DANUBE WATCH

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DANUBE DAY 2015
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icpdr iksd
International Commission for the Protection of the Danube River
Internationale Kommission zum Schutz der Donau

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Dear readers,

It has been a great pleasure cooperating with all of the distinguished Heads of Delegations and experts from the Danube countries and serving the large, colourful family of the most international river basin in the world. The charm of the Danube Basin is in its diversity of languages, cultures, environments and administrative traditions. Yet the true strength of the ICPDR is in overcoming any differences to work together for the benefit of the entire region. In fact, the work of the ICPDR has been recognised globally as one of the best examples of transboundary cooperation and integrated river basin management. For more on the ICPDR's relationship with other river basins around the world, see the article on page 16.

My pleasure has been even greater to preside over the ICPDR during the year in which two important documents will be finalised of which we can all be proud: the second Danube River Basin Management Plan and the first Danube Flood Risk Management Plan are crucial documents in the implementation of the EU Water Framework Directive. Furthermore, since the public has always been a focus of the ICPDR's activities, the two documents were presented at the ICPDR's Stakeholder Consultation Workshop, 'Voice of the Danube', held in Zagreb this July to gain insight and public opinion on the documents.

Cooperation with other commissions has been an important part of the ICPDR since its establishment. For the Republic of Croatia, cooperation with the International Sava River Basin Commission is especially important, as it connects us to our neighbouring countries and helps in particular to coordinate the synergy of water management and navigation issues. For more on this synergy, see the article on page 22.

Though we can be proud of our accomplishments, there is still much to do. This summer the Republic of Croatia had extremely high temperatures and severe drought and the negative impact of climate change is evident. The ICPDR has already developed a basin adaptation strategy and will sign the Environment-Paris Pact to bring the impact of climate change on water to the attention of the 2015 United Nations Climate Change Conference in December.

Looking at the past we have much to be proud of, and looking into the future we have good reasons to be optimistic. I wish our Czech colleagues who will take over the ICPDR presidency next year a successful and flood-free presidency!

Dražen Kurečić,
Assistant Minister of Agriculture for the Republic of Croatia and ICPDR President for 2015

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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.

OVER €220 MILLION INVESTED IN DANUBE REGION

The new Danube Transnational Programme was adopted in August to boost innovation and entrepreneurship, preserve natural and cultural assets of the region, improve connectivity and support the shift towards a low-carbon economy. The programme will support projects in line with the priorities of the EU Strategy for the Danube Region, and with the same geographical focus. More than €200.2 million from the European Regional Development Fun and €19.8 million from the Instrument for Transnational Projects will be invested in the Danube Basin.

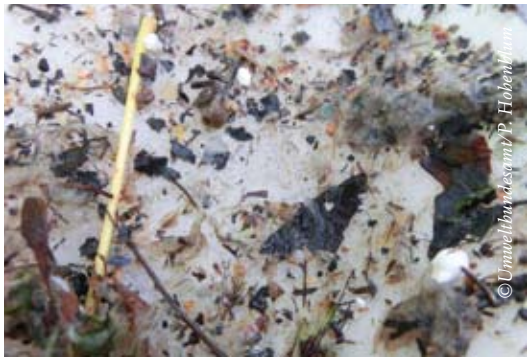
For more information, please visit: www.southeast-europe.net/en/about_see/danubeprogramme/index

ICPDR AT 4TH ANNUAL DANUBE STRATEGY FORUM

The 4th Annual Forum of the EU Strategy for the Danube Region was held in November this year, organised by the European Commission, the State of Baden-Württemberg and the City of Ulm, with the theme 'Smart, social, sustainable - innovation for the Danube Region'. The ICPDR contributed to a number of events, including workshops on the Danube Flood Risk Management Plan, the Sturgeon 2020 project, funding for measures under the Danube River Basin Management Plan, regional initiatives for sustainable use of local resources, and a joint session of the Danube Strategy's environmental pillar.

www.icpdr.org/main/icpdr-4th-annual-forum-eusdr

NEW GROUP WORKING TO STOP PLASTIC POLLUTION



Microplastics are tiny, but cause big problems. To tackle this challenge, a new transnational interest group was created by the Network of Environmental Protection Agencies at a meeting of the heads of the European Environment Agencies in Reykjavik in September. The interest group aims to raise awareness for plastics in the environment at the European level, beginning with a project entitled 'Eliminating Plastic Pollution' under the leadership of the Environment Agency Austria. This project will develop harmonised methods for sampling, analysis and evaluation, in dialogue with industry, NGOs and citizens.

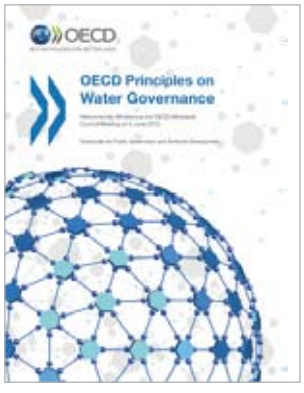
www.umweltbundesamt.at/news_150930_en/

PUBLIC CONSULTATION BRINGS STRONG FEEDBACK

The six-month public consultation phase for the Danube River Basin Management Plan Update 2015 and the first Danube Flood Risk Management Plan ended in July 2015. In addition to collecting feedback in writing, a stakeholder consultation workshop was held in Zagreb in June, and social medial platforms such as such as Facebook and Twitter provided simple and accessible ways to engage with the ICPDR. A closing report on the public consultation will be published at the end of 2015, featuring all of the comments as well as a description of how each was processed. The management plans will be finalised in early December and officially endorsed in February.

