UNDP/GEF Danube Regional Project

Strengthening the Implementation Capacities for Nutrient Reduction and Transboundary Cooperation in the Danube River Basin

Field and Policy Action for Integrated Land Use in the Danube River Basin –

Methodology and Pilot Site testing with special reference to wetland and floodplain management

Project Component 1.4: Integrated Land Use Assessment and Inventory of Protected Areas

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Preface

The long term goal of the DRP is, in short, to strengthen capacities of key Danube stakeholders and institutions to effectively and sustainably manage the Danube River Basin's water resources and ecosystems for citizens of Danube countries.

Land use management practices can not be separated from river basin management. Inappropriate land-use from agriculture, forestry, flood protection etc. can lead to impairments in the water ecosystem, lower water quality, biodiversity etc. Therefore sustainable water resource management also means the appropriate management of land with direct linkages to water ecosystems.

The purpose of this assignment was to develop approaches to assess land uses, related policies and planning, and their effects on water ecosystems and in particular linkages with land-water such as wetlands and floodplains. The assignment was intended to develop a methodology for assessing land-use practices and for then identifying appropriate land-use in the frame of integrated river basin management. The assignment then was to identify pilot areas to test the methodology and to demonstrate actions to appropriately manage land for multiple water ecosystem benefits.

The component resulted in a Land-use assessment methodology that now is to be tested in the 2nd phase of the DRP. 3 Pilot Sites have been identified in 3 different regions of the Danube with different land-use water-ecosystem characteristics. Local stakeholder consultation meetings were held at each pilot site to assure ownership and to validate the value of pursuing activities. This result contains the methodology that has been developed as well as a description of the 3 pilot sites chosen. It can be expected that the methodology will evolve after the completion of the pilot site activities in Phase 2.

One challenge of this assignment, has been, and will continue to be in Phase 2 of the DRP, to define the appropriate linkages between land-use policy and planning (agriculture, forestry,) water interfaces (wetlands, floodplains etc.) and with river basin management as a whole and in particular within the frame of the EU WFD.

The results of this component are intended on the one hand for policy makers and planners at a central government level as well as for stakeholder/actors at the more local (pilot site) level i.e. NGOs, wetland managers, local governments etc.

The report was prepared by a team of experts led by the WWF Danube-Carpathian Programme and reflects the views of the expert team. The report and its contents remain the property of the UNDP/GEF DRP and should not be used without providing full credit to the DRP.

For further information about the DRP, objectives, activities, results etc. please visit the DRP webpage at: www.undp-drp.org .

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Abbreviations

CAP	Common Agricultural Policy
CIS	Common Implementation Strategy of the EU Water Framework Directive
DRB	Danube River Basin
DRP	Danube Regional Project
EC	European Commission
ECO EG	Ecological Expert Group of ICPDR
EU	European Union
GEF	Global Environment Facility
GIS	Geographical Information System
ICPDR	International Commission for the Protection of the Danube River
IRBM	Integrated River Basin Management
ISPA	EU pre-accession instrument for structural measures
LIFE	The EC financial instrument for the environment
UNDP	United Nations Development Programme
RBM EG	River Basin Management Expert Group of ICPDR
SAPARD	EU pre-accession instrument for agriculture and rural development measures
WFD	Water Framework Directive (2000/60/EC)
WWF	World Wide Fund For Nature

Units of measurement

ha	hectares
km	kilometres
km^2	square kilometres
m	metres
t	tons

Executive Summary

Objective 1 of the UNDP/GEF Danube Regional Project offers support to policy development favouring creation of sustainable ecological conditions for land use and water management. Within Objective 1, Output 1.4, *Integrated Land Use Assessment and Inventory of Protected Areas*, was one of eight project outputs. This report covers only the *Integrated Land-use Assessment* element of Output 1.4 (the *Inventory of Protected Areas* is the subject of a separate report).

The overall aim of Output 1.4 was to assist Danube River Basin countries to prepare new land-use and wetland rehabilitation/protection policies and legislation in line with existing and emerging legislation, particularly the EU Water Framework Directive. The specific objectives of this element of Phase 1 of Output 1.4 were to:

- develop a straightforward, yet rigorous, land-use assessment methodology that could be tested and adapted as necessary for use across the region;
- select three pilot sites at which the methodology could be tested through implementation of specific site-based activities including the holding of a workshop at each location to ensure stakeholder involvement and wider public participation in the identification and assessment of various future land-use alternatives;
- from the testing, develop specific proposals for final land-use concepts at each pilot site, including recommendations for the actions and measures required to implement the concepts in practice (potentially in Phase 2 of the DRP); and
- develop a communications strategy to ensure the dissemination of conclusions and recommendations, including the final land-use assessment methodology, throughout the Danube River Basin.

Specific activities carried out by the Output 1.4 project team included:

- Development of a working methodology for assessing land use;
- Selection of three pilot sites – Zupanisjski canal, near Budakovac village, Drava sub-basin Croatia; Lower Elan valley, Prut sub-basin, Romania; and Olsavica valley, Tisza sub-basin, Slovakia - at which the working methodology could be tested;
- Preparation of sustainable land-use concepts at each pilot site aimed at reducing nutrient inputs into water bodies, particularly through wetland and floodplain rehabilitation and/or restoration;
- Holding of a workshop at which local and national level stakeholders could review the technical steps described above and provide feedback on possible steps for changing land use and restoring wetlands in order to meet the Output 1.4 objectives;
- Identification of the practical and policy measures required to move towards more sustainable land use patterns at each pilot site; and
- Dissemination of the findings, conclusions and recommendations from these activities.

The methodology for assessing land use was successfully applied in all three pilot sites and needed only minor amendments following the testing. The final version is attached as separate Annex to this report. Other potential users – including national and local authorities in the Danube River Basin, NGOs and international organisations such as the Ramsar Secretariat – are encouraged to make use of this methodology.

Implementation of proposals for practical and policy action at each pilot site will be subject to preparation of detailed feasibility studies, technical plans and budgets at the outset of Phase 2 of the DRP. However, the technical work and stakeholder involvement at each site was successful in producing outline action plans as follows:

- **Zupanijski canal**:
    1. Place a hydraulic structure in the canal to divert water to existing, but extended, channel thereby reconnecting Drava to adjacent Podravski Sokolac wetland and Budakovac oxbow and consequently raise local water tables;
    2. Install a second hydraulic structure to raise surface water levels in the channel and adjacent Marcina jama reed beds;
    3. Construct a 150m channel to rehabilitate reed beds around Zanos
    4. Construct a mains water pipeline to the villages of Vladmirovac and Budakovac (currently without mains water);
    5. Construct a wastewater treatment facility at Budakovac village; and
    6. Construct a wastewater treatment facility in the villages of Brezovica, Vaska, Kapicini and Vladmirovac.
- **Lower Elan Valley**:
    1. Rehabilitate the lower Elan floodplain downstream of the confluence with Sarat Creek through meander restoration and planting of native *Salix* and *Populus* species;
    2. Reprofile the Elan river channel;
    3. Control soil erosion on hillslopes through changed land-use, implementation of good agricultural practice, land reclamation and afforestation;
    4. Improve hydrological conditions at Mata Radeanu fish farm (at confluence of Elan and Prut rivers);
    5. Declare Lower Elan floodplain a protected area; and
    6. Improve public awareness and train civil society organisations especially those in local communities and schools.
- **Olsavica Valley**:
    1. Build small dams on selected streams to control channel erosion;
    2. Reopen small meanders on canalised stream;
    3. Restore wet grasslands to act as a buffer zone between agricultural land and the stream;
    4. Remove underground drainage system to restore water tables;
    5. Plant trees on steep stream banks to control soil erosion;
    6. Fence springs to prevent damage from grazing; and
    7. Promote restoration more widely through public awareness information.

Many of the actions recommended at each pilot site are in line with, and could be more widely encouraged by, existing policy drivers. Four policy trends in particular were found to support sustainable land-use and wetland restoration measures:

- wetlands are an integral part of the EU Water Framework Directive (WFD);
- Agriculture is changing across Europe:
- Wetlands can help safeguard against floods; and
- Public participation is now a legal necessity

It is important that these opportunities are promoted at all levels and especially by the European Commission, the ICPDR, national governments and statutory authorities within the Danube River Basin and regional authorities.

One overarching policy finding of Output 1.4 is that information on these policy drivers is lacking locally. At the pilot site level there is a chronic shortage of information and knowledge about recent, new and emerging policies and the opportunities associated with them, including financial instruments, for promoting sustainable land use. This serious shortcoming – itself and argument for, and target of, improved public participation – needs to be addressed urgently.

In terms of "hard" policy findings, many European or Danube-wide policies already support the actions suggested for each pilot site. For instance, the WFD and other EU and international instruments such as the Natura 2000 directives and Bern Convention - clearly support wetland restoration as a contribution to Integrated River Basin Management initiatives. Similarly, the ongoing reform of the Common Agricultural Policy, SAPARD and Rural Development Directive will offer a range of supportive instruments, although knowledge and uptake of these remains low. The Horizontal Guidance on Wetlands offers guidance on how wetland restoration, protection and sustainable management can actively contribute to achieving the WFD objectives. And all Danube countries are members of the Ramsar Convention.

Analysis of "soft" policy aspects from Output 1.4 showed that there are often different realities in rural areas and at and national level possibly as a result of a bottleneck in administrative capacity at local or regional levels. Access to information on many policy instruments should also be improved and there is an urgent need to improve the active involvement of the public, in line with Article 14 of the WFD. The three pilot sites all highlighted the need for immediate capacity-building of government institutions and administrations at regional and local levels for WFD and other types of policy and programmatic information provision, public awareness and implementation. Such capacity-building actions should also be extended to include NGOs and other stakeholders who can play a constructive role in implementation of the WFD and other policy instruments.

1. INTRODUCTION

1.1. Context – the Danube Regional Project

This report covers activities within the framework of the UNDP/GEF Danube Regional Project (DRP), the long-term development objective of which is *"to contribute to sustainable human development in the Danube River Basin through reinforcing the capacities of participating countries to develop effective mechanisms for regional cooperation in order to ensure protection of international waters, sustainable management of natural resources and protection of biodiversity"*.[1]

The goal of Phase 1 of the DRP (December 2001 to November 2003) is to prepare and initiate basin-wide capacity-building activities, for further consolidation during DRP Phase 2 (November 2003 to October 2006). Phase 1 comprises 20 Project Outputs, together covering more than 80 separate activities, which are grouped into four immediate objectives:

Objective 1: Support for **policy development** favouring creation of sustainable ecological conditions for land use and water management;

Objective 2: **Capacity building** and reinforcement of **transboundary cooperation** for the improvement of water quality and environmental standards in the Danube River Basin;

Objective 3: Strengthening of **public involvement** in environmental decision making and reinforcement of community actions for pollution reduction and protection of ecosystems;

Objective 4: Reinforcement of **monitoring, evaluation and information systems** to control transboundary pollution, and to reduce nutrients and harmful substances.

The present study covers Phase 1 activities within Project Output 1.4 *Integrated Land Use Assessment and Inventory of Protected Areas*, one of eight Project Outputs under the overall umbrella of Objective 1. In particular, this report provides findings and recommendations designed to support sustainable, integrated land-use patterns that are capable of delivering multiple socio-economic and ecological benefits, including nutrient reduction in streams and rivers. Floodplain/wetland management, including rehabilitation and/or restoration where appropriate, is given special attention in line with the Project Implementation Plan (see Section 2 below for further details). This report deals only with the *Integrated Land Use* element of Project Output 1.4. The *Inventory of Protected Areas* is covered by a separate document. In this respect, it is important to underline that certain activities and outputs under other Project Outputs are of particular relevance to the issues dealt with in this report. These include the following:

- **Policy development – river basin and water resource management, and agriculture**

  Project Output 1.1 Development and implementation of policy guidelines for river basin and water resources management (Activities within this Output have been developed to mirror the development of guidelines in the framework of the Common Implementation Strategy (CIS) of the EU Water Framework Directive (WFD). Of particular note is Activity 1.1-11 which been instrumental in producing a Draft Public

[1] Source: DRP Project Implementation Plan, available at http://www.icpdr.org/undp-drp/

Participation Strategy for the DRB, reflecting the emphasis of the WFD on public participation as a key cross-cutting issue. The whole of this Output should be seen in the light of the CIS Horizontal Guidance on Wetlands and the WFD, published in November 2003);

Project Output 1.2 Reduction of nutrients and other harmful substances from agricultural point and non-point sources through agricultural policy changes;

Project Output 1.3 Development of pilot projects on reduction of nutrients and other harmful substances from agricultural point and non-point sources through agricultural policy changes.

- **Public participation**

Project Output 3.1 Support for institutional development of NGOs and community involvement (notably through establishment of the Danube Environment Forum);

Project Output 3.3 Organization of public awareness-raising campaigns on nutrient reduction and control of toxic substances.

These two Outputs have also contributed to preparation of the Public Participation Strategy for the Danube River Basin, (see Output 1.1).

- **Monitoring and assessment**

Project Output 4.3 Monitoring and assessment of nutrient removal capacities of riverine wetlands. (Activities under this Project Output have also been implemented by WWF, involving the development of a draft assessment methodology for testing at pilot sites).

The outputs of all of the above Project Outputs will need to be taken into consideration when making the final selection of activities to be taken forward in DRP Phase 2.

1.2 Structure of this report

The next chapter of this report sets out the aims and objectives of activities under the integrated land-use portion of Project Output 1.4, with reference to the Terms of Reference established by UNDP/GEF. This is followed by a detailed account of the activities undertaken, focusing on development of a generic land-use assessment methodology and work to field test the methodology at three DRB Pilot Sites, in Croatia, Romania and the Slovak Republic, respectively. The final chapter sets out detailed findings and recommendations which are relevant at a range of different levels (e.g. field and policy; local, national and international) and for a range of different actors (e.g. Pilot Site stakeholders, national authorities, ICPDR, EC etc). A series of technical Annexes sets out in detail the work carried out at the three Pilot Sites.

2. AIMS & OBJECTIVES

2.1 Overall aims

The DRP Project Implementation Plan and the Terms of Reference for Project Output 1.4 identify the following overall aims:

- The primary focus is to assist DRB countries to prepare **new land use and wetland rehabilitation/protection policies and legislation** in line with existing and emerging environmental legislation.
- The Project Output shall address **common inappropriate land uses** and subsequent **impacts on ecologically sensitive areas and wetlands** including the effects of **transboundary pollution** with particular attention to **nutrients and toxic substances**.
- While targeting action at a **high policy level**, the Output is also directed towards **demonstrating pragmatic implementation of appropriate land use management on the ground** in pilot activities.

2.2 Specific objectives:

In order to fulfil the overall aims set out above, the project team developed activities with the following specific objectives:

(a) Development of a land-use assessment Methodology

Given the need to identify appropriate and feasible approaches and solutions for eventual application throughout the DRB, the **first objective** was to develop a straightforward, yet rigorous, land-use assessment methodology in the frame of river basin management that could be tested and adapted as necessary for use across the region. The methodology would need to be suitable for:

- assessing current land use
- identifying and evaluating alternative land-use scenarios, with special attention to the multiple benefits of wetland/floodplain rehabilitation and/or restoration.
- involving stakeholders
- assuring public participation
- setting the basis for future actions, especially in the framework of Phase 2 of the DRP.

(b) Pilot Site selection and implementation of Pilot Site activities

The **second objective** was to select Pilot Sites in several DRB countries at which the land-use assessment methodology could be tested through the implementation of specific site-based activities, including the holding of a workshop at each location to ensure stakeholder involvement and wider public participation in the identification and assessment of various future land-use alternatives.

(c) Final land-use concepts

Based on the field testing of the land-use assessment methodology at Pilot Sites, the **third objective** was to develop specific proposals for 'final land-use concepts' at each of the Pilot Sites, including recommendations for the actions and measures required to implement the concepts in practice (potentially in Phase 2 of the DRP), giving priority to identifying the benefits (socio-economic AND ecological) of appropriate land use.

(d) Dissemination of findings

The **fourth objective** was to develop a communications strategy to ensure the dissemination of conclusions and recommendations, including the final land-use assessment methodology, throughout the Danube River Basin. It was identified at an early stage that such a strategy should be aligned with other DRP Activities, including those under Outputs 3.3, 2.6, as well as Activity 1.4.5 (holding of a DRB-wide workshop) Six broad target groups were identified:

- ICPDR (notably ECO EG, RBM EG);
- Other international bodies (e.g. Ramsar Convention, EC), including 'internal' messages aimed at UNDP/GEF and WWF;
- Governments and relevant national authorities of Croatia, Romania, Slovakia;
- Other DRB national authorities;
- Regional and local authorities in DRB priority areas, e.g. Lower Danube Green Corridor, WFD Pilot River Basin testing exercise;
- DRB NGOs, especially through the Danube Environment Forum.

3. ACTIVITIES

3.1 Summary of Activities

In line with the aims and objectives described in Section 2, the Activities set out in the Project Implementation Plan and Terms of Reference were implemented, primarily during the period January to October 2003. A project team was formed by WWF International's Danube-Carpathian Programme to coordinate this work at international level and to ensure field-level implementation at selected Pilot Sites. In summary the Activities comprised:

- Development of a land-use Methodology (Activity 1.4.1[2]);
- Selection of Pilot Sites for field testing;
- Preparation of sustainable land-use concepts aimed at reducing nutrient inputs into water courses, particularly through wetland and floodplain rehabilitation and/or restoration;
- Identification of the practical and policy measures required to move towards more sustainable land-use patterns;
- Dissemination of findings, conclusions and recommendations.

Each of these Activities is summarised below.

3.2 Development of land-use assessment methodology

In fact, the term 'land-use assessment' methodology is to some extent a misleading short-hand terminology since it was clear from the beginning that the methodology needed to extend to all aspects of the project objectives – not only the assessment of land-use. In other words, it also needed to provide a structured, operational framework for the testing of measures at pilot sites, the development of sustainable alternative land-use scenarios and the application of essential cross-cutting measures, notably the involvement of stakeholders and wider public participation.

The methodology also began from the premise in the Project Implementation Plan that one of the key sets of measures to be tested at the pilot sites, and for inclusion in action plans for alternative land-use concepts, would be those specifically targeted at wetland/floodplain areas. Consequently, development of the methodology was based on the following rationale:

a) The restoration, conservation, and sustainable management of wetlands and floodplains **contributes towards nutrient reduction**, in accordance with the UNDP/GEF strategy for pollution reduction in the DRB and, therefore, the Black Sea.

b) The restoration, conservation, and sustainable management of wetlands and floodplains also **contributes towards the achievement of good ecological and chemical status of waters** in the

[2] Numbering of Activities as per Project Implementation Plan for Phase 1, dated April 2002.

DRB, the ultimate objective of the EU Water Framework Directive[3], as well as other purposes of the WFD such as mitigation of floods and is therefore a key aspect of appropriate river basin management approaches.

c) The restoration, conservation, and sustainable management of wetlands and floodplains **contributes towards locally-inspired, environmentally-appropriate socio-economic development**, by offering economically important environmental goods and services such as water purification, groundwater recharge, flood mitigation, and by facilitating income-generation as a result of the provision of multiple benefits, *inter alia* fishing, nature conservation, rural (including eco-) tourism, recreation, and ecological agriculture.

d) The restoration, conservation, and sustainable management of wetlands and floodplains also **help governments to honour their commitments in terms of international conventions** and agreements (e.g. Ramsar Convention, Convention on Biological Diversity, Bucharest Summit on Environment and Sustainable Development) as well as fulfilling significant elements of the EU environmental *acquis* (e.g. WFD, Habitats and Birds Directives/Natura 2000).

e) There is a range of **policy and funding instruments available** to governments for promoting such activities and approaches, including EU pre- and post-accession instruments in the fields of nature conservation (LIFE, Natura 2000), agriculture, rural and regional development (CAP, SAPARD, agri-environment measures, Structural Funds) and river basin management (WFD, ISPA).

f) To date, **wetlands and floodplains have been progressively drained or otherwise degraded throughout the DRB**[4] as a result of inappropriate land-use planning and implementation, pressure from intensive agriculture and urbanization, construction of infrastructure for transport and navigation, and pollution, and that despite significant progress in implementing the Ramsar Convention and Natura 2000, far more needs to be done in order to conserve – for the reasons outlined above – the functions and values of wetland ecosystems in all countries of the DRB, both within and (in particular) outside designated protected areas.

3.3 Summary of methodology

WWF's project coordination team produced a draft methodology that was further refined (through a desk-based exercise of circulation and commenting) over a period of several months before being finalised as the 'working methodology' for pilot site testing. The piloted methodology consisted of seven stages, which are summarised below. It is important to bear in mind that this is not a strictly chronological sequence; many of the stages can be worked on simultaneously. Indeed, the need to treat the methodology as a flexible tool and not as a prescriptive, step-by-step, strictly controlled 'recipe' is a point that is underlined in the findings and conclusions presented in section 4.

1. GIS mapping of the pilot site, including **key water and wetland features**;
2. Identifying all **strategies, plans and policies** that relate to activities undertaken in and around the pilot site and the **threats, impacts and pressures** to wetlands and floodplains at the pilot site;
3. Assessing the **ecologically optimal conditions** for wetland management and nutrient reduction at the pilot site. (Note that the terminology of "ecological optimum" does not imply that this is necessarily the desired state of land-use. Rather, it is the land-use that would, if no other factors were operating, provide the best ecological conditions. Socio-economic factors may mean that,

[3] All countries of the DRB are formally committed to implementing the WFD, whether as (current) Member States: Austria and Germany; as Candidate Countries applying to become Member States under the EU Enlargement process: Bulgaria, Czech Republic, Hungary, Romania, Slovakia and Slovenia; or as signatories to the Danube Convention: Bosnia-Herzegovina, Croatia, Moldova, Serbia and Montenegro and Ukraine.

[4] In the last 100 years, more than 80% of the DRB's wetlands and floodplains have been lost.

while the ecologically optimal conditions are not themselves realistically achievable, land-use that incorporates some elements of the ecological optimum might be appropriate.)

4. Undertaking a **gap analysis** to assess the difference between current and 'ecologically optimal' land-use for wetlands and nutrient reduction in the area as a step towards generating options for appropriate land-use;
5. Organising **participatory stakeholder workshops** to generate appropriate land-use options including a vision and objectives for the catchment;
6. Undertaking a **policy analysis** to identify the policy and funding obstacles or opportunities for each of the management options;
7. Selecting options and **developing action plans** to take the work forward.

Note that the relationship between the ecologically optimal land use and other concepts set out in legislation (such as the "reference conditions" for water bodies referred to in the WFD; or Favourable Conservation Status as set out in the Natura 2000 legislation) was not specifically considered during this phase of Output 1.4. Depending on the site in question, users of the methodology may wish to use these concepts in place of the "ecological optimum".

Details of each component of the methodology can be found in Annex 1.

3.4 Selection of Pilot Sites

Three Pilot Sites within the DRB were selected for field testing of the methodology, based on the following 'guiding principle' and detailed selection criteria:.

Guiding Principle for Pilot Site selection: The pilot areas would ideally together constitute a relatively representative sample of the Danube River Basin in terms of geographical spread, habitat diversity, and upstream/downstream, upland/lowland variation.

Detailed selection criteria:

a) **Representativeness** – Is the area somehow 'typical' of the ecosystems, and/or socio-economic threats and pressures, prevailing in this part of the Danube river basin?
b) **Information availability** – Is there an accessible base of information, for example previous land-use or management studies, water management information, biological surveys, or regional/rural development assessments, on the area? (this is necessary in the pilot stage since there is not sufficient time or resources to support significant primary research and data gathering)
c) **Stakeholders** – Are there readily identifiable, active and credible stakeholders working on land-use issues in the area?
d) **Potential for official support** – Are new or strengthened plans for wetland restoration arising from the pilot project likely to find support not only from local stakeholders but also from local/regional/national governmental agencies and authorities?
e) **Ecological benefits** – Will the selection of the area somehow contribute to the body of knowledge on nutrient reduction and/or pollution control and/or flood control?

f) **Socio-economic benefits** – Does the area support multiple uses or benefits in the form of socio-economic opportunities and other environmental goods and services?

g) **Biodiversity value** – Is the area of significant value for biodiversity, nature conservation, and wetland management?

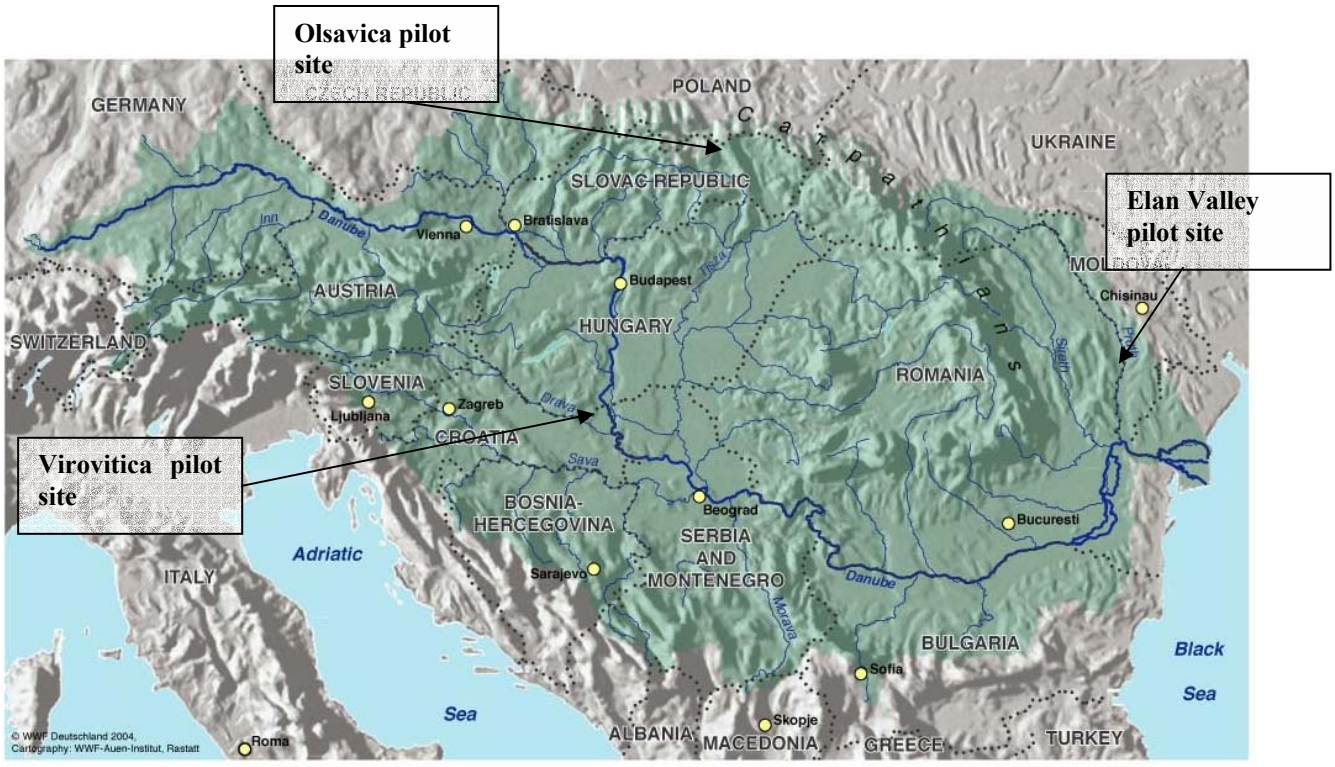
h) **WFD implementation** – Will the selection of the area for pilot studies contribute somehow to the body of knowledge relevant for implementing the Water Framework Directive, especially in relation to the development and testing of CIS Guidance Documents?

i) **Threats and pressures** – Are there significant threats or land-use pressures on the wetland/floodplain resources, especially as outlined in the EC Guidance Document on Impacts and Pressures?

Ten potential Pilot Sites in the DRB – Bulgaria (3 sites), Croatia (1), Czech Republic/Slovak Republic (1), Hungary/Romania (1), Romania (2), Slovak Republic (1), Slovenia/Croatia (1) – were evaluated using a scoring matrix constructed around the above ten criteria. As a result of this, the three highest-scoring sites – with total scores of 100, 97 and 96, respectively, out of a possible 100 points – the following three sites were selected:

- Olsavica valley, in the uppermost Tisza basin, Slovak Republic
- Lower Elan Basin, Prut River Basin, Romania
- Drava floodplain, near Virovitica, Croatia

The selection of these sites was subsequently endorsed by the UNDP/GEF project team.



3.5 Overview of selected Pilot Sites

Detailed descriptions of the pilot sites (based on the format of the *Information Sheet for describing Ramsar Sites and other wetlands* used globally by Contracting Parties to the Ramsar Convention) are contained in Annexes HR–1, RO–1 and SK–1 (dealing respectively with Croatia, Romania and the Slovak Republic). The following provides a brief outline of the main features of each site and its significance in terms of the land-use challenges within the wider Danube River Basin.

3.5.1 Pilot Site 1: Zupanijski canal, near Budakovac village, Drava River Basin, Croatia

The pilot site, which covers 2,350 ha, is located close to the city of Virovitica, near the Drava River on the border between northern Croatia and southern Hungary, as shown below.

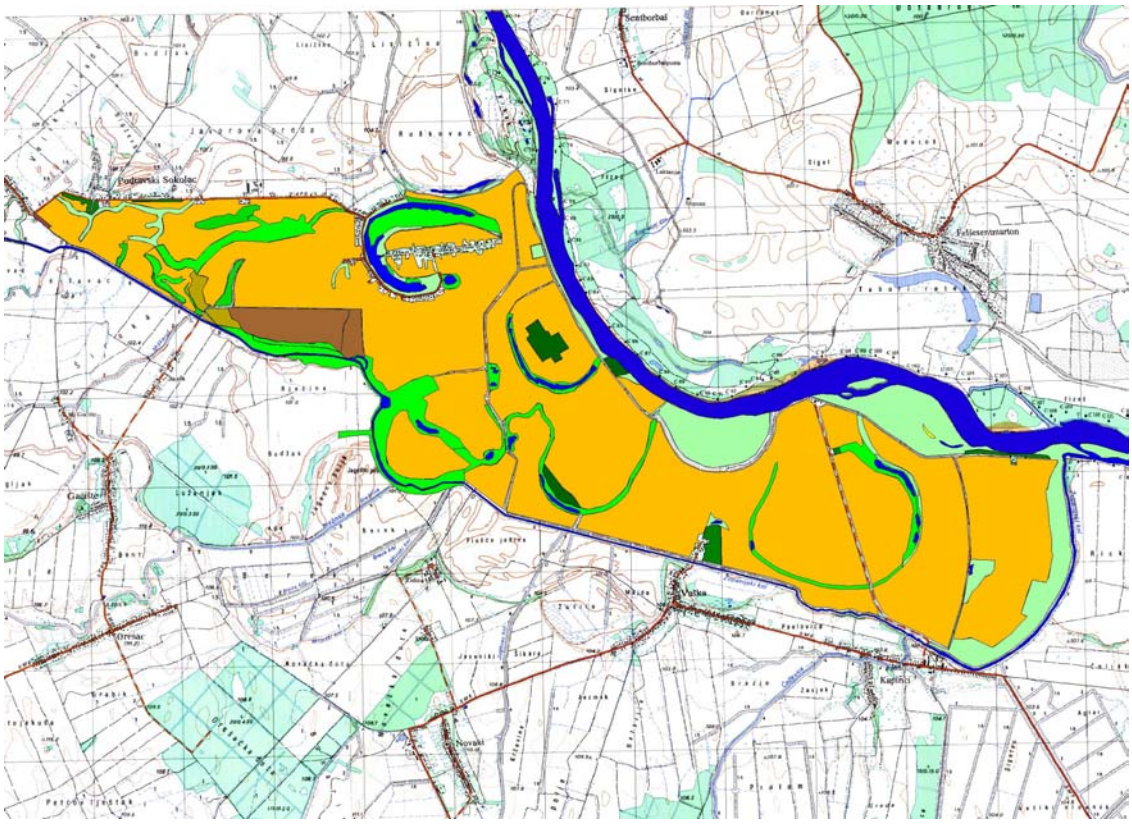
Additional maps accompanying the site description (see Annex HR-1) show its location in detail. Within the site is a large sugar factory, owned by the 'Viro' company, which has installed a waste-treatment system that actually has greater capacity than needed for the factory's waste output. Therefore under a unique agreement, Viro also treats the municipal waste-water from Virovitica. The treated water then passes through the Zupanijski canal (a canalised former side arm) some 35km to the Drava, and thence into the Danube.

The canal cuts through the former floodplain of the Drava with oxbows, reed-beds, and willow and poplar stands in a mosaic of agricultural land. Although the original floodplain forest has almost entirely disappeared, the Drava was unregulated in this area until relatively recently and biodiversity remains high. Nevertheless, the regulated river is now cut off from many of its natural backwaters, so the shallow Zupanijski channel – though artificial – provides important fish spawning grounds. The proposal to establish a UNESCO 'Danube–Drava–Mura Biosphere Reserve' includes much of the present pilot site as a buffer zone, while the oxbow of Budakovac would be in the core zone.

