Joint Danube Surveys and contributions of IAD

Ulrich Schwarz: FLUVIUS, Floodplain Ecology and River Basin Management, Vienna, Austria, e-mail: Ulrich.Schwarz@fluvius.com

The Joint Danube Surveys and hydromorphology

While for the first JDS in 2001 only a few local parameters and images of the sampling sites were taken as a general description, such as bank conditions (natural/rip-rap) or the sediment composition, in 2007, the JDS 2 applied the CEN Guidance standard (CEN 2004) for the first time and assessed a total of 66 Danube segments of individual length by using assessments for channel, banks and floodplains (Schwarz 2008a and 2015c, Schwarz & Kraier 2008b). Additionally a systematic picture and, for some sites, video documentation and leaflets with core information were prepared to support biology teams in creating quality elements and to allow long time documentation and comparison of developments along the entire river.

During JDS 3 in 2013, following the general monitoring cycle of WFD with six years, the 10 river km segment assessment as well as WFD 3 Digit assessment according to supplementary CEN scoring standard (CEN 2010) was introduced and for the first time combined by in-situ measurements on all JDS sites implemented by VUVH (water research institute) Bratislava with own team. Both analyses have led to an extensive joint assessment report of JDS 2 and 3 by field research (Schwarz & Holubova 2015a and b).

The JDS 4 in summer 2019 was not operated by a central research team and vessels, but only by national teams coordinated in regional workshops. Regarding hydromorphology, it was possible to update the results of JDS 2 for the 10 river km segments, prepared by the countries (desk work). The ICPDR Secretariat has developed an online data entry tool allowing countries to report individual changes (improvements and deteriorations, such as newly implemented training structures or vice-versa, restoration activities like the removal of rip-rap or reconnection of side-channels), which are then centrally collected and assessed (results expected for winter 2019/2020). In addition, infrastructure and restoration projects for the respective period (2013–2019) were collected. This exercise provided a precise overview of changes and indicated measures to be taken to improve hydromorphological conditions.

As an outlook and for a potential JDS 5 in 2025, the new CEN standard 2018 (CEN 2018) should be applied, moving the assessment from the static, pressure based description of alterations towards a process based understanding of changes of hydromorphological processes. The recently finished Danube Sediment Project [1)] generated a lot of new important data on morphology such as sediment balance

