Watch your Danube

Joint Danube Survey

icpdr iksd

Fact Sheet 6

Significant Water Management Issue 4: Hydromorphological Alterations

About the Joint Danube Survey 3: The Joint Danube Survey 3, also known as 'JDS3', is the world's biggest river research expedition in 2013. Its main goal is to produce highly comparable and reliable information on water quality and pollution for the entire Danube River and many of its tributaries and to raise awareness about the importance of the Danube and sustainable water management. The International Commission for the Protection of the Danube River (ICPDR) coordinates the implementation of JDS3. Launched on August 14, 2013 from Regensburg, Germany, the boats of the JDS3 will travel 2,375 km downstream the Danube River, through 10 countries, to the Danube Delta in Romania and Ukraine until late September.

About the Significant Water Management Issues: The EU Water Framework Directive (WFD) requires that all EU waters reach at least good status by 2015 (or at the latest by 2027). The Danube River Basin Management Plan (DRBMP) 2009 and its Joint Programme and Measures (JPM) focus on four Significant Water Management Issues (SWMIs) that affect the quality of rivers and lakes as well as transboundary groundwater bodies, namely: pollution by organic substances, pollution by nutrients, pollution by hazardous substances and hydromorphological alterations. This Fact Sheet presents an overview of the pressures, vision, measures and expectations for hydromorphological alterations. It is part of a series of four fact sheets, each dealing with one specific SWMI.

Overview of main pressures, sources and measures

Hydromorphological alterations are defined as alterations to the physical characteristics of a water body's shape, boundaries and content. Good hydromorphology is essential for meeting the requirements of the Water Framework Directive (WFD), because it contributes to `good ecological status´ whereby waters must provide good conditions, such as migration routes and suitable habitats, for natural species to live healthily. This goes alongside the WFD requirement for `good chemical status´.

The Danube River Basin Management Plan identifies hydropower generation, navigation and flood protection as the key water uses that cause hydromorphological alterations. These result in the following key pressures of basin-wide importance: the interruption of river and habitat continuity; the disconnection of adjacent wetlands/floodplains; and hydrological alterations.

The overall goal for the restoration of *river and habitat continuity* is the re-establishment of free migration routes for fish in DRBD rivers with catchment areas over 4,000 km^2 through the construction of fish migration aids. 932 migration barriers are located in the Danube River Basin District (DRBD), of which 56 are located in the Danube River itself. The Joint Program of Measures indicates that, by 2015, 108 fish migration aids will be constructed. The remaining interruptions will be addressed in the next WFD cycles 2015-2021 and 2021-2027.

The Iron Gate dams I & II at the border between Romania and Serbia are a specific challenge. They

represent the first impassable obstacles for fish migration along the Danube River from the Black Sea. Restoration here would re-open a reach of more than 800 km, providing access to habitats and spawning grounds along the Danube and its tributaries for sturgeons and other migratory fish species. Different ways to re-establish longitudinal connectivity at the Iron Gates are currently assessed and part of a set of measures proposed in the "Sturgeon 2020" program of the "Danube Sturgeon Task Force" (see http://www.dstf.eu).

The DRBM Plan concluded that 80% of the DRBD's former *wetlands/floodplains are disconnected*, largely due to the expansion of agricultural uses and river engineering works for flood control, navigation and power generation. Significant restoration efforts and measures are needed. In 2009, 95 wetlands/floodplains (covering 612,745 ha) with the potential to be re-connected to the Danube River and its tributaries were identified. Of this, the JPM indicated that 11 wetlands/floodplains (62,300 ha) should be reconnected by 2015.

Hydrological alterations impact the status of water bodies for different reasons, for example through alterations and reductions to flow velocities and the flow regime, or alterations in the quantity and flow dynamics of rivers. In the DRBD, 449 water bodies are affected by impoundments, 140 by water abstractions and 89 by hydropeaking. Overall, the JPM foresees that 139 measures to improve impacts on water bodies caused by hydrological alterations will be implemented by 2015.

Impoundments are caused by barriers that - in addition to interrupting river/habitat continuity – alter the upstream flow conditions of rivers. The character of the river is changed to lake-like types due to a decrease of flow velocities and the eventual alteration of flow discharge. Examples of measures to improve the environmental situation include the restoration of habitats and the reconnection of backwaters. 52 impoundments are reported to be improved by 2015.

The key water uses causing significant alterations through water abstractions are hydropower generation, agriculture and forestry, as well as public water supply. Other uses are cooling water especially in caloric and nuclear power plants, the manufacturing industry and navigation. These significantly reduce the flow and quantity of water and impact the water status where the minimum ecological flow of rivers is not guaranteed. 140 water abstractions cause alterations to water flow in DRBD rivers. 42 measures were indicated in the JPM to be implemented by 2015.

