

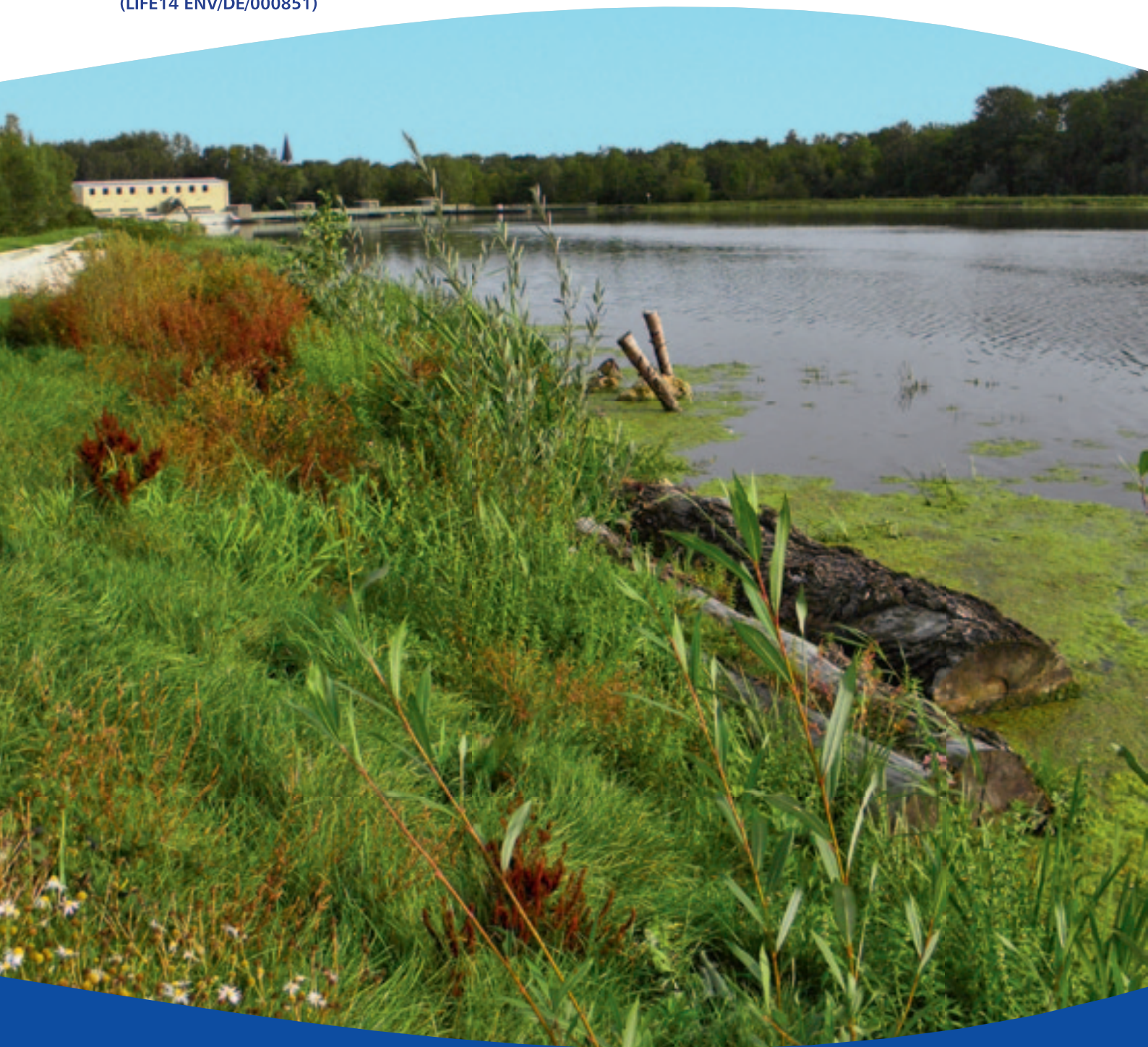


INNOVATIVE APPROACHES FOR
DAM RESTORATION AND ELEVATION
(LIFE14 ENV/DE/000851)