Where the treated mix of municipal and industrial waste-water enters the Zupanijski canal, the presence of nitrates and phosphates remains so high that the water is Category V in quality. However, this falls rapidly as the water flows along the first few kilometres of the canal due to the slow flow and extensive aquatic vegetation. The most effective bio-remediation is on a stretch where the canal could not be straightened because of inaccessibility to machinery, so it follows the curve of the old natural oxbow for a few hundred metres. Here, water quality reaches Category I. However, further downstream the canal passes several villages and the quality drops, presumably indicating that untreated waste water from these settlements reaches the canal. None of the villages currently benefits from a piped water supply or from any form of wastewater treatment. The result is that by the time the canal reaches the Drava river, the water is Category II in terms of nitrate and phosphate content. Under certain circumstances, water quality entering the Drava is though to be significantly lower. For example, during annual maintenance at the Viro facility, municipal wastewater is fed directly into the Zupanijski canal without treatment. Furthermore, though nutrient concentrations are theoretically diluted in wet periods, the fact that storm water and sewage are not separated in the municipality of Virovitica makes treatment difficult due to the excessive volumes involved.

The Zupanijski canal was deepened considerably two years ago – apparently to increase capacity for runoff from farmland in the neighbouring hills – and since then the string of oxbow lakes along its course have been drying out. Local farmers say that groundwater levels have fallen – a claim

supported by available monitoring data – thus having a negative effect on production. Another result of this deepening is that the channel which once connected the canal with the oxbow lake of Budakovac no longer flows because of lower water levels, and the level of the oxbow itself has dropped by about one metre, with adverse effects for local people and wetland biodiversity.



Most people living in the villages within the pilot site make their livings from agriculture and some from forestry. Rural development is urgently needed so that people in the region can share the same opportunities as those elsewhere in Europe, with provision of piped drinking water and adequate sanitation being a basic step. The area is environmentally rich and a path of sustainable development has great potential; the development of long-term environmental management schemes and peaceful transboundary co-operation are fundamental. Current land-cover within the pilot site is shown below (Zupanijski Canal forms the southern boundary, with the Drava River the to the north. Villages are dark green, wetlands (including ox-bows) brilliant green and forests mid-green. Agricultural land is shown dark yellow.

Land ownership is very unclear. Following the fall of the former Socialist Federative Republic of Yugoslavia and the establishment of the Croatian Republic in 1990, land (re-)privatization began in 1995. As elsewhere in Central and Eastern Europe, this process has been very complex; many owners failed to claim back their land or could not substantiate their claims. As a result, some land is now owned privately, some by the state; some is owned privately but used by the state, and vice-versa. In addition, *Hrvatske vode* (Croatian Waters) owns all waterways and some six metres of bank on either side.

Although the use of the Viro facility to treat urban wastewater is unusual, the pilot site exhibits many features that are characteristic for the wider Danube River Basin. These can be summarised as follows:

- Former natural water courses now canalised;
- Floodplain wetlands artificially cut off from the rivers that created them;
- Low level of rural development with inadequate water supply and sanitation;
- Complexity of land ownership;
- Land-use dominated by agriculture (70%) and forestry (15%);
- An approach to water management that has emphasized traditional engineered solutions.

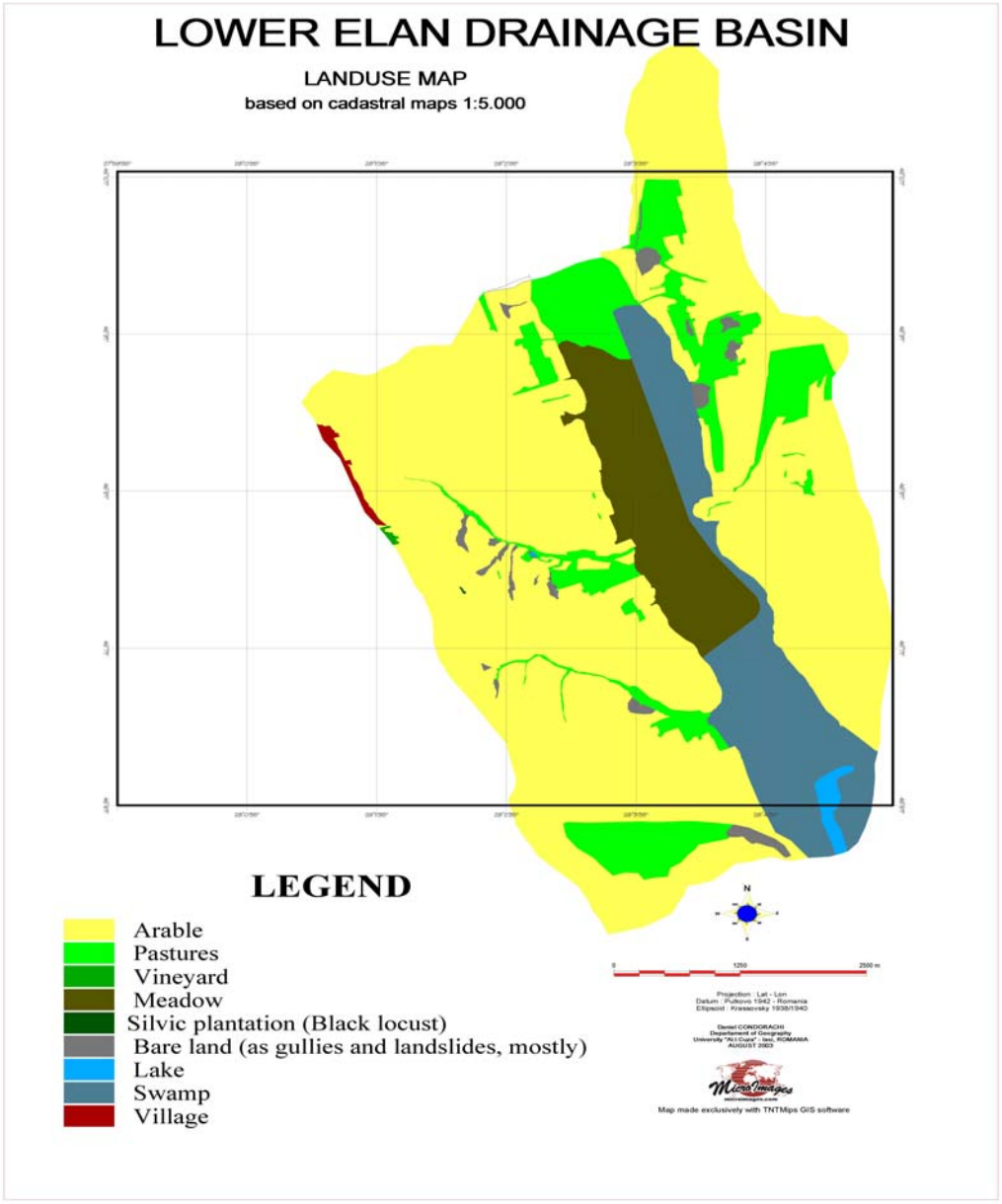
Initial project premise: The WWF project team aimed to assess the feasibility of increasing the connectivity of the Zupanijski Canal and the former floodplain wetlands with a view to increasing the bio-remediation potential of the canal and therefore raising the average quality of water reaching the Drava-Danube system. It was anticipated that this measure would have additional benefits, including improved fishery production and a general improvement in wetland habitat extent and quality.

3.5.2 Pilot Site 2: Lower Elan Valley, Prut River Basin, Romania

The Pilot Site is located in eastern Romania, within Vaslui and Galati Counties, in the basin of the Prut River, the last first-order tributary of the Danube River before its Delta. The Elan River is a tributary of the Prut and the 'Lower Elan Basin' Pilot Site comprises an area of almost 3,300 hectares at and immediately upstream of the confluence between the Prut and Elan Rivers. Within the Pilot Site, some 620 hectares are floodplain, of which permanent wetlands cover 382 hectares (364 hectares of reed swamp and 18 hectares of water bodies). The floodplain is bordered by eroded hillsides used for grazing and cultivation.

The Lower Elan wetlands are extremely important, for both people and biodiversity because of their important functions and values. These include flood peak mitigation, agriculture support, water supply, fisheries support and habitat provision for flora and fauna. Although damaging floods are far less prevalent than formerly (due to dam construction upstream) the Lower Elan Floodplains may still have a vital role to play during exceptional rainfall events.

The resource functions of the floodplain are also significant. Drinking water for both people and livestock, small-scale irrigation and groundwater replenishment are desperately needed in the area given that the average water deficit is about 200 mm/year. Provision of potable water is a major challenge given that the three groundwater boreholes in the area cannot be used for drinking purposes without treatment. Improving the quantity and quality of surface water supply, as well as groundwater recharge, through floodplain rehabilitation could therefore make a significant contribution to the water resource situation for local communities.



The Lower Elan wetlands also encourage the deposition of nutrient-rich sediments carried by the river. This has important benefits further downstream in the Prut and Danube Rivers, through the reduction of nutrient loads, mainly nitrogen and phosphorous from agricultural sources, but also from human wastes and industrial discharges. Some of these nutrients are taken up by wetland/floodplain vegetation and reed harvesting in winter effectively removes them from the system, as well as providing important raw materials for local villagers.

The local commune, Murgeni, has around 8,660 inhabitants and an area of 13,240 hectares. Because there is very little industry in the area the inhabitants use their land for livestock rearing (sheep and cattle) and extensive cultivation of crops (especially maize and sunflower but also some vineyards) without any assistance from irrigation. Cattle are allowed to graze in certain areas throughout the year, and, after the hay crop is cut, graze the whole floodplain. In case of severe drought (as in 2003) the reedbeds are used as food for cattle. There is a fishpond complex close to the confluence of the Elan

and Prut, but collapse of the retaining dyke means that there is insufficient water for fish production and biodiversity values have also decreased. Current land-use is shown on the map below:

The natural Elan ecosystem has been disrupted in several ways. Upstream, the Posta Elan Reservoir was intended to fulfil combined flood protection and water supply functions. However, due to construction of the reservoir, dyke-building along the right bank of the Elan River, and canalisation of the main channel, this side of the floodplain is no longer flooded and large areas were developed for agricultural use during the Ceaucescu period. The land was levelled and extensive drainage systems installed. After the political changes of the 1990s the collective farms were broken up and land was reclaimed by local inhabitants. The former floodplain drainage system collapsed and the land is now worked by the landowners themselves. The left-bank floodplain has effectively acted as a sedimentation basin, with a rapid build-up of sediment.

Excessive hillside erosion is recognized as a major environmental threat throughout the Moldavian Plateau of eastern Romania. In 1950, the traditional hillside agricultural system of cultivation up and down slopes (i.e. across, not with, the contours) prevailed. Most of the land was split into excessively small plots, each of less than one hectare in size. Except in a few localised areas, there were no concerns about the threat from soil erosion and a minimum awareness of conservation practices. After 1950, theses areas were incorporated into collective farms. Many innovative research studies on soil erosion control were initiated and conservation practices were considered a national priority. By the end of 1989, up to 30 percent of the agricultural land with erosion potential had been treated.

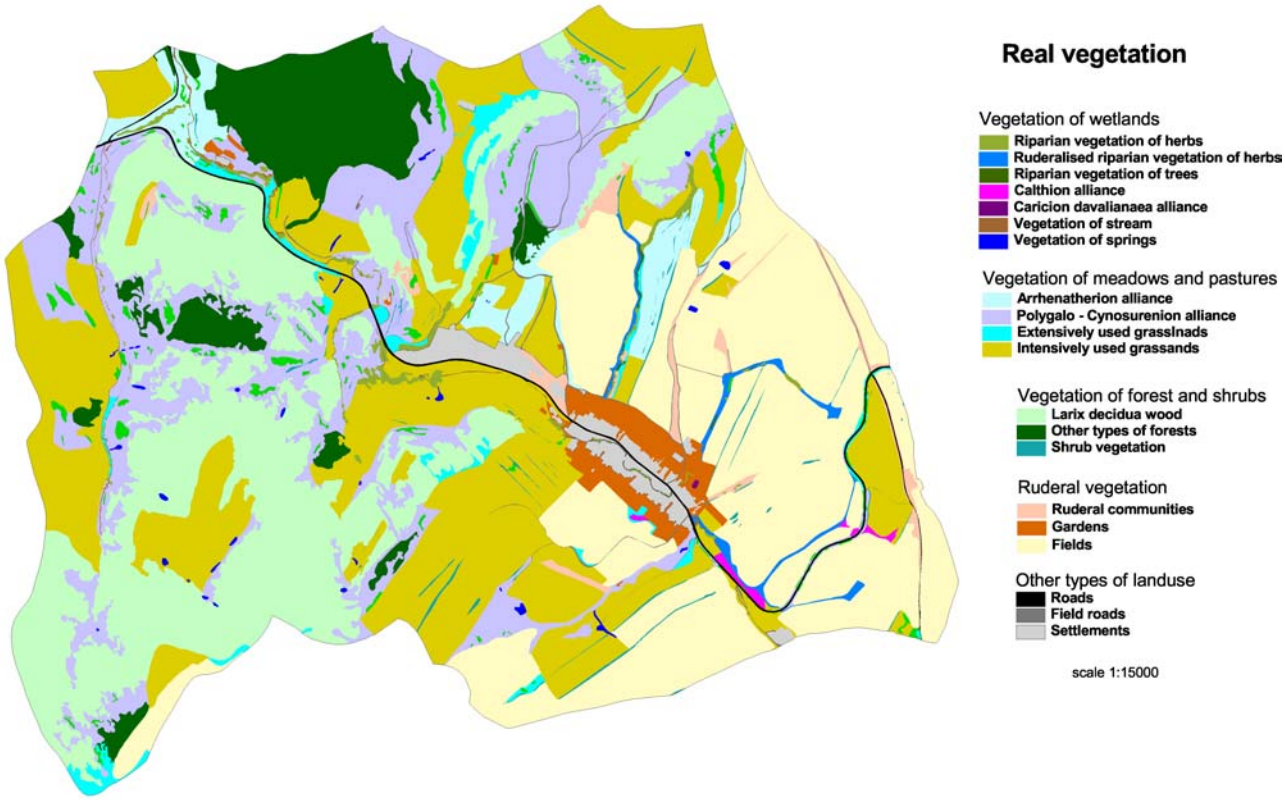
Following the collapse of the Ceaucescu regime, the new Romanian property law no. 18/1991 included two key provisions that favoured a return to the former pattern of very small plots with erosion-promoting land-use practices based on cultivation up and down slopes. To make things worse, during the last decade, the state has ceased funding for soil erosion control and such investment does not represent a priority for landowners. The seriousness of soil erosion as a challenge to sustainable use of both wetlands and drylands is vividly demonstrated in the Lower Elan Basin, making it a suitable model site for other areas within the Danube River Basin that are also suffering from the effects of large-scale erosion due to inappropriate land-use practices, in addition to the other factors already mentioned such as the dependence of the local communities on the floodplain wetlands for grazing, water supply and fishery production.

The important natural values of the Lower Elan Valley have been recognised through its recognition as an Important Bird Area by BirdLife International, a status recognised at pan-European level.

Initial project premise: the WWF project team aimed to identify land-use changes that would help to tackle the problem of excessive erosion and sedimentation, improve hay yields and grazing quality for local farmers, and support groundwater recharge.

3.5.3 Pilot Site 3: Olsavica Valley, Slovak Republic

The Olsavica Valley is located in Levoca district of Presov county and lies within the Torysa/Hornad River Basin, one of the sub-basins of the Tisza River Basin. This is an upland area (720–920 m above sea level) on the border between Central and Eastern Slovakia, in the eastern Levocske vrchy hills, which are part of the Carpathian Mountain range. Current land-cover within the study area is shown in the map below.



The most dominant land-cover types are spruce forests, grasslands, extensive pastures with European larch (*Larix decidua*) and arable land. The regional geological structures mean that the area has an abundant groundwater supply, with the sandstone yielding a number of fissure springs. Wetlands are represented by fragments of submontane and montane floodplain forests, fens, tall sedges and wet grasslands, though these are much reduced due to human impacts (see below).

The Pilot Site covers some 1,200 ha around the village of Olsavica, at the mouth of the Olsavica Valley. The village has been subjected to significant flooding at least annually since the mid-1980s, with consequent damage to life and property. The Olsavica stream has not been regulated and intensive down-cutting has caused the stream bed to develop a canyon-like character. The main road of Olsavica village is located on the stream banks and there are several small bridges which act as bottlenecks during summer storms.

The flooding is thought to be largely the result of agricultural intensification of the farmland above the village during the late 1970s and early 1980s, driven by state mandates to increase the area of arable land and hence crop production. An artificial surface and sub-surface land drainage system was installed in the upper part of the Olsavica valley with the aim of improving the soil-water regime in this area, thereby allowing fields to be cultivated and planted. Other intensification measures included landscape simplification through the removal of traditional terraces and grassland buffer zones. Furthermore, as a result of the intensive drainage works, many springs and wetlands in the upper part of the Olsavica Valley have been drained and subjected to intensive agricultural methods including high levels of fertilizer and manure use. In addition to local flooding, the area suffers from high soil

erosion, which, together with excessive runoff, contribute to sediment and nutrient loading of water-courses. These factors together are likely to have a negative impact on downstream water quality and to increase the risk of flooding elsewhere in the basin. Soil erosion has led to a decrease in the area of land available for arable cultivation.

Olsavica depends on farming and has suffered from rural depopulation in recent years. The principal economic stakeholder is the agricultural enterprise 'Olsavica–Brutovce' which farms some 2,290 ha, of which approximately 1,936 ha is under grassland. The remaining c.350 ha are located mainly in the upper part of the valley and subject to intensive arable production. The process of land (re-)privatization in Olsavica Valley was initiated several years ago but is still incomplete. Most private landowners rent their land to the agricultural cooperative.

The area has high nature conservation value, but Olsavica valley is not included within any formally recognised protected area, although a significant part of it is designated as a water supply protection area. Zone A, established in 1983 should positively influence some 1,062 ha of agricultural land, while Zone B, established in 1993 by a decision of the District Environment Department in Presov, should apply to a further 562 ha of farmland. In practice, the farming cooperative does not strictly respect the water supply protection areas, because there is no compensation/incentive for doing so.

The problems associated with accelerated surface and sub-surface runoff and excessive soil erosion due to drainage and landscape simplification (including loss of wetlands) are considered typical of numerous tributaries within the Danube River Basin, as are the socio-economic challenges facing Olsavica village as a small, farming-dependent rural community. Olsavica is therefore regarded as having a high potential demonstration value for the Danube Basin as a whole. Furthermore, the site also benefits from synergies with the project *Central European Grasslands Conservation and Sustainable Use Project in the Slovak Republic* under GEF Grant TF 023 781, which was activated in June 2000. The purpose of this project is to assist the Slovak Republic to maintain representative samples of its unique grassland ecosystems and their biodiversity in both protected areas and the wider productive landscape, through the promotion of restoration, conservation and sustainable management practices. In particular, the project is aimed at promoting the sustainable use of meadows in four pilot areas, one of them being the Olsavica Valley. A specific objective for Olsavica is the preparation and implementation of a pilot restoration programme that would be focused on reversion of arable land to meadows.

Initial project premise: the WWF project team aimed to work with stakeholders at the Pilot Site to identify acceptable, appropriate and feasible land-use options that would reduce runoff and erosion, thereby contributing to flood relief for Olsavica village at the same time as reducing the sediment, nutrient and flood discharge loading in water courses downstream.

3.6 Testing of the methodology at Pilot Sites

Within the WWF project coordination team, a pilot site leader was appointed to take on responsibility for field testing of the methodology at each of the three selected sites. This work was carried out primarily between June and October 2003. Standardized reporting formats were devised (see Annexes HR–1 to HR–4, RO–1 to RO–4 and SK–1 to SK–4) and regular coordination between the three site leaders ensured to the extent possible that the approach and methods followed were broadly compatible.

Information gathering, synthesis and analysis

As much information as possible about the pilot sites was gathered under the key headings identified in the *Methodology* and organized in the *Site Description* format referred to above in section 3.5. The individual Site Descriptions (Annexes HR–1, RO–1, and SK–1) are accompanied by numerous maps, diagrams, technical data sets and photographs submitted on CD–ROM. At all three sites, GIS technology was used to produce maps showing current land cover/land use. These are the maps included in section 3.5.

As required by the *Methodology*, the data gathering process also included the assessment of pressures and impacts influencing each site and this information has been incorporated into the Site Descriptions under the heading **'***Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects'*.

Also as required by the *Methodology*, the site leaders conducted a review of the policy context at the site. This was implemented as part of an overall *Gap Analysis*, which involved an assessment of the following factors:

- Information availability
- Policies and plans influencing the site
- Laws and regulations influencing the site
- Resources and capacities for moving towards more appropriate integrated land use
- Stakeholder support for possible land-use modifications
- Public awareness of the issues at the heart of the DRP and Output 1.4 (i.e. the linkages between land use, environmental quality and rural economic development).

For each of these headings, the pilot site leaders were asked to identify obstacles and opportunities and to provide brief explanations of the main issues. The results of these *Gap Analysis* exercises are presented in Annexes HR–3, RO–3 and SK–3. The 'obstacle' and 'opportunity' columns of the corresponding tables may contain up to three 'minus' symbols (–) or up to three 'plus' symbols (+) to indicate whether the relevant heading is a more or less influential opportunity (positive factor for achieving more appropriate land use in future) or obstacle (negative factor for achieving more appropriate land use).

Information gathering, synthesis and analysis continued throughout the project period and will be an essential ongoing element of potential DRP Phase 2 activities, where effective monitoring and evaluation is essential and depends on the availability of key data (see section 4).

Preparation of 'ecological optimum' and 'proposed alternative land-use scenarios'

For each pilot site, GIS maps were prepared showing the theoretical 'ecological optimum' for land cover/land use, taking into account the former distribution and extent of wetlands based on field evidence (e.g. geomorphology/topography, pedology and surviving natural/semi-natural vegetation and habitats), historical maps/documents, and discussions with local people. The 'ecological optimum' was then used to inform stakeholder consultations and as one of the inputs to defining feasible and appropriate alternatives for future land use, other inputs including the constraints inherent to working in the 'real world'.

Stakeholder consultations and public participation

Particular attention was given to the requirements of the methodology dealing with stakeholder involvement and public participation, taking into account the guidance provided by the ICPDR Issue Paper on Public Participation and subsequently the Public Participation Strategy for the DRB. At an early stage, a 'Stakeholder Matrix' was developed for each site to identify the key stakeholders, giving

balanced consideration to local, regional and national interests, as well as those linked to specific sectoral issues (e.g. land-use planning, agriculture, water management, fishing, hunting). The Stakeholder Matrices are contained in Annexes HR–2, RO–2 and SK–2. On the basis of the key groups and individuals identified using the Stakeholder Matrix, one- or two-day stakeholder workshops were held at each pilot site. In every case these involved strong public awareness initiatives, including invitations to local community representatives and landowners, and the presence of press and broadcast media. Summary Reports of the Stakeholder workshops can be found in Annexes HR–5, RO–5 and SK–5. In all cases, the broad-based participation is amply demonstrated.

At each workshop the aims and objectives of the DRP and Output 1.4 were presented and stakeholder views sought on possible future land-use options that would provide multiple socio-economic and ecological benefits.

Final alternative land-use concepts

The eventual output for each pilot site was a series of proposals for land-use modifications expected to have multiple benefits, including:

- economic and social benefits for local communities
- nutrient reduction
- flood peak mitigation

The detailed proposals for each site are presented in section 4 and the policy implications at local, regional, national and international levels are discussed.

3.7 Assessment of Methodology and development of final version

The Land-use Assessment Methodology is set out in Annex G-1.

3.7.1 Overall assessment

Overall, the project Methodology was judged a success. In particular, its main strengths are:

- The rigorous analytical framework provided, including the anchoring of all project activities in sound information gathering;
- The identification of alternative land-use concepts that are technically feasible **and** locally acceptable and appropriate;
- The importance given to establishing clear linkages between field proposals and the policy/planning changes needed to provide a favourable context for the proposals to be implemented successfully;
- The high priority given to identifying and working with as many key stakeholders as possible from the beginning of the process at national, regional and local levels;
- The strong emphasis on promoting public awareness of the project's overall aims and objectives amongst local people within each pilot site and provision of participation opportunities, notably through organization of on-site workshops.

The Methodology was judged not to have any fundamental weaknesses, however the following points have been taken into account in preparing the final version.

- Gathering information on relevant policies and plans is time-consuming and likely to require the establishment of working relations with relevant Ministries and other national/regional authorities at a very early stage if a complete picture is to be obtained.
- At all three pilot sites it was shown that the 'ecological optimum' concept can be an unwanted distraction, since even with the most careful explanation is likely to be interpreted by some stakeholders as the 'target scenario' for environmentally oriented organizations such as WWF and its partners. It seems to be the use of the word 'optimum' that generates this misunderstanding, so an alternative, such as 'former land-cover situation' may be more appropriate. However, this will also need care to stress that 'former' means prior to the most adverse land-use changes, rather than to a theoretical situation before humans were present at all. Although they refer, respectively, to water bodies (i.e. rivers, lakes, estuaries and coastal waters) and protected areas rather than to any area of floodplain, it may also be useful to use terms such as "reference conditions" (as used in the WFD) or Favourable Conservation Status (as used in Natura 2000 legislation) when using this methodology. Indeed it should be that this methodology is be used as a tool to help meet the requirements of such legislation.
- The use of standardised table format for reporting is useful for summarising and generating of products that are broadly comparable from one site to another. However, the need for such standardization should not prevent the preparation and submission of additional, sites-specific supporting materials.
- The EU's Corine land-cover classification provides a tool that is used at a pan-European level and which provides greater scientific rigour and detail than the Ramsar classification of wetland type. However, the choice of classification system may depend on the level of information available at a given site.
- There is potential for establishing linkages and technical compatibility between the GIS products from the project and other GIS-related activities within the DRP and ICPDR.
- The need to stress that the Methodology should not be seen as a strictly chronological, linear ('step-by-step') process, but as a framework within which several activities may be occurring simultaneously, e.g. information gathering and stakeholder consultations will, by definition, inform each other.
- The need to include an explicit monitoring and evaluation component.

4. CONCLUSIONS AND RECOMMENDATIONS

This section has two main components, first the site-specific conclusions and recommendations for each of the three Pilot Sites are presented, including priorities and recommendations for DRP Phase 2. This information is presented in tabular format for ease of reading.

In the second section, conclusions are drawn regarding the policy areas that are driving current and future land-use in the Danube River Basin. In some cases, these policy drivers are favouring unsustainable land-use practices that have adverse impacts on wetland and floodplain systems and therefore on the overall environmental health of the DRB, particularly with regard to nutrient and flood management. On the other hand, there are also policy opportunities and financial instruments available for promoting integrated land-use measures that will contribute to socio-economic and environmental sustainability. Particular attention is given to the opportunities offered by the Water Framework Directive.

4.1 Site-by-site findings and recommendations

In the following tables, which are based on the site-by-site Action Plans contained in Annexes HR–4, RO–4 and RO–5, the measures proposed for each site are summarised. All of these measures result from application of the Methodology set out in section 3 and all have been discussed with stakeholders and have received their general support. However, in most cases, longer-term support depends on the design of detailed feasibility studies and technical plans at the commencement of Phase 2. In each case, the land-use proposal is briefly described, with an indication of the corresponding spatial and temporal scales. The final column sets out the expected benefits that would be derived from implementation and identifies existing policy drivers that would support such measures

Pilot Site: Zupanijski canal, Drava Floodplain, Croatia			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits *(and Existing Supportive policies)***
Proposal 1. Placing of a structure in the Zupanijski canal to raise water-levels in the canal, operating so that 50-100% of the water is diverted about 50 metres into the existing channel and wetland south of Podravski Sokolac (Vladimirovac).	Local	Short term	The water would follow a course of about double the present length through this area and the wetland extent would also be much greater. As a consequence, the potential for bio-remediation of these waters is greatly enhanced. Specific benefits include: • Greater nutrient reduction potential; • Provision of cleaner water; • Greater groundwater recharge; • Provision of habitat for wildlife, including commercially important species (fishing, reed-harvesting) *(Supportive policy drivers: WFD – contribution to achieving the WFD goal of good ecological and chemical status; Natura 2000/Emerald Network/ Biosphere Reserve status, if designated)*
Proposal 1a. The channel from proposal 1 is extended into the existing channel and extensive wetlands which in the past always fed the oxbow in Budakovac.	Local	Short term	As Proposal 1. In addition, about 50% of fish species need aquatic plants to lay their eggs on. As the Drava has lost many of its shallow and vegetated wetlands, implementation of this proposal will help restore fish populations. *(Supportive policy drivers: WFD – contribution to achieving the WFD goal of good ecological and chemical status; Natura 2000/Emerald Network/ Biosphere Reserve status, if designated)*

Pilot Site: Zupanijski canal, Drava Floodplain, Croatia			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits *(and Existing Supportive policies)***
Proposal 2. A structure is installed at the bridge near Zibina to raise water levels in the canal. 50-100% of the waters are then fed into the existing channel and reed-beds of Marcina jama.	Local	Short term	As Proposal 1. *(Supportive policy drivers: WFD – good ecological status; Natura 2000/Emerald Network/Biosphere Reserve if designated)*
Proposal 2a. This watercourse is extended into an old branch of the Drava near the existing levee.	Local	Short term	As above, this would also connect the extended channel directly with the Drava, leading to: • Greater potential for nutrient reduction; • Provision of cleaner waters; • Greater groundwater recharge; • Provision of habitat for wildlife, including commercially important species (fishing, reed-harvesting) *(Supportive policy drivers: WFD – good ecological status; Natura 2000/Emerald Network/Biosphere Reserve if designated)*
Proposal 3. A structure is installed and a channel of about 150 metres in length is constructed, so that the reed-beds of the old meander around Zanos can be rehabilitated. This is expected to be the most ambitious of the proposed actions as the Zupanijski canal is so deep here and it will be difficult to raise water levels sufficiently.	Local	Short term	Benefits as Proposal 2a. *(Supportive policy drivers – WFD: good ecological status; Natura 2000/Emerald Network/Biosphere Reserve if designated)*

Potential additional actions that emerged following the stakeholder workshop:

Proposal	**Spatial scale**	**Timescale**	**Benefits** ***(and Existing Supportive policies)***
Proposal 4. Construction of a mains water pipeline to the villages of Vladimirovac and Budakovac.	Local	Short term – but this is a new issue and demands much negotiation and further information collection.	The implementation of proposals 4–6 would help to provide a more integrated water management programme for local communities, combining the provision of reliable supplies of clean water with environmentally friendly methods of waste-water processing at the same time as delivering significant ecological benefits. *(Supportive policy drivers: WFD – good ecological status through cost-effective solution for municipal water supply and treatment).*
Proposal 5. Construction of a waste-water treatment facility at Budakovac village.	Local	Short term – but this is partly dependent on Proposal 4. Nature of facility not yet determined.	See above. *(Supportive policy drivers: WFD – good ecological status through cost-effective solution for municipal water supply and treatment).*
Proposal 6. Construction of a waste-water treatment facility in the villages of Brezovica, Vaska, Kapinci and Vladimirovac.	Local	Medium term, but the same comments apply as to Proposal 5.	See above. *(Supportive policy drivers – WFD: good ecological status through cost-effective solution for municipal water supply and treatment).*

Note: prioritization and costings for Phase 2 not yet available.

Pilot Site: Lower Elan Valley, Prut River Basin, Romania			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits** ***(and Existing Supportive policies)***
Proposal 1. *Rehabilitation of the lower Elan floodplain, downstream of the Elan's junction with Sarata Creek*: • Restoration of the former meanders, in particular on the right side of the Elan floodplain; • Planting of native floodplain tree species (*Salix, Populus*) along the banks of the Elan River;	Local	Short term	*Through the rehabilitation of the lower Elan floodplain, in particular through restoring the former meanders on the right side of Elan River, the following benefits are expected:* • Nutrient reduction/retention and recycling through plant filtration and binding; • Flood control (actually the moderation of floods) by increasing storage capacity; • Improvement of local climate (mitigation of heat and drought); • Increased hay yield for local inhabitants; • Greater biodiversity through diversification of habitat and increased habitat quality. *(Supportive policy drivers: WFD: good ecological status through cost-effective solution for nutrient reduction; Natura 2000 Birds and Habitats Directives; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures; Danube JAP).*
Proposal 2. *Channel re-profiling***:** • Dredging of the present channel. • This proposal should be combined with Proposal 1 in order to obtain the best results. • In practical terms, there is no longer any significant risk of catastrophic flooding of the Elan valley due to the Posta Elan Reservoir upstream, which hydrologically controls about half of the Elan River Basin.	Local	Short term	• Increased channel capacity during seasonal floods; • Decreased wetland area (marshes) on the left side of the floodplain. Some people from Murgeni-Carja village, owners of the floodplain in this area, very often complain of too much water on their meadows. Sometimes the land is flooded and it is not possible for them to harvest their grass.

