THE SERVICE CONTRACT - STUDIES DEVELOPMENT NO. 414 / 2010

STUDY NAME:
DANUBE RIVER’S MORPHOLOGY AND REVITALIZATION

PROGRAMME NAME:
TRANSNATIONAL COOPERATION PROGRAMME FOR SOUTH-EAST EUROPE 2007-2013

PROJECT NAME:
DANUBEPAKRS - DANUBEPAKRS - DANUBE RIVER NETWORK OF PROTECTED AREAS - DEVELPMENT AND IMPLEMENT THE TRANSNATIONAL STRATEGIES FOR CONSERVATION OF DANUBE NATURAL HERITAGE

FINAL REPORT
DRMR PROJECT’S FUTURE

Draft paper DRMR (1. phase)

- Co-operation with WWF (database)
- Questionnaires (before Christmas)

Feedback from all partners

Finalization
February

Presentation of Document at Conference in Orth (spring 2011)

1. Database (of implemented projects)
2. Key role of Protected Areas
3. Project Assessment
4. Lessons learned
5. Recommendations & Visions
I.1 Synergies between revitalization and ecological restoration

to restore - tranzitive verb. (paintings, architectural monuments, etc.) A return to baseline, to put back into a former or original state [Sil. -Sit-u-] / <fr. restaurer, lat. restaurare
to revitalize - transitive verb - to give new life or vigor to (< fr. revitaliser)

• Anthropic degradation of aquatic ecosystems, whether we refer to rivers, streams, lakes or coastal areas, deltas, is an omnipresent reality with major implications for centuries, if we refer to the Danube basin. Ecosystems are affected by morphological, chemical, hydrological or biological changes, all creating pressure on the structure and functions of ecosystems.
• Human impact on ecosystems is the main theme of numerous studies on the degree of anthropic degradation and many monitoring and evaluation indicators have been developed, to diagnose the state of ecosystems.
• In response to anthropic pressures that led to the degradation of ecosystems, have been tried measures of reconstruction / rehabilitation or ecological restoration. Ecological restoration is a discipline developed in latest 20 years, approaching different thematics with aplicability on species., habitas.
FUNCTIONAL ANALYSIS OF THE ECOSYSTEMS

ECOSYSTEMS

- **Natural Capital**
  - Functionality
    - Primary production
    - Hydrologic cycle
  - Ecological integrity
    - Strength
  - Structure
    - Biotic structure
    - Structura abiotica

- **Anthropogenic Capital**
  - Socio-cultural capital
    - Institutions
    - Social networks
    - Confidence
    - Ethnicity
  - Human capital
    - Active population
    - Health
    - Aptitudes
    - Education
    - Cunoaștere
  - Built capital
    - Buildings
    - Infrastructure
    - Equipment
  - Financial capital
    - Financial situation

- **Ecosystem’s Functions**
  - Productivity services
    - Aprovisionare
    - Water availability
    - Hunting
    - Agriculture
    - Livestock
    - Plants
  - Regulation services
    - Air quality
    - Water quality
    - Disease control
    - Pollinate
    - Strength
    - Habitat providing
  - Cultural services
    - Tourism
    - Esthetic elements
    - Cultural heritage
    - Spiritual values
    - Education
    - Research
    - Traditional elements

- **Ecosystem’s Dynamics**
  - Connectivity ecosystems
    - Conectivitate ecosisteme
  - Time
  - Dinamism
  - Structure
    - Biotic structure
    - Structura abiotica
  - Functionality
    - Primary production
    - Hydrologic cycle
    - Ciclul biogeochimic

LEAC methodology
Preliminary classification of measures after FORECAST project:

- to improve water flow quantity;
- to improve sediment flow quantity;
- to improve flow dynamics;
- to improve longitudinal connectivity;
- to improve river bed depth and width variation;
- to improve in-channel structure and substrate;
- to improve lateral connectivity;
- to improve riparian zones;
- to improve floodplains
General model of ecosystem performance. An ecosystem or habitat that is in rudimentary condition with low functioning develops into a system with optimal structure and functioning. Development can take several pathways, and can oscillate between system states (Thom R.M, 2004).
Revitalization and morphology of DANUBE RIVER

