

Editorial

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Dear readers,

As responsible editors we invite you to enjoy reading the 40th issue of Danube News. This official bulletin of the International Association for Danube Research was launched for the first time in September 1999, 20 years ago. Jürg Bloesch, at that time president of IAD, took this important and finally long-lasting initiative. He conceptualized, improved and successfully edited Danube News for 13 years until October 2012. When we took over from his successor Georg Janauer in spring 2017, we were in the lucky position to step into a well-established and professionally managed task. Everyone connected to IAD knows Danube News and appreciates it as an outlet offering the opportunity to make scholars and the interested public familiar with research on the Danube or simply likes to read it. All issues of Danube News are available on the IAD-webpage and our dedicated current general secretary, Katrin Teubner, is regularly posting individual articles on the webpage.

We took this Danube News 'jubilee' as an opportunity to look back to the history of IAD and to reflect on perspectives for the future. Over the almost 65 years of its existence, IAD has passed turbulent times. Jürg Bloesch details in his contribution how IAD evolved and changed since 1956. He refers among others to the collapse of the communist regime and how it affected IAD and the cooperation of its scholars. But the hydrobiologists and limnologists, who investigated the Danube in the past decades found also a drastically changing ecological system. In the second half of the 20th century, human interventions into this European lifeline increased at an unprecedented speed. Pollution is an everlasting topic with many new substances harmful for the aquatic life but also for humans. IAD had to adapt to these alterations. As

the contribution of Georg Janauer and Gertrud Haidvogel summarizes, this is reflected in the scientific topics and programmes of the association. IAD conferences were since the beginning an important platform of exchange, not only of the latest scientific findings but also of social interaction. Thomas Tittizer offered a personal view of 42 IAD conferences over time, and Bernd Cyffka mapped the places. Finally, Uli Schwarz presents an overview on hydromorphological investigations during the Joint Danube Surveys to which IAD contributed substantially.

Looking back to history requires almost automatically to think about the future, in particular to which circumstances IAD will have to react and adapt in the coming years. Cristina Sandu, Thomas Hein and Katrin Teubner, the current IAD presidium, present their visions and especially major tasks to keep IAD as a lively association which tackles challenges of the Danube river basin. Teodora Trichkova writes from the perspective of an expert group leader, while Dušanka Cvijanović offers the expectations of a post doc. Finally, we are happy, that ICPDR as a main cooperation partner of IAD accepted our request to contribute its point of view and prospects.

We hearty thank all authors for their efforts and contributions to this particular issue!



Coverpages of Danube News 1 (1999; left) and 17 (2008). Since 2008, Danube News is published in English only and with new the layout. Danube News issues are available online at https://www.danube-iad.eu/index.php?item=danube_news

Highlights and challenges of IAD history

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The IAD, as the oldest NGO in the Danube River Basin (DRB), has a varied history. Its foundation in 1956, during the cold war, aimed at fostering research and scientific co-operation between the Danube countries as well as making the Iron Curtain between East and West semipermeable for scientists. After the collapse of the communist regime in 1989/90, the new political environment in the DRB necessitated a change in the mission of IAD. The ICPDR (International Commission for the Protection of the Danube River) was established as a water management body taking over some former tasks of IAD, which became an observer and cooperator of this governmental organization. After the turn of the millennium, IAD launched a new scientific strategy that aimed at bridging basic and applied science and increasing public visibility. Recently, IAD strengthened its network in the DRB by contributing to water protection and water policy. Detailed information is available on the IAD website www.danube-iad.eu.

Foundation of the IAD in 1956



Figure 1. Reinhard Liepolt (1906–1996), founder of IAD and president for 24 years. Credit: AC-IAD.

I can vividly imagine that, in the 1950s, the Austrian university professor Reinhard Liepolt (*Figure 1*) suffered in Vienna from a lack of scientific exchange with colleagues in communist countries about water protection issues for the Danube River Basin (DRB). Thus in 1956, he founded the IAD (Arbeitsgemeinschaft Donauforschung) with the help and cooperation of enthusiastic associates from other Danube countries and with the financial and moral support and under the umbrella of SIL (Societas Internationalis Limnologiae) (*Figure 2*). The organization of a scientific NGO with a president, a general secretary, national representatives (all forming the board) and expert groups (EG), similar as in SIL, allowed for annual meetings in Vienna where scientific issues could be discussed in a free atmosphere. SIL membership extended the scientific network in the DRB to a global level, and this exchange was beneficial for all members of both associations for decades. Only after a major shift in the SIL board and strategy initiated by the death of its long-term General Secretary

Bob Wetzel in 2005 (obituary in DN-12, 2005), IAD not only lost its small annual grant, but also – and more importantly – the official contact to the international limnological community by the decision to terminate SIL affiliation in 2010.

Apart from the annual board meetings in Vienna, IAD Conferences were the basic event to gather and unite EG leaders and researchers from the DRB to exchange data and knowledge (see Tittizer & Cyffka 2019). Conference Proceedings were published and are mostly available through the library of the University of Vienna¹⁾. Later, a few were summarized and published in scientific journals, (e.g. Bloesch 2002b, 2003, 2005). However, nowadays, they have disappeared mostly because the modern scientific system does not accept such contributions for professional records.

In a joint effort, Liepolt managed to publish a monograph on the Danube River (Liepolt 1967) that was an outstanding achievement of IAD and remained a key book of Europe's second largest river over decades (see Haidvogel & Janauer 2019). Not before 2009 was a comprehensive update published as chapter in the book 'Rivers of Europe' (Sommerwerk et al. 2009), now under revision for a second edition.

In this period, in 1976, the Austrian Committee of IAD was formed (www.oen-iad.org), operating as an association according to Austrian law. The AC-IAD honoured Reinhard Liepolt by issuing the 'Liepolt Award' for outstanding scientific contributions of young Austrian researchers every two years. Austria is the only country with a national committee, while member countries were and still are free to organize themselves (e.g. in electing their representatives).

Consolidation phase 1980-1992

Under the presidency of Imrich Daubner (CSSR), IAD remained a constant and reliable network in the DRB. Both national representatives and expert group leaders delivered annual reports documenting multidisciplinary IAD activities and outputs. Apart from the Danube River and its tributaries,

¹⁾ <http://bibliothek.univie.ac.at/fb-biologie/biologiellinks.html>



Figure 2. The founding members of IAD (from left to right): Dr. Russev, Prof. Dr. Mucha, Prof. Dr. Liepolt, Prof. Dr. Dudich, Dr. Rudesco, Prof. Dr. Banu, Dr. Knöpp, Vienna, December 1956. Credit: Thomas Tittizer.



Figure 3. The first IAD ship survey of the Danube from Vienna to the Black Sea in 1960, operated by the vessel MS Amur. Sampling in these days was performed in formal clothes with coat, tie and leather shoes. Credit: Thomas Tittizer.

lakes also were a matter of concern (later combined into the limnological catchment approach (Bloesch 2005) and the River Basin Management). The booklet ‘25 Jahre IAD’ (IAD 1981) shows exemplarily the IAD performance in these days, presenting short reports by national representatives. In this period, General Secretary Edmund Weber (obituary in DN-16, 2007) was a prominent leader and organizer of IAD Conferences. After five conferences in Vienna, these then took place according to a given sequence in all member countries, which was abandoned in the late 1990s. Further, most conferences had a headline pointing out the main topic, and produced resolutions on behalf of the public to highlight major achievements and problems in Danube River protection. Unfortunately, there was no systematic archive of these documents and board meeting protocols, although presently the IAD history is being researched. Most of the scientific output of IAD supporters is in publications in national and international journals, often located in Danube countries. At least, the triennial IAD reports by the presidents, published in the SIL-Proceedings, document the scientific production and personal changes.