VGB
POWERTECH

LEW
Lechwerke



Layman's Report

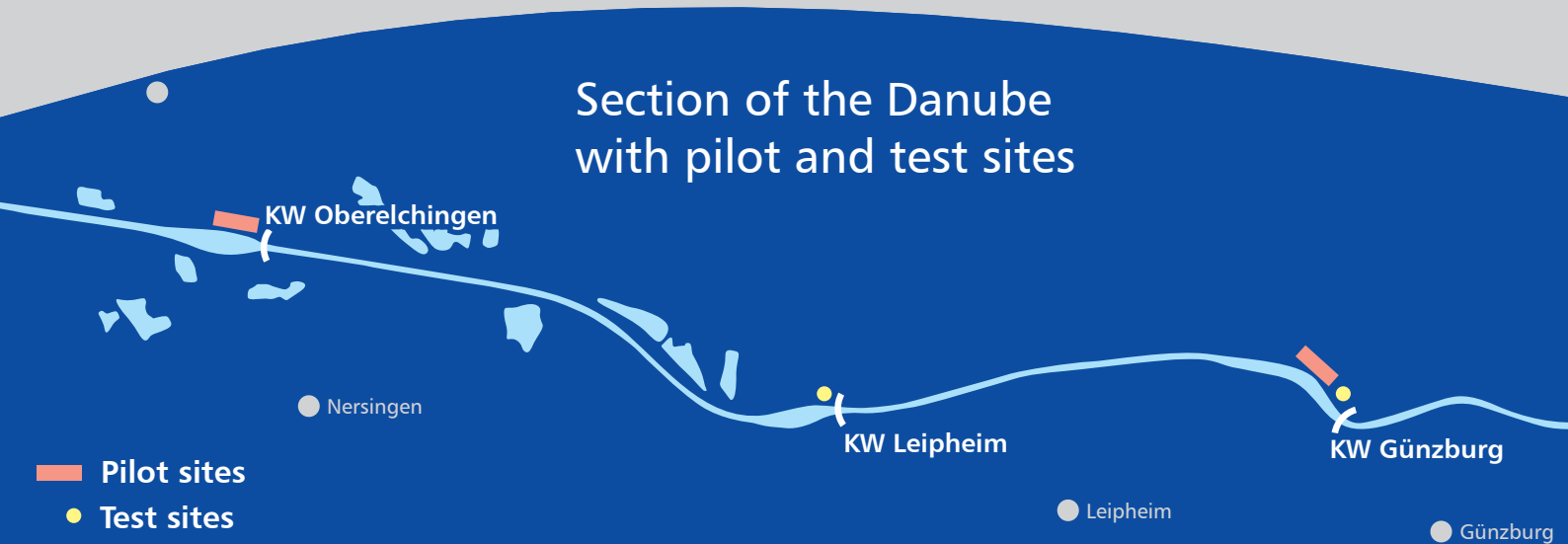
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1. Introduction

The banks of most water bodies with dams today are covered with wave breakers made of concrete. They usually do not provide a noteworthy ecological habitat. At restoration activities today the old concrete surface is just exchanged by new concrete elements, without improving the environment for flora and fauna.

When dams have to be elevated the dam becomes broader on the landside, which increases land consumption and has a negative impact on the floodplain forests (usually FFH-areas).

The INADAR - project successfully demonstrated a new approach for dam restoration by using eco-berms. They make it possible to do the restoration respectively the elevation of the dam requested by the Directive for Flood Risk Management and the improvement of the ecological potential as demanded by the Water Framework Directive (WFD) in one work step. This increases the efficiency and cost effectiveness of the measures.

Eco-berms are suitable for dams where the river profile is not critical for flood protection, for example in water basins of hydropower stations and floodgates or at inland waterways.

The objectives of the project were therefore:

- Efficient dam renovation with or without elevation
- Significant improvement of the ecological potential at the river banks and a better environment for fauna and flora. The aim is the good ecological potential for the whole water body.
- Avoid impact on floodplain forests (mainly FFH-areas) and reduce the demand for compensation measures
- Reduction of land consumption of dams



