Revitalization of the upper Drau River in Austria

Year of issue

2013

Summary

At three different sections of the Austrian Drau the river bed was enlarged and restoration works have taken place. Moreover, 25 ha of riparian forest were created as well as meadows, lakes and several river branches.

Photo Gallery





Location

46.748666, 12.96743

Project

NWRM

National ID

Austria_01

Sector

Hydromorphology

Installation Date

2006-2011

Contact

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Overview

Location of the project

The project side lies close to the Italian border in the west of Klagenfurt. The revitalized parts of the Drau are between Spittal i.Dr. and Oberdrauburg.

Country

Austria

NUTS2 Code

Kärnten

Sponge measures implemented in the case study

Re-meandering

Stream bed re-naturalisation

Natural bank stabilisation

Lake restoration

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
National water authority	Federal Ministry for Agriculture, Forestry, Environment and Water Management, represented by the Carinthian State Government, department 8- Competence Centre environment, Nature and Water conservation, subdivision water management	Initiation of the measure	Execution	Responsible
Other	Torrent and avalanche control, section Carinthia, regional management supervision 4 Upper Drau Valley and Müll Valley	Implementation	reconstruction of the open check dam	Responsible
National water authority	Carinthian State Government, department 8, competence centre environment, water and nature protection, subdivision Nature Conservation and National Park Law	Other	supervision of nature conservation measures	Responsible

Authority type	Authority name	Authority role	Comments	Authority responsibility
Research institute / University	University of Vienna	Monitoring	Analysis of the river bed before and after the LIFE Project, Study of the composition of the fish fauna, calculation of the transported bedload in the Feistritzbach	Supporting
Research institute / University	Ökoteam	Monitoring	search for indicator species in order to document the improvement of the ecological state	Supporting
Local water authority	Agrarian Regional Office of Villach	Implementation	Purchase of land	Responsible
—	LIFE Nature	Financing	Project Control for the EU	Responsible
Architects / Engineers	REVITAL Ziviltechniker GmbH	Implementation	Project Coordination	Responsible
Architects / Engineers	DI Dr Peter Mayr and team	Monitoring	geodetic survey of the river	Supporting
National water authority	Federal Ministry for Agriculture, Forestry, Environment and Water Management (rural development section) department II/4	Financing	—	Responsible

Site Information

Climate Zone

Cool temperate moist

Precipitation

1100.00 mm

Temperature (°C)

7.00 °C

Runoff

73.80 mm

Elevation range

625

Slope range

0-1%

Vegetation class

In the surroundings of the upper Drau one can find a big variety of different landuses: forest, meadows, fields.

WFD Ecological status

Poor

WFD Chemical status

Failing to achieve good

Water quality status

Given that water quality improvement was not an objective of the project, no information is available.

Design and Implementation

Project scale

Meso

Project scale specifications

Although the enlargement of the river bed was done on a length of 5 km the affected length of the river/region around the river is 68 km. The surface of the project region (river and surroundings) are 976 ha.
1 ha meadow lakes, 25 ha riparian forests

Project area

26

Size

5.00

Size unit

km

Principles

As already explained the erosion of the river bed (the Drau became deeper and deeper) determined the choice of measures. Another point to mention is the availability of land. Next to the negotiations with farmers a reallocation of land took place. Plots were exchanged between farmers and the project responsible. Depending on the size of riparian buffers available the measurements were adapted.
A good ecological status should be achieved for the Drau river. The measurements combine habitat diversity with passive flood protection. Secondary the regional tourism department supported the project by designing picnic areas, positioning info points and marketing the project.

Constraints

The availability of land determines which measures can be used and how expensive the implementation of the measures will be.

Favourable preconditions

The erosion of the river bed should be stopped. This goal determined the choice of measures.