Pilot Site: Lower Elan Valley, Prut River Basin, Romania			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits** ***(and Existing Supportive policies)***
Proposal 3. *Soil erosion control on slopes*: • Changing land use within some areas to favour erosion-reducing crops; • Implementing good agricultural practices; • Implementing land reclamation works on slopes subjected to severe erosion and landslides; • Afforesting so-called 'bad lands' on the slopes; • Improving forage production on poor-quality pastures (both eroded and salinized soils) by use of ecologically adapted grass species and rotation/deferral of grazing pressure.	Local	Medium term	• Decreased runoff and soil loss through implementation of erosion control on cultivated land; • Improved land/pasture quality for local people; • Reduced chemical pollution coming from agriculture (fertilizers, pesticides, heavy metals etc.), in particular from the slopes where the arable lands belong to one important juridical agricultural association by faster implementation of appropriate soil conservation practices (contouring, strip-cropping and terracing); • Increased crop yields by maintaining and/or improving soil quality; • Establishing forest plantations, including windbreaks, using native species such as false acacia *Robinia pseudoacacia*, will provide fuelwood for local people. *(Supportive policy drivers: WFD – good ecological status through cost-effective solution for nutrient reduction; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures).*
Proposal 4. *Improving hydrological conditions at Mata Radeanu fishfarm (at confluence of Elan and Prut):* • Partial restoration of the adjoining dyke along the Elan River to increase water levels in the fishponds. The dyke has been partly destroyed and water levels within the fishpond cannot be maintained at a sufficiently high level.	Local	Medium term	• Greater water storage capacity up to the level of the original fishpond design. • Increased biodiversity (only this year because of the exceptionally dry season, the water level in the fishponds was extremely low, contributing to the disappearance of several bird and fish species). *(Supportive policy drivers: WFD – good ecological status through cost-effective solution for nutrient reduction; Natura 2000 Birds and Habitats Directives; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures; Danube JAP).*

Pilot Site: Lower Elan Valley, Prut River Basin, Romania			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits *(and Existing Supportive policies)***
Proposal 5. *Declaration of the Lower Elan Floodplain as a protected area*: • Extension to the North of the Lower Danube Green Corridor' project area.	National	Medium term	• Increased protection for biodiversity. • Increased status for the area generating potential for increased national attention and greater likelihood of access to international funding support. *(Supportive policy drivers: WFD – Article 6 protected areas; possible Ramsar Site designation, Natura 2000, Danube JAP)*
Proposal 6. *Public awareness and training of civil society representatives, with special emphasis on local communities and schools*: • Through production of posters, leaflets, reports, interviews, movies and CD-ROMs throughout the project, a comprehensive education and awareness resource will be developed for local communities and schools. • Some office equipment may be purchased. • This component should be integrated into all other proposals as a cross-cutting priority	Local	Short term	• Increased public awareness of and support for floodplain rehabilitation measures and the benefits that will accrue to local communities. *(Supportive policy drivers: WFD – Article 14; Danube PP Strategy; Arhus Convention).*

Note: The above proposals could be implemented individually, but it is strongly preferable that they be implemented as an integrated package. All proposals have been discussed with the stakeholders concerned.

Prioritization and initial cost estimates for Lower Elan Valley proposals in Phase 2

First priority, Proposal 6 – *Public awareness and training of civil society representatives, with special emphasis on local communities and schools* **Estimated cost: up to 5,000 Euros**.

Second priority, detailed technical design for Proposal 1 – *Rehabilitation of the lower Elan floodplain, downstream of the Elan's junction with Sarata Creek*; and Proposal 2 – Channel re-profiling. The ultimate success (or failure) of these two proposals depends on support from the landowners concerned, which can only be secured on the basis of a detailed technical project. This should be produced either by a small local design company or by individual consultants. The technical design should specify the conservation practices to be used to rehabilitate the floodplain under proposals 2 and 3. **Estimated cost 5,000 to 10,000 Euros**.

Third priority, implementation of proposals 1 and 2, which involve mainly physical works. **Estimated cost: 25,000 to 30,0000 Euros** (possibly more, depending on outcome of technical design phase).

Fourth priority, Proposal 3 – *Soil erosion control on slopes* through forestation of a representative highly degraded slope. **Estimated cost: 5,000 to 10,000 Euros**.

Fifth priority: initiation of Proposal 5 – *Declaration of the Lower Elan Floodplain as a protected area*, as a northward extension of the Lower Danube Green Corridor (obtaining of agreements, drafting of a management plan etc.) **Estimated cost: 5,000 Euros** (possibly more).

Total estimated budget for these four priority measures: c. 45,000 to 60,000 Euros

Pilot Site: Olsavica Valley, Slovak Republic			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits** ***(and Existing Supportive policies)***
Proposal 1. *Building of small dams on selected streams.* Several small streams are deeply eroded due to low retention capacity, which is a consequence of intensification of agriculture. The geological substrate is sensitive to erosion and during heavy rains water is not retained and its speed is high. It is proposed to build four small dams, each 1-2 m in height.	Local – upper part of Olsavica valley	Short term	• Through the construction of small dams the speed of the water will be decreased and soils eroded from the fields will start the process of sedimentation. Due to the presence of fertilizers, more eutrophic, but natural types of wetlands can be developed. • Water storage capacity will be slightly increased. • Soil erosion will be decreased. • The local cooling effect of wetlands will be re-established. *(Supportive policy drivers: WFD – good ecological status; Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and soil/water management measures; Danube JAP).*
Proposal 2. *Reopening of small meanders on the canalised stream*. Above the village is the main canalised stream, which collects surface water from the adjacent sub-basin and underground drainage. Before regulation, there was a meandering stream and one of the larger former meanders is still visible, but water flows directly through the canal and not via the meander. Using simple technical measures, water flow through meander will be restored.	Local – upper part of Olsavica valley	Short term	• By implementation of this measure the velocity of water flow will be decreased. • The quality of nearby small-scale wetlands will be enhanced. *(Supportive policy drivers: WFD – good ecological status; Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures; Danube JAP).*

Pilot Site: Olsavica Valley, Slovak Republic			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits** ***(and Existing Supportive policies)***
Proposal 3. *Restoration management of wet grasslands.* Former wet grasslands have been degraded through drainage and fertilization. Some remnants are still left along small streams or around the sites of former springs, where they are in direct contact with arable land. They create a buffer zone between the arable land and streams or springs. Application of high amounts of fertilizers and manure caused degradation and had an adverse impact on biodiversity. Wet grasslands have not been managed for at least 20 years. Mulching of biomass will be applied in the first year and the cooperative farm will continue regular management (mowing) in subsequent years.	Local – upper part of Olsavica valley	Short term	• Wet grasslands create a vital buffer zone between arable land and streams or springs, leading to a decrease in soil erosion and a reduction in the sediments (and therefore nutrients) entering water courses. • Regular removal of biomass from wet grasslands will decrease amount of nutrients in the soil and streams. • A combination of two factors – the high amount of fertilizers and lack of management is causing eutrophication and having an adverse impact on biodiversity. • By introducing regular management, the biodiversity of wet grasslands will be restored and ruderal species will be suppressed. *(Supportive policy drivers: WFD; Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures; Danube JAP).*
Proposal 4. *Removal of underground drainage system.* The total area of agricultural land, which is influenced by underground drainage, is 183 ha. We have no information about functioning and efficiency of drainage network. On appropriate locations for creation of small scale wetlands, drainage network could be blocked.	Local – upper part of Olsavica valley	Long term	Creation of small-scale wetlands, which will help to balance water regime in summer time and increase retention capacity. Wetlands operate as a nutrient sink. Performance of cooling function during summer. *(Supportive policy drivers: WFD – good ecological status; Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and water management measures; Danube JAP).*

Pilot Site: Olsavica Valley, Slovak Republic			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits** ***(and Existing Supportive policies)***
Proposal 5. *Soil erosion control by planting of wood species on the steep banks of streams.* There is increased erosion on the banks of some streams located in the slopes. Native tree species will be planted on such disturbed places.	Local – upper part of Olsavica valley	Short term	According to Potential vegetation map, along the streams the woody vegetation was developed. Currently, there are almost no trees in upper part of Olsavica Valley. Village Olsavica got name according to alder tree. Currently, there are no alders growing. By planting of native tree species: • soil erosion will be decreasing, • banks will be stabilised and • quality of water will be improved. *(Supportive policy drivers: Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and soil/water management measures).*
Proposal 6. *Fencing of springs to prevent damage from grazing.* In the lower and central part of Olsavica valley, some well-developed spring wetlands are still present. The area is used by cattle grazing and springs are used as a source of water. Cattle are causing damaging of wetlands. Simple wooden fences will be built to protect these wetlands.	Local – lower and central part of Olsavica valley	Short term	By building of fences water pollution, eutrophication and disturbance of wetlands will be decreased. *(Supportive policy drivers – WFD: good ecological status; Natura 2000 Birds and Habitats Directives if designated; Rural Development Regulation; CAP/SAPARD/Agri-environment rural development and soil/water management measures).*
Proposal 7. *Promotion of restoration activities.* Implementation of proposed measures may serve as an example for restoration and implementation of sustainable land-use and water management in mountain areas. Information leaflets will be printed in Slovak and English, for dissemination of project results in Slovakia, as well as in all Carpathian and Danubian countries.	National scale International scale	Medium	Dissemination of project results *(Supportive policy drivers: WFD Article 14, Aarhus Convention)*

Prioritization and initial cost estimates for implementation of Olsavica Valley proposals in Phase 2

First priority Preparation of technical feasibility studies **Estimated cost 10,000.- USD**

Technical studies are required for: the location and structure of small 'gabion' (rock-filled basket) dams, for the reopening of meanders, and for more fully understanding the functioning of the underground drainage system to propose sites for blocking. When a technical plan has been completed and agreed with stakeholders, it can be implemented at low cost by local people.

Second priority Implementation of measures **Estimated cost 20,000.- USD**

According to the findings of the technical feasibility studies, it is anticipated that Proposals 2 to 6 will be implemented in the following order: 2, 3, 5, 6, 4. It is estimated that realisation of Proposal 4 (Removal of underground drainage system) would require additional resources over and above the USD 20,000 indicative budget. Proposal 7 (Promotion of restoration activities) will be carried out as a cross-cutting measure within other proposals.

Third priority Monitoring of water and biota **Estimated cost 10,000.- USD**

Fourth priority Management and reporting **Estimated cost 10,000.- USD**

4.2 Policy drivers favouring sustainable management of wetlands / floodplains

The activities proposed by stakeholders in the three pilot sites are all supported by existing policies, as demonstrated in the tables above. The following sections outline four underlying policy trends which could be harnessed not only in the pilot sites but throughout the Danube basin to give wetland and floodplain restoration a central role in integrated land-use solutions for sustainable river basin management.

- Wetlands are an integral part of the EU Water Framework Directive;
- Agriculture is changing across Europe;
- Wetlands can help safeguard against floods;
- Public participation is now a legal necessity.

It is important that these opportunities are promoted at all levels and especially by:

- European Commission
- ICPDR
- National Governments and statutory authorities within the DRB
- Regional authorities

4.2.1 Wetlands are an integral part of the EU Water Framework Directive

Although the WFD does not define wetlands or set specific objectives for them, it does include important provisions that will assist in their protection. For example, in defining good groundwater status, Annex V requires that the level of groundwater is not subject to anthropogenic alterations that would result in any significant damage to terrestrial ecosystems – such as wetlands – that depend directly on the groundwater body, nor shall the chemical composition of groundwater, if it is to be classed as 'good', result in significant damage to the wetland.

Within the WFD Common Implementation Strategy process, a 'Horizontal Guidance' document on wetlands and the WFD has been jointly developed by all EU Member State and Candidate Country governments, the EC, and water stakeholders from across the continent. The Guidance document has recently been endorsed by a meeting of 'EU Water Directors' held under the auspices of the Italian Presidency. This document attempts to ensure that the links between WFD ecological objectives and wetland values and functions will be fully considered by Member States during the implementation process. In particular, the sustainable management (including rehabilitation/restoration) of wetlands should be included among the 'basic' and 'supplementary' measures included in the Programme of Measures necessary for reaching the ultimate WFD goal of good ecological and chemical status of all waters in each River Basin District.

The three Pilot Sites each demonstrate vividly on the ground the potential of sustainable wetland/floodplain management to contribute in a cost-effective way to implementing the WFD. They also show the willingness and desire of people who live and work in the sites – farmers, fishermen, mayors, community groups and other stakeholders – to propose, plan and ultimately implement the proposed actions. This clearly indicates that land-use strategies based around the sustainable management of wetlands/floodplains are unlikely to be unpopular or politically difficult at a local

level, provided that sufficient consultation is undertaken with stakeholders. Given the findings below on information, awareness and public participation and on lack of capacity at local and regional levels this latter is likely to increase the attractiveness of wetland strategies to authorities throughout Europe.

4.2.2 Agriculture is changing across Europe

At the same time as this, profound changes are sweeping through agriculture, still the dominant land-use across 80% of the continent and certainly also so in the three pilot sites. Global market trends and pressures, an ongoing swing away from production-based subsidies in the EU, EU enlargement and EU budgetary problems, and the reform of the Common Agricultural Policy in 2006 mean that farmers across the continent face an uncertain future. The impact on rural European landscapes and communities is likely to be enormous, and alternative types of rural development and new income-generation opportunities will be both desperately needed but also policy- and funding-supported. Wetland and floodplain restoration and sustainable use are likely to be encouraged by and indeed necessary for the changing agricultural policies. "Second pillar" payments from CAP will increase in significance this means those relating to environmental stewardship actions (including for measures necessary for better water or river basin management under the WFD), agri-environment, rural community development and so on.

For the countries of the Danube River Basin, EU accession, the ongoing economic and political transition, the traditional dominance of agriculture as a source of employment, and the still remaining rich freshwater biodiversity all combine to mean that this impact will be especially strong, and that wetland and floodplain restoration strategies will prove especially relevant and useful as ways of maintaining rural communities.

4.2.3 Wetlands can help safeguard against floods

Central and Eastern Europe – indeed most of the continent – has recently suffered greatly from catastrophic flood events which have resulted in loss of life and damages to health, property, and businesses in and around former floodplains. Now a new consensus is emerging on how more ecologically balanced approaches to flood risk management contribute to lower risk and upstream preventative measures, driven by governments (such as Germany and Hungary) who recognise this necessity, and who – together with the EC – have started working on integrating flood management into the WFD process through the development of a Guidance Document.

These ecologically balanced approaches rely heavily upon the natural capacity of wetlands and floodplains to minimise, absorb and buffer the effects of flood events. Wetland restoration – both for enhanced storage capacities downstream in floodplains and for increased retention capacity or sponge effect upstream - is therefore becoming recognised as a tool for preventative, flood minimisation. All three pilot sites suggest benefits of this nature, the Slovak site primarily so.

4.2.4 Public participation is now a legal necessity

The preceding three factors in combination offer a supportive climate for wetland restoration from the policy, economic and technical points of view. The legal requirement for public participation in environmental (through Arhus) and especially water management (through the transposition of WFD) planning and decision-making offers additional impetus from the social point of view.

For the first time, stakeholders must be consulted and involved and actively participate in RBM planning. Recognising this, ICPDR and UNDP/GEF together facilitated the elaboration of a Danube Strategy for Public Participation in River Basin Management Planning, drafted by Danube country governments and other stakeholders. As noted above in X.1.1 and emphasised by the outcomes in all three pilot sites, public support and motivation for wetland restoration activities is high. These study sites are certainly not atypical of thousands of rural communities throughout the river basin, suggesting that as public participation improves many more community-driven initiatives of this kind are likely to be tabled for discussion and eventual implementation.

4.3 General policy findings:

The project's main findings in terms of policy can be split into two groupings: 'harder', or technically based policy areas, i.e. relating to land-use itself, water management, pollution reduction, wetland restoration and so on, and 'softer', or process-related policy areas, i.e. those relating to public participation, capacity-building, access to information, and so on. These are presented in turn.

4.3.1 Overarching policy finding – policy information lacking locally

One over-arching finding applies to all policies – both technical and process – and all, or almost all, of the specific policy areas outlined below. At local, pilot site level, there is a chronic shortage of information and knowledge about recent, new and emerging policy drivers and the opportunities associated with them, including financial instruments, for promoting sustainable land-use. This shortcoming applies both to practical preparations for EU accession (administration, structures, capacities) and also to actual implementation implications (what will actually happen after EU accession?). Questions relating to CAP, WFD, SAPARD, Natura 2000 and so on are asked by few stakeholders and there are even fewer people – generally in 'remote' capital cities or international bodies – who might be able to provide the answers. Likewise, little thought is currently being given to integrated river basin management at the critical local level, even though the crucial implementation phase is about to begin. This serious shortcoming – itself an argument for, and target of, improved public participation – needs to be addressed urgently.

4.4 'Hard' policy findings

The technical proposals made by stakeholders in the three sites are all supported by existing European-wide or Danube basin policies.

4.4.1 Water management and IRBM

Despite the lack of local consideration for overall RBM planning, the wider context to the wetland restoration proposals from each pilot site should not be overlooked, and it is clear that the WFD is supportive of attempts to employ "softer" type solutions to achieving good ecological status. Backed up by other EC environmental legislation – such as the Natura 2000 Birds and Habitats Directives or Bern Convention/Council of Europe Emerald Network in Croatia – as well as international instruments such as the Convention on Biological Diversity (CBD) and Ramsar, there is clearly an array of supportive legislation which provides very comprehensively the legal framework for the proposed actions.

No further policies are required to this end. What is needed is greater use or respect of these existing instruments.

4.4.2 Water management and agriculture

Agriculture – as noted above, is particularly important and is seen by many as the greatest challenge to WFD implementation. Reflecting this, the EC is currently attempting to harmonise internally and the next review of the Common Agricultural Policy is likely to result in attention being drawn to measures – financially supported by direct payments to farmers – which promote best agricultural practice towards achieving good ecological status in line with the WFD.

In Slovakia and Romania, SAPARD and the future implementation of the Rural Development Directive offer a range of instruments for such work, whether through agri-environment or through diverse rural development programming. As with RBM above, there is therefore already a range of instruments available to EC-stream governments who wish to encourage such environmentally appropriate (and WFD-compatible) agricultural management. The problem remains low awareness and uptake and implementation of these options.

4.4.3 Water management and wetland restoration

The WFD is not consistent in its references to wetlands. Article 1 says that the aim of the WFD is to encourage action that *prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and* ***wetlands*** *directly depending on the aquatic ecosystems*. However the rest of the WFD refers to "water bodies", i.e. rivers, lakes, transitional waters and coastal waters, without any inclusion of other wetland areas that are hydrologically or ecologically linked to these water bodies.

To help overcome this inconsistency, the EU Water Directors asked an expert group to develop Horizontal Guidance on the role of wetlands in WFD implementation. This Horizontal Guidance, approved by the Water Directors in November 2003, includes a number of recommendations for incorporating proper consideration of wetlands in river basin characterisation, monitoring, development of programmes of measures and other WFD implementation activities.

Within the Danube River Basin, the Ecology Expert Group of the ICPDR is currently drafting a Wetlands Issues Paper, drawing on the Horizontal Guidance, that will set out a number of possible activities for incorporating wetlands into WFD implementation. The final draft of the Wetlands Issues Paper will be ready in late 2004.

4.4.4 Water management and nature conservation

Under the Ramsar Convention – to which all three countries are signatory – wise use of all wetland habitats is mandatory. Through the WFD, as noted in detail above, wetland restoration and conservation is seen as an integral strategy for achieving the WFD objectives. Furthermore, the WFD is not fully complied with until supporting water-related legislation is enforced, including the Birds and Habitats Directives, both of which demand management planning processes for each designated site, including of course water management. In Croatia, the Bern Convention offers similar provisions.

So, again, there seems to be sufficient legislation already in place to ensure and promote the nature conservation aspects of water management. Again, problems are with enforcement, especially as a result of insufficient funds being made available to nature conservation activities.

4.5 'Soft' policy findings – process

Equally important are the findings of the pilot sites in terms of access to information, consultation, public participation, and capacities available to implement IRBM (and therefore wetland and floodplain restoration).

4.5.1 Different realities at local level

There is a huge gap between plans and policies developed or transposed at the national level and what is happening in the rural areas, especially when the rural area in question is markedly peripheral, as these pilot sites each undoubtedly are. Astonishingly little is known about relevant policies and processes at levels even as "high" as municipality, regional, or county levels.

This is possibly due partly at least to a severe bottleneck in terms of administrative capacity in ensuring new developments or planning processes, information about funding programmes, policies etc. "trickle down" to these areas. This has been commented upon many times during the WFD process (lack of capacity for implementation especially at local or regional level etc), this seems to be evidence for that.

4.5.2 Insufficient or difficult access to information

All sites – to a greater or lesser degree – show that access to appropriate policy-relevant information remains problematic. There is possibly an institutional failure or "centralist" bias in terms of not sufficiently providing (or even protecting against) access to information, which results in the regions and villages simply not being properly informed. This clearly needs to change if the challenges and opportunities present by the four weighty influences described above in section X.1 are to be met).

Fortunately, the policies supportive of this change already do exist, in the form of:

- Arhus Convention
- Forthcoming EC Directive on Access to Environmental Information
- EC Directive on SEA
- EC Water Framework Directive (preamble and Article 14)
- WFD CIS Horizontal Guidance on Public Participation

The Danube PP Strategy recognises and promotes early and full public participation, including - and largely beginning with - the timely provision of information about RBM and on the various preparatory processes and activities required (listing of significant water management issues, economic analysis, etc.). The Strategy also recommends continuing and expanding efforts to capacitate NGOs - and through them the wider local communities – to assist people to be properly informed, and therefore become properly prepared.

4.5.3 Insufficient Active involvement

Both the WFD itself and the Horizontal Guidance Document on Public Participation stress that it is in the interest of governments to encourage active involvement as early as possible. The Danube PP Strategy reiterates this obligation and plans for a series of activities at local, sub-basin, national and river basin level which if implemented would help in securing meaningful – active – public involvement in RB planning. Unfortunately, given the lack of local knowledge or capacity concerning RB planning in the three pilot sites, it appears that so far little or nothing has been done in this regard.

The pool of ideas regarding RB planning, and store of relevant knowledge, data and information, are likely to be much richer once active involvement of the public – including interest groups, NGOs, research and academic, and cultural organisations – is secured. For this and many other reasons, it is strongly recommended to take seriously the WFD provisions on this subject, to "borrow" best practices and tools and techniques from the Guidance, and to implement all aspects of the Danube PP Strategy in order to ensure active public involvement.

This involvement can be expected to result in many community-driven proposals for alternative forms of wetland and floodplain land-use.

4.6 Capacity requirements

The three pilot sites all highlight the need for immediate capacity-building of government institutions and administrations at regional and local levels for WFD and other types of policy or programmatic information provision, public awareness, and implementation. The lack of information available locally is likely to become a serious obstacle to all aspects of full WFD implementation, including therefore also wetland management and restoration.

Such capacity-building actions need also to be extended to include NGOs and other stakeholders in the local communities. This need is recognised and reflected by the Danube PP Strategy, which recommends stakeholder analysis and capacity needs assessments as first steps in preparing for appropriate interventions.

4.7 Dissemination and communication

The findings, conclusions and recommendations will be made available by the WWF and UNDP/GEF project teams to the following target groups:

- ICPDR (notably Ecology EG, RBM EG);
- Other international bodies (e.g. Ramsar Convention, EC), including 'internal' messages aimed at experts within UNDP/GEF and WWF;
- Governments and relevant national authorities of Croatia, Romania, Slovakia who can provide important support to Phase 2 activities;
- Other DRB national authorities who can promote use of the methodology during their own WFD implementation efforts;
- Regional and local authorities in DRB priority areas who can actually use the methodology locally, e.g. Lower Danube Green Corridor, WFD Pilot River Basin testing exercise; and
- DRB NGOs, especially through the Danube Environment Forum who should be involved in implementing the WFD and in using this methodology locally.

List of Annexes

Note the Annexes can be located through the running header, which bears the corresponding reference number given below (except for those which are indicated as available in CD–ROM format only).

General

G–1 Integrated assessment of land-use policies and land-use options for wetland restoration in the Danube River Basin: Final Methodology

Croatia

HR–1 Site Description

HR–2 Stakeholder Matrix

HR–3 Gap Analysis

HR–4 Action Plan

HR–5 Report of Stakeholder Workshop

HR–6 Pilot Site Leader's Overall Report

HR–7 Maps accompanying Site description (submitted on CD–ROM)

HR–8 Photographs from pilot site (submitted on CD–ROM)

HR–9 GIS files (available on CD–ROM on request)

Romania

RO–1 Site Description

RO–2 Stakeholder Matrix

RO–3 Gap Analysis

RO–4 Action Plan

RO–5 Report of Stakeholder Workshop

RO–6 Maps accompanying Site description (submitted on CD–ROM)

RO–7 Photographs from pilot site (submitted on CD–ROM)

RO–8 GIS files (available on CD–ROM on request)

Slovak Republic

SK–1 Site Description

SK–2 Stakeholder Matrix

SK–3 Gap Analysis

SK–4 Action Plan

SK–5 Report of Stakeholder Workshop

SK–6 Maps accompanying Site description (submitted on CD–ROM)

SK–7 Photographs from pilot site (submitted on CD–ROM)

SK–8 GIS files (available on CD–ROM on request)

UNDP/GEF DANUBE REGIONAL PROJECT

OBJECTIVE 1: **Creation of Sustainable Ecological Conditions for Land Use and Water Management**

1.4 - Policy Development for Wetlands Rehabilitation under the Aspect of Appropriate Land Use

INTEGRATED ASSESSMENT OF LAND-USE POLICIES AND LAND-USE OPTIONS FOR WETLAND RESTORATION IN THE DANUBE RIVER BASIN

FINAL METHODOLOGY

NOVEMBER 2003

Charlie Avis, Jan Seffer, Dave Tickner

WWF International Danube-Carpathian Programme, Vienna & Daphne, Bratislava

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1 Background

This document forms part of activities carried out under the UNDP/GEF Danube Regional Project Output 1.4, which involved two distinct sections: (1) an inventory of protected areas in the Danube River Basin, and (2) integrated land-use assessment and wetland restoration.

Activities related to the inventory of protected areas are reported elsewhere.

The goals and outputs of this component as related to the policy development/land-use parts are as follows:

> *to develop appropriate integrated land use concepts including policies for the protection and/or rehabilitation of three selected sensitive nature protection /wetland areas. The identified approaches should be demonstrated in the frame of pilot activities that will also serve to stimulate activities that will expand the use of sustainable land use practices in critical nature protection and wetland areas of the DRB.*

This document sets out a methodology for investigating land-use in small-scale floodplain areas and for proposing of new policy concepts for sustainable land-use and wetland restoration.

2 Developing the methodology

A working methodology was prepared by Charlie Avis (Policy Officer, WWF International Danube-Carpathian Programme) and Jan Seffer (Director, Daphne Institute for Applied Ecology) and refined following discussions during project team meetings in Vienna in January, April and May 2003, written feedback from the UNDP/GEF project team, and written comments from ICPDR ECO-EG.

The methodology was then field-tested in three pilot sites within the Danube River Basin:

- Budokovar along the Drava river in Virovitica County, Croatia
- The Elan River near Murgeni, Romania
- Olsavica in Slovakia

3 Rationale for Methodology

The methodology is built upon the following premises or rationale:

1. That the restoration, conservation, and sustainable management of wetlands and floodplains **contributes towards nutrient reduction**, in accordance with the UNDP/GEF strategy for pollution reduction in the DRB and, therefore, the Black Sea.

2. That the restoration, conservation, and sustainable management of wetlands and floodplains also **contributes towards the achievement of good ecological status of waters** in the DRB,

the final objective of the EU Water Framework Directive (WFD)[5], as well as other purposes of the WFD such as mitigation of floods.

3. That the restoration, conservation, and sustainable management of wetlands and floodplains **contributes towards locally-inspired, environmentally-appropriate socio-economic development**, through offering commercially important environmental goods and services such as water purification, groundwater recharge, flood mitigation, and through facilitating income-generation as a result of the provision of multiple benefits in the form of fishing, nature conservation, rural (including eco-) tourism, recreation, ecological agriculture and so on.

4. That the restoration, conservation, and sustainable management of wetlands and floodplains also **help governments to honour their commitments in terms of international conventions** and declarations (Ramsar Convention, Convention on Biological Diversity, Bucharest Summit on Environment and Sustainable Development) as well as fulfilling significant elements of the EU environmental acquis (Habitats and Birds Directives/Natura 2000, and WFD).

5. That there is a range of **policy and funding instruments available** to governments in order to promote such activities and approaches, including EU pre-accession instruments in the fields of nature conservation (Natura 2000, LIFE), agriculture and rural development (SAPARD, agri-environment) and river basin management (WFD, ISPA).

6. That to date **wetlands and floodplains have been progressively drained or otherwise degraded throughout the DRB**[6] as a result of inappropriate land-use planning, pressure from intensive agriculture and urbanization, construction of infrastructure for transport and navigation, and pollution, and that despite significant progress in implementing the Ramsar Convention and EU Habitats and Birds Directives, more needs to be done in order to conserve – for the reasons outlined above - valuable wetland and floodplain habitats in all countries of the DRB.

4 The Methodology in the Context of Policy Trends in Europe

Pollution remains a serious problem in the Danube. The volume of nutrients – mainly from agricultural fertilizers, household products and urban sewage – entering the river is too high. This is one of the main reasons why the ecology of the Black Sea is at risk. Toxic substances are also a key threat and have been made worse by mining accidents and floods that flush toxins directly into watercourses. The UNDP, with support from the Global Environment Facility, has been working to address priority environmental problems in the Danube since 1992. The Danube Regional Project is the latest phase of this work. One of the primary aims of the DRP is to reduce nutrient pollution in the Danube.

[5] All countries of the DRB are formally committed to implementing the WFD, whether as (current) Member States: Austria and Germany; as Candidate Countries applying to become Member States: Bulgaria, Czech Republic, Hungary, Romania, Slovakia and Slovenia; or as signatories to the Danube Convention: Bosnia-Herzegovina, Croatia, Moldova, Ukraine and Yugoslavia.

[6] In the last 100 years, more than 80% of the DRB's wetlands and floodplains have been lost.

Importantly, the catastrophic flooding events in Europe in the summer of 2002 have focused the attention of the media, public, and governments upon the search for sustainable approaches to river basin management, in line with the WFD. Wetlands and floodplains are central to such sustainable approaches and can be expected to receive greater attention in the immediate future. At the same time, they are beginning to receive due attention in the pan-European process of WFD implementation. The recent German Government announcement of a 5-Point Strategy for Flood Protection – based as it is on floodplain restoration and "alternative" types of land and water management – has given a boost to the use of wetlands and floodplains for achieving the twin aims of flood protection and WFD "good ecological status".

Strategies for public participation are currently being considered for river basin management across Europe as part of the WFD implementation process. So far, no real concrete action has taken place. Public participation – or, to call it by another name, stakeholder involvement – is central to this project, in fact without it the project will fail.

Other work carried out to help WFD implementation is also relevant. In particular, the IMPRESS Working Group set up under the first phase of the Water Framework Directive Common Implementation Strategy produced guidance on how to analyse the anthropogenic pressures on water bodies and their impacts in line with Article 5 of the WFD.

5 Land-Use Assessment: Working Methodology

5.1 Summary

In summary, the necessary activities are as follows, some of which were overlapping and/or consecutive:

- Mapping the area on GIS (geographical information system), including key water and wetland features
- Identifying all the strategies, plans and policies that relate to activities undertaken in and around the floodplain and the threats, impacts and pressures to wetlands and floodplains in the area
- Assessing the ecological optimal conditions for wetland management and nutrient reduction in the area
- Undertaking gap analysis to assess the difference between current, and ecological optimal, land-use for wetlands and nutrient reduction in the area
- Organising participatory stakeholder workshops to generate sustainable floodplain management options including a vision and objectives for the catchment
- Undertaking policy analysis to identify the policy and funding obstacles or opportunities to each of the management options
- Selecting options and developing action plans to take the work forward.

Key steps in the methodology are described in detail below.

5.2 Component I – Information gathering and analysis

Information has to be gathered at several different levels:

- Local: i.e. the characteristics of the site itself and the local municipality/community, including local land- and water-use plans and policies and opinions of local people.
- Regional: i.e. district/county territorial and economic planning policies and procedures.
- National: i.e. national policies, programmes, processes and funding mechanisms for spatial planning, agriculture and rural development, water and river basin management, including transposition into national law of EC environmental *acquis*.
- International: i.e. the requirements of international agreements and processes, including ICPDR, the Ramsar Convention and EU Directives.

Such diversity requires that the project team comprises individuals with expertise and access to information/key stakeholder at all these levels. However, the local and regional levels are of special importance given that specific proposals will normally apply at these scales.

A checklist is provided below for ensuring that all relevant types and sources of information are addressed. The checklist should be completed by the project team leader based on previous delegation of information gathering assignments to individual team members. Ideally this should involve a round-table discussion involving the whole team plus invited experts and stakeholders, as appropriate, in order to jointly agree on key questions and issues.

The completed checklist should then be distributed for comments to selected stakeholders in order to identify and accommodate necessary amendments before a more formal stakeholder consultation begins.

