Future of European Waters

Budapest Conference 24-25 March 2011

Climate Change and WFD in the light of the results so far of the Project ClimateWater

(www.climatewater.org)

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SEVENTH FRAMEWORK PROGRAMME

Content:

1. What is the main objective of ClimateWater?
2. What are the main features of WFD in trying to cope with climate change impacts?
3. Listing major problems, e.g. what are the major gaps to bridge: (unprecendented diffuse pollution, not working accident emergency foreacsts, Lack of international enforceability of major adaptations strategies, of flood control, drought management, pollution control)
4. Ideas for the solution for some problems, briefly on the Ecohydrological River Basing Management Planning approach

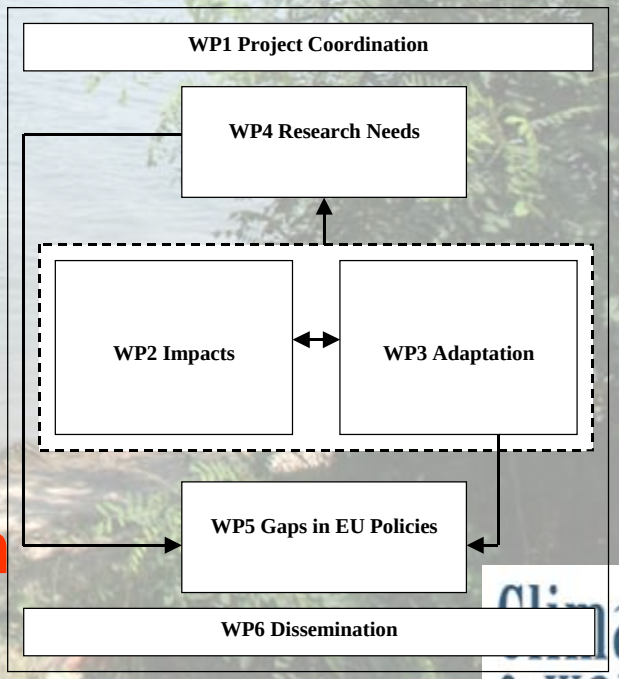
ClimateWater : BRIDGING THE GAP BETWEEN ADAPTATION STRATEGIES OF CLIMATE CHANGE IMPACTS AND EUROPEAN WATER POLICIES

Project duration:3 years 2008 November-2011 November
Project type: Supporting action (FP7);
Home page: http://www.climatewater.org

Coordinator: VITUKI, Hungary, Budapest/Jolánkai

Partners:
UNIDEB, Hungary;
CNR-IRSA, Italy;
USF, Germany;
GeoEcoMar, Romania;
Geonardo, Hungary;
UNILEI, UK;
UNIVIEN,Austria;
SHMU,Slovakia;
SOGREAH, France;
MRA, Malta

The task of the project is to find the gaps that unable adaptation to climate change in EU water policies



We have so far processed literally hundreds of documents, mostly those of larger projects and EU related organs. Thus only fragments of the results on climate change induced impacts on water related issues of Europe (e.g. Impacts on human life and nature) can be given in a presentation.

47 sub-topics, grouped for

1/ Floods and excess waters;
2/ Drought and water scarcity;
3/ Water quality and water pollution;
4/ Water supply and water management;
5/ Nature, aquatic ecosystems;
6/ Water industries, navigation, hydropower