Connectivity types sketch in a river ecosystem

Methods: Starting from The Los Angeles River Revitalization Master Plan developed by City of Los Angeles department of public works were taken and adapted several standard criterions of revitalization for Danube River, representing the base for the following 4 criterion subclasses:

• Danube River’s restoration and rehabilitation through Lateral Connectivity;
• Danube River’s restoration and rehabilitation through Longitudinal Continuity;
• Danube River’s restoration and rehabilitation through Temporal Conectivity;
• Capture Community Opportunities & Create Value.
River revitalization approach must take into account the scale at which the process impact. So important are three levels to analyze the impact that has to be quantified rigorously, namely:

- Local level
- Regional level
- Basinal level

The approach framework of the Danube in the European context - the Danube Strategy & ESPON Programme 2013

connectivity (sustainable transport, energy networks, tourism and culture)

environment, water resources and risk management;

economic prosperity and social development (education, research, rural development, competitiveness, internal market);

improving system of governance (institutional capacity and internal security).

II. DIAGNOSIS

- II.1 Methods used in diagnosis
  - II.1.1 Analyse through Land and Ecosystem Accounting (LEAC)
  - II.1.2 Analyse based on DPSIR indicators (Driving Force, Pressure, State, Impact and Response)
  - II.1.3 Multicriteria analysis
  - II.1.4 Risk analysis
  - II.1.5 Stakeholder Analysis/Logical Framework
The purpose of LEAC analyze is to reflect the dynamic of variables of state (functional and structural) and of control factors, determination of indicators regarding the structure, the composition and operating of components of natural capital and socio-economical systems as well as indicators set hereby are appreciated the reports between CN and SEE or co-developing reports, evaluation of impacts and ecological risk and diagnosis of modification causes.
II.1.2 Analyse based on DPSIR indicators (Driving Force, Pressure, State, Impact and Response)

The Pressure-State-Response framework

II.1.3. Multicriterial analysis

- MCDA (HISTORICAL ASSESSMENT) is a discrete multi-criteria method whose impact (or evaluation) matrix may include crisp, stochastic or fuzzy measurements of the performance of a scenario (or an alternative option) with respect to an evaluation criterion. (NAIADE – Munda 1995)
II. 1. 4 RISK ANALYSIS

The main idea is to evaluate the risks in each of the six stages of planning:

- 1) identifying problems and opportunities,
- 2) inventory and forecast,
- 3) plan formulation,
- 4) evaluation of plans,
- 5) comparison of alternatives,
- 6) plan selection.
In order to ensure an accurate representation of the local situation and the wishes of local people in relation to the revitalization of the river can be made a socio-anthropological rigorous investigation by specialists. The socio-anthropological survey mentioned above through specific methods (tree approach - from identifying the parties involved in order to implement the Focus Group method and/or semi-structured interviews) is not at the empirical level, but committed a theoretical point of view - a pragmatic approach on both the social and basic research regarding revitalization.

From the previous projects experience: Integrated Management of European Wetlands (IMEW), Master Plan for Master Plan - support for sustainable development in DDBR Tulcea county/ Romania Logical Framework Analyze (LFA), Ecological and Economical Resizing in Romanian Sector of Danube Floodplain (REELD), Room for the River in Cat’s Bend, Romania, DDNI specialists will provide a good sample of methodology for identification and analysis of stakeholders involved in flood risk management.
III. DIMENSIONS OF DOCUMENTATIONS AND ANALYSIS

- **SPATIAL DIMENSION**
  - Basin level
  - Regional level
  - Local level

- **TYPOLOGICAL DIMENSION**
  - Ecoregion
  - Altitude
  - Catchments area
  - Geology

- **THEMATIC DIMENSION**
  - Physical environment
  - Chemical
  - Biota
III. EXAMPLES AND LESSONS FOR BEST PRACTICES

- **SPATIAL/TYPOLOFICAL/THEMATIC DIMENSION**
  - Basin level
    - Danube strategy
    - Rhine Integrated Plan (RIP)
  - Regional level
    - REELD
    - Danube Delta Master Plan
Local level