In the years 1960/61 and 1988, IAD performed a Danube survey along the river course, encompassing physical, chemical and biological sampling, to get a clear picture about the degree of pollution (Figure 3). The results and compilations of key topics were published in the book series ‘Ergebnisse der Donauforschung’ (see Haidvogel & Janauer 2019). In the mid 1990s, a third Danube cruise was planned but not realized, mainly because of organizational and financial problems. These investigations were substituted later by ICPDR in their Joint Danube Survey (JDS) campaigns in 2001, 2007, 2013, and 2019 (ongoing) (see Schwarz 2019).

Political changes 1990 and new IAD strategy 1998

The major political changes in Europe in 1989/90 affected the work of the IAD (Wachs 1996, Bloesch 1999). In view of the foundation of the EU in November 1993, the water sector in the DRB was completely reorganized, cumulating in the establishment of the ICPDR in 1998 (www.icpdr.org), which

aims at implementing the Danube River Protection Convention signed in 1994 and enforced in 1998. IAD and WWF were the first NGOs accepted as observers in the ICPDR. Since ICPDR is a governmental organization, these NGOs cooperate in activities without voting rights. The main task of ICPDR is to coordinate the implementation of the EU-WFD (2000) in Danube Countries. As active observers, many IAD scientists work in several Expert Groups and contribute significantly to ICPDR reports and the JDS, as well as large EU-driven projects such as navigation (in particular, the submerged sill at Bala-Borcea Branch) and hydropower (in particular, the fish passage at the Iron Gate dams) both dealing with spawning migration and protection of the highly endangered Danube sturgeons (Reinartz 2002). More details are given in Schwarz (2019) and Haidvogel & Janauer (2019). IAD also participated with programs in the Danube Day – every 29 June – that was introduced by ICPDR in 2004 to raise public awareness (Figure 4).

In this changed political setting, the role of IAD to unite Danube Countries in water protection had ended, as this task was taken over by ICPDR. The decade programs of IAD became less important and were abandoned. However, IAD still aimed at promoting science as the foundation of water management and bridging basic and applied research (Sommerwerk et al. 2010). As a consequence of the war in the Balkans during the 1990s, the planned IAD Conference in Novi Sad was cancelled, and as a substitute, a first joint meeting with NR and EGL was organized in Mosonmagyaróvár, Hungary, in 1999. In 2002, an internal Peer Review (Bloesch 2002a) provided the foundation for strategic changes and to abandon a few traditions: i.e. balance novelty with tradition in a changed environment. The board decided to prioritize a few key research topics (sturgeons, macrophytes, microbiology, Danube quality maps and biomonitoring; later complemented by hydromorphology), while the Danube Delta, the Vienna floodplains and old Danube branches, the Hungarian internal delta (Pannonian Plain), the Iron Gates, the Lower Danube Green Corridor as well as major tributaries remained hotspot areas of scientific interest. IAD was transformed from a loose



Figure 4. Danube Day 2006: IAD transboundary bicycling tour from Vienna to Győr. The official ICPDR theme ‘Danube Living Space’ was interpreted by IAD as ‘Let the Danube inspire you’ and realized by ‘Save the Sturgeons’. Credit: Meinhard Breiling.

network into a legal association according to Austrian law to allow application and partnership in European research programs. This necessitated creating statutes and introducing a list of members paying an annual fee as the countries already did since 1956. Also, significant physical changes occurred, e.g., losing the traditional support of the Austrian Ministry, leaving the traditional host institute in Vienna (Bundesanstalt für Wassergüte) and organizing a new IAD office for the General Secretary.

After these structural revisions, in 2010, the Presidium was enlarged by the Vice-President to increase the representation of IAD in international organizations. Other changes occurred with Expert Groups (EG), a process that is still ongoing today. Some EG lost their leaders by retirement and no successors were found, some traditional basic science EG merged (e.g. Phytoplankton and Zooplankton), and some topics lost importance (e.g. Radiology). Further, new topics emerged, leading to new EG such as Floodplain Ecology, Invasive Alien Species, LTSE & Environmental History, and Sustainable Development & Public Participation. There was a change from traditional basic aquatic science disciplines (chemistry, physics, biology) to more applied and societal subjects. Any EG should be active in networking and representing IAD, as documented in annual reports in a similar way as the country annual reports.

The German representative at that time, Thomas Tittizer, suggested launching an IAD bulletin to reach the public. This idea was first realized in 1999 by bilingual issues in German and English, the latter recognized as the accepted international (scientific) language. Since 2008, the bulletin is published in English only and in a new modernized layout. Danube News – Donau Aktuell (ISSN 2070-1992) appears twice a year and features the most challenging topics in aquatic research and water pollution issues relevant to the DRB. They also contain obituaries of prominent IAD officers that reflect parts of its history. All editions can be downloaded from www.danube-iad.eu.



Figure 5. Mureș/Maros River, with a mean discharge of 184 m³/s, the largest tributary of Tisza River that flows into the Danube River. It still features many near-natural stretches with extended gravel bars and riparian vegetation. Photo: Jürg Bloesch.

Celebration of 50 years IAD (2006)

The 50 year anniversary of IAD was celebrated in Vienna during the 36th IAD Conference. The historical evolution and the turnaround of IAD are well documented in Danube News 13/14, 2006, where the Mureș River, Romania, was proposed to be a model catchment as a potential outdoor lab for IAD (Sandu 2008, Schwarz 2010) (Figure 5). Since the late 1990s, IAD tried to be more visible by disseminating PR materials (IAD flyers since 1995), maintaining a homepage (from 1999), and exhibiting roll-ups, all being periodically updated. Moreover, its attractiveness was enhanced by supporting young scientists in the Middle and Lower Danube countries. During 2001–2007, IAD sponsored SIL poster presentations of four PhD students in Melbourne, Lahti and Montreal that were selected by peer review. The requested reports of the conferences documented the positive and useful experience of creating and presenting a good poster, and likely assisted these students to create an international network and promote their scientific careers. Nowadays, these activities are sustained by small grants for young students attending IAD and international conferences.

The present – bottom line of 63 years IAD existence

The vivid history of IAD reflects the different cultures in the DRB, major political changes, and the strong gradient of financial power from upstream to downstream countries. Over decades, IAD fostered the scientific dialogue across borders, adding a new dimension in the past years: dissemination of scientific results to the policy level and the public, in particular by contributions to international projects and in the framework of the ICPDR and the European Strategy for the Danube Region (EUSDR, Priority Areas 4 (Water Quality) and 6 (Biodiversity)). The bridge between science and politics is complex and difficult, as governmental managers and decision makers often do not take scientific data and facts into consideration, and only a strong scientific foundation can yield reliable and truly sustainable solutions to environmental problems.

Major scientific achievements are presented and acknowledged in Haidvogel & Janauer (2019) (see also Bloesch 2009); but scientific quality is an everlasting task. Too many papers are descriptive and present so-called monitoring results, rather than investigating ecological processes, testing hypotheses and developing concepts. While the introduction of a review system for IAD Conference contributions was a first step for improvement, scientific education remains a primary problem. Although several universities are actively involved in IAD research, political pressure influences education systems not only in primary schools, but also in universities and Academies and, hence, has an impact on IAD performance. In the conflict area of bottom-up and top-down strategies, the IAD presidency is dedicated to acquire funding and implement

projects targeting the protection and restoration of aquatic biodiversity in the Danube Region, to attract all Danube countries and motivate scientists to become pro-active IAD members and promoters, and to further increase IAD visibility at the regional level.

