

WORK PACKAGE 11
GUIDELINES FOR THE USE OF THE TRAINING
MODULE FOR URBAN RIVER BASIN
ENHANCEMENT METHODS

DELIVERABLES 11.2, 11.6

to support short running training courses and briefing sessions



FOREWORD

This brochure is designed to assist trainers and educators who plan to run short training courses for water and environmental specialists and briefing sessions for key decision makers based on the deliverables of the EU funded URBEM project. The Guidelines is accompanied by a series of PP (Power Point) slides and links to reports developed within the project.

One of the most important aspects in the development of the modern world is the rapid movement of people from rural places to urban centres. The environment of urban areas extends far beyond their boundaries; in the context of rivers, these are modified to meet the needs of the urban population and often act as conduits for wastewaters.

Historically, development of watercourses has been undertaken for a variety of reasons such as water supply, navigation or flood control. In the past urban watercourses have been confined to narrow river corridors with the channels canalised and concrete and other man-made materials forming the bed and banks of the river.

The URBEM project has investigated new techniques and materials for incorporation into urban river systems in order to enhance the visual and ecological value. The approach of URBEM is based on the belief that the whole river corridor and its interactions with the urban environment are an integral part of the system (Gardiner, 1992).

Within urban areas, management and control of a watercourse are used to prevent or reduce bank erosion, flooding and increased pollutant loads, but may also be used for the protection of the natural hydraulic conditions and aquatic habitats. The urban communities expect protection from floods, and there are public health and safety issues from water quality and the proximity of running water. Resolving the conflict over watercourse functions is particularly complex in urban areas, and urban watercourses are seen as an important element in an integrated urban water management cycle (Maksimovic et al., 2001)

Many urban streams have been converted into closed conduit sewers, and now receive both storm drainage and raw or dilute sewage from the surrounding area. The pollutant loading also frequently leads to poor water quality, indeed this adverse impact of urbanisation often extends to the watercourses downstream of the urban area. In some cases the bacteriological or chemical quality of urban streams may present a severe threat to public health. The result is that many urban watercourses have virtually no aesthetic or amenity value, support a limited range of ecosystems, and do not meet the water quality objectives prescribed by the EC Water Framework Directive (WFD).

Modification of watercourses is recognised in European legislation through the Water Framework Directive, which defines a “heavily modified water body” as a “body of surface water, which as a result of physical alterations by human activity is substantially changed in character”. The WFD provides the basis for long-term, sustainable development, enhancement and planning of European rivers with an emphasis on natural ecosystems, and intrinsic wildlife value. The pressure on European urban centres has increased significantly over the past century, with higher population densities, together with expectations of many for an improved quality of life. Improvement of the river systems through urban areas in terms of quality, ecology, aesthetics and amenity values is vital in the movement towards an environmentally sustainable future for cities in Europe.

One of the URBEM project deliverables is the training module which is available on a CD. This brochure is designed accompanies the CD and provide guidance in preparation and running of the training programme.

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Appendix: Training Slides

1 GENERAL INFORMATION

1.1 Introduction

The Training Module (TM) has been developed within the URBEM project under the EU funding within the Framework Programmes 5. The main objective of the TM is to enhance the awareness of the general public and develop the capabilities to public, professional and environmental authorities about how to plan, implement and maintain an urban stream rehabilitation scheme. Additionally, it can serve as a support to briefing sessions to the top level decision makers.

The TM is designed so that it can be tailored to suit the audience being addressed. There are three target groups of a different level of interest and understanding the topic: top level decision makers, professionals (water and environmental planners, developers and designers) and general public. The TM presentations consist of series of slides supported by written material. It is anticipated that those involved in the presentations will have an understanding of the subject area and the technical knowledge to undertake the training programme.

1.2 The Concept of the Training Module

The TM is provided on a CD with folders: and artistically designed slides (about 350). It can be used directly from the CD or copied on a hard drive and used from there.

Draft versions of the slides have been developed by URBEM project working groups and the final version have been elaborated by CUW-UK.

The hardware requirements are a personal computer (PC) with the operation system Windows (version 95 and above), 64 MB RAM and Microsoft's programmes Word and PowerPoint (version 97 and above).