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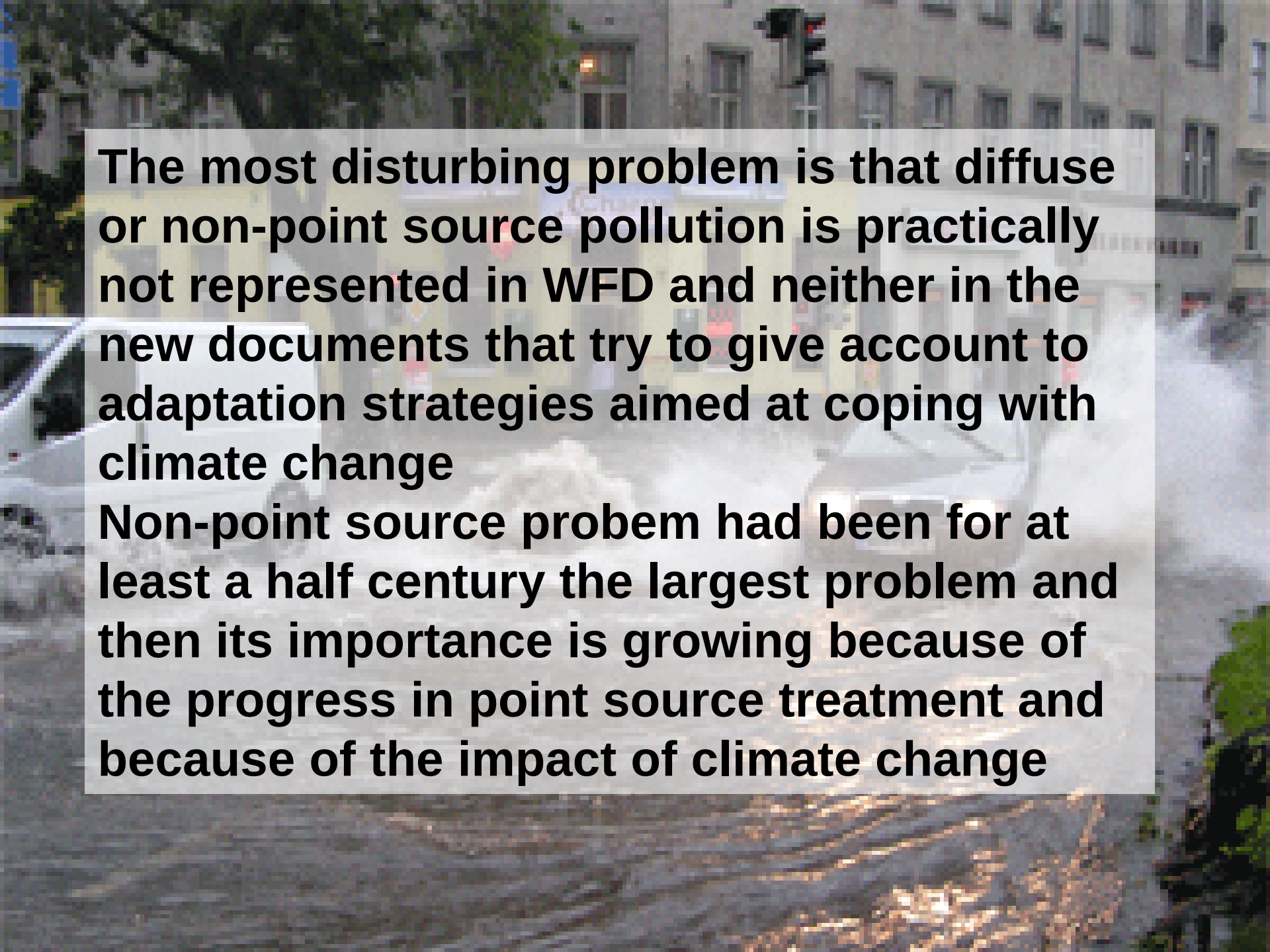
Major tasks of WFD with regard to coping with climate change

1/ To achive good water status (Member States should aim to achieve the objective of at least good water status by defining and implementing the necessary measures within integrated programmes of measures, **)**

2/ To control polution, an unfortunate definition: (40) With regard to pollution prevention and control, Community water policy should be based on a combined approach using control of pollution at source through the **setting of emission limit values** and of environmental quality standard

3/ To do it through River Basin Management Planning, so as to select appropriate strategies and plan also the measures needed



The most disturbing problem is that diffuse or non-point source pollution is practically not represented in WFD and neither in the new documents that try to give account to adaptation strategies aimed at coping with climate change

Non-point source probem had been for at least a half century the largest problem and then its importance is growing because of the progress in point source treatment and because of the impact of climate change

