WWF

REPORT

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Freshwater

ASSESSMENT OF THE RESTORATION POTENTIAL ALONG THE DANUBE AND MAIN TRIBUTARIES

Breaching 300 m of dikes that surround Ermakov island reconnected the island's barren interior to the life force of the Danube's seasonal flooding.

What is the best strategy for restoring Danube floodplains?

Floodplains are the land adjacent to a river that experience periodical flooding. Along the Danube and its tributaries, floodplains have provided benefits to people for millennia, such as retention of flood waters, replenishing groundwater to secure drinking water supply, water purification, as well as provision of wood, fish, game, and reed. In recent times, their value for recreation and tourism, as well as for climate change adaptation, has moved into the centre of attention. They are also biodiversity hotspots due to their diversity of dynamic habitats adapted to thrive with fluctuating water levels – marshes, wet meadows, specific forests and reed beds, to name just a few.

Once, the floodplains of the Danube river system covered 10% of the basin. In recent history, 80% of these floodplains have been cut off by dikes and dams for flood control, hydropower generation or to improve navigability, which led to severe ecological consequences. European environmental legislation, in particular the EU Water Framework Directive, the Floods Directive and the Nature Directives, call for a reversal of this trend. The question is how to restore Danube basin floodplains in the most cost-effective, efficient and socially acceptable way?

As a contribution to answering this question, WWF commissioned the study “Assessment of the restoration potential along the Danube and main tributaries”, which delivered first answers in July 2010 .

People matter

A closer look reveals that along the upper stretches of the Danube, in Germany and Austria, free flowing river sections are few and the construction of flood protection dikes started systematically cutting off floodplains as early as 1870.

Consequently, ecological changes are much more profound and the restoration potential is lower than along the Middle and Lower Danube.

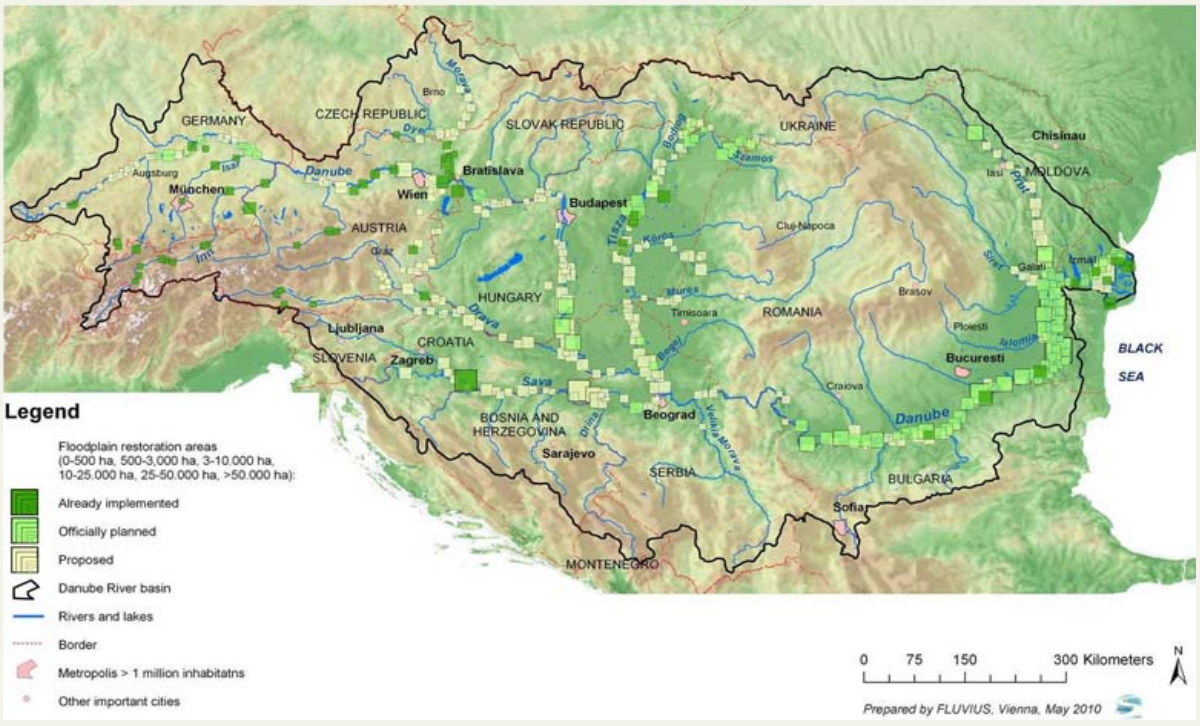
In Slovakia, Hungary, Croatia and Serbia, the river is still free-flowing with the exception of the Gabcikovo and Iron Gate dam stretches, but floodplains have nevertheless suffered from the construction of flood protection measures over the past 100 years. The deposition of fine sediments in the floodplain hand-in-hand with channel incision due to river straightening has impacted the groundwater table over many decades. So restoration is difficult, but possible, and needs to be accompanied by measures to restore the interrupted continuity between the river and its floodplain (removal of dikes or other infrastructure, reactivating side arms and former natural channels) as well as sediment management measures.

