

DANUBE WATCH

THE MAGAZINE OF THE DANUBE RIVER / WWW.ICPDR.ORG 3/2016



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Vienna, Austria

An innovative breeding container located in the heart of Vienna is hatching and rearing sterlets with Danube water under near natural conditions. This facility is the first of its kind in the Danube River Basin and will ensure the fish are fit for survival in the wild.

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Nikšić, Montenegro

The work of the ICPDR is supported by a team of staff members – including interns – drawn from across the Danube Basin, all working to ensure the sustainable and equitable use of waters in the Danube River Basin.

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Bucharest, Romania

The Danube Box is one of several ICPDR outreach programmes to address the youngest of stakeholders in the basin. The educational kit, designed to give school children aged 9 to 12 a greater understanding of the river, is available for seven languages – including Romanian.





Dear readers,

You may already know that the Danube region comprises an impressive ecosystem we all benefit from. What is less known is that the Danube region also features an impressive research ecosystem. The latter has a direct impact on the well-being of people in this region and could be even more beneficial if its stock of knowledge, competence and human capital is put to good use. Exploiting this potential means acting in the fields of research, technology transfer, early stage and growth financing, as well as involving civil society and stakeholders at different levels.

The collaboration of local communities, scientists and businesses from the Danube region is the basis of a bottom-up research approach followed in a scientific initiative from the European Commission Directorate-General Joint Research Centre (JRC) supporting the EU Strategy for the Danube Region (EUSDR). In collaboration with the ICPDR, the JRC Danube Water Nexus flagship project is delivering, among other things, simulations of evolving energy and agriculture scenarios highlighting their respective environmental and socio-economic consequences.

JRC and ICPDR research in these areas has also explored how citizens may contribute to the process of data collection by providing their observations and measurements on developments in their region. This

creates a new dynamic in data sharing as well as a technical challenge to ensure that such data can be readily captured, maintained and reused. More importantly, it offers a mechanism to democratise data, creating a sense of common ownership of issues between government and citizens, and a contribution to the sustainable development of the macro-region.

In the next phase of the work, the scientific knowledge put together through these activities must be handed over to the region's actors and used to serve ICPDR and EUSDR priorities. This transfer can be facilitated through ad hoc gatherings of stakeholders, service operators, government and local communities focusing on the specific problems to be solved.

In conclusion, I would like to reiterate that the JRC remains committed to reinforcing cooperation and deepening ties with the ICPDR and the scientific and local communities in the Danube Region.

Vladimír Šucha
Director-General
Joint Research Centre
European Commission



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Danube Watch is the official magazine of ICPDR, the International Commission for the Protection of the Danube River. Danube Watch enhances regional cooperation and information sharing on sustainable water management and environmental protection in the Danube River Basin. It reports on current issues affecting the Danube Basin, and on action taken to deal with challenges in the river basin. Striving for scientific accuracy while remaining concise, clear and readable, it is produced for the wide range of people who are actively involved in the Danube River Basin and are working for the improvement of its environment.

The ICPDR accepts no responsibility or liability whatsoever with regard to information or opinions of the authors of the articles in this issue.



ICPDR CELEBRATES 20 YEARS AT DONAU-AUEN NATIONAL PARK

On 27 October, the Donau-Auen National Park celebrated 20 years of existence. Since its founding in 1996, the work of the national park has been essential for developing and maintaining biological corridors for the diverse fauna and flora in its 38 kilometres stretch of the Danube. The national park received a special birthday gift this year: the protected area was expanded by 277 hectares with areas at Fischamend and Petronell. This expansion, made possible by the support of the federal government and the provinces of Vienna and Lower Austria, has made a significant step towards the further development of the national park.

For more information, visit: www.donauauen.at



BLACK SEA FROM SPACE WORKSHOP

The Romanian Space Agency (ROSA), together with the National Institute for Marine Research and Development 'Grigore Antipa' and the European Space Agency (ESA), organised the 'Black Sea from Space' workshop, held on 28-30 September. The ICPDR was represented by Technical Expert on GIS Zoran Major as invited keynote speaker. The workshop focused on the opportunity of the Earth Observation to monitor and analyse the environment of the Black Sea, utilising the increasing observing capacity offered by space projects such as the Sentinel satellites and accessing long term data that can indicate changes, and offer the necessary tools to provide solutions to improve the quality of the environment.

For more information, visit: www.rosa.ro/index.php/en/news-menu/evenimente/1700-black-sea-from-space-workshop



DISCUSSIONS HELD ON SEDIMENT MANAGEMENT

The European Sediment Network (SedNet), the ICPDR and the International Commission for the Protection of the Elbe River organised the third Round Table Discussion of its kind, this time on the topic, 'Bringing Together Experiences in Sediment Management Concepts - Elbe meets Danube', held in Budapest on 7-9 November 2016. The Round Table allowed the two river basin commissions together with SedNet to exchange experiences on the integration of sediment management in river basin management. In particular, the discussion focused on methodological approaches of designing and implementing a sediment management concept. Representatives from other European river basins where similar activities on sediment management have taken place were invited to take part. A report on the outcome of the meeting is expected to be published.

For more information, visit: www.sednet.org



ICPDR ANNUAL REPORT 2015 NOW AVAILABLE

2015 was an eventful year for the ICPDR. Major advances were made towards achieving the ICPDR's long-term vision for sustainable integrated river basin management in the Danube Basin, including a focus on finalising management plans for the 2015–21 cycle, as well as initiatives on sturgeon, invasive species, and public participation. The Annual Report 2015 is available, in print or for download, providing detailed insight into all the ICPDR initiatives, events and cooperative activities in the Danube River Basin during 2015.

To download a copy, visit:

www.icpdr.org/main/publications/annual-reports



7TH FOLLOW-UP MEETING OF THE JOINT STATEMENT

On 15–16 September, the Danube Commission hosted the 7th follow-up meeting of the Joint Statement on Inland Navigation and Environmental Sustainability in the Danube River Basin (Joint Statement) and introduced two new, concrete mechanisms to implement by the next meeting in order to improve the process of such meetings: Good Navigation Status and Pool of Experts. After lively discussions, nine important areas were identified needing technical assistance on projects in the next period: geomorphology, hydrology, river ecology, river engineering, environmental impact assessment, NATURA 2000, the EU Water Framework Directive, inland navigation and waterways management. The underlying principle of such meetings is the need for an interdisciplinary planning process from the beginning of a project, as well as to minimise the impacts of engineering interventions through non-structural measures and the application of environmental impact assessments with public input.

For more information, visit: www.danubecommission.org



RESEARCH AND INNOVATION AT 5TH ANNUAL FORUM OF THE EUSDR

Entitled 'Innovative Flows – Water, Knowledge and Innovation in the Danube Region', this year's annual forum of the EU Strategy for the Danube Region (EUSDR) held in Bratislava, Slovakia on 3–4 November 2016 focused on water management and innovation in the Danube region. Participants discussed the future of the Danube Strategy in workshops covering issues such as water management, knowledge society, governance of the Strategy and links to EU funds. The forum, jointly organised by the Slovak Republic (current Presidency of the EUSDR) and the European Commission (Directorate General for Regional and Urban Policy - DG REGIO and Directorate General of the Joint Research Center - DG JRC), also highlighted the 'Scientific Support to the Danube Strategy' initiative by the Joint Research Centre of the European Commission.

