WISER news

First WISER deliverables available

Deliverable D3.2-1

Overview and comparison of macrophyte survey methods used in European countries and a proposal for a harmonised common sampling protocol to be used for the WISER uncertainty exercise including a relevant common species list.

Aquatic vegetation has not been a major issue in monitoring programmes in most European countries until recently. Starting from the year 2000, when the Water Framework Directive (WFD) came into force, all the EU members were obliged to include in their monitoring programs methods based on biological components, also macrophytes. Several aspects are important to consider when selecting the appropriate method of aquatic plants investigation. For the biological monitoring purposes it is necessary to develop a method allowing comprehensive, quick and cost-effective surveys of the macrophyte stands. Furthermore, the method should provide data of the accuracy, which enables reliable and unequivocal assessment of ecological status of the waterbody.

Deliverable D3.2-1 includes an overview of the macrophyte field survey methods, which have been used to date in the different European countries together with an analysis of their practical aspects in the light of the biological monitoring of waters consistent with the WFD. Also, a detailed review of the different methods used for taxonomic composition surveys and measurements of aquatic macrophyte abundance has been presented.

One of the simplest method, formerly applied in lake monitoring, e.g. in Great Britain, was providing the list of species occurring in the stand. Due to the lack of quantitative data on macrophyte frequency and abundance the method might be insufficient to assess the lake ecological conditions. The more precise information can be achieved by using a phytosociological method, considering not only floristic composition but also abundance (% cover) and sociability of the species within a relevé. The phytosociological approach is generally accepted and widely applied in hydrobotanical research in continental Europe, also in Poland. In many countries, e.g. in Germany, Austria, Denmark or Great Britain, in lake macrophyte surveying the belt transect method is commonly used, although it can vary substantially in technical details such as number and width of transects, number and depth of survey zones, etc.

A complete mapping of the vegetation within the littoral zone provides the most detailed information on vegetation structure and composition. The latter can be used effectively for the whole lake assessment purposes. Quantitative methods in macrophyte sampling are based in general on the estimation of frequency or abundance of the plant species or communities. Several scales of measurement of different accuracy are

Content

Impressum

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in use, starting from the simplest descriptive scales such as Kohler or DAFOR scale, throughout the more sophisticated ones based on percentage estimates, ending up with the most detailed measurements based on the absolute units of area cover or volume inhabited.

The compilation and comparison of the presented macrophyte field survey methods served as a basis for establishing a harmonised common methodology for macrophyte sampling for the WISER uncertainty exercise purposes. A method based on belt transects has been recognised to be the most widespread and commonly used in European countries, and also compliant with CEN standard.

Thus, for the WISER lake macrophyte survey a modification of a transect method was adapted. According to the methodology, within each lake six localities, evenly distributed along a shoreline, are identified and within each locality three transects (replicates) are surveyed. Each transect (replicate) is divided into depth zones of 1 m depth intervals up to the colonisation depth limit. In each depth zone five macrophyte samples are taken. One macrophyte sample is one rake-full or one look through a bathyscope. In each sample all species are identified and their abundance is estimated in percentage continuous scale (easy to be recalculated to various point scales). Macrophyte data collected for the WISER exercise by applying the common methodology will be then used to demonstrate and to estimate the uncertainty in aquatic macrophyte survey methods caused by the spatial variability (vertical and horizontal) of aquatic vegetation.

lead contractor: IEP

Deliverable D5.1-1

Conceptual models of the impact of degradation and restoration on riverine aquatic organisms.

Anthropogenic degradation of aquatic ecosystems – rivers, lakes, estuaries and coastal waters – is manifold, pervasive and dates back for centuries in Europe. The ecosystems are affected by physical, chemical, hydrological and morphological modifications, all of which impose environmental pressures on the structure and function of aquatic communities. Human impacts on aquatic ecology have frequently been studied and numerous indicators for assessment and monitoring of various environmental impacts on aquatic ecosystems were developed.

