discussed above, after the statistical analysis small alterations were made to the sampling procedure and metric selection. It was also stated that, from the APs point of view, acceptance of the FAME method by governments would not be based on scientific grounds only. Before enforcing final ecological targets policy makers will, almost certainly, consider the economic viewpoint and they may have different aspirations. With respect to the applicability of the FAME method the APs mentioned the following constraints and consequences:

- in addition to FAME there are national activities which will not necessarily follow the same time schedule and principles. It should be remembered that, on national level, decisions might have already been made on topics like how to deal with reference sites and typology that are not always in line with the FAME methodology. Most AP's involvement in the the implementation of the WFD extends further than fish. Remaining issues (most beyond the scope of FAME) are:
 - o Differences between the FAME typology and that on national level
 - o Little cross-fertilization and harmonization with groups working on other ecological quality elements. The risk exists that "best" sites will be different for each ecological quality element
 - o What to do with fish in other water bodies (viz. lakes, transitional waterbodies)
- As stated previously, the method developed is scientifically sound but the software presented is a "black box" methodology from the end-users viewpoint, which makes it not easily applicable, understandable and therefore less acceptable..

- It is necessary to evaluate whether all the requirements of the WFD have been met. No information on age structure or 0+ fish is included and information on length is missing for most samples. It was proposed that the project should develop and test a diversity index for 0+ fish (Shannon Weaver) and this wasn't finally carried out.
- It was suggested that a better definition for connectivity was needed but there was no time available to do this within in the FAME project timeframe.
- The FAME method cannot always be applied across a whole country or in all Ecoregions. It was demonstrated, for example by the Netherlands, that on a national level problems remain such as: the lack of reference sites; sites that can't be adequately sampled if sampling is restricted to electro fishing; assessment of Heavily Modified water bodies and the assessment of large lowland rivers .
- To summarise, questions remaining are as follows:
 - o How to work with multi gear samples (not just those collected using electro fishing only as the national standard). This may be required because of water body characteristics.
 - o What to do with Heavily modified water bodies
 - o What to do with large rivers
 - o What to do with Mediterranean rivers
 - o What to do with low species rivers
 - o What is the status and what will be the effect of intercalibration exercises
 It is expected that some of the above aspects will be covered in the manual, which goes with the EFI software. The manual is, however, not yet available at the time of writing.

European Fish Index

The Applied Partners were critical of the method and software available at the last meeting of the FAME project (October 2004). The software worked, but some APs did not agree with the final status classification of certain sites. Consequently some of the APs will not use the EFI because it does not produce an acceptable classification in their opinion. Especially Germany and Austria think that the EFI is overestimating, in other words the EFI classifies at a higher level than national methods. Other countries have not yet tested the EFI with new data – data not already used in the FAME project. For Germany 80 % of the sites tested were apparently misclassified (dataset of ca. 35 sites). When testing the EFI the model appears as black box - it is not obvious how a result is produced and the results for different countries seem to be treated differently by the EFI. This may be dependant on the specific situation in the country with respect to degradation/non degradation. It is too early to say whether the EFI generally overestimates or underestimates. Furthermore, it was explained that for Germany as well as for Austria there was already a problem with the newly sampled sites in WP 9. It is most likely to be a problem of sites impacted by physical pressures only. There are also other examples where additional sites were tested using the EFI and the results were deemed to be correct for more than 80 % of the sites.

From the analyses it appears that fish are more sensitive to chemical impacts than to physical impacts. However, information on pressure data should be improved before detailed analysis can be carried out on this observation. An alternative hypothesis is that physical pressures influence size/population structures especially and we did not include such metrics in the EFI.

Furthermore, Applied Partners are of the opinion that not all requirements of the WFD

have been met.. Age structure, for example, is not included and connectivity was not correctly considered by the method. The final methodology and software were not available until the end of the project – too late for adequate consideration. It was therefore recommended that the initial use of the software should be restricted to a group of prospective users. This may, however, be difficult to arrange as the FAME project ends at the end of October 2004.

4.3. Conclusions and recommendations

During the FAME project the needs and activities of the APs changed. At the start the discussions focused on the status and consequences of the implementation of the WFD and its time schedule. During the second half of the first year most APs were overwhelmed by the amount of work needed for filling the database, especially the environmental data. In the second half of 2003 they were mainly involved in the field-testing. Only in second half of 2004 did the SPs report on the progress and outcomes of the FAME methodology, including the developed EFI method. Only then APs were able to respond to this. There was little time left then to adapt the method.

The AP group was diverse and their interests and responsibilities focussed on water management or fisheries. A less “fish-oriented” group was perhaps desirable for implementing the new methodology and dissemination of the outputs. A more “fish oriented group” was, however, desirable for method development and field-testing. With hindsight, perhaps it would have been desirable for both water authorities and fisheries agencies to be asked to participate on a national level.

Co-operation between APs and SPs was very good most of the time. Applied partners were not always informed in sufficient time about the extent of work for the FAME project and especially the deadlines. The AP point of view always came after the SPs analysis. Due to the strict planning and strict time schedule at the end of the project not all-final software, test results and reports were available. In some cases little or no time was left to adjust or redo analysis after discussion with the APs.

From the AP point of view the following recommendations can be given for the follow up to FAME:

- All countries should test EFI in 2006, during the first WFD monitoring exercise and report on this, perhaps to Brussels in a follow up of FAME (FAME2). AP will only be able to judge EFI consistently after applying the index on the national monitoring network.
- Maintenance of FIDES, to include missing info and fill gaps, incorporate age structure, environmental data and new information on a national level should be collected in future years
- Develop guidance on how to help/inform new EU countries or non-FAME countries
- Because too little time was available to adjust and test the new developed method Brussels should be asked to permit/arrange this by way of follow up
- Help desk facility is needed for EFI and FIDES
- Training is needed for field teams and authorities
- Development of type specific rehabilitation measurement packages are required

APs should put pressure on the EU through their governments to achieve these objectives.

5. REFERENCES

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6. APPENDICES TO WP 11

6.1. Table of Applied Partners and Scientific Partners involved in FAME

Country	Eco-region	Scientific Partner	Applied Partner
Austria	4, 9, 11	BOKU-Hydro, Univ. of Agricultural Sciences Vienna	BAW-IGF Federal Agency for Water Management
Belgium	13	FUNDP-URBO, Faculté Universitaires N.D. de la Paix, Namur	CRNFB Centre de Recherche de la nature, des Forêts et du Bois
Belgium	13	IBW Institute for Forestry and Game Management	VMM Flemish Environment Agency (Vlaamse Milieumaatschappij)
France	2, 4, 8, 13	UCBL-BTGEEC Université de Lyon I, CNRS ESA 5023	CSP Conseil Supérieur de la Pêche
Germany	4, 8, 9, 14	HOHENHEIM University of Hohenheim, Institut of Zoology	FFS Fisheries Research Station of Baden-Württemberg
Greece	6	HCMR Hellenic Centre for Marine Research	CRES Centre for Renewable Energy Sources
Lithuania	15	IE Institute of Ecology	JRC Joint Research Centre Environment Quality Assessment Division
Poland	9,10,14, 15,16	ICE PAS International Centre for Ecology Polish Academy of Sciences	VIEP Voivodship Inspectorate for Environmental Protection in Lodz
Portugal	1	ISA Instituto Superior de Agronomia	DGF Inland Waters Fisheries Division
Sweden	14,20, 21,22	NBF Institute of Freshwater Research at the National Board of Fisheries	
The Netherlands	13, 14	RIZA Institute for Inland Water Management and Waste Water Treatment	
The Netherlands	13, 14	RIVO Netherlands Institute for Fisheries Research	
United Kingdom	18	UHULL University of Hull, International Fisheries Institute	THE AGENCY Environment Agency, National Coarse Fish Centre

6.2. The Applied Partners institutes profile and expectations

Characteristics of the Applied institutes involved in FAME and expectations of the FAME project as mentioned at the start of FAME. (nag. = no answer received)

Applied Partner	Institute profile	Institutes role WFD	Expectations FAME	Special wishes
Austria (AU) BAW-IGF	Governmental, National, Environment and water management and research	Leading a sub group „fish ecology“ of working group „ecological assessment“	nag.	n.a.
Belgium (BF) CRNFB	Governmental Regional scientific institution ecological research and monitoring	Responsible for the ecological network of WFD	To develop a working fish based index for Wallonia because till now this was not available	n.a.
Belgium (BV) VMM	Regional, Environment Agency, monitoring, water management and research	chairmanship of a special study group 'WFD'	To elaborate working methods and fish indices as asked in the WFD, that can be used in common by member states of the same river basin district	Give support to the SP to obtain results useful for the implementation of the WFD
France (FR) CSP	Governmental, National/regional, Fish monitoring, Control of anglers, water and aquatic environment protection control	Participation in working groups on ecological monitoring and assessment. Responsible for the fish monitoring	Provide common guidance on sampling of fish and assessing ecosystem quality from the fish assemblage, intercalibration of national assessment tools	n.a.
Germany (DL) FFS		Coordinator of the working group on "fish-based monitoring of river quality" which has advisory function in questions concerning the implementation of the WFD	Elaboration of sampling and assessment methods in consideration of different river basins. Extensive adjustments of methods to regional conditions should be possible	Expectations according to the description of work of the FAME Project: Accompanying the scientific consortium in developing the new method and test it's applicability in order to get findings usable for the implementation of the WFD.
Greece (GR) CRES	Public entity functioning under private laws although under the auspices of the Ministry of Development; main focus is rational use of energy and energy saving.	No role in the WFD; the organizations prime experience was the support of HCMR in FAME.	Cooperate closely with HCMR, help promote, sensitize government and the public about the WFD	Provide support to SP and to obtain and archive site data useful for the implementation of the WFD.