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Six decades of scientific cooperation in the Danube River Basin

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In 2020, the International Association for Danube Research (IAD) looks back to almost 65 years of investigating the second largest river system of Europe. Since 1956, IAD has passed turbulent times. Scientific cooperation across the political divide between 'west' and 'east' is without any doubt among the biggest achievements which was attained until the turn from the 1980s to the 1990s (Bloesch 2019). Using among others previous publications on the history of IAD and the extensive IAD-library hosted at the University of Vienna this article summarizes major research topics and their change over time (e.g. Daubner 1982, Berczik 1995, Bloesch 1999, Bloesch 2009).

Development of Danube research and main scientific achievements of IAD

Efforts to establish an international association for Danube research started much before the Iron Curtain divided the Danube countries. In 1935, the 'Internationale Kommission zur wissenschaftlichen Erforschung der Donau' (International Commission for the Scientific Investigation of the Danube) was founded. The Austrian fishery scientist Adolf Cerny, his famous Romanian colleague Grigori Antipa and the Hungarian Danube researchers Rezső

Maucha and Emil Unger were important promoters (Liepollt 1959, Berczik 1995). Already in 1935, A. Cerny undertook a first river survey by ship to get in touch with other scholars and to exchange on the most needed research activities. Water samples were taken during the travel and analyzed either directly on place or at the 'Hydrobiologische Donaustation' in Vienna. Following contemporaneous European research trends in hydrobiology, monitoring fish migration was identified as a major task. Emil Unger was designated to lead this endeavor envisaged for 1936. A large number of fish specimen should have been marked, and (re-)captures being reported back by fishermen similar to studies of the Upper Danube, the Rhine or the Main (see e.g. Steinmann et al. 1937). Soon after, the deteriorating economic situation and World War II prevented coordinated activities among scientists for many years. But the Danube Commission of 1935 is proof that researchers in the Danube River Basin exchanged and cooperated already before World War II. One might speculate that these efforts have helped to set up and implement a comprehensive joint scientific program shortly after the foundation of IAD in 1956. In many countries, the formation of IAD speeded up long-lasting initiatives. For example, in Hungary, it gave the necessary impetus to establish internationally connected Danube research via the foundation of the 'Danube Research Institute' at the Hungarian Academy of Sciences (Berczik 1995).

Within few years, IAD organized and accomplished a joint survey of the Danube from Vienna to the Black Sea and from the source to Vienna in 1960 and 1961, respectively. Based on a wealth of field observations, IAD published the outstanding edited volume 'Limnologie der Donau' in 1967 (Limnology of the Danube, Liepolt 1967). It covers a wide range of scientific topics, reflects nicely the full scope of limnology and integrates societal aspects. On almost 600 pages it addresses climate, hydrology, palaeography, physics, chemistry, radiology, biotic processes, biology, biological impacts of human interventions as well as human uses. The volume closes with a brief overview on history, culture and the interaction between men and the Danube. As R. Liepolt states in his preface, in the late 1960s IAD-scientists were concerned with the expected changes of the Danube due to increasing societal imprint by pollution and hydromorphological alteration. At that time large hydropower plants had been completed on the Upper Danube, others were project here and on the Middle and Lower Danube, such as the Iron Gates dams. On the lowest river section, the extensive floodplains were increasingly threatened by plans to modernize and industrialize Romanian agriculture. Most of the projects suggested in the 1950s and 1960s were realized in the following decades. But the scholars contributing to the first IAD Danube survey could still pass, e.g., the island Ada Kaleh which was soon to be drowned in the Iron Gates impoundment, and they found the huge inundation zones at Braila still untouched from large scale drainage systems (*figures 1–3*). The scientific data collected are thus of tremendous importance because they show river conditions before the major impacts of the second half of the 20th century. With respect to comprehensiveness and scientific detail, Liepolt's 'Limnologie der Donau' remains without a comparable successor publication to date despite important reviews of the ecological conditions of the Danube and its major tributaries had been published in recent years (e.g. reports on the findings of the Joint Danube Surveys or Sommerwerk et al. 2009).

Another vital sign of IAD activities was made possible due to its official recognition as part of the Societas Internationalis Limnologiae (SIL) in 1959. Cooperation with SIL not only offered opportunities for fruitful scientific exchange outside of the Danube river basin. It also paved new ways of promoting research findings. Between 1963 and 1992, IAD issued 'Veröffentlichungen der Arbeitsgemeinschaft Donauforschung' (Publications of the Association for Danube Research) as supplements to 'Archiv für Hydrobiologie', the official journal of SIL. The eight volumes and almost 30 issues address all aspects of limnology research on the Danube. In 1986, a bibliography on the 'Limnologie der Donau und ihrer Nebengewässer' was compiled, impressively showing the scientific output 30 years after the foundation of IAD (Limnology of the Danube and its tributaries; Godeanu & Popescu-Marinescu 1986). A systematic analysis of all these publications and its contents is still lacking.

In 1988, an initiative for a second Danube survey in the section between Vienna and Vilkovo was taken. The results were presented in 'Ergebnisse der Internationalen Donauexpedition 1988' (Results of the International Danube Expedition 1988, IAD 1990), again a comprehensive œuvre of 350 pages covering a wide array of topics though less complete in thematic scope than 'Limnologie der Donau'. The publication attracted less attention of the scientific community as only few copies were published by IAD itself. Three further monographs released between 1993 and 1998 dealt with water quality (Weber 1993, Schmid 1994) as well as with planktonic and benthic communities of the Danube (Kusel-Fetzmann et al. 1998).

When the Danube River Protection Convention, signed by eleven Danube states and the European Commission in 1994, came into force in 1998, the International Commission for the Protection of the Danube River (ICPDR) got active in monitoring and standardized scientific sampling of the river. Due to the long lasting international cooperation and the experiences in joint field surveys, it is not surprising that IAD became an official observer in ICPDR from its very beginning. Until today, IAD offers scientific support to the different ICPDR-expert groups. Efforts concentrated e.g. on the Danube Sturgeons and resulted in a Sturgeon Action Plan to which IAD members contributed substantially (Bloesch et al. 2005). ICPDR not only benefits from scientific knowledge of IAD but also from the long involvement in both theoretical and applied research and exchange with stakeholders. Since the early 2000s, four Joint Danube Surveys were organized by ICPDR and supported by IAD (see Schwarz 2019).

Expert groups, scientific programs and conference resolutions

In the six decades of its existence, IAD has developed as an association of scholars and river managers (Bloesch 2019). Also the scientific programs and objectives evolved, on the one hand in line with scientific progress in limnology and hydrobiology but also as a response to changing environmental problems of the Danube. The development of the scientific targets is reflected in the evolution of expert groups, in the topics of the regular conferences (Tittizer & Cyffka 2019) but also in the decadal scientific programs formulated by IAD members between 1956 and 2006 or in the resolutions adopted for many years as outcomes of IAD conferences.