In response, the knowledge about the linkages between environmental pressures and aquatic communities was used to derive appropriate measures to rehabilitate and restore aquatic ecosystems. Restoration ecology is often assuming that communities are beginning to recover as soon as the pressures are reduced or removed. However, the simple reversal of degradation equally often does not show the desired and anticipated ecological effect and the biota continue to stay 'degraded'. Firstly, the small spatial scale of many restoration measures does not fit the often very broad-scale degradation at the catchment level; secondly, monitoring activities are rather short-term and do not sufficiently account for long time periods required for restoration; and thirdly, the knowledge about a catchment's potential for recovery is sparse.

Module 5 of the WISER project will model relationships between restoration measures, their effect on environmental pressures and finally their ecological effect on aquatic communities. This deliverable on conceptual models of degradation and recovery aims at providing a conceptual framework for guiding such studies within the WISER project. The models transfer the relationships between environmental pressures and biological impact and between restoration measures and biological recovery into cause-effect chains, while the linkages are based on an evaluation of the peer-reviewed literature. Hypotheses can be derived from well-referenced chains and can be tested with causative data analyses. Moreover, the results will be used to set up predictive models on the community's recovery after restoration. Finally, knowledge gaps can be identified and summarised to guide future research.

This draft version aims at outlining the general approach to develop the conceptual models. General examples are derived from the existing restoration literature and are illustrated. More examples will be provided with the final version due in May 2010. The final version will also address the quantification of cause-effect chains and the identification of important knowledge gaps.

lead contractor: UDE

Deliverable D6.1-1

Report on a workshop to bring together experts experienced with tool development and uncertainty estimation.

This deliverable summarises a workshop on uncertainty of aquatic biological assessments held as part of the initial full meeting of all WISER partners in March 2009.

The Water Framework Directive (WFD) requires Member States to assess, monitor and where necessary, improve the ecological condition of all of its water bodies, namely rivers, lakes, transitional (estuarine or brackish) and coastal waters. Assessments are to be based on measures comparing the observed biology with that expected if the site was high quality and unimpacted (termed reference condition). All water bodies are to be classified into one of five ecological quality classes, but most importantly the ultimate aim is for all water bodies to be of good or high status.

However, any index of biological quality is of little use without some knowledge of the associated uncertainty. Could we have classified a lake quite differently if we had taken another sample or just surveyed a different part of it? What confidence do we have that a estuary is really of good or better status? What is the likelihood that there has been a real improvement in lake quality based on the sampling method and indices we have used?

A major part of the WISER project is a field sampling and surveying campaign for phytoplankton, invertebrates, plants and fish at each of a range of types and qualities of lakes, coastal and transitional waters.

The uncertainty workshop was used to learn from past experiences, especially from rivers, in assessing sampling variability of different methods and indices, with quantifying variability in space and time, and with sample processing, sub-sampling and taxonomic identification errors and their quality assurance.

Sub-groups then considered the perceived major sources of uncertainty for their water body type and taxonomic group and went on to devise field sampling/surveying programmes to enable them to estimate the major sources of variability and compare the relative sampling precision of different methods and indices

lead contractor: CEH

Deliverable D7.1-3

End user teams and contact list.

One of the main objectives of the WISER project is to establish a close contact to the end users. WISER end users are experts within Geographical Intercalibration Groups (GIGs) and river basin and water managers at national and international ministries and authorities.

The first contact to end users was established during the kick-off meeting in March 2009 (Mallorca, Spain). Altogether 13 external experts were invited to the meeting to discuss the workplan details of each Workpackage together with the WISER consortium. Moreover, each Workpackage leader was asked during the meeting to nominate and contact end users and to report the contacts to Workpackage 7.1.

Of particular interest for the end users are the Modules on 'lake assessment and intercalibration' (Module 3), 'transitional/coastal water assessment and intercalibration' (Module 4), and on 'catchment management' (Module 5). Therefore, the establishment of end user contacts focussed on these Modules.

