



DRA-MUR-CI: *Drava-Mura Crossborder Initiative*

Project brochure



Foto: Bojani Origi



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 Maribor, Slovenia**



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 and sustainability
 Graz, Austria**



**Office of the State Government of Styria
 Department A13 Environment and Spatial Planning
 Graz, Austria**



**Provincial Government of Carinthia, Department 8,
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Dramurci

THE DRA-MUR-CI PROJECT

Drava-Mura Crossborder Initiative

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Publisher: Ministry of Agriculture and the Environment of the Republic of Slovenia,
Environment Directorate / Department of Waters

Electronic edition
Ljubljana, Slovenia, 2013

Editing: mag. Tanja Kocjan Stjepanovič, Zavod Prava poteza
Design: Ljiljana Sušnik, CwIT
Cover photo: Bojan Orgl

CIP:



OBJECTIVE 3 – EUROPEAN TERRITORIAL COOPERATION OPERATIONAL PROGRAMME SLOVENIA-AUSTRIA 2007-2013

THE DRA-MUR-CI PROJECT *Drava-Mura Crossborder Initiative*

Project Name: Drava-Mura Crossborder Water Management Initiative (DRA-MUR-CI)
Lead Partner: Faculty of Civil Engineering, University of Maribor
Project Coordinator: Prof dr. Renata Jecl
Project No.: 4300-270/2008/
Project Duration: 01.04.2009 – 30.06.2013
Project Budget: 3.500.000 EUR

Project partnership:

- Lead Partner: Faculty of Civil Engineering, University of Maribor
Maribor, Slovenia
- Partner 1: Office of the State Government of Styria
Department A14 Water management, resources and sustainability
Graz, Austria
- Partner 2: Office of the State Government of Styria
Department A13 Environment and Spatial Planning
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- Partner 8: DRAVA – Water Management Company, Plc.
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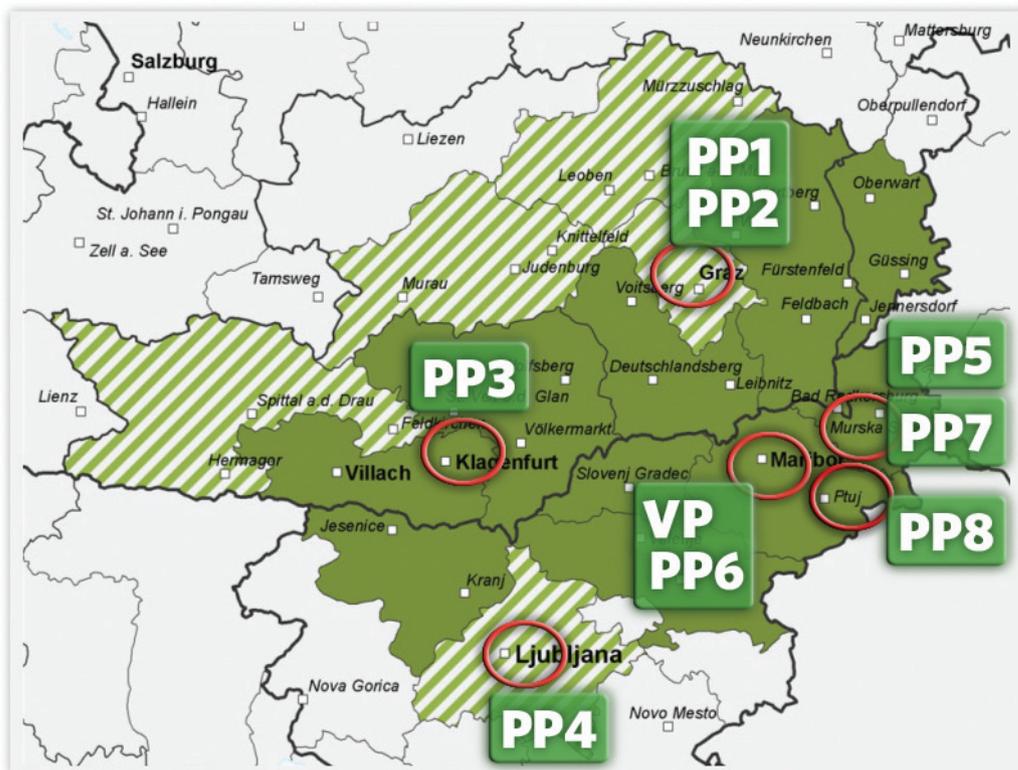
CONTENTS

INTRODUCTION	7
INFORMATION ABOUT THE PROJECT	8
The issues and objectives of the project.....	8
Project activities.....	9
WORK PACKAGE 1 – INTERNATIONAL PROJECT MANAGEMENT AND COLLABORATION BETWEEN PARTNERS	11
Main results:	11
WORK PACKAGE 2 – FLOOD MANAGEMENT AND FLOOD RISK REDUCTION	13
Flood Scenario Catalogue	13
Flood protection measure studies	13
Flood information platform	13
Main results	14
WORK PACKAGE 3 – SEDIMENT TRANSPORT	17
Monitoring of the bed load and suspended load transport on the Drava and Mura	17
Modeling of the suspended load transport in the hydro power chain of the Drava (Carinthia).....	17
Main results	17
WORK PACKAGE 4 – ECOLOGICAL STATUS OF WATER AND ADJACENT HABITATS	21
Monitoring Mur	21
Monitoring Drau	21
Ecological investigations in the scope of flood protection projects Rosegg	21
Main results:	22
WORK PACKAGE 5 – IMPLEMENTATION OF MEASURES - PILOT PROJECTS.....	26
IMPLEMENTATION OF MEASURES AT THE RIVER MURA.....	26
Measure Sieldorf	26
Measure Trummer-Lahn	26
Measure Gosdorf	27
Widening of the river channel at »11-mill channel« and »Vizjak channel«	27
Widening of the river channel and connection with »Alter graba« geavel pit	27
REALIZATION OF MEASURES AT THE RIVER DRAVA.....	27
Measure Malečnik	28
Measure Celestrina	28
FLOOD CONTROL DAMS BAD RADKERSBURG	28
Main results:	28
WORK PACKAGE 6 – DISSEMINATION AND PUBLIC ACTIVITIES	32
Project meetings and workshops with public participation	32
Project portal www.dramurci.eu	32
Presentations and publications.....	32
Flood scenario catalogues.....	32
Main results:	32
CONCLUSION AND RECOMMENDATIONS	37

INTRODUCTION

The project »Crossborder water initiative for the Drava and Mura« with the acronym DRA-MUR-CI, was selected in the framework of the Operational Programme Slovenia-Austria 2007-2013 ([http://www.si-at.eu / start_sl /](http://www.si-at.eu/start_sl/)). It is located in the 2nd priority programs, whose main objective is to achieve sustainable and harmonious development. It is a strategy of sustainable and balanced development stemming from the potential of the regions, which can be (further) used in a sustainable and responsible way to improve the quality of life for present and future generations. Since the program area the Operational Programme has a relatively well preserved environment, rich biodiversity and valuable natural resources, the conservation of resources necessary is necessary to promote sustainable and responsible use of resources. This should include existing knowledge and skills of participants in cross-border areas and to support the protection of biodiversity and the preservation of ecosystems. The project DRA-MUR-CI highlights opportunities for cooperation and finding solutions in areas of common water management, specifically for the Drava and Mura, in collaborative solutions and actions to prevent flood risks and prevent the loss of biodiversity and the issue of the decline in the number of species and habitats which are constantly under threat.

The project was carried out in the period from April 1st, 2009 until June 30th, 2013 and involved 9 partners from both countries.



General map of the program area with the seats of the participating partners

INFORMATION ABOUT THE PROJECT

The internet site www.dramurci.eu includes most information about the project and its results.