- The Danube restoration project between Neuburg und Ingolstadt (Germany)
- Bulgarian Wetland Restoration and Pollution Reduction Project (RIVER ENGINEERING) (Bulgaria)
- The LIFE Project “Upper Drava-river valley” Austria
- The LIFE Project „Wild river landscape of the Tyrolean Lech” Austria
- Monitoring results of revitalization measures on an urban lowland River (Liesingbach, Vienna, Austria)
- River Wien restoration project: improvement of the ecological condition of a heavily modified river in a urban environment (Austria)
- LIFE Nature Project Wachau of dry grasslands and Danube nase (Austria)
- Lobau (Austria): reconnection at floodplain
- National Park Donau – Auen (Austria): side arm restoration and river bank restoration
- Morava River (Slovakia and Austria): reconnection of meanders
- LIFE05NAT/SK/000112 „Restoration of the Wetlands of Zahorie Lowland“ (WETREST) Slovakia
- Krapje Djol (Croatia): reflooding of oxbow
- Camenca river restoration (Moldova) – Lessons learned for river restoration in the eastern part of the Danube River Basin
- Ecological Restoration in the Danube Delta Biosphere Reserve (Romania) – Babina and Cernovca islands
- Research for ecological restoration in the Dunavat-Dranov region, Danube Delta (Romania)
III. 4. Progressive development of tree problems (Logical Framework Analyze) and the SketchMatch method for scenarios and possible renaturation measures

- Problem analysis was conducted to create the conceptual model of human intervention in the geographic landscape of the Danube River, starting from identifying key factors that have a modifier role and their effect as shown in the problem tree. Tree problems show the problems in a hierarchical order. First will be identified causes and effects, then they will be summed and placed in a wider range, then building the tree as follows:
  - what are the causes are at the bottom of the tree;
  - what are the effects are at the top of the tree.
Lessons successes

<table>
<thead>
<tr>
<th>Stakeholder success</th>
<th>Assessment Criteria</th>
<th>Project Identification Number (ID) and values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Aesthetics</td>
<td></td>
<td>5</td>
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<tr>
<td>Economic benefits</td>
<td></td>
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<td>Tourism and recreation</td>
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<td>3</td>
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<tr>
<td>Education</td>
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<td>5</td>
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<tr>
<td>Traditional activities renew</td>
<td></td>
<td>-</td>
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<td>Health</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Governance</td>
<td></td>
<td>4</td>
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<tr>
<td>Security – Flood risk management</td>
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<td>-</td>
</tr>
<tr>
<td>Guiding image exists</td>
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</tr>
<tr>
<td>Ecological improvements</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Self sustaining</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>No lasting harm done</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Assessment completed</td>
<td></td>
<td>5</td>
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## Lessons successes

<table>
<thead>
<tr>
<th>Learning success</th>
<th>Scientific contribution</th>
<th>Management experience</th>
<th>Improve methods</th>
</tr>
</thead>
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<td>4 4 4 3 - 2 3 3 4 4 3 3 3 5 5</td>
<td>4 4 4 4 - 3 - 5 4 4 2 5 4 3 5 5</td>
<td>5 3 3 4 - 1 2 3 4 3 2 4 3 2 4 4</td>
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</table>

<table>
<thead>
<tr>
<th>River system</th>
<th>Lateral connectivity</th>
<th>Longitudinal connectivity</th>
<th>Temporal connectivity</th>
</tr>
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<tbody>
<tr>
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<td>- - - - - - - - - 4 2 - - - -</td>
<td>- 5 5 - 3 - 3 4 4 1 4 2 3 4 4</td>
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**TOTAL** (max. 95 p.)

|                        | 44 71 71 37 34 33 30 63 53 76 30 57 52 43 81 71 |

*Table 4 – Assessment criteria Matrix*
<table>
<thead>
<tr>
<th>No.</th>
<th>Crt.</th>
<th>Project name</th>
<th>Subclasses</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>The Danube restoration project between Neuburg und Ingolstadt (Germany)</td>
<td>River restoration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Capture Community Opportunities</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Bulgarian Wetland Restoration and Pollution Reduction Project (RIVER ENGINEERING) (Bulgaria)</td>
<td>River restoration</td>
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<td></td>
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<td></td>
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<tr>
<td>3</td>
<td></td>
<td>Extension of the existing Belene Islands Complex Ramsar Site Bulgaria</td>
<td>Create Value</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>The LIFE Project „Upper Drava-river valley“ Austria</td>
<td>River restoration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Create Value</td>
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<td>5</td>
<td></td>
<td>The LIFE Project „Wild river landscape of the Tyrolean Lech“ Austria</td>
<td>River restoration</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Create Value</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Monitoring results of revitalization measures on an urban lowland River (Liesingbach, Vienna, Austria)</td>
<td>Capture Community Opportunities</td>
</tr>
</tbody>
</table>