In order to establish the end user contacts, an outline document on end user involvement and a cover letter have been prepared in collaboration with the project coordinator. These documents were sent to the end users in October 2009 to inform them about their potential involvement in the WISER project. A questionnaire was sent in parallel to ask for the end user's wishes with regard to their involvement. Altogether 82 contacts are listed in the Annex 1 of the deliverable. Most end users have been contacted for Module 3 (34) and Module 4 (41). Nine contacts were established for Module 5. The end users cover most European countries, but no end user contact has yet been established in the Czech Republic and in Slovakia. With regard to lake and river ecosystems, there is still a lack of end users in Italy, Latvia and Lithuania.

lead contractor: EC-JRC

WISER deliverables can be downloaded as PDFs from:

www.wiser.eu/results/deliverables/

WISER project midterm meeting in Poland 2010

On 6-10 September 2010 a WISER general assembly meeting will be held in Debe, Poland. The meeting will be organised by the Polish colleagues at IEP (Institute of Environmental Protection). Details about this meeting will follow soon in 2010.

For the latest information about events, workshops and meetings go to:

wiser.eu/news/events/

WISER goes fishing in northern Italy

WISER fish ecologists at work.

In October 2009, WISER fish ecologists from Denmark, France, Germany and the U.K. converged in northern Italy to help their Italian colleagues with a concerted programme of field-work at three lakes to continue work already done in July by the Italian team at the mesotrophic Lake Candia.

The work began at the oligotrophic Lake Segrino before moving on to the eutrophic Lake Alserio and finally to the mesotrophic Lake Piano. At each site, gill nets of a standardised design were set to a pre-planned pattern stratified by depth while the shallow perimeter of each lake was sampled by standardised boat-based electric fishing. All fish caught were identified, measured and weighed to produce data which will be used in the development of fish community assessment indices.

Fish and fishing usually arouse some interest in local stakeholders and it is not always positive. However, following a lot of early and proactive engagement by the Italian scientists, the degrees of interest, support and enthusiasm shown by the communities at each of these lakes were remarkable and unstintingly helpful. Volunteers from local fishing and environmental associations descended on bulging gill nets and emptied them of fish at lightning speed, at the same time as giving free access to boats and other facilities and producing delicious food, coffee, wine and even a little grappa. Even the local police came to have a look at the proceedings. The raw results obtained over the seven days of hard work proved to be very interesting, notably showing surprisingly many small perch in Lake Segrino despite a low nutrient level, 'pelagic' catfish in Lake Alserio avoiding low oxygen conditions at depth, and some very large pumpkinseed sunfish of North American origin in Lake Piano.

Measuring and weighing of the caught fish.

Fishing campaign in Italian lakes.

The eleven WISER scientists involved in this field work also used the opportunity to hold a one day workshop at the CNR-Institute of Ecosystem Study in Pallanza to discuss their initial findings and make further plans for the future, including reconvening to sample lakes in Sardinia in 2010.

Ian Winfield (NERC), Pietro Volta (CNR) and Torben L. Lauridsen (AU)

For latest news from the WISER project go to:

www.wiser.eu/news/

Workshop on conceptual modelling

Biological assessment of aquatic ecosystems requires knowledge of impacts of multiple environmental pressures on aquatic communities: fish, benthic macro-invertebrates, macrophytes, angiosperms, macroalgae, phytobenthos and phytoplankton. The relationships between drivers (e.g., land use), environmental pressures (e.g., eutrophication), status (e.g., nutrient load) and impact (e.g., changes in biotic communities) can be conceptualised and structured with cause-effect chains for different organism groups and different pressures.

The knowledge of such relationships has recently laid the ground for numerous novel monitoring systems to assess ecological status of marine and freshwaters in Europe. River basin land use management, structural habitat restoration and other measures to rehabilitate a water body are often based on the same cause-effect chains and driven by the assumption that the reduction or mitigation of environmental pressures will automatically lead to recovery. But all too often ecological management of aquatic ecosystems does not have the desired or anticipated effects on the biology. Hypotheses on the reasons are manifold and should be addressed by scientists to link restoration ecology with restoration practice.