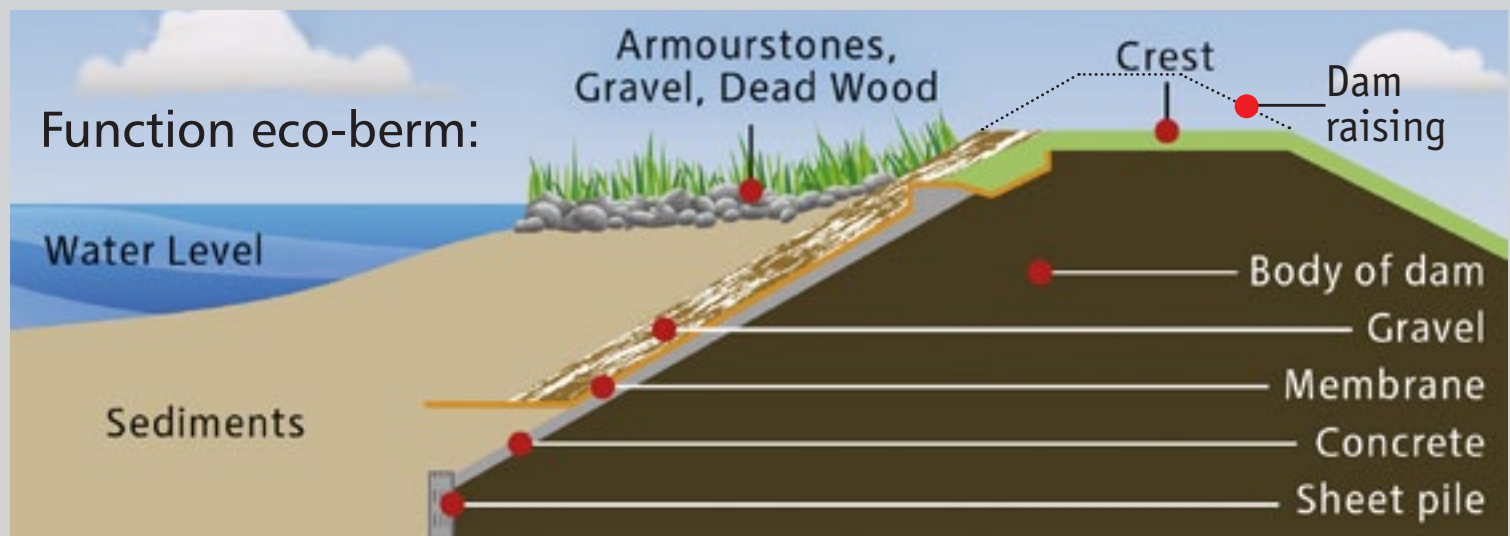


The production of cement produces a lot of CO₂. Eco-berms are built mainly with natural materials and have a much lower impact. Lower costs for restoration and elevation reduce the barriers for necessary measures for flood protection and environmental improvement.

A simplified approval process for the implementation of eco-berms has been developed. Therefore, indicators will be developed together with the actors involved, to define, where and how this solution can be applied.

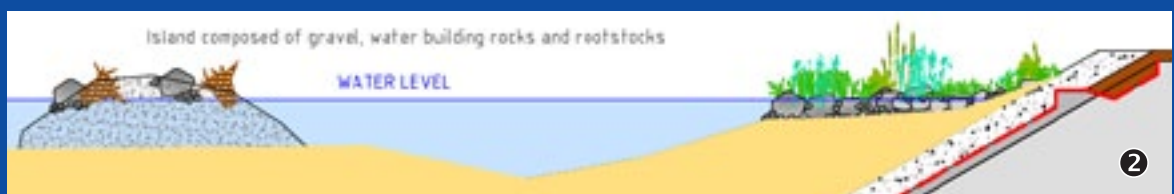
The first step to build an eco-berm is to excavate some parts of the sediments and prepare the ground for the construction with geo-grids.

A bentonite / root protection mat makes sure that the dam remains save and future vegetation has no opportunity to cause damages. This layer is covered with gravel and rocks. On top the ecological structures are built. The structure of an eco-berm is shown here:



Different types of eco-berms:

- ① Module small island
- ② Module large island
- ③ Module groyne
- ④ Module deadwood and root stocks





The results of the monitoring confirm that this method provides at least the same flood protection like traditional approaches but at the same time it provides a significant improvement of the ecological situation. New habitats for fauna and flora developed and negative impacts in the existing alluvial forests were avoided. The number of fish species and the number of individuals for these species increased significantly.

The overall construction costs were significantly lower, but maintenance cost might be slightly higher, if the maintenance of the ecological structures is included. To gain experiences with these processes was an important part of the demonstration project. Other results of the project concern the improved attractiveness of the river for visitors and the facilitation of approval procedures for this kind of dam restoration.