Introducing project website DRA-MUR-CI

The issues and objectives of the project

The aim of the project is integration of water management in the area of the largest rivers (Drava and Mura), which are shared by Austria and Slovenia, in accordance with the two EU Directives: Water Framework Directive (WFD) and Flood Directive (FD). While the first directive is relating to the design and manufacturing programs, public participation and the good condition of the river basin, the second directive deals with the flooding problems taking into account the objectives of flood management, flood risk management plans and the establishment of floodplains. Within the project we have produced flood scenarios catalogues that include hydrologic and hydraulic analysis. Designed catalogues serve as a tool for competent institutions in the decision-making process where pre-calculated hydrologic and hydraulic (1D/2D) conditions permit prediction of flood events and the proper and timely action for protection and rescue forces. Hydraulic studies have also been done for the flood protection of certain areas. On the Drava these areas are River Rosegg and Lavamünd in Austria and Malečnik and Duplek in Slovenia. Hydraulic analysis of the marginal section of the river Mura from Šentilj to Petanjci, focusing on the design of flood protection measures for Bad Radkesburg and Gornja Radgona was also performed. An important outcome of the project represents informa-

tion platform on flooding, which is an online platform that brings together information about the floods on the rivers Drava and Mura. The project is addressing also the problem of sediment transport in both rivers. For this purpose, a number of sites, both in Slovenia and Austria, were established where the measurements have been carried out to carry out the correlation between the flow rate and the amount of suspended material. Monitorings of fish, birds and insects have also been accomplished to determine the impact to the ecological status of the two rivers and the state of their habitats. One of the project aims was to prevent further erosion of the river Mura, protecting a stable river bed and to increase the level of groundwater, as well as establishing a network of river sections with sand dunes enabling the sustainable natural and dynamic development of the river, which was carried out in certain sections of both Austrian and Slovenian side. The project has also established a project web portal www.dramurci.eu where all information about the project in the different languages and three levels of content to the public, experts and project partners can be found. Also the trilingual glossary (SLO-DE-EN) of terms related to water management and content of the project was made.

Project activities

DRA-MUR-CI project activities include a coherent cross-border development and support measures for the protection of people and the environment from natural disasters and improving the living environment of people, flora and fauna. In a series of six work packages common standards and information-based technology for flood protection and exchange of experience at the professional level will be established. There are two essential tasks for the project:

1. An in-depth development of the field of management and cross-border cooperation, including an understanding of the flood development and flood risk, the control of the sediment and bedload. Based on the scientific data analysis and information platform about the floods we can improve the system of warning and informing citizens, civil protection and upgraded bilateral warning and action plans.
2. River regulation and flood protection measures by re-evaluating the nature and habitat of both rivers and integrated action in the form of pilot projects on the river Drava and Mura.

The primary beneficiaries of the project results are the bodies responsible for water management and civil protection on both sides of the rivers. The final beneficiaries of project results will be residents of the river basin of the Drava and Mura, whose goal is to live in a safe environment with an efficient use of resources in accordance with the general concept of water management, which is also known as the public trust doctrine. General public will be informed of the risks, hazards, flood protection, and warned of the possibility of flooding. The project results will be used by specific government agencies, public agencies and operators of hydroelectric power plants. The main value that is achieved through cross-border cooperation in the DRA-MUR-CI project stems from the fact that water management and efficient management of the basin can only be achieved if both countries are involved and considering all parts of the river. Cross-border cooperation is the inevitable approach to achieve coordinated planning and implementation of measures in the riverbed.

WP1	<i>International project management and collaboration between partners</i>
WP2	<i>Flood Management and Flood Risk Reduction</i>
WP3	<i>Sediment transport</i>
WP4	<i>Ecological status of water and adjacent habitats</i>
WP5	<i>Implementation of measures - pilot projects</i>
WP6	<i>Dissemination and public activities</i>

Project work packages

WORK PACKAGE 1 – INTERNATIONAL PROJECT MANAGEMENT AND COLLABORATION BETWEEN PARTNERS

WP1 Leader: Faculty of Civil Engineering, University of Maribor
WP1 Coordinator: prof dr. Renata Jecl

Each work package was led by a specially designated partner; out of six work packages three were led by Slovenian and three by Austrian partners. They coordinated activities within the work package among all the partners who were involved in this work. Coordination of the entire project was done by the LP (Faculty of Civil Engineering, University of Maribor). The lead partner reported to the Joint Technical Secretariat (JTS) on activities and costs of the project, supervised the project partners in the implementation of activities, took care of the repayment and payment of ERDF funds and organized meetings of the coordination group of the project (Steering Committee). Management of the partnership, inter alia, included a detailed periodic reporting on the progress of the project and the use of financial resources and the coordination of the project in terms of changes of the set of initial work plan and spending. Due to the current financial crisis, the savings and the transfer of responsibilities project was faced with a big challenge because one of the partners in the project (almost completely) withdrew. This has led to a redistribution of tasks and financial resources, and the inclusion of two new project partners. Due to unforeseen natural events, a request to extend the project for an additional three months was approved.

Main results:

- Organization and execution of the Project Steering Committee meetings (Gornja Radgona - 13.12.2010; Apače - 19.05.2011; Apače – 15.02.2012; Maribor – 17.12.2012).
- Presentation of the project and its results (DEM - 10.12.2009; Mišičev vodarski dan 2009, 2010, 2011, 2012; VI. Konferenca slovenski arhitektov in gradbenikov iz sveta in Slovenije, Bohinj, 20. - 21.10.2010; Mednarodna konferenca o Dravi, Dravograd, 30.9 – 1.10.2010).
- Successfully carrying out the Managing Authority's control of the project DRA-MUR-CI, on 12.11.2012 at Lead Partner and in Sieldorf.
- Monitoring the implementation of activities by work packages.
- Monitoring the expenses of the project (for partners over the years, after the reporting periods in each category).
- Preparation of claims for reimbursement of eligible costs of the Lead Partner, consisting of financial and substantive part.
- Provision of adequate accounting track and archived documents related to the project.
- Preparation of appropriate documentation for changes in the project (the entry of new partners, change the names of the partners, changes in the cost categories for individual partners, changes in responsible persons, business data, etc.).

*Managing Authority
Control at University
of Maribor*



*Kick-off Meeting
on Sept. 25th 2009
in Maribor*



WORK PACKAGE 2 – FLOOD MANAGEMENT AND FLOOD RISK REDUCTION

WP2 Leader: Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo
WP2 Coordinator: prof. dr. Franci Steinman

Flood Scenario Catalogue

The preparation of the Flood scenario catalogue represents an important part of activities in the Work Package 2, as the area of the Drava forms with its tributaries a complex system of flood management and flood risk mitigation. The Flood scenario catalogue includes hydrological and hydraulic analysis of the Drava river and the tributaries Gail, Gurk, Karavanke tributaries, Lavant, Meža and Mislinja. The established flood scenario catalogue serves as a tool for the competent institutions in the decision making processes. Furthermore, the pre-calculated hydrological and hydraulic (1D/2D or 2D) scenarios can be used for proper forecasting of flood events and for timely actions of the protection and rescue forces.

Flood protection measure studies

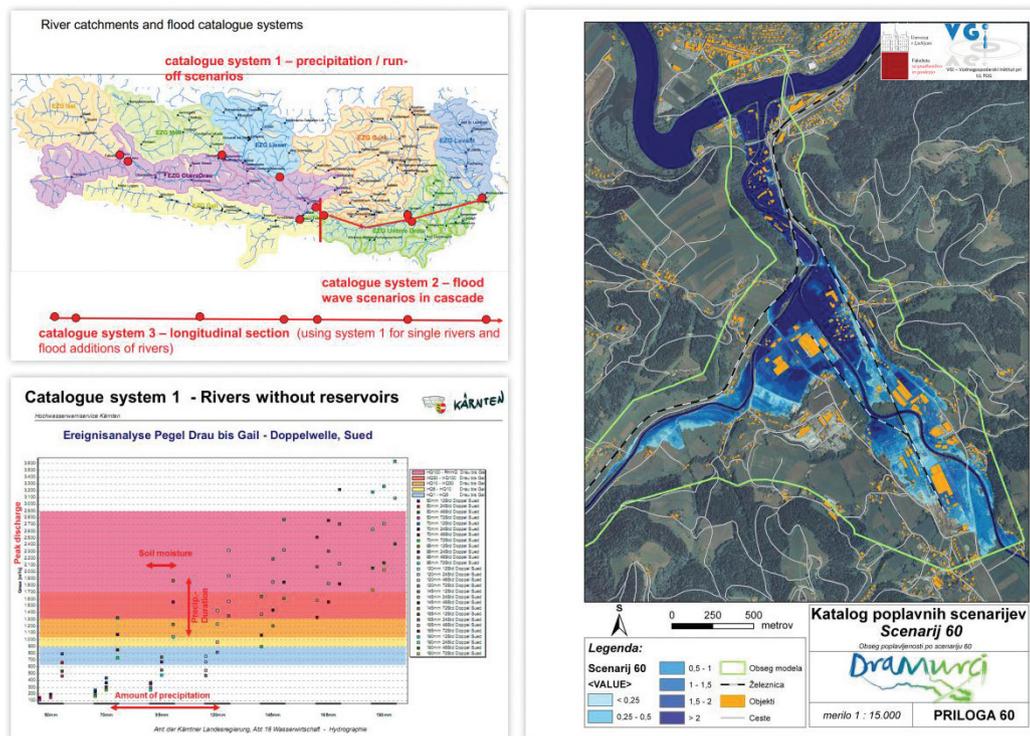
The studies of flood protection measures included areas of different Drava and Mura reaches. On the river Drava, the following areas were analysed: Rosegg and Lavamünd on the Austrian side and Malečnik and Duplek on the Slovenian side. Established hydraulic analysis (1D/2D) served as technical support for the planning of flood protection measures (flood protection embankments). Also, a hydraulic analysis of the border reach of the Mura river from Šentilj until Petanjci was carried out. Within this analysis a special emphasis was placed on the design of flood protection measures in Bad Radkersburg and Gornja Radgona. The implementation of technical measures required coordinated cross-border cooperation in accordance with the Austrian and the Slovenian legislation. Furthermore, the integration of professional and local community was necessary in the process of promulgation.