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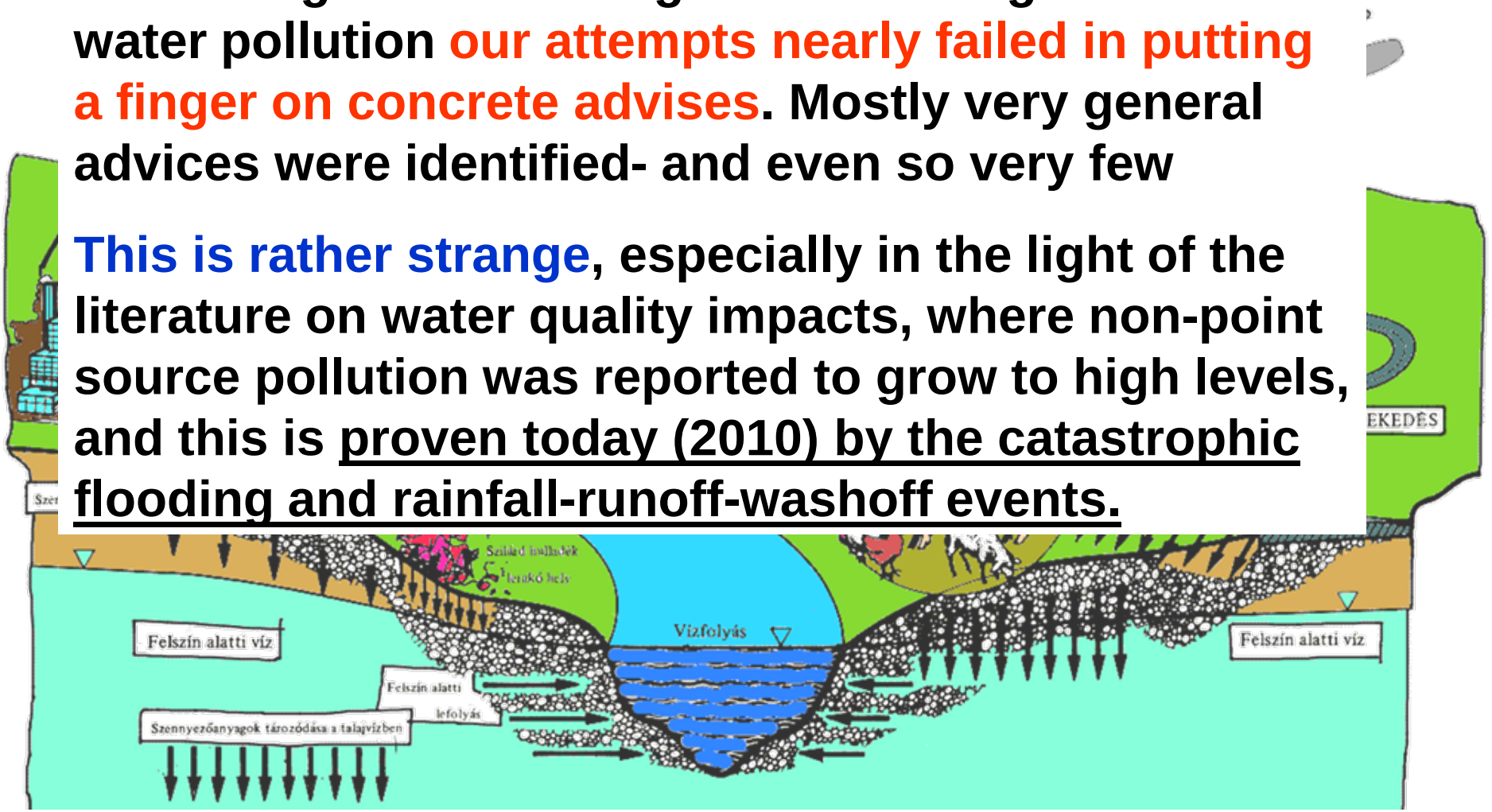
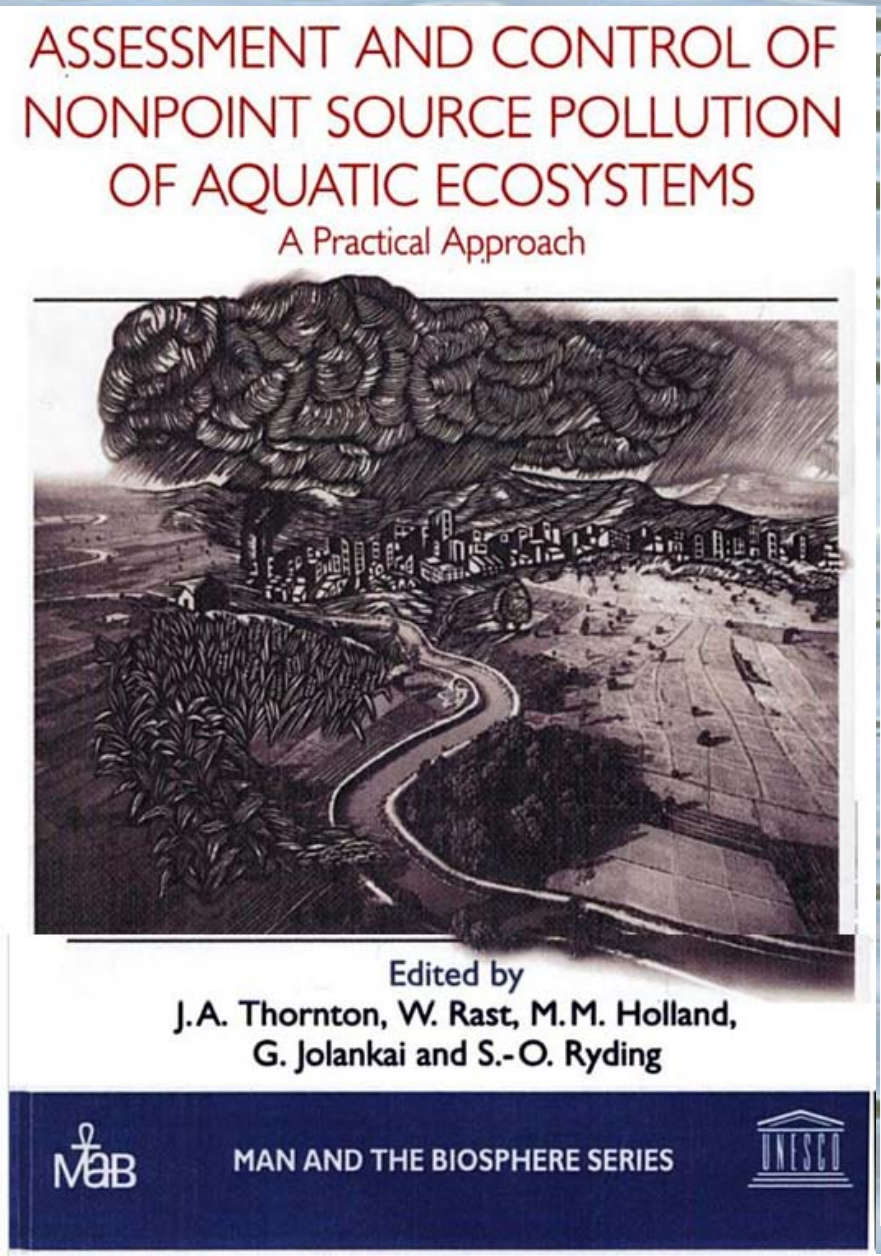
Having made a relatively careful literature and EU Project search for adaptation strategies in combating-counteracting climate change induced water pollution our attempts nearly failed in putting a finger on concrete advises. Mostly very general advices were identified- and even so very few

This is rather strange, especially in the light of the literature on water quality impacts, where non-point source pollution was reported to grow to high levels, and this is proven today (2010) by the catastrophic flooding and rainfall-runoff-washoff events.