Financing

Total cost

4475000.00 €

Total cost information

total costs of the project

Costs capital

3930000.00 €

Costs capital information

Construction, staff, journeys, measuring instruments, gauges

Costs land acquisition

670000.00

Costs land acquisition unit

€ (total value)

Costs land acquisition information

Purchase of land

Costs operation maintenance information

No special, project-linked expenses.

Every few years maintenance has to be done as on every other river like cutting grass or trees.

Costs operational

10000.00 €

Costs operational information

Monitoring of the river bed

cost per year

Costs maintenance

0.00 €

Costs maintenance information

No project-specific maintenance needed

Economic costs other annual

98000.00 €

Financing authorities

Authority name	Type of funding	Comments	Financing share
European Union	EU-funds: LIFE+	1.5 Million €	33 %
Torrent and Avalanche Control	Sub-national funds	0.2 Million €	4 %
Carinthian State Government	Sub-national funds	0.2 Million €	4 %
Federal Ministry for Agriculture	National funds	Forestry, Environment and Water Management 2.7 Mio €	60 %

Policy and Governance

Policy description

The river bed is too narrow and there is a lack of brash and pebbles. As consequence the river bed became deeper, bank stabilization got insecure and flood plains inoperable.

Policy targets

Runoff control

Improved Biodiversity

Increase Water Storage

Target remarks

Flood control and flood risk mitigation
Soil formation and maintenance
Biodiversity and gene-pool conservation in riparia

Policy pressure

Directive	Relevant pressure
WFD identified pressure	Physical alteration of channel/bed/riparian area/shore of water body for agriculture and transportation.

Pressure remarks

Bed load balance shall be achieved. Due to missing pebble supply the Drau river bed became deeper and deeper. Thus the groundwater level decreased, bank stabilization became insecure and flood plains inoperable.

Policy impact

Directive	Relevant impact
WFD identified pressure	Altered habitats due to morphological changes
WFD identified pressure	Damage to groundwater dependent terrestrial ecosystems for chemical / quantitative reasons
Floods Directive identified pressure	Property
Floods Directive identified pressure	Infrastructure

Requirement directive remarks

A good ecological status of the Drau should be achieved in order to meet the demands of the WFD.

Policy challenges requirements

The project follows a master plan for the development of the river. With RIWA-T technical guidelines are established that give priority to passive flood protection and take into account the ecological functions of a water body .

Part of a wider plan

Oui

Wider plan

Wider plan type	Wider plan focus	Name	Comments
Catchment-based	Water	water body-development-concept	Plan made in the middle of 90s (93 or 94). Programme for the whole river Drau.

Public consultation

Oui

Consultation activities

Activity stage	Activity type
Implementation phase	public inaugauration feasts e.g. for the new dam or the different enlarged riverparts
Implementation phase	information day for school children
Implementation phase	tree planting event for children
Design phase	tourism concept, guided routes within the national park
Other	post card showing before after pictures of the drau
Implementation phase	VIP event: Mimi Hughes (marathon swimmer and environmental activist swam through the drau until danube

Has contractual arrangements

Non

Impacts and Monitoring

Monitoring System

Monitoring parameters

The monitoring is still ongoing for the riverbed. It is controlled whether bedload balance is reached and whether the erosion of the bed is stopped. Given that the Drau is let more freedom to form its river bed monitoring is done how the shape of the river develops. The biological monitoring is accomplished. The number of fisch, amphibian and insect species were counted

Maintenance

Maintenance requirements

There are no project-specific maintenance requirements. As for every river every few years grass will be needed to cut as well as trees.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

-Assessment of aerial photos
- Geodetic survey of cross profiles (echolot)
- Laserscanning with drones
- Steel plates are on the bottom of the river in order to measure the transported load in size and volume with ultrasound
- Life space mapping

Socio-economic Impacts

Direct benefits

3250000

Direct benefits information

Total expenses for the implementation of the project given to regional companies, planning offices.

Ancillary benefits information

The tourism department definitetly benefitted from the Drau project but this cannot be quantified yet.