In addition to PP slides which generally follow the URBEM project logic and order of topics, more detailed documents about lesson subjects are provided. They are taken from the reports on individual topics dealt with within the project's work packages. When the reader of the presentation implies a left mouse button click on the button with "More information" option, this will invoke the document on the screen. A return to the text is by a mouse click at opened document's "Close" option.

In addition to the slides provided in this package new ones can be added into the group of slides for particular training session or programs (copy and paste from other resources) or temporarily hidden (command hide/unhide in PowerPoint Slide Sorter View, invoked by right mouse button click on the slide). The slides provided are as follows:

- Individual, simple graphs and photos
- Animated slides, consisting of several sequential images and
- Slides with buttons for more information about specific subject

1.3 The Contents of the TM Folders

The contents of the TM folders are as follows:

Guidelines for the TM

This folder consists of only this text file – URBEM Guidelines for the Training Module.

Training Slides

The folder has the main training slides:

- Training Slides – Group A
- List of Training Slides – Group A
- Training Slides – Group B
- List of Training Slides – Group B
- Training Slides – Group C
- List of Training Slides – Group C

2 TARGET AUDIENCE

The primary use of the Training Module is to provide assistance in the training of water and environmental planners in mastering the basics of planning, implementing and maintaining an urban rehabilitation scheme. (Target Group B). The materials are selected so that they can serve both young specialists that are entering this profession and the senior specialists. As mentioned, there are also two other groups of slides which are meant to be used in briefing short sessions the professionals from the Target Group A (top level decision makers) and in running public awareness sessions for the Target Group C (general public).

The TM is specifically designed for the three above mentioned target audiences, each with different levels of interest and technical knowledge. The audience is assumed to have a general understanding of the particular project and subject area.

2.1 Target Group A

Top level decision makers - governmental officials working with environmental issue tackling the problems of urban stream, top executives, mayors or their deputies in charge of the environment and alike. This audience is in principle responsible for a broader spectrum of problems at the governmental, regional but mainly local (municipal) level and thus does not necessarily have an insight into modern concepts and technologies of urban stream rehabilitation. Since this group is not assumed to have a deep technical knowledge on the subject, the TM is supposed to provide them with a brief, concise overview of the modern concepts of solutions, available technologies and basic criteria for technology selection depending on the local conditions. However, this group relies on the advice and support of the second target group. Technical specialists are meant to propose the options for the final

considerations and possible criteria for technology selections. The typical duration of briefing sessions for this group is between half an hour and half a day. Exceptionally a one day session can be contemplated if this topic is combined with other complementary ones. A short evaluation session should be held at the end of the briefing session.

2.2 Target Group B

Water and environmental planners, developers and designers - this audience has a high level of technical knowledge and is interested in the technical aspects of the planning, operation and maintenance of urban rehabilitation. This major target group has a very important role to play in spatial planning, co-ordination of plans among various specialists, advising the key decision makers on technology choice and in co-operating with experts in technology, design, analysis and operational management. However, it should be mentioned that even this group is not supposed to make a detailed design of the systems, which still remains to be done by the other specialists in analysis, design, construction, and operational management of the rehabilitation schemes. To provide vocational training for this group of specialist is beyond the scope of the present TM. However they can and should be updated on the modern trends covered by the TM.

2.3 Target Group C

General audience (general public, teachers, journalists, school children, NGOs) - this audience has very little or no technical knowledge and no experience with either planning or implementation of the urban rehabilitation schemes. They belong to the broader category of the users of these solutions and should be made aware of the general concept of rehabilitation and on its implementation. This target group plays a major role in public hearings and if not properly made aware of the basics, could potentially be misled by various groups for their own goals. This group can make the system work or fail. They should be consulted in the planning process, and thus should be properly informed. The TM can be used for presentation to this target audience but can also be used for development of the other training material.

