Standardisation of river classifications:

Framework method for calibrating different biological survey results against ecological quality classifications to be developed for the Water Framework Directive

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Sampling workshops – an overview

(Paper version)

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Key Action 1: Sustainable Management and Quality of Water

Contents

1 Aims and Scope

1.1 This report

This report covers only the sampling workshops. The replicate sampling investigation for macro-invertebrates was transferred to Work Package 7, and it will be reported in the deliverable for that work package (Deliverable No. 7). The replicate sampling investigation for diatoms remained in Work Package 6 but that too is reported separately in an additional report by Johan van der Molen and Piet Verdonschot, *Results of La Bresse Sampling and Analysis Workshop*.

1.2 The sampling workshops

The aim of the sampling workshops, which constituted the main component of Work Package 6, was to ensure that all the project's participants had a clear and common understanding of the sampling and laboratory protocols, in particular that there were no differences in interpretation of the written protocols. The workshops were also to be used to collect replicate samples of diatoms and macro-invertebrates by every partner in order to quantify, compare and inter-calibrate sampling variation in each form of macro-invertebrate and diatom sampling method applied in the project.

The original plans for collecting replicate invertebrate samples at the sampling workshops were impractical. There were a number of reasons for this. There was insufficient time in either the sampling workshop in La Bresse or Dorchester, given the number of methods for which training was needed. All the partners were unfamiliar with the faunas in other parts of Europe – the partners covered the whole of Europe and encompassed most of its ecoregions. Many national sampling protocols were inappropriate for other ecoregions. There were also practical and legal problems in transporting unsorted samples back to the partners' home countries.

Six new partners, from three Newly Associated States (NAS) (Latvia, Poland and the Slovak Republic) joined the STAR project in the second year of the project. In the light of experience with the sampling workshops for the original partners, it was considered vital to provide them with practical field training in all the field and laboratory protocols that they will have to use to collect new biological, hydromorphological and environmental data for the project. This new objective was added to the Work Package.

2 Methods

2.1 Overview

The initial plan was to hold sampling workshops in conjunction with full project meetings in early April and September of the first year in which fieldwork was to be undertaken. The spring sampling workshop was to be held in Southern Europe to ensure that there was adequate diatom growth for field training and replicate sampling. The September meeting was to be in the United Kingdom. All of the macro-invertebrate sampling methods used in the project and the diatom sampling

method selected for the project were to be demonstrated at each site. All participating scientific and applied consortium members were to participate in this training. The trainers were to be the national experts in the use of each technique and all participants at the workshop were to be obliged to learn and demonstrate their proficiency in all techniques in all sites. Any points of difference in the application of techniques were to be resolved and documented. The training sessions were to be used to demonstrate the strategy for the following day's replicate sampling exercise.

The work programme was modified extensively during the first six months of the project, although the essential objectives were retained. The changes were introduced to partners at the first workshop in Dorchester, December 2001.

The main change was that the macro-invertebrate replicate sampling investigation was not undertaken in the sampling workshops, but moved to Work Package 7.

The scope of the sampling workshops was expanded to cover all of the field methods used in the project. This included macrophytes, benthic algae other than diatoms and river morphology.

The work package was expanded to incorporate the role of the expert panels in determining the most appropriate protocols to adopt for each taxonomic group and the hydro-morphological surveys (Section 2.2). The methods that they adopted determined the nature and content of the sampling workshops.

The main sampling workshop was undertaken at La Bresse in France. This was to be attended by all partners. The sampling workshop in Dorchester in September 2002 was shortened and changed to a discussion forum to resolve any existing sampling problems.

The work programme expanded again when the new NAS partners joined the project a year after it started.

Sampling workshops for the new partners were held early in the second year of the project. Together, these additional workshops covered all the field and laboratory methods that had been covered in the sampling workshops held in La Bresse and Dorchester for the original partners. Most of the training was by the same trainers to ensure that all the STAR partners received the same training.

A number of identification workshops were held to supplement the sampling workshops. Although these were not included in original plans for the sampling workshops, they are reported here for convenience.

Nigel Holmes provided macrophyte identification sessions during the sampling workshop at La Bresse.

An identification workshop on oligochaetes was held in Wageningen during the first year. This coincided with the publication of a new identification guide by ALTERRA.

In September of the first year, the Environment Agency sub-contracted Martyn Kelly to provide training in diatom identification to members of staff from CEH Dorset. This had not been included in the original plan because its need was realised after the project started. It followed from the decision to use a sampling and analytical method for diatoms based on the method used operationally in the UK. This was because the method was the basis for the method that was being developed by CEN as a European standard.

In the second year, a diatom identification workshop was held in Wageningen.