Biophysical impacts: Hydrology

Hydrological effects

Until mid 2011 28000 km3 were mobilized by the open checked dam and 16000 km3 arrived at the Drau. As consequence the bedload balance could be improved and the riverbed stabilized.

Information on retained water

No quantitative data. However riparian forests were planted and buffer stripes installed along the river shore. These measurements favour an increase of water storage capacity.

Information on increased water storage

No quantitative data. Side arms were reconnected to the main channel and the riverbed itself was enlarged. As a consequence storage capacity must have increased.

Information on runoff reduction

no data available

Biophysical impacts: Biodiversity

Improved biodiversity

Oui

Information on improved biodiversity

Number of amphibian species multiplied by six.
Number of insect and fish species increased as well, new habitats and higher habitat quality for fish and their breeding, more than 100 spider and ground beetle species several of which are endangered or threatened by extinction .

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

N/A info

Information on water quality overall

Riparian forests may act as buffers for diffuse pollution input for water from fields (nitrogen, phosphorous, herbicide flux).

Soil quality overall improvements

N/A info

Information on soil quality overall improvements

No monitoring is done on this aspect since it was not targeted in the project.

Biophysical impacts: Others

Ecosystem impact climate regulation

Increased permanent biomass

Information on ecosystem impact climate regulation

Given that buffer strips, riparian forests and meadows were created/restored permanent biomas has increased.

Lessons Learned

Key lessons

By adapting open check dams the bed load balance of a river can be improved. The reconnections of side arms, the creation of riparian forests and meadows support a greater biodiversity.
The adaptation of open check dams to improve bed load balance is possible. The widening of the river bed and the reconnection of side arms create larger habitat diversity and as consequence the number of species in the area rises.

Barriers

Barrier type	Barrier role	Comments
Other	Main barrier	The project had to be replanned several times since farmers didn't want to sell ground or sell it for very high prices. Others changed their opinion suddenly and new possibilities openend up.
Lacking coordination between authorities	Secondary barrier	There is always tension between the disciplines agriculture, nature protection and hydraulic engineering which have different priorities.

Drivers

Driver type	Driver role	Comments
Other	Main driver	Erosion of the river bed was observed (becoming deeper and deeper). There was furthermore a risk that floodplains fall dry and can't operate anymore, as well as a risk of a falling ground water table.

Success factors

Success factor type	Success factor role	Comments
Attitude of the public	Main factor	Since the revitalization measures on the Drau are a subsequent project to former projects and measures, much less publicity had to be done. The responsibles hadn't to face the fears and worries of farmers and citizens.
Existing staff and consultant knowledge	Main factor	20 years of experience exist on restoring the river to a more natural state. Moreover, there is good cooperation between the different stakeholders for nature conservation and hydraulic engineering.
Other	Secondary factor	The regional touristic department supported the measure and furthermore helped to merchandise the Drau project. They looked amongst others at the following questions: How to design picnic areas? Where are the best places for information boards? How can we conduct tourists through the region?
Attitude of decision makers	Main factor	The purchase of land was combined with a reallocation of land process. Lots were exchanged between farmers. There were a lot of farmers willing to give land for the project and there was also political support of the action. A company constructing/operating hydropower plants had bought lots in the 90s. After their project of building 4 new power plants on the Drau was refused they were nevertheless ready to give their lots to the project partners for a fair price.

Flexibility / Adaptability

Since the river has freedom to form its bed, it will adapt the measures on its own. The adaptation of the measures by humans is linked with huge costs and difficult to execute.

Transferability

There has to be knowledge about the original characteristics of the river. Was it a branched or meandering river?

Sources

Sources

Life vein-Upper Drau RiverÂ ; Carinthia†™s largest nature restoration campaign (2006-2011)

NWRMs experience from Austria

Telephone Interview with Norbert Sereinig (project responsible)

LIFE Projekt Auenverbund Obere Drau