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PlasticFree Danube

Interreg
Slovakia-Austria
European Regional Development Fund

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PlasticFreeDanube

Project results

A project co-financed by the European Regional Development Fund

The project **PlasticFreeDanube**

Plastic waste has become a global environmental hazard. Around 80% of plastics polluting the world's oceans are transported via rivers. However, sources and input pathways of plastics into the rivers and its environmental impacts remain widely unclear.

PlasticFreeDanube focuses on macro plastic waste (> 5 mm) in and along the Danube river, between Vienna (Austria) and the power plant in Gabčikovo (Slovakia), and parts of its riparian area. The overall aim of the project is to establish a scientifically sound knowledge base as well as a methodological approach on plastic waste in and along the river in terms of entrance points, quantities, transport patterns, and environmental threats.

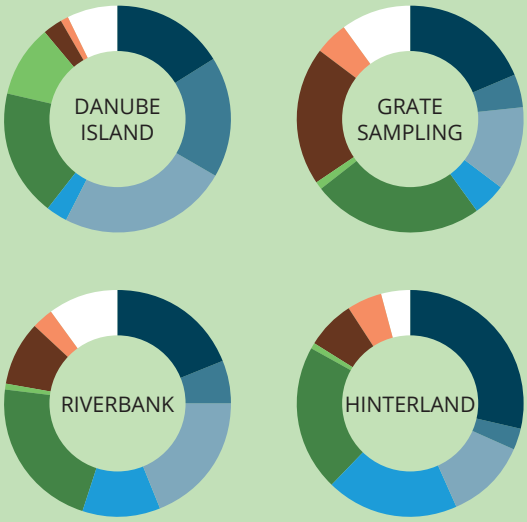
Sorting analyses

In order to determine sources and origin of plastic pollution in and along the Danube, 2,000 kg of collected plastic waste was sorted and analysed.

In the waste from littering on the Danube Island in Vienna a lot of sanitary waste (especially cleaning tissues) and a large portion of packaging could be found. Samplings from the hydropower plant Freudenau contained higher amounts of plastic waste from households, sport and leisure activities as well as waste from ships (ropes, buoys). Washed up waste on the riverbanks was characterized mainly by plastic from households and packaging but also by a large portion of foamed plastic. In the hinterland a high amount of PET drink bottles and foamed plastic could be found.

A newly developed sampling and sorting protocol helps to compare results of respective studies in the future.