For more information, visit: www.danube-region.eu



The public river: why stakeholder management on the Danube matters

For participation, like rivers and waters themselves, there can be no boundaries, and for true integrated river basin management to take place, public participation needs to take place at all levels of the ICPDR.

Public participation is a process that directly engages the public in decision-making and gives full consideration to public input made in that decision. The ICPDR has been, from Day 1, committed to supporting public participation in its decision making. And why is that? Because we are convinced that public participation leads to broader support for policies and to more efficiency in implementing measures. We support the active involvement of stakeholders and civil society on all levels of our work. From conceptualising policies, to implementing measures, to evaluating impacts, the ICPDR involves stakeholders in the entire cycle of activities.

In practice, the ICPDR pursues public participation primarily through two avenues: the involvement of observer organisations in its ongoing work and specific activities that are dedicated to public participation and information. A third line of public participation activities are organised ad-hoc; these are stakeholder dialogues on specific integration issues. In particular, such activities have been organised for inland navigation, climate change adaptation, sustainable hydropower development and agriculture.

Incorporating public voices into the ICPDR's work. To accompany the development of these plans, public consultation

was undertaken in three main stages, in which the ICPDR collected comments from the public on:

- (1) the timetable and work programme including public consultation measures;
- (2) the significant water management issues in the river basin; and
- (3) the draft of the two management plans.

The opportunity to participate in each of these steps was promoted through the ICPDR network of contracting parties and observers, news items on the ICPDR website icpdr.org, the magazine Danube Watch, targeted media campaigns and a video clip that called stakeholders to get active in the consultation process. The



The 'Voice of the Danube' consultation workshop, held to discuss the draft Danube River Basin Management Plan Update 2015 (DRBMP) and the Flood Risk Management Plan (DFRMP), is one of the best and most current illustrations of stakeholder involvement. The workshop brought together over 80 participants representing a broad range of backgrounds, from academia, to the national and international public sector, to non-government organisations and corporate entities.



The Danube countries have committed to frameworks – in the form of the EU Water Framework Directive (WFD) and the EU Flood Directive – which demand public participation. Article 14 of the WFD and Article 10 of the Flood Directive specifically require countries to encourage participation from all stakeholders, and both plans have been developed with a range of public consultation measures.



video was used in national channels via the ICPDR network and can be found at: icpdr.org/main/get-active.

Bringing stakeholders together. One of the best and most current illustrations of stakeholder involvement was the stakeholder consultation workshop Voice of the Danube on the draft DRBMP Update 2015 and the DFRMP, which was held in Zagreb, on 2-3 July 2015. The workshop targeted specialists with expertise in water management, and was implemented by the ICPDR together with Global Water Partnership. In total, over 80 participants represented a broad range of backgrounds, from academia, to the national and international public sector, to non-government organisations and corporate entities.

The one and a half day event covered both the DRBMP Update 2015 and the DFRMP. Keynote speakers gave a short introduction to the plans and participants had the opportunity to make short statements, but the heart of the workshop comprised five topical sessions with moderated, interactive discussions. All participants worked on elements from both draft management plans regardless of their professional background. The input for both plans was of remarkable value.

Every citizen and every institution has a stake in the sustainable use of water and the future of the ecosystem services related to it. We know this and we demonstrate it through our devoted public participation expert group. Because there is no single stakeholder, no single formula that gets everyone involved, we gather input from a wide spectrum of stakeholder interests, resulting in a wide range of views and concerns and providing fair treatment, meaningful involvement and social inclusion for all people with respect to the development, implementation, and decisions made through the public participation process. Our task at the ICPDR is to balance these views and concerns, and reflect the decisions back so that the public understands how its diverse concerns have been considered.

Hélène Masliab-Gilkarov is the Technical Expert for Public Participation and Communication in the ICPDR Secretariat, and the Executive Editor of Danube Watch.

The rising tide of public participation

From water quality to flood prevention, stakeholders are more involved with water issues in the Danube River Basin – which is proving to be an important tool to secure precious resources now, and for future generations.

With increasingly higher stakes for water resources, such as climate change, it is critical to bring all stakeholders on board to protect those resources. Susanne Brandstetter – public relations manager for water at the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, as well as Chairperson of the ICPDR's Public Participation Expert Group – speaks about how to get stakeholders involved actively in sustainable water management and the future of public participation in the Danube River Basin.

Dabube Watch: What is your personal relationship to the Danube River?

Susanne Brandstetter: I was born near the Danube River in Lower Austria and I had strong connections to the river while growing up. My childhood memories are of trips to the small village of Grein in Upper Austria for ice cream, or to the Wachau, which continues to be a fascinating landscape for me now.

Professionally, I've been connected to the river for years – first studying Geography at University and especially since working for the Ministry. And of course with my dedication to working with the ICPDR.

Water is my life. It means a lot to me – I feel the value, power and spirit – and I see how much it gives us so that I'm more than happy to work for its protection.

What is your philosophy of involvement and participation?

Information is the crucial point of interest. If you provide appropriate informa-

tion, you open the doors to anyone who is ready and interested to be a part of the decision. Without appropriate, tailor-made and targeted information you can't move ahead to the next steps of public participation. Information has to be translated from technical terminology to the language of the people – and kept simple and easy to understand for everybody! You can spend a lot of creativity to design this information in the best way and attract people's interest. This delivers the stable foundation for next steps like consultation and public participation as the highest level of involvement.

Decisions made with broad involvement from different stakeholders, and also especially from the public, achieve broader acceptance and ultimately improve the outcome. The process often looks difficult from the outside, but in the end all of this effort makes a real difference if you want to achieve something stable.

How does one motivate stakeholders to get involved?

To motivate stakeholders, you first have to find out who they are exactly – which is why a stakeholder analysis is so important. Once this is done, you should try to reach out to motivated people in the relevant stakeholder groups or organisations willing to take part in a fair and transparent process. We must all accept that decision-making takes place on another level and may be against the interests of one or another stakeholder. Therefore transparency is most important and you should always keep an eye on this during the whole process of public participation.

However, for stakeholders from sectors such as agriculture, which are traditionally difficult to motivate, it is clear that you have to find special ways of negotiating. But I am quite sure that if you can find the right track you could reach out to all sorts of stakeholders. The ICPDR will be exploring this sector in the future because it is so important to the field of water quality.

Reaching out to and listening to stakeholders is critical, as we see for example with young people. You have to give a lot of attention to young people – by using fancy material, for example – and you have to take them seriously. They can feel it if they are just being used for a single purpose or if there is a real interest in their opinion. In Austria we've found that young people are very easy to motivate if you use the right channels and attract them – and of course digital communication plays an important role here. We have had a lot of success with ongoing actions to get young people involved in the field of water with our youth platform www.generationblue.at.

What public participation projects outside the Danube region do you think the ICPDR can learn from?

We are very fortunate that the ICPDR has excellent observers who are very active in public participation and in the expert group meetings. They share their knowledge of public outreach campaigns with us and, importantly, they share information about the Danube in their own communication networks.