SALVATORE GABOLA PASSES AWAY

It was with deep sorrow that the ICPDR received the news about the death in October of Salvatore Gabola, Director of Public Affairs for Coca-Cola Europe Group. Salvatore was instrumental in starting the "Green Danube Partnership" between the ICPDR, the Coca-Cola Company and Coca-Cola Hellenic. At the signing of the Memorandum of Understanding that formalised the partnership (pictured) he said, "Looking after the Danube means commemorating glorious past and celebrating the expanding, peaceful Europe of our future". He will be remembered by the ICPDR community for his commitment to the Danube, and will be greatly missed.



OECD PRINCIPLES ON WATER GOVERNANCE NOW IN 15 LANGUAGES

Securing access to water for all as needs increase will be a matter of good governance. To meet this challenge, the Organisation for Economic Co-operation and Development (OECD) has recently published the OECD Principles on Water Governance, now available in 15 languages. The Principles build on three pillars of water governance – efficiency, effectiveness, and trust and engagement – and lay down the 12 'must-have' components for governments to navigate the tenets of good public policy on water, and distil what they need for their own challenges.

To download a copy, please visit: http://www.oecd.org/governance/oecd-principles-on-water-governance.htm

A state of the sector: looking at water and wastewater in the Danube Basin

A new report from the World Bank highlights the double challenge and opportunities for the water sector in the Danube region.

In May of this year, the World Bank launched a comprehensive regional study, financed under the Danube Water Programme, called on 'Water and Wastewater Services in the Danube Region: A State of the Sector'. The report, which is complemented by 16 country notes, is the first of its kind in analysing the progress and double challenge of 16 countries in the Danube watershed in delivering sustainable water and wastewater services to all, while meeting the high standards of the EU environmental legislation.

The report analyses the capacity of the countries to deliver these services to their populations across four main dimensions: access to, quality, efficiency and financing of services. There are sizeable investments needed in the region to bring the water sector up to EU standards, and the report delivers a sound analysis of the status quo as a basis for informed policy making and sustainable investments.

Context and organisation. Most of the Danube Basin has shared a common trajectory over the past 30 years and the development of water and wastewater services has broadly followed a similar path of transformation – driven mainly by two major politico-economic processes: the fall of communism and EU integration. While in the post-socialist period there has been strong decentralisation and significant involvement of the private sector in most countries, EU integration has led to a need for increased regulation of municipal services, the introduction of the cost recovery principle, a drive towards structural change and increased efficiency and sustainability in service provision.

Some of the trends include the aggregation and corporatisation of service providers and the establishment of independent regulatory authorities. About three-quarters of the population receive public services from one of the more than 10,000 formal utility providers in the region, leaving one-quarter to rely on informal providers or self-provision, mostly in rural areas. Sector policy formulation remains the responsibility of central governments, whereby the EU agenda and transposition of EU water directives, such as the Urban Waste Water Treatment Directive and the Drinking Water Directive, are key drivers of change in the sector.

Access and performance. Access to water and sanitation services in the region is high compared with the rest of the world. The collection and treatment of wastewater,

Access to water and sanitation services in the region is high compared to the rest of the world. The collection and treatment of wastewater, however, generally lags behind the high level of access to piped water and private flush toilets, especially with regard to EU standards.

however, generally lags behind the high level of access to piped water and private flush toilets, especially with regard to EU standards: 83% of the region's population have piped water in their dwellings, leaving 17%, or almost 22.5 million, without this service. Almost 80% of the population in the Danube watershed report having a flush toilet in their home, leaving around 28 million without, yet only 66% are connected to public sewer networks.

The overall performance of water and wastewater services varies widely in quality and efficiency and is generally below international good practice standards. However, there have been positive trends in a number of dimensions. In many countries, water service is generally continuous and drinking water reaches national quality standards. The level of customer metering has steadily increased to nearly universal coverage in many countries, bringing down individual consumption of water to 100 l/cap/day from 120 l/cap/day in most countries, which is in line with EU standards. Despite overall improvements, the efficiency of utilities in most countries is below international standards and non-revenue water and overstaffing continue to present significant challenges.

The report uses a proposed Water Utility Performance Index (WUPI) to evaluate the overall performance of utilities and it shows that performance varies widely within the region and each country. Overall, the performance of utilities has improved over the past ten years, with the high performers generally also charging higher tariffs.

Financing services. Increasing costs have driven increases in tariffs throughout the region, to a point where services might become unaffordable for low-income households in some countries. Yet the region is far from implementing the Water Framework Directive's principle of cost recovery. Overall, the level of sector financing from tariffs, taxes and transfers varies widely, with EU countries showing the highest rate of per capita financing. On average, the sector directs about half of overall expenditure toward operating and maintaining infrastructure and half toward renewing and expanding it. Water and wastewater investments are around €3.5 billion per year, significantly below the €5.5 billion needed to achieve EU and national targets.

Conclusions and future steps. Despite the above mentioned challenges, the EU accession process serves as a motivator to improve access, quality and efficiency of water services and the status of countries applying for EU accession is positively related to the level of development of wastewater services. The region can also build on some important opportunities. The sector has proven to be open to change and those governments considering reforms in around a third of the countries can continue to build positive momentum by basing their efforts on solid analyses. EU integration continues to present a tremendous policy and financing opportunity for many countries. Formal regulatory frameworks and utility corporatisation can help greater accountability, and despite managerial shortcomings, the sector can count on a strong technical workforce.