3 TRAINING MODULE MATERIAL

Training module consists of 10 lessons, presented in Power Point presentations as follows:

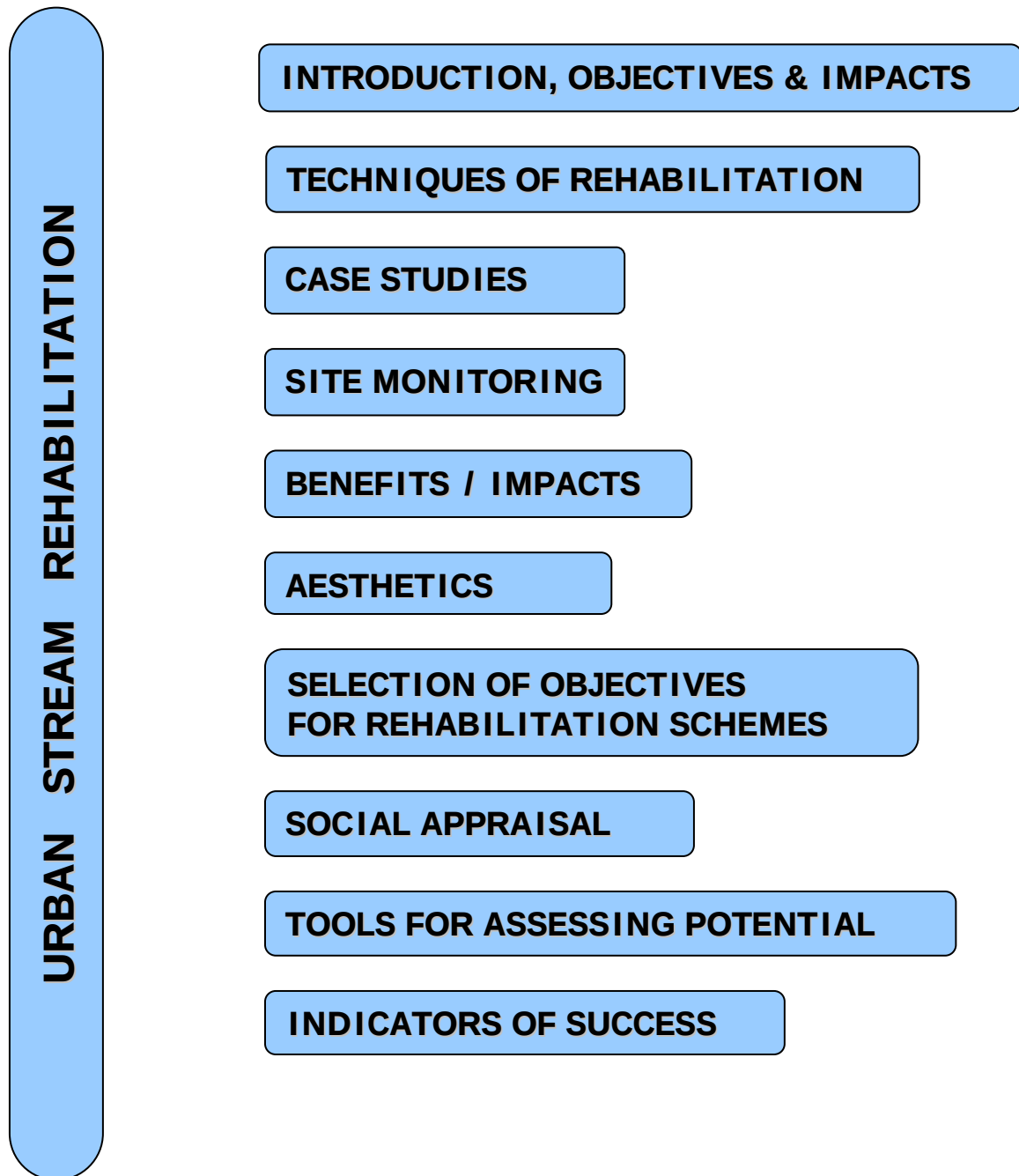


Fig 1. Contents of the Training Module

3.1 Training Slides

A core group of slides is selected so that they cover the major topics and enable fast learning of the basic concepts. The training slides are divided into three separate files, one for each of the target groups A, B and C. The principles of modern graphics design are used, and the slides are meant to be easy to understand to master their essence.

Guidelines related to valuation of urban stream rehabilitation.