In the long term the LEW will implement the INADAR approach at all appropriate river sections in their region. On a European scale it can be expected that some thousands of kilometres of river dams are feasible for this method.

The aim is, to make the INADAR – approach a standard for dam restoration and dam elevation in suitable river sections in Europe. The project demonstrates the reliability of the method and define framework conditions, where it can be applied. The results should lead to efficient approval procedures.

2. Key results

Except for some delays, the overall implementation of the project was successful.

The initial plans from the test sites could be improved in some details, but the basic concept was implemented in the INADAR project without problems. One major progress, compared to the test sites, was that the eco-berms also can be built on sediments, if geo-grids are used.

The authorities, responsible for the permission, are generally very positive about the project and recognize the good results. But the approach did not fit in their common approval procedures. Therefore, the approval process at the moment is quite time consuming and complex. It was possible to establish some kind of “work-around”, by separating the construction of the eco-berms from the dam elevation, but the aim of the project to facilitate permission procedures remains a task for the future. For some material (especially the bentonite layer) it was difficult to find companies who can deliver these things. It seems that a market for such products still has to develop.



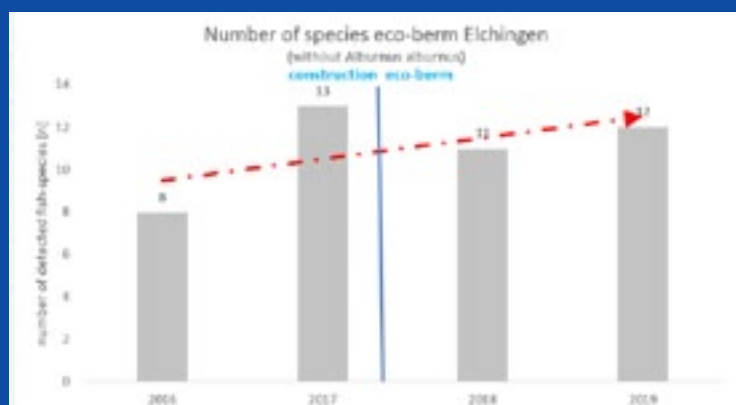
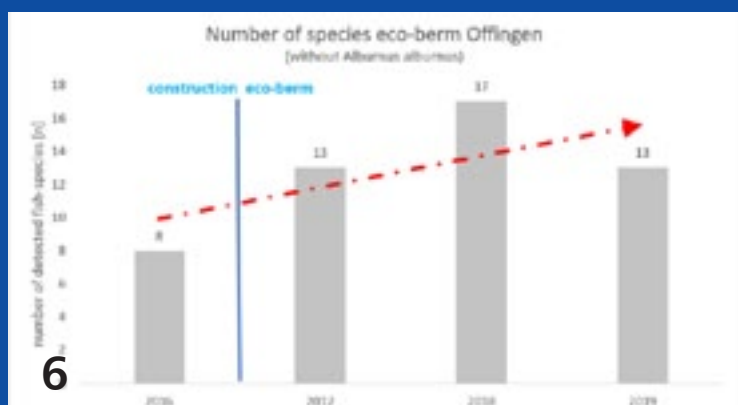
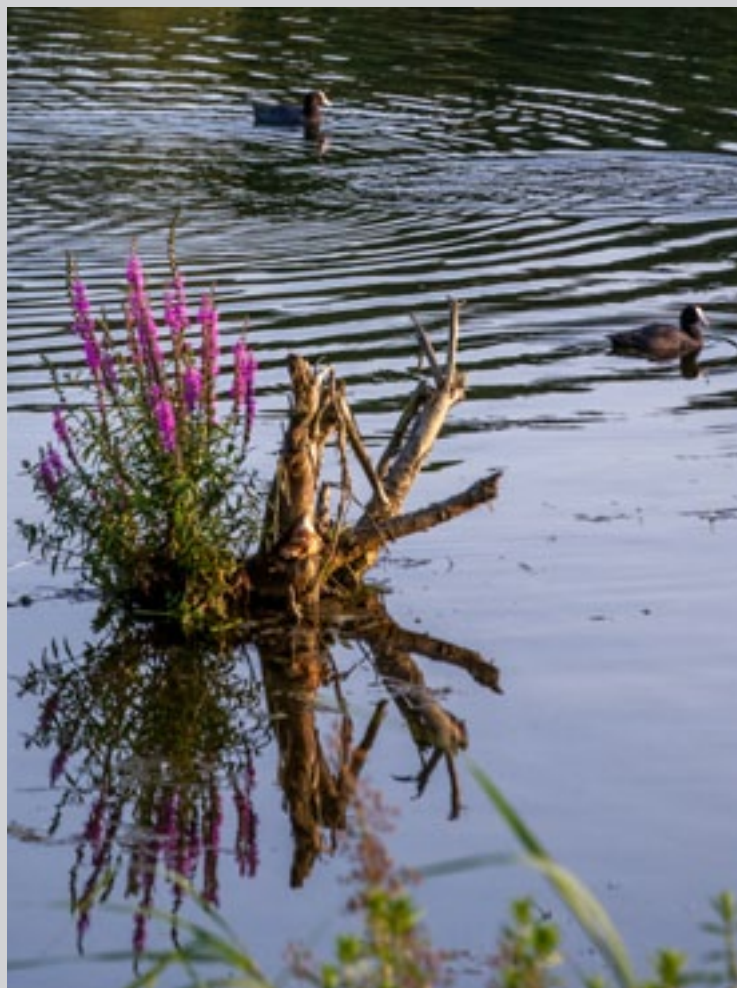