Based on the outcomes of the report, the Danube Water Programme plans – under its recently started phase II – to provide policy support to countries at national level, conduct more research into non-formal service providers and release a second study on the state of the sector in 2018.

For more information on the Programme visit: www.danube-water-program.org. For copies of the report (including translations of the report and country notes in several regional languages), see: http://sos.danubis.org/.

Angelika Heider is a programme analyst at the World Bank.

DANUBE WATER PROGRAMME

The Vienna-based Danube Water Programme supports policy dialogue and capacity development to achieve smart policies, strong utilities and sustainable services in the water supply and wastewater sector in 11 target countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, the Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Romania, Serbia and Ukraine. Five other countries of the Danube region – Austria, the Czech Republic, Hungary, Slovakia and Slovenia – also participate but do not benefit directly from Programme funding. The Programme is a partnership between the World Bank and the International Association of Water Supply Companies in the Danube River Catchment Area (IAWD), with seed financing from the government of Austria.

Providing safe passage routes on the Columbia River

The Pacific salmon faces many of the same obstacles as the Danube's Huchen in reaching safe spawning grounds. However, hydropower planning that has included fish passages from the very beginning has made passage survival a reality.

In the Pacific Northwest, a region of about 15 million people, the Pacific salmon has cultural, sustenance and environmental importance. In his 1990 book *The Good Rain: Across Time and Terrain in the Pacific Northwest*, **author Timothy Egan writes, "The Pacific Northwest is simply this: wherever the salmon can get to."**

However, like the Huchen, the iconic signature fish of the Danube Basin, Pacific salmon migrate in rivers where hydropower dams threaten their survival. Hydropower is the largest source of electricity in the area and nearly half of the region's hydropower is generated at dams in the Columbia River Basin, with most of that generated at the 31 dams of the Federal Columbia River Power System.

The Columbia Basin covers 671,000 square kilometers and has an annual discharge of 237 billion cubic meters. Adult salmon and steelhead can travel up the Columbia River past dams for about 877 kilometers, and up the Columbia's major tributary, the Snake River, for about 920 kilometers. Passage facilities for both adult and juvenile fish have been in place for decades at many – though not all – hydropower dams in the region. Over time, passage survival has improved as research, monitoring and evaluation has informed decisions about new passage facilities, modifications of existing structures and river operations.

The first of its kind. A guiding principle for new hydropower dams in the Danube Basin is to ensure fish migration, and the same was true when Bonneville Lock and Dam, the first Columbia dam inland from the ocean, was completed in 1938. At more than 21 meters tall, Bonneville was the largest fish-blocking structure built on any river in the United States or Europe at the time, and provided access to spawning grounds for more than 75% of all migratory fish in the Columbia Basin.

There was strong political, scientific, and public support for the fish passage at Bonneville Dam. For adult fish, the original construction included fish ladders, hydraulic fish lifts (though these proved ineffective and later were abandoned), a fish-collection system across the front of the dam, and bypasses. Attracted to the outflow of the ladders, adult fish find the entrances, navigate the ladders and passages, and exit behind the dam.

Downstream challenges. Passing juvenile fish downstream, however, has proven more problematic – an issue for many European rivers as well. With the exception of some steelhead, there is no downstream

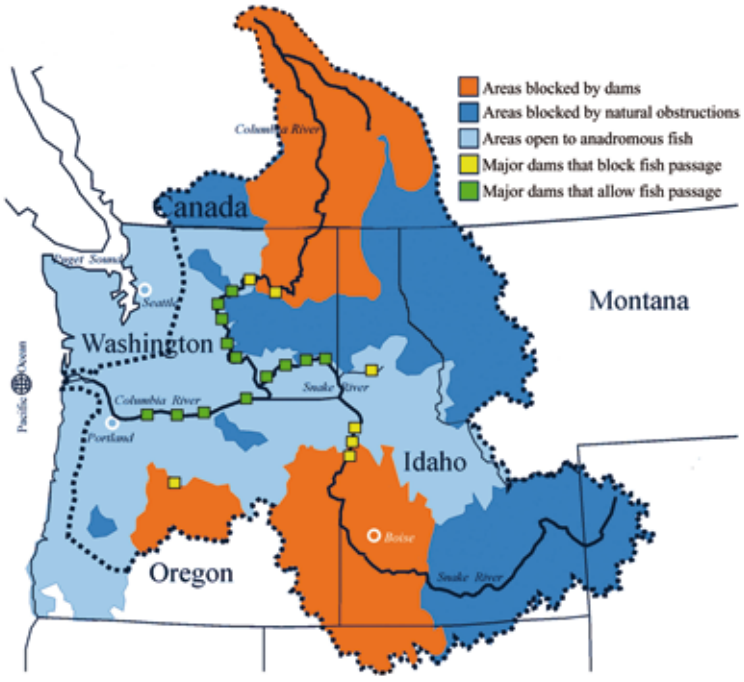
Spilling water and fish over dams and thus away from turbines is generally the safest method of the juvenile fish passage routes at the Columbia and Snake River dams.

Bonneville Dam provides access to spawning ground for more than 75% of all migratory fish in the Columbia Basin.

migration of adult anadromous salmonids in the Columbia River. In the 1930s, it was believed juvenile salmonids could survive passage through hydropower turbines, but over time it became apparent that passage through the high-pressure turbine environment was more lethal than earlier believed. In addition, slow-moving water in reservoirs delayed the physiologically important migration to saltwater.