<p>Lithuania (Li)</p> <p>JRC</p>		<p>Leading institution in Lithuania is Ministry of Environment (MoE) First responsible institution is Joint Research Centre (from year 2003 - Lithuanian Environment Agency).</p>	<p>assessment of fish community state, develop standardised fish-based assessment method for evaluation ecological status of Lithuanian rivers and to have possibility compare ecological river status with other European countries.</p>	<p>For the moment we haven't any specific expectations or wishes how to participate in the project.</p>
<p>Poland (PL)</p> <p>VIEP</p>		<p>control of regulations in environmental protection and sustainable use and management of water resources · participation in the decision process and environmental protection with other institutions, local and governmental administration, juridical institutions, police, and local society · organising and coordination of national monitoring of the environmental quality, direct assessment of the quality, and any changes and threats of the quality environment</p>	<p>To use and apply of the method in whole Poland</p>	<p>Not yet...</p>
<p>Portugal (PO)</p> <p>DGF</p>		<p>The role of each institution in the implementation of the FWD in Portugal is not defined yet.</p>	<p>A definition of standard sampling and assessment methods that can be used to assess ecological status, but also used for fish population and fisheries management.</p>	<p>Collaborate with the SP in order that the scientific output of the project became "usable" in water and fisheries management according the implementation of the WFD.</p>
<p>Sweden (SW)</p> <p>NBF</p>		<p>In Sweden it is not yet decided how the implementation of the WFD will be carried out. The organisation is under consideration. The regional county administrations (24 in Sweden), the Environmental Protection Agency, the National Board of Fisheries (us) and some other</p>	<p>To develop a common strategy for the use of fish in assessment of ecological status. The developed indices might need country wise additional indices to facilitate evaluation of ecological status, e.g. acidification indices for Scandinavia.</p>	<p>To get a scientifically sound evaluation strategy that will broaden the use of present fish monitoring to also include environmental monitoring using the same investigations. Id est, cost efficiency through coordination of resource and environmental monitoring</p>

		governmental agencies will be involved. As the structure is not ready we decided to enter FAME both as scientific and applied partner.	To build up an international expertise framework for the use of fish in WFD.	
Netherlands (NL) RIZA	RIZA is the research and advisory body for the Rijkswaterstaat (the Directorate-General for Public Works and Water Management) for inland water in the Netherlands and a leading international centre of knowledge for integrated water management	A national implementation team is leading the way in the Netherlands. The team consists of representatives of competent authorities: – Ministry of Transport, Public Works and Water management (of which RIZA is part) is initiator and first responsible	Elaboration of a framework for standardised sampling of fish and a method for fish based assessment of the ecological status of large rivers which can be applied, adopt and enforced at national level	No others as in the description of work for the FAME project
United Kingdom (UK) EA-NCFC		n.a.	Technique for classifying and assessing fish populations in rivers	

6.3. Questionnaires

The inquiry sent to all participants prior to the workshop in Maastricht January 2002.

Name	
Area of monitoring (river basin, country, county or province)	
Methodology of river type classification	System A or B according to the WFD, or others (please describe briefly)
Reference conditions, Data and methods	Type of data: reference sites, historic, data, others Methods: <ul style="list-style-type: none"> - Spatially based type-specific conditions (descriptive) - Modelling (predictive models or hindcasting methods) - Expert judgement - Combination of these methods
Field sampling methods applied for monitoring fish stocks in rivers	<ul style="list-style-type: none"> - What is the statistical sampling strategy: random, regular, representative, stratified random? - What kind of sampling methods (electrofishing, seining, fykenets, trawls) are used in which river type? - What are the sampling costs per metric/site/river type? - What is the river-type-dependent sampling intensity: number of sites per assessment unit, length of sampling stretches, fishing duration, number of fishing efforts? - What kind of quantitative or semi-quantitative stock assessment method is used: removal method, catch-recapture method, CPUE (catch per unit effort)? - What are the preferred river-type-specific sampling seasons? - What kind of other environmental data are collected (physiographic characteristics, habitat, chemical/physical water quality, type and intensity of human impacts)
Spatial and temporal sampling intensity of monitoring network	Sampling interval (every x year) Number of sampling sites per river length, river type, region, country, unit area
Assessment methods	Metrics <ul style="list-style-type: none"> - Which criteria and metrics are selected at the ecosystem, community, population, individual level? - To which spatio-temporal scales do proposed metrics refer:

	<p>catchment, river, reach, habitat?</p> <ul style="list-style-type: none"> - Faunal level: How is species diversity defined: number of all species, native species, river-type-specific species? What taxonomic levels are used? Is information about stocked fish included and how is it considered? - Community level: What kind of guild classifications are used: habitat, feeding, reproduction, migration, etc.? - Population level: What kind of metrics are used to characterise population size: abundance, biomass? Which kind of information is used to characterise the population age-structure? - Individual level: What kind of individual data are used: body anomalies, toxicological parameters? <p>Assessment method</p> <ul style="list-style-type: none"> - Index (algorithm) - Expert judgement - Others
Comments and bottlenecks	
Available guidelines, publications, reports, case studies (language)	
Other institutions and people involved in the development and implementation of fish-based assessment methods	

Questions asked to the AP after the Maastricht meeting January 2002

1. General
1.1 What is the institute's role during the implementation?
1.2 What other organisations are involved?
1.3 What is the current status of the follow up of the FWD in your country related to assessment of the ecological status?
1.4 Since we intend (or stated in our Description of Work) to develop a cost efficient method?
1.4.1 what is the current budget for assessing and/or monitoring rivers?
1.4.2 what are actual costs per sampling?
1.4.3 what is the proposed budget for assessment and monitoring according to the WFD?
1.5 What are the general expectations from the FAME project ?
1.6 Are there specific expectations or wishes concerning how to participate in the project?
2. Considerations
2.1 What is already discussed with your scientific partner ?
2.2 How is the contact with WP-leaders and scientific partner?
2.3 Are only 3 partners involved in the implementation of WFD?
2.4 What are the expectations of WP11?
2.5 How to implement the new method successfully?
2.6 How to give feed back to the people at home?
2.7 How to inform and involve other people in time?
3. Additional Maastricht questions?
3.1 Find out time schedules for the implementation of the WFD in your country.
3.2 Whom is the FAME person informed about the national implementation scheme of WFD?
3.3 In what way are you involved by national activities and how do you inform others?
3.4 What topics is decided upon already in your country and is this information transferred to the WP-leader?

6.4. Results of the questionnaires

The results of the first questionnaire prior to the Maastricht meeting are given in: An overview of river fish monitoring in various European countries (Buijse et al. 2002 on FAME countries only). Below the results are given per AP country of the additional questions during the AP meetings.

INFO Applied Partners (17-4-2004)

Country	Austria
Institute	BAW-IGF
Partner nr	15
Contactpersons	Albert Jagsch Reinhard Haunschmid

Implementation WFD

Institutes role during implementation

Leading a national group „fish ecology“ of working group „ecological assessment in respect to WFD“

Responsible in general

Ministry of Agriculture and Forestry, Environment and Water Management; regional governments (“Länder”)

Responsible with respect to fish only

Ministry of Agriculture and Forestry, Environment and Water Management; regional governments

at the national level

Ministry of Agriculture and Forestry, Environment and Water Management

at regional/provincial level

Regional governments

other national organisations involved

None

Other organisations involved

Technical bureaus

River typology clear and decided upon already

River typology: A stream classification based on abiotic features shows 17 aquatic landscape units for Austria (type specific regions). This map was a basis for the subgroup fish ecology to elaborate a fish specific map. So far the given 17 units could be reduced to 10. The problem is to combine the area related aspect with the longitudinal aspect of river zonation.

Reference conditions: Status of reference could be defined by historical and actual data.

Reference sites nominated by regional governments according to chemical and macrozoobenthos data have been checked whether they also fit to fisheries data. This work is not yet completely finished.

For epi-, meta-, hyporhithral, epi-, metapotamal typespecific species compositions have been defined.

Assessment scheme: Dominant and accompanying species, guilds (reproduction, habitat), fish region index, age structure and biomass are taken as metrics for assessment.

Involved in national research projects related to WFD ?
Involved in research focussing on f.b.a.?

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

At the moment: Electric sampling gear (wading and boat)

Which f.b.a.method is presently used

From the national group „fish ecology”

Metrics:

River type specific species, species with self-sustaining populations, number of ecological guilds and composition, fish region index, density and biomass, population age structure of dominating species

Is sampling according FAME standard applicable

Yes, although slightly modified for national purposes.

Is the sampling strategy cost efficient

Hopefully Yes

Is proper electro fish equipment available

Yes

Total budget for fish stock assessment in rivers

There is no defined current budget for assessing and /or monitoring rivers in respect to fish ecology. Current work is done by our institute (calculated costs ca. 80.000 €) without extra funding by the Ministry. Partly investigations are carried out by teams of local governments. Actual costs per sampling: depend greatly on river type (is a boat and a bigger team used or just a small team for wading, etc.) 1000 –2000 € per day.

Costs per sample (results from table cost_inv.xl € 1679,-

Expected number of samples in rivers and streams

Expected number of sampling sites: <400

Are environmental variables as required for FIDES already surveyed

Partly surveyed

Is additional data-collection necessary due to regional conditions?

Dissemination FAME results

Contact with SP

Several meetings, email connection

Contact with end-users

Yes Information for regional experts

Actions taken already

Information for regional experts, regional water authorities

Particular features of national water systems

High knowledge of fish stocks in trout and grayling zone; less data on fish stocks in large rivers (mainly electro fishing surveys of the litoral zone)

Unique national aspects considering fish based assessment

Due to highly variable biomass of trout we introduced the term “k.o criteria” for that metric. Below a biomass of 25 kg/ha the sampling site is classified as the bad status

Did you already start information activities

Regional fisheries organisations have been already informed

Which institutes/organisations should be informed

NGOs

What are the general expectations from the FAME project?

Producing basic data that can be used for developing a national assessment scheme.

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (electric fishing)

Name : Albert Jagsch
Country: Austria

General information

Number of men needed during sampling: min.3 / max.8
 Number of sites possible to sample per day: min.1 / max.3
 Expected number of samples to monitor per year = <400
 Equipment and sampling specification

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	10.000,00	5	2.000,00
Electrofishing anodes, dipnets	500,00	2	250,00
Electrofishing safety equipment	500,00	5	100,00
....			
Sampling boat			
Boat	10.000,00	10	1.000,00
Outboard motor	4.000,00	5	800,00
Accessories	1.000,00	5	200,00
Boat trailer	4.000,00	10	400,00
Others (specify)			
Total fixed costs	30.000,00		4.750,00
Variable costs			
Equipment operation			
Electrofisher repair and maintenance			300,00
Boat repair and maintenance			300,00
Fuel, oil			300,00
Others (specify)			100,00
Personnel (salary etc.)			
Supervisor			30.000,00
Technician 1			20.000,00
Technician 2			15.000,00
Others (specify)			30.000,00
Total variable cost			96.000,00
Total cost			100.750,00
Cost per sample			1.679,00

Cost Basis Personnel tariff
 500 hours (~60 days)
 Supervisor € ~ 60,-/h
 Techn 1 € ~ 40,-/h
 Techn 2 € ~ 30,-/h
 others á € ~ 30,- /h

INFO Applied Partners

Country

Belgium (BF)

Institute

CRNFB

Partner nr

15

Contactpersons

Pierre-Gerard Dominique

No information received Belgium Wallonia

INFO Applied Partners

Country	Belgium (BV)
Institute	VMM
Partner nr	16
Contactpersons	Gaby Verhaegen

Implementation WFD

Institutes role during implementation

For the implementation of the WFD a special study group 'WFD' was set up under chairmanship of VMM.