Flood information platform

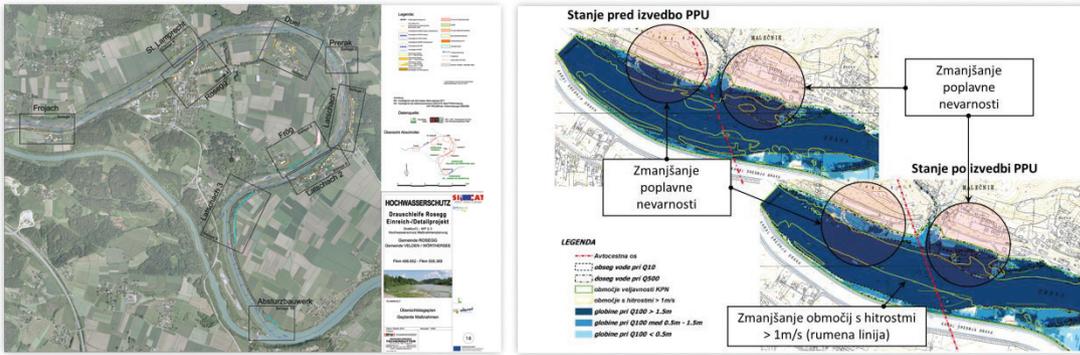
The Flood information platform is designed as a web-based platform which includes information on the current flood conditions on the two rivers Drava and Mura. The platform connects the Slovenian and the two Austrian professional services of the regional governments (Carinthia and Styria), as it combines data about the actual river state and the forecasted state for a particular area of the rivers Drava and Mura and therefore offers effective information to the public. Furthermore, it provides information and flood warnings for both professional as well as the general public. The flood information platform also includes a trilingual dictionary that provides professional terminology related to the topic of flood hazard.

Main results

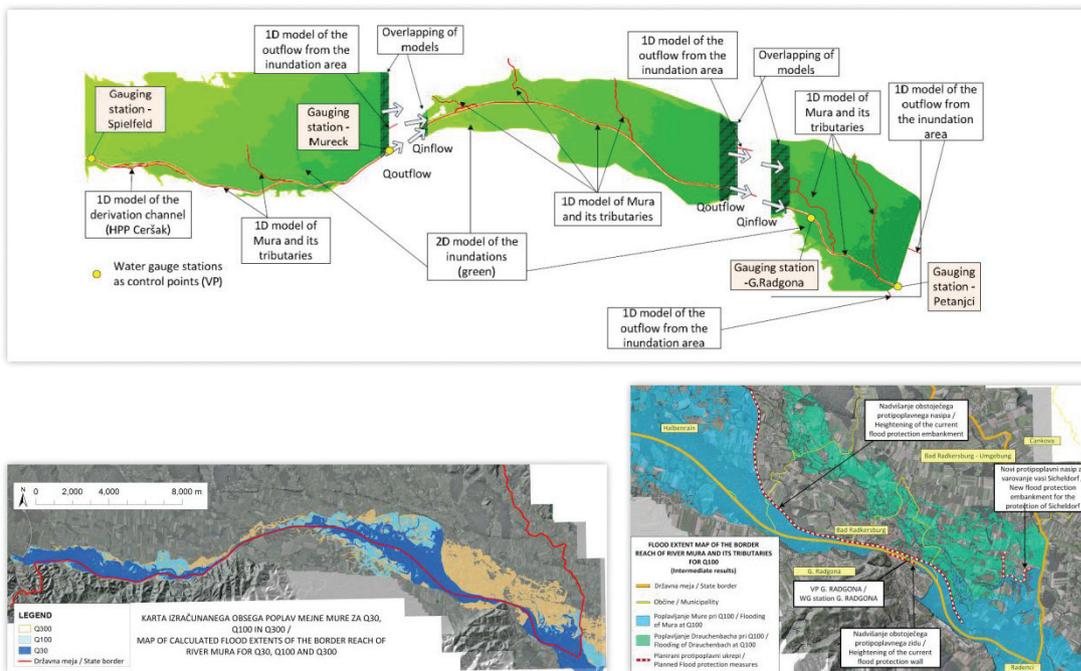
- Flood scenario Catalogue – Flood Forecast – 1. Part of the Manual – Tributaries without the Hydropower Plant chain of the Drava River
- Flood scenario Catalogue – Flood Forecast – 2. Part of the Manual – Hydropower Plant chain on the Drava River
- Flood scenario Catalogue - Meža, Mislinja, Drava
- Hydraulic model of the border reach of the Mura River
- Planning of the flood protection technical design in Bad Radkersburg/ Gornja Radgona
- Technical support and flood protection measures for Lavamünd, Rosegg – Drava
- Technical support and flood protection measures for Malečnik, Duplek – Drava
- Flood information platform



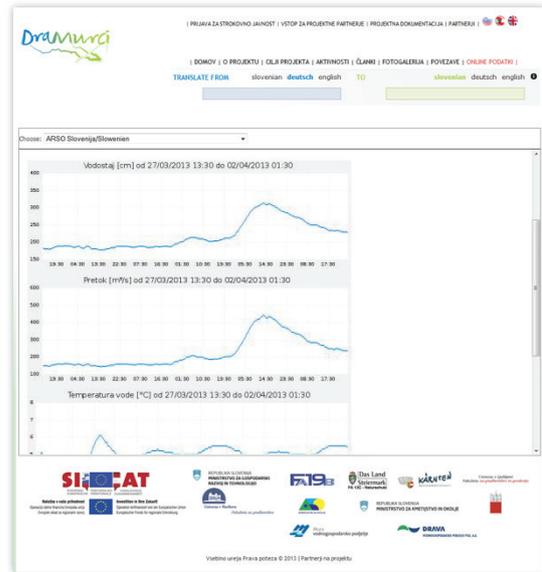
Flood scenario Catalogue for the river Gail (Austria) and for the rivers Meža and Mislinja (Slovenia)



Technical support and flood protection measures on the river Drava for Rosegg (Austria) and Malečnik (Slovenia)



Technical support and flood protection measures on the river Mura for Bad Radkersburg (Austria) and Gornja Radgona (Slovenia)



Flood Information Platform – SLO/AUT connection

WORK PACKAGE 3 – SEDIMENT TRANSPORT

WP3 Leader: Provincial Government of Carinthia, Department 8, Environment, Water and Nature protection

WP3 Coordinator: Dipl.-Ing. Johannes Moser

Monitoring of the bed load and suspended load transport on the Drava and Mura

The suspended load transport on the river Drava in Carinthia was measured between the years 2009 and 2012 at six measurement stations. The measurement has been done continuously at different discharges using turbidity sensors in combination with hand samplers for calibration.

The measurement results have been analyzed to point out the correlation between the discharge and the sediment transport.

On the Slovenian side of the Drava, the suspended load transport has been also measured and analyzed at three stations. In order to compare and harmonize the methods, two common measurements have taken place in both countries.

Similar measures have also been taken on the Mura river at three measurement stations – two in Slovenia and one in Styria.

Furthermore, the development of a restored river section at the Mura near Gosdorf has been monitored by means of bed load transport.

Within this work package the development of a diverted river section after sediment digging has also been documented. This river section is located between Malečnik and Duplek in Slovenia.

Modeling of the suspended load transport in the hydro power chain of the Drava (Carinthia)

The results of the suspended load measurements integrated with cross section surveys and the surveyed underground of the Drava reservoir at the Feistritz/Ludmannsdorf (Kärnten) served as a basis for a simulation model. This model was calibrated using the data of the flood from November 2012. It can be used for modeling the suspended load for different discharge and flood waves. The simulation aims to optimize the sediment transport within the hydropower chain of the Drava river.