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<table>
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<tr>
<th>No.</th>
<th>Project Description</th>
<th>Capture Opportunities</th>
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<tbody>
<tr>
<td>7</td>
<td>River Wien restoration project: improvement of the ecological condition of a heavily modified river in an urban environment (Austria)</td>
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<td>LIFE Nature Project Wachau of dry grasslands and Danube nase (Austria)</td>
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<td>Morava River (Slovakia and Austria): reconnection of meanders</td>
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</tr>
<tr>
<td>12</td>
<td>LIFE05NAT/SK/000112 „Restoration of the Wetlands of Zahone Lowland“ (WETREST) Slovakia</td>
<td>Create Value</td>
</tr>
<tr>
<td>13</td>
<td>Krapje Djil (Croatia): reflooding of oxbow</td>
<td>River restoration</td>
</tr>
<tr>
<td>14</td>
<td>Camena river restoration (Moldova) – Lessons learned for river restoration in the eastern part of the Danube River Basin</td>
<td>River restoration</td>
</tr>
</tbody>
</table>
**Assessment Criteria**

<table>
<thead>
<tr>
<th>TOTAL</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
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</thead>
</table>

Table 4 – Assessment criteria Matrix

<table>
<thead>
<tr>
<th>Number</th>
<th>Project Description</th>
<th>Revitalization Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>LIFE05NAT/SK000112, „Restoration of the Wetlands of Zahorie Lowland“ (WETREST) Slovakia</td>
<td>Create Value</td>
</tr>
<tr>
<td>13</td>
<td>Krapje Doli (Croatia): reflooding of oxbow</td>
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<td>Camenca river restoration (Moldova) – Lessons learned for river restoration in the eastern part of the Danube River Basin</td>
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</tr>
<tr>
<td>15</td>
<td>Ecological Restoration in the Danube Delta Biosphere Reserve (Romania) – Babina and Cernovca islands</td>
<td>Capture Community Opportunities</td>
</tr>
<tr>
<td>16</td>
<td>Research for ecological restoration in the Dunavat-Dranov region, Danube Delta (Romania)</td>
<td>Capture Community Opportunities</td>
</tr>
</tbody>
</table>

Table 5 – Link between projects and the 4 classes of revitalization identified
DANUBE RIVER MORPHOLOGY AND REVITALIZATION GUIDE

PRIMARY DECISION BLOCK

POLITICAL DECISION

SITE BACKGROUND

PRE-DIAGNOSTIC

RESTORATION/REVITALIZATION MEASURES

SOCIAL/COMMUNITY NEEDS

SPATIAL DIMENSION

UE DIRECTIVES

OPERATIONAL PROGRAMS

TERRITORIAL PLANNING DESIGNS

BAZIN LEVEL

REGIONAL LEVEL

LOCAL LEVEL
Stakeholder success
Aesthetics
Economic Benefits
Recreation
Education

Most effective restoration

Ecological success
Guiding image exists
Ecological improvement
Self-sustaining
No lasting harm done
Assessment completed

Learning success
Scientific contribution
Management experience
Improve methods
VI RELATION BETWEEN THE DANUBE PARKS NETWORK AND REVITALISATION PARKS

The Danube Parks network can be developed through:

- Improve connectivity between existing natural areas to counter fragmentation and enhance their ecological coherence,
- Greater permeability of the landscape to support species dispersal, migration and movement, for example using land in a favorable for fauna and flora or introducing agricultural or forestry environmental schemes that support extensive agricultural practices
- **Identification of multifunctional** areas. In such areas, compatible land use that supports healthy ecosystems is favored against destructive practices.

In practice, one of the most effective ways of achieving these principles is adopting a more integrated approach to land management at three levels: local, regional, watershed. This in turn is best achieved through a Spatial Planning, which allows investigation of spatial interactions between different components.
• THANK YOU VERY MUCH FOR YOUR ATTENTION!