At a larger scale, the OSCE (Organization for Security and Co-operation in Europe) had a dedicated focus on water in 2015. The OSCE has a long track record of supporting countries to jointly manage water resources sustainably and has successfully supported cooperation among its participating states. High level events took place with a strong focus on outreach activities and sharing experiences. I was able to join the activities as a moderator and give a presentation showcasing our efforts in the Danube Basin for raising awareness and public participation. The interest especially in our experience was extremely high – I received a lot of positive feedback concerning our work and the results. It was a great opportunity to share our success story with so many countries outside



In the new interview series People of the Danube, Danube Watch presents personal portraits of individuals who relate passionately to the Danube Basin and its waters.

the Danube River Basin as well and to explore new topics related to water.

I think that such opportunities prove that a wider exchange on communication, information and participation is necessary. I really appreciate that Article 14 of the EU Water Framework Directive clarifies the importance of those three aspects. Nevertheless I believe that more active discussion in this regard is needed at EU level. There is no working group tackling coordinated communication and public participation for water-related issues, and there are not enough Member States sharing useful experiences in this field. I would like to see a network such as the ICPDR's Public Participation Expert Group operating at the EU level.

Where will communication and public participation be in five or ten years?

In the future I see public participation playing an important role in the ICPDR – with its dedicated expert group and technical expert in the Secretariat as well as high recognition in ICPDR bodies – and a big role outside the Danube in other river commissions.

Education and awareness-raising will remain our focus, and in five or ten years, public participation will be increasingly digital. We will have more technology and methods for direct communication and online voting – using real-time videos, etc. Social media will definitely be more important in the future. Already it is a very important tool for official bodies like ministries, for policy makers and of course also for NGOs to mobilise on a broad scale.

Education and awareness-raising will remain our focus, and in five or ten years, public participation will be increasingly digital.

Social media can help official bodies like ICPDR to reach more stakeholders. People living all over will have access to information and can participate, especially at local level, in order to contribute to the sustainable management of water resources. It is so critical not to miss this 'social evolution', otherwise your messages may be lost in the future.

However, I believe we should not

Susanne Brandstetter is public relations manager for water at the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management and Chairperson of the ICPDR's Public Participation Expert Group.

underestimate the resources needed to implement this evolution and to undertake necessary actions in time. The Public Participation Expert Group could play an essential role matching these new challenges. And for sure – budget and time constraints will also be very tricky issues we have to handle in the future. I am ready to take on all future tasks and challenges and will do my best as Chairperson of the Public Participation Expert Group – it is a huge honour and a pleasure for me chairing this group. I would like to take this opportunity to thank ICPDR and especially "my working group" for the ongoing highly motivated and engaged work and for being excellent focal points of our duties in the countries. And great thanks also to our associated network of observers. Concluding I invite the whole 'Danube Family' to step into this future together, and join us in our motto: WE LOVE DANUBE.



The Danube Art Master competition will return in 2017.

The Danube Art Master competition demonstrates how children can connect with the water, growing more and more attached to the Danube and becoming aware of the river's challenges. National winners receive prizes during Danube Day celebrations in most countries, and the International Danube Art Master attends a special award ceremony at the ICPDR Secretariat to receive recognition from the entire Danube River Basin. © Credits (all photos): GWP

Danube Art Master: celebrating children's environmental art

The international school competition, created at the initiative of the ICPDR as part of Danube Day, will be returning in 2017 after a one-year break.

The Danube Art Master competition invites schools to organise a school field trip to the Danube – or a Danube tributary – and create works of art. The competition is organised jointly by national governments and NGOs in most of the countries under the framework of Danube Day and has had an overwhelming success, with over 3000 candidates registered in 2013.

The Danube Art Master competition is an excellent opportunity for children to discover the geography, chemistry and ecology of rivers – in the field and out of their classrooms. However, the heart of the competition is uniting children across the entire basin and encouraging them to visit their local rivers and reflect on what Danube waters mean to them. Whether made using reeds, stones, driftwood or simply waste found along the riverbank, the diversity of the art produced illustrates the wealth of the Danube Basin and its unity under a banner that says: We love Danube.

Hélène Masliab-Gilkarov is the Technical Expert for Public Participation and Communication in the ICPDR Secretariat, and the Executive Editor of Danube Watch.



Raising concerned Danube Citizens



© Blue Rivers Ukraine

The Danube River has a shared past that unites over 80 million people living in the basin; whether it has a sustainable future depends on the awareness of future generations.

Several of the ICPDR's outreach programmes specifically address young stakeholders and encourage children to leave the classroom and explore nature through playful educational activities and games.

For children to grow up to respect the river and preserve the natural treasures of its ecosystems, they have to learn to appreciate it when they are young. If children learn to appreciate the river when they are young, they will grow up to respect it and preserve its natural treasures when they are older. To make this connection early, several ICPDR outreach programmes specifically address the youngest of stakeholders in the basin. These programmes encourage children to explore beyond their immediate experience of nature through playful educational activities and games. Because when children learn to respect our natural treasures, the Danube is the real winner.

Danube Adventure Game

The Danube Adventure is designed for children aged 10–14 years. Players choose an avatar from among the river's residents – such as a sturgeon – and travel upstream along the three segments of the Danube. On their journey they can earn credits by correctly answering multiple choice questions. Reaching higher credit levels unlocks more avatars for players to choose from.

Danube Box

The Danube Box is a comprehensive educational kit launched in 2006 to give school children aged 9–12 years greater understanding of the river, the threats posed to the river, and the need to preserve water resources. The educational material in the Danube Box – which includes quizzes, teacher training materials, interactive web journeys and more – is suitable for a variety of disciplines and provides a range of information on ecology, geography, wildlife and cultural diversity in the region.

Both the Danube Adventure and the Danube Box were created under the Green Danube Partnership between the ICPDR and the Coca-Cola Company and Coca-Cola Hellenic.

Try out the game yourself at: www.danubeadventure.org. **And to learn more about the Danube Box or to get a copy for your school or your child, visit:** www.danubebox.org.

Kirstie Shepherd is a freelance journalist living in Vienna and has called the Danube River Basin home since 2000.

TEST YOUR DANUBE KNOWLEDGE

See how well you can keep up with schoolchildren with these sample questions from the Danube Box:

1. How much of the water evaporated from the sea returns to earth as rain or snow?

- a) one quarter
- b) one half
- c) nothing
- d) all

2. In the catchment area of rivers, what protects us from floods?

- a) forest
- b) agricultural fields
- c) human settlements
- d) car park

3. In a river with gravel islands, each high water alters... (more than one answer may be correct)

- a) the islands in the river
- b) the few plants that grow on the

islands

- c) the position of the river arms
- d) the amount of water in the river

4. Water snails feed on small algae which grow on water plants and rocks. How do the snails obtain their food?

- a) They filter suspended organisms from the water
- b) They eat through the sludge at the river bottom
- c) They crawl over rocks and water plants and graze on small animals and plants
- d) They eat leaves and twigs that have fallen into the water

5. How many rivers feed into the Danube? Nearly...

- a) 50
- b) 100
- c) 150
- d) 300

correct answers:

- 1) d, 2) a, 3) all, 4) c, 5) d

Plastics and microplastics in the Danube River

While there is increasing awareness of the environmental dangers posed by plastics, until now few fresh water studies were available for comparison. However, a new survey from the Environment Agency Austria is providing sound data on the transport of plastic particles in the Danube River.