Main results

- More state of the art stations for measurement of suspended load transport on the Drava river in Carinthia, and at the bordering Mura were set up. The stations will be operated also after the end of the DRA-MUR-CI project.
- Reports about the correlation between (flood-)discharge and suspended load transport within the hydro power chain of the Drava and the Mura river (»Grenzmur«), i.e. showing results of daily, monthly and annual suspended load within the investigation period.
- Calibrated model for simulation of suspended load transport for the reservoir Stauraum Feistritz/Ludmannsdorf.

- Report about the morphologic development of the restored river section on the Mura near Gosdorf and of the diverted and digged section between Malečnik and Duplek (Drava).



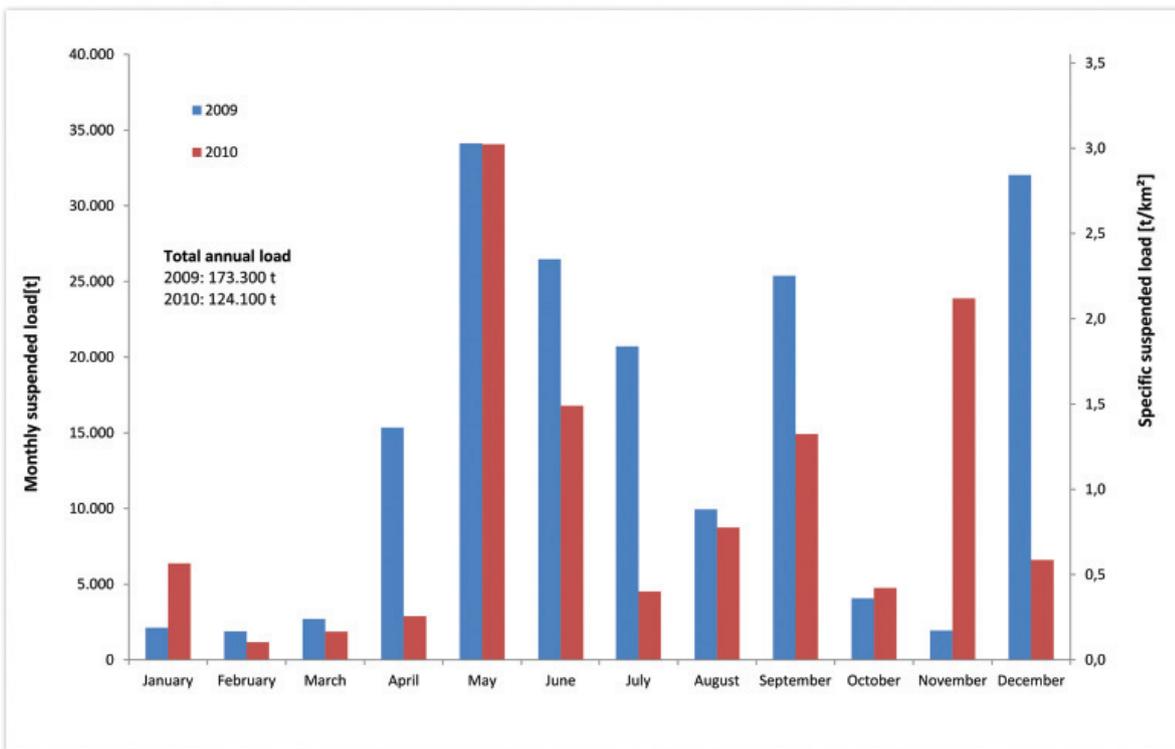
Map with all measurement stations for suspended load transport, bed load transport and diverted river section.



Comparison measurement on June, 17 2010 in Lavamünd (Austria), the river Drava



Removal of sediment probes for underground investigation in the reservoir Feistritz/Ludmannsdorf (Drava)



Suspended sediment load, measure station Lavamünd, Kärnten

WORK PACKAGE 4 – ECOLOGICAL STATUS OF WATER AND ADJACENT HABITATS

*WP4 Leader: Office of the State Government of Styria
Department A13 Environment and Spatial Planning
WP4 Coordinator: Dr. Reinhold Turk*

Monitoring Mur

In order to identify main interferences for the ecological status of water and the habitats influenced by water in the rivers Drava and Mura a scientific monitoring of habitats and species has been carried out. The results of the studies shall help to optimize the existing and the future measures. The monitoring in Austria was carried out at the beginning, in the middle and at the end of the duration of the project. A fish ecological assessment at the river Mura was carried out from Bad Radkersburg, through Drauchenbach to the national border. An extensive monitoring combined with habitat modelling and an investigation of different types of biotopes and animal species, visitor pressure and neophytes were taken around the measure Gosdorf I and realized in the project Interreg IIIa (2002 – 2008). Among other things FFH-protective goods such as the thick shelled river mussel, the green club-tailed dragonfly, and small fish species such as the *Rutilus pigus* as well as the bank swallow and the soft alluvial forest were observed and examined.

Monitoring existing / implemented measures and actions was carried out at the beginning, in the middle and at the of the project period. Biological and hydrological monitoring in the river Mura encompassed the following:

- Monitoring of fish species
- Monitoring of bird species, reptiles, amphibians
- Inventory of vegetation (vegetation communities and indicator species)
- Analysis of bed-load discharge of the river
- Monitoring of hydrodynamic processes of the river
- Monitoring the combined impact of interventions on the biological and hydro-morphodynamic processes.

Monitoring Drau

Maintenance measures were implemented on the sandbanks at the river Drava (in the area of Malečnik and Duplek) in order to improve flood discharge. The realization of measures includes removal of vegetation on the sandbanks and its lowering. While monitoring the effects on aquatic habitats was examined, the guidelines for the implementation of the considered measures on the sandbanks were created. Focus was on the protection and improvement of aquatic habitats and fish population.

Ecological investigations in the scope of flood protection projects Rosegg

The settlements on the loop of the river Drava Rosegg shall be protected against flooding up to a 100-annual year occurrence. Several protective measures were proposed according to precise hydraulic analysis. As the Rosegger loop is the only free flowing

section of the lower river Drava, the technical planning was complemented by environmental studies and an ecological expert planning. Special emphasis was on the protection of ecological sensible areas.

Main results:

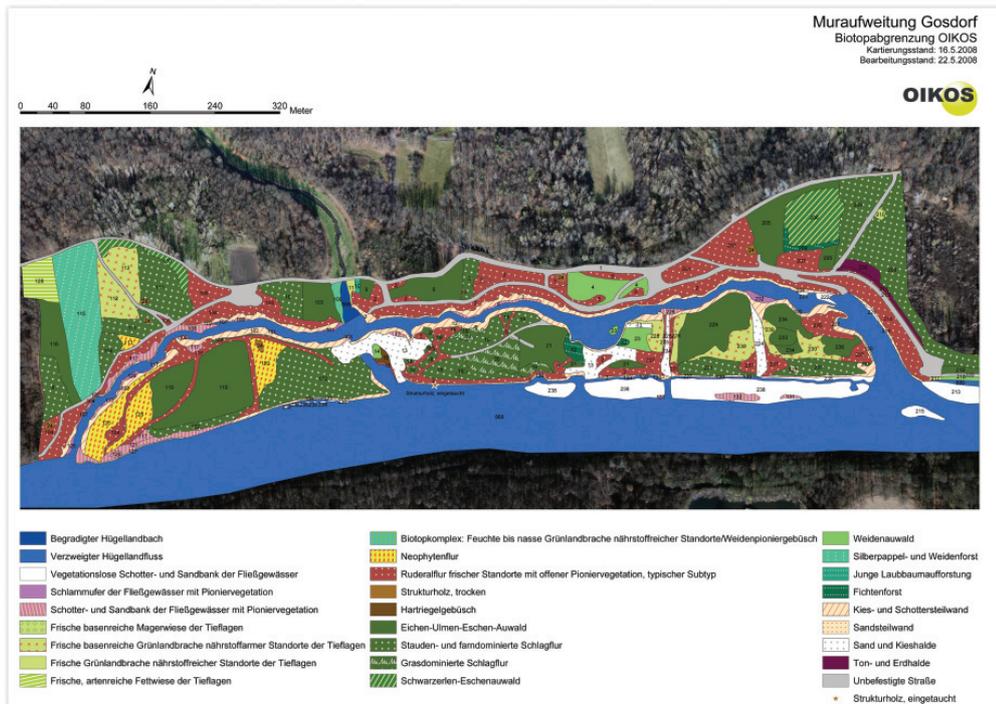
The pre- and post-monitoring – results show a striking development of already existing and new habitats of the examined protective goods concerning the realization of measures. The strong dynamic in the new initiated system of tributaries supports the development and the formation of valuable animal habitats, as breeding and spawning grounds. But also the development and further development of new and old areas of vegetation will be supported. The results make clearly visible the necessity of a specific neophyte management, as well as information for visitors and users.