Some facts about non-point source pollution



One of the problems is that although we do know the NPS techniques, even BAT is available, we still do not know (at design support level) their pollutant removal capacity and efficiency.!!!!

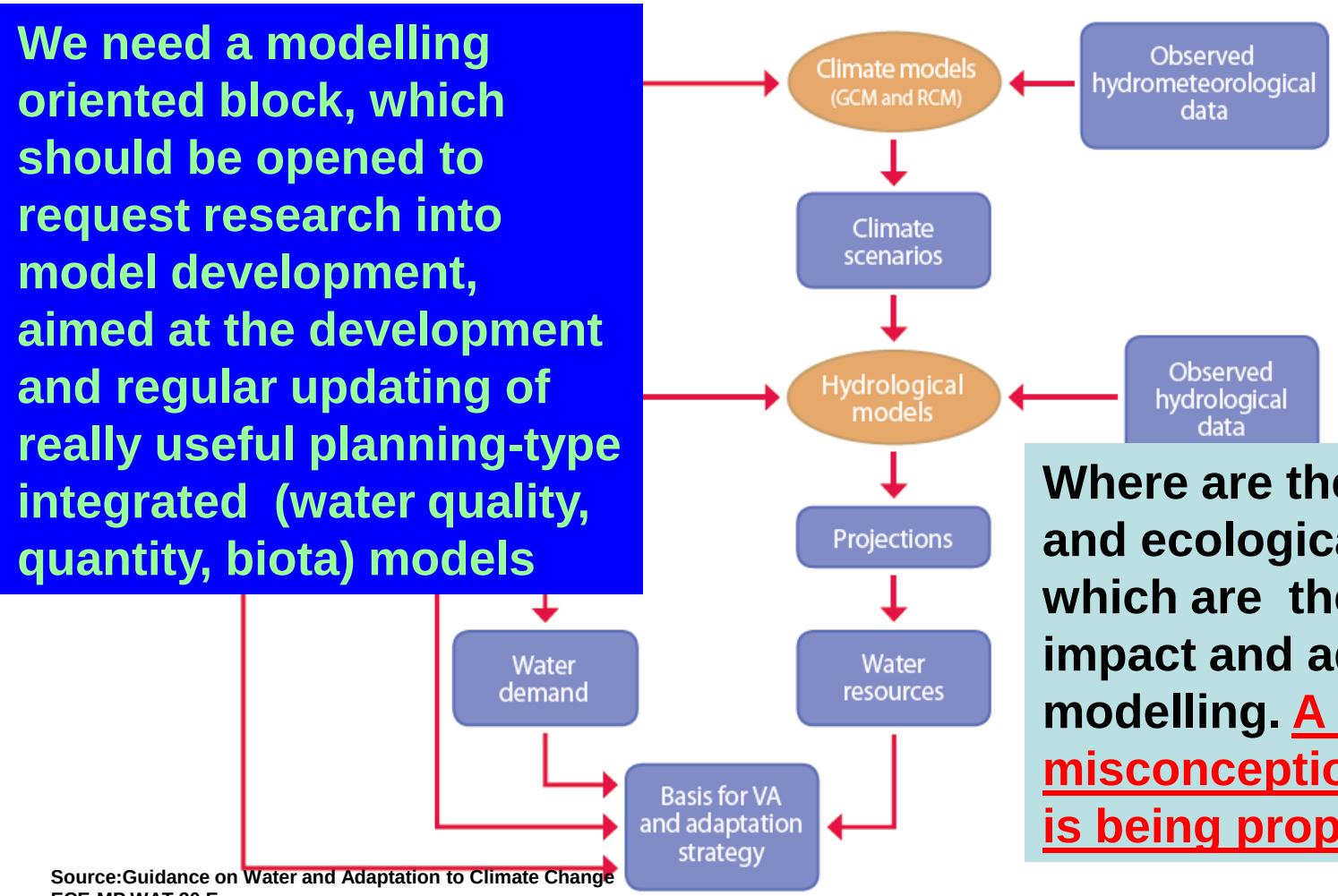
This is because very few experimental data are available.

All the NPS techniques, together with the hydrological-hydraulic management techniquest cen be called ECOHYDROLOGY

How to plan the adaptation strategies?

In an important document I found the following figure to support the argument on the need of models to be used for adaptation:

Figure 6: Overview of the process towards the adaptation strategy



We need a modelling oriented block, which should be opened to request research into model development, aimed at the development and regular updating of really useful planning-type integrated (water quality, quantity, biota) models

Where are the water quality and ecological models, which are the keys of all impact and adaptation modelling. A serious misconception of modelling is being propagated??!!!