2.2 Expert Panels

The expert panels for determining the methods to be adopted by STAR for each biological quality element were established at the final meeting of the AQEM project that was held in December 2001. This meeting was attended by all the STAR partners as a preparatory meeting.

The following expert panels were established:

- Macro-invertebrates
- Macrophytes
- Phytobenthos
- Hydromporphology
- Fish

The expert panels delivered their recommendations before or at the sampling workshop in La Bresse, France at the end of April 2002. Each panel had its own discussion page on the STAR website.

Experience gained in the sampling workshop, and the practical applications of the recommended methods, led to the further evolution, clarification and refinement of the protocols. These changes were disseminated to partners via pages on the discussion forum for STAR partners hosted on the project's web site.

2.3 Sampling workshop in La Bresse

This was held between 27th April and 4th May 2002. The University of Metz (Partner 14) organised the venue, including accommodation, location of sampling sites, permissions to sample and logistic support.

The University of Metz (Partner 14) gave an introductory presentation about the workshop in the final AQEM project meeting held in Dorchester in December 2001. In this they described the location and range of potential sites that could be used for training and replicate sampling.

The Environment Agency (Partner 11) and CEH (Partner 1) met twice before the sampling workshop to discuss the choice of field sites, in conjunction with the University of Metz (Partner 14) and University of Duisburg-Essen (Partner 2) by telephone. The sites covered a wide range of water quality and stream types. The

main differences between types of steam were size, current velocity, substrate and macrophyte cover.

CEH Dorset (Partner 1) assisted with the overall management of the workshop and its content. They provided training assistance in River Habitat Survey hydro-morphological survey protocol and helped with its accreditation exam

ALTERRA Green World Research (Partner 4) provided field training in phytobenthos sampling.

Following the decision to adopt the UK's Mean Trophic Rank (MTR) protocol as the macrophyte sampling method for STAR, the Environment Agency (Partner 11) sub-contracted Nigel Holmes (Alconbury Environmental Consultants) to lead the macrophyte survey training at the sampling workshop in France. This was not in the original project plan. Nigel had been responsible for the original development of the method. The results of the macrophyte surveys undertaken as a part of the workshop were distributed to all who participated in this part of the workshop. CEH assisted with this training.

Nigel Holmes ran additional training sessions in the main sampling workshop on macrophyte identification, particularly mosses, for partners who were not confident in the identification of this difficult group of plants.

Training in diatom sampling was provided by Martyn Kelly (Bowburn Consultants), sub-contractor to Environment Agency (Partner 11). Martyn was the author of the Trophic Diatom Index (TDI) method that forms the basis of a planned CEN European standard method for sampling diatoms. During the workshop, discussions were held about the need to sample other benthic algae. ALTERRA provided training in sampling algae from soft substrates.

The AQEM method was adopted as the standard macro-invertebrate protocol for STAR, as it was the most widely used method amongst the partners. Field training therefore concentrated on this method and was provided by the University of Duisburg-Essen. Shorter demonstrations were given of the RIVPACS by the Environment Agency and similar methods including PERLA by the Masaryk Water Research Institute.

More training than originally anticipated was provided for the River Habitat Survey (RHS) protocol for hydro-morphological survey. This was so that all partners could gain accreditation in the method, as required by all official RHS surveyors. Training and accreditation was provided by the Environment Agency (Partner 11) with assistance from CEH Dorset (Partner 1). Training was in the then current version of RHS (RHS97). The impending new version was described, although there were further changes before it was launched as version 2003. As well as ensuring that all partners understood the method for use in STAR, this introduced them to the concept of accreditation and the formal training that must accompany such a scheme. Accreditation is used to quality assure of RHS and complements the audits introduced to partners in Work Package 9.

2.4 Northern Europe Macro-invertebrate Sampling Workshop, Denmark

Partly as a result of the problems with AQEM protocol, selected partners held a North European sampling workshop in Silkeborg, Denmark between 25th and 27th June 2002. The workshop was co-ordinated by the National Environmental Research Institute, Silkeborg (Partner 10). Details of the AQEM protocol were discussed This included the substratum recording forms, the allocation of AQEM sampling units, AQEM sample size and the return of specimens to the river. The revised AQEM protocol was tested at Core Stream Type 2 sites.

University of Duisburg-Essen (Partner 2) provided further field training in the AQEM protocol.

A South European Working Group harmonised methodologies for Southern European rivers. The methodologies used in this region differed because of the wide environmental gradients in its rivers. This group had an important role in ensuring that STAR protocols were suitable for the whole of Europe,

A conceptual model for the relative location of sampling sites for each monitoring element was devised during the main sampling workshop at La Bresse. The protocol was further discussed at the North European sampling workshop in Denmark, where it was refined. The final protocol was re-iterated to all partners at the workshop held in Dorchester in September.