Recommendations:

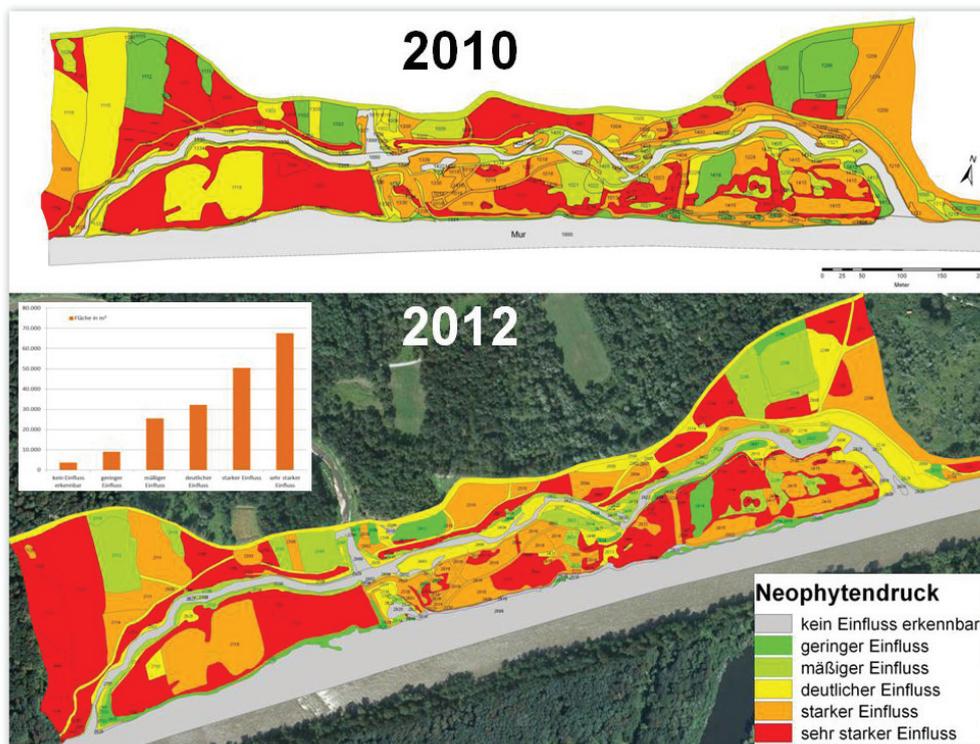
- Elaboration of detailed management plans based on the monitoring results
- Quality control and adaption of measures
- Documentation of future actions and their continuous monitoring
- Further monitoring activities in regular intervals, long-term scientific observation of development in the areas of measures
- Continuation of renaturation measures, further formation of large connected habitats

In summary, the development of all concerned habitats was extremely influenced by dynamic river engineering and a substantial improvement for habitats and living organisms was documented. It has been planned to continue the scientific studies and long-term observations, as well as further renaturation measures at the river Mura and the creation of additional habitats in future.

Monitoring habitat:



Biotope mapping Gosdorf after realization of measures



Comparison development of neophytes 2010 – 2012

Monitoring animals:



Little Ringed Plover

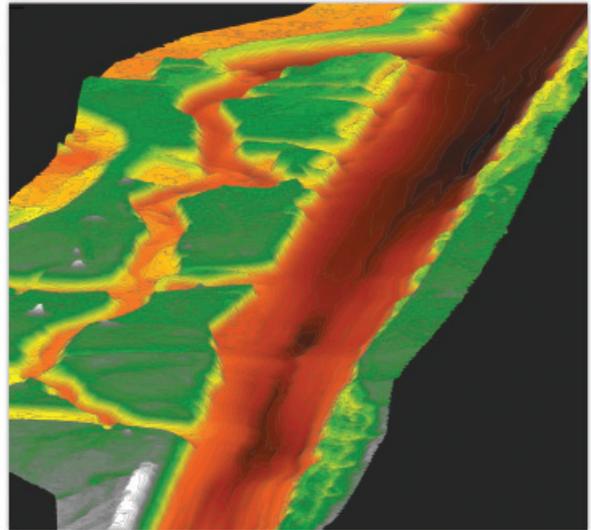
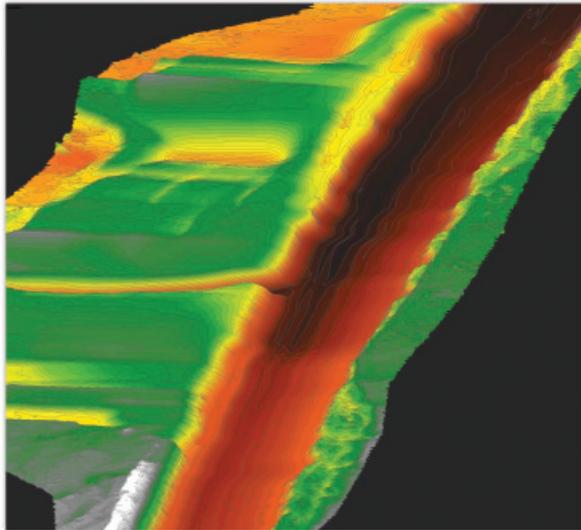


Kingfisher

Monitoring habitat modelling:



Orthophotos of the project section before and after the realization of the measure



Terrain model of the status of the prognosis with (left) and without (right) interventions

Monitoring Fishes:

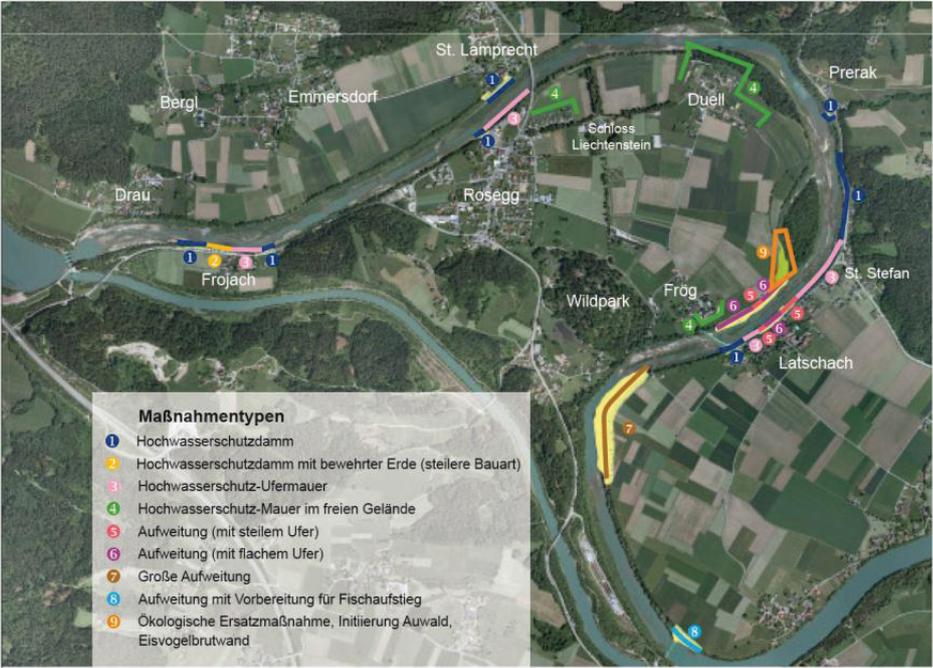


Electro fishing



Fishing

Flood protection Rosegg:



General view flood protection Rosegg/Drau

WORK PACKAGE 5 – IMPLEMENTATION OF MEASURES - PILOT PROJECTS

*WP5 Leader: Office of the State Government of Styria
Department A14 Water management, resources and sustainability
WP5 Coordinator: Dipl.-Ing. Rudolf Hornich*

IMPLEMENTATION OF MEASURES AT THE RIVER MURA

In order to improve the ecological conditions at the river Mura five measures were planned. These measures follow the state of the model of a highly dynamic river with a distinct lateral movement. They shall contribute to a creation of typical branching of water with gravel banks and the initiation of a sustainable natural-dynamic development of the river, as well as to protect the bottom level and to prevent further erosions of the river Mura.

Three measures were realized on the Austrian side and two on the Slovenian side of the river Mura:

- Two widenings at the river Mura for the accumulation of bed-load and stabilization of the riverbed in Gosdorf II and in the area of the estuaries of the 11-mill canal and the Vizjak - canal
- Three widenings at the river Mura for the linking of water routes according to the basic water management plan in the area of Halbenrain and Sichelndorf and Alter Graba in the area of Zg. Velka und Mele

Measure Sichelndorf

The measure serves the ecological and hydrological improvement of the actual state by dismantling of the left bank on a length of about 1,400m.