Plastics have been serving societal development over the last 60 years because of their excellent material properties. Over this period of time, production of plastic has increased from 1.7 million tonnes in 1959 to more than 280 million tonnes annually today. This number represents roughly 40 kg of plastics produced annually for each of the approximately 7 billion people on Earth.

Some fractions of postconsumer waste, however, escape the controlled waste streams and find their way into the environment. Owing to the material's stability, plastic barely decomposes at all and therefore remains in the environment for a long time. Exposure to sunlight and mechanical and chemical forces alters the material and slowly weathers it into debris the size of a few micro meters, which are easily dispersed in the environment.

DID YOU KNOW?

The term 'microplastics' generally describes plastic particles that are less than 5 mm in diameter. This represents a broad range down to the nano scale. Still, there is no binding definition of size or composition of microplastics.

Plastic waste in the environment was first recognised as a problem mainly in marine regions. Initial reports about plastic garbage patches in the Atlantic and Pacific Oceans had already emerged in the late 1970s. Owing to its floating behaviour it is known to have a negative impact on

marine organisms in almost all parts of the trophic layers, depending on the particle size. Also, transfer of plastic particles along the food chain has been observed. More than 80% of marine plastics is attributed to land-based sources with rivers as the main contributors. Studies in fresh water systems are rare, however, and because of the use of different methods for sampling

and measurement, results are mostly incomparable.

Sampling the Danube River. In spring 2014, Environment Agency Austria was invited to design and lead a survey in order to determine the transport of plastic and microplastic in the Danube River. The survey was funded by the Austrian Minis-



The survey took samples at two sites on the river, Aschach in Upper Austria and Hainburg in Lower Austria, and was carried out five times at each site at different discharges.



try for Agriculture, Forestry, Environment and Water Management together with the provincial governments of Lower Austria, Upper Austria and Vienna. The study was carried out in cooperation with the University of Natural Resources and Life Sciences (BOKU) and the Austrian waterway company viadonau. The main aim of the survey was to produce sound data on the transport of plastic particles at two sampling sites.

The Institute of Water Management, Hydrology and Hydraulic Engineering (IWHW) at the University of Natural Resources and Life Sciences adapted two existing techniques used for determining suspended sediment and bed load transport for the new methodology. The method took into account the vertical, horizontal and temporal variability of plastic transport in the flow of the river but requires a truck with a crane to lower the massive construction. The construction allowed for simultaneous skimming of the surface and sampling of a middle layer and the river bed with nets of 500 µm and 250 µm mesh size. Sampling took place at the sites of Aschach (Upper Austria) and Hainburg (Lower Austria) from road bridges and was carried out five times at each site at different discharges. For every sampling point, the plastic transport and concentration (mg/1000.m³) was determined for both microplastic and the total amount of plastic. Hence, values are available for 15 to 21 sampling points within one profile.

Samples were processed in the laboratory and plastic particles were separated manually. The plastic material was identified by means of attenuated total reflection (ATR) infrared spectroscopy and by Fourier transform (FT) Infrared Micro-Spectroscopy in the accredited testing

laboratory at Environment Agency Austria.

Results of the study. An annual average of the plastic transport load could be calculated amounting to a range of between 6 kg and 66 kg per day for particles smaller than 5 mm and a range of between 7 kg and 161 kg for the total plastic load. The annual load was calculated using the average annual hydrographs of the years 2009 to 2014 for both sites. The annual load for microplastic amounts to < 17 tonnes/year at Hainburg and the total plastic load amounts to < 41 tonnes/year at the same site.

Furthermore, the study revealed that addressing the whole waterbody is of major importance for sampling a river's cross

More than 80% of marine plastics is attributed to land-based sources with rivers as the main contributors.

section, since plastic particles have the properties of suspended particles rather than floating particles. They are encountered in the entire river profile, depending on the hydro-morphological conditions; thus multi-spot sampling is indispensable to acquiring sound results. The majority of the plastic particles consisted of polyethylene and polypropylene. Both compounds account for approximately 80% of global plastic production.

The source of Danube plastic. Around 10% of the particles found in the Danube River were identified as pellets, which un-

ambiguously were attributed to industrial activities such as production processes, conversion and transport. Some 90% of the plastic particles in the Danube River, however, are emitted by diffuse sources, these being littering, fragmentation and transport by wind, run-off from sealed surfaces (roads, parking spaces and residential areas), inappropriate use of products, use of cosmetics, construction activities and so forth. By the same pathways, plastic and microplastic can reach soil, air and other environmental compartments and, once ingested by organisms, move up within the food chain.

Around the sampling site of Hainburg, 30 fish specimens were caught and their digestive tracts analysed for plastic particles. No plastic particles could be identified in any of them. For comparison, another study carried out in the Danube River in Upper Austria investigated 840 individual fish specimens and could only identify two plastic particles in them.

Effects of plastic on wildlife. Whereas reports about the hazardous effects of (micro)

plastics are scarce in freshwater systems, several reports from marine environments demonstrate different effects. Plastics are often mistaken for food by sea birds and sea turtles and some of them feed plastics to their chicks. Other marine species tend to become entangled in plastic waste and suffer injuries and reduced mobility. The small size of microplastics makes them prone to bioavailability to lower trophic organisms as most species exert limited selectivity between natural and artificial particles. Incorporation of microplastic was observed in the tissue of mussels and inflammatory effects were reported depending on the particles' shape. And plastics and microplastics contain a number of chemicals to adapt the material's behaviour, which in turn can be taken up in the organism when ingested.

Reducing plastics in Danube waters.

The catchment of the Austrian stretch of the Danube River accommodates three plastic production sites and approximately 560 plastic converters. Plastic particles, especially raw material like pellets, waste and dust from treatment processes can be mobilised and emitted to the aquatic environment. Approximately 10% of the plastics found in the river Danube can be attributed to industrial origins. The Austrian Industry together with the Austrian Ministry for Agriculture, Forestry, Environment and Water Management adopted an initiative to reduce plastic pellet losses into the environment by means of technical measures and by raising awareness of employees. Littering, however, is also a societal problem which needs to be tackled at European and Global levels.

Austria initiated several activities to address the topic internationally and to seek international cooperation. The main concerns are the need for definition of the subject, addressing incomparability of data and the need for harmonisation of methods, to address the European Environment Agency and to raise the topic in the next State of the Environment Report as well as to strengthen the cooperation among Europe's environmental agencies.

Philipp Hobenblum is water and contaminants expert at the Environment Agency Austria (Umweltbundesamt).

Marcel Liedermann is senior scientist at the University of Natural Resources and Life Sciences (BOKU) with research fields in river restoration, sediment transport and monitoring at large rivers.

The study revealed that addressing the entire waterbody is important for sampling a river's cross section, since plastic particles have the properties of suspended particles rather than floating particles. They are encountered in the entire river profile, depending on the hydro-morphological conditions; thus multi-spot sampling is indispensable to acquiring sound results.



© Philipp Hobenblum, Umweltbundesamt



SWMI – a funny acronym for serious issues

The EU Water Framework Directive aims to make all waters cleaner and healthier. To meet these requirements, the ICPDR's Danube River Basin Management Plan takes a close look at the most important pressures affecting water status.

Investments in urban wastewater treatment plants have resulted in a remarkable decrease of organic pollution and point source nutrient emissions.