In the first decade from 1956–1966, the activities of IAD were dedicated to establishing and agreeing cooperation. In particular, the organizational and administrative details for the first joint Danube survey were set. The resolution issued after the IAD conference of October 1966 in Varna, Bulgaria, made a plea to use the research findings of the association as basis for water management as well as for international cooperation. As the adverse effects of economic growth and increasing industrial activities on



Figure 1: Remains of Ada Kaleh – an island close to Orșova. After 1968, the population was resettled as the island was to be drowned in the Iron Gates impoundments (Eberhard Nabel, cc-license)

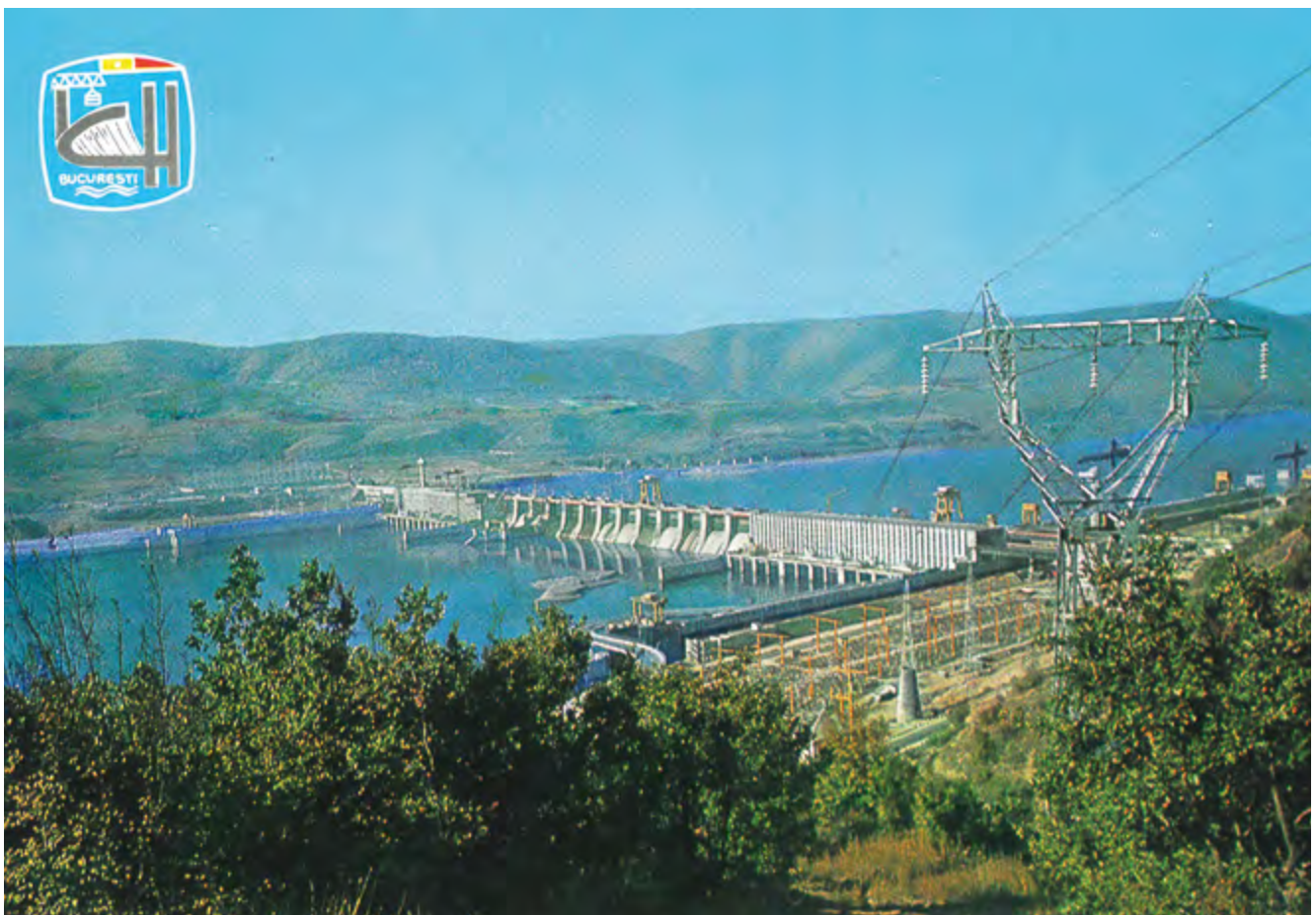


Figure 2: One of the Iron Gates dams soon after completion as a theme of a postal card (© Al. Comănescu)

the Danube had become clearly visible, the 108 participants of the event strongly recommended to governments and administration to take any possible endeavour to limit pollution for the sake of sufficient water supply, irrigation and fisheries. IAD offered support in water management issue to be dealt with by river managers.

In the following period (1967–1976) coordinating research and in particular standardizing field sampling methods were a focus. River pollution remained a major and unifying subject, acknowledging the tight connection between upstream and downstream sections. IAD intensified its engagement in (national) river management. Joint norms for the physical and chemical conditions of the Danube water and for sewage waters to be released into rivers were envisaged. In 1967 – the year when ‘Limnologie der Donau’ had been published – the resolution formulated during the IAD-conference in Kiev stressed the importance of an integrated approach of river investigation, including at least the larger tributaries. Again, the negative effects of industrial and domestic pollution, the presence of pathogens and parasites, as well as toxic substances, all of which potentially harmful for humans were emphasized. Hydro-power figured prominently in the conference presentations as well as in the resolution one year later. The IAD-members joining the event claimed explicitly that large scale engineering measures should not be planned and implemented without preceding scientific investigation to estimate the ecological effects.

From 1977 to 1986, assessing ecological conditions and anthropogenic impacts became more significant. Restoring the ecological functioning of the Danube started to guide research and scientific cooperation. Still, the IAD resolutions acknowledged the importance of the Danube for humans. Keeping an ecologically but also societally functioning river was a major target, as addressed explicitly for example in the resolution adopted in 1974 as a result of the 17th IAD-conference in Galați, Romania.

From the late 1980s onwards – in the decade from 1987–1996 – the impact of harmful substances figured again prominently in the decadal program. Efforts strived for regular monitoring and the establishment of early warning systems. IAD-scientists referred increasingly to impacts of water engineering projects on the ecosystem and ecological integrity. The last decadal program (1997–2006) aimed at contributing to integrative river basin management and river protection, conservation and restoration but also at promoting sustainable river uses. Major research activities accomplished by IAD expert groups between the 1990s and 2006 are summarized in Danube News 13/14.

Although no scientific programme was issued after 2006, integrated management and sustainability remained major targets for IAD. It actively supports the implementation of the macro-regional EU-Strategy for the Danube Region as a step towards sustainable development. New expert groups have been established focusing on floodplain ecology, invasive species, sustainable development and public participation or Long-Term Socio-Ecological Research and environmental history. Training of students and young researchers plays an important role to attract new scholars but also to help reducing the brain drain in some countries of the Middle and Lower Danube.

IAD expert groups – an example of joint macrophyte surveys since 35 years

The expert groups are at the centre of scientific research of IAD. The first expert groups focused on chemistry & physics, radiology, (eco-)toxicology, microbiology & hygienics as well as on different biological groups (fish, zoo- & phytoplankton, zoo- & phytobenthos), biotic processes and saprobiology; another expert group still active deals with the delta/fore-delta. As stated above, some of the currently 12 expert groups are relatively new; but many can look back to long-lasting cooperation and research within the whole Danube River Basin. Representative for transnational



Figure 3a and b: Vast stands of reed along the Sulina canal (left) and fishermen in the Sulina canal (right), about 1960 (© IAD)

scientific collaboration, the development of the macrophyte expert group will be briefly summarized below.