[1)] http://www.interreg-danube.eu/approved-projects/danubesediment

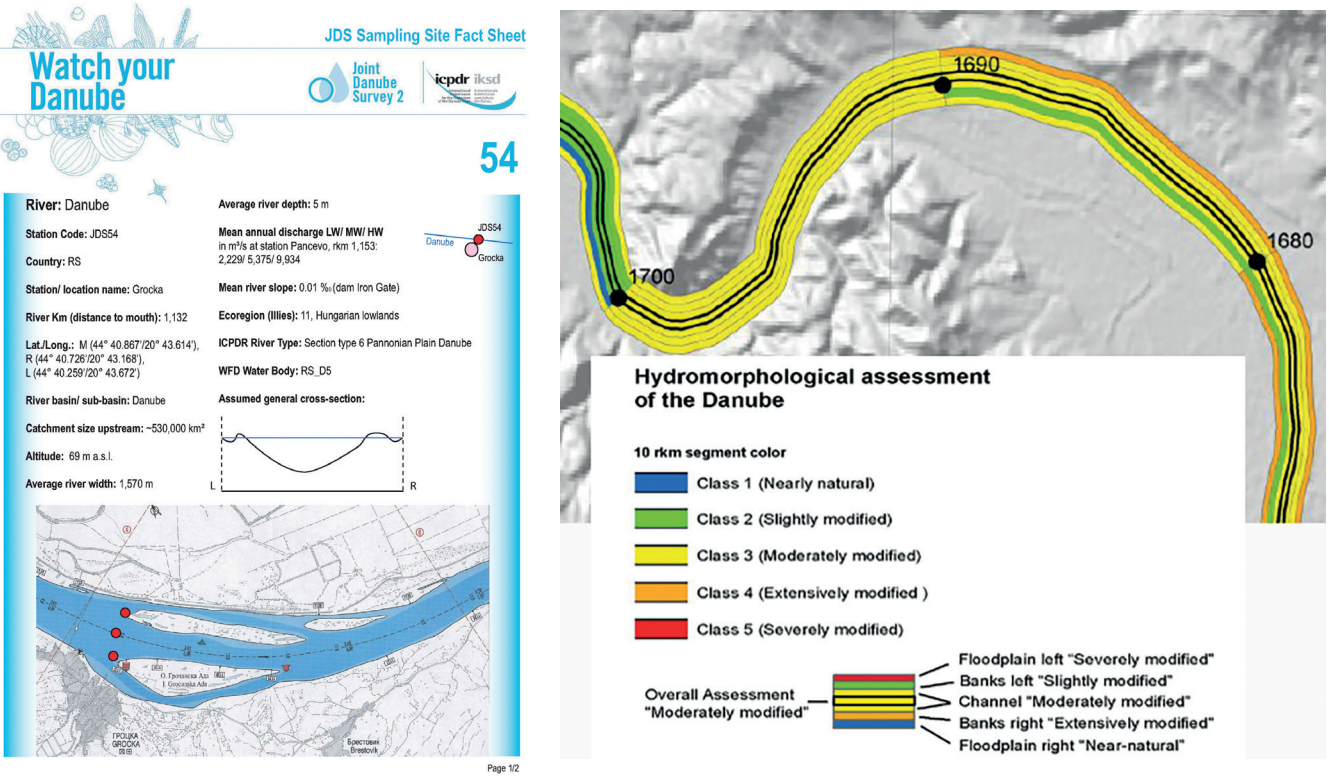

Figure 1: Factsheets for all JDS sampling sites (JDS 2) and 10 river km assessment reaches of the JDS 3

Figure 2: The Hungarian research vessel 'Széchényi', JDS 3 (photograph W. Kraier)

(including erosion and deposition stretches), longitudinal profile changes, planform analyses and river types as well as grain size distribution data, and gives first recommendations how to improve assessment methods regarding the sediment transport. The introduction of sediment deficit as a significant water management issue under the umbrella of hydromorphology is an important step in forcing countries to improve monitoring and to assess infrastructure projects under those aspects.

In the meantime, the hydromorphological aspects are reflected in many ICPDR papers, as such regarding the implementation of the European Floods Directive, the guidance documents for navigation and hydropower or within several workshops and projects on hydromorphology.

What are the development trends on the Danube in the past 12 years?

In general it can be stated that restoration on the upper and later also on the middle Danube becomes more important, however many projects are rather small and have only limited effects. The implementation of four fish passes along the Austrian Danube in recent years can be seen as an improvement for fish migration. In addition, the practices to reduce or even stop the extraction of sediment by dredging and to implement an adapted sediment management on the upper Danube is an improvement.

On the lower Danube, in general the situation is unchanged except for local regulation work such as the Bala branch groundsill. Further, the cascades of dams on tributaries such as on Iskar in Bulgaria or Jiu in Romania increased the lack of sediments along the lower Danube, which was mainly caused by the Iron Gate dams.

Finally, future infrastructure as well as restoration projects will influence the further development such as several low-water correction and management projects as for upper Serbian Danube reach (already ongoing), Romanian-Bulgarian border reach or the Hungarian Danube. But the results of the Danube Floodplain Project [2] which will propose restoration areas should also have the potential to change the hydromorphological assessment at least locally.

References

CEN (2004): CEN/TC 230 N 0463, Water quality – Guidance standard for assessing the hydromorphological features of rivers

CEN (2010): CEN/TC 230 N 0463, Water quality – Guidance standard for assessing the hydromorphological features of rivers

CEN (2018): preCEN/TC 230 N 0463, Water quality – Guidance standard for assessing the hydromorphological features of rivers

Schwarz U (2008a): JDS 2 Hydromorphological survey. In: ICPDR Joint Danube Survey 2. Final Scientific Report. ICPDR, Vienna, 32–40

Schwarz U, Kraier W (2008b): Hydromorphological assessment of the Danube for the ICPDR – Joint Danube Survey 2 (JDS 2): In: Conference proceedings 37th IAD Conference Chisinau, Moldova, 37–41

Schwarz U, Holubova K, Cuban R, Matok P, Busovsky J (2015a): JDS 3 Hydromorphological survey. In: ICPDR Joint Danube Survey 3. A comprehensive analysis of Danube water quality. ICPDR, Vienna, 40–71

Schwarz U, Holubova K (2015b): JDS 3 Hydromorphological survey. IAD Danube News 31, 3–8

Schwarz U (2015c): Hydromorphology of the Danube. In: Liska I (ed.): The Danube River Basin. The Handbook of Environmental Chemistry 39. Springer –Verlag, Berlin Heidelberg, 469-480.

[2] http://www.interreg-danube.eu/approved-projects/danube-floodplain