Hydropeaking occurs through the generation of peak energy supply by hydropower stations (i.e. stations store as much water as possible before releasing it to create maximum energy surges). Altered flow regimes below hydropower plants occur in 89 water bodies of the DRBD - 32 are causing significant water level fluctuations. Three measures addressing hydropeaking were reported by Austria in the JPM to be implemented by 2015.

Future infrastructure projects for navigation, hydropower and flood protection may have negative impacts on water status and need to be addressed. The development and application of Best Available Techniques and Best Environmental Practices is crucial. Environmental requirements and stakeholder

involvement must be considered as an integral part of the planning and implementation process. In response, the DRBM Plan suggests developing processes and guidance documents. In cooperation with the Danube Commission and Sava Commission, the ICPDR has already started a cross-sectoral discussion process with the navigation sector involving all relevant stakeholders and NGOs, leading to a Joint Statement on sustainable inland navigation (http://www.icpdr.org/main/activities-projects/joint-statement-navigation-environment). In June 2013, the ICPDR adopted a set of guiding principles on sustainable hydropower development for the Danube Basin (see: http://www.icpdr.org/main/activities-projects/guiding-principles-sustainable-hydropower). A new integrated flood risk management approach focusing on prevention, protection and preparedness including forecasting is also being promoted.

SWMI Visions for hydromorphological alterations

The balanced management of past, ongoing and future structural changes of the riverine environment, so that the aquatic ecosystem in the entire Danube River Basin functions in a holistic way and is represented with all native species.

Anthropogenic barriers and habitat deficits do not hinder fish migration and spawning anymore – sturgeon species and specified other migratory species are able to access the Danube River and relevant tributaries. Sturgeon species and specified other migratory species are represented with self-sustaining populations in the Danube River Basin according to their historical distribution.

Floodplains/wetlands in the entire Danube River Basin are re-connected and restored. The integrated function of these riverine systems ensures the development of self-sustaining aquatic populations, flood protection and the reduction of pollution in the Danube River Basin.

Hydrological alterations are managed in such a way that the aquatic ecosystem is not influenced in its natural development and distribution.

DRBM Plan 2009 and its implementation

The DRBM Plan 2009 includes a Joint Programme of Measures (JPM) where the coordinated visions, management objectives and measures of basin-wide importance for the first WFD cycle 2009-2015 can be found (http://www.icpdr.org/main/activities-projects/river-basin-management).

In 2012, the ICPDR published an “Interim Report on Progress in the Implementation of the Joint Programme of Measures in the Danube River Basin” (http://www.icpdr.org/main/publications/reports). With regard to hydromorphological alterations, it concludes:

With the implementation of the Water Framework Directive, hydromorphological aspects were introduced into water management due to their key relevance for the ecosystem and the achievement of ‘good status’. A number of hydromorphological measures were selected in the 1st DRBM Plan, including measures on the improvement of river and habitat continuity, the re-connection of adjacent

floodplains/wetlands, addressing hydrological alterations like impoundments, water abstractions and hydropeaking, as well as the issue of future infrastructure projects and the way such projects can be implemented in a sustainable way.

A number of those measures are already completed or the construction is ongoing. The bulk of the measures is currently in the planning phase (e.g. technical planning phase, licensing procedures, public procurement procedures), to be completed after 2012. The main reasons which were identified for causing delays are existing administrative hurdles (e.g. solving ownership questions or existing permits valid for a long time period putting a challenge on adaptive management), partly still existing shortcomings with regard to the know-how on technical issues (cause-and-effect relationship between measures and the effect on the biology), as well as the lack of financial resources for full measures implementation.

Regarding technical questions, experience is expected to grow with the currently ongoing implementation of hydromorphological measures, allowing for a more targeted and effective selection of measures for the next WFD cycle. Technical guidance documents, which are currently under development in some Danube countries (e.g. on the design and construction of fish migration aids), can help not only in terms of taking the right technical steps but also supporting the administration and water-related economic sectors by setting a clear framework for implementation of cost effective solutions. This is supported by the ongoing activities on integration taking place with different sectors in the frame of the ICPDR, i.e. with inland navigation, hydropower and flood risk management, besides strategic approaches for targeting measures in a most efficient way (i.e. the update of the ecological prioritisation approach for continuity restoration in the Danube River Basin, respectively ongoing discussions on a priority ranking with regard to the re-connection of adjacent floodplains/wetlands).

In the frame of the Joint Danube Survey 3 (JDS3), a continuous longitudinal survey will be carried out to obtain an overview of the hydromorphological conditions of the Danube from Kelheim (rkm 2,415) to the Danube Delta (rkm 0). This survey will consist of the assessment of channel, banks and floodplain according to a European standard. In parallel, a detailed hydromorphological characterization of JDS3 sampling sites will be done to support the interpretation of biological assessment. To obtain a complete picture, a number of additional supportive measurements will be performed such as sediment characterization, suspended sediment analysis, flow velocity and discharge measurements and measuring the water level slope and water level fluctuation.