The floodplain wetlands along the lower Danube and in the Delta have been disconnected systematically from the main channel only during the past 50 years. Due to the rather "young" disconnection and good ecological conditions, the restoration potential is largest in this part of the basin.

However, not only historical and natural conditions determine the feasibility of floodplain restoration measures. The legal framework, who uses and owns the land adjacent to the river, hard data underpinning cost-benefit calculations and last but not least, acceptance by the local population, are crucial factors as well.

DEFINING THE TASKS AHEAD

The Danube River Basin Management Plan of 2010 produced under the leadership of the International Commission for the Protection of the Danube River (ICPDR) proposes to restore a total area of about 560,000 ha of Danube floodplain area plus 100,000 ha along the major tributaries of the Danube. The WWF study came up with a somewhat higher potential of 810,000 ha along the Danube, so the difference is not considerable. For the tributaries, however, the WWF study proposes another 570,000 ha. This figure includes 50,000 ha in Lonjsko Polje along the Sava River, which has already been restored in recent times.



Floodplain restoration areas (implemented, planned, proposed) along the Danube and major tributaries

Building a Green Infrastructure

TO ENSURE THE FUTURE OF MIGRATORY SPECIES MIGRATION CORRIDORS SHOULD BE IDENTIFIED AND MANAGED PROPERLY

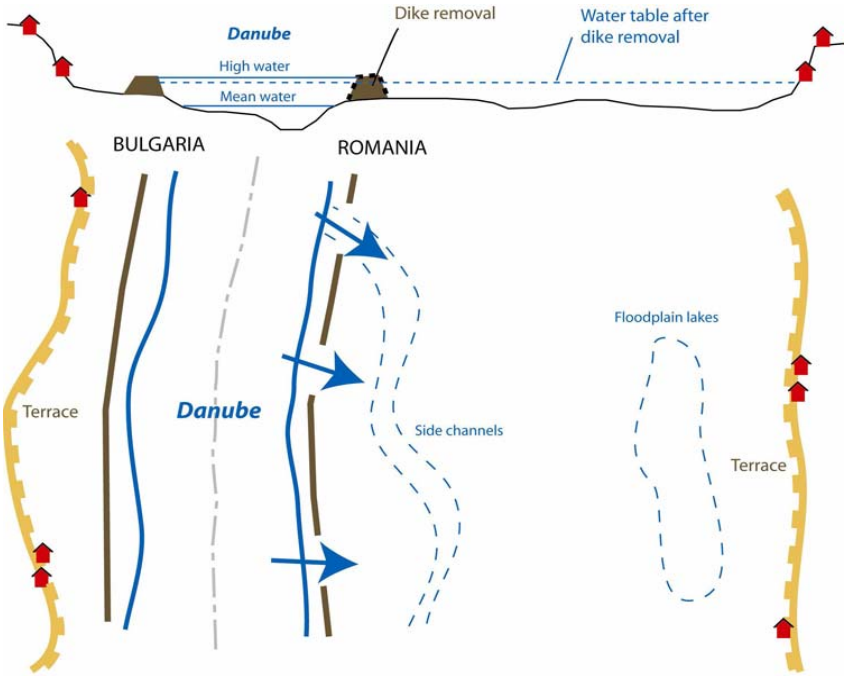
The Danube ecosystem and its habitats have become increasingly fragmented by dikes, roads, settlements etc. This loss of ecological coherence is a major reason for biodiversity decline, reduced supply of ecosystem services, and lower resilience to stress such as climate change. The good news is that a functioning "green infrastructure" can be recreated by linking habitats or securing stepping stones to facilitate the movement of species, as well as restoring critical habitats such as floodplain wetlands. 40% of the Danube floodplain is already protected by national and international environmental law, so a good foundation has been laid. It is consequently a matter of some extra, well planned restoration and management efforts to re-establish a fully functioning green infrastructure in the Danube basin.