The following are the main steps:

- 1 Create awareness about the values of the goods and services provided by urban stream rehabilitation, and incorporate the valuation of these goods and services into water resources planning.

- 2 Define a framework, such as multi-criteria analysis, that allows evaluation of all social, cultural and ecological values of urban stream rehabilitation, as well as economic values.

- 3 Develop economic tools to enable evaluation of the use of water to support urban stream rehabilitation services, for comparison with the value of alternative uses such as industrial and public supply.

A key element in water and environmental projects is the involvement of stakeholders in the decision-making process. This involvement should include establishing a forum, such as a working group, to enable interaction and conflict resolution. The implementing agency needs to establish a multi-disciplinary team and to open an information centre that holds all reports and data with open access. Through stakeholder participation the various water uses and users within the catchment should be defined along with the objectives for water project, which should include the desired ecological character of urban stream. Objectives for water allocations to urban stream may be primarily ecological or may be related to wise use practices, such as fishing. Management problems should be phrased in quantifiable terms.

3.3 Additional Information Material

For those interested in additional details, blocks are a group of text documents that can be selected from appropriate slides. These texts enable users with a broader spectrum of interest to have a better access to the optional material. The add-on modules are based on an adequate level of the general technical knowledge of the audience and can be accordingly prepared

The Training Module has been developed so that further updates and upgrades can easily be made. Separate modules can be specifically designed for various regions, written in the appropriate language and adapted to the local culture. Detailed examples and case studies can also be included. Its translation into various languages would make it available to an even wider audience, and should enhance the process of creating additional local modules.

Internet-based versions of the TM could be made available to those with Internet access who mean the co-operation agreement with URBEM project coordinator. This new form of distribution would greatly increase the Training Module's popularity, as it would be user-friendlier, providing interactive links between the slides / figures and the text.

The future local trainers should send their individual comments and suggestions, which can then be included in upcoming versions of the TM.

4 WORKSHOP PROGRAMMES

4.1 Introduction

Workshops are going to be the main form of conveying the principles of urban stream rehabilitation to the target audience.

Workshops for target Group B need to be carefully prepared due to the fact that they are planned to last for 5 days, and the audience consists of educated professionals with good knowledge and understanding of urban drainage problems.

Workshops or briefing session for Group A and Group C will not be considered here because they are of a much shorter duration (less than half a day or one day) and will be supported with adequate texts and slides. In general, they will have a similar form to the workshop for Group B, but be tailored by local trainers.

4.2 Urban stream rehabilitation Workshop – Group B

Day 1

Registration

Introduction – opening and welcome address

Presentation of basic, concept, creation of working group.

Day 2

Introduction to Training Module URBEM (30 minutes)

Presentations - lectures

Discussion on presentations

Day 3

Morning

Recapitulation of the topics covered at the previous day.

Field trip to load project. Reporting on findings

....

Introduction to role game

Introduction of participant's case studies (10 minutes)

Introduction to purpose of role game (30 minutes)

Problem – The committee must decide between different urban stream rehabilitation schemes.

Objective – to select the most cost-effective and environmentally sound stream rehabilitation.

Selection of roles between participants – the participants should choose/be assigned roles from the list below. If there are more participants than roles (very likely) then more important roles should be played by 2 or more participants. (30 minutes)

Roles:

Stakeholders – policy makers, investors, managers, users

Policy makers (politicians - government or local authorities) - governments generally have final jurisdiction and responsibility in urban stream rehabilitation by setting overall policy, whether they are involved in performing the management functions or not. Often environmental departments assist in providing policy input in urban stream rehabilitation.

Planners - Planning of urban stream rehabilitation requires thoughtful consideration, because of the complexity of the process. A new planning approach has to be developed in the form of participatory integrated assessment.

Regulators – Inspection of construction is performed by the local public works department. The operation and maintenance function of publicly-owned facilities comes under the department of public works. The director in this division is responsible to a city manager or other elected officials.

Water Company - commonly deals with water supply and wastewater collection and discharge but can be involved in urban stream management. Public works departments have jurisdiction over large infrastructure projects that may include urban stream. They have the responsibility for operating and maintaining centrally operated and overview the systems operated by private contractors.