The checklist comprises the following:

A. Background Information

A.1 Site Description*

- location, altitude, size (area)
- physical features (topography, soils, climate etc.)
- hydrological features (surface and groundwater regime and natural functions/values)
- ecological features (main natural/semi-natural habitats and values)
- catchment characteristics (outline of the main features of the river basin within which the site is located)
- current land use (mapped using GIS)
- demographic/socio-economic profile of local communities
- social, economic and cultural (including recreational) values of the site
- land ownership/tenure and jurisdiction

- factors (past, present or potential) adversely affecting the site, including changes in land or water use and development projects, whether within the site boundaries, the wider catchment or further afield (see B. Pressures and Impacts below)
- conservation/sustainable use measures to date, including designation of protected areas

*The *Information Sheet for describing Ramsar Sites and other Wetlands*, developed by the 'Ramsar' Convention on Wetlands and in use throughout Europe and across the world, provides a useful structure for presenting site-based information and is accompanied by extensive guidelines.

B. Pressures and Impacts

The following headings cover most of the main pressures and impacts on wetland and floodplain areas within the DRB. In gathering and presenting information under each of these headings it is essential to separate clearly: (a) past and (b) current/ongoing pressures/impacts.

- drainage for agriculture and/or construction (including urban, industrial and transport/communications purposes)
- infilling for agriculture and/or construction (including urban, industrial and transport/communications purposes)
- landscape simplification (e.g. removal of vegetation cover
- point-source pollution (e.g. urban, industrial)
- diffuse pollution, including nutrient enrichment (e.g. agricultural runoff)
- accelerated sedimentation due to excessive soil erosion
- river regulation (e.g. canalization and dyke construction)
- dam construction
- over-abstraction of ground or surface water
- excessive flooding due to anthropogenic impacts (e.g. due to increased runoff from arable land)
- climate change (e.g. increased drought risk)
- impact of invasive, exotic species

C. Policies, Plans and Legislation

C.1 Policy Framework

Seek to identify and briefly summarise:

- national, regional and local policies, plans and procedures for spatial planning
- national, regional and local policies, plans and procedures for agriculture and rural development
- national, regional and local policies, plans and procedures for water allocation and management, including river basin management

- national, regional and local policies, plans and procedures for transport and navigation
- national, regional and local policies and procedures for nature conservation
- implementation and enforcement at national, regional and local levels

Pay particular attention to those policies, plans and procedures that are most influential at the site-specific level.

C.2 Policy Analysis

- review the compatibility of the above policies, plans, legislation and procedures with the requirements of environmentally and economically sustainable land- and water-use, distinguishing between the provisions 'on paper' and the actual situation 'on the ground'.

C.3 Wider Policy Context

- links to river basin planning through WFD
- transboundary considerations (WFD, ICPDR)
- implications of the EU Enlargement process for agricultural and rural development policy, structural/transport development, river basin management (WFD) and nature conservation (Natura 2000).

D. Possible Future Threats and Opportunities

D.1 Possible Threats

Distinguish between those factors for which a significant threat currently exists and those where there is a theoretical risk, but no immediate threat. The check-list of factors is the same as those given for the assessment of past and current pressures and impacts under part B above, namely:

- drainage for agriculture and/or construction (including urban, industrial and transport/communications purposes)
- infilling for agriculture and/or construction (including urban, industrial and transport/communications purposes)
- landscape simplification (e.g. removal of vegetation cover
- point-source pollution (e.g. urban, industrial)
- diffuse pollution, including nutrient enrichment (e.g. agricultural runoff)
- accelerated sedimentation due to excessive soil erosion
- river regulation (e.g. canalization and dyke construction)
- dam construction
- over-abstraction of ground or surface water
- excessive flooding due to anthropogenic impacts (e.g. due to increased runoff from arable land)
- climate change (e.g. increased drought risk)
- impact of invasive, exotic species

D.2 Possible Opportunities

- wetland/floodplain rehabilitation and/or restoration for socio-economic income-generation activities (e.g. improved crop yields and fishery production)
- wetland/floodplain rehabilitation and/or restoration for nutrient reduction
- wetland/floodplain rehabilitation and/or restoration for sustainable flood management
- wetland/floodplain rehabilitation and/or restoration for improved groundwater recharge
- wetland/floodplain rehabilitation and/or restoration for improved surface-water quality
- wetland/floodplain restoration fro biodiversity gains
- implementation of policies, programmes and funding mechanisms that support the above.

E. Assessment of alternative land-uses and development of initial proposals

- summarize the expected pros and cons of maintaining the status quo
- summarize the expected pros and cons of introducing specific land-use changes
- identify the policies, plans and procedures that would support these changes
- identify the policies, plans and procedures that conflict directly with sustainable wetland/floodplain management within the framework of integrated land-use;
- make an initial list of potentially feasible land-use and policy measures for consultation with stakeholders.

5.3 Component II - Development and Finalisation of Appropriate Land-Use Proposals

II.1 Define the former ecological situation

Several methods can be used for reconstructing the former ecological situation of a given site:

- Using historical maps, other documents and photographs;
- Talking with local people to identify changes that have occurred within living memory;
- Using a nearby site that has been less affected by pressures and impacts as a ‘reference site’;
- Using existing geomorphological, hydrological and ecological evidence to infer likely conditions in the past.

These methods should be used in combination, rather than as alternatives. On the basis of these techniques, it should be possible to reconstruct former land use patterns and to identify

wetland/floodplain features that existed in the relatively recent past but that have been lost as a result of the pressures and impacts identified previously.

II.2 Compare Current and Former Land-use

This should ideally be done using GIS.

II.3 Reconcile 'Former' with 'Feasible' to find 'Appropriate' – Gap Analysis and Stakeholder consultations

At this point the quality and extent of the existing features, and the potential of the site are used to prepare a list of ideal land-use objectives. The ideal objectives are those that could be realized if it was possible to have complete control over activities and land uses within and adjacent to the site. Clearly, such 'ideal' objectives are unlikely ever to be practicable for a whole range of reasons. They are, however, an indication of the site's ecological potential. Although this part of the methodology is basically an academic exercise to help frame the next steps, the concept of 'ideal' or 'optimal' objectives may be one that is misunderstood by stakeholders, some of whom will assume that the 'ideal' is indeed what the project is aiming to achieve. This is liable to generate antagonism and resentment. Consequently, it is not recommended that this stage of the methodology be given prominence in stakeholder consultations.

In reality, of course, objectives will be determined by factors such as degree of stakeholder support, availability of resources, expertise and technology, and the local social, economic and political context. The following 'Gap Analysis' framework may help to organize thinking on these issues:

Name of Site:			
Attribute (or category of 'key issue' affecting whether you can progress from the current status to a more desirable situation)	**Obstacle** (Use from one to three 'minus' signs (–) to indicate how much of an obstacle this attribute is)	**Opportunity** (Use from one to three 'plus' signs (+) to indicate how much of an opportunity this attribute is)	**Brief explanation** (In this column of the table explain in a few lines why you have scored each attribute as being an obstacle, an opportunity, neither, or both at the same time. What are the negative and/or positive aspects?)
• **Information** (e.g. maps, socio-economic data, hydrology, biodiversity etc.)	Remember, a particular attribute can represent BOTH an opportunity and an obstacle at the same time, so it would be quite possible to allocate, for example, three minus signs and two plus signs to the same attribute, recognizing that there are both strong drawbacks as well as some important positive aspects		Is all the baseline information that you need available? If not, why not? Which are the most important information gaps? Which are the most complete types of information you have been able to gather?
• **Policies and Plans** (remember to think about the four different scales mentioned on			Are local authority planning policies adapted to the requirements of sustainable water and wetland use? Is there are national policy or planning framework that

Name of Site:			
Attribute (or category of 'key issue' affecting whether you can progress from the current status to a more desirable situation)	**Obstacle** (Use from one to three 'minus' signs (–) to indicate how much of an obstacle this attribute is)	**Opportunity** (Use from one to three 'plus' signs (+) to indicate how much of an opportunity this attribute is)	**Brief explanation** (In this column of the table explain in a few lines why you have scored each attribute as being an obstacle, an opportunity, neither, or both at the same time. What are the negative and/or positive aspects?)
page 1 of this document, i.e. local/regional, national, basin, and EU)			can help support restoration of wetlands for 'ecological' nutrient reduction and flood control? Are there policies and plans that work actively against these objectives?
• **Laws and regulations to support the changes needed** (again, also think about the four different scales)			Do the laws and regulations needed for sustainable land use exist locally/nationally and internationally? If so, are they implemented? How effectively? If not, what are the gaps? Which laws work actively against conservation and sustainable use?
• **Resources and capacities to make the changes needed** (remember that this is not only about financial resources, but also technical and human capacities)			Analyse whether the human and technical capacity to do what you want to do is available within the region/country? If so, then this is an opportunity. Does it vary from one field of work to another? If capacity in a particular field is lacking, is it a financial problem a policy problem? More a question of training, or all of these things together?
• **Stakeholder support for making the changes needed**			(do the main stakeholder groups you are working with support the aims and objectives of the project? Does the degree of support or opposition vary from one group to another)
• **Public awareness**			Is the wider public –within and around the pilot site – aware of what you are trying to do? Does it matter?
• **Other site-specific issues** (include here, using as many additional rows as necessary, other important attributes fro your site - e.g. cultural or 'behavioural' issues that are very regional or local in their expression and impact)			

Stakeholder consultations, particularly the holding of on-site stakeholder workshops, are a key means to determining the feasibility and appropriateness of alternative land-use proposals. Such workshops should be held in or close to the site and involve representatives of all key stakeholder groups, identified using the following 'Stakeholder Matrix' or an adaptation of it:

	National level	Regional level	Local level
Public sector			
Ministries (Environment, Water, Agriculture, Forestry, Regional Development, Spatial Planning etc)			
Statutory authorities (e.g. water management boards, forest management authorities, state farm advisory services, environmental protection authorities etc.)			
Municipalities, including politicians (e.g. mayors, councillors) and officials (e.g. spatial planners, environmental protection officers, flood managers etc)			
Private sector			
Land-users (e.g. farmers and farm co-operatives)			
Water-users (e.g. fisherman, water supply companies, shipping companies)			
Tourist operators			
Media			
Civil society sector			
Environmental NGOs			
Recreational groups, e.g. hunters, anglers,			
Local community groups (e.g. youth clubs, churches, schools, colleges etc).			
Academic institutions			

Stakeholder workshops should be planned with the following points in mind:

- meetings should be organised well in advance, with adequate preparation
- local people are less likely to be available on working days
- officials from capital cities and regional administrations are less likely to be available at weekends
- limited documentation should be provided in advance to provide sufficient explanation and background without swamping stakeholders in detail
- local communities are more likely to become involved through personal contact rather than through formal invitations and documentation
- transparency and openness are essential and all stakeholders should be given an equal chance to participate

- the proposals on the table should be sufficiently concrete to generate meaningful discussion but should not be so developed that they may appear as *fait accompli* to stakeholders
- care must be taken to manage expectations so as to avoid raising false hopes e.g. about the potential of the project to deliver financial investment for land-use changes
- stakeholders should be encouraged to provide additional feedback after the workshop
- feedback should be provided to workshop participants as the project progresses

Useful sources of information are the Public Participation Strategy for the DRB and the Public Participation Guidelines drawn up under the WFD CIS.

II.4 Action Plan of Measures for Appropriate Land-Use

Based on the preceding stages of the Methodology and especially the conclusions from the Gap Analysis and stakeholder consultations, it should be possible to draw up an Action Plan of measures. This should include the following:

- Description of proposed measure
- Spatial scale (site-specific, local, regional, national, EU)
- Time-scale (as accurately as possible, but at least short- medium- or long-term)
- Expected benefits (socio-economic and environmental)
- Resource implications

It is important to recognise that the proposals will more than likely be 'mixes' of solutions and sectors, rather than rigidly defined single-sector or single activity type scenarios. Examples of these "mixes" include:

a) Agriculture and water and wetland management
b) Biodiversity in agriculture areas
c) Sustainable resource use
d) Sustainable flood management and wetlands
e) Sustainable forestry
f) Eco-tourism

Pilot Site Description – Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia

1. Name and address of the compiler of this form: David Reeder, WWF-DCP Drava Co-ordinator, 2092 Budakeszi, Rakoczi u. 103, Hungary

2. Name of the site: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia.

3. Maps of site included:

Figure 1: Croatia location in Europe

Figure 2: Study area in Croatia

Figure 3: 1:25,000 topographic map (needs ArcView interface)

Figure 4: 1:5000 detail maps (needs ArcView interface)

4. General location: Croatian Drava floodplain, Virovitica-Podravska county, Croatia, near Virovitica city.

Specific locations, based on Gauss Krieger projection:

Westernmost point: 17 ^{o} 35' E

Easternmost point: 17 ^{o} 44' E

Southernmost point: 45 ^{o} 48' 30" N

Northernmost point: 45 ^{o} 51' 40" N

Virovitica city centre: : 17^{o} 23' 30" East, 45^{o} 50' North

5. Elevation: 99 – 110 metres above sea level.

6. Area: Approximately 2,350 hectares.

7. Overview: Oxbows, reed-beds, willow and poplar stands in a mosaic of agricultural lands; the original natural wetland forest, oak-ash (*Quercus-Fraxinus*), has almost disappeared from the study area. Some small stands of alder (*Alnus*) forest and ash-alder. Open water in the Drava river and the Zupanijski canal; this canal is rich in aquatic vegetation and now that the Drava has lost many of its natural backwaters, this shallow artificial channel provides important spawning grounds for fish. The wetlands support many endangered species of fish, plants, birds, insects, amphibians and mammals. The proposal to establish a 'Danube–Drava–Mura Biosphere Reserve' includes much of the present pilot site as a buffer zone, while the oxbow of Budakovac would be in the core zone.

8. Physical features of the site:

Geology The bedrock is Palaeozoic and this was overlaid by carbonate rocks consolidated from deposits on the bed of the Pannonian Sea in the Mesozoic. From the end of that period until the Oligocene was a period of uplift. Quaternary clays, sands and gravels were deposited in wetland environments. These was overlaid by alluvial deposits throughout the Quaternary. River terraces of different materials can be discerned and dunes of sandy materials can be determined in the landscape. See geological map – Figure 5.

Geomorphology The section of the River Drava which forms the basis of the border between Hungary and Croatia is a classic expression of European lowland, lower-course rivers. Before river regulation, drainage and land reclamation works were carried out, from the late eighteenth century onwards, this was a flood-prone region where the river meandered extensively, creating an extremely varied pattern of oxbow lakes, river branches and islands on both sides of the river. Some oxbows remain, although atrophied, but the meander scars are clearly evident on modern maps – through land-use variation – and particularly on multi-band satellite images. Many of these oxbows, both in Hungary and Croatia, are suitable for rehabilitation.

Soils Mostly recent alluvial deposits at lower elevations near the river; at slightly higher elevations these merge into a region of (generally acidic) meadows; at higher elevations again the soils are mostly parapodsols. Silica sand predominates, with small areas of hypogley and amphogley.

General climate Continental, with the international climate classification Cfwbx. This is a moderately warm rain climate, with rainfall in the range 900–1100 mm per year (mean annual precipitation at an atlitude of 120 m is 815.5 mm). Average temperature of the warmest month: 20.5 °C, average temperature of the coldest month: -0.3°C.

Water Quality Where the city/factory waste water enters the Zupanijski canal, the presence of nitrates and phosphates is so high that the water is Category V in quality. However, this falls rapidly as the water flows along the first few kilometers of the canal. In its further journey along this channel, the slow-flowing waters and the existing aquatic vegetation cause the concentration of these nutrients to fall and the quality to improve considerably. The most effective bio-remediation is on a stretch after passing Jagodno polje, where the canal could not be straightened because of inaccessibility to dredging machinery, so it follows the curve of the old natural oxbow for a few hundred metres. Here, water quality reaches Category I. However, further along its journey the canal passes the villages of Brezovica, Vaska and Kapinci and the quality drops, presumably indicating that untreated waste water from these settlements reaches the canal. The result is that by the time the canal reaches the Drava river, the water is Category II in terms of nitrates and phosphates (see Table 1, water quality analysis; and Figure 7, which shows the locations of the measuring stations).

NB (a) During the period of our study, the Viro wastewater treatment plant was out of action for two weeks for maintenance purposes, something that occurs every year. During this maintenance period, municipal wastewater are completely untreated and fed directly into the Zupanijski canal via another channel.

NB (b) During the higher flows of winter, nutrient concentrations are diluted.

NB (c) Rainwater and wastewater are not separated in the municipality of Virovitica by the Virkom utility; this makes treatment difficult during wet periods, due to the excessive volume involved.

Hydrology: Hydrological data were requested from the Croatian Waters Company. The data received were significantly incomplete and not really adequate for the needs of the present study (for example, complete data series for groundwater in the vicinity of the canal, and canal discharge data were missing). There were two possible explanations; either Croatian Waters' data sets were themselves incomplete or access to the data for the purposes of this project had been restricted. Given that the 'missing data' were later obtained informally through the Hydrological Institute, the latter explanation appears likely.

Information received from private drainage contractors advised that the Zupanijski canal was considerably deepened two years ago and since then the string of oxbow lakes along its course have been drying out. Farmers complained at the time that the groundwater levels would fall, thus affecting their production, and now they claim that this has in fact happened. Another result of this deepening – the rationale of which was to accommodate excess water from farmland at higher elevations in the Bilogora hills which run parallel to the Drava – is that the channel which once connected the canal with the oxbow lake of Budokovac no longer flows because of lower water levels, and the level of that lake itself has dropped by about one metre. Table 2 illustrates the drop in groundwater levels at stations near the canal between 1997 and 2003; Figure 7 shows the locations of the measuring stations.

There is an automatic station measuring the depth of water in the Zupanijski canal 30 metres downstream of the bridge at Vaska (17^{o} 40' E, 45^{o} 49' N). The 'zero' level of the canal waters is set at 95.666 metres asl. 2003 has been a very dry year and a depth of 39cm above this zero level was measured on September 10th. On the same date in 2002 – a much wetter year – the level was 47cm, while the corresponding figure for 2001 was 192cm. Table 3 shows the levels recorded, as provided by Croatian Waters. The hydrological map, Figure 6, shows the direction of groundwater flow through the region; it was supplied by an independent hydrological contractor.

Groundwater: The data received from the Croatian Waters Company was recorded by piezo-electric sensors in wells reaching into the groundwater layers. We requested data from wells closer to the canal but did not initially receive this information and had to pursue other avenues. The data that we eventually compiled shows a fall in groundwater levels of an average of about one metre after 2000 – see Table 2. It is possible that groundwater levels closer to the canal would show more dramatic changes following the deepening works.

Downstream from the pilot site, the river has been regulated since the 19^{th} Century, when shipping access was more of a priority. Meanders were cut off and banks reinforced, many river branches have been closed. However, there are still some river islands and in Viroviticka-podravska county, the section of the Drava here has been little regulated and retains much of its natural character. The Zupanijski canal meets the River Drava near Km 125 from its confluence with the Danube; the interfluve between the two rivers constitutes the very important Kopacki Rit wetland, which is a Ramsar site.

9. Physical features of the catchment area:

Please refer to Appendix 3. The Drava is a major right-bank tributary of the Danube River, in south-central Europe. It rises in the Carnic Alps near Dobbiaco (Toblach), Italy, and flows eastward through the Austrian Bundesländer (federal states) of Tirol and Kärnten, where it forms the Drautal, the longest longitudinal valley of the Alps. From there it flows south-eastward through Slovenia. Near Legrad, Croatia, it is joined by the Mura River and forms part of the Croatian-Hungarian border. The originally swift course of the Drava has been harnessed by hydroelectric power plants in Austria,

Slovenia, and Croatia. In the Alps and Slovenian hills these dams act as sediment traps; at lower elevations in Slovenia and Croatia they also lead to daily unnatural flood-waves below the last dam in the chain. The Drava is navigable only by small boats in its upper reaches and by larger craft downstream from Donji Miholjac, Croatia.

Regarding the middle and lower reaches of the Drava, the overall biogeographical region is the Pannonian Plain, which encompasses a mosaic of many types of natural habitat: dynamic alluvial systems, a range of wetland-area types and hardwood/softwood riparian forests; with wet meadows, marsh-woodlands and grasslands forming a buffer area. The groundwater regime produces a mosaic of its own resulting from alluvial deposits of different permeabilities.

These alluvial lands have always supported small farming which was adapted to the river regime with small plots for cultivation on higher land, wet pastures and meadows at lower levels, wetland forest on the flood-prone areas. The border with Hungary was strictly enforced since 1947, which discouraged any form of development in the region. This part of Croatia maintained the small-plot system whereas neighbouring Hungary converted its land-use to large collectivized fields. There is some forestry carried out here, also reforestation, sometimes with non-native species.

10. Hydrological values:

Groundwater levels appear to have fallen since the Zupanijski canal has been deepened (see Table 2) and our researchers conclude that there is a connection. In addition, local people, including contractors who were involved in this drainage work, connect the drying-out of this chain of oxbows with these works. The same people feel that raising the water-levels in the canal through a sluice or series of sluices, combined with making or clearing channels from the canal leading into the remains of the old river meanders (oxbows, low dry channels), will revitalize the oxbows and lead to a general rise in local groundwater levels.

11. Wetland Habitat Types according to Annex 1

Refer to map of current habitats, Figure 10

a) Presence, using Ramsar classification:

M: Permanent rivers, streams or creeks

Tp: Permanent freshwater marshes or pools

Ts: Seasonal/intermittent freshwater marshes or pools

W: Shrub-dominated wetlands

Xf: Freshwater, tree-dominated wetlands

b) Dominance:

Land-use	Extent, hectares
River Drava	253.6
Water bodies	107.3
Meadows	14.7
Reed	212.3
Sedge	20.4
Arable	1667.7
Acacia	0.8
Oak-ash	53.9
Alder-ash	11.3
Ruderal	20.2
Willow-poplar	261.2
Total	**2623.4**

We also have the complete list of habitat types under the Corine classification system, which is more thorough than the Ramsar system. Furthermore, it is the pan-European system accepted by the Croatian Ministry of Environment. Types present include:

24.32: Vegetated river sandbanks

38.22: Medio-European lowland hay meadows

44.12: *Salix* forest on low-lying river banks

44.132C: Salici-Populetum nigrae association: willow and black poplar

44.31: Medio-European stream ash-alder woods

53.111: Flooded *Phragmites* beds

53.141: Sagittario-sparganietum association, mesotrophic, slow moving water

53.21: Large *Carex* beds

82.1: Unbroken intensive cropland

82.12: Market gardens and horticulture

83.324: Planted *Robinia pseudoacacia*

86.4.11: Sand, clay and kaolin quarries

86.2: Villages

87.1: Fallow fields

87.2: Ruderal communities

89.22: Ditches and small canals

12. General ecological features:

The section of the Drava which borders Viroviticka-podravska county, and the section of the proposed Biosphere Reserve which lies within that county, is a particularly characteristic region, the river here was unregulated until recently and biodiversity has remained high. There are few allochthonous fish species and our researchers believe that we would encounter twice the number of species in the spring that we have have found during this summer study.

The waters of the Drava here are cyprinid waters: chubb, *Leuciscus cephalus*, is characteristic, as is bleak, *Alburnus alburnus.* There are also turtles, many amphibians and reptiles, otters and beavers.

The river islands are important breeding places for birds. Some species, e.g. little ringed plover *Charadrius dubius* and little tern *Sterna albifrons*, thrive in such habitats. Several species of heron are found, notably the rare purple heron *Ardea purpurea* along the Zupanijski canal. Gravel banks and beaches are also important breeding places, especially for little ringed plover and little tern.

Steep river banks provide nesting places for sand martins *Riparia riparia* and bee-eaters *Merops apiaster* as well as kingfishers *Alcedo atthis*.

The forests along the Drava support many breeding birds, most notably the black stork *Ciconia nigra* and white-tailed eagle *Haliaeetus albicilla* although these species have not been seen during this particular pilot site study. There are also many woodpeckers and owls.

River branches are important for fish spawning, water birds and water plants (the water here is more still than the main channel, some fish lay their eggs on plants).

Oxbow lakes are always very productive. Colonisation by *Salix alba* is a feature. *Equisetum hymalle*, an endangered plant species, and flowering rush *Butomus umbellatus* are found here.

Very few wetland pastures and meadows (used for grazing and mowing) have survived. Sustainable use maintains them as very valuable semi-natural habitats and prevents the succession to forest. However the decline in traditional agriculture has greatly reduced the presence of such habitats and ‘melioration’ (using a system of underground drainage pipes) has degraded many of them. Grazing could be reintroduced, as in the Hungarian Danube-Drava National Park, where traditional domestic animal species are used as tools in traditional floodplain management.

A more detailed report on the ecological values of the Budakovac study area can be found in Appendix 1.

13. Social and cultural values:

The political history of the region between the Second World War and the early 1990s discouraged economic development along the river, which was essentially part of the ‘Iron Curtain’. The city of Virovitica has always had a strong woodworking industry, but industrial production and employment has fallen considerably since privatization in the 1990s. There is still one very successful furniture

factory, employing 4,000 people, which supplies IKEA. Its trade is enough to make positive the balance of trade of the entire county. However, unemployment is still considered too high in Virovitica. Virovitica was established as a free royal city in 1234; craft guilds were active in the city from that time. In the baroque age, painting and sculpture, especially in wood, thrived in the city. There is an independent theatre. On the adjoining hills of Bilogora, wines are made. The economy of the nearby town of Pitomaca is based on agriculture, with some industry, especially making wooden furniture. Herbs are collected and packaged for sale, mostly for export.

The village of Vaska was mentioned as early as the 11th Century. It is older than Virovitica and it used to be the seat of an archbishop. There was a very old church here but it was destroyed by the Germans in the Second World War. To quote a resident: *"We have strong connections with Martinci, over there in Hungary: there have been many marriages between the two communities. There once was a ferry connecting us. In 1955-56 there was a big flood and a whole village was destroyed: the people migrated and never came back. We still have a lot of game here, sometimes you can see as many as 100 deer in one place."* Many people in the study area, especially in the central village of Budakovac, speak Hungarian, which testifies to the permeability of the border before the decades of the Iron Curtain. Also, in the village of Martinci (Felsőszentmárton), across the Drava river in Hungary, 95% of the 1,200 residents are of Croatian stock.

The region is part of the former Socialist Federative Republic of Yugoslavia. The 1991 war with Serbia did not really affect the pilot site area, although one nearby village had many Serbian residents who fled their homes. The people are Roman Catholics only; local traditions are strong and traditional costumes are worn during festivals. Ecotourism is potentially an important local income generator. Cycle routes are established in Koprivnica county and the plan is to connect them to this county and extend across the border into Hungary. There is a plan at county level to establish a wine route, perhaps link this with Hungary and incorporate cycle routes here. Another activity which could be very effective for livelihoods is educational tourism and educational programmes. A pilot ecotourism area is being established in Koprivnica county.

Fisheries: A national strategy for fisheries has been drafted; the sections dealing with freshwater fisheries are attached (see Appendix 2)

14. Land tenure/ownership:

Land ownership is very unclear. After the Second World War much land was taken by the state to be used by socially-owned 'combinats' (collective farms). Following the fall of the socialist Yugoslav Federation and the establishment of the Croatian Republic in 1990, privatization began in 1995. As in all other ex-communist countries, this process has been far from perfect; many owners failed to claim back their land or could not substantiate their claims. As a result, some land is now owned privately, some by the state; some is owned privately but used by the state, and vice-versa. To complicate things further, *Hrvatske vode* (Croatian Waters) owns the waterways and some 6 metres of bank on either side. However, where they have straightened waterways the situation has often changed because additional land was taken into *Hrvatske vode*'s ownership, while ownership of other land was relinquished. Furthermore, where drainage has taken place, ownership has in some cases passed to the people using the reclaimed land.

An overall conclusion is that privatization has under-achieved and politicians would rather sell land than give it away. Even the County Cadastral Office cannot clarify this question. However, the

percentage of state-owned land in our study area, based on the extent of the PIK lands (rented from the state) and the State Forestry, *Hrvatske sume*, would appear to be about 40%.

15. Current land (including water) use:

Refer to map of current habitats, Figure 10, compiled using large copies of the satellite image, Figure 9, as a base-map for ground-truth surveys.

70% agriculture, 15% water (including river area), some 10% forestry (see Figure 7) and 1% other woodland. Lakes and fishponds support sport fishing and angling.

Most people in the study-area live from agriculture and some from forestry. Historically, livelihoods here were based around ancient techniques of traditional floodplain management, including the use of domestic animals adapted to wetland living, and seasonal use of meadows and pastures based around the annual flood cycle. Fishing played a very important role. Now development is urgently needed, so that people in the region can share the same opportunities as those in the rest of Europe. Viroviticka-podravska county is rich in nature and a sustainable path of development has great potential here: the development of long-term environmental management schemes and peaceful transboundary co-operation are fundamental. Components will include co-operation with and between communities, organisations and industries along the river-system; a sensitive use of river-resources; sustainable tourism and conservation management; sustainable forestry, fishery and agricultural practices and the promotion of local products.

The combination of a good groundwater supply and high insolation has always fostered high agricultural productivity. These are small farms, practicing multiculture: it is not a rich living. The crops are mainly maize, wheat, sunflowers, soya and sugar beet; also some vegetables: potatoes, paprika, onions and even aubergines. Tobacco has always been important and is still grown. It is a profitable crop and thrives even in very dry weather, but is highly labour-intensive. There are small herds of cows, and many families have small herds/flocks of cows, goats and sheep. Many homes have pigs and other domestic animals for home production (plus some very limited income from hunting and fishing). Forestry provides a few jobs, tourism is developing but at a very slow rate and this employs some people with horses. Bee-keeping and honey production is important.

Local products include basket-work, local wines; culinary specialities, especially fish; home-prepared meat products from high-quality livestock; high-quality fruit, vegetables and honey. This is a market which could be developed to satisfy consumption in western Europe. There are many uses for willow, *Salix spp,* but generally forestry is at a low level in our study area. Hunting of deer and wild boar has always been and continues to be an important activity, as is fishing for traditional species. Collection of herbs and mushrooms is a very important folk-activity and needs a diverse range of habitats for these species and traditional practices to survive. Fine woodworking has always used the best local timber. Much honey is produced locally.

16. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Previous work on this site:

River regulation, drainage and land reclamation works were carried out on these flood-prone lands from the late eighteenth century onwards and many old river channels and oxbow lakes remain in the landscape. The river level here has dropped more than a metre over historical levels, resulting from regulation works, thus groundwater base levels have also fallen.

Drainage-channels formed a part of this work and one of the main features here is the straight canal which was considerably enlarged and is now being used to convey the Viro/Virovitica waste water to the Drava.

The agricultural impact here has been relatively light, although some 70% of the study area is used agriculturally. Nevertheless, fields are small and farming practices not intensive. Fertiliser use is also light as it is considered expensive for such extensive farming. The forests have been selectively logged, all the fine wet-forest oaks were cut long ago, during the heyday of baroque carving and furniture-making in Virovitica. It seems that there has been relatively little replanting apart from hybrid poplars for paper production.

Additional value of this project

Croatia is in a very interesting – and not easy – historical transition, as an independent republic only a dozen years old and a democracy for only two years. As a member of the Yugoslav Federation, her people enjoyed the benefits of socialism and Tito's pragmatic statesmanship as well as the economic freedom to travel and work abroad and run private businesses alongside state co-operatives. Independence in 1991 brought the rule of Tudjman: many of the structures and hirearchies of socialism remained but their operation became focused on profit, on personal gain, on the exploitation of resources. Since Tudjman's death in 2001, Croatia has moved strongly towards Europe, despite the strong nationalist element. The recent application for EU membership, and its demand for greater responsibility towards the environment, has had a profound effect at the powerful county level and at many levels of national bodies.

Virovtica county suffered quite badly in the 1991 war and it does not have the economic resilience of neighbouring counties to the west. Unemployment is high. Until recently the county council has been ambivalent about nature protection and sustainable development, but some active green people have recently convinced them of the importance of these issues. The council has come out in favour of the Danube-Drava-Mura Biosphere Reserve scheme and is going to change the county physical plan to incorporate the proposed protected areas. In a sense, siting the DRP 1.4 project here recognises the county's progressive stance and will bring it attention, recognition, and hopefully, tangible benefits if the project is implemented.

Fostering the goodwill of this county authority is, in political terms, a critical element in the Drava League vision of the nature protection and sustainable development of the Drava region. Already Virovitica's support has enabled us to pressure other counties along the Drava to act more responsibly. The Zupans are powerful and they seem to have an important role in the concessions for operations

such as gravel extraction, although this is not easy to establish. This particular section of the Drava does not suffer from extraction nor the threat of the proposed dam, so in a sense it is politically neutral. There is of course all sorts of potential to publicise this project and make links with ministries and national bodies – for example to talk to *Hrvatske vode* (Croatian Waters) without having an immediately antagonistic agenda. I believe this project has significant policy potential.

There is also potential of more tangible gains. Wetland habitats will be restored and the region's rich wildlife given another refuge; we need to press for implementation of protection, rangers etc. Ecotourism potential – based on the region's nature and culture – could benefit considerably from more natural areas and would augment several proposed initiatives: a wine road in the Bilogora hills just south of here, cycle routes along the Croatian Drava, model ecotourism zones and transboundary tourism networks, as are already being investigated in neighbouring counties.