Triggered by a novel methodology for assessing aquatic plant growth in running waters, published by Kohler et al. in 1971, the program of the IAD Conference in Bratislava (1973) included an excursion to a small channel full with 'aquatic macrophytes' (Trachaeophytes and some filamentous algae). Several IAD members instantly got interested in this methodology and a first 'survey' was carried out. Representatives of almost all Danube Basin Countries had been present, and the application of the new method was met with approval by all participants. At the IAD-Board Meeting in Szentendre in 1984 the Expert Group Macrophytes (EGM) was established, followed by its first meeting in 1985 during the IAD-Conference in Bratislava. In the period 1998–1999 work for a Pilot Study was started by the partner teams, focused on assuring a harmonised method for field survey and the description of results (published in 2003). This was proof of concept regarding the ability of the partner teams to carry out a survey along the River Danube, covering each individual river-kilometre from source to mouth, including the two source streams. This project was funded by the then named Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (Vienna), and by the Austrian Committee of IAD. In 2018, the results of this trans-national project were published by ACADEMIA – Publishing House of the Academy of Sciences, Prague (Janauer et al. 2018).

To this day the EGM is still active, i.e. providing the methodological background – and some new collaborators – for the macrophyte assessment during the Joint Danube Surveys (JDS 1 to 3), supervised by ICPDR, and a fourth survey recently carried out in 2019 (Schwarz 2019). All JDS campaigns provide basic results for the continuing implementation of the Water Framework Directive and the success in reaching 'good ecological status' in European running waters and lakes, especially in the Danube River Basin.

At the 2019 EGM-Meeting in the village of Susa, near the Kopacki Rit natural reserve, new topics were already offered: (i) river-bed incision and the future of oxbow systems; (ii) 'excavating' so far unpublished data from the Danube Macrophyte Project; (iii) comparison of the macrophyte flora and diversity in Danube river branches like the Mosoni Duna (HU) and the Maly Dunaj (SK); (iv) interpreting 'Terrestrialisation' processes in floodplain water bodies, and several other ideas regarding the future development of aquatic landscapes. EGM will be busy in the future still, to have a close look on problems related to the aquatic vegetation, like invasive aquatic plant species. Even if some topics may look simple, all results will add to achieving a better future for aquatic environments.

History as a foundation for the future

IAD's history brings to light the close link between the development of the association on the one hand and poli-

tical as well as socio-economic circumstances on the other hand. The major scientific topics reflect the pressing environmental problems of the Danube River and their changes over the last six decades. Scholars of IAD investigated the Danube in a period of enormous economic growth, unprecedented use of environmental resources and ever increasing impacts to river ecosystems. As the perspectives for the future provided in this issue of Danube News demonstrate, IAD is prepared to face the present and forthcoming challenges of the Danube River. A sound and comprehensive appraisal of the long-lasting cooperation of scholars in the river basin and in particular of the wealth of ecological data collected and published in six decades can form an extremely valuable basis to reconstruct the main ecological alterations in the Danube since the foundation of IAD in 1956.

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IAD Conferences of the past 60 years

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Bernd Cyffka: *Co-editor of Danube News, National IAD Representative of Germany and leader of the Expert Group Floodplain Ecology; Head of Floodplain Institute Neuburg and professor for Applied Physical Geography at Catholic University of Eichstaett-Ingolstadt, e-mail: bernd.cyffka@ku.de*

Since the foundation of the International Association for Danube Research in the year 1956 a total of 42 conferences have been organized. They were hosted regularly and rotating in different countries within and even outside the Danube Basin (see map below). During the time when Europe was divided into two blocs, the IAD played a not negligible role of international understanding. Beyond the borders, scientists have been conducting intensive research on water purity, and the ecological development of fauna and flora as well as – at least in modern times – hydromorphology of Europe's second largest river.

The participation in the particular conference was, at least for IAD members from Eastern Europe, bound to the presentation of a short scientific topic. Initially, submitted presentations of participants from both sides of the Iron Curtain were always accepted as the motto was 'It's taking part that counts'. It was never in the interests of IAD to set up barriers to participation because nobody wanted to limit the character of international understanding of these conferences.

The submitted presentations were initially published in two proceedings of the respective conference; Volume 1 contained the scientific short presentations, volume 2 the commemorative speeches as well as the main presentations. At least the presentations of volume 2 were presented orally at the conference. Later on, everything was joined to one volume and split into the sections 'oral presentations' and 'poster sessions'. Over time, the poster sessions became more and more important especially for work reports and/or reports on student works.

A change in the quality of the main presentations occurred after the introduction of an internal 'peer review' system in accordance with international standards. Presentations were and still are followed by the audience with great interest and are usually discussed intensively. However, the conference excursions were often more popular, especially in earlier times, and even more so before the opening of the Iron Curtain. The respective National Representatives, who at the time were the main responsible persons for the organization of the conferences, made huge efforts to organize the excursions as interesting and diversified as possible. During these field trips, the participants had the possibility to get in closer contact to each other and there often was a lively exchange of practical and scientific experiences. In addition, during the conference, but more often during the excursions, participants started to set up personal friendships, some of which have been lasting until

today. Thus, the scientific community of IAD has become more and more a large family in the recent years. This family was proudly celebrated at the 36th IAD Conference in Vienna in 2006, which was the anniversary of '50 years of IAD'. At this time, Prof. Tittizer looked back on a long IAD membership, while it was the first IAD conference for Prof. Cyffka. It should also be mentioned that Prof. Tittizer was the first to be appointed Honorary Member of IAD during this conference. This tribute fills him with happiness until today.

Features of the modern conferences, at least of the 21st century, were workshops and networking meetings of various kinds and topics. Next to the excursion, the 'Board Meeting' and the 'General Assembly of IAD' have become an inherent part of the conference. The President, the Vice-President and the General Secretary as well as all National Representatives and Expert Group Leaders participate in the Board Meetings. Everyone reports on the works in the respective countries and on the works of the Expert Groups during the past period. These reports are usually discussed in detail as they form the basis for the planning and future development of IAD in the member countries and in general. In a short form, all these findings and results are presented to the IAD General Assembly the following day. This procedure is valid until today.