During the construction of the eco-berms no major problems occurred. It was obvious that the growing experiences of the people working on site lead to significant higher speed / efficiency. It can be expected that also costs will further reduce in the future, due to shorter construction times.

There are no indications that dam stability could be a problem in the future. The new habitats are populated step by step by the regional fauna and flora. The ecological objectives of the project were reached.

The INADAR project received a lot of attention from all target groups. Representatives were invited to various conferences to present the project. It can be expected that this will continue even after the project. Many visitors came to local and regional events. The regional press presented articles about the project regularly.

A good network to corresponding projects on different levels, from the region to the EU, was established. The contacts will be informed about project results even after the end of the project.





2.1 Ecology

- At least 2 ha of valuable habitats for fauna and flora were created
- The number of fish species increased from 8 to 17 and the number of individual fishes increased by factor 8 in Offingen
- 3 endangered species were already found in the new habitats
- The number of plant species increased by about 25, including some endangered species
- There was no impact on the existing alluvial forests - 4.000 m² have been saved

2.2 Social aspects

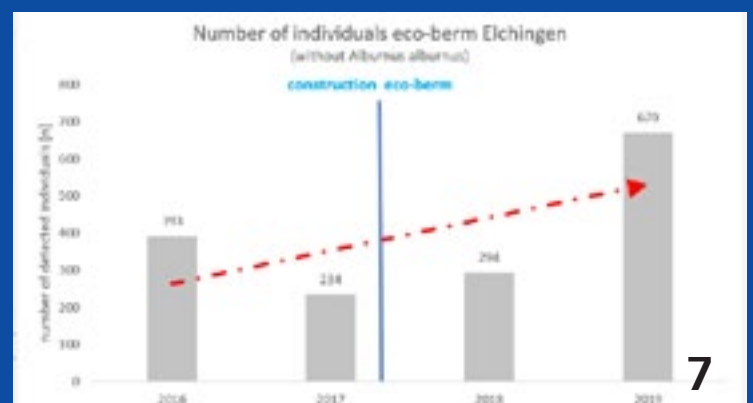
- All stakeholders support the approach –
- Win-Win-Situation for all parties involved
- Increased accessibility and quality of the river for recreational activities

2.3 Technology and economy

- The eco-berms were successfully implemented at a total of 1 km
- Dam renovation / elevation and implementation of the “good ecological potential” were done in one working step
- The eco-berms are proven to be save in terms of dam stability and flood protection
- Construction costs are significantly lower than the traditional approach

2.4 Climate

- CO₂-emissions for transport of material and concrete production were reduced





3. Communication

The dissemination activities of INADAR had the following target groups:

- Citizens who live in the project region along the Danube and experience the implementation of the eco-berms on site.
- Regional stakeholders, who are relevant for the permission and implementation processes (water authorities, environmental agencies, municipalities, district representatives etc.)
- Stakeholders who are responsible for river sections who could transfer the approach to their region.
- The "water community" including other EU-funded projects, research institutions consultants and public authorities from the regional to the EU-level.