17. Conservation measures taken:

At present none of the territory in the study-area is protected. However, a nomination to establish a continuous corridor of protected land along the Drave-Mura corridor has been lodged with the Croatian Man and the Biosphere Committee, as the proposed 'Danube–Drava–Mura Biosphere Reserve'. The River Drava and its riparian corridor would form the axis of the Core Zone. The Budakovac oxbow, despite its being surrounded by the village, was also proposed as part of the core zone because of its ecological importance.

18. Current recreation and tourism:

Fishing is still very popular in Budakovac, although we are told that before the Serbia-Croatian war many visitors would also come to the area for its piscatorial delights. The current level of fishing activity is estimated as 'moderate'. Platforms and jetties used by fishermen can be seen standing in the water of the oxbow . In summer, people swim in parts of the lake, but again, this used to be a much more popular activity. The oxbows in our study area which have been so reduced in recent years have obviously declined in their fish populations and fishing potential.

In the summer, children swim in the Zupanijski canal in the villages of Brezovica and Vaska, despite the questionable water quality. The sandy beach at Ricka ada, on the Drava near Sopje, a village on the edge of the pilot site, was very popular for picnics and swimming in the hot summer of 2003 and the national and regional press even carried articles about the recreational popularity of the Drava. However this was very localized and current intensity is also rated as moderate.

19. Jurisdiction:

The Ministry of Agriculture and Forestry, the Ministry of Environment.

20. Management authority:

Hrvatske Vode, the Croatian Waters Company, control all of the waters and wetlands in Croatia. The local director is dipl.Ing Ivan Horvat, Antuna Mihanovica, 33000 Virovitica, Croatia.

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Pilot Site Stakeholder Matrix: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia

Sector	National contacts	Regional contacts	Local contacts
Public sector			
Ministries	Mr Roko Andricevic, PhD, Assistant Minister **Directorate for the Protection of the Environment** Mr Ivan Martinic, PhD, Assistant Minister Directorate for the Protection of Nature Mr Zlatko Uzelac, Assistant Minister **Directorate for Physical Planning** Jasminka Radovic **Ministry of Environment** Zlatko Homen, **Fisheries Department, Ministry of Agriculture** Ivan Katavic Fisheries Department, Ministry of Agriculture Neda Skakelja, Fisheries Department, Ministry of Agriculture	Josip Matancic, Director, regional **Croatian Forestry**	Josip Matancic, Croatian Forestry, Budakovac area Ivan Horvat, **Croatian Waters**, Virovitica
Statutory authorities	Ms Mojca Luksic, **State Water Directorate**	Mario Spajic, Croatian Waters, Osijek	

Sector	National contacts	Regional contacts	Local contacts
		Zvonko Vrkic, **Director of Protected Areas**	
Municipalities		Antun Mihokovic, **Deputy County Governor** Jasna Baranjac-Keserica, **Chief County Planner** Sanja Kicinbaci, Chief, **County Cadastral Office** Mirjana Spehar, **County Environmental Health Authority**	Mr Ivica Kirin, Mayor, **Virovitica city** Mr. Kepec, **Municipality Virkom** Mr. Zagorec, Mayor, **Municipality Gradina** Mr. Pavo Tutanov, Mayor, **Municipality Sopje** **Mr. Rujer,** Department of Rural Economics in Virovitica
Private sector			
Land-users		Ljubomir Slabev, Water Treatment Manager, **Viro sugar factory**	**PIK Agricultural Combinat** Small-scale **farmers**
Water-users		Ivan Burlic, Vice-president, **County Angling Association**	**Drainage contractor**
Tourist operators		Boris Madjarec, **ecotourism consultant** Marijan Peric, **County Tourism Authority**	Mr. Zoltan Barnaki, **landowner/ publican**, Budakovac Mr. Josip Mikolcic, **City Tourism Department, Virovitica**

Sector	National contacts	Regional contacts	Local contacts
Media	Mariana Kranjc **HTV National TV channels**; Vecernji list, Jutarnji list, Vjesnik newspapers	**Glas Slavonije newspaper, Istrian radio station, Pula**	**local newspaper and local radio station of Virovitica**
Civil society sector			
Environmental NGOs		**Drava League** coalition of Croatian NGOs	**'Drava' Ecological Society**, Virovitica Dragan Radovic, Director, **Croatian Ornithological Institute**
Recreational interests/groups			**Villager from Vaska** Mr. Ivica Grgic **"Saran" fishermen's society**
Local community groups and			Duro Kafka, President, **Village Committee, Budokavac**
Academic bodies	Margareta Glancer-Soljan, Professor, Food and Biological Technology Faculty, **University of Zagreb** Milorad Mrakovcic, Natural Sciences and Mathematics Faculty, University of Zagreb Antun Delic, Professor of Biology, **Academy of Philosophical Education**, Zagreb Mladen Kerovec, Professor of Limnology, Natural Sciences and Mathematics Faculty, University of Zagreb		

Pilot Site Gap Analysis: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia			
Attribute	**Obstacle**	**Opportunity**	**Brief explanation**
• **Information**	– – –	+++	At a county level, information has been freely available to us. We have been given copies of the maps of the study area, at no charge, also detailed satellite maps. The local branch of the national forestry authority, Croatian Forestry, has also been extremely helpful, giving us maps, information etc. Other partners who have been supportive with information are the city authorities, county tourist office, staff of the sugar factory Viro, local societies, mayors of municipalities and members of the public, all in their own fields. However at the next level up, the politicians and civil servants, we were less successful at gaining information. The *Zupan,* or governor of Virovitica county, did not attend our meetings, but we heard that as a farmer he recognised the benefits of higher groundwater levels and consequently supported our project. We only managed to contact the local manager, not the directors, of PIK, the large local agricultural company formed out of an earlier collective: thus could not gain much information about fertiliser use, productivity, agricultural plans etc. With the ministries we found people to be personally very friendly, helpful in meetings but thereafter it was difficult for us to follow up on these or to get further information. The biggest challenge is the Croatian Waters Company, who hold all of the technical data which would be needed for Phase 2 of this project; they are also the body which can grant or refuse permission for the physical works of Phase 2 to go ahead. We approached their governing body, the State Water Directorate; who contacted the relevant branch of Croatian Waters (*Hrvatske Vode – HV*) asking for data and their opinions on this project. The response was slow but they did respond and we found some data through other public offices.
• **Policies and Plans**	– –	+++	The physical planning of this study area is entirely within the jurisdiction of the county authorities, who are in the process of re-drafting their development plans to take greater account of nature protection and sustainable development. However they can see the rural development potential in this rehabilitation scheme and welcome any initiative which might help this somewhat remote, depopulating area. However, the final decision will be made by HV who enjoy jurisdiction over all the waters of Croatia. The area is part of the proposed UNESCO Danube-Drava-Mura Biosphere Reserve. First

Pilot Site Gap Analysis: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia			
Attribute	**Obstacle**	**Opportunity**	**Brief explanation**
			nominated in 1997 as a transboundary reserve and accepted at a river-basin level, lack of support at national level halted progress. The new nomination (2003) is for Croatian territories only. So far, the application has been delivered to the Croatian MAB Committee. In the Biological and Landscape Diversity Strategy of Croatia (Ministry of Environment, 2000), the Drava was declared a priority ecosystem; however, implementation lags significantly behind such proposals. Of particular interest will be the agricultural policies as designed for EU membership: given that in Hungary one-third of agricultural land is being taken out of production, how will areas like this be affected, where small-scale agriculture is the main income? The Fisheries Department of the Ministry of Agriculture are interested in developing aquaculture and freshwater fisheries throughout the country. They are currently developing policies and are taking an interest in this project.
• **Laws and regulations to support the changes needed**	– – –	+	
• **Resources and capacities to make the changes needed**	– – –	+/2	HV have all the data, experience and machinery to make the physical changes in this restoration. Their governing body, the State Water Directorate, is beginning to adopt some of the processes of the Water Framework Directive, such as Public Participation; however Croatia is still an EU candidate country and there is no legal obligation on her to honour the WFD. There is a Hungary-Croatia Commission for Transboundary Waters, so the basic framework capacity for IRBM obviously exists, but the deliberations of this body have so far proved inaccessible to the public. A major obstacle is the culture of technocracy which exists among all authorities, ministries and academic institutions. It can be difficult for citizens to access information or people in powerful positions.

Pilot Site Gap Analysis: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia			
Attribute	**Obstacle**	**Opportunity**	**Brief explanation**
• **Stakeholder support for making the changes needed**	– –	+++	Most of the key stakeholder groups are generally supportive of efforts to improve groundwater levels and revive fish ponds. Regional (county) and local authorities favour any initiatives that might help to develop an underprivileged area. However, the local directorate of the water management company has shown itself to be sceptical of non-traditional (technocratic) approaches and methods. Determined and effective lobbying of the water authorities and decision makers at every level (from local to Brussels) is essential.
• **Public awareness**		+++	We have carried out site visits to meet local people, and posted information (a summary of the study and a proposed agenda of the meeting itself) in prominent places and informed the press before the stakeholders' meeting. Press and TV coverage for this meeting was considerable and very favourable.
• **Other site-specific issues**	– –		Our water-quality investigations show that the villages along the canal discharge waste-water into it. This needs addressing. The small-scale farming is of particular importance, in terms of the problem with falling groundwater levels and what policies and opportunities will occur re EU membership and the CAP reforms. A healthy fishing culture could do wonders in stimulating rural development, as seen in Kriznica. The language gap between Hungary and Croatia is large, but in this border area of Croatia there are many Hungarian speakers. On the other side is a village of some 1,500 people which is largely Croatian and bilingual. The border location could be a real asset in attracting foreign tourists. All riverside communities see a bridge across the river as a gateway to success. However practical considerations aside, impacts on nature and society must be carefully considered.

Pilot Site Action Plan: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia

Note: the following table is to be read in conjunction with the explanatory map Figure V. No individual option should be considered as excluding any of the others. Please also refer to: Figure 11, Ecological optimum and Figure 12, Action Plan maps.

Action Plan proposals for Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia			
Proposal	**Spatial scale**	**Timescale**	**Expected benefits**
Proposal 1. A structure in the Zupanijski canal to raise water-levels in the canal, operating so that 50-100% of the water is diverted about 50 metres into the existing channel and wetland south of Podravski Sokolac (Vladimirovac).	Local	Short term	The water would follow a course of about double the present length through this area and the wetland extent would also be much greater. As a consequence, the potential for bio-remediation of these waters is greatly enhanced.
Proposal 1a. The channel from proposal 1 is extended into the existing channel and extensive wetlands which in the past always fed the oxbow in Budakovac.	Local	Short term	As Proposal 1. In addition, about 50% of our fish species need aquatic plants to lay their eggs on. As the Drava has lost many of its shallow and vegetated wetlands, implementation of this proposal could help to restore fish populations.
Proposal 2. A structure is installed at the bridge near Zibina to raise water levels in the canal. 50-100% of the waters are then fed into the existing channel and reed-beds of Marcina jama.	Local	Short term	As Proposal 1.
Proposal 2a. This watercourse is extended into an old branch of the Drava near the existing levee.	Local	Short term	As above, this would also connect the extended channel directly with the Drava.
Proposal 3. A structure is installed and a channel of about 150 metres in length is constructed, so that the reed-beds of the old meander around Zanos can be rehabilitated. This is expected to be the most ambitious of the proposed actions as the Zupanijski canal is so deep here and it will be difficult to raise water levels sufficiently.	Local	Short term	Benefits as Proposal 2a.

Potential additional actions that have emerged following the stakeholder workshop:

Proposal	Spatial scale	Timescale	Benefits
Proposal 4. Construction of a mains water pipeline to the villages of Vladimirovac and Budakovac.	Local	Short term – but this is a new issue and demands much negotiation and further information collection.	The implementation of proposals 4–6 could significantly change life for the better in Budakovac and Vladimirovac through provision of a clean, reliable water supply. However, this proposal must be treated as part of an integrated water management programme for local communities, combining the provision of clean water with environmentally friendly methods of waste-water processing at the same time as protecting local water-bodies, thus leading to significant ecological benefits – which could be translated into economic benefits through sustainable development strategies.
Proposal 5. Construction of a waste-water treatment facility at Budakovac.	Local	Short term – but this is partly dependent on Proposal 4. Nature of facility not yet determined.	Enquiries are being carried out into the small-scale treatment plants available on the market, and the costs of laying sewerage pipes throughout the village. Certain treatment systems are now available which combine traditional methods with bio-remediation.
Proposal 6. Construction of a waste-water treatment facility in the villages of Brezovica, Vaska, Kapinci and Vladimirovac.	Local	Medium term, but the same comments apply as to Proposal 5.	The same applies as in Proposal 5, but the outlay – and the environmental benefits – would be scaled up.

Pilot Site – Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia

Report of Stakeholder Workshop, Budakovac, 10-11 October 2003.

This meeting was planned so as to try and reconcile the difference in availability between the 'officials' (who only wish to attend public meetings during the working week) and the general populace, who are usually only free outside working hours. Accordingly the meeting began at 1200 on Friday October 11th, for the benefit of officials – although the meeting was entirely open to all. We had lunch at about 1400 then continued our discussions. At about 1700 Darko Grlica provided a Land Rover expedition for those people interested in viewing the project site.

By the evening many of the officials had left, but with the help of Goran Safarek and Zoltan Barnaki, some 20 local inhabitants were visited at home and encouraged to come and join us for dinner, take part in the presentation and express their opinions. A lively debate ensued and useful views emerged; we closed at about 2100. The next morning the organisers and presenters assembled again for informal discussions; there were few visitors but those that came were significant: the mayor of Virovitica and a community leader pleading for piped water to his village. Also one of the national newspapers sent a reporter that morning to cover the event: it was excellent and positive report.

The meeting was reasonably successful: at least it went almost exactly as planned, which is quite unusual. We had prime coverage on two national TV channels, and good articles in all the main national and regional press.

David Reeder, Pilot Site Leader

Friday, October 10th

12.00

Opening of the Workshop and presentation of the Project to national and regional stakeholders (Ministry of Environmental Protection and Physical Planning, Croatian Waters, Virovitica County, Touristic Association of Virovitica County, NGO's)

Mr. David Reeder, WWF-DCP – Project Manager and Moderator of the Workshop, opened the workshop and welcomed all participants in the name of WWF.

Ms. Jasna Grlica, NGO "Drava" – Project Expert Assistant, read out the agenda of the workshop. The agenda was adopted by all participants.

Mr. Reeder emphasized the importance of the local community and the participation of local people in this project. The object of this complex project was not only wetland restoration but also revitalization of local communities and people's coexistence with nature. Unfortunately, depopulation is an ongoing process in the project area and it needs to be stopped; one means is through giving people the new idea of improving the quality of their lives in a nature-friendly way. On the other hand, such preserved

nature in this region represents the last remains of the ecological richness of Europe which has been lost in the highly-developed western countries through rapid development during the 20th century, without respect for the sustainability of natural resources. During this period developed Europe lost most of the habitats and species which are still present and vital in the Drava region.

Mr. David Tickner, WWF Danube-Carpathian Programme - Freshwater Team Leader, expressed the apologies of Mr Andy Garner, UNDP Project Officer, for not being able to attend this meeting. Mr Garner had stated his intention to visit the site and meet some of the principal stakeholders in early November. Mr Tickner then presented his role in the project and put it in a Danube-wide context. He informed participants about the two other similar pilot-projects in the Danube basin – restoration of the river Elan in Romania, and restoration of the Olsavica river in Slovakia. He underlined the importance of these three projects as pilot-models for sustainable development throughout the Danube basin.

Mr. Ivan Grlica, NGO "Drava" - local project co-ordinator, reported on the project status and results. He gave a presentation of the collected data: a land coverage map, a land use map, results of a habitats and species inventory, water quality studies in the Zupanijski channel, and groundwater-level studies. He expressed his findings of high biodiversity and a high ecological potential in the project area. He stressed the problems of the project area: deepening of the Drava river-bed and the Zupanijski channel; a lowering of groundwater levels; overuse of artificial fertilizers and pesticides leading to high nutrient levels in the Zupanijski channel; households leaving, the conversion of wet habitats on low fertile soils in depressions into agricultural lands, etc.

15.30

Comments of invited representatives of the County, Touristic Association of Virovitica, Croatian Waters and other invited stakeholders.

Mr. Antun Mihokovic, Deputy Governor of the County, thanked on behalf of Virovitica County the project proposers and leaders for recognizing and giving such importance to Drava river in his County. He couldn't confirm a consensus on the importance of protection and restoration of natural ecological values in Virovitica County, but it was obvious that awareness was rising. He also stressed the problem of depopulation which needs to be solved, together with the fast degradation of natural assets.

Mr. Josip Mikolcic, Director of the Touristic Association of Virovitica County, emphasized the advantages of the diversification of tourism as compared to the process of globalization. Villages like Budakovac represent, in their authenticity, special touristic resources still untouched by the uniformity of the globalization process. Nevertheless, its inhabitants claim to be victims of the process of political transition. He proposed specific forms of touristic promotion which stress the preservation and presentation of natural values. He applied to the scientists and environmentalists to involve themselves in producing popular materials for presenting the natural assets of the region. He also emphasized that the Viroviticka County Spatial Plan has foreseen the protection of the River Drava and includes appropriate nature-protection zoning.

Ms. Jasna Baranjac-Keserica, Head of the County Department for Spatial Planning. According to her words this important meeting promoted the natural values of Virovitica County. Her Department had worked out the County Spatial Plan, the basis for the sustainable development of the County. Environmental protection and tourism were given special chapters in the Plan, and protection of the Drava river forms an important element. She emphasized the joint aim of protection of the environment coupled with stimulating economic growth.

Mr. Mario Spajic, Croatian Waters, Osijek - Water Protection Officer, referred to the lack of information on the project concept, which did not enable Croatian Waters to review the project properly. Croatian Waters are ready to support the project. Today, every project is technically feasible.

Mr. Silvio Brezak, Croatian Waters, Osijek - Water Protection Officer, commented on the problem of the lowering of the Drava water-level. He emphasized that the problem was not completely explored. The Croatian and Hungarian water management companies were completing an Atlas of the Drava River, which would provide information on the causes of this problem. According to his words, lowering of the Drava levels began immediately after the construction of the first hydro-electric power plant in Austria, and will not be stopped until completion of all the planned power plants on the Drava. The recent water-level problem has been more the result of drought rather than human influence.

Mr. Ivan Grgic, of the Community of Sopje, commented on the problem of the permanent lowering of surface and underground water levels.

Mr. Burlic and Mr. Zidak, representatives of local angling associations, supported the project. They were not confident about it being realised, especially where solving the problem of disappearing fish-spawning grounds is concerned.

17.00

Excursion to Zupanijski channel inside the project area by terrain car (Mr. Grlica guided representatives of Croatian Waters – Ms. Marija Jokic, Mr. Silvio Brezak, Mr. Mario Spajic and Mr. Emil Flajsman).

Mr. Grlica pointed out the consequences of the hydrotechnical deepening of the channel and transferring its course, which lowered its water by about one meter, drained the surrounding terrain and lowered the water in local wells. The oxbow lake in Budakovac had lost contact with the Zupanijski channel. A reduced abundance of fish had also been observed in the oxbow.

Mr. Brezak expressed a different opinion on the causes of the evident lowering of water levels in the project area. From his point of view it was mostly the result of last year's drought, which had lowered the water level of the Drava and connected waters in the surrounding area. According to his words the problem would be permanently solved only by completing all of the proposed multipurpose hydroelectric power plants on the still undammed part of the Drava. Unfortunately our Hungarian neighbours and Croatian green NGOs were temporarily slowing down this plan. Mr. Brezak and Mr. Spajic repeated their conviction as to the technical feasibility of these locally beneficial projects of restoration.

Mr. Grlica recalled the project results which, together with the observations of local people, differ from Mr. Brezak's statements. Grlica was convinced that only the return of higher water levels in the Zupanijski channel would bring back water to the dried-up depressions and wells. Mr. Grlica and Mr. Brezak concluded that cooperation between the project team and Croatian Waters was needed for the sake of the benefit of local people.

19.00

Presentation of the Project to local stakeholders and open discussion

Mr. Kafka and Mr. Varga, of Budakovac village, stressed the problem of low groundwater levels. Mr. Varga believes in the touristic potential of the project area.

Mr. Silner, of Budakovac, was disappointed by the rapid depopulation of his village. The project proposal was well defined. Somebody had finally found enough interest to offer a new perspective and new hope to his village.

Mr. Bokunic, village Vladimirovac, gave his absolute support to the project. He was worried about the relationship between politics and reality. Until now, they had been given only empty promises. After a long time they have encountered a proposal for something concrete: thus they must know on what level the project needs the support of local people. They also asked for the support of the project team to solve the lack of a piped water supply to their village.

A group of people from Budakovac were worried about the uncertain future of the oxbow. They claimed that the regulation works on the Zupanijski channel lowered the water level in the oxbow and broke its connection with neighbouring water bodies.

Saturday, October 11th

10.00

Informal discussion with the stakeholders unable to attend to the workshop on Friday

Mr. Ivica Kirin, Mayor of Virovitica, supported the project team efforts to help the local community. In his opinion the whole area could be oriented towards healthy food production (fruit and vegetable growing), which could be the key to a better quality of life for local people. He underlined the importance of keeping the waters unpolluted.

13.00

Workshop closure

Mr. Reeder, Mr. Tickner and Mr. Grlica thanked on behalf of GEF/UNDP, WWF and NGO "Drava" those stakeholders present for their support for the project. They expressed their hope that the project reaches completion, and thus fulfils its potential benefits for local people, for the environment of the Drava river and the whole Danube basin.

Reported by :

Emil Flajsman,

Croatian Waters, Varazdin

Water Protection Officer, Member of ECO EG of ICPDR

Pilot Site Leader's Overall Report: Zupanijski canal, near Budakovac village, Virovitica-Podravska county, Croatia

Background. The Pilot Site was carefully chosen to be 'politically neutral', i.e. the major Drava conservation and sustainable use issues linked to the proposed Novo Virje dam and industrial gravel extraction were not critical in the selected area.

Local project team. We had incredible good fortune in the choice of our local co-ordinator Darko Grlica of the 'Drava' NGO of Virovitica. He improved upon our original choice of site by identifying the nutrient-reduction potential of the atrophied oxbow lakes lying alongside the Zupanijski canal and the link with the waste-waters of Virovitica city and the Viro sugar factory. Our local project team could also see quite clearly the potential in the study area for sustainable development based on natural and cultural assets, for example 'ecotourism'. Grlica is a biologist, his wife a botanist, so they brought a scientific discipline and credibility to our project; but also, surprisingly to me, a political awareness and presence which focused precisely at the local/regional/county level yet with some very useful links to ministries and other national institutions in the capital.

Other members of the 'Drava' NGO' proved very useful in the project : a hydrological contractor, a water analyst, 'networkers', a much-appreciated general factotum. Our GIS contractor is a biologist currently completing his PhD at the University of Osijek; his work needed some corrections but he was not expensive and most importantly, he was available. Goran Safarek of the Dravska Liga provided invaluable support as translator, interpreter and in interviewing local people.

Project progress. There were considerable delays in being allowed to start the project resulting from the political sensitivity surrounding the Drava. Naturally these delays made it very difficult to keep up the enthusiasm of the project team and also to maintain our credibility with stakeholders; so we began some data collection anyway. The Grlicas undertook all of the biological work, habitat mapping and a species inventory; they also investigated potential physical solutions for the rehabilitation work. I undertook a series of stakeholder interviews through interpreters and had numerous meetings with contributors and contractors.

From the beginning we had excellent support from the county authorities. Some weeks earlier, the county governor had declared that their county spatial plan would be amended to incorporate the nature-protection of the River Drava corridor, as called for by the Dravksa Liga in their application to UNESCO to establish a Biosphere Reserve along the river. Following this we received great support from the County Planning Office: we were given maps and hard copies of the latest satellite images of the region. They also carried out some basic GIS tasks for us so that we could present the project in our early meetings. Tony Mihokovic, the deputy governor, has had some training in participatory processes and stakeholder involvement, and sees clearly the path that Croatian institutions must take to align themselves with Europe. He proved to be our most important supporter in the project, effecting many introductions and giving us credibility.

We received huge interest and support from local people, those in the villages especially, from the outset. The latter supplied us with information on the local hydrology and its changes; on changes in the flora and fauna of the area; socio-economic, demographic and historical detail, and suggestions on our wetland revitalization concept. Interestingly, their main priority is the supply of piped water to Budakovac village and this has put pressure on the project design to incorporate this provision and the associated waste-water facilities that this would entail. Negotiations continue on this topic.

At a national level however, there was very little support or interest. In part this is due to 'civil service inertia', which can be very pronounced where political appointments are common. Thus, we entered the Ministry of Agriculture, the Fisheries Directorate: everyone was very friendly, they gave us some data and some English text on freshwater fisheries policy, but then contact ceased, we were never afforded the introductions to the Rural Development Directorate we were promised, a key stakeholder in this project. I simply failed to make contact with the Ministry of European Integration despite several attempts, my time in Zagreb is just too limited. It was not easy to involve the Water Authorities in the project, especially at a local level. Similarly a key figure in the Ministry of Environment declared that he could not attend, nor would he allow anyone else from his office to represent him.

A principal event was the stakeholder workshop in Budakovac village. This focused the issues, the project studies, the possible wetland rehabilitation solutions and brought together the main stakeholders, as well as giving a very open opportunity to local people to take part, ask questions and state their opinions. A separate report is attached, but in general it was a great success, proceeding almost exactly as planned. Another very useful 'node of action' took place during Andy Garner's visit (Item 5, stakeholder consultations folder). We met with the main local and regional stakeholders and the UNDP presence enhanced the credibility of our project, gave me a chance to present the whole project to Andy in context, and to give acknowledgement to those people who had given us so much support.

Agriculture. This is an aspect which did not receive nearly enough attention in the project so far: our project area is 70% agricultural, most of the inhabitants farm small plots or work for the now-privatized PIK company. The smallholders use little agro-chemicals, figures were not available from PIK. But I believe the most important aspect is the changes in agricultural practices that EU Accession will bring. In Hungary, which will join the EU next year, one million hectares, one-third of the country's agricultural land, is being taken out of production: subsidies are on offer and the investigation of alternative land-use – eg forestry, energy plantations, bio-diesel production, leisure uses, aquaculture – is in progress. Similar massive changes are planned in Romania. Thus there is bound to be a profound impact on Croatian agriculture also, especially given the dire rate of return that has prevailed there for some years now.

In terms of our project, one major question is how land-use will change in the project area, how much land will be abandoned for economic or policy reasons. So far I have been unable to consult with the Ministry in Zagreb, and although I doubt that they have a very clear picture, there are some initiatives underway. In the neighbouring county of Koprivnica-krizevci, the production of fruit is being encouraged as a more profitable option than traditional crops; this autumn the first 'Fruit Fair' was held in Koprivnica city, featuring mostly apples. This summer, farmers in Osijek made a mass protest against the water authorities because the severe drought was devastating their crops. A recent meeting has revealed that they (HV) would like to undertake an enormous scheme of irrigation so that local farmers can concentrate on growing high-value fruit and vegetables. I hope to be able to find some official statements on these issues very soon.

Meanwhile, during the stakeholder consultations I was careful not to lead on the issue of 'set aside' of land, as it would effectively be. This is a region where farming has been practised through the generations, it is the socio-economic foundation of local society, and such a concept as giving up the land could have dramatic effects. I judged that it was best not to throw such a radical suggestion into the mix, particularly as there has been no clear guidance from the Croatian government on the matter. This was especially true of the stakeholder workshop, I feel this topic might have derailed the meeting thus I avoided it – and none of the stakeholders raised it either, neither then nor in earlier consultations.

Conclusions.

Methodology

- My opinion is that this process of stakeholder consultation is an excellent method; it is time-consuming and costly, but in principle it can address the needs and opinions of all stakeholders and help to avoid costly mistakes.
- In my experience such an approach needs skilful project management, good communication and interpersonal skills and very effective local co-ordination. I was not able to visit the other pilot-sites in Romania and Slovakia, but I gather that their experiences were similar on these two points.
- However, stakeholder consultation as a process does open up a project to stakeholder concerns and this can divert a project from its original course. For example in Budakovac it was questions of water quantity and water supply that dominated over water quality and policy, the main focus of the DRP.
- The skills and style of the local co-ordinator are critical to the success of such a project, but there is a danger of such a person 'taking over' – ie diverting the project, perhaps unconsciously, towards their own opinions and objectives. Clear project management is essential, and this in turn demands a good connection with the project team.
- A dedicated project leader was lacking. We all work under far too much pressure of course, do far too many jobs. But one person in a key position, say working for WWF-DCP, could have helped things go more smoothly.
- However I personally would have resented too much control of my project, my team, under local conditions; thus a skilful balance would be called for here, someone with the experience to handle it.
- Homogeneity between the projects should be a guide but not an objective, because there are so many profound differences, in culture, history, governance, environmental variables.
- A closer working relationship with the project team from the beginning might have helped to avoid some of the nervousness, uncertainty and delays which affected my project. More trust could have been built up.
- Personnel changes in WWF during project preparation certainly did not help things progress.
- The sub-project title specifically quotes land-use policies and land-use options. Our project opened up a path of wetland restoration, and being a pilot, was allowed to continue along that route. Policy was little explored because of logistical constraints, but also the reasons given above in the project report. I tend to think that this is in itself revealing, that 'no information is in fact information': and that there are no clear policies, certainly not at the critical regional level. Even land ownership and tenure is very unclear. Also, I would question the connection between policy initiatives at ministry level, eg the freshwater fisheries drafts, and what is happening on the ground such as the apparent management co-ordination failure over the Kopacki rit fishponds, or the coming increase of water charges for fishponds.
- A project leader, working from HQ, might be better placed to elicit information from government departments and ministries.
- Of course a project leader would involve extra cost; but then good work takes time and is costly: I myself have logged over 300 hours on the project so far.
- The use of an 'ecological optimum' as a reference condition was derided by my local team, who would have preferred to work with the concept of 'ecological potential'. The former was

regarded as unhelpful, open-ended, unattainable, a fantasy; whereas the latter has some basis of achievability. My co-ordinator actually feared for his scientific credibility over this issue, and would not include the optimum map in the information pack we distributed on CD.

- Similar scepticism was voiced over the use of Ramsar classification as opposed to Corine. This latter system is much more specific and is used throughout Europe, and in particular by the Croatian government. Of course to a non-scientist this system is probably too complex, but we must have scientific input in the project format anyway, so it is not too much to expect that these scientists could deal with this topic and ensure scientific communicability.
- Fortunately I know something about GIS, its uses and potentials etc, because we received very little guidance on this. Guidance was promised – perhaps I missed some vital communication whilst travelling? I made decisions about mapping scales partly from the data available; on details of presentation such as colours, symbols, etc, we made our own choices.

Project findings and status

1. The water treatment plant at the Viro factory works rather well; but there are times when it is not in operation, e.g. for maintenance, and then the untreated city waste is fed directly into the Zupanijski canal by another route. Thus there is a place for backup systems.

2. Also the Zupanijski canal works well as a bio-remediation facility: before the village of Brezovica the aquatic vegetation has removed nitrates and phosphates to the extent that the water tests as Catgory I for these substances. However the villages of Brezovica, Vaska and Kapinci all cause an increase of these nutrients in the canal waters. Local treatment plants would seem to be an answer.

3. Our basic project is practicable. For relatively little cost we could connect a few atrophied channels and raise water-levels in this district. This would have several benefits: nutrient reduction, higher groundwater, restored fishing waters and benefits to agriculture.

4. The Croatian Waters Company has a different viewpoint on the value of the canal; their rationale seems to be to remove waters as quickly as possible. Accordingly they like to clean the Zupanijski canal of vegetation, as we observed during our project researches. This of course reduces the bio-remediation potential and adds weight to our project which would increase this effect.

5. Of all the authorities we consulted, only the Croatian Waters Company (HV) was sceptical. They have jurisdiction over all waters in the country, so their approval of the implementation of the project, Phase II, is critical.

6. HV have a very strong economic position. Water in Croatia is expensive: in Virovitica 7 kunas (about 93 Euro-cents), per cubic metre. Also, HV charges for infrastructural work and maintenance, based on the area of land held or the area of roof-cover.

7. It seems that some authorities regard environmental concerns, even from bodies such as the EU, UN or WWF, as ideologically inimical.

8. The regional level is the place to observe best these processes in action. My contacts at county level tell me that HV people at this level have much power and little accountability. At national level, higher officials in HV and the State Water Directorate seem to realize that Croatia must come into line with European standards and practices, and seem to be ready to negotiate, ready to change.

9. So far I can envisage three scenarios for the Budakovac project:

   (a) HV blocks the project. I don't think this is very likely because of the support at national level. Croatia appears to be an enthusiastic participant in ICPDR meetings and withholding permission for the project would compromise these efforts.

   (b) HV allows the project but insists that they specify the structural work. This could change the nature of the project and may also hold the risk of cost over-runs through over-engineered solutions.