Source:Guidance on Water and Adaptation to Climate Change ECE-MP WAT 30 E

How to plan the adaptation strategies?

Another example of the many found

In among the Guiding principles of the Measures of Adaptation one finds the following texts and Figures:

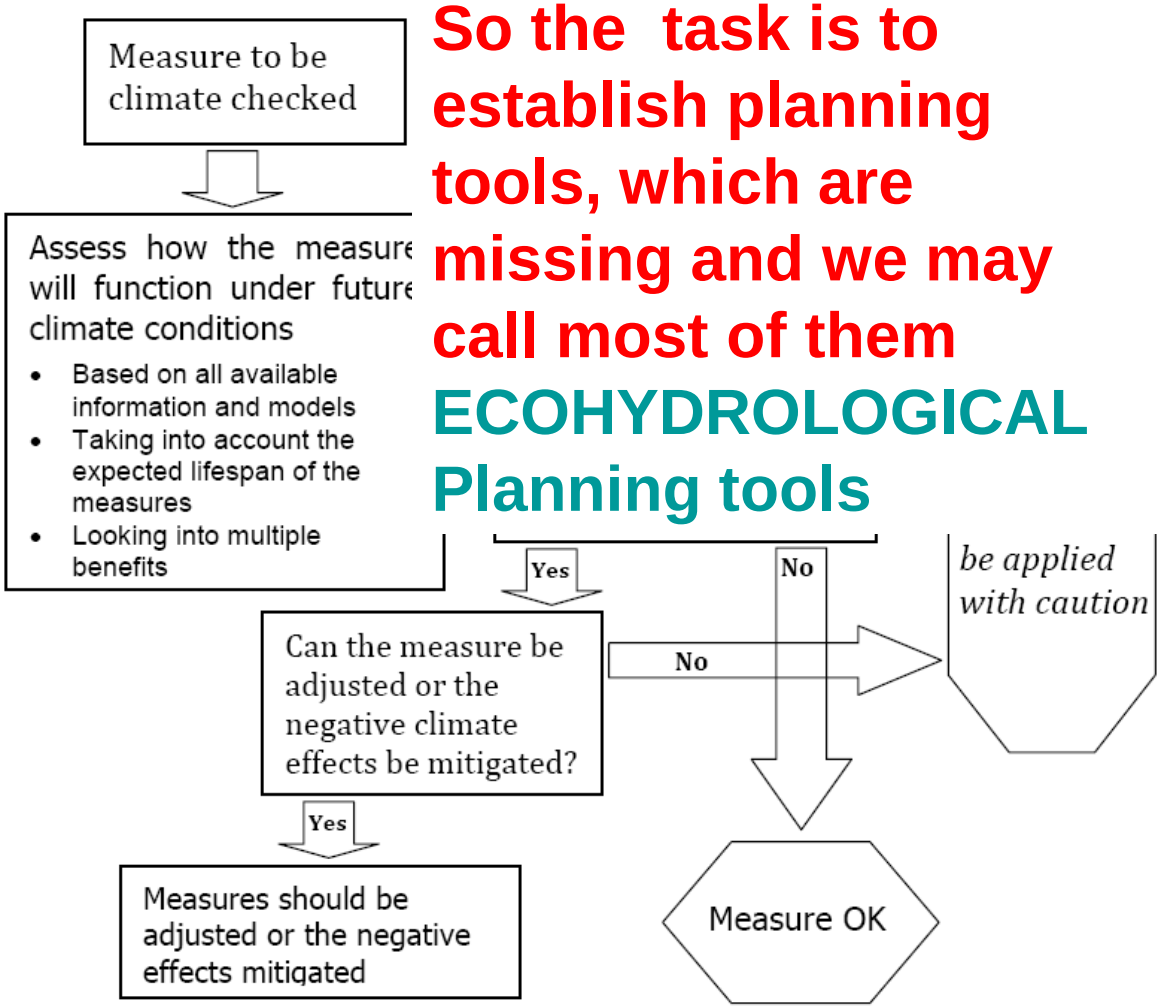


Figure 3 Climate checking of measures

Source: EU Technical Report no 2009-40. Guidance Document No.24
River Basin Management in a Changing Climate. Chapter 5

So the task is to establish planning tools, which are missing and we may call most of them ECOHYDROLOGICAL Planning tools

These advises seem to be good ones. Nevertheless they are a bit too general to really help upgrading WFD and RBMP to suit climate change adaptation. This flowchart should probably have a block for planning the changes that result from measures, as this is the main task in RBMP

The essence of ecohydrology is:

to save aquatic ecosystems by indentifying sources of degradation problems (sedimentation, excess nutrient loads, other pollutants, too little or too much flow) and find hydrological and pollution control solution (also by modelling), while enhanced ecosystems will provide means of controlling flows and water quality.