The INADAR – Team disseminated the project results via the following activities:

- INADAR-website which had about 12.000 visitors
- A project leaflet in German and English
- Info-Boards on site, including a dispenser for leaflets



- Excursions and events on site, e.g. the "Donau Radl-spaß", with about 5.000 visitors or a boat excursion with various stakeholders
- A short movie explaining the INADAR-approach
- Presentations on congresses with a total of about 1.500 participants
- Various press releases and 4 papers for congresses / expert articles
- A "Layman´s report" - a project summary for the general public
- An "After-LIFE-Communication Plan" for the dissemination of the project results after the project.

The INADAR project was also very successful to create and improve regional networks for the development of the river. These networks will be extended and cultivated in the future. The following LIFE projects Isobel and CityRiver are the cornerstones of the ongoing cooperation.





3

BEW
Bayerische
Entwicklungshilfe

Life+ Projekt INADAR - Öko-Bermen an der Donau

Wiederherstellung eines ökologisch wertvollen Gewässers

Das Projekt INADAR zielt darauf ab, die ökologische Qualität der Donau zu verbessern. Durch die Anlage von Öko-Bermen und die Wiederherstellung von Auen wird die Biodiversität gefördert und die Wasserqualität verbessert. Die Maßnahmen umfassen die Anlage von Kiesbänken, die Entfernung von Schutt und die Pflanzung von Ufervegetation.

Wiederherstellung eines ökologisch wertvollen Gewässers

Die Anlage von Öko-Bermen ist ein wichtiger Bestandteil des Projekts. Diese Bermen schaffen neue Lebensräume für verschiedene Tier- und Pflanzenarten. Zudem verbessern sie die Durchlässigkeit des Gewässers und fördern die Selbstreinigungsfähigkeit der Donau.

Wiederherstellung eines ökologisch wertvollen Gewässers

Die Wiederherstellung von Auen ist ein weiterer wichtiger Schritt. Auen sind wichtige Lebensräume für viele Arten und spielen eine wichtige Rolle bei der Hochwasserschutz. Durch die Renaturierung von Auen wird die Resilienz der Donau gegenüber Extremwetterereignissen erhöht.

Wiederherstellung eines ökologisch wertvollen Gewässers

Die Wiederherstellung eines ökologisch wertvollen Gewässers ist ein langfristiges Ziel. Durch kontinuierliche Pflege und Monitoring wird der Erfolg des Projekts sichergestellt. Die Zusammenarbeit zwischen verschiedenen Akteuren ist dabei von zentraler Bedeutung.

Öko-Bermen

Öko-Bermen sind künstlich angelegte Bänke aus Kies und Geröll, die die Dynamik des Gewässers wiederherstellen. Sie fördern die Durchlässigkeit und verbessern die Wasserqualität.

Auen

Auen sind flache, überschaubarke Gebiete, die regelmäßig von Wasser überflutet werden. Sie sind wichtige Lebensräume für viele Arten und spielen eine wichtige Rolle bei der Hochwasserschutz.

Monitoring

Das Monitoring ist ein wichtiger Bestandteil des Projekts. Es ermöglicht die Erfassung der Auswirkungen der Maßnahmen und die Anpassung des Projektmanagements.

Partnerschaft

Die Partnerschaft zwischen verschiedenen Akteuren ist ein Schlüsselfaktor für den Erfolg des Projekts. Durch die Zusammenarbeit werden Ressourcen gebündelt und die Umsetzung erleichtert.

Map of the Danube River

The map shows the course of the Danube River from its source in the Alps to its mouth in the Black Sea. Key locations along the river are marked, including Vienna, Bratislava, and Budapest. The project area is highlighted in green.

Logo of the European Union

The logo of the European Union is displayed at the bottom left of the poster.



Die theologische *Umbau* des Theaters hat Entsprechungen im *Wissenschaftsbereich*: Michael Baur, Peter Thoma, Werner und Sabina...