Responsible in general: Assessment of the ecological status

Responsible with respect to fish only: No

At the national level: No

At regional/provincial level: Yes

Other national organisations involved: Administrations of the department for infrastructure and environment (LIN) of the ministry of the Flemish Community

Other organisations involved

Pararegional institutions and scientific institutions related to watermanagement

River typology clear and decided upon already

System B is used (river width, slope, distance to source)

Involved in national research projects related to WFD

Yes, for regional research projects about typology and other ecological quality elements

Involved in research focussing on f.b.a.

Yes, for regional research projects

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

Electrofishing, seinenets, fykenets, gillnets

Which f.b.a.method is presently used

A multimetric index is applied. Parameters give information concerning the community, population and individuals

Is sampling according FAME standard applicable: Yes

Is the sampling strategy cost efficient: Yes

Is proper electro fish equipment available: Yes

Total budget for fish stock assessment in rivers ?

Costs per sample (results from table cost_inv.xls) 375 €

Expected number of samples in rivers and streams 200 (sampled in 2002)

Are environmental variables as required for FIDES already surveyed ? Partly

Is additional data-collection necessary due to regional conditions No

Dissemination FAME results

Contact with SP: Yes, provide some data and follow-up of research results.

Contact with end-users ? The SP and the AP are potential end-users.

Actions taken already ? Information on typology and progress of the project.

Particular features of national water systems ?

Unique national aspects considering fish based assessment ?

Did you already start information activities Yes, presentation on workshop 19/12/'03 (Scaldit), leaflet on meeting 18/03/'04 (CIW), information to researchers and universities.

Which institutes/organisations should be informed

VIWC (Flemish watermanagement committee; renamed as CIW)-partners: Aminimal-Water; Arohm; AWZ; VMM; VMW; VVP; VVPW; VVSG; ICBS-CIPE (renamed as ISC-CIE) and ICBM-CIPM (renamed as IMC-CIM). NGOs

What are the general expectations from the FAME project

To elaborate working methods and fishindices as asked in the WFD, that can be used in common by member states of the same river basin district.

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (electric fishing)

Name :	Jan Breine		
Country:	Belgium Flanders		
General information			
Number of men needed during sampling		5	
Number of sites possible to sample per day		5	this is a maximum
Expected number of samples to monitor per year =	in 2002 we sampled 200 locations		this includes standing water
Equipment and sampling specification			
	Purchase cost	Life expectancy	Annual cost
	(€)	(year)	(€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	in total 6250 €		10
Electrofishing anodes, dipnets			1
Electrofishing safety equipment			1
....			
Sampling boat			
Boat	2482 till 3600 €		10
Outboard motor	2200.0 €		5
Accessories	500.0 €		5
Boat trailer	1200.0 €		6
Others (specify)safety jackets and c	500.0 €		2
Total fixed costs		14500.0 €	
Variable costs			
Equipment operation			
Electrofisher repair and maintenance	600.0 €		
Boat repair and maintenance	300.0 €		
Fuel, oil	800.0 €		
Others (specify)	3600 € per car		
Personnel (salary etc.)			
Supervisor	2100000.0 €		
Technician 1	1500000.0 €		
Technician 2			
Others (specify)	labourers : 1000000 €		
clothing	120.0 €		
Total variable cost			
Total cost			
Cost per sample	we estimate 375 € per sample		

INFO Applied Partners

Country

France (FR)

Institute

CSP

Partner nr

17

Contactpersons

Nicolas Roset

Romuald Berrebi

Jean-Pierre Porcher

Implementation WFD

Institutes role during implementation

National working groups have been formed, in accordance to EC groups (REFCOND, IMPRESS, MONITORING.). The CSP (National Council of Fishing) takes part into these groups with the objective of developing the biological approach and especially assessment tools based on fish populations.

responsible in general

No

responsible with respect to fish only

Yes, to develop the biological approach and especially assessment tools based on fish populations and the monitoring of fish populations.

at the national level

Yes

at regional/provincial level

Yes

other national organisations involved

The Ministry of Environment and its local representative (Regional Directions of Environment) are responsible for coordination at the national level.

Other organisations involved

The Six Water Agencies are the competent authorities for the application of the WFD in the six districts.

River typology clear and decided upon already

We use system B to classify our rivers: basin, drainage area, river slope, river width, river depth, temperature

Involved in national research projects related to WFD

Yes, setup of tools aimed at the assessment of river habitat (part of hydromorphological assessment) and at the evaluation of impacts of human activities, using fish models (assemblage of species or indicator fish species).

Involved in research focussing on f.b.a.

Yes, development of a Fish Based Index over the period 1996 – 2000, and later improvement of this first version of the index (in cooperation with the scientific partner).

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

Electrofishing

Which f.b.a.method is presently used

Semi-quantitative method.

Metrics

- Total number of species
- Number of lithophilic species
- Number of benthic species
- Benthic species individuals
- Number of rheophilic species
- Number of intolerant species
- Tolerant species individuals
- Omnivorous species individual

- Invertivorous species individuals
- Total density of individuals

Is sampling according FAME standard applicable

Yes, though the minimum length to be sampled on large rivers is not always respected today, and could be difficult to reach in some cases

Is the sampling strategy cost efficient

Yes, the cost of fish sampling seems to be competitive compared to the cost and information given by chemical analysis or other biological sampling.

Is proper electro fish equipment available

Yes

Total budget for fish stock assessment in rivers

About 2 000 000 €

Costs per sample (results from table cost_inv.xls)

2945 €

Expected number of samples in rivers and streams

675 at the moment. Number of sites for the future network of the WFD (assessment and survey) not already known

Are environmental variables as required for FIDES already surveyed

No, even if the main sites descriptors are surveyed (slope, distance from source, altitude...), some others such as “width flooded area”, water source type, flow regime; geological typology, lakes upstream...) and most of human pressure parameters (land use, urbanisation, connectivity, floodplain lateral movement, riparian zone...) are not already available at the national scale.

Is additional data-collection necessary due to regional conditions

No, except if some river types are under-represented in the reference data set, this could require further investigations.

Dissemination FAME results

Contact with SP

So far all contacts are by the mean of workshops and Intranet site.

Contact with end-users

Yes, as AP, CSP is a main potential end-user of the Fish index. Other are private firms but they would rather use it after national validation and normalisation

Actions taken already

To date (Jan. 2003), the identification of surface water bodies is on progress in the districts, with the first report on the ecological status and impact of human activities.

Particular features of national water systems ?

Unique national aspects considering fish based assessment ?

Did you already start information activities

Yes during several workshops and meetings (e.g. with Water Agencies) and recently (Apr 2004) the French Ministry of Environment and other river managers with national responsibility (together with SP)

Which institutes/organisations should be informed

Ministry of environment, Water agencies and regional Direction of CSP

What are the general expectations from the FAME project ?

Provide common guidance on sampling of fish and assessing ecosystem quality from the fish assemblage, intercalibration of national assessment tools, enrichment of national databases in order to develop more powerful tools.

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (€)

Name : PORCHER Jean-Pierre jean-pierre.po
Country: France

General information

Number of men needed during sampling 7 to 23, average = 13 Depending on
The number o
 Number of sites possible to sample per day 2
 Expected number of samples to monitor per year = 35 samples per team 675 samples c
 Equipment and sampling specification Authorised Equipment Type "Héron", 5 KVA, sampl

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
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Fixed costs per fishing team (VAT excluded)

Sampling gear			
Electrofisher, generator, booms	13.500 €	10 €	1.350 €
Electrofishing anodes, dipnets	4.000 €	5 €	800 €
Electrofishing safety equipment	1.500 €	5 €	300 €
....			
Sampling boat			
Boat	2.500 €	10 €	250 €
Outboard motor	2.200 €	10 €	220 €
Accessories			
Boat trailer + tractor vehicle	18.000 €	8 €	2.250 €
Others (specify)			
Total fixed costs	41.700 €		

Variable costs

Equipment operation			
Electrofisher repair and maintenance	2.300 €		2.300 €
Boat repair and maintenance	1.100 €		1.100 €
Fuel, oil			
Others (specify)			
Personnel (salary etc.)			
Supervisor : 1 * 35 days	12.600 €		12.600 €
Technician 1 : 2 * 35 days	20.300 €		20.300 €
Technician 2 : 9 * 17.5 days	44.100 €		44.100 €
Others (specify) Traveling costs	17.500 €		17.500 €

Total variable cost 97.900 €

Total cost 103.070 €
 Cost per sample 2.945 €

INFO Applied Partners

Country	Germany (DL)
Institute	Fisheries Research Station of Baden-Württemberg (FFS)
Partner nr	19
Contactpersons	Uwe Dussling Rainer Berg Ralf Haberbosch

Implementation WFD

Institutes role during implementation

The FFS cooperates with the "Federal States working group on water" (LAWA, Länderarbeitsgemeinschaft Wasser) and is coordinator of the working group on "fish-based monitoring of river quality" (AK "Fischereiliche Gewässerzustandsüberwachung"), which has advisory function in questions concerning the implementation of the WFD.

responsible in general

No

responsible with respect to fish only

Yes, the FFS is coordinator of the working group on "fish-based monitoring of river quality" (AK "Fischereiliche Gewässerzustandsüberwachung"), and coordinator of a connected national joint project on the development of a fish-based assessment method for rivers according to the WFD.

at the national level

The working group on "fish-based monitoring of river quality" (AK "Fischereiliche Gewässerzustands-überwachung") has advisory function in questions concerning the implementation of the WFD, but the implementation of the WFD is in the responsibility of the different Federal States (Bundesländer).

at regional/provincial level

The FFS has advisory functions for the ministry of agriculture and the fisheries administration in the federal state of Baden-Württemberg.

other national organisations involved

The LAWA has a leading role concerning the implementation of the WFD, but the transfer into water management application is the task of the different Federal States.

Other organisations involved Actually not decided

River typology clear and decided upon already

An outline of a typology distinguishing 20 river-types has been published (SCHMEDJE et al., 2001). A revised version of this german typology (POTTGIESSER et al. 2004) is accepted and transformed into Federal States law. It is based on geomorphological criteria, system B is used. In the current version, it contains 24 river types. A further fish-based subdivision of single river types is possible and necessary especially for large rivers.

Involved in national research projects related to WFD

National joint project on the development of a fish-based assessment method for rivers according to the WFD (May 2001 – September 2003).

Involved in research focussing on f.b.a.

Yes, a rough draft of an assessment scheme using fish communities has been proposed by the German working group "fish-based monitoring of river quality" (AK "Fischereiliche Gewässerzustandsüberwachung"). This draft was used as a basis for the work in the national joint project (May 2001 – September 2003). The aim of this project was, to further develop and verify the draft in order to finalize a generalized assessment system suitable for all German river-types. Also a proposal for sampling methods suitable in the different German river types will be given. The results of the project will be presented at a meeting in Berlin from 25th –26th March 2004.