Fish encountered these problems at all of the dams where passage was provided. Research revealed where and how fish approached the dams, passed through them, and whether they survived. This has led to ongoing improvements in passage facilities and river operations to assist passage.

In addition to dam passage, other factors affect survival (predation, harvest, straying, injuries or disease). While juvenile passage survival at Bonneville Dam is about 96%, survival declines as a function of how many dams fish must pass. In 2014, for example, estimated juvenile survival through the eight dams of the lower Snake and Columbia rivers was 49.7% for Snake River yearling Chinook salmon and 77.1% for Snake River steelhead. For the 2008-2012 period, the average adult passage survival upstream past the same eight dams ranged from 70.9% to 97%, depending on the species.



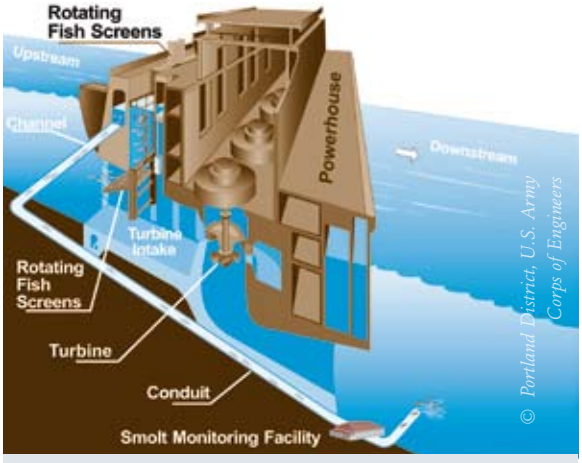
© Northwest Power and Conservation Council

Adult salmon and steelhead can travel up the Columbia River past dams for about 877 kilometers, and up the Columbia's major tributary, the Snake River, for about 920 kilometers

Increasing passage survival for the future. Although newer small dams are possible, it is unlikely that additional large dams will be built in the Columbia River Basin. Some 71,000 kilometers of streams and rivers in the Columbia Basin are protected from hydroelectric development in order to prevent major negative impacts that could not be reversed.

However, hydropower will continue to be the major source of electricity in the Pacific Northwest, and salmon and steelhead will continue to be the most important fish species in the region. In 2014, more than 2.5 million adult salmonids were counted at Bonneville Dam, a record since counting began there in 1938. While the record is good news demonstrating that fish clearly are passing dams successfully in the Columbia River Basin, there is more work to do. Fishery managers and dam operators will continue to look for ways to increase dam-passage survival.

Over time, passage survival on the Columbia River and its major tributary the Snake River has improved as research, monitoring and evaluation has informed decisions about new passage facilities, modifications of existing structures and river operations.



© Portland District, U.S. Army Corps of Engineers

JUVENILE BYPASS SCHEMATIC

Today, juvenile fish passage routes at the mainstem Columbia and Snake River dams include:

- **Spill:** Spilling water and fish over dams and thus away from turbines is generally the safest method
- **Surface passage:** Specially designed spillway weirs take advantage of natural migration patterns – juvenile salmonids tend to migrate in the top 3-9 meters of the water column
- **Screened bypass systems:** These facilities guide fish away from turbines and into bypass channels by means of submerged screens installed in front of turbine intakes
- **Barging:** When river conditions are poor – warm water, low flow – fish are collected from bypass system outfalls and transported downriver past the dams in specially designed barges

John Harrison is the Information Officer for the Northwest Power and Conservation Council, www.nwcouncil.org. Two officials of the U.S. Army Corps of Engineers Portland District ,http://www.nwp.usace.army.mil

Diana Fredlund, Public Affairs Specialist, and *Brad Eppard,* Chief, Fish Passage Section, Environmental Resources Branch, also contributed to this article.

Rivers, wetlands and groundwater are highly interconnected. When river water is high, it infiltrates into the groundwater system, and in dry periods groundwater recharges wetlands and river flows, helping to prevent drought.

Groundwater: the river's invisible twin

A vital source of drinking water and water for irrigation, groundwater also feeds rivers all year round. However, because it is hidden away below the surface, groundwater is extremely susceptible to pollutants and over-extraction.

Groundwater is largely invisible; we often ignore it or take it for granted. But the truth is that groundwater has incredibly important values for people, industry and the environment throughout the Danube River Basin. And to maintain those values, it desperately needs our constant protection.

Nearly 72% of all drinking water consumed in the Danube River Basin is produced from groundwater sources, serving an overall population of some 59 million people. Groundwater also provides much-needed water for agricultural irrigation, and it is an important resource for other industrial activities. Applications for cooling and heating also often depend on groundwater sources.

Alongside its multiple benefits for people, it has become increasingly clear that groundwater should be protected for its environmental values. Its essential role in the basin's hydrological cycle brings numerous environmental goods and services, such as providing livelihood for wildlife species.