General public – are the users of the system. People are usually unaware of conventional domestic urban stream problems, and will probably have little opinion, and therefore be fairly accepting. However, several NGO, ecological groups can be constructors and destructors partners Community participation depends largely on the extent to which public participation is used generally in a given locality. Unless they live fairly close by, people don't tend to be very aware of characteristics of the systems, and will probably have little opinion.

Designers – city engineer is responsible for design and design approval.

Contractors (developers) – Construction of urban stream facilities is done by private contractors under contract to the local jurisdiction or land developers. Private sector companies provide a range of services ranging from being contractors to government in conducting feasibility studies, community consultation, drawing master plans for wastewater and stormwater infrastructure, to constructing the infrastructure and operating facilities. Unlike governments they do not have direct responsibility in maintaining public health or quality of the environment and urban stream. Construction costs may change considerably over the next few years as the implications of the greenhouse effects may start to be felt .

Insurance companies (to cover the cost of damage beyond commonly accepted risk)

Presentation of problem - scenario (30 minutes)

Group creates their own assumptions with respect to physical characteristics of scenario, available resources (budget, maintenance personnel), scope of the problem and legal standards. Information regarding scheme choice is given in the Introduction above. (30 minutes)

Group agrees on criteria for selecting the most appropriate scenario. (30 minutes)

Afternoon

Discussion on the proposals.

Argument and counter argument of the main role players.

Day 4

Role game continued – report writing

Group applies previously mentioned steps and presents the final decision (scheme choice) to a larger group and explains all relevant decision-making steps. (4 hours)

The following tasks should be performed:

Examination of the reasons for the proposed scheme – in order to better understand alternatives, anticipate desirable and negative impacts. The outcome should be a clear understanding of the need for this scheme and its expectations.

Identification of guiding policies and other standards – list of strategic requirements, authorisations needed.

Identification of impacts or changes (direct/indirect, short-term/long-term, residual/cumulative)

Evaluate impacts – changes or risks associated with all the identified issues.

Creation of policy (gives guidance on how the scheme should be selected, used and maintained to stream rehabilitation).

Day 5

Group discussion of contents of Workshop

Evaluation of Workshop

Conclusion

Closing/certificate distribution

5 CONCLUSION

The TM is a concise document which adequately assists lecturers in running three basic forms of knowledge transfer and awareness raising through:

- Briefing sessions for top level decision makers
- Training programs for water and environmental planners specialists and
- Public awareness exercises for general public.

The slides and text are relatively simple to follow, and carefully designed to suit the specific target audiences. They are particularly suited for translation into other languages and for adaptations and adoptions for the global use in both developed and developing countries. It can serve as an excellent foundation for the development of future material for other projects and publications.

6 ACKNOWLEDGEMENTS

1 This Training Module is one of the outputs of Urbem Project. Research contractors for this part of the project was CUW-UK, Centre for Urban Water, London UK under co-ordination of Professor Cedo Maksimovic, Imperial College, London and the development work has been done by Mrs Jelena Tolic graduate civil engineer, and Miss Milena Djurić, IT student

A steering group consisting of guided production of this training material

Prof. Cedo Maksimovic Dr Roger Bettes and the initial version of the material have been regularly presented in the Project Workshops

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APPENDICES

Appendix 1. Training Slides

GROUP A: DECISION MAKERS

URBEM FRAMEWORK

- **The URBEM Framework for Assessing and Managing River Rehabilitation**
- **How to navigate the framework**
- **River Rehabilitation Information**
- **What tools and assessment procedures are available?**
- **Which indicators can be used for decision-making?**
- **Key**
- **The generic approach to assessing and managing urban river rehabilitation**
- **Formulating river rehabilitation goals**
- **Defining method of assessment**
- **Development of options**
- **Assessment of options**
- **Implement, monitor and review**
- **Conclusions**