The WISER workshop on conceptual modelling of the biological response on aquatic ecosystem management aimed at identifying the cause-effect linkages based on evidence from the restoration literature. Altogether 20 scientists and water managers met therefore at the Wageningen University Research Centre ALTERRA in the Netherlands. The experts developed and discussed conceptual models to illustrate the existing knowledge of the relation between management measures and their effect on fish, invertebrate, macrophyte and algal communities. A focus was laid on mountain and lowland rivers, and on shallow and deep lakes in Central and Northern Europe. The cause-effect chains will be extended with examples from marine ecosystems.

The approach to review the existing knowledge will help to identify both well-supported linkages and knowledge gaps in the field

WISER scientists developing conceptual models.

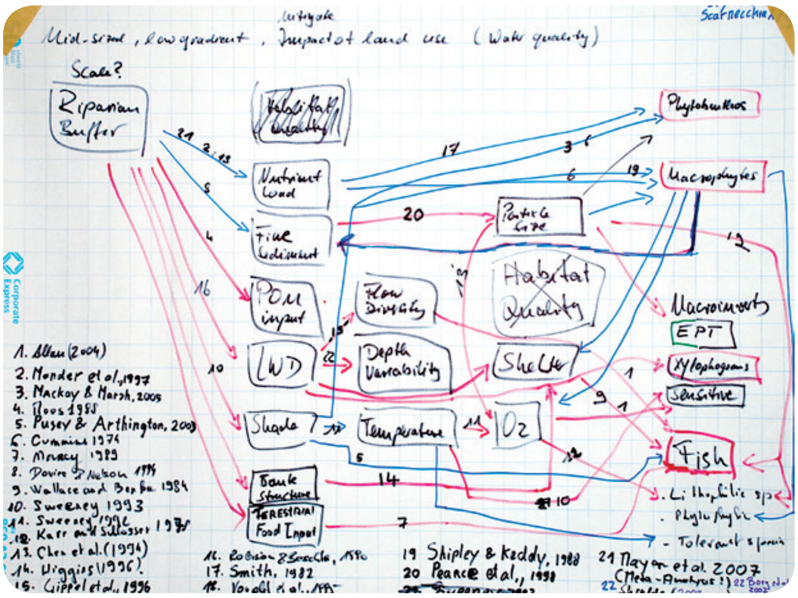
of ecological restoration. While the latter directly raises future research needs, the former might help to develop predictive models of the effect of restoration measures that will aid water managers making the right decisions.

"I am still impressed by the amount of knowledge and information on water body restoration, which exists within WISER", Bas van der Wal, water manager at STOWA (the Netherlands), stated after he had attended the workshop. But not without adding his hope that WISER "will be able to comprise and review existing information and to 'downsize' it to the level at which it can be used in European water management."

Altogether eight conceptual models, four each for lakes and rivers, resulted from the workshop. Together with marine examples, the models will be made available at www.wiser.eu after another step of harmonisation and a critical review, which is expected for early spring 2010. A deliverable on conceptual models of rivers will be finalised by the end of May 2010. For further information, please contact christian.feld@uni-due.de.

Christian K. Feld (UDE)

Draft ideas of a cause-effect chain.



Freshwaterecology.info – version 4.0 online

Freshwaterecology.info is *the* database on ecological information of freshwater organisms in Europe.