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

There is no standardized national monitoring until now.

Which f.b.a.method is presently used

A standardized German river monitoring system was not established until now due to the special situation in Germany not comparable to other countries. Inland fisheries is the task of the Federal States in Germany. Due to this, every Federal State has its own river monitoring programme and uses an own database. During the last 3 years a national fish-based assessment method was developed. (DUBLING, U., BERG, R., KLINGER, H., & C. WOLTER 2004: Assessing the Ecological Status of River Systems Using Fish Assemblages. In: STEINBERG, C., CALMANO, W., KLAPPER, H., WILKEN, R.D. (eds): Handbuch Angewandte Limnologie, Loseblatt-Ausgabe, 20. Ergänzungslieferung 12/04, ecomed, Landsberg am Lech, 84 pp.

Is sampling according FAME standard applicable

We don't think, that the sampling strategy developed in FAME is realistic, applicable and cost efficient in each case. We mentioned problems with different points proposed in FAME WP 3 in several statements. For example the usage of 1 anode per 5 m river width is not possible in larger wadable rivers because of several reasons (for example necessary staff not available, safety problems).

Is the sampling strategy cost efficient

No, see above.

Is proper electro fish equipment available

Yes

Total budget for fish stock assessment in rivers

There is no current budget for monitoring fish communities in rivers. A general standardized monitoring programme for fish in Germany has not been established until now.

Costs per sample (results from table cost_inv.xls)

Costs per sampling depend on different aspects as river type, used sampling method and intensity and accuracy of data evaluation. As there is no standardized monitoring programme and sampling design in Germany, exact calculations about costs are not possible. According to a rough estimation costs will be between about 500,- € and 2.000,- € per sample.

Expected number of samples in rivers and streams

Not fixed until now.

Are environmental variables as required for FIDES already surveyed. The variables for FIDES were very unspecific in some way. The environmental data recorded in Germany are very detailed, but normally not available in the fish databases of the different Federal States.

Is additional data-collection necessary due to regional conditions ?

Dissemination FAME results

Contact with SP

Our contact with the scientific partner concerning the comments to WP 1-3 was mainly via e-mail. Contact to WP-leaders mainly took place via intranet or e-mail.

Contact with end-users

We are in persistent contact with the end-users in Baden-Württemberg. Contact to the end-users in other Federal States is given in the working group on "fish-based monitoring of river quality" (AK "Fischereiliche Gewässerzustandsüberwachung").

Actions taken already

Several presentations about FAME on the regional and national level.

Particular features of national water systems

Nearly no reference sites; different river basins with different zoogeographic aspects.

Unique national aspects considering fish based assessment

?

Did you already start information activities

Yes, see above (Actions taken already). The time table for the implementation of the WFD in Germany is corresponding with the time table given in the WFD. It is available in the internet (www.bmu.de - German guidance document for the implementation of the EC Water Framework Directive).

Which institutes/organisations should be informed

The concerning institutions of the different Federal States are informed as they are members of the working group on fish-based monitoring of river quality.

What are the general expectations from the FAME project ?

Elaboration of sampling and assessment methods in consideration of different river basins.

Adjustments of methods to regional conditions should be possible.

Expectations according to the description of work of the FAME project: Accompanying the scientific consortium in developing the new method and test its applicability in order to get findings usable for the implementation of the WFD.

No info on costs of sampling fish in rivers according to FAME/CEN standards received

INFO Applied Partners

Country

Greece (GR)

Institute

CRES

Partner nr

20

Contactpersons

Kostis Karras (CRES)

Alkis Economou (HCMR)

Stamatis Zogaris (HCMR)

Implementation WFD

Institutes role during implementation

responsible in general No

responsible with respect to fish only No

at the national level No

at regional/provincial level No

other national organisations involved

In the case of Greece, CRES was designated as an applied partner but as an organization it does not have involvement in implementing the WFD or working on bioassessment. During the FAME project CRES supported the research and specific physico-chemical data-search for the FAME sites as well as other applied aspects of the work (public awareness etc.). The Hellenic Center for Marine Research-Institute of Inland Waters (HCMR) as the SP worked together with CRES to promote applied aspects of the FAME project and this is why both organizations contributed as “Applied Partners” in FAME in Greece. The HCMR has an active role to play in application of the WFD in Greece and although responses to this questionnaire apply to CRES, HCMR has contributed to most of the technical and policy-relevant applied responses.

Other organisations involved

Hellenic Ministry of Environment, Physical Planning and Public Works supported physico-chemical and pollution data from its river monitoring sites.

River typology clear and decided upon already

- No river typology has yet been promoted for the country although discussions tend toward the use of a System B typology; this has yet to be developed.

Involved in national research projects related to WFD

Yes in concert with work on FAME with HCMR

Involved in research focussing on f.b.a.

Yes in concert with work on FAME with HCMR

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

In Greece small backpack and landbased electrofishers have been used in the past and fish sampling has rarely followed strict methods such as the CEN standards, most fish sampling has been for distributional work, fish taxonomy collections and more recently some small scale impact studies or specific studies such as the sampling executed under the FAME project by HCMR.

Which f.b.a.method is presently used

There are no monitoring programmes of fish and their aquatic environment in Greece, and no fish-based assessment method has ever been developed. The information provided in this inquiry concerns general methodology used in ichthyological projects in Greece.

Is sampling according FAME standard applicable

Yes in small rivers, in larger wadeable rivers fish sampling using two or more anodes has not been executed as far as the SP is concerned. Due to the larger number of people needed to sample rivers larger than 10 m wetted width following FAME methods and CEN standards this undertaking will be a rather expensive endeavour in Greece. Electrofishing in non-wadable rivers using boats has never been undertaken by the Greek SP and to its knowledge has never been practiced for scientific sampling anywhere in Greece. Boat-based sampling should be applicable in many larger Greek rivers and the SP is promoting its development in the near future.

Is the sampling strategy cost efficient

Difficult to answer this question since cost varies greatly in Greece and this methodology according to strict CEN standards has not been widely applied.

Is proper electro fish equipment available

Yes for small streams; no equipment is currently available for larger rivers or non-wadable rivers.

Total budget for fish stock assessment in rivers

This appraisal is not possible with currently very low and scattered base-line knowledge.

Costs per sample (results from table cost_inv.xls)

Electrofishing sampling in Greece costs roughly 400 to 2000 Euros per sample with an average estimate of 1837 per site if about 180 sites in Greece were to be set up as a monitoring system. Actual costs per sample depend greatly on river type, terrain, accessibility, distance from Athens or other headquarters. The cost range is very wide due to several practical problems, such as Greece's poor inland and mountain road conditions; the large number of islands covering nearly 20% of the country; the mountainous nature of 70 % of the country and the remarkable biogeographic diversity which calls for a very carefully developed assessment system which will be responsive to much natural variability. Also one should bare in mind that very few people practice electrofishing in Greece so experienced field technicians are very scarce, so the start-up costs for a fish-based monitoring and assessment system for the entire country will be relatively high.

Expected number of samples in rivers and streams

Approximately 180 sites to be sampled in total; and about 80 sites per year. This number should cover a representative sample of most of mainland Greece's 80 or so major large and medium-sized drainage basins and some of Greece's insular basins also.

Are environmental variables as required for FIDES already surveyed

This is a very large problem. Precise environmental data is not easy to gather or to assess the data quality.

Is additional data-collection necessary due to regional conditions

Yes.

Dissemination FAME results

Contact with SP

The SP was very closely involved in most applied aspects of the FAME work so the contact was constant.

Contact with end-users

Some contact with governmental and non-governmental organizations who will be involved in future monitoring work in the real of the WFD was made.

Actions taken already

Proposals and several meetings with key government officials were made during the FAME project.

Particular features of national water systems

Our national water system monitoring system is centered on physico-chemical and hydrological measurements and several agencies are involved in gathering data with varied levels of precision and different sampling strategies.

Unique national aspects considering fishbased assessment

Since no monitoring has been developed, data for the FAME database had to be gathered from previous sampling projects which did not follow bioassessment methodology. The database was therefore weak in terms of the data quantity and quality. Many climatic, biogeographical, historical, anthropogenic disturbances and other factors affect the fish communities of Greek streams making the development of a fish-based assessment index in Greece particularly challenging.

Did you already start information activities

Yes. Presentation at three conferences have been undertaken and a special seminar was conducted devoted to the implementation of WFD. On June the 25th, 2004 a working meeting was organised in collaboration with HCMR and took place at the premises of CRES in Pikermi, Attica. The meeting title was: "The Water Framework Directive (2000/60/EC, WFD) and possibilities of application of fish-based assessment methods for assessing the ecological situation of rivers in Greece". In the meeting people from the relevant national authorities and SME's were invited and many of them participated actively in the discussion.

Which institutes/organisations should be informed

It is very important that the stakeholders directly involved in the implementation of the WFD be well informed. These include officials and staff of the Ministry of Environment, Public Works and Planning; Ministry of Agriculture; Ministry of Development and other central authorities.

So far NCMR personnel have informed the following organizations at a formal or informal level: Ministry of Environment, Public Works and Planning; Ministry of Agriculture; Ministry of Development; Aristotle University of Thessaloniki; University of Ioannina; University of Athens; National Technical University of Athens; as well as several other smaller institutions, National Park Management Bodies, Environmental NGOs, Environmental Consultancies, Local Development Agencies etc.

What are the general expectations from the FAME project ?

The FAME project helped promote the use of fish as bioindicators in Greece an aspect of bioassessment which had never before been promoted in this country.

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (electric fishing)

Name : Economou, A.N., Zogaris, S., Giakoumi, S.
Country: Greece

General information

Number of persons needed during sampling 4
 Number of sites possible to sample per day 1 to 2 (40 sites will take one whole day to survey, 40 will take half d:
 Expected number of samples to monitor per year = 80

Equipment and sampling specification

	Equipment and sampling specification	
	Purchase cost (€)	Annual cost (€)
Fixed costs	Fixed costs	
Sampling gear		
Electrofischer, generator, booms	38000	5 2000,0 €
Electrofishing anodes, dipnets	500	2 250,0 €
Electrofishing safety equipment	500	5 200,0 €
Sampling boat		
Boat	10000,0 €	12 1000,0 €
Outboard motor	3000,0 €	5 250,0 €
Accessories	1000,0 €	5 100,0 €
Boat trailer	4000,0 €	5 200,0 €
Safety jackets, clothes, other equipment	2000,0 €	2 1000,0 €
Total fixed costs	59000,0 €	5000,0 €

Variable costs

Equipment operation		
Electrofischer repair and maintenance	300,0 €	5 100,0 €
Boat repair and maintenance	300,0 €	5 100,0 €
Fuel, oil	2400,0 €	1 2400,0 €
Jeep transportation (car rental)		
Jeep transportation (car rental)	8400,0 €	1 8400,0 €
Other travel costs (airplane etc)	5000,0 €	5000,0 €
Travel costs		
Personnel (salary, data entry, management etc.)		
Supervisor	35000,0 €	1 35000,0 €
Technician 1	19000,0 €	1 19000,0 €
Technician 1	19000,0 €	1 19000,0 €
Technician 2	18000,0 €	1 18000,0 €
Others (fishermen, boat-handler)	10000,0 €	1 10000,0 €
Training (Certification, seminars etc)	5000,0 €	5000,0 €
Accommodation (hotels etc)	20000,0 €	1 20000,0 €

Total variable cost 142400,0 €

Total cost 206400,0 €

Cost per sample 1837 per sample

INFO Applied Partners

Country	Lithuania
Institute	EPA
Partner nr	21
Contactpersons	Juozas Molis

Implementation WFD

Institutes role during implementation

Leading institution in Lithuania is Ministry of Environment (MoE).