In order to support an erosion of the left bank, initial cracks (bays, excavation of about 15,000m³) were created and four temporary islands were poured out of the existing excavated material into the river Mura.

By removing the bank protection and by erosions of the banks caused therefrom break lines and a natural shoreline are resulting. Break-off banks and gravel banks form new habitats for the typical animal species and plantings in and around the water.

Measure Trummer-Lahn

The aim of this measure is the revaluation of the about 1 ha area between Mur and Lahn. Sub-measures to achieve these objectives are to dissolve the straight and narrow obstruction of the bank of the river Mur and the close to nature formation and integration of the Trummer-Lahn estuary.

A widening of the estuary Trummer-Lahn took place together with lowering of the riverbed as retreat area for fishes in the river Mur.

Another subarea of widening of the river Mur serves as boat landing. The whole project shall be opened as event area for the population or for bicycle tourists.

By widening measures the river Mur was broadened from a total length of 130 m up to 37 m, the existing solid bank protection of the river Mur was removed and reinstalled inland, covered in erosion-prone areas.

Measure Gosdorf

The aim of this measure is widening of approx. 900m of the ca. 11,4 ha large area between Mur-km 114,7 and 113,8, a few metres downstream of the measure Gosdorf I (implemented in project Interreg IIIa) by removing the currently existing »bank corset« of the river Mur, as well as the initiation of habitats typical for both rivers. The branch is only accumulated if there are higher flowing-offs (>mean-flow conditions) and serves therefore as retreat possibility for small fishes, if water conditions are normal (stagnant water zone).

As an accompanying measure it is planned to relocate the bank way in the north direction, as well as a height adjustment of the Mur cycle path and the establishment of additional flood control dams.

Widening of the river channel at Alter Graba and the »11-mill« channel

Technical and background documentations for widening of the river Mura riverbed was made with the purpose of delivering bed loads and thus stabilizing the river bank (area around Vizijak- and 11-mill Channel). Additional to that, widening was made for the restoration of the side branches and lateral connection sleeve on the Mura in accordance with the water management fundamental rules for the area of Zg. Velka on the Slovenian side. For both areas the technical resp. project documentation was made. It was necessary to clean the vegetation on the foreseen area as well as assess of the actual state and prepare the channel profile before the realisation of planned activities on the location if the widening. Next step was the realisation of widening with construction machinery according to the prepared plan. Due inspections were carried out during the realisation. All activities were recorded in the construction diary on the location and charged according to the records in the documentation.

REALIZATION OF MEASURES AT THE RIVER DRAVA

By riverbed regulations and maintenance work on the sandbanks of the river Drava the preservation of the bank revetment and prevention of uncontrolled horizontal erosion shall be supported. In several sections a widening of the profile in order to improve the discharge capacity in a bank-full stage should be realized.

The following measures at the river Drau could be implemented:

Measure Malečnik

Maintenance work to preserve the bank revetment and to prevent uncontrolled horizontal erosion shall be carried out in Malečnik (Melje-Celestrina-Zrkovci). In several sections a widening of the profile in order to improve the discharge capacity in a bank-full stage are in realisation.

In Malečnik the machine cut of vegetation, crushing and removal, then an excavation and removal of alluvium to the landfill and surface levelling of bars was implemented.

Measure Celestrina

Maintenance work on the sandbanks including measures for the improvement of the discharge regime (mowing of the undergrowth to clean sand banks) had to be done between Celestrina and Duplek.

In Celestrina the vegetation was removed from the bar, including the humus layer, which was then buried into a previously excavated trench along the bar.

Both arrangements resulted in a better flow ability and reduction of water levels of high water at the endangered area of Malečnik and Zrkovci. At the same time gravel beds were created which represent a vanishing habitat due to modified flow regime following the construction of hydroelectric power plants at this section of Drava.

FLOOD CONTROL DAMS BAD RADKERSBURG

Planning work for the renovation of the flood control dam in the municipalities of Bad Radkersburg and the surrounding area and Halbenrain have been completed. The project was coordinated in accordance with the planning work on the Slovenian side. All documents for the licensing procedures are available.

Main results:

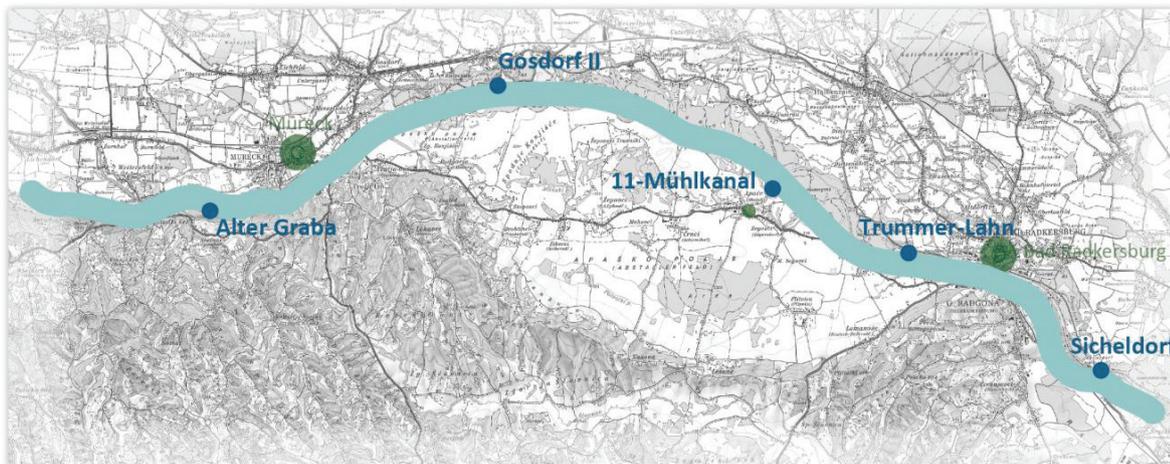
- Implementation of measures in Sieldorf in the Summer of 2012
- Implementation of measures in Trummer-Lahn (Halbrain) in the Summer of 2012
- Implementation of the measure Gosdorf II in the Spring of 2013
- Implementation of the measure 11-mill channel in the Winter 2012/2013
- Implementation of the measure Alter Graba 2012/13
- Implementation of the measure Malečnik
- Implementation of the measure between Celestrina and Duplek
- Construction plans and documentation for obtaining the necessary permits for the construction of flood control dams in Bad Radkersburg. It will be implemented in 2014.

The project aims at the prevention of a further erosion of the river Mura, the protection of the bottom level and the increasing of the groundwater level, as well as the creation of a network of the river sections with sand banks and the initiation of a sustainable natural-dynamic development of the river was supported in the planning of the measures and realized both on the Austrian and Slovenian side.

All building operations are performed on the river Mura or Drava and pursue the target of a dynamic development, individual and constant changes, habitats for small fish, insects and birds and a aquatic organisms together with mature alluvial forests.

Based on monitoring results first positive developments are already visible at the end of the project. A dynamic course of the river and embankments have already started, also the sediment transport started increasingly. Experience and detailed findings from previous projects at the river Mura show that the renaturation measures, which are already implemented, have a rapid development of new habitats. A natural fluvial course will arrive and the effects of the single steps will spread to the further river extensively.

Summary of measures at the river Mura



Sieldorf:



*Widening area Sieldorf:
bays with island building*



*Structures with deadwood and
variable water depths*



Profile: Interlocking of water and alluvial forest (succession habitat)

Trummer-Lahn – Halbenrain:



Stagnant water zone for small fishes



Initiated tributaries

Gosdorf II: In process – realization starts in April 2013

11-mill canal:

Renaturation 11-mill canal



Alter Graba:

*Estuary into the river Mur of the
Alter Graba*



Summary of measures river Drava:

Malečnik:



Widening area with gravel island



Widening area with shallow banks for an alluvial forest development

Celestrina and Duplek:



Construction phase: formation of a shallow bank area



Widening area with gravel island

WORK PACKAGE 6 – DISSEMINATION AND PUBLIC ACTIVITIES

WP6 leader: Republic of Slovenia, Ministry of Agriculture and the Environment (MKO)

WP6 coordinator: mag. Nevenka Colnarič

Project meetings and workshops with public participation

The project started with the official signing of the consortium contract at the headquarters of the University of Maribor, which was attended by the representatives and responsible persons of all project partners, including the rector of the University in Maribor, Minister of the Environment, public representatives, his excellency the Ambassador of Austria and the representatives of municipalities and local organizations. During the project lifetime we conducted five workshops, which were in a certain part intended only for professional audience. At these workshops, we presented the results of their work and research.