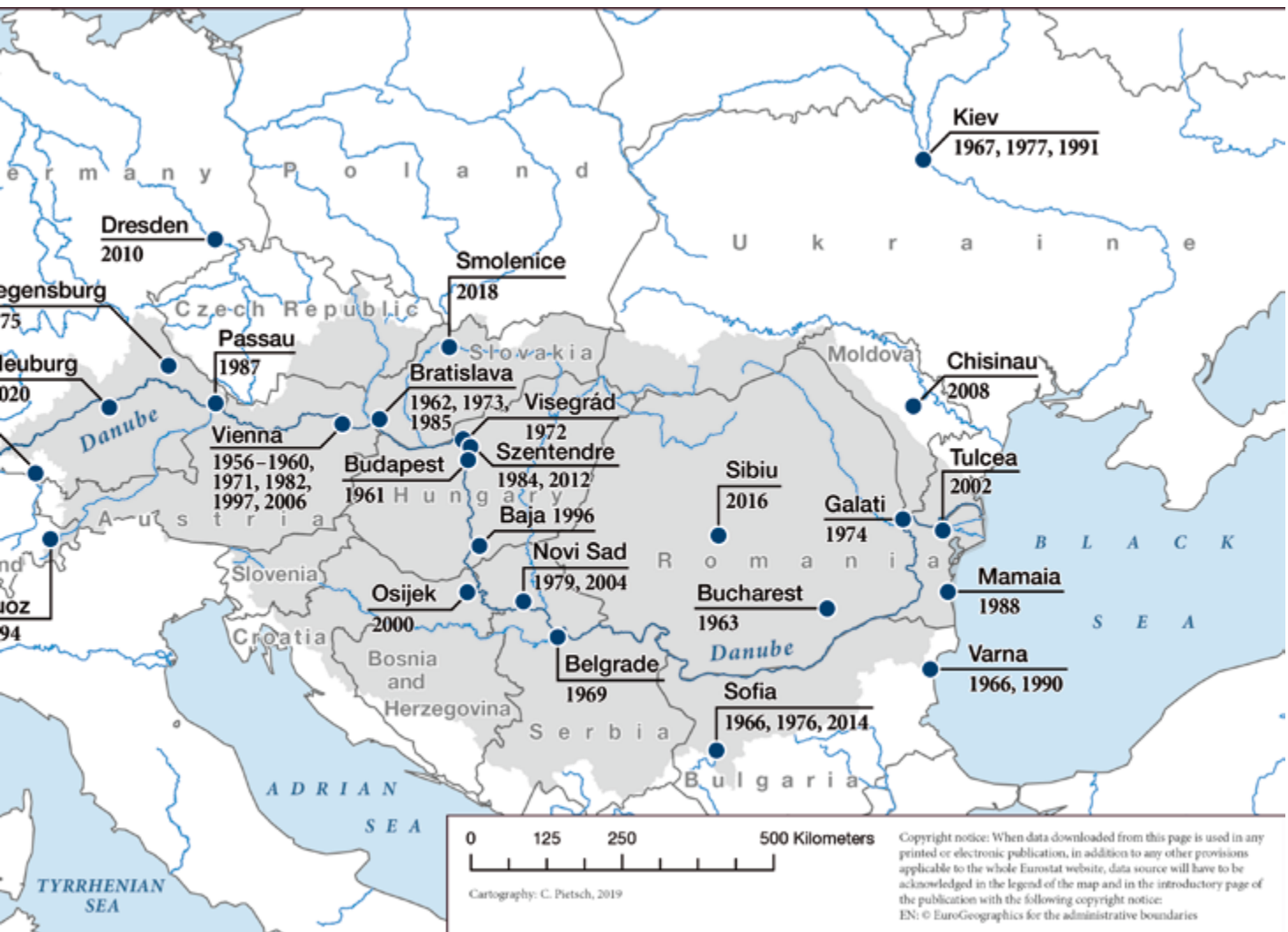
As mentioned, the preparation of the conferences was always carried out with the utmost care. Sometimes however, one had the impression that the organizers were in a real state of perfection: The upcoming event should always be a bit more perfect than the ones before, especially in former times. After the borders became more open, the possibilities generally changed for the better, and all this went hand in hand with the improvement of conference technology in modern years. From his many years of membership, Prof. Tittizer remembers well the 34th IAD Conference in Tulcea 2002. The Romanian National Representative of that time, Prof. Gheorghe Brezeanu, succeeded in winning the Romanian President Ion Iliescu as patron of the conference (cf. photo).

Among the conference excursions that are often regarded as the highlight of the event, the trip to the Danube Delta has to be mentioned. The participants had the opportunity to watch the catch of a two metre long 'starry sturgeon' (*Acipenser stellatus*) as well as to observe colonies of 'Dalmatian pelicans' (*Pelecanus crispus*) (cf. photos).





Impressions from IAD conferences and excursions and venues of the 42 IAD conferences. Photos: T. Tittizer





42nd IAD-conference in Smolenice, Slovakia. Photo: Teodora Trichkova.

43rd IAD Conference 2020

Rivers and Floodplains in the Anthropocene – Upcoming Challenges in the Danube River Basin

July 14–17, 2020

Neuburg/Danube, Germany; Venue: Castle of Gruenau

Call for abstracts

Call for abstracts and registration are open from now. We are looking forward to receive your abstract! More information about registration and abstract submission are available online under www.iad2020.ku.de.

Important Dates

Deadline for the submission of abstracts:	29.02.2020
Notification of acceptance	31.03.2020
Deadline for early bird payment:	15.04.2020
Deadline for late payment:	15.06.2020

Registration and Conference Fees

Please note that registration will not be possible anymore after June 15. Relevant is the date of payment receipt. Onsite registration will not be possible.

Payment is possible via bank transfer only. There is no possibility for onsite payment.



	Early Bird	Late Payment
IAD-Member	110 €	130 €
Non-Members	140 €	160 €
Students		40 €
Non-member students		60 €

Joint Danube Surveys and contributions of IAD

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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 Project¹⁾ generated a lot of new important data on morphology such as sediment balance

¹⁾ <http://www.interreg-danube.eu/approved-projects/danubesediment>

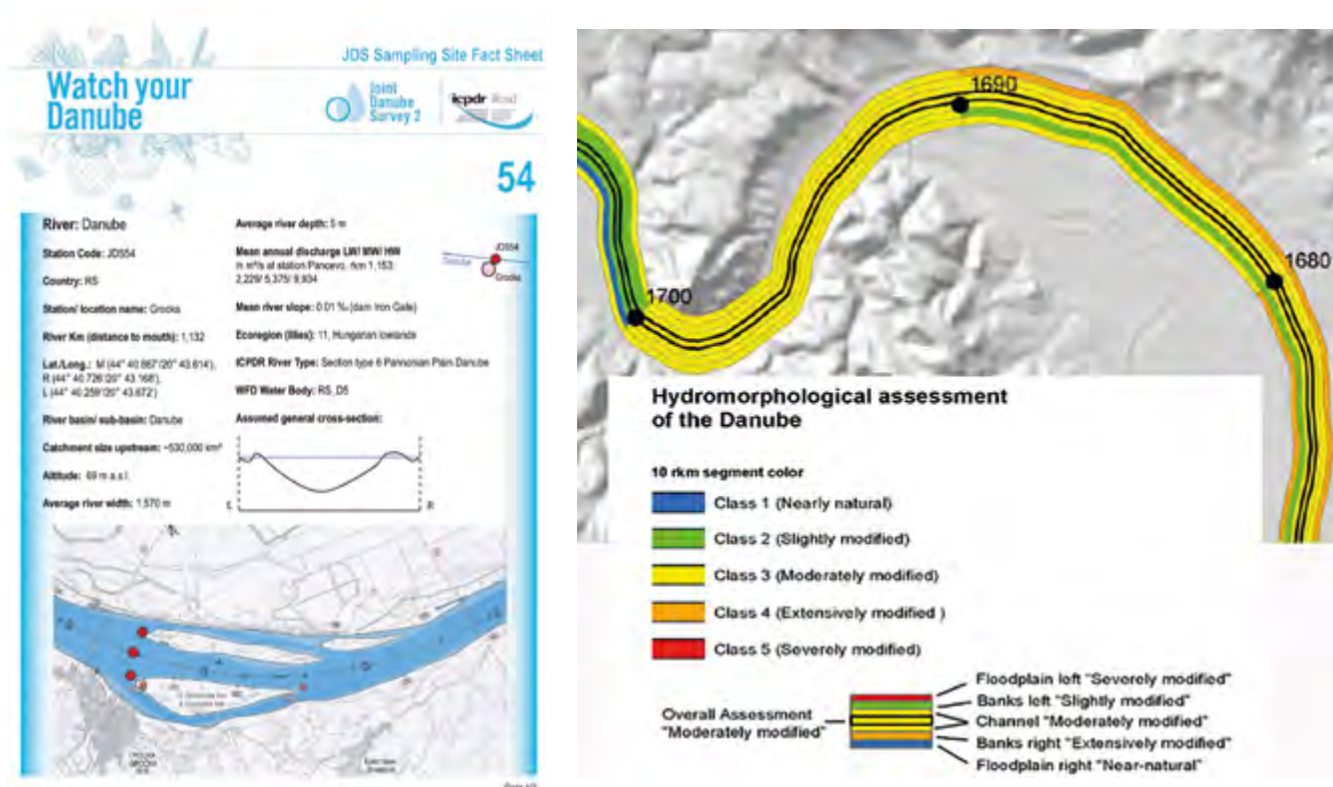


Figure 1: Factsheets for all JDS sampling sites (JDS 2) and 10 river km assessment reaches of the JDS 3



Figure 2: The Hungarian research vessel 'Széchenyi', 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 ground sill. 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 Project²⁾ which will propose restoration areas should also have the potential to change the hydromorphological assessment at least locally.