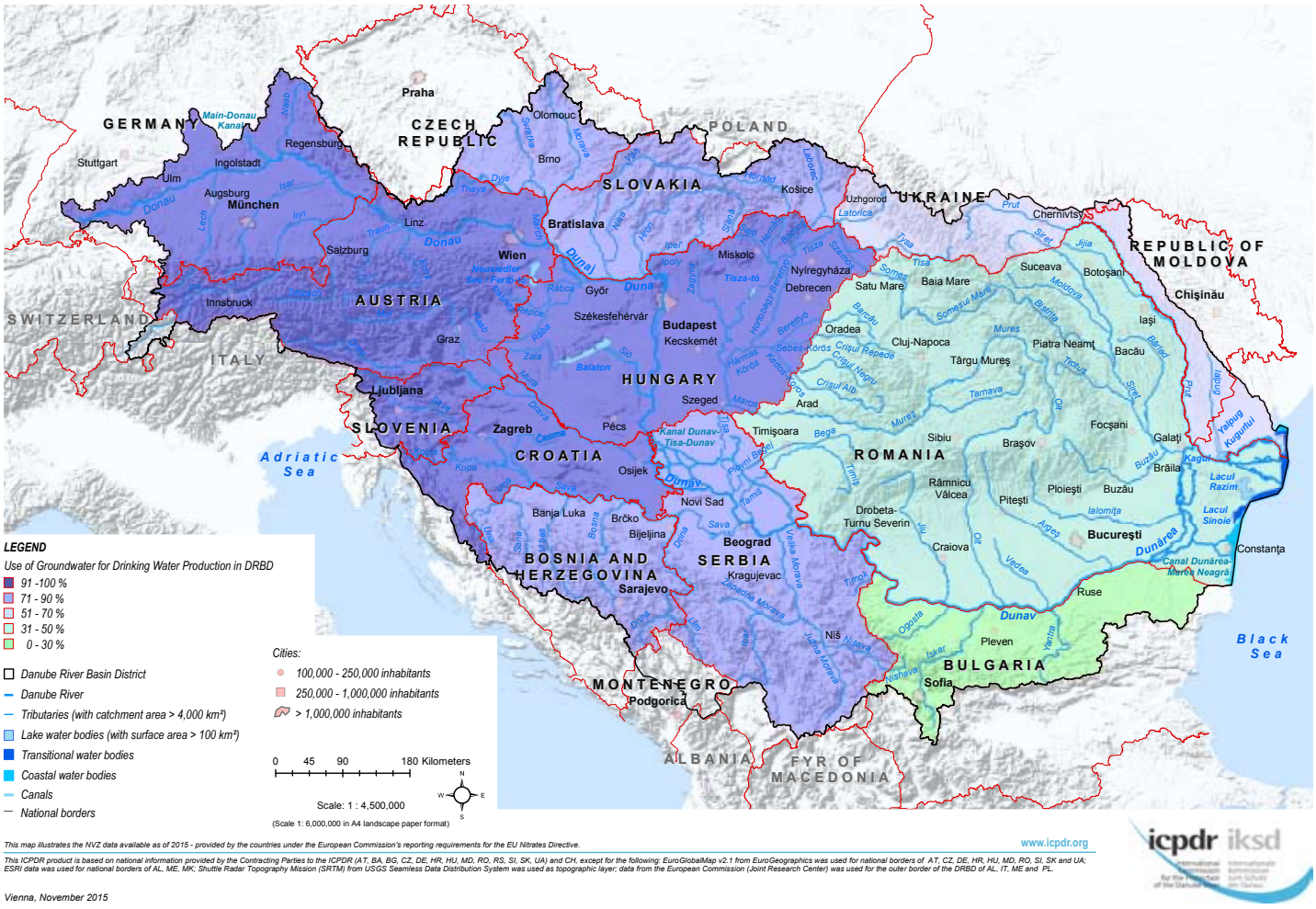
Surface water and groundwater tend to be highly interconnected. When the river surface water level is high, river water infiltrates into the groundwater system. This is especially true during high flows, when both the river and adjoining floodplains and meadows can become flooded. In drier periods, groundwater can help recharge wetlands and even river flows, acting as a buffer and thereby helping to prevent drought. This exchange includes quantities of water as well as concentrations of potential pollutants in the water that might be transferred.

Nearly 72% of all drinking water consumed in the Danube River Basin is produced from groundwater sources, serving an overall population of some 59 million people.

Groundwater faces many threats. The main risk to groundwater quality comes from pollution – such as untreated sewage from cities, fertilisers and pesticides from agriculture, or chemicals leaching from contaminated industrial waste sites.
Pollution can reach groundwater reserves in many ways, such as through direct discharge from a point-source to a water body, or indirect discharge through soil infiltration. As a result, some groundwater sources cannot be used without prior treatment. As for groundwater quantity, the main pressure is excessive abstraction by users, such as for drinking water or agriculture.

The international response. Ensuring that groundwater in the Danube River Basin is monitored and protected is an important goal of the Danube River Protection Convention has been one of the main issues managed by the ICPDR and its Groundwater Task Group. All Danube countries, whether they are EU Member States or not, are fully involved, demonstrating the joint interest of all countries in the basin to ensure the protection and proper management

Use of Groundwater for Drinking Water Production in DRBD



Nearly 72% of all drinking water consumed in the Danube River Basin is produced from groundwater sources, serving an overall population of some 59 million people.

of groundwater. Over the years, the ICPDR and Danube countries have successfully identified 11 transboundary groundwater bodies of basin-wide importance. They have also formulated basin-wide visions regarding the pollution of groundwater and its sustainable use.

Meeting EU water legislation. The Danube countries have been actively taking steps to achieve the objectives of the EU's Water Framework Directive (WFD) and the more specific Groundwater Directive. The WFD requires Member States to achieve a 'good status' for all waters in the EU by 2015. This includes a good status for all Danube basin groundwater bodies – in terms of chemicals (i.e. the water should be clean) and in terms of quantity (i.e. there should be no groundwater overexploitation). Furthermore, achieving good status is not only relevant from the perspective of human uses, but also for the health of aquatic and terrestrial ecosystems that depend on groundwater.