Umwelt Mit der Damm-Sanierung an der Staatsstraße Obereichingen hat ein einmaliges EU-weites Pilotprojekt begonnen. Von Thomas Vogel/

[illegible]

„Odo-Bermer“ auch bei Offingen

Einzelgespräche mit den Begleitpersonen (Eltern, Großeltern, Geschwister, Freunde) werden, um 100 prozentig zu sein, in der Regel in der ersten oder zweiten Sitzung durchgeführt. In der Regel werden die Begleitpersonen in der ersten Sitzung eingeladen und in der zweiten Sitzung eingeladen. In der dritten Sitzung werden die Begleitpersonen eingeladen. In der vierten Sitzung werden die Begleitpersonen eingeladen. In der fünften Sitzung werden die Begleitpersonen eingeladen. In der sechsten Sitzung werden die Begleitpersonen eingeladen. In der siebten Sitzung werden die Begleitpersonen eingeladen. In der achten Sitzung werden die Begleitpersonen eingeladen. In der neunten Sitzung werden die Begleitpersonen eingeladen. In der zehnten Sitzung werden die Begleitpersonen eingeladen. In der elften Sitzung werden die Begleitpersonen eingeladen. In der zwölften Sitzung werden die Begleitpersonen eingeladen. In der dreizehnten Sitzung werden die Begleitpersonen eingeladen. In der vierzehnten Sitzung werden die Begleitpersonen eingeladen. In der fünfzehnten Sitzung werden die Begleitpersonen eingeladen. In der sechzehnten Sitzung werden die Begleitpersonen eingeladen. In der siebenzehnten Sitzung werden die Begleitpersonen eingeladen. In der achtzehnten Sitzung werden die Begleitpersonen eingeladen. In der neunzehnten Sitzung werden die Begleitpersonen eingeladen. In der zwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der einundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der zweiundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der dreiundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der vierundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der fünfundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der sechsundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der siebenundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der achtundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der neunundzwanzigsten Sitzung werden die Begleitpersonen eingeladen. In der hundertsten Sitzung werden die Begleitpersonen eingeladen.

1 Project INADAR Website

② Leaflets

3 Info-Boards on site

④ Public events

5 Press articles

⑥ Excursions with stakeholders

e.g. boat excursion with stakeholders at the “Hydropower day” in 2017.





4. The European dimension of INADAR

The implementation of the eco-berms was a success and no obstacles for the implementation at other sites became obvious. The LEW already implemented the approach in Günzburg, Feldheim and Elgau (Iller). Other sites like Leipheim, Feimingen and Gundelfingen are scheduled for the near future.



Other stakeholders in Austria and Germany are interested in the approach and plan to build eco-berms. But eco-berms are a suitable solution for thousands of kilometres of European rivers and channels, so the project partners continue to disseminate the project results to various European stakeholders.

Another objective of the INADAR – project was to facilitate the permission process for eco-berms. This only was achieved partly so far. For INADAR the permission process was separated in two parts. The process for the eco-berms was relatively fast and easy, because they were treated like maintenance work. The permission for the dam elevation still requires a much more complex process. The negotiations with the Bavarian State Ministry to find a better permission procedure are still ongoing. The aim is to integrate eco-berms in the Bavarian Compensation Regulation (Bay-KompV). If this is achieved, this can be a template for the national and EU-level. The long term goal still is to integrate eco-berms in EU regulations and guidelines.



Before:

Traditional dam



After:

Dam with eco-berms





This project by LEW Wasserkraft GmbH is funded by LIFE, the EU funding program for projects concerning nature and environmental protection.

Three partners participate in the INADAR project. The LEW Wasserkraft GmbH is coordinating all activities and leads the construction of the pilot lines. The UIBK is responsible for the scientific monitoring of the project. The VGB PowerTech e.V. ensures an EU-wide dissemination of the project results. The Upper Danube Kraftwerke AG (ODK) is a financing partner of the project..

www.inadar.eu

Project partners:



Facts project INADAR

LIFE Project Number: LIFE14 ENV/DE/000851

Project location:..... River Danube, Germany

Project start date:..... 01/08/2015

Project end date:..... 31/01/2019

Extension date: 31/07/2019

Total Project duration (in months):..... 49

Total budget: 1,417,105 €

EC contribution:..... 1,091,834 €

(%) of total costs:..... 46%

(%) of eligible costs:..... 60%

Supporters

Bavarian State Ministry of the Environment and Consumer Protection | Bavarian Ministry of Economic Affairs and Media, Energy and Technology | Bavarian State Office of the Environment (LFU) | Gouvernement of Swabia | Districts of Günzburg and Neu-Ulm | Water Management Office Donauwörth | Swabian Fisheries Counseling | Bavarian Association for Energy and Water Management | Arbeitsgemeinschaft Alpine Hydropower

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