Project portal www.dramurci.eu

After the successful launch of the project, we designed a project identity (including project's logo) and the platform for the publication of information about the project: web portal in three languages (Slovenian, German, and English) and three levels: for general public, project partners and experts. We continuously updated the content with dissemination news and project results. We have also published a trilingual glossary of terms related to water management in the framework of this web portal.

Presentations and publications

Results and research carried out in the framework of the project was also presented at international conferences and journals. For the purpose of presenting the results of the project in the media, at workshops and conferences we produced the presentation material in the form of posters, brochures and leaflets.

Flood scenario catalogues

We have prepared two flood scenarios catalogues (in the form of printed catalogue and a digital image CD ROM) describing the Austrian and Slovenian part of the Drava river basin.

Main results:

- Design of the project identity.
- Set up of the project web portal www.dramurci.eu with public and expert content designed for public, experts and project partners.
- A number of project presentations for the general public and the media at various national and international events (papers in journals, presentations at international conferences, at Slovenian water days »Mišičevi dnevi« and other professional conferences with public participation.

- More than fourteen papers at professional meetings, and more than six articles in the newspapers were published.
- Promotional material was prepared: two leaflets in the Slovenian language covering Slovenian rivers Drava and Mura and two leaflets in the German language covering Austrian part of Mura and Drava.
- The project brochure about project results in printed and in digital form was presented.
- A Slovenian and an Austrian catalogue with flood scenarios on the river Drava.
- A trilingual (DE-SI-EN) project dictionary was made and posted on the web site of the project for the public use.
- Five workshops with the participation of the experts and the general public in Slovenia and Austria were organised.



The ceremonial signing of the contract



Workshop



A conference presentation in the year 2010

Booklet about the project

Drava-Mura Crossborder Initiative

1 O projektu DRA-MUR-CI

Projekt DRA-MUR-CI spodbuja skupne rešitve za organe oblasti obeh držav ob rekah in je namenjen raziskovanju, razvoju, preprečevanju tveganj in integriranemu upravljanju z vodami. Gre za krepitev skupnih pristopov in izmenjavo izkušenj na področju upravljanja voda, zagotavljanja poplavne varnosti in ohranjanja biotske raznovrstnosti v porečjih, kar so tudi poudarki pri prilagajanju na podnebne spremembe. Ključna sestavina projekta je definirana z dvema direktivama EU:

- Vodna direktiva (Water Framework Directive - WFD (2000/60))
- Poplavna direktiva (Flood Directive - FD (2007/60))

V teh direktivah so predpisane določene naloge in dolžnosti, ki morajo biti izpolnjene, da se lahko mednarodno porečje obravnava kot celota.

Celoten projekt je v osnovi razdeljen na štiri prostorska območja: porečje Drave v Sloveniji, porečje Mure v Sloveniji, porečje Drave v Avstriji in na porečje Mure v Avstriji. Glavno vodilo projekta je, da je za učinkovito gospodarjenje z vodami in upravljanje z akumulacijami na porečjih potrebno sodelovanje obeh držav.

2 Aktivnosti

Projekt DRA-MUR-CI zajema skladen čezmejni razvoj in ukrepe za podporo zaščite ljudi in okolja pred naravnimi nesrečami in izboljšanje življenjskega okolja ljudi, flore in faune. V vrsti šestih delovnih paketov (DP) bodo vzpostavljeni skupni standardi in informacijsko podprta tehnologija za zaščito pred poplavami in izmenjave izkušenj na strokovni ravni:

- DP 1: Vodenje projekta
- DP 2: Ravnanje ob poplavah in zmanjševanje tveganj
- DP 3: Transport sedimentov
- DP 4: Ekološki status voda in sosednjih habitatov
- DP 5: Ukrepi - pilotni projekti
- DP 6: Udeležba javnosti, predstavitev rezultatov in nadaljnje aktivnosti

3 Naloge in predvideni rezultati

Projekt zajema poglobljen razvoj na področju upravljanja in čezmejno sodelovanje, vključno z razumevanjem nastanka poplav in poplavnih tveganj, nadzorom usedlin in rijnjih plavin. Na osnovi znanstvenih analiz in podatkov informacijske platforme o poplavah se bo lahko izboljšal sistem opozarjanja in informiranja občanov, civilne zaščite in nadgradili bilateralni načrti opozarjanja in ukrepanja.

Upravljanje rek in ukrepi zaščite pred poplavami s ponovnim ovrednotenjem narave, življenjskega prostora obah rek in celostnih ukrepov v obliki pilotnih projektov na reki Dravi in Muri.

4 Karte poplavne nevarnosti

Za odsek Mure od Avstrijske meje do Petančev bode na osnovi matematičnih hidravličnih modelov izdelane karte poplavne nevarnosti. S sodelovanjem avstrijskih in slovenskih partnerjev bo zagotovljena usklajenost teh kart glede na različno zakonodajo obeh držav.

5 Vzpostavljavanje modela ledečih plavin

Na izbranih profilih reke Drave in Mure se izvajajo kontinuirne meritve pretokov, sočasno pa se odvezujemo vzorci vode, na podlagi katerih se v laboratoriju ugotavlja količina in vrsta sedimentov. Izmerjeni rezultati služijo za nadaljnjo detajlno analizo hidrodinamičnih karakterskih odsekov obeh rek, predvsem za kasnejše vzpostavljavanje čim bolj natančnega modela ledečih plavin.

6 Poplavni scenariji

Na vodnem vozlišču Drave, Meže in Mislinje je poplavam izpostavljenih več objektov, zato so za ustrezno ukrepanje ob poplavah in protipoplavno zaščito potrebne podrobnejše hidravlične analize. V projektu Dra-Mur-CI bomo za to območje izdelali katalog poplavnih scenarijev, v katerega bodo vključene kombinacije dogodkov ob visokih vodah, ter za nje določili doseg poplave.

Scenariji bodo obravnavali sovpilvanje dejavnikov, ki povzročajo poplavno nevarnost, kot so npr. pojav visoke vode v posameznem vodotoku z različno sočasnostjo v drugih, zagodeno plavje in zamašitve prepotov in mostov, ipd. Izračuni v 2D hidravličnem modelu bodo dopolnjevali karte poplavne nevarnosti, ki obsegajo samo stanje pri Q10, Q100 in Q500. Poznavanje razmer ob nastopu dogodkov, ki bodo vključeni v katalog poplavnih scenarijev, bo lahko zagotovilo boljše pripravljenost na visokovodni dogodek in ravnanje ljudi in institucij v takšnih razmerah.

www.dramurci.eu

O projektu / über das Projekt
 Trajanje projekta / Projektzeitraum: 2008-2012 (5 leta / 4 Jahre)
 Vrednota projekta / Projektwert: ca. 3,5 Mio EUR

Priznjeni partnerji / Projektpartner
 Vodilni partner / Leitpartner: Univerza na Muru, Fakulteta za gradbeništvo / Universität Maribor, Fakultät für Bauingenieurwesen

Partner 1: Oddelka unosa avstrijske Slojenske deželne vlade 15B / Amt der Steiermärkischen Landesregierung, Fachabteilung 15B, Schutzgemeinschaft und Bodenkulturbau

Partner 2: Oddelka unosa avstrijske Slojenske deželne vlade 13C / Amt der Steiermärkischen Landesregierung, Fachabteilung 13C, Naturschutz

Partner 3: Oddelka unosa avstrijske Slojenske deželne vlade 18 / Amt der Steiermärkischen Landesregierung, Abteilung 18, Wasserversorgung

Partner 4: Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo / Universität Ljubljana, Fakultät für Bauingenieurwesen und Geodäsie

Partner 5: Agencija Republike Slovenije za okolje (ARSO) / Agentur der Republik Slowenien für Umwelt

Partner 6: Ministrstvo za okolje in prostor Republike Slovenije / Ministerium für Umwelt und Raumordnung Sloweniens

Partner 7: Mura – vodnogospodarsko podjetje d.o.o. / Wasserversorgung Mura

Partner 8: Drava vodnogospodarsko podjetje Plus, d.o.o. / Wasserversorgung Drava

Kooperacijski partnerji / Kooperationspartner:
 VVP (Virtuelni vodni Posrednik) / DEM (Draava Elektroenergetik)

Vodja projekta / Projektleiter:
 prof. dr. Božidar Jelčič
 tel.: +386 2 2294 180, fax: +386 2 2524 176, info@draturci.eu, www.draturci.eu

SI DRATURCI
 Čezmejna vodarska iniciativa za reki Drava in Mura
 Grenzüberschreitende wasserwirtschaftliche Initiative für die Flüsse Draa und Mur

www.draturci.eu

O projektu DRA-MUR-CI
 Reki Drava in Mura so v letih 2008-2012 v Sloveniji povsem obnovili, kar pomeni, da sta bila za slovenske občanov vodno gospodarsko vredna in okolju prijazna vodna telesa.