TECHNIQUES FOR REHABILITATION

- **Measures to lessen the volume of runoff on the source**
- **Measures to improve the quality of runoff**
- **Measures to control erosion and sedimentation**
- **Measures to maintain groundwater recharge**
- **Measures to detain peak flow**
- **Measures to minimize pollution from sewage**
- **Measures for urban stream rehabilitation in channel bed and banks**
- **Channel reconstruction through transverse structures on the streambed**
- **Channel stabilization through stream parallel flow guiding structures**
- **Protection and stabilization of stream banks**

TECHNIQUES FOR REHABILITATION

Soil - bioengineering

- **Soil bio-engineering**
- **Examples of urban watercourses**
- **Example for a river cross section using soil bio-engineering techniques**
- **Advantages of soil bio-engineering techniques**
- **Willows – most important plants**
- **Summarizing considerations**
- **Final Example**

CASE STUDIES

- Contents
- Approach
- Map
- Austria:Vienna - Wienfluss
- Germany:Munich – Isar
- Italy:Florence – Mugnone Brook
- Switzerland: Zurich
- Czech Republic:Chrudim – Náhon
- North American
- Canada:Toronto – Mud Creek
- United States:Wilmington – Christina River
- Case studies - Characterisation
- Objectives (set)
- Impacts of river rehabilitation (set)
- Planning and implementation process (set)
- Aesthetic Evaluation
- Social appraisal
- legal requirements (set)
- Rehabilitation techniques (set)
- Measures
- Summary

SITE MONITORING

- MONITORING IN EUROPE (Monitoring according to the Water Framework Directive)
- Description
- Pressures on urban rivers
- Water Framework Directive guidelines on monitoring
- Rehabilitation Objectives for the different case studies
- URBEM monitoring database summary
- Biological sampling
- Chemical and physico-chemical sampling
- Monitoring in URBEM case study: *Chaudanne, France*
- Case study: Ljubljana, Slovenia
- Case study: Newcastle, UK

AESTHETIC EVALUATION of URBAN WATERCOURSES

- Aesthetical evaluation
- Aesthetical evaluation methodology
- A tri-dimensional approach
- Aesthetical Value of Watercourses
- RIVER
- CITY
- PEOPLE
- The result – profiling aesthetical characteristics

- Summarizing considerations

SOCIAL APPRAISAL AND PUBLIC INVOLVEMENT

- Driving forces for rehabilitation
- Article 14, Water Framework Directive, 2000
- Contents
- Legal requirements
- Defining a stakeholder
- Listing Stakeholders
- Stakeholders
- What you might want from stakeholders
- Finding out what stakeholders think and want
- Alternatives to Prove It!

POST IMPLEMENTATION ASSESSMENT & INDICATORS OF SUCCESS:

- Content
- Theoretical background
- State of science and current practice
- Relation to the planning and implementation and management process
- Defining the scope for success appraisal
- Effect dimension
- Scale of Assessment Abstraction dimension
- Space dimension of effects
- Time dimension
- Interpretation of results
- Conclusions / prerequisites for the assessment
- Development of indicators for post implementation assessment
- Existing indicators and indicator systems for appraisal of urban river rehabilitation
- Social and economic aspects
- Criteria for the choice of indicators
- Method for post implementation appraisal
- Existing Methods of Indicator Based Project Assessment
- FLAG Method (*Nijkamp & Ouwersloot 1998*)
- Procedure for the establishment of a project specific indicator system for urban river rehabilitation
- Setting General Goals and specific Objectives
- Establishing a Monitoring plan
- Application considerations
- Framework for irregular Post Implementation Assessment
- Description of Criteria and Indicators
- Hierarchy of Criteria and Indicators
- Criteria and Indicators of Ecology
- Criteria and Indicators of Social Well-being
- Public Accessibility to River and River Site

- **Open Space Extend and Quality**
- **Quality and Extend of Recreational and Cultural Facilities**
- **Incidents and Provisions related to Public Health and Safety**
- **Quality and Density of Land Uses**
- **Public Appreciation and Utilization of River and River**
- **Public Appreciation of River and River Sites**
- **Recreational Use and User groups**
- **Residential Use and Social Structure of Residents**
- **Social Relations and Social Organisation**
- **Neighbourhood Relations and Neighbourhood Cohesion**
- **Relations between Institutions/Organisations and Residents/Stakeholders**
- **Criteria and Indicators of Economic Sustainability**
- **Production Values**
- **Utility Values**
- **Direct Use Values**
- **Non-Use Values**
- **Project Costs and Maintenance costs**