Therefore, biodiversity aspects should be taken into consideration when planning floodplain restoration work:

- Identify areas that could serve as stepping stones and migration corridors and manage them appropriately
- Embed restoration projects in local and regional nature protection planning
- Aim at increasing diversity of riparian habitats from stagnant water bodies to highly dynamic (reconnected) side-arms.

Flood protection – working with nature

Fortunately, there has been a recent paradigm shift in the water management sector. New flood protection projects are supposed to be "ecologically sound", working more with nature and less with "hard" infrastructure measures. The principle mechanism is to create more space along the river that can soak up floodwaters, thereby reducing flood peaks. This can be done e.g. by reconnecting former wetlands or reactivating sidearms.



If floodplain restoration measures are to serve flood protection purposes, the following aspects are of particular importance:

- Create and maintain retention areas above or next to areas of considerable flood risk and with high economic or cultural assets such as town pairs on both sides of the river.
- Assess the capacity of restoration sites to retain floodwater. During the 100-year flood event in 2002, the Austrian Danube floodplains had a retention volume of approximately 0.6 billion m^3 and substantially mitigated the flood peaks in Vienna, Bratislava and even Budapest. With an average of 1.5 m water depth of potential restoration sites, a total capacity volume of about 13.5 billion m^3 is realistic.
- Opportunities for creating large scale, freely-floodable floodplains are higher along the middle and lower courses of major rivers
- Polder solutions are more costly and less ecologically sustainable, and should be reserved for cases where no natural retention areas can be created.

Ermakov isl. before restoration and during the first flooding

Babina polder before restoration and two years afterwards

High cost-benefit ratio

Large scale restoration projects can take up to 10 years. They often go beyond some infrastructural measures, requiring changes in land management, e.g. less intensive forestry or mowing of meadows.

Monitoring is a necessary tool to assess the restoration progress over years or decades.

Restoration areas must be protected and integrated into the existing protection network.

Dikes might have to be relocated, land purchased.

All these costs of course vary from project to project and country to country, but an average initial investment cost of 5,000 €/ha seems reasonable. Total investment costs in the Danube basin would therefore amount to about 6,000,000,000 €.

However, it is important to remember that along the lower Danube, for example, the monetary value of restored floodplains is approximately 500 €/ha/year, according to recent calculations. It is apparent that the initial investment into restoration measures pays off within a relatively short period of time.

TAKING THE FIRST STEPS

Based on the updated floodplain delineation and the newly assessed restoration potential, the following steps lie ahead:

- Agree on a basin-wide prioritisation approach
- Develop national, or even international, floodplain inventories and realistic restoration targets
- Identify and prepare at least one large pilot restoration site (>3,000 ha) per country by 2015 as a blueprint for future efforts.
- Protect and improve still existing retention areas
- Inform and involve the public
- Share experiences across borders
- Embed river and floodplain restoration into national and international biological corridor network planning as well as spatial plans
- Stop river bed degradation and further floodplain elevation due to fine sediment accumulation
- Prevent further deterioration of the river system from unsustainable infrastructure projects

The full study can be downloaded from
http://assets.panda.org/downloads/restpotwwf_dcpofinal08072010.pdf

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