2.5 Demonstration of RIVPACS sorting procedure, Wareham

CEH Dorset (Partner 1) gave a practical demonstrated the RIVPACS sorting procedure at the Freshwater Biological Association's River Laboratory during the Project meeting in Dorchester from 15th to 20 September 2002.

2.6 Introductory Workshop for NAS Partners, Uppsala

An introductory workshop for new NAS partners was held in Uppsala, Sweden from 7th to 8th February 2003. The aim was to introduce the new partners to each other and to the other STAR partners participating in the four new project work packages, to develop detailed work programmes for the four new work packages, to integrate the activities of the new NAS partners into the overall project work programme, and to demonstrate field and laboratory diatom sampling and sample processing protocols. Leonard Sandin of the Swedish University of Agricultural Sciences (Partner 5) organised the workshop. Mike Furse of CEH Dorset (Partner 1) gave presentations on STAR and Hanneke Vlek of ALTERRA Green World Research (Partner 4) provided training on diatoms.

2.7 Macro-invertebrate Workshop for New Partners, Tresta

A sampling workshop '*Macro-invertebrates: Sampling and Laboratory Protocols'* was held at the University of Łódź, in the Hydrobiological Field Station located near

The Sulejów Reservoir (Tresta, Poland) from 27 –30 March 2003. The main objective was to train NAS partners the in macro-invertebrate sampling procedures and laboratory protocols required for STAR. The workshop comprised lectures, laboratory and field work. The key workshop point was defining a clear-cut input of 2 macro-invertebrate methods to the STAR Project: RIVPACS and STAR/AQEM. Barbara Bis of the University of Łódź (Partner 17) organised the workshop. Nick Kneebone of CEH Dorset (Partner 1) provided training on the RIVPACS protocol and Marta Wenikajtys of the University of Duisburg-Essen (Partner 2) provided training on the AQEM/STAR protocol. To review the national sampling methodologies, participants presented their national protocols in an additional seminar. Information on Slovak sampling procedures was provided by Zuzana Zatovicova, of the Slovak Academy of Sciences, Bratislava (Partner 21); on Latvian sampling procedures by Elga Parele of the University of Latvia, Riga (Partner 20); on Polish sampling procedures by Andrzej Kownacki (IBW, PAS, Kraków); and on diatoms as freshwater quality indicators, sampling and processing procedures by Janina Kwandrans and Barbara Kawecka (IBW, PAS, Kraków). The main discussion topics included problems in sending macro-invertebrate samples between countries (customs, requirements), the replicate sampling programme in STAR and archiving data. Taking advantage of the opportunity afforded by the workshop, representatives of Latvian group and PAS Kraków had a discussion on defining the STAR sampling requirements for diatoms as indicators of freshwater quality.

2.8 RHS and macrophyte Workshop for New Partners, Poznan

A sampling workshop '*River morphology assessment (RHS) and macrophytes as bioindicators (MTR)*' was held for the new NAS Partners in Poznan (Poland) from 31May to 9 June 2003. Krzysztof Szoszkiewicz and Ryszard Staniszewski of the August Cieszkowski Agricultural University of Poznań (Partner 18) organised the workshop with the University of Łódź (Partner 17). Nigel Holmes of Alconbury Environmental Consultants (Partner 11 sub-contractor), who trained STAR partners in the first sampling workshop at La Bresse in April 2002, provided training on macrophytes. The full RHS training was given by Paul Raven, the Head of Conservation and Ecology in the Environment Agency (Partner 11), together with Pete Scarlett and Duncan Hornby from CEH Dorset (Partner 1) and participants undertook the same type of test as that used for accreditation. Only those passing this test would undertake RHS surveys for STAR. However, formal RHS accreditation was not possible because no authorising RHS training officer was present..A web site was established for the workshop at:

http://www.au.poznan.pl/katedra/eosr/WORKSHOP/workshop.html.

2.9 Diatom Identification Workshop, Wageningen

An identification workshop on diatoms was held at the WICC conference centre in Wageningen, Netherlands on 22 and 23 May 2002. The aim of the workshop was to discuss identification problems of taxa encountered in the STAR project. Johan van der Molen of organised by ALTERRA Green World Research. Martyn Kelly from

Bowburn Consultants, sub-contracted to the Environment Agency and who provided diatom training at the first sampling workshop in La Bresse, provided training on taxonomy and ecology. Adrienne Mertens of Aquasense provided training on diatom identification. Johan van der Molen, who is auditing diatom samples for STAR, presented the results of the ring test at the first sampling workshop in La Bresse. The participants had different levels of diatom identification skills ranging from 'beginners' to professionals. This made it possible to enhance the level of identification skill for those who had relatively little experience. The identification problems that had become clear after the diatom ring test during the first workshop in La Bresse were also discussed.