Research needs can also be summarized as those into ecohydrology (strategies of ecology, hydrology, hydraulic construction and pollution control of point and nonpoint sources)

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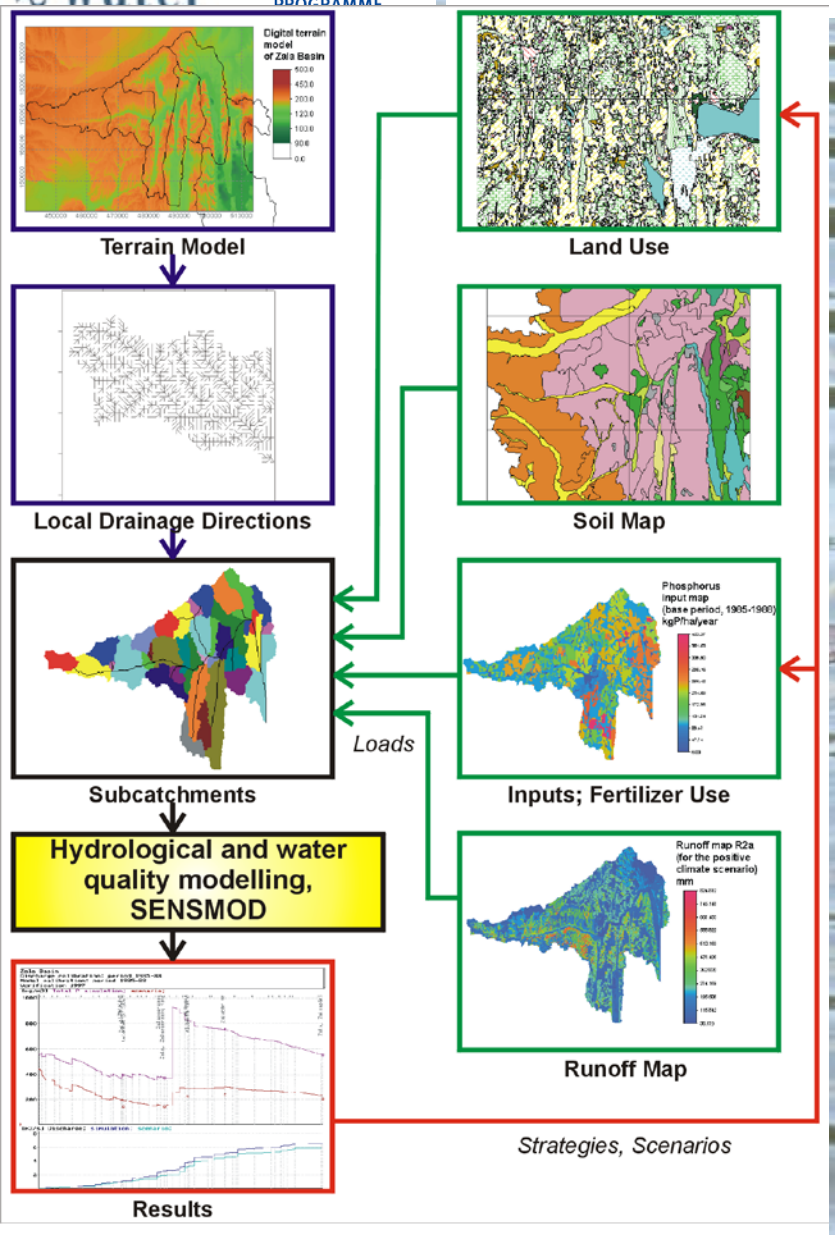
What do we need for bridging the gaps with ecohydrological models?,



I frequently use this flowchart (made from the results of an early EU project)

Nevertheless I have never succeded in turning a river basin model study to a real planning-forecasting tool. They all ended up in „drawers” or „winchesters” in the lack of follow up „maintenance” of the models systems.

The reason is that we never succeded to make real contact with decision and and policy makers (financing institutions).

Other problems include: The lack of understunding each others we scientists of ecology, biology, chemistry, hydrology, hydraulics, etc.

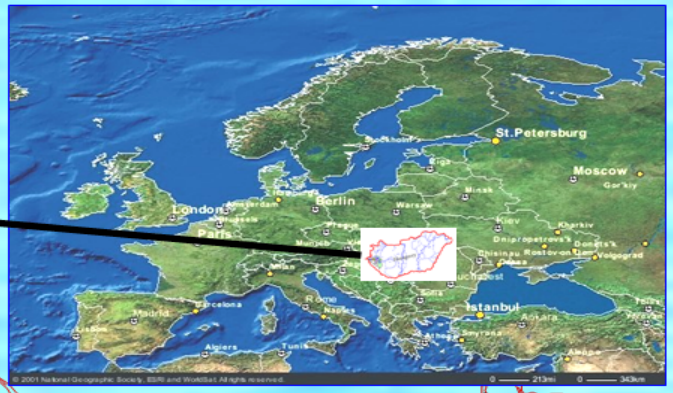
What are then the main ecohydrological adaptation strategies?

soil, nutrients and
management of the
sound water
needed

iculture,
shoes
th water
nd/or

Last but far not the least the proper ecohydrological management of wetlands, existing and/or recreated for the purpose, also with the help of modelling

Some examples of succesful wetland revitalisation



Lake Balaton Catchment

The likely largest and most successful wetland revitalisation in Europe, the recostruction of Kis (Little) Balaton