The Danube River Basin District Management Plan – Update 2015 identifies four significant water management issues, called SWMIs, as the main pressures of basin-wide importance affecting the ecological and chemical status of surface waters: pollution by organic substances, nutrients and hazardous substances as well as hydromorphological alterations.

Pollution by organic substances. Organic pollution refers to emissions of non-toxic organic substances that, to a large extent, can be biologically decomposed by bacteria. Organic pollution can deplete the oxygen in the aquatic environment through the biochemical decomposition of organic matter and cause health hazards from microbiological contamination of the water. The key emitters of organic pollution are localised sources such as untreated or insufficiently treated municipal wastewater from domestic, industrial or agricultural activities.

Investments in urban wastewater treatment plants with minimum biological treatment technology and enhanced industrial technologies have helped decrease organic pollution significantly. Since 2005, organic emissions via wastewater have decreased by almost 50% as a result of substantial development in

wastewater infrastructure, and wastewater collection and treatment had improved at almost 900 agglomerations by 2015.

Nevertheless, not all measures have been taken and there is still room for improvement. By 2021, basic infrastructural development facilities – either public sewer systems with adequate waste water treatment or appropriate decentralised systems – will serve approximately 15 million inhabitants.

Pollution by nutrients. Nutrient pollution is caused by excessive releases of nitrogen and phosphorus into the aquatic environment. These excess nutrients cause eutrophication, where the growth of algae or macrophytes (aquatic plants large enough to be seen by the naked eye) is substantially accelerated. This can severely impair water quality and even limit human use of water. Eutrophication is increasingly important as the Black Sea is the ultimate recipient of the Danube's waters, and its ecosystem is particularly sensitive to excess nutrients.

Nutrient emissions originate from both point (localised) sources – similar to those

translates to a 12% decrease in nitrogen emissions and a 34% decline in phosphorus emissions.

However, there remains much to be done to reduce nutrient contamination. By 2021, wastewater treatment for 20 million inhabitants should be enhanced with the introduction of costlier nutrient removal technology. Fertiliser application will be strictly regulated in more than 80% of the basin, and several good agricultural practices will be in place to reduce nutrient losses.

Pollution by hazardous substances. Hazardous substances, emitted from point or diffuse sources, pose serious threats to the aquatic environment. Depending on their concentration and the environmental conditions, they can cause acute or chronic toxicity. Some hazardous substances are persistent, degrade slowly and can accumulate in the ecosystem.

Domestic wastewater, industrial facilities, urban paved areas, agriculture and chemically contaminated sites are the most important sources of hazardous substances pollution. According to scarce information

available on emissions, 33 compounds have been released by major industrial facilities and wastewater treatment plants. Of these substances, eight organic pollutants, eight heavy metals, three pesticides, eleven chlorinated organic substances and three inorganic pollutants were identified.

Despite our expertise in pollution control we still face a significant information gap, and improved

analyses of pollution sources and implementation of measures are high on the ICPDR agenda. Treating urban wastewater appropriately and using best available techniques in industrial plants and large agricultural holdings can significantly mitigate hazardous contaminations. Further efforts are needed to identify priority substances and other emerging chemicals of basin-wide relevance. In particular, pollution sources should be investigated using emission inventories and regionalised pathway modelling.

Hydromorphological alterations. Anthropogenic, or man-made, pressures resulting from engineering measures for flood protection, hydropower generation or inland navigation can significantly alter the natural structure and dynamics of surface waters. River continuity interruptions, morphology alterations, disconnected wetlands and hydrological alterations such as impoundments, water abstractions and hydropeaking can all affect the ecological status of the river and its ability to provide adequate habitats and conditions for aquatic species.

A number of measures have been taken since 2009 to improve hydromorphological conditions: More than 120 fish migration aids have been built, over 50,000 ha of wetlands reconnected and improved, and more than 50 measures addressing hydro-

By 2021, fertiliser application will be strictly regulated in more than 80% of the basin, and several good agricultural practices will be in place to reduce nutrient losses.

logical alterations have been implemented. Efforts to further improve hydromorphological conditions by 2021 are being planned, including installing 146 additional fish migration aids, morphology restoration measures for 77 water bodies and reconnection and improvement of some 15,000 ha of wetlands. In 66 cases, measures are foreseen to reduce the impacts of impoundments, water abstractions and hydropeaking.

Further pressures imposed by new infrastructure projects should be carefully avoided. A total of 39 infrastructure projects have been planned by 2021 related to navigation, flood protection, hydropower generation and water supply, and the ICPDR is working intensely on targeted inter-sectoral cooperation activities to ensure the sustainability of such projects.

For more information about these figures and findings, download a copy of the Danube River Basin District Management Plan – Update 2015 at www.icpdr.org.

Adam Kovacs is the Technical Expert on Pollution Control in the ICPDR Secretariat.



© Novum

of organic pollution – as well as diffuse sources such as runoff, soil erosion and subsurface flow, all of which transport nutrients from agriculture, urban areas, atmosphere and even natural areas.

As with organic pollution, the development of wastewater infrastructure has resulted in a remarkable decrease in point sources of nutrient emissions since 2005. Diffuse emissions have also dropped substantially owing to low agricultural intensity in many countries and the implementation of environment-aware agricultural measures. Compared to 2005 figures, this



The smallest sturgeon species is making big progress

While their larger sturgeon cousins have become extinct in the Upper Danube in the last century as a result of overfishing and migration barriers, the smallest Danube sturgeon, the sterlet, is just barely holding on. A pilot project in Austria is working to secure self-sustaining sterlet populations for the future.

A breeding container will hatch and rear eggs and juveniles with Danube water to induce the fish to 'imprint' on the river and use homing behaviour to locate spawning sites.

The sterlet (*Acipenser ruthenus*) is the smallest of the Danube sturgeons and spends its whole life cycle in freshwater without the need to migrate to the Black Sea. While sterlets are still present in small numbers in the Upper Danube, the Austrian sterlet population is on the brink of extinction with only few specimens remaining. Without the critical efforts of the LIFE-Sterlet project to reintroduce self-sustaining populations of sterlets to the Austrian Danube, they are doomed to disappear from the wild.

The LIFE-Sterlet project was developed within the Danube Sturgeon Task Force (DSTF) Sturgeon 2020 programme. Conceived as a pilot project for the Danube

THE CHALLENGES FOR DANUBE STURGEONS

Within their natural range sturgeons are one of the best indicators for riverine ecosystem health, and their significant decline over the past century poses one of the ultimate challenges for river basin management. Worldwide, many sturgeon species are already considered extinct, highly endangered or vulnerable, as they are extremely sensitive to a broad selection of anthropogenic impacts. Owing to their highly valued caviar and meat they were heavily overfished in the past, which still continues today. Their long generation intervals of up to 20 years and irregular spawning patterns of 2–7 years, make sturgeons extremely sensitive to overexploitation and stocks require a long time to recover.

Obstacles within the river systems pose a serious additional threat to sturgeon stocks as the sturgeon life cycle includes long spawning migration, ranging between several hundred to several thousand of kilometres. Furthermore, juveniles and spawned adults need a wide selection of habitats within the river and must have the ability to

are differences between various wild sterlet strains and broodstocks in hatcheries. Mother fish will be recruited from wild stocks in the Slovakian Danube downstream of the Gabčíkovo dam and genetically characterized prior to propagation. All specimens caught within the project and used for reproduction will be molecu-

migrate downstream after spawning.