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²⁾ <http://www.interreg-danube.eu/approved-projects/danube-floodplain>

Future IAD: Acting together for the conservation of the Danube River system



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60 years ago, it seemed a 'curiosity that the largest Central European river, the Danube, had so far found relatively little limnological interest'. This statement of IAD-founder Reinhard Liepolt in 1961 came as a consequence of the lack of knowledge about this riverine ecosystem and addresses the challenge of cooperation between the numerous Danube countries at that time (Liepolt 1961). What was the vision of the IAD founding members and, more importantly, is it still relevant?

Their scientific concept was to act together for a joint study of Danube, organizing cruises from the mouth to the source and developing standardised methods to speak in one scientific language about the riverine conditions. This is how the knowledge about Danube developed gradually from describing aquatic habitats and biocoenoses of single stretches, to holistic studies of processes and mechanisms governing the functionality of the whole Danube River and its major tributaries, being considered in national and regional environmental policies, nature conservation and environmental education activities.

All these points follow the statutes of IAD, aiming to:

- encourage and support scientific research in the Danube region in the fields of limnology, ecology and related fields
- act for environmental, natural and water protection in the Danube region, cooperate with related organizations (such as environmental NGOs or intergovernmental bodies)
- increase public awareness on topics of water ecology and water conservation

The aim for integrated research and cooperation among Danube scientists is vivid also today and represents the backbone of IAD activities.

In order to meet the big challenges faced nowadays, we plan to focus on 3 main pillars:

1. Fostering joint research along Danube River and the riverine network

While there is general agreement that science is needed to provide a sound basis for future development of the Danube Region, scientific outputs are heterogeneously distributed in the region. To enhance the scientific excellence and foster closer collaboration among scientists, we plan to:

- increase knowledge exchange between scientists studying the Danube system by facilitating student attendance at scientific conferences, short-term exchanges, organization of seminars, summer schools and summer camps, aiming for initiatives to link Master, PhD and post-doc studies, etc.
- establish student volunteering programs in the Danube Region (1-2 weeks up to 1-3 months) and link them with relevant international universities
- encourage transboundary studies and publications among IAD scientists
- create a mentoring program between advanced research teams and their counterparts to build future project partnerships. For example, the CEEPUS network EcoMan-Aqua (www.ceepus.info) was established by several IAD members in 2017 to provide mobility for teaching and joint supervision of graduate students within the CEEPUS network and with other partners (DN 36).

To achieve these goals, inter-institutional cooperation at transnational level is an essential aspect. Over the years, members of IAD developed numerous transboundary partnerships and research projects (e.g. MEASURES, MARS, AQUACROSS, RESI, RISE, DANUBIUS-RI, DANUBE:FUTURE, DREAM, ESMERALDA, ECOPOTENTIAL, ISOBEL, FITHYDRO, Danube Sediment, Danube Floodplain, STURGEON 2020, ESENIAS – TOOLS, LIFE Sturgeon), and we intend to foster such activities also in the future by:

- creating a network of existing field stations/units along the Danube River and its major tributaries in support of joint research/education activities,
- identifying major knowledge gaps for specific areas of the Danube River Basin
- launching transboundary research projects to complete the knowledge base and foster a more comprehensive understanding
- supporting small projects along the Danube River and its main tributaries for young scientists (regular calls on IAD website).



Figure 1: Preserving natural riverine systems is essential for biodiversity conservation. Channel in the Danube Delta. Photo: Cristina Sandu

Recent books of IAD members document the multiple aspects of joint activities in Danube research and project implementation. These books cover various topics such as fish (Kováč 2015), macrophytes (Janauer et al. 2018), invasive species (Trichkova et al. 2017), Danube historical landscape development (Jungwirth et al. 2014), the sustainable management in the Danube River Basin (Schmutz & Sendzimir 2018) and sustainable restoration of former stretches of the main river (Dokulil et al. 2018).

2. Increasing public awareness and promoting environmental education

Environmental education, dissemination of scientific output (publications, conference presentations) and communication of scientific results to stakeholders and experts with different background (navigation, hydropower, fishery) form since the foundation a key part of IAD legacy in support of Danube environment. For this reason, over the past years we have participated in numerous environmental education events (Danube Day, World Fish Migration Day, school events, summer camps), and we plan to continue such activities with key actors in the region also in the future. Furthermore, we extend these activities also to more enhanced exchange with younger generations and the educational system in the Danube region. For example, IAD has cooperated recently with a Slovenian partner to develop e-learning tools for environmental education for primary and secondary schools in the Lower Danube Region (guidebooks and experiments presenting river bio-

diversity and mechanisms enabling self-purification processes) (<https://water-detective.net/>).

As expertise in IAD covers also other topics on aquatic ecosystems, we can transpose scientific output into easily accessible teaching materials highlighting e.g. the impact of current environmental challenges on water resources and aquatic biodiversity, or ecological mechanisms and processes in aquatic ecosystems. Thus, we can offer children, youth and the wider public an easier access to knowledge and information on options to prevent further degradation of the aquatic environment and how they can contribute to its conservation.

3. Acting for implementing scientific results by communication at the science – policy interface

Over the years, IAD scientists cooperated closely with water authorities in the Danube Region, facilitating the consideration of scientific results into decision tools. After the establishment of the International Commission for the Protection of the Danube River in 1998, IAD became an observer to this international governmental organization, providing state-of-the-art scientific knowledge regarding river systems.

Over the past decade, IAD was involved also in transdisciplinary dialogues with navigation, hydropower, flood protection, presenting scientific evidence for river management and biodiversity conservation. IAD has also contributed to the implementation of the EU directives and international conventions devoted to biodiversity conservation and ecosystem health, such as Water Framework Directive, Birds

and Habitats Directives, Bonn Convention, Bern Convention and the Convention on the Biological Diversity.

The activities foreseen in pillars 1 & 2, targeting harmonization of aquatic research activities in the Danube Region and fostering excellence in research, facilitate the provision of sound scientific evidence concerning the status and the evolution of aquatic ecosystems across the Danube Region. Transferring such knowledge at local and regional policy level also in the future is crucial for informed decisions about water management.

To foster this ecosystem knowledge transfer, we plan to:

- enhance IAD's role and contribution to policy level (ICPDR, EUSDR, EC) by developing relevant projects, continuing and extending our work in different expert groups and informing on state-of-the-art scientific results,
- enhance dissemination of scientific results to policy stakeholders and the wide public via books and scientific articles, the IAD Bulletin Danube News, policy notes or other communication materials,
- create specific programs addressing several key groups of stakeholders, as experience exchanges, trainings, participation in joint field trips and scientific projects, aiming to raise awareness on the importance of aquatic biodiversity conservation

To conclude: Many aspects of research on the Danube River Basin were stimulated by IAD scientists over the last decades. In future, IAD will not only continue these studies, but will also dedicate more attempts to assemble individual research outcomes in order to obtain an integrative picture

of the status of this river system and to better contribute to its conservation. Balancing a healthy river system on the one hand, and its sustainable use on the other, is a challenge that we should try to overcome together, so we can preserve the Danube ecosystem also for the generations to come.

Acknowledgements: We would like to thank to J. Bloesch, R. Kalchev, V. Kováč and M. Pusch for their valuable comments on this article.