2.10 Oligochaete Identification Workshop, Berg en Dal

A workshop on Oligochaeta was held in Berg en Dal, the Netherlands on 16 and 17th October 2002. The course consisted of a theoretical part about the taxonomy, systematics, phylogeny, biology and autecology of the Oligochaeta, and a practical part on identification, mainly of the families Naididae and Tubificidae. The course was given by Piet Verdonschot and Tjeerd-Harm van den Hoek, both experts in taxonomy, ecology, and identification of oligochaetes. The participants were guided by the teachers, using video to enable the whole group to identify difficult animals.

2.11 SLU Plecoptera Workshop, Uppsala

A workshop on Plecoptera was held in Uppsala, Sweden on 7and 8th November 2002. It was hosted by Lars Eriksson of the Swedish University of Agricultural Sciences (Partner 5) with teaching by Arne Fjellheim (Stavanger Museum). As well as identification, the workshop covered the fossil record, world distribution, developmental ecology, life history biology, role of Plecoptera in the food chain and morphology.

3 Results

3.1 Expert Panels

The development of the protocols was the prime responsibility of the expert panels, and these all operated effectively. The process of finalising the various methodologies stimulated a considerable debate. When necessary, this was mediated by the project co-ordinator. All the sampling protocols were finalised during the first reporting period . Most were posted on the public access section of the project web site before or shortly after the sampling workshop in La Bresse.

Partners found it relatively easy to agree protocols for most monitoring elements, except macro-invertebrates. There was a resistance to changing methods already adopted, even when the changes were to improve consistency and comparability between partners using what should have been the same method (AQEM) or derivative methods (e.g. PERLA and RIVPACS).

3.2 Sampling workshop in La Bresse

During the field training session, it became apparent that there were inconsistencies in the way in which many partners had applied the AQEM protocol, in particular the distribution of samples between lotic and lentic sub-sampling areas and the margin and main channel. More time was therefore spent in the field training sessions to elucidate these discrepancies. During and after the main sampling workshop, there was an intense debate within the invertebrate expert panel. An additional North European Workshop was held in Denmark to sort these problems out.

The conceptual model for the relative location of sampling sites for each monitoring element was devised during the main sampling workshop at La Bresse.

The STAR surveyors who attended the workshop at La Bresse achieved RHS accreditation to a European standard. The course given to surveyors in UK is more detailed (it takes a whole week) than that provided in the STAR workshop, hence the different levels of accreditation are indicated. The STAR project surveyors are recorded on the RHS database of surveyors as holding RHS STAR accreditation.

The RHS survey method was changed in early 2003, some months after the workshop at La Bresse. However, all the surveyors who were trained in RHS for the STAR project have retained their accreditation with the launch of the 2003 methodology and they do not require any further training for the 2003 version of RHS. All of the surveyors trained showed a high level of competence with the methodology and the trainers discussed the modifications that were being made to the survey format with the delegates on the training course. All STAR accredited surveyors received a 2003 field survey manual when it was launched last year. The manual points out the differences between the two versions, and the surveyors can teach themselves the new additions to the method.

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3.3 Northern Europe Workshop, Denmark

This workshop was a direct result of problems in the AQEM/STAR sampling protocol identified by the sampling workshop at La Bresse. Details of the AQEM protocol were agreed. This included the substratum recording forms, the allocation of AQEM sampling units, AQEM sample size and the return of specimens to the river.

This work led to the production of a revised AQEM protocol by University of Essen that was both transparent and precise, with assistance from BOKU – University of Agricultural Sciences and the Swedish University of Agricultural Sciences. Although this caused extra work for the STAR project, the identification of the discrepancies and their solution was one of the major achievements of the sampling workshop and the work package as a whole.

Where their original interpretation of AQEM protocols differed from the revised AQEM protocol produced for STAR, partners were given the option of using the protocol as they had originally interpreted it as their ‘national method’. All partners were required to follow the revised protocol as the STAR standard invertebrate method.

Whilst the AQEM protocol was revised, the terminology used was matched to the RHS terminology as far as was practicable. This was discussed at the main sampling workshop on La Bresse and at the North European sampling workshop in Denmark. Consideration was given to amalgamating the RHS and AQEM survey forms, but this was not done, to retain the integrity of the individual surveys. Some differences in terminology also remained. This was not considered to be a major problem because the aims of the two protocols were different: the hydro-morphological survey in AQEM provided information to help interpret the results of the macro-invertebrate sampling whereas RHS provided metrics for quantifying the ecological quality of river stretches

The following detailed decisions were made
All partners present were finding it difficult to find sites that fully met the STAR QEM criteria for reference conditions. Partners agreed to find reference sites that met most of the criteria and were the best achievable conditions.