Over the years, the Danube countries have identified 11 transboundary groundwater bodies of basin-wide importance, and have formulated basin-wide visions regarding the pollution of groundwater and its sustainable use.

Broadly speaking, the comprehensive WFD aims at preventing deterioration, and enhancing, restoring and protecting Europe's surface and groundwater bodies through a challenging set of actions. It requires the identification, characterisation and review of the impacts of human activities. To achieve the demanding WFD objectives, a comprehensive programme of measures is essential to address existing and expected groundwater problems. Overall, transboundary and integrated river basin management is needed, as water does not respect administrative or political boundaries and moves continuously above and below the surface within the hydrological cycle, from one reservoir to another (e.g. from air to rivers, lakes, oceans, wetlands, soil and aquifers). Continuous monitoring and periodic reviews and reporting, including public participation, are required to achieve the overall goals in due time.

In the Danube River Basin Management Plan the ICPDR developed such a programme which will ensure that the water use is appropriately balanced and does not exceed the available groundwater resource, considering future impacts of climate change and that the emissions of polluting substances would not cause any deterioration of groundwater quality.

Igor Liska is the Technical Expert for Water Quality and Water Management at the ICPDR Secretariat.

From the six native Danube sturgeon species - some of which migrated as far as Regensburg on the Upper Danube - one is already extinct, one is functionally extinct, three are on the verge of extinction and one is considered threatened.

Sturgeons are a natural heritage of the Danube River Basin and a flagship species signalling the health of the habitats and ecosystems of the river and its tributaries. The dramatic decline of sturgeon populations in recent years has captured the attention of the Danube countries, and several projects across the basin are working to protect these 'living fossils'.

Fighting overexploitation. Although most sturgeon caviar today comes from aquaculture facilities, caviar from poached sturgeon still finds its way to the market. A three-year project to fight sturgeon over-exploitation, jointly financed by the EU and WWF, has recently ended. Called 'Joint actions to raise awareness on overexploitation of Danube sturgeons in Romania and Bulgaria', the project worked with fishermen, law enforcement agencies and the aquaculture industry to reduce illegal fishing in those countries with the last viable populations of sturgeons in the Danube.

Thanks to the project, local sturgeon advocates in Bulgaria and Romania have raised the awareness of fishermen about sturgeon conservation and informed them about alternative sources of income. Project workshops for law enforcement authorities have helped add information and capacity to control illegal fishing, smuggling and trading, and plans are in the works to develop the first wildlife crime unit in Bulgaria. Furthermore, eight aquaculture farms in Bulgaria and Romania have committed to protect wild sturgeons beyond legal requirements. "The key to protecting sturgeons is to inform and train the central stakeholders," says project leader Jutta Jahrl from WWF Austria.

A follow-up project has been submitted to expand sturgeon protection activities into Serbia and the Ukrainian Danube Delta. However, the current fishing ban in place in Bulgaria and Romania expires on 31 December 2015. With no defined protection measures by the governments beyond this, it is unclear how long the success of the project can last.

Protecting migration routes. One of the most significant – and literal – obstacles sturgeons must overcome is the Iron Gates Dams I and II, which interrupt their migration route. To gather dataabout how to operate effective fish passes so the dams could be reopened, a one-year preparatory project was conducted this year, funded by the European Investment Bank.

The project tested equipment to achieve the prevision required to track sturgeon positioning in relation to turbines at the Iron Gates Dam II. Results showed radio telemetry to be ineffective in the high radio noise environment, however new acoustic telemetry equipment allowed researchers to estimate the receiver's distance from fish carrying the transmitter – impossible a year before – and project leaders in Romania held hands-on training in acoustic telemetry for teams from Bulgaria and Serbia.

A male beluga sturgeon is tagged at Dunavtsi, near Vidina, Bulgaria, as part of a project to track sturgeon positioning in relation to turbines at the Iron Gates Dam II..

As part of the project, a study compared genes of beluga sturgeons migrating to the Iron Gates with those spawning further downstream. Though researchers expected the two groups to differ, the genetic comparison showed that fish migrating to the Iron Gates are quite similar to the ones living and spawning farther downstream.

This project will form the basis for a three-year project, also to be funded by the European Investment Bank, to study the behaviour of sturgeons and other migratory fish at the Iron Gates dams and reservoirs.

Fighting for the sturgeons

Once present in large numbers in the Danube River Basin, sturgeons today face threats from overfishing and illegal marketing, disruption of spawning migration, and habitat loss due to river engineering. Although they have outlived the dinosaurs, it's not clear how much longer they can survive without urgent help.

Preserving genetic diversity. The Danube Sturgeon Task Force was established in 2012 to support the implementation of the Sturgeon 2020 programme. A new project, funded by the EU Strategy for the Danube Region's START programme, is targeting one of the key topics of Sturgeon 2020: Ex-situ Survey to Preserve Sturgeon Genetic Diversity in the Middle and Lower Danube (Sturgene).

The Sturgene project will obtain an overview of existing facilities, broodstock and expertise and then develop a roadmap for ex-situ conservation in the Danube Basin, while mobilising further political and public support for sturgeon conservation. Measures will focus first on the Lower and Middle Danube, where wild migratory sturgeons still exist and Sturgene intends to secure their diversity and stem the decline in their population. However, the aim is to create facilities producing sturgeon fingerlings and supporting restocking programmes all along the Danube to reintroduce sturgeons in natural habitats and establish self-sustaining populations. A roadmap for the project, the first phase of which will run from 2016 to 2020, will be finalised in a few months.