Map and scenes of Kis Balaton

51 km2

16 km2

Keleti-berek
Zalavár
Kis-Balaton II.tározó
Zala
Vörsi-berek
Vörs
Balatonsz
Zala-berek
Zalavári-erdő
Zalaszabar
Hidvégi-tábla
Kis-Balaton I.tározó
Radai-Kőrises
Fonyed
Szegerdő
Gólyás-berek
Vörsi-erdő
Tófoki-dűlő
Gyótai-dűlő
Hupolgón-dűlő
Major-dűlő
Ökör-bolt
Égett-berek
Balatonmagyaród
Cigányházi-dűlő
Garabonc
Nagy-rét
Ófalusi-dűlő
Tólápi-dűlő
Kormósi-berek
Szőkedencs

Another example is the new flood control system of Hungary (to avoid such levee failures like this)

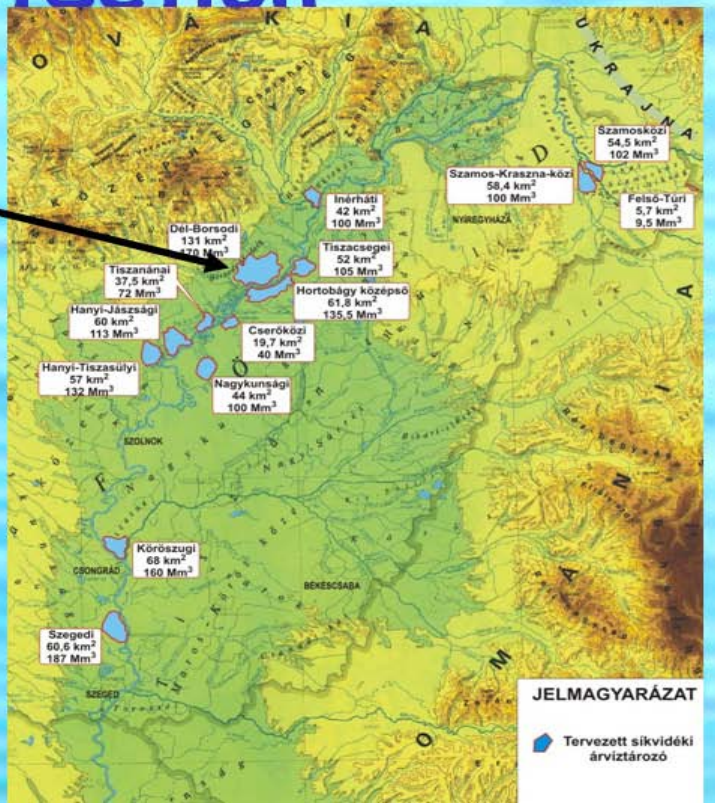
Floods and flood control

Vásárhelyi Plan: Improvment of t Tisza Flood Protection

Emergency reservoirs

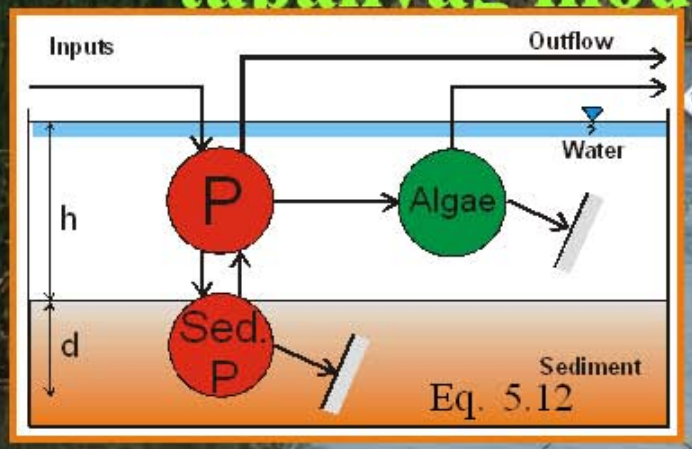
Management of the flood channel

Revitalisation of wetlands



One of VITUKI's simple and robust ecohydrological models called EcoHydSim

- Talán egy ilyen vízmérleg és alga-tápanyag modellt lehetne alkalmazni



$$\frac{dP_L}{dt} = \frac{1}{Ah}\left[P_{in}Q_{in} - P_L Q_{out}\right] - K_{set}P_L + K_{scu}P_s\frac{d}{h}$$

Eq. 5.10

$$\frac{dP_s}{dt} = \frac{h}{d}K_{set}P_L - K_{scu}P_s - K_{bur}P_s$$

$$\frac{dh}{dt} = \frac{1}{A}\left[Q_{in} - Q_{out}\right] + P - E$$

Eq. 5.11

$$TEMPLIM = \frac{t_c - t}{t_c - t_o}\exp\left(1 - \frac{t_c - t}{t_c - t_o}\right)$$

$$0 \text{ if } t > t_c$$

Some ecological-hydrological modelling might help (not only for justifying the existence of elderly water sceintists), but they must be very simple to provide a real palnning/design tool!!