The overlap between the AQEM environmental recording protocol and the River Habitat Survey was discussed. Whereas RHS was for evaluating the habitat quality of the river corridor and to quantify the Ecological Status of the stretch of river surveyed, the AQEM protocol was to interpret the results of the macro-invertebrate sampling. After discussion, the AQEM environmental recording protocol was amended.

The conceptual model for locating sampling sites was. It was agreed that it should be viewed as a guide rather than an imperative because it was not always possible to meet its criteria fully.. However, no other taxonomic group should be sampled downstream of the macro-invertebrate sampling area or upstream of the uppermost limit of the RHS survey area

Most delegates preferred the prototype substrate recording forms designed by Mike Furse, although many also found it useful to record their decision-making on plain paper.

Christian Feld explained the allocation of AQEM sampling units

It was agreed that partners should try to minimise the amount of material collected in AQEM samples without jeopardising the effectiveness of the sampling procedure, by controlling the amount of material entering the sample net and elutriating the macrophytes and inorganic particles collected, on site. Care should be taken to retain specimens adhering to macrophytes and stones. The abundance categories of some taxa may need to be recorded in the field.

No more than thirty specimens of large species or those important to conservation should be returned to the stream after being collected in a macro-invertebrate sample. All specimens returned to the stream, or kept separate in the field because they are delicate should be assigned a randomly selected co-ordinate on the AQEM sub-sample grid before sub-sampling. They are only part of the 700 AQEM taxa if their co-ordinate corresponds with cells chosen for sorting. Procedures need to be developed for such specimens collected by “national” protocols.

For replicate sampling two people should assess the substrate individually and collect alternate AQEM sample units, based on their allocation of sample units to substratum types. They should do this in an upstream direction.

The two national replicate samples should be taken separately by the two samplers. Where possible, they should be taken in a uniform section of river somewhere along the 100m AQEM sampling section. Precise strategies will vary and partners must make their own decisions.

The macro-invertebrate audit was discussed and the sorting and identification audits were split.

3.4 Demonstration of RIVPACS sorting procedure in Dorchester Workshop

A document describing what was demonstrated was produced after the meeting. This was distributed to partners as well as being published on the STAR web site.

This protocol will be re-instated in the sampling manual used by environmental protection agencies in the United Kingdom.

3.5 Attendance at Workshops by external organisations

Most of the sampling workshops for new partners were attended not only by STAR partners, but also by other organisations in the New Accession States. The impact of the workshops was therefore wider than the STAR project alone.

The third sampling workshop in Tresta was attended by individuals from the Polish Academy of Sciences, Kraków.

The fourth sampling workshop in Poznan was attended by individuals from four organisations outside the STAR consortium from Central Europe. These were Wojewódzki Inspektorat Ochrony Środowiska, Szczecin, Poland; University of Gdańsk Department of Plant Taxonomy and Nature Conservation, Poland; RZGW (Regional River Authorities), Poznan, Poland; Slovak Institute of Hydrometeorology.

The diatom workshop was attended by individuals from four organisations outside the STAR consortium: Jarlman HB, the Agricultural Institute of S. Michele All'adige, Italy), RIZA Lelystad, Holland and Centre de Recherche Public - Gabriel Lippmann, Luxembourg.

The Plecoptera workshop was attended by individuals from six organisations outside STAR consortium: Alcontrol, Sweden; Ekologgrupen i Landskrona, Sweden; Medins Sjo & Åbiologi, Sweden; Naturvatten i Roslagen, Sweden; Pelagia, Sweden; and Stavanger Museum, Norway.

4 Discussion and conclusions

The sampling workshops clearly demonstrated that written manuals alone are not sufficient for communicating ecological sampling protocols. Field demonstrations are essential for ensuring that protocols are interpreted in the same way by all who use them.

- Training provided at sampling workshops helped to ensure that protocols used in STAR were not open to misinterpretation by therefore that each partner's samples were comparable.

- The benefits of field sampling workshops to 'calibrate' partners' understanding of methods was demonstrated by variation in interpretation and implementation of original AQEM protocol

- Revised AQEM is now a more robust and protocol that has the widest application in Europe of any invertebrate method

- As a result of the sampling workshop, all RHS results in STAR will be produced by accredited surveyors, so they can contribute to the European RHS database.
- Experience at the first workshop in La Bresse demonstrated that field workshops were vital for ensuring that methods are properly understood and that written protocols were important but not sufficient on their own.

- The high degree of standardisation thus achieved, particularly in the STAR/AQEM macro-invertebrate method, contributed to a suggestion at the recent EU Water Framework Directive Expert Workshop on Intercalibration Network (11-13 February 2004) that results from STAR could be used to intercalibrate ecological status class boundaries of member states' various national methods.