GROUP B: TECHNICAL SPECIALISTS

URBEM FRAMEWORK

- The URBEM Framework for Assessing and Managing River Rehabilitation
- How to navigate the framework
- River Rehabilitation Information
- What tools and assessment procedures are available?
- Which indicators can be used for decision-making?
- Key
- The generic approach to assessing and managing urban river rehabilitation
- Formulating river rehabilitation goals
- Defining method of assessment
- Development of options
- Assessment of options
- Implement, monitor and review
- Conclusions

TECHNIQUES FOR REHABILITATION

- Measures to lessen the volume of runoff on the source
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- Measures to maintain groundwater recharge
- Measures to detain peak flow
- Measures to minimize pollution from sewage
- Measures for urban stream rehabilitation in channel bed and banks
- Channel reconstruction through transverse structures on the streambed
- Channel stabilization through stream parallel flow guiding structures
- Protection and stabilization of stream banks

TECHNIQUES FOR REHABILITATION

Soil - bioengineering

- Soil bio-engineering
- Examples of urban watercourses
- Example for a river cross section using soil bio-engineering techniques
- Effects and impacts of soil bio-engineering techniques
- Living materials
- Types of bank vegetation
- Hydraulic impacts of vegetated river banks
- Willows
- Willow contraction
- Willow-brush mattress
- Fascines
- Fascines with brush layers

- Live stakes
- Geotextile and live stakes
- Geotextile on brush layer
- Wattle fence
- Fascine layer
- Row of tree stumps
- Design considerations
- Resistance limits
- Maintenance
- Maintenance activities in a structure's lifetime
- Maintenance master plan
- Maintenance master plan, example
- Final Example

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- Aesthetic Evaluation
- Social appraisal
- legal requirements (set)
- Rehabilitation techniques (set)
- Measures
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SOCIAL APPRAISAL AND PUBLIC INVOLVEMENT

- Driving forces for rehabilitation
- Article 14, Water Framework Directive, 2000
- Contents
- Legal requirements
- Defining a stakeholder
- Listing Stakeholders
- Stakeholders
- What you might want from stakeholders
- Increasing Stakeholders understanding
- Methods for increasing understanding
- Finding out what stakeholders think and want
- What is social capital?
- Prove It! and evaluation
- Prove It! – the options
- Alternatives to Prove It!
- Sources on surveys and statistics
- Tools in the Prove It! toolkit
- How the tools are presented
- What people like about Prove It!
- Example from a rowing and canoeing project in London

POST IMPLEMENTATION ASSESSMENT & INDICATORS OF SUCCESS:

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- Existing indicators and indicator systems for appraisal of urban river rehabilitation
- Social and economic aspects
- Criteria for the choice of indicators
- Method for post implementation appraisal
- Existing Methods of Indicator Based Project Assessment

- **FLAG Method (*Nijkamp & Ouwersloot 1998*)**
- **Procedure for the establishment of a project specific indicator system for urban river rehabilitation**
- **Setting General Goals and specific Objectives**
- **Selection of a project specific set of indicators**
- **Defining target values and value classes for indicators**
- **Classification of values**
- **Weighting of Indicators**
- **Assessment of parameters**
- **Aggregation of data**
- **Presentation of Results**
- **Establishing a Monitoring plan**
- **Application considerations**
- **Framework for irregular Post Implementation Assessment**
- **Description of Criteria and Indicators**
- **Hierarchy of Criteria and Indicators**
- **Criteria and Indicators of Ecology**
- **Criteria and Indicators of Social Well-being**
- **Existing Conditions and Quality of River and River Site Settings**
- **Public Accessibility to River and River Site**
- **Open Space Extend and Quality**
- **Quality and Extend of Recreational and Cultural Facilities**
- **Incidents and Provisions related to Public Health and Safety**
- **Quality and Density of Land Uses**
- **Public Appreciation and Utilization of River and River**
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- **Utility Values**
- **Direct Use Values**
- **Non-Use Values**
- **Project Costs and Maintenance costs**