FOUND PLASTIC WASTE IN AND ALONG THE DANUBE

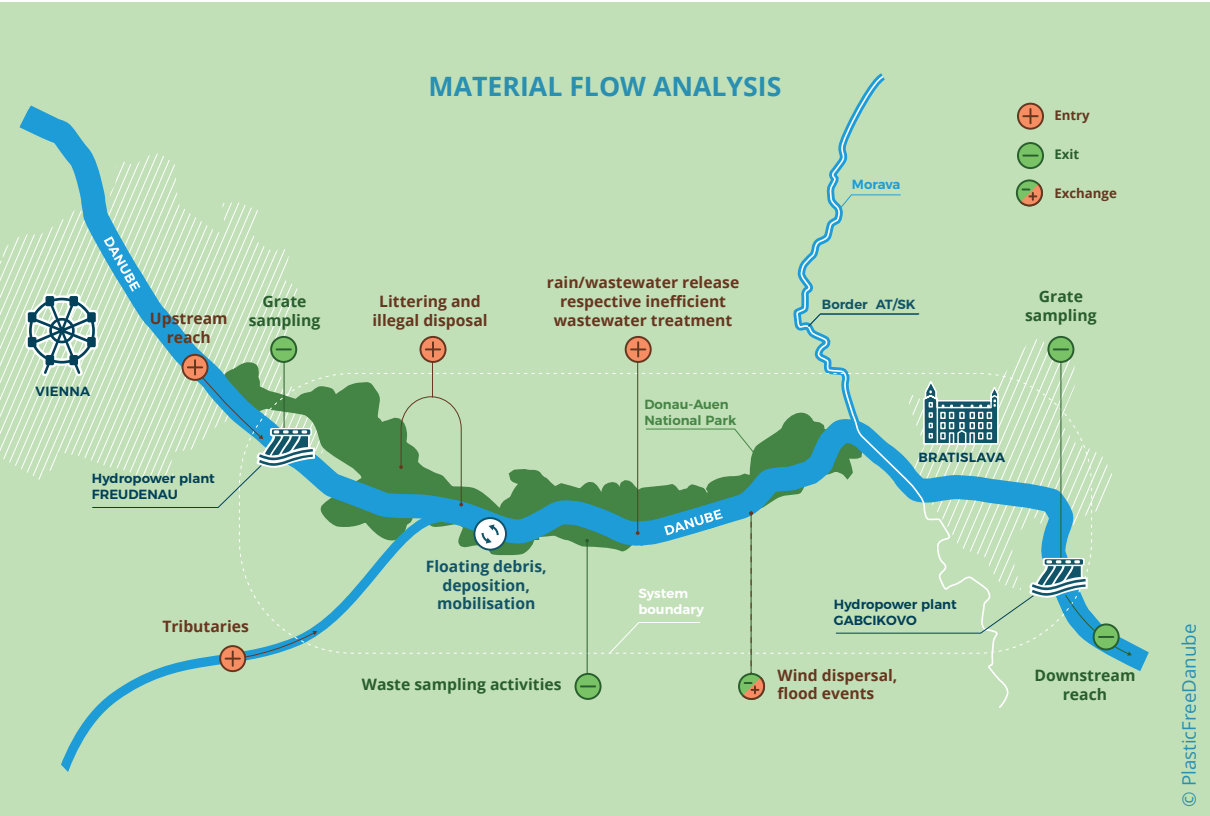


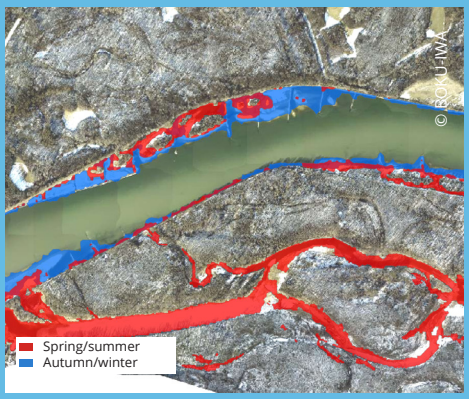
Modelling the material flow

Pollution is often not to find at the source of emission. This is especially true for plastic waste in the Donau-Auen National Park. The low weight of plastics favours wind dispersal and transport together with rainwater across long distances.

In order to create appropriate prevention measures it is important to know the origin of plastic waste and its pathways into the Danube.

This can be illustrated quantitatively with the help of a material flow analysis (MFA). It shows sources, pollution hotspots, input and output pathways of plastic waste into the Danube.





Delineation of potential river bank near accumulation zones based on the model results.

Measurement of plastic transport with specific nets on the Freudenauer harbour bridge.

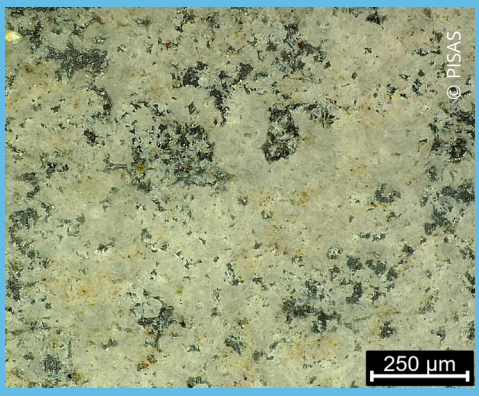
3D hydrodynamic modelling

Seasonal zones with high accumulation potential were detected and quantified along the Danube east of Vienna with so called numerical modelling of hydrodynamics. Further simulations deal with the impact of hydraulic structures and vegetation on the accumulation behaviour.

The findings should help to define specific collection areas and to estimate the possibilities for artificial accumulation zones.

In order to better estimate the input pathways, measurements at the hydropower plant Freudenau were accompanied by measurements of plastic transport in the Viennese Danube Canal. Additionally, GPS tracer were used for tracking of single plastic pieces in the Danube.

Samples of macro plastic after one month in moving water.



Driblet of sample no. 5 under the microscope: detected microplastics.

Analysis of plastic waste

Samples of plastic waste collected in the project area were analysed with so called "leaching experiments" to evaluate if hazardous substances can leak from the plastic waste.

Emergence of microplastics and possible toxic substances was evaluated with micro-FTIR, optical microscopy, gas chromatology and mass spectrometry. Concentrations of detected organic substances were below the hazardous limits. Chemical analyses performed in order to determine the occurrence of metals detected an increased concentration of antimony in PET bottles.

Awareness raising & action plan

Raising public awareness towards the problem of plastic waste in nature in general and in rivers in particular is the key to sustainable behaviour changes.

Therefore, information events and workshops were organized within the project as well as information materials for schools and other educational institutions were developed. All documents and reports can be downloaded on a digital communication and information platform, where it is also possible to add initiatives and events against the global plastic waste pollution.

Moreover, an action plan for the management of plastic waste was derived from the outcomes of the project and workshops with various stakeholders and decision makers.

More information can be found here:

plasticfreeconnected.com

Protect Nature – avoid pollution!

plasticfreedanube.eu

Macro plastic waste in and along the Danube

PlasticFree Danube

Project duration:
1 October 2017 – 31 March 2021

Budget: 1.23 mil. euro

EU Funding (ERDF): 1.04 mil. euro

Funding programme:
Interreg V-A Slovakia-Austria
2014-2020
www.sk-at.eu

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Printed according to the directive "printed material" UZ 24 of the Austrian eco-label, *name of the printing company*

The project is realized by the following partners from Austria and Slovakia:

ABF BOKU · viadonau · RepaNet o.z. · BOKU IWA · Polymer Institute SAS · nationalpark donauauen – Kostbare Natur für Generationen

National co-financing:

Federal Ministry Republic of Austria
Climate Action, Environment, Energy, Mobility, Innovation and Technology

City of Vienna Water Management

Ministry of Agriculture and Rural Development of the Slovak Republic