First responsible institution is Lithuanian Environment Protection Agency.

responsible in general

MoE

responsible with respect to fish only

Institute of Ecology. Institute is responsible fish community, biomass and life of river and lake type.

at the national level

EPA. EPA is responsible for assessment of surface water quality, sampling and analysing of rivers and lakes quality, assessment of point source, identify types of rivers and lakes to assess their ecological quality by biological and physiochemical quality elements, full coordination of surface water monitoring. From the year 2003 EPA is responsible for sustainable and complex use and protection of water resources, creation of river basin management system, preparation of river basin management plans and programs.

at regional/provincial level

8 Regional Environmental Protection Departments (REPD). REPD are responsible for the water sampling and routine analysis.

other national organisations involved

Marine Research Centre, Geological Survey, Hydrometeorological Service. Marine Research Centre responsible for monitoring, protection and assessment resources of coastal marine waters, assessment coastal marine waters ecological quality by biological and physiochemical quality elements.

The Geological Survey is responsible for protection and assessment resources of ground water, coordination of ground water monitoring, sampling and analysing of ground water quality. Hydrometeorological Service is responsible for surface water resources, assessment of surface water level and discharge.

Other organisations involved

1. Agriculture Ministry is responsible for ecological arable farming.
2. Finance Ministry is responsible for the monitoring budget.
3. Geographic institute is responsible for lakes hydrological, limnological, typological, and geological classification according to WFD recommendations.

River typology clear and decided upon already

We use our own river classification methodology that includes some descriptors from both – A and B classifications. The main descriptors we use are river length, width, depth, yield and water thermal regime.

Involved in national research projects related to WFD

Danish EPA - long-term assistance in the transposition and implementation of the Nitrates Directive, tools for groundwater and surface water analysis during implementation of the WFD in Lithuania. Preparation of the Implementation of the EU WFD in a Nemunas lowland and Curonian Lagoon.

Swedish MoE - Capacity building of Lithuanian Institutions responsible for WFD implementation.

Involved in research focussing on f.b.a.

Institute of Ecology

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

The main sampling method is electro fishing, but in larger rivers we use selective gill nets and floating nets too.

Which f.b.a.method is presently used

Assessment method depends on situation and the aims to be achieved: in some cases – index (IBI), and in some – expert judgement.

Metrics:

- At the community level - species diversity, trophic composition density, biomass;
- At the population level – age-length structure, density, biomass, in rivers included into monitoring system of Lithuania – growth, mortality, toxicological parameters.
- At the individual level – body anomalies, diseases. These metrics refer mainly to river, habitat and catchment.
- To define species diversity we use number of all species, because non-native species rarely occur in the rivers. Taxonomic levels – family, genus, species.
- Concerning stocked fish – only recently stocking of salmon and sea-trout takes place in Lithuania, and investigations on stocking effectiveness goes on: the changes in salmon and sea-trout population density are monitored.
- At the community level almost all guild classifications are used – habitat, feeding and migration.
- To characterise population size we use both density and biomass. For identification of age structure we use fish scales.
- At the individual level we record body anomalies, individuals with disease. In the rivers, included into monitoring network, the accumulations of heavy metals and radionuclids in fish (roach *Rutilus rutilus* and perch *Perca fluviatilis*) tissues are recorded every 3-d year.

Is sampling according FAME standard applicabl Yes

Is the sampling strategy cost efficient Yes

Is proper electro fish equipment available Yes, but don't have

Total budget for fish stock assessment in rivers

In 2001 - 2003 year the current budget for assessing and monitoring rivers is over ~ 30 thousand EURO per year

Costs per sample (results from table cost_inv.xls)

750-1000 EURO

Expected number of samples in rivers and streams 60-80

Are environmental variables as required for FIDES already surveyed No

Is additional data-collection necessary due to regional conditions No

Dissemination FAME results

Contact with SP Good

Contact with end-users Good

Actions taken already

It is available in the internet (<http://aaa.am.lt>).

Particular features of national water systems

Unification of the methods

Unique national aspects considering fish based assessment?

Did you already start information activities Yes

Which institutes/organisations should be informed

The organisations and institutes to whom was sent the FAME brochure are: Municipalitys, Centers of Hygiena, Research institutions

What are the general expectations from the FAME project ?

The general expectations from the FAME project are assessment of fish community state, develop standardised fish-based assessment method for evaluation ecological status of Lithuanian rivers and to have possibility compare ecological river status with other European countries.

Name : Juozas Molis
Country: Lithuania

General information

Number of men needed during sampling 4
 Number of sites possible to sample per day 2-3
 Expected number of samples to monitor per year = 60-80
 Equipment and sampling specification

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	4000-5000	5	800-1000
Electrofishing anodes, dipnets	200	5	40
Electrofishing safety equipment	500	3	160
....			
Sampling boat			
Boat	1500	5	300
Outboard motor	2300	10	230
Accessories	150	3	50
Boat trailer	2300	10	230
Fish tanks	100	5	20
Total fixed costs	11050-12050	46	1830-2030
Variable costs			
Equipment operation			
Electrofisher repair and maintenance	500	5	100
Boat repair and maintenance	500	5	100
Fuel, oil	1000	1	1000
Transportation (exploitation of car)	3000	1	3000
Personnel (salary etc.)			
Supervisor	18000	1	18000
Technician 1	14400	1	14400
Technician 2	12000	1	12000
Others (specify) asistent-driver	9600	1	9600
Total variable cost	59000		58200
Total cost	20550-21550		60030-60230
Cost per sample			750-1000

INFO Applied Partners

Country

Poland (PL)

Institute

VIEP

Partner nr

22

Contactpersons

Włodzimierz Andrzejczak

Implementation WFD

Institutes role during implementation

- control of the use of regulations in environmental protection and sustainable use and management of water resources
- participation in the decision process according to: closing of investments harmful to the environment and consulting of investments which may improve the quality of environment;
- cooperation in environmental protection with other institutions, local and governmental administration, juridical institutions, police, and local society;
- organising and coordination of national monitoring of the environmental quality, direct assessment of the quality, and any changes and threats of the quality environment;
- elaboration and implementation of analytic and control methods in environmental assessment;
- initiation of the undertakings in order to mitigate and prevent against threats in the quality of environment, removing of negative effects, renaturalisation;

responsible in general: No

responsible with respect to fish only: No

at the national level: No

at regional/provincial level: Yes

other national organisations involved?

Other organisations involved

1. Ministry of Environment.

2. Department of Water Resources in Ministry of Environment.

3. Chief Inspectorate for Environmental Protection.

4. Voivodship Inspectorates for Environmental Protection in whole Poland.

5. Voivodeship Marshal's Offices (VMO) with Departments of Agriculture and Environment Protection, in whole Poland.

River typology clear and decided upon already

Up to now mostly river type classification based on system B – physical: morphological and hydrological description of the river (geology, size of catchment, altitude, gradient slope, discharge, mean current velocity, mean width, mean depth, general bottom characteristic, submerged plants, riparian vegetation, adjacent area, degree of pollution, water conductivity, channel characteristics: natural vs. regulated), and chemical description of river water quality.

The new methodology for establishing river typology for Polish rivers is now under preparation – the Expertise for Ministry of Environment "Identification of problems and necessary works and the proposition of initial methodology for evaluation of typology and classification of waters in Poland from the point of water management planning according to WFD (2000 / 60 / EC) - Identyfikacja problemów i niezbędnych prac oraz propozycja wstępnych wytycznych metodycznych w zakresie opracowania typologii i klasyfikacji wód w Polsce dla potrzeb sporządzania planów gospodarowania wodami zgodnie z RDW 2000 / 60 / WE." Working team: Zalewski, M., Wagner-Lotkowska, I., Bocian, J., Rodzoch A. Warsaw.

Currently, the 25 river types for Poland (Błachuta et al., in prep.) are elaborated in the framework of Twinning Project (Germany-Poland), PL 02 IB EN 01 Water Framework Directive (twinning.com). Member States involved: Germany, MS Body responsible for implementation-German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety; CC Body responsible for implementation: Polish Ministry of the Environment; Department of the Foreign Funds Management. Sector “Environment”.

Involved in national research projects related to WFD

Yes, but only chemical and biological analysis. In 2003, in Poland will be implemented a new regulations adjust to the Water Frame Directive.

Involved in research focussing on f.b.a.

Not yet, only due to cooperation with FAME project.

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

Electrofishing with 1 or maximum 2 runs, and selective net sampling (gillnets) in case of large rivers.

Which f.b.a.method is presently used Assessment methods:

- IBI, Diversity, ABC indices
- Expert judgement

Metrics:

At the fish community level:

- Fish density, biomass, standing crop, productivity, species diversity, guilds (mainly reproductive, but also feeding and habitat)

At the population level:

- Population age structure (from fish scales and otoliths), density and biomass

- At the individual level:

individual fish length and weight, body anomalies and diseases.

Is sampling according FAME standard applicable It might be applicable but only in cooperation with institutions currently performing fish monitoring in rivers like e.g. Polish Anglers Association (PAA) or with scientific institutions that cooperate in this subject with PAA, or with private institutions posses the PAA licence for fishing with electricity.

Moreover, in novelised polish law toward its adjustment to WFD, the Voivodeship Inspectorates for Environment Protection will still be obliged to assess and monitor the physico-chemical and bacteriological quality of water in rivers (Dz.U.04.32.283,284). And so far, from the point of biological assessment: saprobien index for fitoplankton and peryfiton; chlorophyll_a; and benthic macroinvertebrates are only estimated. Other new elements, transposed from WFD by above act deal with additional assessment of surface water quality on the base of hydrological and morphological elements, what include some river characteristics present in FIDES_database (altitude, size of watershed, geological formation, water depth, discharge, river connectivity, river channel morphology, river width, current velocity, structure of river banks and riparian zone). However, according to this new polish regulation for river hydrological and morphological elements assessment the responsibility will be taken by hydro-meteorological national services not by VIEP , thus needs another cooperation.