Summary, conclusions

- For many water-related climate change impacts one of the adaptation strategies is an all-basin wide management of flows, quality components and the state of the ecoosystems (natural and man made-managed)
- These strategies together are called the Ecohydrological management
- These actions should be planned and the River Basin Managment Planning is (must be) the suitable frame, in the form of an appropriate planning (modelling) tool
- This tool is missing (!!!) and therefore the urgent task is to develop and apply

ECOHYDROLOGICAL RBMP MODELLING TOOLS

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Summary, conclusions cntd

- For the appropriate operation of the tools created for RBMP one must ensure the continuous updating of the tools by repeated calibration and verification. This also means a much upgraded monitoring
- The tools to be continously updated must include the early warning and forecasting models of pollution accidents
- For international basins the equitable use of the quality and quantity of water resources of river basins be really ensured in an enforceable manner by relevant international legal regulations, agreements and conventions (e.g. the existing ones always have an amendment or footnote that allows the escaping from all obligations)

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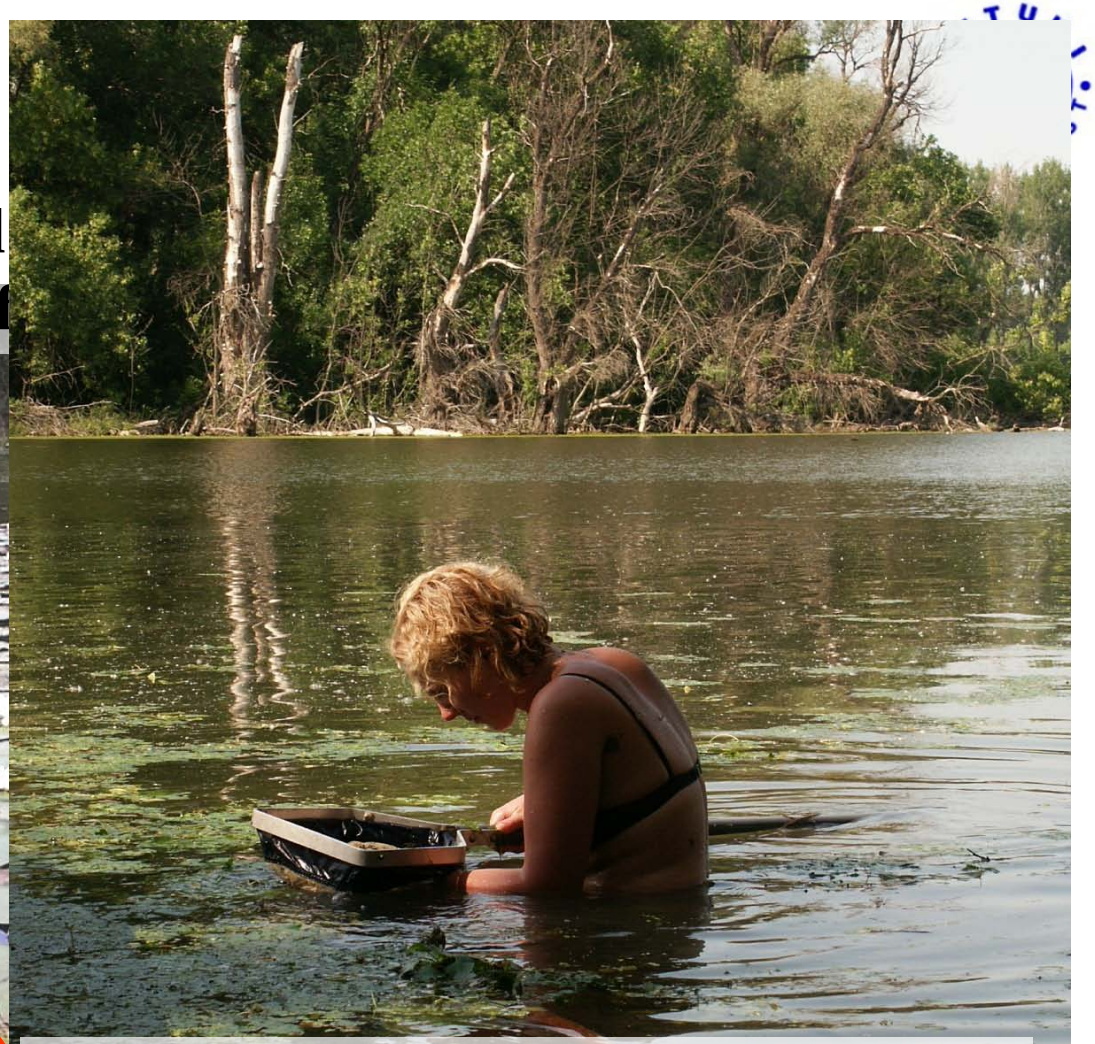
Summary conclusion

The future of European waters depends on whether the newly reformed policies can or cannot handle the above problems, and whether planning tools, and relevant international legislation are also reformed. This would need much more measurement and monitoring than what is being made presently and will demand much higher financial inputs for the continuing updating, calibration and verification work that would be needed to keep all tools in working order and perform scientifically acceptable plans and forecasts

Thank you for

(This is what I would call

work, needed regularly f



Many of you might like this type of work even better, this being one of the much needed activities of field work, which is not sufficiently practiced

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The evironmentally