- The introductory workshop for new NAS partners in Uppsala introduced them to the project as a whole and to its practical approach by the training on diatom methods used in STAR.

- During two days field and lab work in the third sampling workshop in Tresta, all participants profitably developed their hands-on experience in macro-invertebrate sampling and analytical procedures.

- Participants in the fourth sampling workshop in Poznan benefited from practical demonstrations and practice with experts on macrophyte and RHS survey techniques.

- An important conclusion from the diatom identification workshop was that it will be very useful for those with little experience in diatom identification to be able to exchange micrographs with other professionals. Ideally this can be done in the form of a website where micrographs can be uploaded and viewed and commented on by project participants.

Appendix 1 List of sampling protocols published on STAR web pages

http://www.eu-staar.at

General
AQEM & STAR Site Protocol
AQEM & STAR Site Protocol Manual
Conceptual Sample Locations per Group per Site
Suggestion for Unique Sampling Coding System

Fish
Fish Sampling Protocol

Hydromorphology
Hydromorphology Guidance
Annexes to the Hydromorphology Guidance

Macro-invertebrates
AQEM Macro-invertebrate sampling Protocol
Revised AQEM/STAR Sorting Protocol
EBEOSWA Macro-invertebrate Sampling Protocol
LVS 240:1999 Latvian Macro-invertebrate Sampling Protocol
NORDIC Macro-invertebrate Sampling Protocol
PERLA Macro-invertebrate Sampling Protocol
RIVPACS Macro-invertebrate Sampling Protocol
RIVPACS Sorting & Recording
Replicate Sampling Programme

Macrophytes
Macrophyte Guidance
Macrophyte Species List

Phytobenthos
Sampling Protocol & Audit Benthic Diatoms
Sampling Protocol & Audit Non-Diatom Benthic Algae
Diatom Taxa List
Non-Diatom Taxa List

Appendix 2 List of Participants in Workshops

Sampling workshop in La Bresse

Name	Institute
Mike Furse	CEH Dorset, UK
Hugh Dawson	CEH Dorset, UK
Nick Kneebone	CEH Dorset, UK
Pete Scarlett	CEH Dorset, UK
Duncan Hornby	CEH Dorset, UK
Leonard Sandin	Swedish University of Agricultural Sciences, Sweden
Lars Eriksson	Swedish University of Agricultural Sciences, Sweden
Willem Goedkoop	Swedish University of Agricultural Sciences, Sweden
Mikael Östlund	Swedish University of Agricultural Sciences, Sweden
Manuela Morais	Universy of Évora, Portugal
Isabel Antunes	Universy of Évora, Portugal
João Pádua	Universy of Évora, Portugal
Patricia Gonzales	Universy of Évora, Portugal
Konstantinos Gritzalis	National Centre for Marine Research, Greece
Theodora Kouvarda	National Centre for Marine Research, Greece
Peter Haase	Research Institite Senckenberg, Germany
Susanne Lohse	Research Institite Senckenberg, Germany
Otto Moog	University of Agricultural Sciences (BOKU), Austria
Thomas Ofenböck	University of Agricultural Sciences (BOKU), Austria
Wolfram Graf	University of Agricultural Sciences (BOKU), Austria
Judith Zika	University of Agricultural Sciences (BOKU), Austria
Petr Paril	Masaryk University, Czech Republic
Karel Brabec	Masaryk University, Czech Republic
Svetlana Zahradkova	Masaryk University, Czech Republic
Jiri Kokes	TGM-WRI-Brno, Cech Republic
Nigel Holmes	Alconbury Environmental Consultants, UK
John Murray-Bligh	Environment Agency, UK
Martyn Kelly	Bowburn Consultants, UK
Helena Parsons	Environment Agency, UK
Philippe Usseglio-Polatera	University of Metz, France
Jean-Nicolas Beisel	University of Metz, France
Jean Claude Moreteau	University of Metz, France
Virginie Archaimbault	University of Metz, France
Véronique De Crespin de Billy	University of Metz, France
Simon Devin	University of Metz, France
Christophe Piscart	University of Metz, France
Philippe Wagner	University of Metz, France
Marie-Christine Peltre	University of Metz, France
Peter Rolauffs	University of Duisburg-Essen, Germany
Armin Lorenz	University of Duisburg-Essen, Germany
Christian Feld	University of Duisburg-Essen, Germany