Only one recent regulation deals with water monitoring that should be provided for fish, but concerns again only physico-chemical water quality assessment from the point of maintainance the

fish community dominated by salmonid or by cyprinid species – the Act of Ministry of Environment to establish norms for inland waters to maintain fish community under natural conditions (Dz.U.02.232.1953). The project includes normative values for physico-chemical parameters that might be acceptable by salmonid or by cyprinid fish species.

Is the sampling strategy cost efficient

Yes.

Is proper electro fish equipment available

Yes.

Total budget for fish stock assessment in rivers

About **60 000, - Euro per year**

Costs per sample (results from table cost_inv.xls)

Sampling costs: 3 sites = 132x3=396, Euro

Expected number of samples in rivers and streams

540 (6 river basins selected for monitoring and 90 sites in each basin) (after the project “Monitoring of Water Habitats’ Biota – Monitoring Przyrody Żywej Siedlisk Wodnych, program for realization for years 1996-2005, by Hillbricht-ilkowska A., Przybylski M., Warsaw, 1996)

Are environmental variables as required for FIDES already surveyed

Some of most important environmental variables as required for FIDES are already surveyed during researches conducted by scientific institutions working on fish stock assessment in polish rivers: site localisation, distance from source, size of catchment, altitude, gradient slope, discharge, mean current velocity, mean width, mean depth, general bottom characteristic, submerged plants, riparian vegetation, adjacent area, degree of pollution, water conductivity, channel characteristics: natural vs. regulated)

Is additional data-collection necessary due to regional conditions

Not necessary to collect any specific data, besides those related to river connectivity metric, as more than 100 dams are constructed on polish river systems (source: OŚRODEK TECHNICZNEJ KONTROLI ZAPÓR, <http://www.otkz.pol.pl/zapory/pl/index.html>)

Dissemination FAME results

Contact with SP

Meetings with SP to get the information about fish assessment methodology available in Poland and world-wide. Co-operation with SP during the Fides_data base preparation in checking and collecting necessary water quality data for given river and site.

Contact with end-users

Contact in order to present the FAME project approach and to verify the possibility of implementation its method:

- with local administration: Voivodeship Marshals Office (VMO) and its departments (i.e. department of Agriculture and Environment Protection), subordinate to Ministry of Environment and responsible for control the VIEP activity, which are direct regional recipients of the VIEP water monitoring results.

- with the Chief Inspectorate for Environmental Protection which is responsible for development and implementation of the analytic/research and control/measurement methods.
- Frequent contact in order to present the FAME project approach, to collect and check the water quality data at the stage of FIDES preparation, and to verify the applicability of implementation its method: with other 15 Voivodeship Inspectorates for Environmental Protection in Poland in: Białystok, Bydgoszcz, Gdańsk, Katowice, Kielce, Kraków, Lublin, Olsztyn, Opole, Poznań, Rzeszów, Szczecin, Warszawa, Wrocław, and Zielona Góra.

Actions taken already

Sectorial Meetings with other 15 Voivodeship Inspectorates for Environmental Protection.

Participation in national meeting with SP:

Polish Hydrobiologists Meeting, Warsaw, Poland, 9-12, September, 2003. Lecture and poster: Zalewski M., Łapińska M., Bocian J., Dembiński Z. Drożdżyk A., Andrzejczak W. „Rozwój, Ocena i Zastosowanie opartej na Indeksach Ryb Standardowej Metody Oceny Statusu Ekologicznego Rzek Europejskich. Wkład do Ramowej Dyrektywy Wodnej”. (Development, Evaluation and Implementation of a Standardised Fish-based Assessment Method for the Ecological Status of European Rivers. A contribution to WFD.).

Particular features of national water systems

- Significant damming, thus disappearance or significant reduction in range of long migratory fish species (Witkowski A. 1992. Threats and protection of freshwater fishes in Poland. *Neth.J.Zool.*42, 243-259), decrease in obligatory for rivers rheophilic salmonids (Witkowski A. and Hesse T. (eds) 1996. Protection of rare and endangered fish species in Poland-current state and perspectives. *Zoologica Poloniae* 41, pp.195) and rheophilic cyprinids (Penczak T., Kruk A. 2000. Threatened obligatory riverine fishes in human-modified Polish rivers. *Ecology of Freshwater Fish*, 9, 109-117), and also reduction of facultative riverine fish (burbot, wells and pike) (Kruk A., Penczak T. 2000. Impoundment impact on populations of facultative riverine fish. *Ann.limnol.-Int.J.Lim.*39(3),197-210).
- Moderate river regulation and channalisation, still some natural parts of river - potential reference conditions can be found in case of every size of rivers (major Wisła and Odra Rivers included).
- Pollution,
- Engineering,
- Overfishing by anglers and poachers.

Unique national aspects considering fish based assessment

There is no systematic fish-based monitoring programme of polish rivers. There are some propositions how to provide such monitoring and which river should be selected, especially in the context of EU Water Framework Directive. Thus, there is no methodology developed considering fish_based assessment.

- Some applications of IBI index for polish rivers are published (i.e. Buras P., Szlakowski J., and Wiśniewolski W. 2000. Zespoły ryb Biebrzy jako kryterium waloryzacji środowiska rzecznoego – Fish communities in Biebrza River as a criterion for river assessment. 18th Polish Hydrobiologist Meeting, Białystok. Buras P., Wiśniewolski W. and Szlakowski J. 2002. Zespoły ryb Nidy jako kryterium waloryzacji środowiska rzecznoego – Fish communities in Nida River as a criterion for river assessment. National Conference “Bliskie naturze kształtowanie ekosystemów wodnych”).

- Most common approach for fish based assessment concerns mainly the calculation of diversity indices (Simpson and Shannon) which in most cases negatively respond to the antropogenic stress (e.g. Penczak T., Mann R.H.K. 1993. A preliminary evaluation of the effect of human activity on the fish populations of the Pilica River, Central Poland. *Pol. Arch. Hydrobiol.* 40, 101-115).
- Also, the applicability of the abundance/biomass comparison method (ABC method, Warwick, 1986) to detect human impact on fish community was tested and advised as a usefull tool for fish_based assessment (Penczak T., Kruk A. 1999. Applicability of the abundance/biomass comparison method for detecting human impacts on fish populations in the Pilica River, Poland. *Fisheries Research* 39, 229-240.).

Did you already start information activities

Yes,

- FAME approach (translated into polish) and the Fame web page is presented on VIEP web page www.wios.lodz.pl
- FAME leaflets were sent to major polish institutions related to water management

Which institutes/organisations should be informed

Organization units subordinate to or supervised by the Minister of Environment indirectly and directly related to water management:

1. Department of European Integration.
2. Department of Environmental Protection Instruments.
3. Department of Ecological Policy.
4. Department of International Co-operation.
5. Department of Water Resources.
6. Bureau of Ecological Education and Public Communication.
7. Chief Inspector for Environmental Protection.
8. Chief Inspectorate for Environmental Protection.
9. Voivodeship Inspectorate of Environment Protection in Białystok.
10. Voivodeship Inspectorate of Environment Protection in Bydgoszcz.
11. Voivodeship Inspectorate of Environment Protection in Gdańsk.
12. Voivodeship Inspectorate of Environment Protection in Katowice.
13. Voivodeship Inspectorate of Environment Protection in Kielce.
14. Voivodeship Inspectorate of Environment Protection in Kraków.
15. Voivodeship Inspectorate of Environment Protection in Łódź.
16. Voivodeship Inspectorate of Environment Protection in Lublin.
17. Voivodeship Inspectorate of Environment Protection in Olsztyn.
18. Voivodeship Inspectorate of Environment Protection in Opole.
19. Voivodeship Inspectorate of Environment Protection in Poznań.
20. Voivodeship Inspectorate of Environment Protection in Rzeszów.
21. Voivodeship Inspectorate of Environment Protection in Szczecin.
22. Voivodeship Inspectorate of Environment Protection in Warszawa.
23. Voivodeship Inspectorate of Environment Protection in Wrocław.
24. Voivodeship Inspectorate of Environment Protection in Zielona Góra.
25. State Inspection for Enviromental Protection.
26. Regional Board for Water Management, in Gdańsk.
27. Regional Board for Water Management, in Gliwice.
28. Regional Board for Water Management, in Cracow.

29. Regional Board for Water Management, in Szczecin.
30. Regional Board for Water Management, in Poznań.
31. Regional Board for Water Management, in Warsaw.
32. Regional Board for Water Management, in Wrocław.
33. Environmental Information Centre in Warsaw.
34. Institute for Environmental Protection, in Warsaw.
35. Institute for Meteorology and Water Management, in Warsaw.
36. National Fund for Environmental Protection and Water Management, in Warsaw.
37. Bureau of Water Management in Warsaw.
38. Polish Geological Institute in Warsaw.

Other institutions related to water management or fisheries:

1. Institute of Hydroengineering of the Polish Academy of Sciences.
2. Institute Ecology, Polish Academy of Sciences, Warsaw.
3. Water Management Committee of the Polish Academy of Sciences.
4. Association of Engineers and Technicians of Water and Melioration.
5. Warsaw Agricultural University Department of Hydraulic Engineering and Environmental Recultivation.
6. Environmental Lobbying Support Office.
7. Europe and the New Independent States, Environment and Natural Resources Division.
8. National Fund of Environmental Protection and Water Management.
9. NewsNet-21, the environment news and information service.
10. Department of Inland Fisheries and Aquaculture, Academy of Agriculture in Poznań.

Scientific Institutions involved in cooperation for FAME project:

1. International Centre for Ecology Polish Academy of Sciences.
2. University of Łódź, Department of Applied Ecology.
3. University of Łódź, Department of Ecology and Vertebrate Zoology.
4. University of Wrocław, Muzeum Przyrodnicze.
5. University of Rzeszów, Institute of Biology and Environmental Protection.
6. Inland Fisheries Institute, Olsztyn, Gdańsk and Warsaw-Żabieniec.
7. Department of Water Biology, Polish Academy of Sciences, Kraków.
8. Department of Environmental Biology, Koszalin Politechnics.
9. Other polish fishery related institutions.

Institutions related to fishery management, monitoring and stock assessment:

1. Main Board of the Polish Anglers Association in Warsaw.
2. Polish Anglers Associations – local units.

What are the general expectations from the FAME project ?