   (c) HV allows the work to be carried out as we specify, but lessens its impact through carrying out other works. Later 'essential works' could divert the water supply and prevent our project from being effective; such things have been done before. In particular, HV is currently considering a massive-scale irrigation provision, between Virovitica and Osijek. This is in response to demonstrations in Osijek last year over a shortfall in water supplies for agriculture.

10. However, despite the power of HV, I believe that it is essential that we proceed with this project – of course in the most circumspect and strategic fashion. One thing that emerged in the stakeholder consultations is that local people have always suffered from being ignored by the authorities or have been given promises which were not honoured. I would not like that to happen in this case and do not want to see WWF and UNDP representing yet more empty promise.

11. We have strategic advantages in proceeding with our project. At a national level we have considerable leverage through ICPDR, WWF and NGO lobbying and through this UNDP project itself: the approach could perhaps be that here is an opportunity for HV to demonstrate their good faith and progressive attitudes to water management, thus defusing some of the criticism they have attracted for destructive actions on other parts of the Drava.

12. At a county level we have considerable support from the county authorities and NGOs, who are beginning to use the new possibilities of public participation as called for under the WFD.

13. A priority for local people which emerged is their appeal for a piped water supply to the villages of Budakovac and Vladimirovac. Apparently this is going to be their gauge on the project. We made no promises on this but lent very sympathetic ears. I am following up on this through the county authorities to see what can be done.

14. This would surely entail waste-water treatment facilities in these villages; at the same time nutrients are finding their way into the canal through waste waters from other villages (Point 2). Thus another potential action which emerges is the possible provision of treatment plants

in the villages of Brezovica, Vaska, Kapinci, Budakovac and Vladimirovac. These could be purely reed or aquatic plant systems, or a combination of these with an appropriate water-treatment technology; this would be dictated by treatment needs and available funding.

15. It is in the nature of oxbows that they silt up with decayed vegetable matter and succeed to drier forms of habitat. In nature, meanders shift and new oxbows are created to compensate for this succession. However in these managed semi-natural habitats it is unlikely that new oxbows will form, so there must be a regime of cleaning planned, as takes place in the fishing-lake at Sopje. This would also act as a 'nutrient harvesting' process.

Postscript, November 21st 2003.

During talks today, Darko Grlica was told that the water pipeline to the villages of Budakovac and Vladimirovac will be going ahead very soon. The cost will be 1.5 million kunas, about € 0.2 million. The tender letters will be opened in early December, work will be carried out early next year. This sudden change on the part of the authorities, we believe, is a major achievement coming from our project presence and the attendance on site of Andy Garner.

This is a very significant step for our project, because as my project report indicates, the support of local people is hinged on whether we can do anything for what they see as their most important need. Obviously we need to keep an eye on the situation, to make sure it does go ahead, and not let up on the pressure, but I think this is a major step forward. The key people have been Darko, Tony Mihokovic, and Andy Garner.

Pilot Site Description – Lower Elan River, Prut River Basin, Romania

1. Name and address of the compiler(s) of this form:

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2. Name of pilot site: Lower Elan River, Prut River Basin – Romania

3. Maps of the site included: See Annex 1 showing the general hipsometric map of Vaslui County (*judet*), Romania at the scale 1:200,000; Annex 2, map of the Lower Elan at scale 1:25,000; and Annex 3, the Elan catchment and the Lower Elan Basin.

4. General location: The Pilot Site is located in eastern Romania, within Vaslui and Galati Counties, in the catchment of the Prut River. The Elan River is a tributary of the Prut River. The Prut is the last first order tribuatry of the Danube river before its Delta. The Prut River is 953 km in length, the first 211 km of the river is in Ukrainian territory and the remaining 711 km represent a natural border between Romania and the Republic of Moldova. The general location of the Pilot Site and the catchment of the Prut River are presented in Annex 2 (Prut River Catchment). The junction between the Elan and Prut Rivers is situated 120 km upstream of the junction between the Prut and the Danube. The Elan river is one of the largest tributaries of the Prut with a length of 73 km and a basin of 601 km^2. The floodplain of the Lower Elan River downsteam of Murgeni village is about 80 km^2, and appears to be a 'natural delta', being less affected by human influence. The main village of Murgeni within the lower Elan basin lies 35 km east of the city of Barlad (Vaslui County) and 90 km north of the city of Galati (Galati County) as measured by road distance.

5. Elevation: The mean elevation of the Prut River basin is 150 m above sea level. The mean elevation of the Elan River is 154 m. The maximum elevation of the Elan basin as a whole is 363m, while the corresponding figure for the lower basin is 172m. The minimum elevation is 10m above sea level at the confluence of the Elan and Prut rivers. The maximum elevation of the wetland in the Pilot Site (i.e. the Lower Elan Basin) reaches 15 m above sea level.

6. Area: The Lower Elan Basin Pilot Site, downstream of the junction between Sarata Stream and the Elan River comprises almost 3,300 hectares, of which 620 hectares are floodplain. At present, permanent wetlands cover 382 hectares (364 hectares of swamp and 18 hectares of water bodies). Within the lower Elan floodplain, on its right side, there are two polders – 'Creteana' (area of about 70 ha and belonging to Vaslui County) and 'Cavadinesti' (area of about 100 ha and belonging to Galati County) which could potentially have a water storage function during extreme flood events. Currently, however, because of the recent drought, these polders are almost completely dry and used for grazing.

7. Overview: The Lower Elan Basin as a whole is a land of contrasts. Green areas are associated with the valley-floor, while the hillsides are pale and brown – being mostly poor-quality pasture with steep slopes. This is a typical steppe area where the floodplain was originally comprised mostly of inundated marshland. Human activity has significantly changed the landscape. Due to economic imperatives in former times, a large part of the wetlands in the area were drained for agricultural use. These changes resulted in a decrease in the area of wetlands and in the abundance of some ecosystem elements. After the political changes of the early 1990s, the drainage system collapsed and is no longer in use. As a result, the floodplain has become drier, the vegetation is species-poor and productivity has declined. However, the area remains relatively natural with extensive reedbeds at the confluence of the Elan and Prut Rivers. At present, part of the land is used for extensive agriculture and the remainder for livestock.

8. Physical features of the Elan catchment:

Surface area: 60,136 hectares.

General geology and geomorphological features.

The Elan basin lies within the Moldavian Plateau of eastern Romania that comprises approximately 25,000 km^2. Clayey-sandy Miocene-Pliocene layers that slope gently towards the south-east have developed from the sedimentary substratum as a result of erosion. Chersonian (upper Sarmatian or upper Miocene) clay and marl and Meotian (lower Pliocen) sandy-clayey strata prevail in the Elan catchment as shown in Annex 4. The local topography shows features typical of a range of rolling hills with average altitude between 100 and 200m (see Annex 5, unit V.2) The steeper slopes, oir cuestas, are north or west facing, as shown in Annex 6.

General soil types are associated with the main zones of vegetation (steppe, forest steppe and forest) as follows: mollisols (chernozems, cambic chernozems and wooden soils).

General land use is presented in GIS format using coloured maps at the scale 1:50,000 (see Annex 7 and GIS files). Tables 1 and 3 also indicate general land use over the entire Moldavian Plateau, where arable is predominant, though note that Table 1 reflects the situation some 30 years ago. It is also important to note that the area given for 'pasture' also includes vacant/unused land.

Table 1. Land use in the Elan basin, Romania 1973-1975

No.	Land use	Surface area	
		ha	%
1	Arable	35,226	58.58
2	Vineyard	4,381	7.29
3	Orchads	173	0.29
4	Pastures	8,806	14.64
5	Woodland	8,397	13.96
6	Swamp	356	0.59
7	Lakes	26	0.04
8	Villages	2,771	4.61
9	**TOTAL**	**60,136**	**100.0**

Table 2 Land use in the Elan Basin – 1997 (Corine Project)

No.	Land use	Surface area	
		Square kilometers	%
1	Non-irrigated arable land	277.41	46.14
2	Broad-leaved forest	108.11	17.98
3	Complex cultivation patterns	69.65	11.59
4	Discontinuous urban fabric	43.27	7.19
5	Natural grassland	34.14	5.69
6	Vineyards	19.14	3.18
7	Pastures	19.05	3.16
8	Fruit trees and berry plantations	13.02	2.16
9	Moors and heathland	7.01	1.16
10	Land principally occupied by agriculture, with significant areas of natural vegetation	5.9	0.98
11	Industrial or commercial units	4.66	0.77
TOTAL	601.36	100	

Climate is temperate continental, with a mean annual temperature of +8.5 to +10.5°C and precipitation between 400 and 550 mm**.** The description of the climate in the Elan River Basin is based on a synthesis of data from meteorological stations in the area.

Table 3 - Extreme and mean values in the Elan River Basin

	Mean monthly values		Extreme values	
	January	July	minimum	maximum
Elan River Basin	-3.5˚C	21.3 ˚C	-30.0˚C	40.0˚C

The annual solar radiation is 110-112 Kcal/cm^2. Mean annual precipitation in the Elan River Basin is 500mm. Long dry periods are normal in the area, especially in autumn. The potential evapotranspiration varies between 600 and 700 mm/year. The average evapotranspiration is limited by water availability. The water deficit is most marked in the floodplains, where the potential evapotranspiration is highest and precipitation lowest. The average water deficit is here about 200 mm/year.

Hydrology: The surface area of the Elan River Basin is 601.36 km^2 and its length is 73 km. The density of the permanently flowing channel network varies from 1 to 7 m/km^2, with an average density of 3 m/km^2. Average water discharge is 0.439 m^3/s for the period 1950-2002 with a peak water discharge of 59.1 m^3/s in late June 1999 (at Murgeni hydrological station). Downstream of the Posta-Elan reservoir the most important tributaries on the right side, are as follows: Căşla (area = 62 km^2, length = 19 km), Oţeleni (area = 28 km^2, length =10 km), Bărboşi (area = 40 km^2, length =17 km), Vutcani (area = 22 km^2, length = 12 km), Urdeşti (area = 45 km^2, length =16 km), Mihona (area =102 km^2, length = 16 km), and Sărata (area = 20 km^2, length =12 km). The main left-bank tributaries are the Hulubăţ (area = 38 km^2, length = 16 km) and Oiţa.

Table 4 - Hydrological stations in the Elan river and the seasonal variations

River	Station	Annual streamflow - %			
		Winter	Spring	Summer	Autumn
Elan	Murgeni	26.80	40.02	21.54	11.64
Elan	Tupilati	26.82	40.19	21.70	11.28

The mean monthly and annual values of water discharge are presented in Annex 8 (Tupilati and Murgeni Hydrological Station data – Excel file).

The climatic factors and geomorphologic conditions are favourable for moderate to severe soil erosion and gully erosion. Observations on sediment transport are usually reported for suspension load. An annual rate of 0.9 kg/s at Tupilati station means 28,382 tons/year transported by the river Elan. Values for suspended load are in the range of 2.0 to 3.5 kg/m^3.

Table 5 Sediment discharge data collected at Tupilati.

River: **ELAN** S.H.: **TUPILATI**

ANUL	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	MED.AN
1975	0.290	0.286	0.238	0.327	17.5	1.54	0.180	0.101	0.027	1.80	0.068	0.130	**1.87**
1976	0.222	0.330	4.29	9.12	0.189	0.021	0.011	0.386	1.20	0.122	0.822	2.59	**1.61**
1977	6.84	1.83	0.112	0.392	0.026	0.184	0.080	0.073	0.027	0.021	0.036	0.025	**0.804**
1978	0.084	0.392	1.14	1.68	5.76	0.185	2.61	1.24	0.022	0.049	0.128	0.426	**1.14**
1979	1.73	0.416	0.135	8.73	0.923	2.14	0.486	0.023	0.034	0.040	0.067	0.052	**1.23**
1980	0.210	0.607	3.99	4.87	0.402	18.0	0.613	0.054	0.008	0.043	0.505	2.07	**2.61**
1981	0.034	2.39	0.596	1.12	4.27	0.584	0.006	0.007	0.164	0.060	0.950	0.984	**0.930**
1982	0.044	0.388	2.13	0.134	0.030	0.046	0.095	0.269	0.024	0.036	0.023	0.086	**0.275**
1983	0.071	0.019	0.029	0.146	0.048	0.029	0.007	0.183	0.003	0.002	0.036	0.012	**0.049**
1984	0.167	0.078	0.508	1.76	0.233	0.102	4.25	0.004	0.046	0.035	0.073	0.042	**0.608**
1985	0.022	0.016	0.516	0.160	0.119	0.652	3.49	0.038	0.005	0.014	0.037	0.044	**0.426**
1986	0.032	0.138	1.14	0.024	0.008	0.017	0.109	0.015	0.005	0.005	0.012	0.004	**0.126**
1987	0.001	0.016	0.077	0.026	0.025	0.066	1.92	0.014	0.001	0.011	0.073	0.072	**0.192**
1988	0.035	2.11	3.43	2.40	15.2	45.0	0.029	0.007	0.051	0.041	0.031	0.132	**5.71**
1989	0.218	0.040	0.063	0.026	0.019	1.44	0.102	0.125	0.496	0.045	0.010	0.010	**0.216**
1990	0.014	0.113	0.010	0.007	0.081	0.523	0.004	0.000	0.001	0.005	0.002	0.012	**0.064**
1991	0.003	0.079	0.080	0.095	7.93	2.31	6.04	3.44	0.044	0.160	0.021	0.004	**1.68**
1992	0.006	0.049	0.177	0.048	0.011	6.61	0.027	0.002	0.006	0.029	0.019	0.029	**0.584**
1993	0.014	0.106	0.977	0.372	0.134	0.781	0.013	0.001	0.016	0.013	0.007	0.123	**0.213**
1994	0.011	0.009	0.003	0.028	0.006	0.020	0.003	0.327	0.002	0.008	0.007	0.004	**0.036**
1995	0.036	0.014	0.011	0.006	0.250	0.033	0.024	0.007	0.342	0.015	0.009	0.008	**0.063**
1996	0.006	0.302	0.912	0.564	0.043	0.014	0.003	0.024	0.383	0.029	0.125	0.062	**0.206**
1997	0.006	0.490	0.051	0.541	0.014	0.044	1.03	0.158	0.049	0.035	0.082	0.535	**0.253**
1998	0.064	0.360	0.048	0.025	0.036	3.52	0.228	0.052	0.006	0.754	0.046	0.004	**0.429**
1999	0.110	0.114	0.427	0.144	0.162	4.14	4.04	0.902	0.680	0.329	0.497	0.650	**1.02**
	0.411	**0.428**	**0.844**	**1.31**	**2.14**	**3.52**	**1.02**	**0.298**	**0.146**	**0.148**	**0.147**	**0.324**	**0.894**

The deep groundwater resources (50-300 m) are evaluated at 2000 l/s. Along the deep valleys in areas of eluvium and colluvial silts, the groundwater depth is at 3-5m, as an irregular layer of insignificant reserves, though there is an important degree of mineralisation. On slopes, with deluviual and colluvial deposits, the groundwater depth is up to 10m. There is a high degree of water mineralisation, giving a brackish taste, as well as high variability in water level and discharge, from one period to another.

In the floodplain, there are some important underground layers at the bottom of the alluvium. These strata bear phreatic water with a high degree of mineralisation caused by sodium, magnesium, calcium sulphates, iron oxides, etc. On heavy soils within the Elan Basin, the water table rises to the surface during wet periods and drops below the river bed in prolonged dry periods. For water supply in the area relies on limited groundwater in combination with regulated surface runoff.

Water quality: The monitoring of surface water quality is performed in the framework of a national programme, at representative points along rivers, according to the Romanian methodology and standards. The 4706/88 standard concerns laboratory analysis of samples and includes three categories of water quality. The first category refers to very clean waters, whereas for indicator values below those of the third category, waters are considered as 'degradated'. Data synthesis is performed at the catchment scale, as yearly books of water quality.

Indicative characteristics of oxygen regime determine the overall quality in the second category of Romanian standards (STAS 4706/88) and the third class is based on "normative regarding objectives and references classes". Mineralization grade it is situated in the first category, while toxic substances and nutrients are situated within the first category and second class of references. These values are listed below: BOD – 7.2 mg/l, COD-MN – 15.7 mg/l, TMS – 551 mg/l, NH_4 – 0.29 mg/l, phenols – 0.001 mg/l, cyanide – 0.001 mg/l.

From a biological point of view, in March the phytoplankton is dominated by diatoms (99% of the total amount) while during the summer the biocenosis is more diverse, dominated by cyanobacteria and euglens species (characteristic for high content of organic substances). As a result, the water clarity (calculated using the Knopp method – saprobic method) was 57.85% (on the scale between 0% – very polluted and 100% very clear, oligotrophic). For zooplankton components of the biotic aquatic ecosystem, the yearly clarity average was 61.04%, in that way the water quality was considered to be in the same saprobic zone as indicated by the phytoplankton analysis). The benthos consists of Trichoptera and Diptera larvae with some leeches (Hirudinea) and Oligochaeta worms.

Three boreholes are used to check the groundwater quality in the area. The frequency of the analysis is four times per year. No boreholes are used for drinking water supply without proper treatment, because the quality is not so good.

Table 6 - Parameters analyzed and concentration for the Elan boreholes

Parameter [mg/l]	concentration [mg/l]			Measured value / Peak tolerable value According to STAS 1342-91			According LMSF 458-02		
Borehole	**F1**	**F2**	**F3**	**F1**	**F2**	**F3**	**F1**	**F2**	**F3**
Conductivity [µs/cm]	5980	5044	819	1.50	1.26	0.20	2.39	2.02	0.33
COD - Mn	6.85	7.65	3.25	2.28	2.55	1.08	1.37	1.53	0.65
Rfix	3307	2790	453	2.76	2.32	0.38			
Ca	96	184	17	0.53	1.02	0.09			
Mg	142	270	25	1.78	3.38	0.31			
Cl	475	843	38	1.19	2.11	0.10	1.90	3.37	0.15
SO4	1305	728	91	3.26	1.82	0.23	5.22	2.91	0.36
NH4	0.235	0.560	0.370	0.47	1.12	0.74	0.47	1.12	0.74
NO2	0.007	0.444	0.007	0.14	8.88	0.14	0.01	0.89	0.01
NO3	12.84	35.97	9.91	0.29	0.80	0.22	0.26	0.72	0.20
PO4	0.251	1.345	0.673	0.50	2.69	1.35			
Fe	3.615	1.630	1.315	12.05	5.43	4.38	18.08	8.15	6.58
Mn	0.360	0.840	0.692	1.20	2.80	2.31	7.20	16.80	13.84

* cells shaded in red exceed the normal values according to Romanian standards

Wastewater from Murgeni enters the Elan giving a water quality of the fifth class. The values are not extreme, but taking into account the fact that the watewater discharges almost equal the discharge of the Elan, a treatment of the wastewater is needed urgently.

Table 7 - The concentrations and values of waste water at Murgeni

Date	6-Aug-97	6-Aug-97	15-Jul-99	22-Jan-01
Discharge	3.14	3.14	3.10	5.00
pH	7.50	7.52	7.76	8.38
Susp	48	45	112	265
BOD	29.60	31.00	133.50	50.80
COD - Mn	37.3	38.9	146.1	75.6
COD - Cr				220
Rfix	603	607	672	845
Cl	53	53	87	102
SO4				78
NH4	10.30	9.70	9.70	29.76
NO2	3.017	5.787	0.110	0.754
NO3	41.60	31.20	4.30	10.11
P	0.260	0.240		1.076
Fe			0.150	5.570
H_2S	0.600	0.700	3.600	4.800
CN				0.0000
Phenol	0.0040	0.0000	0.0120	
Detergent	0.120	0.140	0.345	1.036
Extract. substances	36	26	22	153

There are no important pollution factors except the wastewater from Murgeni village and therefore only one monitoring point was set up (in conformity with the provisions of the European Water Framework Directive 60/2000/EC).

9. Physical features of the site:

Geology and geomorphology have already been outlined above in relation to the Elan Basin overall. The Pilot Site itself is characterised by the outcropping of the slightly mineralised Upper Miocene clays and marls within the foothills. The hills adjoining the floodplain reach between 120 and 150 m a.s.l. Chernozem soils occur on the hillsides, with alluvial soils in the valley floor.

The sediment transported by stream flows generally consists of fine materials and is of natural origin.

Hydrology and water quality are fairly consistent over the entire basin.

The climate is semiarid with annual precipitation of 400-450 mm and an average annual temperature of over 10°C. Flooding typically occurs in spring due to a combination of snow-melt and rainfall.

10. Hydrological values:

The Lower Elan wetlands are very important, not only for people, but also for nature because of their important functions and values. Floodplain can play an important role in flood control. By rehabilitating the floodplain heavy rainfall could be held within the area, reducing flood peaks by slowing down the force of water.

The production function of the Lower Elan wetland is also very important. Water for drinking (people and cattle), small-scale irrigation and groundwater replenishment are desperately needed in the area given that the average water deficit is about 200 mm/year. To provide good quality drinking water resources is a major challenge considering that the three groundwater boreholes cannot be used for drinking water supply without proper treatment. Improving the quantity and quality of surface water supply could therefore make a significant contribution to improving access to water resources for local communities.

In addition the Lower Elan wetlands encourage the deposition of nutrient-rich sediments carried out by the water. This has important benefits further downstream in the Prut and Danube Rivers, through the reduction of nutrient loads, mainly nitrogen and phosphorous from agricultural sources, but also from human wastes and industrial discharges. A part of these nutrients are taken up by wetland/floodplain vegetation and reed harvesting in winter effectively removes them from the system as well as providing important raw materials for local villagers.

11. Wetland Habitat Types according to Annex 1

The clasification of existing wetland habitats types within the Elan floodplain has been carried out using the EU Corine system, taking into account both presence and dominance, as is shown in the tables no 8 and 9 below, with very similar results.

a) presence: in the whole catchment there are 11 habitats according to Corine land cover Project. These are listed by surface importance as follows:

Table 8 – Classification of inland wetlands in the Lower Elan River with links to Ramsar Classification

System	Formation	Habitat type	Ramsar classification
Palustrine	grass-herb	Tall-sedge	Tp, Ts
		Wet meadow and pasture	Sp, Ss, Ts, Va, 4, 9
		Tall-herb floodplain	
		Reed swamp	Tp, Ts
		Aquatic vegetation	9
Riverine	grass-herb	w. sedges	L, M
		w. grasses and herbs	L, M, 4
		w. aquatic plants	L, M

b) dominance:

Table 9 – Classification by dominance rank within the inland wetlands of the Lower Elan River with links to Ramsar Classification

System	Formation	Habitat type	Ramsar classification
Palustrine	grass-herb	Tall-sedge	Tp, Ts
		Wet meadow and pasture	Sp, Ss, Ts, Va, 4, 9
		Reed swamp	Tp, Ts
		Tall-herb floodplain	
		Aquatic vegetation	9
Riverine	grass-herb	w. grasses and herbs	L, M, 4
		w. sedges	L, M
		w. aquatic plants	L, M

12. General ecological features in the Elan catchment:

The main ecological features were analyzed and several main habitats were identified:

Woodland, bushes and forest plantations: the total surface currently covered by the forests accounts for about 10% of the Elan catchment, while forest soils cover some 15% of the catchment, meaning that the present forest represents only two-thirds of the formerly forested area. The biggest surfaces are covered by the Quercetum mixtum association; also Querco robori-Carpinetum and Querco-

petraeae-Carpinetum and a Carpinetum-Fagetum association occur. On the wet valleys a Fraxino-Ulmetum association appears. At the border silvosteppe associations occur on the grey soils. Among the more frequent associations are: Aceri-Quercetum roboris, Corno-Quercetum and Quercetum pedunculifloriae; the transition between these associations and those located on brown soils on the hills is made up of Convallario-Quercetum, Cynancho-Quercetum and Quercetum-Litospermum subboreale. Characteristic for the hilly drought floodplains is Lathyro-Quercetum pubescentis, Querceto-Lithospermetum cotinosum (= Cotino- Quercetum pubescentis), Orno-Quercetum and steppic bushes of Pruno spinosae-Cretaegetum, Crataego-Cerasetum fruticosae and Amygdaletum nanae. Robinietum pseudacaciae is the only anthropogenic, cultivated forest in the catchment.

Riparian floodplain forest, forest floodplain plantation and bushwoods: the actual composition of this vegetation is dependant of human influence and also on relief and climate. Some of the characteristic associations are listed: Salicetum triandrae, Salicetum purpureae, Salicetum albae-fragilis, Populetum albae, Tamaricetum ramosissimae and cultivated association with Populetum marylandicae.

Grassland vegetation (zonal and intra zonal areas): 17 associations were identified, 12 of these belongs to Festuco-Bromnetea Class (zonal grassland) and 5 are part of the Molinio-Arrhenatheretea Class (in zonal areas). With few exceptions, zonal grasslands are located on steppe and silvosteppe areas, on the chernozem (very rare on the grey soils) while in zonal grasslands are located on the large valleys and bottom land on the alluvial soils and very underground humid chernozem. 423 species were identified, 86% have no economic importance, or are toxic/harmful, and only 14% can be cropped – this shows the advanced stage of degradation of the region. The biggest zonal associations is Andropogonetum ischaemi; after that Poetum bulbosae and Artemisietum austriacae associations are present in areas affected by landslides. Intensive grazing, landslides, absence of maintenance works decreased the value of these grasslands to the lowest possible limit. In this way, large areas of grassland have no green crop value, with Euphorbietum stepposae and Ceratocarpetum arenarii species. Some of the areas where grazing is not so intensive are covered by the Medicagini-Festucetum valesiacae; at the bottom of the slopes, where the soil is rich in salts some small areas with Festucetum pseudovinae appears. Hygrophyllous grassland appears in the valleys, depressions and other low-lying places where underground water is very close to the surface. The largest such area supports Agropyretum repentis, Lolietum peronnis, Poetum pratensis, Alopecuretum pratensis and Agrostetum stoloniferae species.

Wetland and marshland vegetation: along the Elan River valley there are limited areas of hygrophyllous and hallophyllous vegetation. 125 species were identified here (forming 28 associations), 38% being eurasiatic, 27.7% cosmopolitan, 20.8% circumpolar, and 10% european (including atlantic species). At Tupilati, the vegetation is represented by the Schoenoplectum tabernaemontani and Bolbochoenetum maritimi associations; on wet salty land a belt with Juncetum gerardi appears, followed by Puccinellietum distansis, Camphorosmetum annuae and some patches with Artemisietum maritimae. From an ecological point of view, 52% of species are hydrophilous and 42% are mesophilous or hygrophilous species.

Vegetation characteristic for salty soils: associations like Obionetum verrusiferae, Camphorosmetum monspeliacae, Bassietum sedoidis, Plantaginetum maritimae are located on the Elan River floodplain, while on the valley sides Juncetum gerardi, Cyrpsidetum aculeatae, Heleochloetum schoenoidis, Iridetum halofilae, Salicornietum herbaceae, Pholiuro-Plantaginetum tenuiflorae, Staticeto-Artemisietum maritime are dominant. From a geographic point of view 31.6% of species are eurasiatics, 22.9% continental and 15.8% cosmopolitan.

Weeds: 304 species were identified among 39 associations. These species show high variability according to biotic and abiotic factors (soil, salts, anthropogenic works, fertilizers and other factors).

Table 10 - Distribution of characteristic species and other species on categories in the Elan catchment:

Habitats	Total number of species	Number of characteristic species	Number of other species
Wetland and marshland	125	Hydrochari-Lemnetea- 11 Potametea – 24 Phragmitetea – 68 Isoeto-Juncetea – 12	aliae classis – 11
Hallophilous (on salty land)	130	Puccinellio-Salicornietea - 84	Festuco-Brometea – 9 Phragmitetea – 13 aliae classis – 24
Grassland	423	Festuco-Brometea – 289 Molinio-Arrhenatheretea - 79	Chenopodietea + alliae classis – 55
Woodland and bushes	459	Qerco-Fagetea 354 + Quarcetea	Festuco-Brometea – 57 Salicetea – 10 aliae classis – 38
Riparian forests	148	Salicetea - 58	Qerco-Fagetea – 36 aliae classis – 54

Romania is a critical transit area for migrating birds within Europe. Romania is crossed by bird populations which migrate mainly through the eastern part of the Mediterranean basin on the following route (in autumn): Greece, Bosphorous, and Nile Valley. The main migration zone of Romania is in the east between the Carpathian Mountains and the Black Sea, Moldova, Dobrogea and the east of Muntenia. This area is used by Red-breasted Goose (*Branta ruficolis*) and the swans (*Cygnus cygnus* and *Cygnus olor*), Black Stork (*Ciconia nigra*), Dalmation and European White Pelicans (*Pelecanus crispus* and *Pelecanus onocrotalus*) and Glossy Ibis (*Plegadis falcinellus*). The Elan catchment includes an internationally recognized Important Bird Area (IBA). 123 birds species have been recorded, with 79 of nesting. 99 species meet the criteria for identification of the IBA.

The most important plant and animal species in the (silvo) steppe zone (according to Haisan E and others, 2000) are listed in Table 11 below.

Table 11 – Most important plant and animal species in the (silvo) steppe zone

Group	Silvosteppe zone	Steppe zone
Herbs	*Festuca valesiaca, F. pratense, Poa bulbosa, Artemisia austriaca, Cynodon dactylon, Agropyron cristatus, Stipa capillata, S. joannis*	*Amygdalus nana, Caragana mollis, Adonis wolgensis, Centaurea orientalis*
Reptiles	*Coluber sauromastes, Coluber jugularis, Lacerta agilis, Eremias arguta*	
Birds	*Perdix perdix, Anthus campestris, Emberiza aurea, Carduelis carduelis, Crex crex, Circus macrourus*	
Mammals	*Citelus citelus, Cricetus cricetus, Spalax microphtalmus, Sicista subtilis, Apodemus agrarius, Microtus arvalis, Orichtolagus cuniculus, Mustela putorius, M. nivalis, Canis vulpes*.	

13. Social and cultural values: Vaslui is a Romanian county (*Judet*) in the Moldavian region with an area of 5,318.4 km^2 and a population of 462,703 inhabitants. The County seat is located at Vaslui (80,041 inhabitants). The main settlements are Vaslui, Barlad, Husi, and Negresti. The total county population is 462,703 of which the economically active population is 202,800 and the urban population 200,547. Population density was 87/km^2 in 2000.

Murgeni commune has around 8,660 inhabitants and a surface area of 13,240 hectares. There are plans to make this a town. There are several villages included within the commune, such as Cirja, Latesti, Schineni, Vadeni, and 23 August. Prior to the revolution of 1990, three agricultural collectives were established in the commune:

- at Cirja (established in 1952) with a surface of 2,274 ha arable land and 710 families;
- at Schineni (1956) with a surface of 1,788 ha arable land and 707 families;
- at Murgeni (1958) with a surface of 1,852 ha arable land and 913 families.

Some livestock farms were also present. Nowadays, all the land and livestock have been privatized and belong to the people themselves. In terms of industry, the commune includes a mill for producing maize and wheat flour, a wine-producing centre and a shoemaker.

Blagesti is a settlement situated in the south-eastern part of Vaslui county. It is a small commune with only three villages and less than 1,500 inhabitants. There are just four telephones available in the commune and these only in public institutions. There is one physician and two nurses in the commune, but they don't have direct phone access. Two public pay phones are installed, one of them in front of the commune hall. Over 300 persons have submitted requests for their own telephone connection. The commune has two schools with 120 pupils and seven teachers. The school has one computer.

Archaeological research highlights that in this county there are a lot of remains from as early as the Palaeolithic. Historical documents show the developement of handicraft activities, the old inhabitants dealt with pottery (Barlad, Oltenesti, Malusteni, Murgeni, Carja) and later in the fur trade and agriculture (see Annex 9, 10 and 11 – maps showing archaeological discoveries from Elan Catchment, Murgeni and Blagesti).

At the northern-most part of Blagesti village (at the confluence of Liscov brook with an adjacent brook) some artefacts were discovered from the periods listed:

- artefact dishes from the La Tene III;
- artefact dishes and pots belonging to 4th, 5th and 7th centuries;
- artefact of houses and tofts from 7th to 9th century.
- In the northern-eastern part of Blagesti it appears that an old church was present and also ceramic artefacts from 8th to 11th centuries were discovered.

In the eastern part of Blagesti, on the Cretana brook ceramic artefacts and old settlements were discovered, characteristic for the 4th and 5th to 13th centuries.

Three kilometres south-south east, artefacts including dishes, chopped bones, ceramics, and cans were discovered, all characteristic of the 4th century.

At the confluence of the Sarateni brook, situated 1.5 km north-east of Blagesti village, ceramics from Hallstatt (maybe La Tene) werefound, some roman remains from the 4th century and also remains from the 6th-7th century (see Annex 11 – Blagesti map village with archaeological discoveries).

This county is a remarkable treasure trove of archaeological finds, ethnographic and folk art values, historic sites and monuments, which attest to the long-term habitation of this area. The Mavrocordat Castle, built in the 19th century, Stephen the Great's Palace, dating from the 15th century, St. John's Church, also founded by Stephen the Great in the 15th century are just a few of the numerous cultural and historic remains preserved in Vaslui county. It is also worth mentioning that the most important towns of this county, Vaslui and Barlad, were raised in the 14th and, 12th centuries respectively.