Über das Projekt DRA-MUR-CI
 Die Draa und die Mur fließen durch Österreich und Slowenien und werden in beiden Ländern, Dabei liegt es nahe, für wasserwirtschaftliche Fragen in diesen Flüssen gemeinsame, länderübergreifende Lösungen zu suchen.

Aktivnosti in pridruženi rezultati

- Uveljavljanje vodarske, upravljalne in vzgojne zakonodaje v okviru projekta DRA-MUR-CI**
 - razpisna in javna naročila za rekonstrukcijo starih Mur in Draa
 - izboljšanje in vzdrževanje vodnih objektov
 - vzdrževanje in obnovitev vodnih objektov
 - vzdrževanje in obnovitev vodnih objektov
- Uveljavljanje vodarske, upravljalne in vzgojne zakonodaje v okviru projekta DRA-MUR-CI**
 - vzdrževanje in obnovitev vodnih objektov
 - vzdrževanje in obnovitev vodnih objektov
 - vzdrževanje in obnovitev vodnih objektov

Aktivnosti und Ergebnisse

- Flussbau, Flussunterhaltung**
 - Planung und Umsetzung von Flussbauvorhaben an der Grenze auf österreichischer und slowenischer Seite
 - Durchführung der Arbeiten zur Verbesserung der Wasserqualität und der Erhaltungszustände des Flussunterlaufes
- Hochwasserschutzmaßnahmen**
 - Planung und Umsetzung von Hochwasserschutzmaßnahmen an der Grenze auf österreichischer und slowenischer Seite
 - Durchführung der Arbeiten zur Verbesserung der Wasserqualität und der Erhaltungszustände des Flussunterlaufes

Maßnahme Sicheldorf
 Die Maßnahme dient der ökologischen und hydrologischen Verbesserung des bestehenden Zustands durch Rückbau des linken Ufers auf einer Länge von etwa 1400 m. Um eine Erosion des linken Ufers zu begünstigen, wurden Initialbänke (Bänke, Aushub ca. 15.000 m³) geschaffen und zusätzlich vier temporäre Inseln aus dem vorhandenen Aushubmaterial in die Mur geschüttet.

Das Projekt
 Das Projektgebiet an der Mur liegt zwischen Obersiebenbrunn/Gersak und Sicheldorf/Melle und beinhaltet auf österreichischer Seite Teile des Europaschutzgebietes Natura 2000 – Gebiet „Steirische Grenz-mur mit Gamsitzbach und Gnasbach“. Insgesamt sind im Rahmen des Projektes fünf Maßnahmen an der Mur, drei davon in Österreich und zwei in Slowenien umgesetzt worden. Die österreichischen Aufwertungen befinden sich im Bereich Gosdorf, Sicheldorf und Halbbrunn.

Maßnahme Trummer-Lahn
 Das Ziel dieser Maßnahme ist eine Aufwertung des etwa 3 ha großen Bereichs zwischen Mur und Lahn, durch das Auflösen des geradlinigen engen Uferverbau der Mur und die naturnahe Gestaltung und Einbindung der Trummer-Lahnbindung. Es erfolgte eine Aufwertung des Mündungsbereichs der Trummer-Lahn mit abgesetzter Sohlbauung als Hochwasserrückzugsraum für Murrische.

Die Maßnahme wurde im Sommer 2012 umgesetzt



Flood scenario catalogues



Flood scenario catalogues

CONCLUSION AND RECOMMENDATIONS

The project DRA-MUR-CI represents a prime example of strengthening common approaches and exchange of experience in the field of water management, providing flood protection and conservation of biodiversity in the Drava and Mura catchment area. The most important value of the project is a realization that water management and governance in the basin could be effective only if both countries are participating in the development and considering all parts of both rivers. Cross-border cooperation is the inevitable way of approach by which we can achieve coordinated planning and implementation of measures in the riverbed. The main objective of the project, which was the integration of water management in the area of the two largest rivers Drava and Mura, shared by Slovenia and Austria, has been fully achieved. With the activities that were carried out in six work packages, the common standards and information-based technology to protect against flooding have been set, the results of measurements of suspended material analysed, the results of monitoring of birds, fish and insects processed, and finally a number of pilot projects aimed at establishing natural dynamic state of the rivers, creating gravel bars, river bed protection and the prevention of erosion have been implemented. The project partners hope that the results of the project are going to be useful to the authorities responsible for water management and water protection, civil protection, and of course for the people living in the Drava and Mura river basin, whose goal is to live in a safe environment with an efficient use of resources in line with the general concept of water management, which is also known as the public trust doctrine. An important outcome of the project is the creation of effective links between Austrian and Slovenian partners, which could constitute a basis for a sustainable cross-border cooperation aimed at a balanced and responsible regional and local development and improving the quality of life for present and future generations.

Prof.dr. Renata Jecl, project coordinator

The project DRA-MUR-CI is an example of excellent cooperation among four administrations of water areas of the rivers Drava and Mura. Exchange of good practice between the upstream and downstream regions and learning about the interdependence between the left and right water vicinity enable coordinated flood management, protection of water and near the water habitats as well as coordinated planning of various measures that have a cross-border impact. Significant results of the project are a good foundation for regulating numerous matters in the field of water and water management.

Prof dr. Franci Steinman, WP2 coordinator

At both the Drau and Mur Rivers, suspended and bed loads are as important as the discharge volumes. These two rivers in fact deliver large amounts of the sediments from the catchments of the countries to the Black Sea. Every year, thousands of tons are mobilized as suspended load; such massive mobilization is critically compromised by barriers like hydro power dams, yet, this negative effect is further amplified by river regulation. Quantification of the sediment transport load was a central task in the Drau-Mur monitoring program. The considerations following the monitoring highlight the need of undertaking sediment load management measures to face their negative effects while further efforts shall be devoted on this matter.

Dipl. Ing. Johannes Moser, WP3 coordinator

The activities in Work Package 4 such as habitat modeling and monitoring of habitats and various animals groups produced an excellent basis for future planning and restoration activities on the Rivers Mura and Drava and other rivers with similar morphological and topographical conditions. It was demonstrated that the flood protection management and the protection and restoration of endangered habitats and species can perfectly complement each other. The cross-border co-operation with the Slovene partners turned out to be especially valuable. The mutual exchange of information and the technical quality of the discussions provided the foundation of a future productive co-operation.

Dr. Reinhold Turk, WP4 coordinator

With the DRAMURCI project the long-term cooperation between Slovenia and Austria in the existing bilateral water commission for the rivers Mur and Drau has been continued successfully. All targets set for the project have been achieved. Both in research and in planning, but also during implementation of the pilot projects excellent results have been reached due to intense bilateral collaboration and exchange of experience as well as expert knowledge transfer. The results fully comply with the requirements of the two main European directives in the water sector, the Water Framework Directive and the Floods Directive. Future tasks in regard to river basin management and flood risk management require increased cooperation of all involved experts. Therefore it is highly recommended to proceed with the approach taken in the DRAMURCI project.

Dipl. Ing. Rudolf Hornich, WP5 coordinator

International cooperation in the basin of the Drava and Mura rivers has a tradition of more than half a century. While implementing the DR-MUR-CI project the model of integrated implementation of EU policy in the field of water management and longstanding collaboration of experts in international commissions of Water Resources is promoted. Flood events in 2012 have demonstrated the importance of cooperation and coordination of the basin water management. The DRA_MUR_CI project is an example of good practice, which has shown how to combine the power of government institutions, both universities, economic partners, the two regional administrations in the Republic of Austria to solve water management problems for the benefit of people who share both rivers in Slovenia and Austria. The project upgraded direct cross-border cooperation in the planning and implementation of measures to improve flood protection and maintain good ecological status both at local and regional level. Sustainable use of water resources in the Drava and Mura basin will demonstrate the future cooperation within the borders of Europe.

Mag. Nevenka Colnarič, WP6 Coordinator



Purpose of this booklet is presentation of DRA-MUR-CI project goals and main results to public and any interested parties. For further and more detailed information please visit the project portal

www.dramurci.eu

or contact the Project Coordinator.

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Dramurci