To use and apply the method in whole Poland

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (electric fishing)

Name : Zalewski M., Lapinska M. Bocian J., Kaczkowski Z., Przybylski M.
Country: Poland

General information

Number of men needed during sampling 3 till 6 (7 teams)
 Number of sites possible to sample per day 3
 Expected number of samples to monitor per year = 540 6 rivers x 90 sites
 Equipment and sampling specification

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	5000	5	1000
Electrofishing anodes, dipnets	500	5	100
Electrofishing safety equipment	500	2	250
....			
Sampling boat			
Boat	2000,0 €	10	250
Outboard motor	1500,0 €	5	300
Accessories	500,0 €	5	200
Boat trailer	2000,0 €	10	250
Others (specify)safety jackets and c	3400,0 €	2 to 5	1250
Total fixed costs (7 teams)	112000,0 €		25200

Variable costs per 7 team

Equipment operation			
Electrofisher repair and maintenance	500,0 €		
Boat repair and maintenance	500,0 €		
Fuel, oil	1000,0 €		
Others (specify)transport costs	8000		
Personnel (salary etc.)			
Supervisor	15000,0 €		
Technician 1	10000,0 €		
Technician 2	5000		
Others (specify) clothing	15000		
Total variable cost	55000		
Total cost	80200		
Cost per sample	149 (100 - 500)		

INFO Applied Partners

Country	Portugal (PO)
Institute	DGF
Partner nr	23
Contactpersons	Jorge Bochechas

Implementation WFD

Institutes role during implementation

The role of each institution in the implementation of the FWD in Portugal is not defined yet. Meanwhile the INAG - Instituto da Água (Water Institute – the national water authority) is preparing the process and the legislation concerning the implementation of the WFD in Portugal. The DGF - Direcção Geral das Florestas (National Forestry Service) as the Portuguese Inland Fisheries Authority is supposed to conduct all the fish monitoring related to the assessment of the ecological status of water.

responsible in general

INAG – Water Institute

responsible with respect to fish only

DGF – National Forestry Service

at the national level

INAG and DGF

at regional/provincial level

CCDR – Comissões de Coordenação e Desenvolvimento Regional (regional environment administration)

other national organisations involved

Other organisations involved

River typology clear and decided upon already

System B.

Involved in national research projects related to WFD

Involved in research focussing on f.b.a.

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

Electrofishing

Which f.b.a.method is presently used

Starting this year, DGF will establish a monitoring program for Portuguese rivers. Multimetric indices will be used to evaluate environmental quality.

Is sampling according FAME standard applicable

Yes.

Is the sampling strategy cost efficient

Yes.

Is proper electro fish equipment available
Yes.

Total budget for fish stock assessment in rivers
66.025 € per year

Costs per sample (results from table cost_inv.xls)
943 €

Expected number of samples in rivers and streams
70 - 90 per year

Are environmental variables as required for FIDES already surveyed

Is additional data-collection necessary due to regional conditions

Dissemination FAME results

Contact with SP

Contact with end-users
DGF is the end-user

Actions taken already

Particular features of national water systems

Unique national aspects considering fish based assessment

Did you already start information activities
Leaflets will be send soon to national and regional organisations

Which institutes/organisations should be informed

What are the general expectations from the FAME project ?

A definition of standard sampling and assessment methods that can be used to assess ecological status, but also used for fish population and fisheries management.

Name : Jorge Bochechas
Country: Portugal

General information

Number of men needed during sampling 4
 Number of sites possible to sample per day 2 to 3
 Expected number of samples to monitor per year = 70 to 90
 Equipment and sampling specification

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	10000	5	2000
Electrofishing anodes, dipnets			
Electrofishing safety equipment	800	1	800
....			
Sampling boat			
Boat	7000,0 €	7	1000
Outboard motor	all		
Accessories	all		
Boat trailer	all		
Others (specify)safety jackets and c	4000,0 €	5	800
Total fixed costs	21800,0 €		4600

Variable costs

Equipment operation			
Electrofisher repair and maintenance	500,0 €		
Boat repair and maintenance	400,0 €		
Fuel, oil	1000,0 €		
Others (specify)	12000		
Person engineer	11000,0 €		
Supervisor	11000,0 €		
Technician 1	3500,0 €		
Technician 2	3500		
Others (specify)			
clothing			
Total variable cost	42900		
taxes			18525
Total cost			66025
Cost per sample			943

INFO Applied Partners

Country	Sweden (SE)
Institute	NBF
Partner nr	11
Contact persons	Ulrika Beier Erik Degerman Susanna Pakkasmaa

Implementation WFD

Institutes role during implementation

In Sweden it is not fully decided how the implementation of the WFD will be carried out. The organisation has not been established. Water management authorities that still are to be established, the Environmental Protection Agency (SEPA), the National Board of Fisheries (NBF) and other governmental authorities will be involved. As the structure is not ready we decided to join FAME both as scientific and applied partner.

responsible in general

No

responsible with respect to fish only

Yes

at the national level

Yes

at regional/provincial level

No

other national organisations involved

Coming Water management authorities, Swedish Environmental protection agency

Other organisations involved

A proposition dated 2004-01-22 from the Swedish government is to make five (out of 24) County administrative boards into Water management authorities for five water districts; the County administrative board (CAB) of Norrbotten for the Bothnian Bay, CAB of Västernorrland for the Bothnian Sea, CAB of Västmanland for the North Baltic Sea, CAB of Kalmar for the South Baltic Sea, and CAB of Västra Götaland for the Western Sea. The Swedish Parliament is now treating the proposition and a decision will be taken probably during the first half of 2004. The Swedish Environmental Protection Agency (SEPA) is the authority responsible for producing scientific and technical basic information for the water management authorities to implement the WFD. This information is in turn collected by other institutions like the National Board of Fisheries, the Swedish University of Agricultural Sciences, other universities etc., on commission by SEPA.

River typology clear and decided upon already

No formal system A or B according to the WFD, yet.

According to the Environmental Quality Criteria (published by the Swedish Environmental Protection Agency), classification of status in running waters based on fish depends for some of the variables on area of catchment, distance to nearest lake, proportion of lakes within drainage area, altitude, and stream velocity (classes).

Involved in national research projects related to WFD

No

Involved in research focussing on f.b.a.

Yes

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

electrofishing and very occasionally gillnets in very wide river stretches

Which f.b.a.method is presently used

FIX index. Metrics:

No. of native species, No. of individuals of native species, Biomass of native species, Proportion of salmonid fish (ind. numbers), Proportion of foreign species (ind. numbers), Occurrence of acid sensitive species and stages. Metrics are evaluated taking altitude, stream catchment size, stream width and proportion of lakes in the catchment into account.

Is sampling according FAME standard applicable

Yes, however electrofishing by boat in non-wadable rivers has not been tested in Sweden.

Is the sampling strategy cost efficient

This has not been evaluated.

Is proper electro fish equipment available

Yes

Total budget for fish stock assessment in rivers

At present in total approximately

220 000 Euro also including evaluation and reporting, about 120 000 Euro just for the actual field sampling. What it will be in the future with the implementation of the WFD is still uncertain, but it should probably not be less than the present amount.

Costs per sample (results from table cost_inv.xls)

512 Euro.

Expected number of samples in rivers and streams

232

Are environmental variables as required for FIDES already surveyed

Some but not all of them.

Is additional data-collection necessary due to regional conditions

Yes, according to the national protocol.

Dissemination FAME results

Contact with SP

NBF is both SP and AP.

Contact with end-users

Several presentations have been made on the national level. The County administrative boards and some consultant companies have been interested but have not tested the method yet. The Swedish Environmental Protection Agency has been informed but not yet showed a very large interest.

Actions taken already

Planned national reports in the information series of the NBF and the SEPA (Swedish Environmental Protection Agency).

Particular features of national water systems

Few species at each site and relatively low densities of fish are the main characteristic features.

Unique national aspects considering fish based assessment

No, not as far as we can see.

Did you already start information activities

Several presentations have been made on the national level.

Which institutes/organisations should be informed

The coming Water management authorities, the Swedish Environmental protection agency

What are the general expectations from the FAME project ?

- 1) To develop a common strategy for the use of fish in assessment of ecological status. The developed method might need country-wise additional indices to facilitate evaluation of ecological status, e.g. including acidification indices in Scandinavia.
- 2) To build up an international expertise framework for the use of fish in WFD.

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (ele

Name : NBF
Country: Sweden

General information

Number of men needed during sampling 20
 Number of sites possible to sample per day 2
 Expected number of samples to monitor per year = 252
 Equipment and sampling specification

	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	15000	10	1500
Electrofishing anodes, dipnets	250	2	125
Electrofishing safety equipment	1000	1	1000
....			
Sampling boat			
Boat	20000	10	2000
Outboard motor	5000	5	1000
Accessories	1000	5	200
Boat trailer	1500	10	150
Others (specify)			
Total fixed costs	43750		5975
Variable costs			
Equipment operation			
Electrofisher repair and maintenance			200
Boat repair and maintenance			500
Fuel, oil			1000
Others (specify)			
Personnel (salary etc.)			
Supervisor			120000
Technician 1			80000
Technician 2			50000
Others (specify)			
Total variable cost			251700
Total cost			257675
Cost per sample			512

Comments:

The total number of persons needed to perform sampling for all sites - they work in pairs.

INFO Applied Partners

Country	The Netherlands (NL)
Institute	RIZA (RIVO)
Partner nr	12
Contactpersons	Joost Backx

Implementation WFD

Institutes role during implementation

A national implementation team is leading the way in the Netherlands. The team consists of representatives of competent authorities. Ministry of Transport, Public Works and Water management (of which RIZA is part) is initiator and first responsible

responsible in general

Main objectives of the team are:

- preparing legal transposition, amendment of national law before 2003
- giving guidance to all organisations in water management in the Netherlands for a proper implementation of the WFD

responsible with respect to fish only No

at the national level Yes

at regional/provincial level No

other national organisations involved

Other organisations involved

- Ministry of Housing, Spatial Planning and Environment
- Ministry of Agriculture, Nature Management and Fisheries
- Association of Province Councils
- Union of Water Boards
- Association of Dutch Municipalities (agenda)

River typology clear and decided upon already

Yes in total 19 river types are defined

Involved in national research projects related to WFD

RIZA is represented by a small group of international representatives. They have to inform a large audience at home. Members of national working groups are represented in the EU Working Groups.

Involved in research focussing on f.b.a Yes on national level

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

beam-trawling, electrofishing (simultaneously in Oct/Nov and Mar/Apr), stow nets for salmonids (Jun/Jul and Oct/Nov), and by-catch in commercial fyke nets (May/Nov) are used to describe species richness, abundance, biomass and length frequency distribution

Which f.b.a.method is presently used

Since the 1990s the rheophilic-eurytopic-limnophilic classification is used to assess the ecological status of rivers. This is done predominantly on the basis of species richness

(note: species richness is particularly vulnerable to sampling effort, for which data are seldom corrected). For species evenness no good assessment is available: mostly high percentages of either rheophilic or limnophilic species are appreciated, while a strong dominance of eurytopic species is considered an indication of poor habitat diversity or poor water quality. Total biomass due to all sampling difficulties (selectivity and efficiency) is hardly an issue at all: the results of sampling are considered an index. Time series are considered an important instrument to assess the development in the fish community: increase in species richness (except for exotic species) and evenness, and increase of rheophilic species in running waters and limnophilic species in stagnant waters are thereby considered as a positive development.