Vaslui County includes several reserves and monuments of nature:

* Fossil Point-Malusteni (55 km from Vaslui), palaeontological reserve, one of the richest in fossil remains in Romania. It contains numerous fossils of monkeys, antelopes, camels, deer, turtles;

* The Hulubat Sands-Vaslui, palaeontological reserve, fossil fauna from the Pleistocene;

* The Seaca Forest-Movileni (near Coroiesti), forest and botanical reserve.

14. Land tenure/ownership: most of the land is owned by the local inhabitants. There are around 400 landowners in the area. The municipality also has some land holdings but the surface is small compared with the extent of private land.

15. Current and optimum land (including water) use: has been realised in the required GIS format using detailed maps at scale 1:5,000 (see Annex 7 and Annex 12).

Table 12. Present and optimum land use in the Lower Elan Basin, Romania

No.	Land use	Surface area			
		ha		%	
		present	optimum	present	optimum
1	Arable	2,216	2,053	67.2	62.2
2	Vineyard	1	1	0.1	0.1
3	Orchads	–	–	–	–
4	Pastures	386	406	11.7	12.3
5	Un-used land	39	–	1.2	–
6	Forest plantations	–	208	–	6.3
7	Swamp	364	368	11.0	11.2
8	Meadow	265	235	8.0	7.1
9	Lakes	18	18	0.5	0.5
10	Villages	9	9	0.3	0.3
11	**TOTAL**	**3,298**	**3,298**	**100.0**	**100.0**

Under the 'optimum landuse' proposals, forest plantations increase and unused land disappears. 163 ha, representing 5% of the current arable land will become pastures that represent the main area for setting silvic plantations. A network of windbreaks would fit very well the future arable land.

The Murgeni commune has around 8,660 inhabitants and a surface of 13,240 hectares. Because industry is scarce in the area the inhabitants use their land for crops (especially maize and sunflower but also some vineyards) in a non-intensive way and without the help of irrigation (there is no irrigation system in the area). Also livestock (sheep and cattle) belonging to the local population are raised in the area. The cattle are allowed to graze in some areas during the whole year, and after mowing (July-August) are allowed to graze the whole floodplain. The main threats to the Lower Elan wetlands are erosion and sedimentation from the surrounding hills, excessive grazing and lack of natural water regime due to hydrotechnical works. Further more a drainage system installed in the floodplain during the Ceausescu regime led to excessive drainage with negative effects on floodplain vegetation. In case of severe drought (as in 2003) the reedbeds are used as food for cattle. Hunting is allowed in the area in accordance with Romanian norms and poaching occurs in the fishponds that are located at the confluence of the Elan and Prut River by poachers (these fishponds belongs to the AJVPS – Galati County Association of Hunters and Fishermen).

16. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use development projects:

The natural river system has been changed by man in several ways. On the Elan River a reservoir was built (Posta Elan Reservoir). This reservoir was intended to fulfil combined flood protection (buffering water at peak discharges and so mitigating flood waves) and water supply functions. As the combined result of the reservoir and dyke construction along the right bank of the Elan River, this side of the

floodplain is not flooded anymore. Large parts were developed for agricultural use during the Ceaucescu period. The land was levelled and extensive drainage systems installed. After the political changes of the 1990s all three communist collective farms were broken up and the land was reclaimed by the local inhabitants. The former drainage system collapsed and the land is now worked by the landowners themselves.

Soil conservation problems Erosion and sedimentation have been recognized as an important environmental threat in the Moldavian Plateau of eastern Romania. By 1950, the traditional agricultural system on the hills of Romania consisted of up-and-down-hill farming. Most of the land, accounting for roughly 85 percent of agricultural hectarage, was split into excessively small plots, each of less than one hectare in size. Except in a few localised areas, there was no concern about the threat from soil erosion threat and a minimum awareness of conservation practices. After 1950, the area comprising those small plots was turned into collective farms. The remaining 15 percent of agricultural land was also subsumed into state farms.

After several decades of quiescence, many new, innovative research studies on soil erosion control have been initiated. For the nation as a whole, the first priority consisted of implementing one or more conservation practices. By the end of 1989, as many as 2.2 million hectares, equating to 30 percent of the agricultural land with erosion potential, had been adequately treated with conservation practices.

The new property law no. 18/1991 includes two provisions that are not of a nature to create conditions for the extension of conservation measures (Motoc, M., et al., 1992, Nistor, D., Ionita, I., 2002). One of these stipulates that "*the land reallotment must usually be based on the old locations"*. In most cases, this means that the plots will be up-and-down hillside contours, rather than parallel to them. The second refers to "*the successors' right up to the fourth degree"*. Under these circumstances, the rate of land division increased greatly and is higher now than before the Second World War. The major effect of this law is the revival of the old traditional agricultural system, namely cultivation across (up and down) rather than along hillside contours. Another problem over the last decade is that the state ceased funding for soil erosion control and such investment does not represent a priority for landowners. This general situation can be seen clearly in the Lower Elan Basin.

Water use development projects within lower Elan catchment: A significant environmental change in the valley floor of the lower Elan took place after a period of unusually high rainfall from 1968 to 1973. Firstly, a state fishing company, 'Piscicoa Galati', canalised the main water course. By 1982, a dyke of 1.5m in height had been built along the right bank of the canal downstream of the junction between Sarata creek and the Elan River. Progressively, the left side of the floodplain actually functioned as a sedimentation basin. At present, this area is almost filled with very recent sediment. The right side of the valley floor functioned as a meadow and temporary wetland. In the future, the water course will change its route breaking down the remnants of the dyke. As a result, a change in the status of the right- and left-bank floodplain areas is expected.

Floodplain management The present floodplain meadow area is the main source of hay for the local inhabitants and it is therefore unlikely that they will freely agree with the restoration of an unmanaged 'natural' wetland (currently, over 300 owners each have individual plots of 0.3-1.0 ha).

17. Conservation measures taken: until now there is no a relevant protected area status but the downstream area is proposed for specific protection within the Lower Prut River, which will itself be included in the Lower Danube Green Coridor Project.

18. Current recreation and tourism: the Pilot Site is not currently used for recreation or tourism. There are plans for two fishponds (at the confluence of the Elan with the Prut River) to be developed as a hunting area within two or three years.

19. Jurisdiction:

- National Company 'Romanian Waters', Prut Directorate, Vaslui and Galati Branches – responsible for the water courses, also groundwater resources;
- Vaslui Enviromental Protection Inspectorate – responsible for environmental protection;
- County Council – responsible for the management of natural protected areas, international programmes, legislation and policies;
- Murgeni Municipality – responsible for some limited areas of the floodplain;
- Vaslui County Association of Hunters and Fishermen;
- Galati County Association of Hunters and Fishermen – owner of two fishponds (situated at the confluence of the Elan with the Prut River).

20. Management authority:

Murgeni Municipality – responsible for some small parts of the Elan catchment (left side);

Blagesti Municipality – responsible for some small parts of the Elan catchment (on the right side).

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List of Annexes:

Annex 1 – Map of Vaslui County at scale 1: 200,000;

Annex 2 – Map of the Lower Elan Basin at scale 1:25,000;

Annex 3 – Elan Basin and the Lower Elan/Prut;

Annex 4 – Geologic map of the Moldavian Platform;

Annex 5 – The subunits of the Moldavian Plateau;

Annex 6 – Map of the cuestas in the Elan basin;

Annex 7 – Current land-use in the Lower Elan Basin.

Annex 8 – Mean monthly and annual water dicharges at Tupilati and Murgeni

Annex 9 – Map of archaeological discoveries from Elan Catchment

Annex 10 – Map of archaeological discoveries from Murgeni Locality Map

Annex 9 – Map of archaeological discoveries from Blagesti village

Annex 10 – Photographs

Pilot Site Stakeholder Matrix: Lower Elan River, Prut River Basin, Romania

Sector/stakeholder group	National contacts	Regional contacts	Local contacts
Public sector			
Ministries	**Deputy Minister for Water – Ministry of Agricultutr, Forests, Water and Environment (MAFWE)** – Florin Stadiu **Deputy Minister for Environmental Protection – MAFWE** – Petru Lificiu		
Statutory authorities	**National Administration 'Romanian Waters'** – Petru Serban – Gratiela Jula	**Vaslui County** **County Council** – eng. Ion Apostol – eng.Teodor Tarnauceanu – eng. Victor Cosma – Arhip Corina – Alexa M. – Nistor Constantin – Chircu L. **Prefectura** – ing. Eugen Neacşu – Ghinghina Laurentiu **Regional Development Agency** – Manole A. – Balan M. **Environmental Protection Inspectorate** – dr. eng. Râclea Corneliu – biologist Cristina Găgeanu – Olariu Dorina **Chamber of Agriculture** – eng. Ion Dima – eng. Calistru Maria – Vasile Dumitru **Forest Directorate**	**Murgeni Village** – agricultural eng. Berbece Elena – agricultural eng. Berbece Dumitru **Blăgeşti Village** – topographer eng. Matei Jenică

Sector/stakeholder group	National contacts	Regional contacts	Local contacts
		Romanian Waters – Vaslui Branch **–** eng. Gabriel Beşleagă – biologist Dolores Opriță – chemist Moraru Gina – biologist Mihaela Vizureanu **Water Branch Galati** – eng. Ciornei Aurica – biologist Alina Costin	
Municipalities			**Murgeni Mayor** – Veselu Dumitru **Murgeni Vice– Mayor** – Panica Jenică **Blăgeşti Mayor** – Chirilă Alecu **Blăgeşti Vice– Mayor –** Neculai Igescu **Cavadineşti Mayor –** Bouceanu Danuța **Cislaru Dragan** **Members of the Country Council Murgeni:** – Tăbăcaru Vasile – Genete Ion – Vîlcu Aurel – Voiculescu Marcel – Chirica Constantin – Ciorici Emil – Chiriac Gheorghe – Filoti Manole – Axinte Valerică – Blănaru Dinu – Mihai Toader – Carja Neculai – Stratulat Andrei – Mocanu Emil **Members of the Country Council Blăgeşti:** – Stoica Constanța – Partene Ion

Sector/stakeholder group	National contacts	Regional contacts	Local contacts
			– Netcu Vasile – Cotea Iordache – Stamate Mitruț – Pașcanu Tănase – Popa Dinu – Buța Titi – Chirila Vasile – Stratulat Neculai – Chiosa Aurelian
Private sector			
Land–users		**SC Comcereal SA Vaslui – Murgeni unit** – Porumboiu	**SC R – Agro Fălciu SA – Murgeni unit** – eng. Manolache Marcel **Farmers:** **Cârja Village** – Coman Gheorghe – Stratulat Ion – Stratulat Andrei – Mihai Toader – Cîrjă Neculai – Tăbăcaru Vasile – Genete Ion – Chihaie Emil – Mocanu Emil **Blăgeşti Village** – Igescu Neculai – Leonte Toader – Lupu Sofia – Stratica I. Ghe – Luchita Stefan – Ghetau Samoila – Macovei Vasile – Iordan Iftene – Buta Aurel – Giusca Ion – Carp Tache

Sector/stakeholder group	National contacts	Regional contacts	Local contacts
			– Iancu Paraschiva – Gurita Casandra – Cioclu Stefan Gh – Lupu Stefan Neculai – Stratulat Nula – Bertea D–tru – Chirita Ghe – Dorobat Stefan – Trencea C–tin – Dorobat Neculai D – Chirila Pavel – Chirila Ion – Malarau Ilinca D – Apostu Iancu – Stratulat Ion D – Iancu Ilinca D – Carp Maria D – Ivas Luminita – Chirila Costache D – Cioclu Stefan – Doru Aurica – Netcu Aneta – Lupu Cezar – Lupu Casandra – Lupu Rumilache – Chirila V Ghe – Chirila Marghioala – Samson Petru – Carp Alecu – Chirita D–tru – Lupu Gavrilacu
Water–users		**SC Cyprinus SA Vaslui (Fishery)** – eng. Adjudeanu	**SC Cyprinus SA Vaslui** – Toader Marcel
Tourist operators			
Media		**Monitorul de Vaslui –**	
Civil society			
Environmental NGOs		**EcoCounceling Center Galați**	

Sector/stakeholder group	National contacts	Regional contacts	Local contacts
		– Petruța Moisi **Planeta Vie** – Lenuta Tarhon **Organizația Ecologica Montana** – – Ioan Tabusca **Asociația Ion micu Mileniul III** – Liviu Hertanu	
Recreational groups		**Galati County Association of the Hunters and Fishermen – Mata–Radeanu fish farm** – chairman Talpeş Vladimir – eng. Băcescu M. **Vaslui County Association of the Hunters and Fishermen** – chairman	**fisherman** – Dabija Iulian
Academic/educational sector	**Romanian Academy – Agricultural Sciences Department** – Academician Mircea Motoc		**Murgeni School** – Vîlcu Aurel **Blăgeşti School** – Chirica Ecaterina – Chirica Veronica

Pilot Site Gap Analysis: Lower Elan River, Prut River Basin, Romania

Attribute	Obstacle	Opportunity	Brief explanation
• **Information**	–	+++	In general there were no problems in gathering the needed information. In fact, the process of gathering all the necessary information for this study represented a healthy challenge for the all actors. There were good maps of the project site freely available both at the local and regional levels. We have been able to gather all key socio-economic and biodiversity data required without any problem. The county and local branches of National Agriculture and Pedology Authority have been extremely helpful, providing us the requested maps at suitable scales and all needed information. The most useful for us in providing the necessary information about the local agriculture and conditions were the landowners from the Elan basin who really wanted to have meetings with the consultants in the field. Those landowners learned about the challenges and objectives of this pilot project and because of this they were ready to provide us with as many ideas and as much information as possible. The main gap is that much more detailed information is still required on the hydrological functioning of the site. But due to the fact that one of the consultants was from 'Romanian Waters' this gap was easily dealt with by the end of the data gathering phase.
• **Policies and Plans**	– –	+	There is a local land-use plan which prevents new construction in floodplain areas, but this is not enforced. The ecological value of the site is not yet formally recognized in any official policies or plans but this project has served to draw attention to this gap. The traditional water and flood management policies are now gradually being adapted with new, modern approaches, in particular to follow the EU requirements. There are policies and plans to support sustainable rural development and diversification of rural incomes but these are only slowly being developed and deployed. This pilot project site is to be proposed for inclusion in a protected wetland network, in particular in the Prut River region.

Attribute	Obstacle	Opportunity	Brief explanation
• **Laws and regulations to support the changes needed**	_	+	The national laws meant to implement the Water Framework Directive are still under development and need further improvement to meet the reequirements of EU legislation. There are more than 10 directives that have already been transposed into Romanian legislation and which are in progress of implementation, such as: D75/440/EEC – the quality of surface water used for drinking water abstraction, D76/160EEC – quality of bathing waters, D 76/464/EEC – discharge of dangerous substances, D80/68/EEC protection of groundwater against pollution, D78/659/EEC – water quality for fishes, D79/923/EEC – water quality for shellfish, D 79/869/ EEC – analyses of surface water intended for drinking water, D91/676/EEC – protection against nitrate pollution from agricultural sources, D 91/271/EEC waste water treatment, D98/83/EEC and D 80/923/EEC drinking water quality. The new Romanian property law no. 18/1991, amended by the law no. 1/2001 includes two provisions that are not of a nature to create conditions for the extension of conservation measures. One of these stipulates that *the land reallotment has usually to be carried out on the old locations*. In most cases, this means that the plots will be up-and-down hill-slope contours. The second refers to *the successors' right up to the fourth degree*. Under these circumstances, the rate of land division greatly increased and is now higher than before the Second World War. The major effect of this land reform is the revival of the old traditional agricultural system, i.e. farming up-and-down contours. Another problem over the last decade is that the state ceased funding for soil erosion control and such an investment does not represent a priority for landowners.
• **Resources and capacities to make the changes needed**	_	++	There is a strong technical capacity in the local soil and water management. However, a much better experience of Integrated River Basin Management is required and study tours to other sites in the Danube basin are desirable. The equipment needed to carry out ecological restoration is easily available in the region, but there is no money to buy or rent it. This is the major problem.

Attribute	Obstacle	Opportunity	Brief explanation
• **Stakeholder support for making the changes needed**	–	++	Most of the key stakeholder groups are generally supportive of any efforts to reduce pollution, flooding and soil erosion. During recernt years they learned more about environmental protection and its advantages. In the meantime, the local directorate of the water management company is determined to depart from traditional 'drainage, concrete and engineering' methods and to turn towards the new approaches that have the advantage of being simple and ecologically adapted. Through a collaboration between farmers and agricultural and environmental institutions the proposed measures can be achievable.
• **Public awareness**	–	+	Most people living in and around the site itself have heard about our project and are supportive in achieving it. But a few (very few), do not care much about proper soil and water conservation. For them, short-term economic motives prevail over longer-term ecological and conservation considerations. But step-by-step, even these 'problem people' will realize the economic advantages of supporting the project. Greater public awareness will be achieved through leaflets, brochures, and mass-media and will play a very important role in a better understanding of the role/functions and benefits of floodplains/wetlands and the advantages of managing these areas sustainably.
• **Other site-specific issues**	–	+	Since 1978, the Stanca-Costesti reservoir within middle Prut basin has significantly changed the hydrological regime in the lower Prut basin. The flow has been reduced significantly and the sediment content has much increased especially during times of high flow. Some landowners in the Elan floodplain really want to return to the former situation, i.e. prior to embankment of the Elan River, in order to obtain higher yields of hay, especially during drought periods.

Pilot Site Action Plan: Lower Elan River, Prut River Basin, Romania

Proposal	Spatial scale	Timescale	Expected benefits
Proposal 1. *Rehabilitation of the lower Elan floodplain, downstream of the Elan's junction with Sarata Creek:* • Restoration of the former meanders, in particular on the right side of the Elan floodplain; • Planting of native floodplain tree species (*Salix, Populus*) along the banks of the Elan River.	Local	Short term	*Through the rehabilitation of the lower Elan floodplain, in particular through restoring the former meanders on the right side of Elan River, the following benefits are expected:* • Nutrient reduction/retention and recycling through plant filtration and binding; • Flood control (actually the moderation of floods) by increasing storage capacity; • Improvement of local climate (mitigation of heat and drought); • Increased hay yield for local inhabitants; • Greater biodiversity through diversification of habitat and increased habitat quality.
Proposal 2. *Channel re-profiling:* • Dredging of the present channel. • This proposal should be combined with Proposal 1 in order to obtain the best results. • In practical terms, there is no longer any significant risk of catastrophic flooding of the Elan valley due to the Posta Elan Reservoir upstream, which hydrologically controls about half of the Elan River Basin.	Local	Short term	• Increased channel capacity during seasonal floods; • Decreased wetland area (marshes) on the left side of the floodplain. Some people from Murgeni-Carja village, owners of the floodplain in this area, very often complain of too much water on their meadows. Sometimes the land is flooded and it is not possible for them to harvest their grass.
Proposal 3. *Soil erosion control on slopes:* • Changing land use within some areas to favour erosion-reducing crops; • Implementing good agricultural practices; • Implementing land reclamation works on slopes subjected to severe erosion and landslides; • Afforesting so-called 'bad lands' on the slopes;	Local	Medium term	• Decreased runoff and soil loss through implementation of erosion control on cultivated land; • Improved land/pasture quality for local people; • Reduced chemical pollution coming from agriculture (fertilizers, pesticides, heavy metals etc.), in particular from the slopes where the arable lands belong to one important juridical agricultural association by faster implementation of appropriate soli conservation practices (contouring, strip-

Proposal	Spatial scale	Timescale	Expected benefits
• Improving forage production on poor-quality pastures (both eroded and salinized soils) by use of ecologically adapted grass species and rotation/deferral of grazing pressure.			cropping and terracing); • Increased crop yields by maintaining and/or improving soil quality; • Establishing forest plantations, including windbreaks, using native species such as false acacia *Robinia pseudoacacia*, will provide fuelwood for local people.
Proposal 4. *Improving hydrological conditions at Mata Radeanu fishfarm (at confluence of Elan and Prut)*: • Partial restoration of the adjoing dyke along the Elan River to increase water levels in the fishponds. The dyke has been partly destroyed and water levels within the fishpond cannot be maintained at a sufficiently high level.	Local	Medium term	• Greater water storage capacity up to the level of the original fishpond design. • Increased biodiversity (only this year, because of the exceptionally dry season, the water level in the fishponds was extremely low, contributing to the disappearance of several bird and fish species).
Proposal 5. *Declaration of the Lower Elan Floodplain as a protected area*: • Extension to the north of the 'Lower Danube Green Corridor' project area.	National	Medium term	• Increased protection for biodiversity. • Increased status for the area generating potential for increased national attention and greater likelihood of access to international funding support.
Proposal 6. *Public awareness and training of civil society representatives, with special emphasis on local communities and schools:* • Through production of posters, leaflets, reports, interviews, movies and CD-ROMs throughout the project, a comprehensive education and awareness resource will be developed for local communities and schools. • Some office equipment may be purchased. • This component should be integrated into all other proposals as a cross-cutting priority.	Local	Short term	• Increased public awareness of,, and support for floodplain rehabilitation measures and the benefits that will accrue to local communities.

Note: The above proposals could be implemented individually, but it is strongly preferable that they be implemented as an integrated package. All proposals have been discussed with the stakeholders concerned.

Prioritization of proposals for Phase 2:

First priority, Proposal 6 – *Public awareness and training of civil society representatives, with special emphasis on local communities and schools.* **Estimated cost: up to 5,000 Euros**.

Second priority, detailed technical design for Proposal 1 – *Rehabilitation of the lower Elan floodplain, downstream of the Elan's junction with Sarata Creek* and Proposal 2 – *Channel re-profiling.* The ultimate success (or failure) of these two proposals depends on support from the landowners concerned, which can only be secured on the basis of a detailed technical project. This should be produced either by a small local design company or by individual consultants. The technical design should specify the conservation practices to be used to rehabilitate the floodplain under proposal 2. **Estimated cost 5,000 to 10,000 Euros**.

Third priority, implementation of proposals 1 and 2, which involve mainly physical works. **Estimated cost: 25,000 to 30,000 Euros** (possibly more, depending on outcome of technical design phase).

Fourth priority, Proposal 3 – *Soil erosion control on slopes* through forestation of a representative, highly degraded slope. **Estimated cost: to 10,000 to 15,000 Euros**.

Fifth priority: initiation of Proposal 5 – *Declaration of the Lower Elan Floodplain as a protected area*, as a northward extension of the Lower Danube Green Corridor (obtaining of agreements, drafting of a management plan etc.) **Estimated cost: 5,000 Euros** (possibly more).

Total estimated budget for these five priority measures: c. 45,000 to 65,000 Euros

Pilot Project Site: Lower Elan River, Prut River Basin, Romania

Report of Stakeholder Workshop, 5 October 2003, Murgeni Village, Vaslui County, Romania

Objective:

- ***To generate and endorse sustainable floodplain management options including the vision and objectives for the Elan/Prut catchment*** *(see below the Workshop Agenda)*

Participants:

- about 30 people from 45 invitees from different levels, national/governmental, regional, local (see enclosed the list of invitees and participants *):

Conclusions:

- The first day of the trip in Elan/Prut Basin (October 04, 2003) was dedicated to a field trip in the pilot project site, together with the UNDP/GEF 1.4 Project "Core Team" - Andy Gardner (AG) and David Tickner (DT), the National Coordinator - Sevastel Mircea (SM) and two of the consultants: Dan Badarau (DB) from Apele Romane Prut-Iasi and Ion Ionita (IO), an agricultural individual consultant from the University of Iasi. This was a very good exercise before the workshop, in particular for the two UNDP/GEF specialists providing them a better understanding of the pilot project site with their real problems on the ground. During that field trip we had the chance to meet once again with some key stakeholders including fishermen, discussing and seeing with them some ecological reconstruction proposals in the area.

- On October 5, there was held the Stakeholder Workshop with a very good participation as expected, consisting of about 30 people from the total of 45 invitees. Very good presentations of the project were made by the consultants and by Mrs. Petruta Moisi (PM) (from EcoCounceling Galati, about the WFD and Public Participation) including the interactive debates among the all participants as well. The workshop had a real success; the most part of proposed work plan for ecological reconstruction of the Lower Elan River being endorsed by the majority of participants (see the proposed Work plan enclosed). It was agreed by the majority of participants that all the proposals contained in the work plan actually represent a complex project proposal rather than separately actions. The project should be approached as a whole, for the entire Elan River cathment. Only in this situation the success of the project will be guaranteed as a whole.

- It was agreed with the UNDP/GEF representatives that the series of stakeholders' consultation should continue in the future too, in particular on the most important proposals from the work plan, for which the meeting/consultation should take place

right in the field if necessary. A detailed technical project should be developed in the future for those the most important proposals and a financial meeting/consultation with the stakeholders should be held soon in the project area in order to try raising additional funds for the implementation faze.

- Public awareness on wetland restoration issue through different ways such as leaflets, brochures, TV, consultation/debates on this issue etc. will play a very important role in assuring the success of the project! This component should be integrated in each others project proposals or could be much better to put it on the top of the action plan!

- It was also recommended and agreed by the UNDP/GEF representatives that this memo of the workshop including the speakers' presentations (but in Romanian language!) and the Action Plan to be put on the UNDP Web page.

- The main conclusion: this pilot project may have good chances for the implementation due to its importance in the region! By implementing such a project, it could represent an important puzzle component of an already existing large transboundary programme of biodiversity conservation on the Prut River.

AGENDA

09.00-09.15	Welcome remarks: State Secretary for Agriculture/Waters/Environment; Mayors of Murgeni, Blagesti, Cavadinesti Villages; UNDP-GEF/WWF representatives
09.15-09.25	Participant's introduction (All)
09.25-09.30	Presentation of the workshop agenda in relation to the project objectives (Sevastel Mircea -WWF)
09.30-09.45	Some aspects concerning IRBM and WFD-PP (Petruta Moisi – CCE Galati)
09.45-10.15	General presentation of the project and its main objectives: background information of the project pilot site, land-use policy, plans and strategies – threats, impact and pressures to wetlands and floodplain in the area, GIS, sustainable floodplain management options etc. (Apele Romane Prut representatives - Consultants)
10.15-10.45	The current land-use (including waters) situation in the area, ecological optimum conditions for wetland management and nutrient reduction in the area; gap analysis etc. (Ion Ionita - Consultant)
10.45-11.00	Coffee break
11.00-13.30	Interactive discussions to generate and endorse sustainable floodplain management options including a vision and objectives for the catchment (All led by Sevastel Mircea)
13.30-14.00	Conclusions and closing of workshop (All led by Sevastel Mircea)
14.00-15.00	Lunch for the workshop's participants (Offered by WWF)
15.00-17.00	Field trip in the Elan/Prut catchment (All)
17.00	End of workshop and departure of participants

LIST OF INVITEES AND PARTICIPANTS (*)

No. crt.	Name and position	Organization / Affiliation	Address	Presence
1	Petre Daia / Florin Stadiu / Petru Lificiu – State Secretaries	MAFWEP	Bucharest	
2	Valerica Grigoras - expert	MAFWEP	Bucharest	*
3	Petru Serban / Gratiela Jula	National Authority "Apele Romane"	Bucharest	
4	Ruxandra Maxim - biolog	National Authority "Apele Romane"	Bucharest	*
5	Andy Gardner	UNDP/GEF	Vienna	*
6	David Tickner	UNDP/GEF - WWF-DCP	Vienna	*
7	Sevastel Mircea-Nat. Coordinator	WWF-DCP	Bucharest	*
8	Ion Ionita – consultant	A.I. Cuza University	Iasi	*
9	Petru Deliu – director	Romanian Waters -Prut Department	Iasi	*
10	Anca Savin – engineer	Romanian Waters -Prut Department	Iasi	*
11	Dan Badarau - engineer	Romanian Waters -Prut Department	Iasi	*
12	Hermes Clipa - biologist	Romanian Waters -Prut Department	Iasi	*
13	Carmen Gache - biologist	Romanian Ornithological Society	Iasi	*
14	Gabriel Besleaga - director	Water Management System	Vaslui	*
15	Dolores Oprita - biologist	Water Management System	Vaslui	*
16	Tărnăuceanu Theodor - director	County Council	Vaslui	*
17	Ginghină Laurențiu - prefect	Prefecture	Vaslui	*
18	Ion Dima - engineer	County Agricultural Department	Vaslui	*
19	Calota ?	Agricultural Chamber	Vaslui	*
20	Dorobăț Constantin - inspector	Environmental Protection Inspectorate	Vaslui	*
21	Dumitru Veselu - mayor	Village Hall	Murgeni-Vaslui	*
22	Alecu Chirila – mayor	Village Hall	Blagesti - Vaslui	*

23	Jenica Panica – vice mayor	Village Hall	Murgeni-Vaslui	*
24	Neculai Ignatescu – vice mayor	Village Hall	Blagesti - Vaslui	*
25	Bouceanu Danuta - mayor	Village Hall	Cavadinesti - Galati	
26	Adjudeanu - engineer	SC Cyprinus SA	Vaslui	
27	Talpeş Vladimir – chairman	County Association of the Hunters and Fishermen	Galaţi	*
28	Mihai Stefan – vice chairman	County Association of the Hunters and Fishermen	Galaţi	*
29	Petruta Moisi - chairwomen	Eco Counceling Centre	Galati	*
30	Tăbăcaru Vasile	Land owner	Murgeni-Cirja	*
31	Coman Gheorghe	Land owner	Murgeni	
32	Paşcan Tănase	Land owner	Blăgeşti	
33	Partene Ion	Land owner	Blăgeşti	
34	Netcu Vasile	Land owner	Blăgeşti	
35	Stratulat Neculai	Land owner	Blăgeşti	
36	Popa Dinu	Land owner	Blăgeşti	
37	Buţă Titi	Land owner	Blăgeşti	*
38	Mocanu Emil	Land owner	Murgeni-Cirja	
39	Matei Maricel	Land owner	Murgeni-Cirja	*
40	Cazan Petru	Land owner	Murgeni-Cirja	
41	Stratica Ion	Land owner	Murgeni-Cirja	*
42	Chihaia Emil	Land owner	Murgeni-Cirja	
43	Cotea Iordache	Land owner	Blăgeşti	
44	Chiosa Aurelian	Land owner	Blăgeşti	

Pilot Site Description: Olsavica valley, Slovak Republic

1. Name and address of the compiler of this form: Viera Stanova PhD., Heyrovského 6, 841 03 Bratislava, Slovak Republic

2. Name of the site: Olsavica valley, Slovak Republic

3. Map of site included: see separate files.

4. General location:

The Olsavica valley is located in Levoca district of Presov county and lies within the Hornad Basin. The whole district is on the border between Central and Eastern Slovakia, and located in the eastern part of the Levocske vrchy hills, which are part of the Carpathian Mountain range. It is located to the north of the state road from Poprad to Presov, about 20 km from Levoca city.

5. Elevation:

Maximal elevation in the catchment area is 920 m above sea level; minimal is 720 m above sea level.

6. Area:

The total area of the pilot site is 1200 ha. The border was defined based on the boundary of the uppermost catchment area of Olsavica stream, where is one of the spring systems of the Torysa River.

7. Overview:

The project site is located in the village of Olsavica, at the foot of the Olsavica Valley. This village has been subjected to significant flooding at least yearly, with consequent property and personal damage, since the mid-1980s. The flooding is thought to be largely the result of agricultural intensification, during the late 1970s and early 1980s, of the farmland above the village, according to state mandates to increase arable land areas, and hence production. Intensification measures included installation of a dense network of subsurface and surface drainage canals, and removal of the historical terraces and grassland buffers. As a result of intensive drainage, springs and wetlands in upper part of Olsavica valley have been drained and subjected to intensive agriculture, fertilizer and manure use. The most dominant habitat types are spruce forests, grasslands, extensive pastures with European larch (*Larix decidua*) and arable land. The geological structures of the Levoca Mountains mean that the area has an abundant groundwater supply, with the sandstone yielding a number of fissure springs. Wetlands are represented by fragments of submontane and montane floodplain forests (*Salicion triandrae, Alnenion glutinoso-incanae*), fens (*Caricion davallianae*), tall sedges (*Caricetum paniculatae, Caricetum gracilis)* and wet grasslands (*Calthion*).

8. Physical features of the site:

The area has diverse geological structures, Holocene and Paleogene sediments. There are fluvial sediments, predominantly loamy or loamy-gravel along the Olsavica stream. Slopes where the spring wetlands are located are created by deluviums (unspecified deluvial loams and screes). A majority of the area is covered by paleogene sandstones predominating over non-calcareous claystones and conglomerate flysch (Gross et al. 1999).

The main type of soil are brown soils – cambisols, which can be acidic or podzolic. The area is characterized by a predominance of slope soils (more that 12º) that cover more than 73 % of Olsavica valley. Loamy sand soils with middle permeability also dominate, covering 77 %. These are acidic cambisols, with podzolic cambisols also occurring in depressions. Soils with low permeability cover 18 % of the valley and soils with high permeability 5 %. They are used as arable land and grasslands. Quality of surface and underground waters is vulnerable to the influence of agricultural production, especially soil erosion from arable land (Stancik et al., 1996).