GROUP C: GENERAL PUBLIC

URBEM FRAMEWORK

- The URBEM Framework for Assessing and Managing River Rehabilitation
- How to navigate the framework
- River Rehabilitation Information
- What tools and assessment procedures are available?
- Which indicators can be used for decision-making?
- Key
- The generic approach to assessing and managing urban river rehabilitation
- Formulating river rehabilitation goals
- Defining method of assessment
- Development of options
- Assessment of options
- Implement, monitor and review
- Conclusions

TECHNIQUES FOR REHABILITATION

- Measures to lessen the volume of runoff on the source
- Measures to improve the quality of runoff
- Measures to control erosion and sedimentation
- Measures to maintain groundwater recharge
- Measures to detain peak flow
- Measures to minimize pollution from sewage
- Measures for urban stream rehabilitation in channel bed and banks
- Channel reconstruction through transverse structures on the streambed
- Channel stabilization through stream parallel flow guiding structures
- Protection and stabilization of stream banks

TECHNIQUES FOR REHABILITATION

Soil - bioengineering

- Soil bio-engineering
- Example for a river cross section using soil bio-engineering techniques
- Examples of urban water courses
- Advantages of soil bio-engineering techniques
- Lots of living materials can be used
- Willows – most important plants
- Selected techniques using willows
- Bundles
- Composite constructions

- Vertical structures
- Maintenance of vegetation
- Final Example

CASE STUDIES

- Contents
- Approach
- Map
- Austria:Vienna - Wienfluss
- Germany:Munich – Isar
- Italy:Florence – Mugnone Brook
- Switzerland: Zurich
- Czech Republic:Chrudim – Náhon
- North American
- Cananda:Toronto – Mud Creek
- United States:Wilmington – Christina River
- Case studies - Characterisation
- Objectives (set)
- Impacts of river rehabilitation (set)
- Planning and implementation process (set)
- Aesthetic Evaluation
- Social appraisal
- legal requirements (set)
- Rehabilitation techniques (set)
- Measures
- Summary

SITE MONITORING

- Monitoring in Europe (Monitoring according to the Water Framework Directive)
- Description
- Pressures on urban rivers
- Water Framework Directive guidelines on monitoring
- URBEM case studies location
- Biological sampling
- Chemical and physico-chemical sampling
- Monitoring in URBEM case study: *Chaudanne, France*
- Case study: Ljubljana, Slovenia
- Case study: Newcastle, UK

AESTHETIC EVALUATION of URBAN WATERCOURSES

- Aesthetical evaluation
- Aesthetical evaluation methodology
- A tri-dimensional approach
- Aesthetical Value of Watercourses
- RIVER

- CITY
- PEOPLE
- The result – profiling aesthetical characteristics
- Example: the Jardas stream
- Jardas stream – studying the different indicators..
- Jardas stream – profile of aesthetical performance
- Summarizing considerations

SOCIAL APPRAISAL AND PUBLIC INVOLVEMENT

- Defining a stakeholder
- Stakeholders
- What you might want from stakeholders
- Finding out what stakeholders think and want
- What is social capital?
- Tools in the Prove It! toolkit
- What people like about Prove It!
- Example from a rowing and canoeing project in London

POST IMPLEMENTATION ASSESSMENT & INDICATORS OF SUCCESS:

- State of science and current practice
- Relation to the planning and implementation and management process
- Conclusions / prerequisites for the assessment
- Development of indicators for post implementation assessment
- Existing indicators and indicator systems for appraisal of urban river rehabilitation
- Social and economic aspects
- Criteria for the choice of indicators
- Method for post implementation appraisal
- Existing Methods of Indicator Based Project Assessment
- Public Accessibility to River and River Site
- Open Space Extend and Quality
- Quality and Extend of Recreational and Cultural Facilities
- Incidents and Provisions related to Public Health and Safety
- Quality and Density of Land Uses
- Public Appreciation and Utilization of River and River Sites
- Public Appreciation of River and River Sites
- Recreational Use and User groups
- Residential Use and Social Structure of Residents