Verena Schwitzer	LABBIO, Italy
Anna Mutschlechner	LABBIO, Italy
Alberta Stenico	LABBIO, Italy
Louise Korsgaard	National Environmental Research Institute, Denmark
Johnny Nielsen	National Environmental Research Institute, Denmark
Morten L.Pedersen	National Environmental Research Institute, Denmark
Jens Skriver	National Environmental Research Institute, Denmark
Rink Wiggers	ALTERRA Green World Research, Netherlands
Hanneke Vlek	ALTERRA Green World Research, Netherlands
Johan van der Molen	ALTERRA Green World Research, Netherlands
Andrea Buffagni	CNR-IRSA, Italy
Raffaella Balestrini	CNR-IRSA, Italy
Guillaume Demortier	Agence de l'Eau, France

Northern Europe Macro-Invertebrate Sampling Workshop, Denmark

Name	**Institute**
Mike Furse	CEH Dorset, UK
Nick Kneebone	CEH Dorset, UK
Jens Skriver	National Environmental Research Institute, Denmark
Nicolai Friberg	National Environmental Research Institute, Denmark
Louise Korsgaard	National Environmental Research Institute, Denmark
Silke Skytte Johannsen	National Environmental Research Institute, Denmark
Christian Feld	University of Duisburg-Essen, Germany
Leonard Sandin	Swedish University of Agricultural Sciences, Sweden
Lars Erikson	Swedish University of Agricultural Sciences, Sweden
Mikael Östlund	Swedish University of Agricultural Sciences, Sweden
Joakim Dahl	Swedish University of Agricultural Sciences, Sweden

Demonstration of RIVPACS sorting procedure, Wareham

Name	**Institute**
Mike Furse	CEH Dorset, UK
Stewart Welton	CEH Dorset, UK
Hugh Dawson	CEH Dorset, UK
Ralph Clarke	CEH Dorset, UK
John Davy-Bowker	CEH Dorset, UK
Do Sturmey	CEH Dorset, UK
Daniel Hering	University of Duisburg-Essen, Germany
Peter Rolauffs	University of Duisburg-Essen, Germany
Joerg Strackbein	University of Duisburg-Essen, Germany
Sebastian Birk	University of Duisburg-Essen, Germany
Otto Moog	University of Agricultural Sciences (BOKU), Austria
Astrid Schmidt-Kloiber	University of Agricultural Sciences (BOKU), Austria
Ilse Stubauer	University of Agricultural Sciences (BOKU), Austria
Piet Verdonschot	ALTERRA Green World Research, Netherlands

Rebi Nijboer	ALTERRA Green World Research, Netherlands
Hanneke Vlek	ALTERRA Green World Research, Netherlands
Leonard Sandin	Swedish University of Agricultural Sciences, Sweden
Richard Johnson	Swedish University of Agricultural Sciences, Sweden
Karel Brabec	Masaryk University, Czech Republic
Petr Paril	Masaryk University, Czech Republic
Kostas Gritzalis	National Centre for Marine Research, Greece
Theodora Kouvarda	National Centre for Marine Research, Greece
Andrea Buffagni	CNR-IRSA, Italy
Stefania Erba	CNR-IRSA, Italy
Anna Mutschlechner	LABBIO, Italy
Paulo Pinto	Universy of Évora, Portugal
Manuela Morais	Universy of Évora, Portugal
Elsa Mourinha	Universy of Évora, Portugal
Teresa Rafael	Universy of Évora, Portugal
João Pádua	Universy of Évora, Portugal
Nikolai Friberg	National Environmental Research Institute, Denmark
Jens Skriver	National Environmental Research Institute, Denmark
John Murray-Bligh	Environment Agency, UK
Rick North	Environment Agency, UK
Jean-Nicolas Beisel	University of Metz, France
Véronique de Crespin de Billy	University of Metz, France
Roger Sweeting	Freshwater Biological Association, UK

Introductory Workshop for NAS Partners, Uppsala

Name	**Institute**
Mike Furse	CEH Dorset, UK
Hanneke Vlek	ALTERRA Green World Research, Netherlands
Leonard Sandin	Swedish University of Agricultural Sciences, Sweden
Barbara Bis	University of Łódź, Poland
Krzysztof Szoszkiewicz	Agricultural University in Poznan, Poland
Gunta Springe	University of Latvia, Riga, Latvia
Ferdinand Sporka	Institute of Zoology, Slovak Academy of Sciences, Bratislava, Slovakia
Ilja Krno	Comenius University, Bratislava, Slovakia

RHS and macrophyte Workshop for New Partners, Poznan

Name	**Institute**
Nigel Holmes	Alconbury Environmental Consultants, UK
Paul Raven	Environment Agency, UK
Pete Scarlett	CEH Dorset, UK
Duncal Hornby	CEH Dorset
Janina Zbierska	Agricultural University in Poznan, Poland
Krzysztof Szoszkiewicz	Agricultural University in Poznan, Poland
Ryszard Staniszewski	Agricultural University in Poznan, Poland