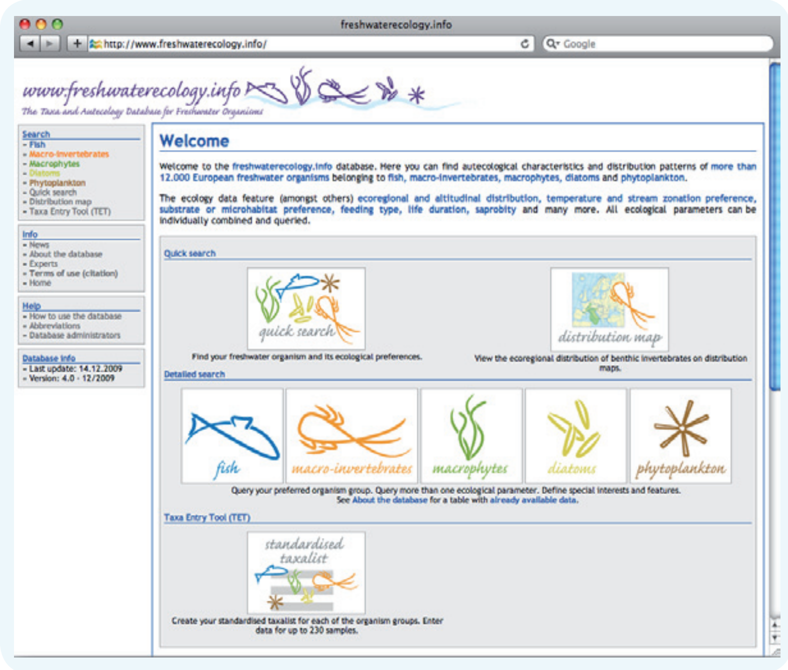
On www.freshwaterecology.info you can find autecological characteristics and distribution patterns of more than 12.000 European freshwater organisms belonging to fish, macro-invertebrates, macrophytes, diatoms and phytoplankton. The ecology data feature (amongst others) ecoregional and altitudinal distribution, temperature and stream zonation preference, substrate or microhabitat preference, feeding type, life duration, saprobity and many more. All ecological parameters can be individually combined and queried.

As a first result of the WISER project the Taxa Entry Tool (TET) was developed and implemented in the website. The TET serves to create standardised taxalists according to the freshwaterecology.info taxonomy. It is available for fish, macro-invertebrates, macrophytes, diatoms and phytoplankton.

More information on the latest changes and improvements can be found on the news section of the webpage.

Astrid Schmidt-Kloiber (BOKU)

Entry page of www.freshwaterecology.info.

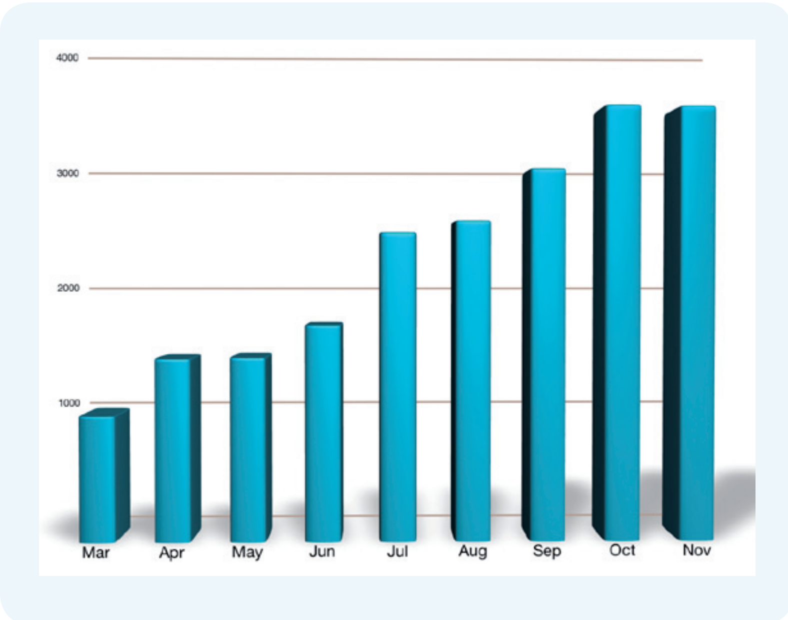


Visitors of the WISER website in 2009

Since the start of the WISER project in March 2009 the number of visitors of the project website has been growing throughout the year. Starting with less than 1000 page visits per month, we have reached now more then 3500 visits in November 2009 and the figures are showing that these numbers are still growing.

Most of the users are coming from all over Europe, but there are also numerous visitors from other countries like Brazil, India, Canada, USA, Russia, Australia, Japan and China – to name just a few from last month' statistics –who pay the WISER website a visit.

Jörg Strackbein (UDE)



Development of visits of the WISER website in 2009.

Impressions of the WISER field campaign 2009