However, the ex-situ conservation programme is not designed to function on its own. The programme will be effective only if accompanied by an extension of the current sturgeon fishing ban, a system of compensation for fishermen affected by the ban, enhanced cooperation with law enforcement organisations to reduce illegal fishing as well as a conservation programme to protect and restore natural habitats. All of these activities are vital to the success of the Sturgene project – and indeed to saving the sturgeons – and should be high priorities for governments in 2016.

Restoring natural populations. Restocking programmes have been largely unsuccessful at producing self-sustaining populations of wild sturgeons 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.

This challenge is being tackled by a new project, called 'Restoration of sterlet populations in the Austrian Danube' (LIFE-Sterlet). The project is organised by the Institute of Hydrobiology and Aquatic Ecosystem Management at the University of Natural Resources and Applied Life Sciences (BOKU) of Vienna, with partners from the Viennese governmental body for river and waters (MA45 Wiener Gewässer) and the Institute of Zoology at the Slovak Academy of Sciences.

The LIFE-Sterlet project will create a genetic inventory of available brood stocks and establish a breeding container on the Danube Island in Vienna. Using water and sediments from the Danube, several hundred thousand eggs will be hatched each year and reared with natural food and exposure to predators.

Starting in 2017, the project will restock several thousand juveniles into three sites – the Morava River and the Wachau Valley and Donau-Auen National Park on the Austrian Danube – and specimens will be monitored by telemetry transmitters to gain a better understanding of habitat use. The project will run until 2021.

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

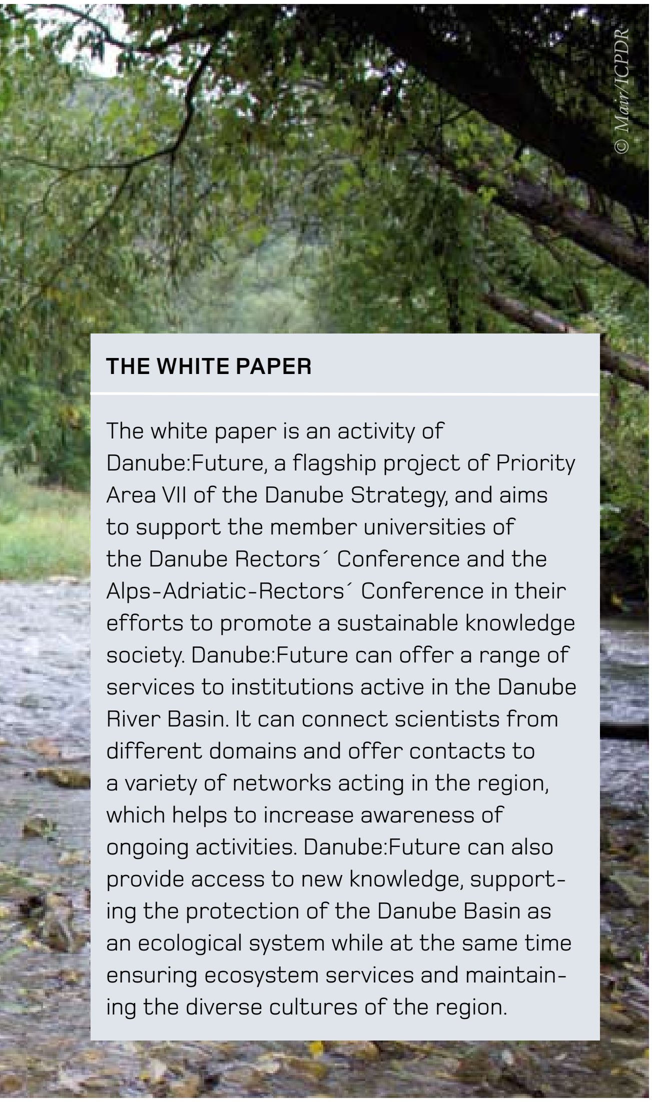
Danube:Future, achieving integrated sustainable development in the Danube River Basin

Rivers are neither cultural nor natural spaces; they are socio-natural sites, where the interplay of humans with the environment has taken place over long periods. A new white paper aims to develop interdisciplinary research and education in the basin as a basis to solve pressing environmental issues and secure a sustainable future for the region.

In the Danube River Basin, environmental challenges such as pollution, interventions into natural cycles or invasive species are connected to economic and social inequalities leading to a brain drain of much-needed expertise, among other things. Sustainable development is key to the prosperous future of the region, and the basic requirement for this future is a balanced integration of environmental, economic and social needs. Such integration is underdeveloped and hampered by conflicting environments.

In July 2015, the 'Danube:Future White Paper on Integrated Sustainable Development of the Danube River Basin' was published. The white paper, which deals with the future of research and education in the Danube River Basin, was prepared in a bottom-up process that involved an interdisciplinary group of researchers from most of the Danube countries. In the Danube River Basin, sustainable development can build on a diverse natural and cultural heritage, natural resources and on tertiary education excellence. It can exert a basin-wide positive impact on migration, re-

Danube:Future



THE WHITE PAPER

The white paper is an activity of Danube:Future, a flagship project of Priority Area VII of the Danube Strategy, and aims to support the member universities of the Danube Rectors´ Conference and the Alps-Adriatic-Rectors´ Conference in their efforts to promote a sustainable knowledge society. Danube:Future can offer a range of services to institutions active in the Danube River Basin. It can connect scientists from different domains and offer contacts to a variety of networks acting in the region, which helps to increase awareness of ongoing activities. Danube:Future can also provide access to new knowledge, supporting the protection of the Danube Basin as an ecological system while at the same time ensuring ecosystem services and maintaining the diverse cultures of the region.

duce brain drain and foster environmental, economic and social justice. But a long-term perspective is indispensable. Such a perspective can shed light on how societies and their environments have interacted and co-evolved in past centuries and offer perspectives for alternative ways of action.