While overexploitation and migration barriers are responsible for diminishing stocks worldwide, additional threats cannot be overlooked. As sturgeons can produce fertile offspring through inter-specific hybridisation, the introduction of non-native sturgeon species or genotypes can lead to an outbreeding depression of native stocks. Because of their longevity and their benthic habitat, sturgeons are also sensitive to pollution and the effects of accumulated heavy metals in the sediments, which may lead to organ dysfunctions, especially affecting the gonads and reducing fertility.

Considering all of the pressures on sturgeons, the challenge in managing them is clear. In the case of the Danube this challenge is even further complicated, since the Danube is the most international river system worldwide, extending into territories of 19 countries, with sturgeon stocks also using the coastal areas of three additional countries in the Black Sea region.

River Basin, the LIFE-Sterlet project combines ex-situ restoration – or efforts outside of natural habitats, such as breeding genetic autochthonous sterlet specimens using state-of-the art techniques – with in-situ efforts, or actions within natural habitats, such as identification and protection of habitats. The project runs from 2015 to 2021 and focuses on building a genetic database, installing an innovative hatchery container, releasing fish into the wild and monitoring the long-term establishment of sterlet populations.

Building blocks for breeding. The introduction of non-native species or genotypes can depress native stocks, so genetic analysis is critical to determine if there

largenetically characterised to ensure that only autochthonous genotypes are used for reproduction. However, genetic variation is vital for sustainable stocking, so the parental generation will be as large as possible to avoid genetic bottlenecks and inbreeding.

Restocking programmes in the past have been largely unsuccessful at producing self-sustaining populations partly because fish born out of natural habitats do not ‘imprint’ on the river and are unable to use homing behaviour to locate spawning sites. To induce this behaviour, a breeding container located in Vienna provides hatching and rearing of eggs and juveniles with Danube water. Rearing the fish under near natural conditions prepares them to be fit for survival in the wild. The

container is also a huge asset to education and awareness-raising activities, as it is located in the heart of Vienna and includes a public aquarium with several information panels which are accessible to visitors. This facility is the first of its kind in the Danube River Basin and will serve as a model for future sturgeon protection projects.

Back in the wild, for the long run. Fish will be released into the wild to suitable habitats in three areas: the Wachau valley, the Danube stretch between Vienna and Gabčíkovo, and the Morava on the Austro-Czech-Slovak border. As younger fish adapt more easily to conditions in the wild than fish kept in captivity for a long time, only small fish will be used. The annual release of at least 10,000 juveniles in each project area over five years should lead to the establishment of self-sustaining populations of at least 4,000 reproducing adults in the Danube National Park/Morava system and 2,000 specimens in the Wachau area.

However, to establish long-term, self-sustaining populations it is crucial to

STURGEON 2020

The ‘Action plan for conservation of sturgeons “Acipenseridae” in the Danube River Basin’ was developed in 2005 under the umbrella of the Bern Convention and updated eight years later by the Danube Sturgeon Task Force, with support from the EU Strategy for the Danube Region and the ICPDR. The new plan, ‘Sturgeon 2020’, addresses ongoing declines in Danube sturgeon populations with a transboundary strategy that fosters synergies between existing organisations in the Danube River Basin and Black Sea

identify and protect key habitats. Therefore a number of adult fish will be tagged with transmitters and tags to follow their migrations and document their habitat use over several years. Catch statistics from fishermen will further help monitor the development of the stocks. The compiled data will help define actions necessary to protect these habitats and will be included in the management plan.

Thomas Friedrich is the project manager of the LIFE-Sterlet project and a fisheries biologist at the University of Natural Resources and Life Sciences, Vienna.

ICPDR study visits: drivers of technical assistance and information exchange

The Danube Basin is a model for cooperation and by sharing its success and challenges the ICPDR can bring these benefits to other regions around the world.

The Danube River Basin and the ICPDR, with its history of transboundary cooperation, is a model of cooperation for water managers in other regions. Study visits to the ICPDR Permanent Secretariat help share success stories with other river basin commissions and allow Danube water managers to learn from others struggling to find answers to water issues that challenge us all.



© Mella/ICPDR

The work of the ICPDR depends on co-operation. As the most international river basin in the world, the ICPDR brings together representatives of 14 countries and the European Commission to make decisions that affect the 83 million people living in the basin. Thus the ICPDR Technical Secretariat in Vienna hosts delegations from around the world to share experiences on integrated river basin management and to develop innovative and collaborative solutions to water quality and quantity pressures with other international river basins.

Working with other river basins provides an opportunity to learn from similar challenges and experiences to see the Danube through other perspectives. September and October were busy months for the technical experts of the Secretariat who shared their expertise with two delegations from diametrically opposite sides of the globe.

Sharing solutions. K Water, the Korean institution operating and managing water resources facilities, came to Vienna to learn about transboundary water management challenges and the general setup of the

ICPDR. The small, three-person delegation consisted of: K Water General Manager Mr Dong-jun Kwon, K Water Senior Manager Mr Yong-kyu Lim and their interpreter Ms. Jinjoo Park.

The second delegation, a group of 25 professionals working on water resources management in the transboundary Drin River Basin, consisted of members of the transboundary institutional setting established under the Memorandum of Understanding for the Management of the Extended Transboundary Drin Basin in Tirana, on 25 November 2011. Among

the participants were members from the Drin Core Group and its Expert Working Groups from Albania, Montenegro, the former Yugoslav Republic of Macedonia and Kosovo participating, as well as officers from Global Water Partnership Mediterranean.

These study visits are just the start of a longer relationship with both organisations. Working together – across our river basin and with others around the world – helps us all as we struggle to find answers to water issues that challenge us all. Despite the heterogeneity of the basin, with a broad range of varying factors, the ICPDR and the contracting countries manage water resources at the transboundary level so harmoniously that the lessons learned and the know-how of the ICPDR are greatly valued by experts and decision-makers in transboundary resource management all over the world.

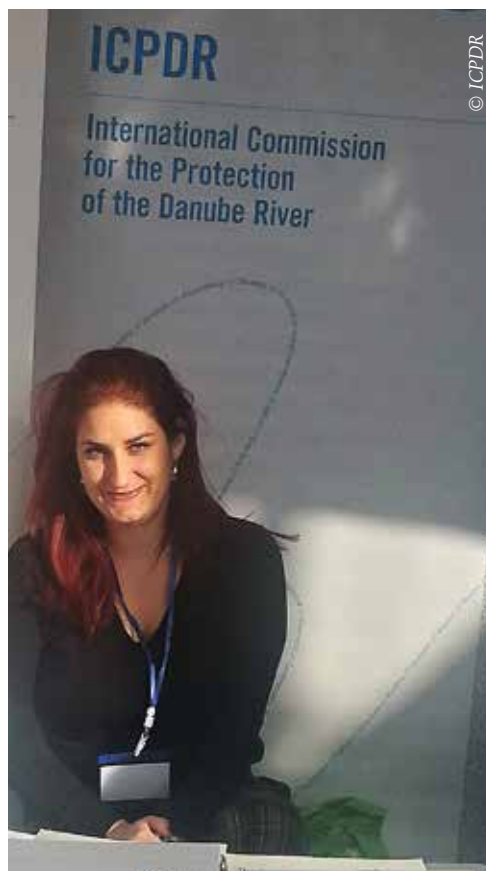
STUDY VISIT OBJECTIVES

Learn about ICPDR experiences in river basin management and flood risk management

Explain the implementation of the EU Water Framework Directive by member states and non-member states

Share best practices, technologies and innovations in water resource management

Hélène Masliab-Gilkarov is the Technical Expert for Public Participation and Communication in the ICPDR Secretariat, and the Executive Editor of Danube Watch.