Is sampling according FAME standard applicable

At this moment the opinion is that the current national monitoring program (MWTL) is insufficient to monitor and assess the ecological status of the large water bodies. The national and regional program will be reviewed by the time new standards and assessments methods are available.

Is the sampling strategy cost efficient

Is proper electro fish equipment available Yes

Total budget for fish stock assessment in rivers

The annual costs (sampling, data storage, validation and basic analysis, and data reporting) are around 320 000 euro.

Costs per sample (results from table cost_inv.xls) ca. € 260,-

Expected number of samples in rivers and streams about 120

Are environmental variables as required for FIDES already surveyed Partly

Is additional data-collection necessary due to regional conditions

Not clear yet like for large rivers

Dissemination FAME results

Contact with SP

Since RIZA/RIVO are both SP and AP contact is good

Contact with end-users: via water boards and institutions involved in water management and fish stock assessment

Actions taken already: Dissimination of preliminary results and presentations on national and international (River Rhine Commission) level

Particular features of national water systems

Unique national aspects considering fish based assessment

Did you already start information activities Yes

Which institutes/organisations should be informed Water authorities and fisherieis involved institutes (see tables in report)

What are the general expectations from the FAME project ?

Elaboration of a framework for standardised sampling of fish and a method for fish based assessment of the ecological status of large rivers which can be applied, adopt and enforced at national level.

Name :	Winter		
Country:	Netherlands		
General information			
Number of men needed during sampling			3
Number of sites possible to sample per day			4-15
Expected number of samples to monitor per year =			120
Equipment and sampling specification	DEKA 7000		
	Purchase cost (€)	Life expectancy (year)	Annual cost (€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	4500	10	including anode, kathode and foot switch
Electrofishing anodes, dipnets	included above		
Electrofishing safety equipment	included above		
.....			
Sampling boat			
Boat	6000	10	15 pk
Outboard motor	4250	4	
Accessories	150		
Boat trailer			
Others (specify)	1200		life jackets
Total fixed costs			
Variable costs			
Equipment operation			
Electrofisher repair and maintenance	640		about 25 liter gass and 1/5 liter oil per week
Boat repair and maintenance	600		
Fuel, oil	270		
Others (specify)			
Personnel (salary etc.)			
Supervisor	1648		technician 3
Technician 1	4000		
Technician 2	4000		
Others (specify)	4000		

Total variable cost	15158
Total cost	31258
Cost per sample	260,4833333

INFO Applied Partners

Country	United Kingdom (UK)
Institute	EA-NCFC
Partner nr	24
Contact persons	Alan Starkie

Implementation WFD

Institutes role during implementation

Following transposition of the Water Framework Directive into domestic legislation (our new regulations “**The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003**, Statutory Instrument 2003 No. 3242” made jointly with the National Assembly for Wales went before Parliament on 11 December 2003 and came into force on 2 January 2004), the Environment Agency has now been confirmed as the sole Competent Authority charged by the Department for Environment, Food and Rural Affairs (DERFA) with the implementation of the WFD in England and Wales.

In Scotland the Scottish Environment Protection Agency (SEPA) fulfil this role whilst in Northern Ireland their Department of Environment (DoE) designated it's Environment and Heritage Service (EHS) as the competent authority.

As the sole Competent Authority, the Environment Agency is responsible for much of the implementation work required by the directive, though the ultimate responsibility rests with DEFRA.

With respect to the status of the implementation of WFD: DEFRA produced a first public consultation paper 29 June 2001:

<http://www.defra.gov.uk/environment/consult/waterframe/index.htm>.

It addressed the requirements of the Directive and invited views on the Government's proposed approach to some initial questions. It covered some of the principal obligations that the Directive places on Member States and provided information about plans to implement it in England and Wales. It also highlighted the areas where choices could be made about the approach to be followed. This was the first step in the consultation process, which includes discussions with the principal affected parties including those from industry, consumers and Non Governmental Organisations (NGOs). The issues raised in the first consultation fed in to the second consultation paper: <http://www.defra.gov.uk/environment/consult/waterframe2/index.htm>, published on 29 October 2002. It is more detailed and includes a summary of the responses to the first consultation. A third consultation, published 4 August 2003 contained proposed draft transposing regulations and commentary on these, a revised Regulatory Impact Assessment (RIA), a summary of responses to the second consultation paper with the Government's reply, and a next steps chapter. Again it is available on the internet site at:

<http://www.defra.gov.uk/corporate/consult/waterframe3/index.htm>

Other organisations involved

A UK wide Technical Advisory Group (UKTAG), which also has representation from the nature conservation agencies, has been established to address the more technical

aspects of the directive on behalf of the DEFRA and the devolved UK administrations in Wales, Scotland and Northern Ireland. UKTAG will use a number of existing and new technical groups both within and outside the Agency to address technical issues. Most of these groups have representation from both the regulatory agencies i.e. the Environment Agency in England, SEPA in Scotland and Environment & Heritage Service in Northern Ireland as well as the conservation agencies such as English Nature (EN), Countryside Council for Wales (CCW) and Scottish Natural Heritage (SNH). SNIFFER, the Scotland and Northern Ireland Forum for Environmental Research, a registered charity formed in 1994 also seeks to identify and manage environmental research, including WFD research, on behalf of members and stakeholders - <http://www.sniffer.org.uk>

I believe it is expected that the Environment Agency, who do most of the monitoring in England and Wales and who have existing databases of results, will be responsible for the compilation and management of WFD data in that part of Ecoregion 18. They will probably include the Scottish data (?provided by SEPA) in a co-ordinated response.

River typology clear and decided upon already

A mixture of systems, simplified to salmonid and coarse fish rivers but then sub-divided based more-or-less on System A. No nationally agreed standard set as far as I am aware

Involved in national research projects related to WFD

?

Involved in research focussing on f.b.a.

Assessment and sampling costs for fish

Sampling gear used in rivers and streams for national monitoring

Mostly electric fishing (wading, boat with hand held electrodes and boom boat) but also seine netting including 'wrap around' netting, hydro-acoustics, and angler catch.

Occasionally, beam trawling, fyke nets, gill nets etc may also be used.

Which f.b.a.method is presently used

Index just being finalised but previously abundance and diversity

The simplest scheme I can remember being used was in the Anglian region. It classified fisheries on a 5 point scale from very good to bad based on standing crop. From memory, very good had $>25 \text{ g m}^{-2}$, good $15-25 \text{ g m}^{-2}$, moderate $10-15 \text{ g m}^{-2}$, poor $5-10 \text{ g m}^{-2}$, and bad $<5 \text{ g m}^{-2}$. More recently the National Rivers Authority (the Agency predecessor) trialed a Fisheries Classification Scheme (FCS) which was initially developed as a manual system but now operates Microsoft Access. A classification is obtained by comparing survey results (fish numbers and biomass, species richness etc) for the site in question with class boundaries derived from a sub-set of representative sites spread across England and Wales. Five classes from A (high) to E (low) together with a sixth class F (zero result but fish expected) are used based on 20 percentiles of the frequency distribution of results from the subset. Hence a site classed "A" will be comparable with the best sites in England & Wales but not necessarily pristine. As well as the absolute classification, a so-called 'relative classification' is also produced by the system. The latter takes 'broad habitat' into account by comparing the standing crop with that expected for the river width and channel gradient of the site.

Is sampling according FAME standard applicable

?

Is the sampling strategy cost efficient

?

Is proper electro fish equipment available

?

Total budget for fish stock assessment in rivers

There is no budget as such specifically set aside for monitoring in England and Wales. The Environment Agency's different departments currently monitor chemical water quality, river biology and fish. Funding for fisheries monitoring comes mainly from fishing licence income though the Agency does receive some Grant in Aid (GIA) from central government i.e. DEFRA. One recent estimate put the annual cost of fisheries survey work in England & Wales at about £0.5 million per annum (approximately 740,000 euros). The budget for assign according WFD could be significant (as it depends partly on how many water bodies are deemed to be "at risk" and, subsequently, how many fail to achieve "Good" or "High" status)

Costs per sample (results from table cost_inv.xls)

See attached table (unchanged except for inflation at about 2.7% per annum)

821 EURO.

Expected number of samples in rivers and streams

250

Are environmental variables as required for FIDES already surveyed

As at Dec. 2002 information for 12,220 surveys and 6,898 sites are entered on our National Fish Population Database (NFPD). Most are for sites surveyed by electric-fishing but some netting data is also included. Data are stored as raw data in an Oracle database. Information includes individual fish lengths etc but does NOT include the additional site data, such as geology, area of catchment upstream, etc requested for FAME

Is additional data-collection necessary due to regional conditions

?

Dissemination FAME results

Contact with SP

?

Contact with end-users

?

Actions taken already

?

Particular features of national water systems

?

Unique national aspects considering fish based assessment

?

Did you already start information activities

?

Which institutes/organisations should be informed

?

What are the general expectations from the FAME project ?

Hopefully a good technique for classifying and assessing fish populations in rivers. As the project appears to be going well I have, of late, been more optimistic about a favourable outcome!

Costs (€) of sampling fish in rivers according to FAME/CEN standards described in D4 par. 3b.2 (€

Name :	Alan Starkie		
Country:	England		
General information			
Number of people needed during sampling	4		
Number of sites possible to sample per day	1,5	2	
Expected number of samples to monitor per year =	250	1333	
Equipment and sampling specification	As per guidelines (D4, 3b2)		
	Purchase cost	Life expectancy	Annual cost
	(€)	(year)	(€)
Fixed costs			
Sampling gear			
Electrofisher, generator, booms	20000	5	4000
Electrofishing anodes, dipnets	5700	2	2850
Electrofishing safety equipment	4500	2	2250
....			
Sampling boat			
Boat	4200	10	420
Outboard motor	2500	5	500
Accessories	1500	2	750
Boat trailer	2500	10	250
Others (specify): 4x4 vehicle,PC,Stop n	10000	mixed	7866
Total fixed costs			18886
Variable costs			
Equipment operation			
Electrofisher repair and maintenance	6666	1	6666
Boat repair and maintenance	1500	1	1500
Fuel, oil	8000	1	8000
Others (specify):Training?(E/F, First Aid etc)			
Personnel (salary etc.)			
Supervisor	52500	1	52500
Technician 1	43500	1	43500
Technician 2	39000	1	39000
Others (specify) Sampling assistant....	34500	1	34500
Total variable cost			185666
Total cost			204552
Cost per sample	818,208		