The Olsavica stream has not been regulated and intensive down-cutting has caused the stream bed to develop a canyon-like character. The main road of Olsavica village is located on the stream banks and there are several small bridges which lead to problems during summer storms when outflow is slower. The aim of the existing artificial land drainage system in the upper part of the Olsavica river basin was to improve the soil-water regime in this area, thereby allowing fields to be cultivated and planted. Intensification measures included installation of a dense network of subsurface and surface drainage canals, and removal of the historical terraces and grassland buffers. Networked drainage was installed over an area of 182.7 ha and became operational in September 1987. Sandy loam and loamy soils occur on the majority of the drained area. Collection pipes were put in at a depth of 0.9 m to 1.0 m below the soil surface. According to the technical plans for the drainage system, it was designed to have a specific drainage discharge of 0.75-0.9 litres per second per hectare (l/s/ha). A specific drainage discharge of 0.9 l/s/ha across a total area of 182.7 ha is sufficient to increase the flow in Olsavica River by about 0.164 cubic metres per second (m^3/s). This increase in discharge is small in comparison with calculated discharges from the upper part of the Olsavica river basin as a whole. In other words, sub-surface drainage doesn't increase discharge in the Olsavica river significantly and so doesn't increase the possibility of flood formation in the basin (Macura et al. 2002). However, landscape and climatic changes have together caused the rather frequent occurrence of flooding during the last decade. These floods occur in summertime as result of intensive storms. The last flood, which flooded houses located along the stream was in 1998.

Hlavcova et al. (2002) found that the intensity of soil erosion in the upper part of the basin (especially on arable land) for all cultivated crops was higher than the soil loss tolerance of 4 tons per hectare per year ($t\ ha^{-1}year^{-1}$). Therefore, agronomic measures (i.e. strip-cropping) using the protective effect of plant cover to reduce erosion, were proposed. With strip-cropping, row crops and protection-effective crops are grown in alternating strips aligned with the slope contour. Erosion is largely limited to the row-crop strips and soil removed from these is trapped within and behind the next strip down-slope, which is generally planted with lucerne or grass crops. In this case, strips with a width of 80 m were proposed and implementation commenced in 2003.

9. Physical features of the catchment area:

According to the regional geomorphological division (Mazur, Luknis 1980) Levocske vrchy belongs to the Western Carpathians. Levocske vrchy (Levoca Hills) is a mountainous area of northeastern Slovakia built of flysch rocks with a central ridge. The central part of the area is the Levocska vysocina. The central ridge is huge with forks separated by deep valleys. The highest hill is Cierna hora at 1,289 m above sea level. The Levocska vysocina borders the Levocska vrchovina in the west and the Levocske planiny in the south. The relief has an upland character, but also has plateau characteristics.

The whole area has an erosive accumulation relief (profluvial-fluvial hills) with considerable elevation differences. The dominant formation is the erosion relief, which affects the dynamic processes of material flows in the horizon, with substantial and dominant surface outflow of rainwater. This is closely connected with the development of erosion processes, especially during heavy rainfall events.

The climate is cold, mountainous, with average temperatures in July 12 – 16 ºC. Average yearly temperature is 4 – 6 ºC, average temperature in January is –5 to –7 ºC. There are 100 – 140 days without frost and the number of days with a summer temperature over 25 ºC is 0 – 30. Average precipitation is 700 – 900 mm and during vegetation period it is 450 – 600 mm.

The area is covered with spruce, spruce-fir and fir forests. In the north are meadows and forests without permanent settlement. The rest of the area has rural habitations.

10. Hydrological values:

Olsavica valley is one of the spring systems of the Torysa River. Olsavica stream is a right-bank tributary, entering into Torysa River below the village of Nizne Repase. The Torysa River is itself a tributary of the Hornad River, which flows into the Tisza River in Hungary.

The largest regional groundwater supplies have been connected with the upper part of Torysa alluvium. The interactive connection of the surface water between the Torysa River and the groundwater is very strong. The Quarternary sediments are the main groundwater collector and this is the cause of the availability of the large water supply, representing the most important hydrogeological area of this region.

Geological structures of the Levoca Mts. represent another relatively abundant groundwater supply area, where the conditions of the sandstone result in a number of fissure springs. Their water yield is not so strong and discharge is not stable and fluctuating (Himic et al. 1991). On the flysch substrate, there is no compact aquifer developed.

The current conditions of the surface and groundwater resources in these areas are very unstable. This shows that the significant influence of the surface rainfall outflow in this area is very important for the hydrological regime of the streams. During periodic floods, when the altered countryside is not able to retain the rainfall water, significant erosion occurs and the physical water quality of the stream is decreased (Kravcik 1995). Additionally, cooperative farm in Olsavica is using manure under the crops (eg. 500 t per hectare under potatoes).

11. Wetland Habitat Types according to Annex 1

Presence:

A system of riverine wetlands occurs within the pilot site. Tree and shrub formation is represented by willow growth, grass-herb formation with dominance of sedges and grasses and herbs. Palustrine systems are rare and developed on stream alluvium or around hillside springs.

Dominance:

Tall sedges (*Caricetum paniculatae, Caricetum gracilis)*

Wet grasslands (*Calthion)*

Submontane and montane floodplain forests (*Salicion triandrae, Alnenion glutinoso-incanae*)

Fen springs (*Caricion davallianae*)

Bulterbur riverine communities (*Petasition officinalis*)

12. General ecological features:

Forests

Acidophilous spruce forests (*Vaccinio-Piceetea*) are Natura 2000 habitat (code 9410).

The unit comprises climatically conditioned spruce woods distributed in the uppermost montane sites. The soil types are mineral-poor and podzolized. The soils reaction is acid to strongly acid. There is low species diversity in the spruce woods, but the moss layer is species rich.

Submontane and montane floodplain forests (*Salicion triandrae, Alnenion glutinoso-incanae)*

This unit comprises riparian ash-alder floodplain woods and communities of shrubby willows. They occur on alluvia along the middle and upper reaches of rivers, mostly under extreme ecological conditions. Ecologically, communities are waterlogged by groundwater or influenced by frequent surface floods. In Olsavica valley, alder no longer occurs, even though the name of the village is derived from this species. There are only fragments of willow communities left, which are in narrow and discontinuous strips, because the streams have cut deeply into the flysch substrate due to increased erosion. According to the Potential vegetation map (Michalko et al. 1986) on these sites formerly forested by ash-alder, secondary plant communities have developed. These belong to *Petasition officinalis*, which is developed in Olsavica valley, and rarely *Phalaridion arundinacae*.

Grasslands

Carpathian submontane hay meadows *(Arrhenatherion elatioris*) were defined as Natura 2000 habitat code 6510.

Mesophile pastures (*Cynosurion cristati*) were defined as habitat of national importance. This is a typical Carpathian community, used for grazing and hay mowing and is the dominant grassland type in Olsavica valley.

Species-rich *Nardus* grasslands on siliceous substrates in mountain areas (*Nardo-Agrostion tenuis*) defined as priority Natura 2000 habitat 6230*.

Non- forested wetlands

Tall sedges (*Caricetum paniculatae, Caricetum gracilis)*

Caricetum paniculatae is physionomically a very distinct community with tussock sedge dominant. In Olsavica valley it is located in field depressions and springs, on fen soils, quite often those disturbed by cattle. A stable and high underground water level is crucial during the whole year.

Caricetum gracilis is located on shallow depressions along small streams. Short-term floods are typical in the springtime followed by summer drying of the soil.

Wet grasslands (*Calthion)* were defined as a habitat of national importance.

In the past, these grasslands were regularly mowed, but are nowadays unused. They occur along the courses of springs and streams but due to intensive drainage and fertilizer use, the majority of such sites within Olsavica valley are highly degraded. The dominant vegetation type is *Scirpetum sylvatici* and *Cirsietum rivularis* around nearby fen springs.

Fen springs (*Caricion davallianae*) were defined as Natura 2000 habitat code 7230, alkaline fens. Only a few untouched remnants have been protected in Olsavica valley on fen soils. Hygrophilous mosses and sedges dominate and these areas can be found around springs. This is a vanishing vegetation type due to large-scale changes such as drainage and eutrophication. Calcareous fens are the habitat of numerous endangered and rare taxa.

Butterbur riverine communities (*Petasition officinalis*) were defined as Natura 2000 habitat code 6430 – hygrophilous tall herb fringe communities of plains and of the montane to alpine belts. The dominant species in Olsavica valley is *Petasites hybridus* and the community has been degraded by the use of fertilizers and manure, which enter the water courses. This community is developed mainly in the lower part of the pilot site, along Olsavica stream.

13. Social and cultural values:

Olsavica Village is one of the oldest settlements in Spis region. Spis region is an historical territory of Eastern Slovakia, which was constituted as an independent territorial and administrative unit at the end of the 12th century. The first written notes about Olsavica are from 1308 when its church was dedicated to St. Michael. At that time, the village belonged to the Sinray family. Ruthenians settled in north-eastern Slovakia in the 15th and 16th centuries, during the Walachian colonization, most being Graeco-Catholis. In 1700, 348 of Olsavica's 351 inhabitants were Graeco-Catholis. At the beginning of the 19th Century, the land was owned by two large farmers, but in the second half of the century

small, local farmers bought the land from them. The main source of livelihood was agriculture and crafts. Life was difficult at that time and several people left to work to America and many of these never returned.

A cooperative farm was established in 1959 and the majority of local people are economically dependent on it. The agricultural enterprise Olsavica-Brutovce is located in the mountainous region, which is not very favourable for intensive agricultural production. The crop and livestock yields in this part of the country are lower than the average for Slovakia. Hay meadows and grazing pasture are the most suitable (environmentally-adapted) land uses.

The agricultural enterprise Olsavica–Brutovce consists of 2,290.73 ha of agricultural land, of which 1,936.53 ha is permanent grassland. Most of the land remaining is used for intensified production of cereal and fodder crops and livestock (primarily cattle and sheep). The enterprise has also diversified into production of wool products and wood processing.

Erosion is a persistent problem for farming in Olsavica. and the proportion of arable land has decreased as a consequence. The erosion problems are serious one and the management of the cooperative are aware of this situation. The discussion about implementation of new environmentally friendly management techniques has been received positively by the staff of the enterprise, in spite of the fact that this new type of farming is more complicated. One can assume that these territories could be used in future mostly for extensive farming. Conservation of meadows and pasture is important for preservation of landscape and biodiversity.

The daily life of local people is connected with farming. During the recent decades, the village has experienced a considerable decrease in the number of inhabitants. Due to lack of possibility for getting jobs, many young people left to find jobs in neighbouring cities.

14. Land tenure/ownership:

The process of land privatization in Olsavica Valley was initiated several years ago but is still incomplete. Old Hungarian-era laws regarding inheritance resulted in land ownership split among sons. This resulted in fragmentation of parcels into smaller and smaller areas. In extreme cases this means that there might be several hundred owners of just a few hectares. As part of the re-privatization process, many owners have been identified and the land returned, but some owners are uninterested in the land, others are unaware that they have property and others are unknown. Due to 40 years of communist government, there are many gaps in the Land Register, and complete records of land ownership are missing. Currently, a land reform process is underway as a prerequisite to successful EU accession, but its development is very slow, due to the limited capacities of the Land Registry Offices. For the implementation of management and restoration activities the agreement of owners is crucial, though it is at times difficult to identify them. Most of the identified private owners rented their land to the local cooperative and many of them are at the same time working for that cooperative. There are about 320 inhabitants in Olsavica village who are simultaneously land owners and members of local cooperative, and who are economically dependent on farming. The local cooperative organizes an annual meeting with members, where results and plans are presented. Only a few owners, mostly retired people, have asked for their land to be returned so that they can take up individual farming again.

15. Current land (including water) use:

The dominant habitat type is grassland, but only half of this area comprises semi-natural (extensive) grassland, including wet grassland. The other half is intensified grassland transformed by ploughing and the sowing of hybrid seed mixtures. Arable soil covers some 366 ha in total, accounting for some two-thirds of the land in the upper part of the valley. The most frequently cultivated crops are barley, rye, leguminous plants and potatoes. Forest covers 382 ha, being especially common in the lower part of the valley where it represents half of all land cover.

16. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Intensification of agriculture and drainage

One consequence of agricultural collectivization was the removal of terraces and the conversion from small-scale farming into large, intensively managed blocks. Extensive drainage caused wetland loss and intensification of production. Large-scale drainage schemes were completed in 1987. In the early 1990s, the negative effect of agricultural practices culminated in flood damage to Olsavica village. Summer floods resulted in very high erosion.

Tichy Potok dam

Above the village of Tichy Potok a drinking water dam to supply the cities of Kosice and Presov was proposed by the Czechoslovakian Government in 1954, when the State water company, alarmed by the lack of adequate drinking water in eastern Slovakia, proposed construction of a 65 metre dam in the Torysa River, creating a reservoir just west of the small village of Tichy Potok. As the project fell in and out of vogue with the government over the next 25 years, numerous surveys and geographical assessments were undertaken for the project, but no actual construction ever began. The proposed water-supply dam also threatens the livelihood of 5 small villages in the Upper Torysa wateshed (Tichy potok, Vysne Repase, Nizne Repase, Torysky and Olsavica).

The water company's intention to build the dam at Tichy Potok had originally meant the evacuation of these villages, many of them over 700 years old. The villages themselves were in no danger of being flooded, but the livestock and agriculture of residents would threaten the quality of stored water. Living under the threat of forced evacuation and unable to build or expand for over 30 years, the villages were decimated. The number of inhabitants dropped from 6,000 to 1,500 people.

The proposed Tichy Potok dam has generated controversial debate over water resource management for the present and future situation in Slovakia. In 1992, the State water company, with government approval, initiated plans to revive the Tichy Potok dam project. In April 1994, People & Water prepared what they called the 'Blue Alternative' proposal for the citizens of Tichy Potok. The plan suggested a more ecological approach to water management in the region. By constructing an array of small catchment-basins and underground sources, it proposed, the water company could harvest as much drinking water as it needed for one-tenth of the price of building the dam. Both their alternative proposal and the results of a referendum in the affected villages (which indicated 98% of citizens were opposed to the proposed dam) were presented to the government's Ministry of the Environment. On November 15 1996, following massive public protests, the Ministry of Environment adopted a

decision not to build the Tichy Potok Dam. However, in June 2003, a new proposal was prepared for Slovak Government approval to include Tichy Potok dam among projects submitted for post-2005 EU financing. The proponents of the dam have argued that it is needed to solve a shortage of drinking water in the region.

Even though the building of dams is highly controversial in Slovakia and strongly criticised by ecologists, in the case of Olsavica it could have a positive impact. The investor has planned to support local farming to a level of 12 million Slovak Crowns (almost 300,000 Euros) for the improvement of agriculture practices to secure cleaner water for the dam, which is located downstream of the main agricultural area. Houses located on the banks of the stream would be removed and sewage treatment installed.

17. Conservation measures taken:

Olsavica valley is not a protected area in terms of nature conservation. In relation to building of Tichy Potok dam, it was established as water supply protection area – zone A in 1983. Protection in Zone A should have impact on 1,062 ha of agricultural land. Zone B was established in 1993 by decision of Environmental department of District office in Presov and should have an impact on 562 ha of agricultural land. In practice, the cooperative farm does not strictly respect the water supply protection areas, because there is no compensation/incentive for doing so.

18. Current recreation and tourism:

Olsavica and surrounding villages are used for recreation for inhabitants from the several big cities located in the vicinity. They prefer to buy original wooden houses, which are used as weekend houses.

19. Jurisdiction:

- **Ministry of the Environment** is the central body of the State administration for environment, water management etc. The Nature and Conservation Division, responsible for nature protection, and Water Management Division are the most relevant.
- **The State Nature Conservancy** (SNC) of the Slovak Republic ensures the implementation of nature and landscape protection measures according to the provisions of Act No. 543/2002 on Nature and Landscape Protection. SNC is under the competence of Ministry of the Environment. Olsavica Valley is under the first level of Protection, where, for example, for conducting activities such as changing the state of wetlands, approval from the nature protection body is required. The Administration of the National Park Slovensky Raj ('Slovak Paradise') is responsible for protection of the National Park itself, as well as surrounding area enjoying 'first level' protection.
- **Local Water Management Authority of Bodrog and Hornad Rivers** – their involvement is crucial for approval of implementation of wetland restoration measures oriented at improving of water regimes. They are responsible for the management of Olsavica stream, above the village Olsavica, where a smaller part of the pilot site is located. The springs and small streams in the upper, damaged parts of the site are under the competence of Olsavica cooperative farm. From 2003 this agency is under the competence of the Ministry of the Environment's Water Management Division.

- **Local State Administration Offices** (at the district and county levels), through their Departments, have decision-making authority in the field of environment.
- **The Ministry of Agriculture** is the central body of the State administration for agriculture, forests, hunting, and the food industry. It represents one of the most significant partners of the Ministry of Environment in the future development of Natura 2000 and the implementation of agro-environment schemes. The most relevant units are the Division of Structural Policy and Rural Development and the Department of Environment, which have influence over the legal and financial framework in the implementation of agri-environmental schemes. The regional department of the Ministry of Agriculture, which has decision-making powers in the use of subsidies, is located in Poprad.

20. Management authority:

Contact person	Organization	Address	Tel./fax
Democko Mikulas - major	Village Olsavica	053 73 Olsavica	Tel.: 00421534699047
Ing. Belicakova - director	Agricultural enterprise Olsavica–Brutovce	053 73 Olsavica	Tel.: 00421534594211
Mr. Kedzuch – Head of Department	District Office Levoca, Environmental Department	Namestie majstra Pavla 59, 054 01 Levoca	Tel.: 00421534501247
Ing. Melikantova Head of Department	District Office Levoca, Department for Agriculture and Forestry	Namestie majstra Pavla 59, 054 01 Levoca	Tel.: 00421534501218
Ing. Vladimir Kundrat Director	Water Management Authority of Bodrog and Hornad Rivers	Slovensky vodohospodarsky podnik, Medzi mostami 2, Kosice	Tel.: 00421917711367

21. Bibliographical references:

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Pilot Site Stakeholder Matrix: Olsavica valley, Slovak Republic

Sector/interest group	National contacts	Regional contacts	Local contacts
Public sector			
Ministries	**Ministry of Environment of the Slovak Republic** **– Department of Nature and Landscape Protection** (Ms. Anna Jusková) **– Department of Water Protection** (Ms. Eleonóra Bartková) Nám. Ľ. Štúra 1 812 35 Bratislava	**Ministry of Agriculture of Slovak Republic** **– Regional Department Poprad** (Mr. Daniel Rataj) Partizánska 690/87 058 01 Poprad	
	Ministry of Agriculture of the Slovak Republic **– Department of Rural Development and Nature Protection** Dobrovičova 12 812 66 Bratislava	**Agency SAPARD** Masarykova 10 080 72 Prešov	
Statutory authorities	**State Nature Conservancy of the SR** (Mr. Martin Kassa) Lazovná 10 974 01 Banská Bystrica	**State Nature Conservancy of the SR** **Administration of the National Park Slovensky Raj** (Mr. Tomáš Dražil, Ms. Anna Leskovjanská) Letecká 3 052 01 Spišská Nová Ves	

Sector/interest group	National contacts	Regional contacts	Local contacts
	Slovak Water Management Authority Radničné nám. 8 969 39 Banská Štiavnica	**Slovak Water Management Authority, Authority of Bodrog and Hornad Rivers** (Mr. Ján Čabala) Medzi mostami 2 040 11 Košice **Slovak Water Management Authority, Authority of Bodrog and Hornad Rivers regional branch Poprad** (Mr. Stanislav Hresko)	
	State Hydromelioration Company, Vrakunska 29, 825 63 Bratislava (Mr. Boris Minarik)		
Municipalities	**Regional office Prešov** **– Department of Agriculture and Forestry** Požiarnická 9 081 92 Prešov **– Department of Environment** Nám. Mieru 3 081 92 Prešov	**District office Levoca** **– Department of Agriculture and Forestry** (Ing. Alena Melikantová) Nám. majstra Pavla 59 054 01 Levoca **– Department of Environment** (Ing. Katarína Grobárová) Nám. majstra Pavla 59 054 01 Levoca	**Village Olsavica - municipality** (Mr. Mikuláš Demočko - mayor) 053 73 Olsavica
Private sector			
Land-users			**Agricultural farm Olsavica – Brutovce** (Ms. Beličáková) 053 73 Olsavica
Private Companies (Monitoring of biological components for building of Tichy potok dam)	**Pedohyg Bratislava**, ulica A. Plávku 8, 85101 BA, (Ing. Hruzikova)		

Sector/interest group	National contacts	Regional contacts	Local contacts
Media		– **Spišský denník** (Korzár) – Monika Topercerová – **Spišské hlasy** – p. Dubivská – **TV Reduta**, Spišská Nová Ves, p. Baláž – **RádioVýchod Prešov**, p. Slivenský Jozef	
Civil society sector			
Environmental NGOs		**Daphne Institute of Applied Ecology** (Ms. Viera Stanová) Hanulova 5/d 844 40 Bratislava **People and Water** (Mr. Michal Kravčík) Pražská 4 040 11 Košice	
Local community groups			
Academic institutions	Doc. Kamila Hlavcova **Slovak Technical University, Dpt. of Water Management and Landscape** Radlinského 11, block C, 12th floor, 813 68 Bratislava 15		

Pilot Site Gap Analysis: Olsavica Valley, Slovak Republic

Attribute	Obstacle	Opportunity	Brief explanation
• **Information**			There are very good maps and studies of the site available. Detailed studies were made related to the building of Tichy Potok dam and necessary changes towards environmentally sensitive forms of farming, including pedological surveys. The Slovak Technical University, Department of Water Management made four studies for the Grassland Medium Sized GEF project oriented for flood prevention and soil erosion. These are detailed in the overall Pilot Site report. We have been able to gather all of the main socio-economic data required and biodiversity surveys have been completed. There is limited information about fauna of the region. The main gap is that much more detailed information is still required on precise position, contours and slopes of small streams, necessary for location of small dams. There is no information about functioning and efficiency of network drainage.
• **Policies and Plans**			There is a local plan for development of the village, which is a strategic document for years 2003-2006. At a national level, there is insufficient cooperation between the authorities responsible for nature conservation, water use and agriculture. The ecological value of the site is not recognized in any official policies or plans. Water and flood management policies follow traditional 'concrete and engineering approaches' There are no policies or plans to support sustainable rural development or diversification of rural incomes. The area is not included into network of proposed Natura 2000 site.
• **Laws and regulations to support the**			The national laws meant to implement the Water Framework Directive exist only on paper so far and are not even at the early stages of implementation. There is a law that allows farmers to receive compensation for using their land less intensively,

Attribute	Obstacle	Opportunity	Brief explanation
changes needed			but there is insufficient funding available to implement it.
• **Resources and capacities to make the changes needed**			There is strong technical capacity in the local water management institute and in the university. However, there is not much experience of Integrated River Basin Management and it will be necessary to provide capacity building opportunities, including study visits to other sites in the Danube basin. The equipment needed to carry out the ecological restoration is easily available in the region, but there is no money to buy or rent it.
• **Stakeholder support for making the changes needed**			Most of the key stakeholder groups are generally supportive of any efforts to reduce pollution and flooding. However, the local directorate of the water management company is strongly sceptical of any approaches that depart from traditional 'drainage, concrete and engineering' methods.
• **Public awareness**			NGO People and Water made intensive public awareness campaign and hold regular consultations at the local villages, expressing their concerns about the Tichy Potok negative environmental and sociological impact.
• **Other site-specific issues**			People living in the village today were told to drain their land 20 years ago and do not understand why they are being told to reverse all that effort and investment now.

Pilot Site Action Plan: Olsavica Valley, Slovak Republic

Proposal	Spatial scale	Timescale	Expected benefits
Proposal 1. *Building of small dams on selected streams.* Several small streams are deeply eroded due to low retention capacity, which is a consequence of intensification of agriculture. The geological substrate is sensitive to erosion and during heavy rains water is not retained and its speed is high. It is proposed to build four small dams, each 1-2 m in height.	Local – upper part of Olsavica valley	Short term	• Through the construction of small dams the speed of the water will be decreased and soils eroded from the fields will start the process of sedimentation. Due to the presence of fertilizers, more eutrophic, but natural types of wetlands can be developed. Water storage capacity will be slightly increased, soil erosion will be decreased. The local cooling effect of wetlands will be re-established.
Proposal 2. *Reopening of small meanders on the canalised stream*. Above the village is the main canalised stream, which collects surface water from the adjacent sub-basin and underground drainage. Before regulation, there was a meandering stream and one of the larger former meanders is still visible, but water flows directly through the canal and not via the meander. Using simple technical measures, water flow through meander will be restored.	Local – upper part of Olsavica valley	Short term	• By implementation of this measure the velocity of water flow will be decreased. The quality of nearby small-scale wetlands will be enhanced.
Proposal 3. *Restoration management of wet grasslands.* Former wet grasslands have been degraded through drainage and fertilization. Some remnants are still left along small streams or around the sites of former springs, where they are in direct contact with arable land. They create a buffer zone between the arable land and streams or springs. Application of high amounts of fertilizers and manure caused degradation and had an adverse impact on biodiversity. Wet grasslands have not been managed for at least 20 years. Mulching of biomass will be applied in the first year and the cooperative farm will continue regular management (mowing) in subsequent years.	Local – upper part of Olsavica valley	Short term	• Wet grasslands create a vital buffer zone between arable land and streams or springs, leading to a decrease in soil erosion and a reduction in the sediments (and therefore nutrients) entering water courses. • Regular removal of biomass from wet grasslands will decrease amount of nutrients in the soil and streams. • A combination of two factors – the high amount of fertilizers and lack of management is causing eutrophication and having an adverse impact on biodiversity. By introducing regular management, the biodiversity of wet grasslands will be restored and ruderal species will be suppressed.

Proposal	Spatial scale	Timescale	Expected benefits
Proposal 4. *Removal of underground drainage system.* The total area of agricultural land, which is influenced by underground drainage, is 183 ha. We have no information about functioning and efficiency of drainage network. On appropriate locations for creation of small scale wetlands, drainage network could be blocked.	Local – upper part of Olsavica valley	Long term	Creation of small-scale wetlands, which will help to balance water regime in summer time and increase retention capacity. Wetlands can operate as a nutrient sink and have a cooling function during summer.
Proposal 5. *Soil erosion control by planting of wood species on the steep banks of streams.* There is increased erosion on the banks of some streams located in the slopes. Native tree species will be planted on such disturbed places.	Local – upper part of Olsavica valley	Short term	By planting of native tree species soil erosion will be decreasing, banks will be stabilised and quality of water will be improved. According to Potencial vegetation map, along the streams the woody vegetation was developed. Currently, there are almost no trees in upper part of Olsavica Valley. Village Olsavica got name according to alder tree. Currently, there are no alders growing.
Proposal 6. *Fencing of springs to prevent damage from grazing.* In the lower and central part of Olsavica valley, some well-developed spring wetlands are still present. The area is used by cattle grazing and springs are used as a source of water. Cattle are causing damaging of wetlands. Simple wooden fences will be built to protect these wetlands.	Local – lower and central part of Olsavica valley	Short term	By building of fences water pollution, eutrophication and disturbance of wetlands will be decreased.
Proposal 7. *Promotion of restoration activities.* Implementation of proposed measures may serve as an example for restoration and implementation of sustainable land-use and water management in mountain areas. Information leaflets will be printed in Slovak and English, for dissemination of project results in Slovakia, as well as in all Carpathian and Danubian countries.	National scale International scale	Medium	Dissemination of project results

Prioritization and draft budget for implementation in Phase 2

First priority Preparation of technical feasibility studies **Estimated cost 10,000.- USD**

Technical studies are required for: the location and structure of small 'gabion' (rock-filled basket) dams, for the reopening of meanders, and for more fully understanding the functioning of the underground drainage system to propose sites for blocking. When a technical plan has been completed and agreed with stakeholders, it can be implemented at low cost by local people.

Second priority Implementation of measures **Estimated cost 20,000.- USD**

According to the findings of the technical feasibility studies, it is anticipated that Proposals 2 to 6 will be implemented in the following order: 2, 3, 5, 6, 4. It is estimated that realisation of Proposal 4 (Removal of underground drainage system) would require additional resources over and above the USD 20,000 indicative budget. Proposal 7 (Promotion of restoration activities) will be carried out as a cross-cutting measure within other proposals.

Third priority Monitoring of water and biota **Estimated cost 10,000.- USD**

Fourth priority Management and reporting **Estimated cost 10,000.- USD**

Pilot Site: Olsavica Valley, Slovak Republic
Report of Stakeholder Workshop, 20 October, Levoca

Participants:

UNDP/GEF 1.4 Project 'Core Team': Ivan Zavadsky, Dave Tickner, Jan Seffer, Jasmine Bachmann.

National Team:
Viera Stanova, Rastislav Lasak, Stefan Maglocky, Tomas Drazil.

National Stakeholders:

Adriana Klindová (Ministry of the Environment, member of Eco-Expert group of ICPDR), Boris Minarik (State Hydromelioration Company), Jan Mikulasovic (Ministry of the Environment, Section for Waters).

Local Stakeholders:

Anna Leskovianská (State Nature Conservancy of the Slovak Republic, Administration of National Park Slovenský raj), Democko Mikulas (major of Village Olsavica), Anna Belicakova, Michal Gorbar (Agricultural farm Olsavica – Brutovce), Melikantova Alena (District Office Levoča, Department for Agriculture and Forestry), Stanislav Hresko (Water Management Authority of Bodrog and Hornad Rivers, branch office Poprad), Zuzana Cihrayova (Water Management Authority of Bodrog and Hornad Rivers, branch office Kosice), Daniel Rataj (Ministry of Agriculture of Slovak Republic, Regional Department Poprad), Samuel Pacenovsky (NGO Sosna - member of DEF)

Media:

Rastislav Ovsona (Slovak Press Agency SITA), Svjatoslav Dohovic (Pravda Daily newspaper), Pavol Sveton (Radio Slovakia), Lubica Drutarovska (Regional branch of Slovak radio), Jozef Slivensky (Radio Vychod), Maria Simonakova (Spisky dennik), Angela Svitekova (Hospodarske noviny), Marcel Blahut (Local Television Reduta)

Objectives:

- to inform about previous activities oriented to grassland restoration and decreasing of soil erosion
- to inform and discuss new UNDP/GEF project focused on integrated assessment of land-use, policies, and land-use options for wetland restoration

Press Conference

A press conference was organized before the start of the meeting. Ivan Zavadsky, Jan Seffer, Mikulas Democko and Viera Stanova were present. There was a good participation of media – eight different journalists, including press agency, daily newspapers, radios and local television.

Conclusions:

Overall, the meeting was very constructive with good discussion of the proposed measures. The invited stakeholders were mainly representatives of organizations, which have decision-making power, so discussion was specific and technical. The following issues were discussed in detail:

Local removal of underground drainage for small scale spring restoration

Mr. Minarik (State Hydromelioration Company) believed that the drainage system may still be functioning because it was only installed in recent decades. The State Hydromelioration Company is responsible for maintaining drainage systems in an operational condition, even though the cooperative farm Olsavica-Brutovce is the owner of the drainage system. Drainage systems and canals are under the responsibility of the State Hydromelioration Company. Technical solutions to prevent the system from functioning are quite easy and the State Hydromelioration Company has relevant experts who could prepare a technical study for the project. In any case, the State Hydromelioration Company wishes to become a project partner. Mr. Gorbar (Olsavica – Brutovce agricultural enterprise) was afraid that through removal of the whole drainage system the farm would lose a high proportion of its arable land. It was agreed that a technical study will be made first, and proposals for blocking of the drainage system will be based on the locations of former spring systems where wetland vegetation is still present, or in depressions, where the location of wetlands would be naturally suitable.

Building of small dams

Technical details, functions and operations of small dams on streams were discussed. Mr. Minarik (State Hydromelioration Company) pointed out that building of small dams may increase retention capacity of the landscape, but that this will not solve the problem that the village has with floods. According to him, extreme flash floods are caused by extreme precipitation and the landscape is simply unable to absorb water. He believes there is no solution for such flooding and is skeptical about the results of experts from the Slovak Technical University, which has proposed measures for the creation of grassland strips would increase protection of the village against extreme floods. It was stressed that flood prevention is not the principal aim of the project, but that it may be an important additional benefit. Mr. Hresko mentioned, that if small dams are to be built, technical details should be discussed with the Water Management Authority of Bodrog and Hornad Rivers.

Technical plan for implementation of proposed measures

The Water Management Authority for the Bodrog and Hornad Rivers are responsible for maintenance of all canals and streams, which are registered in the State Cadaster as water courses. A Technical Plan for Implementation of Proposed Measures should be prepared in close cooperation with the Water Management Authority of Bodrog and Hornad Rivers and the State Hydromelioration Company. Their approval is crucial for implementation phase, as is approval by Levoca District Office, Environmental Department.

Use of EU Structural Funds

It was recommended, that the project could help the cooperative farm Olsavica-Brutovce to make an economic analysis of possible transformation from intensive landscape use to a more extensive system. If they were to select key measures under a Rural Development Plan, this could be economically beneficial for them. So far, they have no vision and a lack of information.