Learning from the ICPDR

The work of the ICPDR is supported by a team of staff members, including interns, drawn from across the Danube Basin, all working to ensure the sustainable and equitable use of waters in the Danube River Basin.

“I come from a small but striking country on the Adriatic Sea called Montenegro. Strong ecological development is one of my country’s core values and one of the main national priorities is to tackle water issues. Last April I was very fortunate

to be nominated for an intern position by the Ministry of Agriculture and Rural Development of Montenegro, which recognises the ICPDR as a highly important international body and platform for implementing EU legislation of water-related issues.

This year-long internship programme and the chance to be part of the Danube River Basin protection family with the ICPDR is a unique opportunity for personal and professional development. I am a first year PhD student in Hydrogeology, which has a strong focus on quantitative and qualitative water issues, so an internship with the ICPDR is a very important first step in complementing my scientific knowledge with practical application of water legislation.

After six months of experience working with the ICPDR technical experts on various issues, I have learned about the complex problems of water management and the importance of understanding each area individually, with the aim of improving the sustainable operation of a large system such as the Danube River Basin. As part of the team, I have participated in various conferences and workshops, and ICPDR Expert and Task Group meetings, experiences which have allowed me to broaden my field of expertise. I have had the chance not only to gain technical experience through this internship, but also to make new friends with various backgrounds and from different countries in the basin. It is a real privilege to work in a positive and healthy environment every day, for which we should thank the ICPDR Secretariat for the excellent management and the warm and open-minded approach to interns.”

Jelena Krstajic is an intern at the ICPDR Permanent Secretariat, working with the technical experts and learning from their broad experience in the implementation of water legislations.

The Donau-Auen National Park – a day in the life

With the founding of the Donau-Auen National Park in 1996, the area east of Vienna was made an international refuge where unique ecosystems can blossom free of commercial constraints, thus guaranteeing that future generations can experience its power and beauty firsthand.



© Kärntner

The contract to establish the Donau-Auen National Park was signed in Hainburg, Austria, on 27 October 1996. Twenty years later, Park Ranger Barbara Mertin looks back on the significance of the national park, and continues to introduce visitors to the treasures of the last remaining major wetlands environment in Central Europe.

Looking back more than 30 years I remember well both the worrying uncertainty as well as the inexplicable predetermination of the future of this unique ecosystem east of Vienna when it was finally declared a national park. At that time I surely wasn't aware of the significant influence it would have on my life. However, as a student of biology I was already under the magic spell of the dynamic floodplains' ever changing face. Having already worked as a nature guide in this area much earlier, I was among the first park rangers who led our visitors both by boat and on foot through the "jungle on the doorstep of Vienna", to quote Konrad Lorenz.

Being a park ranger is one of the most fulfilling careers, and is far more than simply a job – it's a mission. But being a park ranger at a place that one can even call home is a blessing. Sharing all these beau-

tiful stories about the park's vivid history with the public is a pleasure, and teaching visitors about its rich biodiversity with many rare species, its significance as one of the very last free flowing stretches of the Danube, or its importance as a recreational area in close vicinity of two fast growing cosmopolitan cities – Vienna in the West and Bratislava in the East – is a challenge that I am happy to undertake.

Bringing students up close to nature. These thoughts accompany me while taking a class of 4th graders into the wilderness nearby Eckartsau where the park's youth camp is based. Every year between April and September numerous groups check in here for one or more nights to gain a deeper insight into the park. Schools, universities, families, volunteer groups or children on a summer camp, all take advantage of the wide range of ranger-led programmes offering several activities depending on interest, time and available budget.

My group today is visiting us for the first time, although the teacher has been a regular visitor for years. The programme starts with an easy question-and-answer session. What does the term 'national park' mean? Their responses range from: "A pro-

tected area", "A place for rare animals and plants" to "There are specific rules", "No hotels and restaurants" or "Pure nature". All true I explain to my students. "Let nature be nature" is the guiding principle of the National Park, I tell them.

Suddenly one child yells "Look, a bird!" I immediately interrupt my lecture and we watch a large bird of prey with distinctive white tail feathers soar high above us. It's a white-tailed eagle! I quickly point out some striking features such as its majestic size and the board-shaped wings. The children are mesmerised. While they are still gazing up at the sky in awe and admiration, I add that the white-tailed eagle is one of our five chosen animal ambassadors which proudly represent our park's success in the 2016 anniversary year. In 1996 these birds were only winter guests, but today – 20 years later – the Donau-Auen National Park is home to at least five breeding pairs.

Learning about habitats. We continue our walk and soon reach an old branch of the Danube. Imagine tranquil backwaters with water lilies, surrounded by reed belts and lots of deadwood around. This place is the preferred habitat of the European Pond Turtle, a native endangered species

The free-flowing Danube is the lifeline of the National Park, and the diverse habitats it creates make the biodiversity found here absolutely unique in all of Central Europe.



whose observation is one of our today's highlights.

Our spotting scope is hidden behind some trees and bushes, so that we don't chase away these shy reptiles before we can actually see them. Each child gets a quick glance. Their eyes are full of excitement while I mention quietly that this is the second animal ambassador they have met personally. For the past 20 years the National Park has run a comprehensive conservation programme including monitoring numbers, protecting nest sites against potential predators and fundraising for a cooperation project with the Zoo of Vienna where one can sponsor an individual turtle.

"Listen! Can you hear that?" Our flying gemstone, a kingfisher and the flagship species of Donau-Auen National Park, flies past, which I only realised thanks to

its characteristic high pitch call. Only a few students catch a glimpse of its stunning beauty of bright blue and red colours because of its very fast flight. How lucky we are with our rare wildlife encounters in such a short period of time! It almost appears as if the animals want to celebrate the 20-year jubilee together with us.

Seeing the effects of restoration. Our trip turns a bit into an expedition when we start hiking off-trail, balancing on a pile of driftwood across a ditch. Massive willows and poplars span their canopies above our heads before revealing an awesome panoramic view at the vast Danube, home to the Little Ringed Plover, another animal ambassador of Donau-Auen National Park.

As an indicator of river dynamics, this ground-nester benefits from large-scale

river restoration projects that provide bare or sparsely vegetated gravel or large sand banks where it lays its brilliantly disguised eggs on blank sediment. Instead of imparting more facts I invite my group to a game. They have to search for a replica clutch of eggs which I have secretly placed beforehand on the gravel bank. It comes as no surprise that nobody is able to find the nest site owing to its perfect camouflage.

Inspired by this activity the kids want to know about the two remaining animal ambassadors, so I tell them, "The stag beetle, a symbol of the importance of deadwood, and a rheophile fish species, the nase, a key species for free flowing rivers."