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The challenge of Invasive Alien Species

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Since 2008, I have been an active member of IAD, and in 2017, I became the head of a newly established expert group on Invasive Alien Species (IAS). By creating such an expert group, IAD has reacted to an important threat to biodiversity in the Danube River Basin (DRB).

The introduction and spread of IAS in the DRB have increased recently. As a result, the biodiversity and ecosystems are affected, and adverse socio-economic effects and impact on human health have been reported. However, still there are many gaps related to the IAS distribution, magnitude of impact, pathways of introduction and spread, and other issues. In response to this growing concern and the necessity of cooperation and coordinated actions at regional level, in 2014, the IAD together with the Priority Area 06 of the EU Strategy for the Danube Region and other organisations initiated the establishment of the **Danube Region Invasive Alien Species Network (DIAS)**. Furthermore, to

strengthen the scientific multidisciplinary approach related to IAS, in 2017, IAD established the **Invasive Alien Species Expert Group** as one of the current 12 IAD expert groups. Thus, IAD helps to reach the targets of DIAS, which comprise: 1) sharing of knowledge; 2) formulating a strategy and work plan to efficiently tackle the issue of IAS in the Danube Region; 3) considering and cooperating with existing European and global IAS networks and organisations; 4) developing individual but coordinated projects in the single regions; and 5) promoting the transfer of know-how and expertise to actors on all administrative levels in a transnational context.

Currently, the IAD Invasive Alien Species Expert Group and DIAS collaborate closely in activities such as:

- Implementation and development of joint projects: Danube-IASapp (2016–2017), Danube IAS Corridor (ongoing), Danube IAS Corridor 2 (2019), Alien CSI (2018–2022);
- Organisation and participation in scientific conferences and forums: Joint ESENIAS and DIAS scientific con-



Figure 1: Participants of the ESENIAS & DIAS Conference 2019, photo: Milcho Todorov

ferences (Sofia 2017, Bucharest 2018, Ohrid 2019); IAD conferences (Sibiu 2016, Smolenice 2018), and other events;

- Joint publications: abstract books and proceedings, guides on IAS, articles in peer review journals, and leaflets; and
- Development of the DIAS strategy and work plan.

In the future, with the support of IAD, we envisage to continue and further develop the research activities and at the same time to integrate more effectively the knowledge and management tools related to IAS in the Danube Region. This will include improved exchange of information and tools between scientists and managers, consideration of successes and challenges for different management options and improved collaboration on IAS between authorities and different stakeholder groups in transboundary and transnational context. In the frame

of IAD, we envisage also to collaborate more actively with the responsible European and regional authorities (EU Strategy for the Danube Region, Danube Commission, Sava Commission) and IAS networks (ESENIAS), in order to facilitate the implementation of the DIAS strategy and European legislation related to IAS at regional level.

In this respect, IAD offers an important and effective platform for cooperation as well as exchange and spread of knowledge and tools on IAS among scientists, authorities and stakeholders concerned with the biodiversity preservation in the Danube Region. Personally, through my membership and work within IAD throughout the years, I have gained valuable international scientific and organisational experience and skills, had the opportunity to meet and work with wonderful scientists and experts from the Danube countries, and received full support for my research ideas and activities.

IAD for the Blue Heart of Europe



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The Blue Heart of Europe is threatened by a heart attack caused by the aggressive development of mini-hydropower plants on streams and small rivers in the region (by 300% in the last two years), endangering the whole dense network of pristine rivers which host many threatened and endemic species in this part of the Danube subregion. Diverting water away from the river through pipelines, leaving behind empty

channels where rivers have been, will directly lead towards losing one of the most important natural river gems of the whole Danube catchment, but also of the entire continent.

Water resources are shared across borders, going far beyond any national interests. This implies a much wider regional approach to environmental protection and the crucial conservation of biodiversity. Within the Western Balkans, this need has increased due to difficult time for society and the scientific community in the recent past. Nevertheless, management efforts and initiatives addressing these issues are extremely rare in the Mid-

dle Danube Basin within the Western Balkan Region. Due to the time and expense of fieldwork, freshwater biodiversity in wetland areas is neglected in the routine monitoring program in this part of the Danube Basin. Although adequate biodiversity data are required for successful ecosystem conservation, a systematic inventory of these habitats does not exist, being omitted from the appropriate conservation management. Moreover, it is not surprising that the entire process of implementing EU environmental legislation in the region is delayed, including the EU Water Framework Directive and the EU Habitat Directive. Over the past two decades, a number of high-profile research projects and papers dealing with burning environmental issues at the Danube Basin level have been conducted, yet without a fully compiled database for the

Western Balkans. Therefore, filling these regional data gaps is the urgent need of the integrated Danube River Basin Management.

I am firmly convinced that the International Association for Danube Research (IAD) is a network capable and eligible to facilitate a fast and fruitful connection among young researchers, inevitably supporting capacity building and development of new research groups for restoration ecology of aquatic ecosystems and wetlands in the entire Danube Region, but especially in the Western Balkans. This is the challenging task but also the great opportunity, particularly in order to apply for research grants, manage nature conservation, mitigate human impact and ultimately save the Blue Heart of Europe.

Managing a shared river



Ivan Zavadsky: Executive Secretary International Commission for the Protection of the Danube River; e-mail: ivan.zavadsky@icpdr.org

Here at the ICPDR, our organisation is currently celebrating the 25th year of activity, bringing together all the countries within the Danube River Basin for the purposes of managing our unique shared waterway. The work of the

IAD goes back even further, but it has been one of our key observers since 1998, with delegates participating in our various Expert Groups and helping us to develop necessary means to conserve, regenerate, and protect the Danube River. We are united behind a shared goal, as laid out in the EU's Water Framework Directive (EU-WFD), of creating an ongoing system of sustainable management for our river basin.

The ICPDR is positioned as a conduit for the many cross-sectoral interests in the Danube River Basin – navigation, fisheries, water treatment, hydropower – and the IAD remains one of our key partners, representing the invaluable input of the scientific community. One of our key achievements has been the four completed Joint Danube Surveys. The most recent of these took place this year, and organisations such as the IAD, providing key input via our expert groups, have made these vast and vital health checks for the river basin possible. Without the likes of the Joint Danube Surveys, it would be impossible for the ICPDR and our partners in the Danube River Basin to plot a way forward which continues to see the status of the river waters

protected, and continues to see constant improvement in the sustainability of the river. The input of the IAD and its scientists is essential to achieving the ICPDR's three 'pillars of action' to improve the lives of citizens in the Danube River Basin (DRB):

- 'Cleaner' water
- A 'Healthier' home for aquatic animals and plants
- A 'Safer' environment for people to live without the fear of floods

The most recent Joint Danube Survey – JDS 4 – took place this very year, here in 2019, and saw the pioneering usage of new and underexplored methods for monitoring water status in the Danube River Basin. Environmental DNA (eDNA) was detected as a matter of standard for the first time in a JDS; effect-based monitoring was also a key method deployed for the first time, aiming to compare old and new chemical analyses in fruitful new ways; and following results from various other studies on European waters showing their ubiquitous presence, microplastics became a key substance subject to monitoring in the Danube and its tributaries in 2019. This all goes to show the speed at which monitoring methods and the science behind river basin management is progressing.

While a central international managing body such as the ICPDR is vital for communicating with the public, and coordinating disparate partners, knowledge bases such as the IAD provide much-needed expertise and guide our innovations. Such organisations are the keys to unlocking a sustainable future.

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Hydrological catchment of the River Danube



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Printing:

Satz & Druck Edler
Am Kreuzweg 5, D-86668 Karlshuld