Maria Drapikowska	Agricultural University in Poznan, Poland
Klaudia Borowiak	Agricultural University in Poznan, Poland
Jerzy Kupiec	Agricultural University in Poznan, Poland
Dominik Mendyk	Agricultural University in Poznan, Poland
Szymon Jusik	Agricultural University in Poznan, Poland
Tomek Zgoła	Agricultural University in Poznan, Poland
Barbara Bis	University of Łódź, Poland
Patrycja Józefowicz	University of Łódź, Poland
Marek Jakubowski	University of Łódź, Poland
Zbigniew Laskowski	University of Łódź, Poland
Hanna Soszka	Institute of Environmental Protection, Warsaw, Poland
Joanna Żurawska	Wojewódzki Inspektorat Ochrony Środowiska, Szczecin, Poland
Joanna Miluch	Wojewódzki Inspektorat Ochrony Środowiska, Szczecin, Poland
Maria Golis	Agricultural University in Poznan, Poland
Artur Golis	University of Gdańsk Dep. of Plant Taxonomy and Nature Conservation, Poland
Jolanta Nagrabska	RZGW (Regional River Authorities), Poznan, Poland
Izabela Lemańska	RZGW (Regional River Authorities), Poznan, Poland
Zuzana Zatovicova	Institute of Zoology, Slovak Academy of Sciences, Bratislava, Slovakia
Silvia Kubalova	Institute of Zoology, Slovak Academy of Sciences, Bratislava, Slovakia
Eva Bulankova	Comenius University, Bratislava, Slovakia
Peter Chynoradsky	Slovak Institute of Hydrometeorology, Slovakia
Agrita Briede	University of Latvia, Riga, Latvia
Andris Urtans	University of Latvia, Riga, Latvia

Diatom Identification Workshop, Wageningen

Name	**Institute**
Amelie Jarlman	Jarlman HB
Andrew Haigh	Environment Agency, UK
Chris Adams	Environment Agency, UK
Elena Štefková	Institute of Zoology Slovak Academy of Sciences, dept. of Hydrobiology
Francesca Ciutti	Agricultural Institute Of S. Michele All'adige
Helena Novais	Universidade de Evora, Laboratório da Água do Centro de Ecologia Aplicada
Johan van der Molen	ALTERRA Green World Research, Netherlands
Jos Sinkeldam	ALTERRA Green World Research, Netherlands
Luc Ector	Centre de Recherche Public - Gabriel Lippmann
Martyn Kelly	Bowburn Consultancy, UK
Nick Kneebone	CEH Dorset, UK
Silke Johannsen	National Environmental Research Institute
Susanna Nunes	Universidade de Evora, Laboratório da Água do Centro de Ecologia Aplicada

Macro-invertebrate Workshop for New Partners, Tresta

Name	Institute
Nick Kneebone	CEH Dorset, UK
Marta Wenikajtys	University of Duisburg-Essen, Germany
Barbara Bis	University of Łódź, Poland
Janusz Majecki	University of Łódź, Poland
Marek Jakubowski	University of Łódź, Poland
Patrycja Józefowicz	University of Łódź, Poland
Elga Parele	University of Latvia, Riga, Latvia
Ivars Druvietis	University of Latvia, Riga, Latvia
Agnija Skuja	University of Latvia, Riga, Latvia
Zuzana Zatovicowa	Slovak Academy of Sciences, Bratislava, Slovakia
Barbara Kawecka	Polish Academy of Sciences, Kraków, Poland
Janina Kwandrans	Polish Academy of Sciences, Kraków, Poland
Elżbieta Dumnicka	Polish Academy of Sciences, Kraków, Poland
Andrzej Kownacki	Polish Academy of Sciences, Kraków, Poland

SLU Plecoptera Workshop, Uppsala

Name	Institute
Aren Fjellheim	Stavanger Museum, Norway
Jens Skriver	National Environmental Research Institute, Denmark
Tjeerd-Harm van den Hoek	ALTERRA Green World Research, Netherlands
Martin Neale	CEH Dorset, UK
Dan Evander	Pelagia, Sweden
Mats Uppman	Pelagia, Sweden
Anders Boström	Alcontrol, Sweden
Cecilia Torle	Ekologgrupen i Landskrona, Sweden
Ulf Ericsson	Medins Sjo & Åbiologi, Sweden
Carin Nilsson	Medins Sjo & Åbiologi, Sweden
Tommy Odelström	Naturvatten i Roslagen, Sweden
Lars Eriksson	Swedish University of Agricultural Sciences, Sweden
Björn Wiklund	Swedish University of Agricultural Sciences, Sweden