Reflecting on the future of the National Park. Our excursion has reached our destination for the day, the Danube. The teacher who knows the region asks curiously, "Isn't the new enlargement area of Donau-Auen National Park situated just opposite from us?" I am happy to confirm that, yes, the news broke recently that after twenty years of waiting our park has finally expanded by 277 hectares, mainly by Petronell.

I have chosen land art as the final activity for the youth group to close up the programme. It should help them to reflect on what they have learnt about national parks today, what they mean to us and for future generations to come.

For more information about the Donau-Auen National Park, please visit: <http://www.donauauen.at>

Barbara Martin has been working in and for the Donau-Auen National Park for many years, and there are more to come.

Danube Day 2016

Thirteen countries marked the 13th Danube Day: a superb celebration of the many ways that rivers enrich our lives. An estimated 25,000 people participated in 160 events. They cleared riversides marred by rubbish; competed in environmental, sport, art and culinary challenges; and contributed to sustainable development. Gifts of friendship were exchanged and beautiful cultural traditions shared. Overseen by the ICPDR, 400 organisations worked in partnership to forge a strong message of Danube solidarity, diversity and cooperation. It was a message extolled in six grand capitals, but also spread in rural riverside communities in the shadow of the Carpathians.

The ICPDR would like to thank all the organisations involved in Danube Day 2016. For more information about events and organisers, please visit www.danubeday.org.

GERMANY 1

2016's festivities spread to five towns. New ways to forecast, minimise and alert people to flood dangers were showcased in Ehingen. In Ulm, 650 hand-painted flags, created to signify Danube diversity, were paraded at the International Danube Festival. While in Bavaria, the Neuburg Auen Institute's tenth birthday party was combined with a triathlon and bank-side concert. © *Donaubüro Ulm/Neu-Ulm*

AUSTRIA 3

As the Danube came to the heart of Vienna, it secured a place in the hearts of a thousand children. The Museumsquartier was filled with interactive games, fascinating facts, climbing, competitions and children! Zooming around stalls, they solved problems, heard career advice, had close encounters with river critters and collected stamps to become Danube champions! © *Danube Day Austria*

CZECH REPUBLIC 2

A Morning of Water in Mosty u Jablunkova encouraged future guardians of the river to explore water through play. Children got active with fishing games, watery painting and taste-testing salt and fresh water at their own water bar!. © *Mostík Family Centre*

SLOVENIA 4

Danube determination came to the fore in ministry-run contests and a cycling tour-de-force! In the seventh Moja Reka, finalists mobilised 10,000 people to clear rubbish from 150km of shoreline. Impressive pedal power in the four-country Sava Cycling Tour saw it completed in just nine days. Some 176 children vied to be crowned Danube Art Master, won this year by Bistrica pri Tržiču Primary School. © *Ministry of Environment and Spatial Planning*

BOSNIA-HERZEGOVINA

The gruelling Sava Cycling Tour passed through Gradiška, Bardača, Brod, Odžak, Šamac and Brčko during the 870km endurance ride. Undertaken in cooperation with the Sava River Basin Commission, cyclists from every Sava country completed the challenge. Locals joined in part-way, adding to the Sava solidarity.

HUNGARY 7

Budapest, Tiszaköröd, Dunaszeg, Gönyű and Lábatlan got active in 2016! Provincial and personal relations with Ukraine were strengthened at a historic joint Tisza festival. Handling river creatures was a highlight of a ministry-led day at Budapest Children's Island, where children released 300 sterlets and watched a fire-boat display. The Interior Ministry also held a conference and river tour. © *Ministry of Rural Development*

SERBIA 6

Exactly 13 towns celebrated the 13th Danube Day in Serbia! In Belgrade, eco workshops deepened children's knowledge of river issues. The Save the Danube Eco Camp engaged students in a week-long outdoor adventure, learning environmental science from national experts. Across northern and central Serbia, river outings, green actions, art, sport and contests enhanced Danube identity and understanding. © *Donji Milanovac Tourist Organisation*

CROATIA

Sustainable management was the priority for ministry, provincial and business leaders meeting in Osijek, where a public festival was also held. Water science road shows visited schools and events across Croatia and a Month of Rivers festival was held in Županja, Zagreb, Slavonski Brod and Sisak.

DANUBE DAY

UKRAINE

A unique event linked Galabor in Zakarpatska with its Hungarian neighbour, Tiszaköröd in a day of music, feasting and fun. Normally separated by the Tisza River, a thousand visitors in the two communities passed freely through a temporary mid-stream border-check, while representatives from the Ministry and local authorities met on a barge to discuss bi-lateral cooperation. Children decorated plaster fish and exchanged these colourful creations across the river as symbols of international friendship.

ROMANIA 8

A Danube Month of festivities saw 4000 people celebrate their rivers in all 11 water basin administrations. Giurgiu hosted national festivities attended by the Minister of Environment, Waters and Forests. Across southern Romania, water testing workshops, field trips, recycling actions and other events nurtured curiosity and environmental commitment. © *WBA Jiu*

MOLDOVA 10

Addressing national and local authorities and NGOs in Cahul, the Regional Development Minister provided updates on the EU Danube Strategy, water and infrastructure initiatives and the proposed Biosphere Reserve. Djurdjulesti held its popular annual celebration of folk culture and Danube films were shown at summer youth camps. © *Ecological Movement of Moldova*

BULGARIA 9

Thousands in each Danube municipality enjoyed celebrations stretching a fortnight – from culinary and art contests in Belene, Ruse and Tutrakan to rubbish clearing in Lom; steamship trips in Kozloduy to water testing in Baykal. Many actions specifically engaged children: Svishtov pupils visited a treatment plant, Nikopol children adorned pavements with rainbow fish, and young Pleven artists decorated the River Basin Directorate. © *Water Management Directorate*

Suzie Holt lives in the UK and is a writer on environmental issues. She has been involved in Danube Day since its start in 2004 and prior to that worked for WWF on the Carpathian Ecoregion Initiative.

KINGFISHER

Alcedo attbis

The kingfisher perches above the water on the lookout for small fish. Once it spots a fish, the kingfisher plunges into the water – even submerging itself completely if necessary.



The kingfisher is dependent on floodwater conditions in the Danube wetlands, which shelter some of the most important kingfisher breeding grounds. On the one hand, it requires the formation of sandy-loamy river banks where it can excavate its breeding tunnels. On the other hand, the kingfisher – which plunge-dives vertically into the water to catch small fish, its main source of food – requires an ever-evolving river bank structure with washed-up deadwood and overhanging branches as perches as well as shallow waters rich in small and young fish.

However, river regulation has led to the elimination of entire swaths of land as suitable habitats, and the kingfisher is categorized as 'endangered' on the International Union for Conservation of Nature (IUCN) Red List. Of great danger to the kingfisher is the pollution of waters by toxic chemicals from industry, but also through eutrophication, or the overfertilisation by agriculture and runoff from residential development. Thus the EU Birds Directive stipulates special protection of the kingfisher, as it does for other endangered birds of Europe, and its habitat in appropriate sanctuaries, the so-called Special Protection Areas.

The kingfisher is the flagship species of the Donau-Auen National Park and by achieving conservation of this species, the status of many other species which share its habitat – or are vulnerable to the same threats – may also be improved.