Transitioning to sustainability. Interdisciplinary cooperation in research is required to support a transition to sustainability. In particular, the humanities have not been stimulated enough to bring their expertise to the needed portfolio of knowledge. The authors of the white paper identified the integration of cultural and natural heritage and legacy challenges between and across disciplines as the most promising avenue to improve the sustainability of the Danube River Basin macro-region.

A humanities' perspective on the effects of global climate change and mitigation options is urgently needed, as legacies of the past play a crucial – but currently underestimated – role in the study of possible sustainable futures.

Civil society and independent media – but also governments – have key roles improving sustainability. University study and training based on regional strengths can support economic development and societal integration. The white paper introduces key topics and principles of research and education and offers policy recommendations at the national and European levels. Cross-discipline approaches combined with a long-term perspective will contribute to better understanding and help tackle present and future challenges. The EU Strategy for the Danube Region and the objectives of the European research agenda have been accounted for in the recommendations, encompassing sub-regionally defined sustainability training and education, the bridging of diverse and often conflicting cultures, and multi-disciplinary investigation of biodiversity, protected areas and ecosystem services.

Looking ahead. Horizon 2020 challenges can and should be tackled in a form adapted to the specific challenges of the macro region as identified in the Danube Strategy. All Horizon 2020 challenges exhibit emergent properties, resulting in a fundamental unpredictability; risk management involving stakeholders becomes key. Decision making under conditions of uncertainty has always been a major challenge for all societies and research has to tackle the non-linearity of complex and interrelated human-ecological systems. Long-term socio-ecological research is necessary to deal successfully with the legacies and raise the value of heritage for sustainable development. Due to the diversity of potentials and challenges characterising the Danube River Basin, the macro-region can become a laboratory for forward-looking, international research and education.

For more about the Danube:Future project, please visit: www.danubefuture.eu. To download a copy of the white paper, visit: http://www.danubefuture.eu/sites/default/files/DanubeFuture_WhitePaper.pdf.

Gertrud Haidvog is senior scientist at the Institute of Hydrobiology and Aquatic Ecosystem Management, University of Natural Resources and Life Sciences, Vienna, Austria, and deputy coordinator of Danube:Future.

Verena Winiwarter is Professor of Environmental History and Dean of the Faculty for Interdisciplinary Studies, Alpen-Adria-Universität Klagenfurt Wien Graz, Austria, and coordinator of Danube:Future.

The lack of sanitation, sewage networks and treatment contributes roughly 75% of the liquid waste the river has to cope with.

Saving a sacred river

An Indo-German cooperation project is bringing experts from the Danube and the Ganga rivers together to share knowledge and experiences on protecting these unique rivers to help river basins achieve their shared goals.

The waters of the Ganga River (commonly known as the Ganges) rise in the Himalayas, from some of the highest peaks on Earth. What's more, the Ganga has significant religious importance, and is a lifeline to all who live along its banks. However the Ganga Basin is one of the most intensely inhabited regions, home to 450 million people, with the result that the river's water over much of its course is highly polluted.

The National Ganga River Basin Authority (NGRBA) was established to provide more focused attention on cleaning the river. The NGRBA's objectives are to decrease pollution effectively and conserve the Ganga River by adopting a river basin approach to promote coordinated planning and management. The NGRBA also aims to ensure water quality and environmentally sustainable development.

The National Mission for Clean Ganga (NMCG) – under the Ministry for Water Resources, River Development and Ganga Rejuvenation – implements the mandate of the NGRBA at the national level. State Level Programme Management Groups from the five states located along the main stream of the Ganga River (Uttar Pradesh, Uttarakhand, Bihar, Jharkhand and West Bengal – with a total population of 400 million people) are responsible for the more detailed project management – such as planning or selection – and for achieving monitoring and evaluation results.

Further degradation of the river. Despite all efforts, however, the situation of the Ganga River is still critical. In general, the stresses on the river have not been reduced, and in some stretches the conditions of the river have even deteriorated.

Wastewater generation has increased and even partly exceeded new treatment capacities thereby keeping the share of treated urban wastewater below 50%. The main source of wastewater is municipal wastewater from the people living in the river basin. The lack of sanitation, sewage networks and treatment contributes roughly 75% of the liquid waste the rivers have to cope with. Another source of pollution stems from industry, mostly small scale industries, such as pulp & paper and tanneries. Solid waste is another harmful source of pollution, ranging from non-degradable plastic to human bodies, clogging the few existent sewage networks and the riverbed. Additionally, non-point sources of pollution, such as runoffs from agriculture in the form of fertilisers, pesticides, livestock and liquid waste, among others.

Other reasons for the river's degradation are issues of quantity. A tremendous amount of water is being abstracted from the river (according to the World Bank almost 90%), mainly for agricultural use. In addition, the increasing construction of hydropower plants and their operations are changing the hydromorphology and flow of the river.

Fortunately, however, Ganga rejuvenation efforts have gained momentum with the establishment of the NamamiGange ("Clean Ganga") umbrella programme by Prime Minister Narendra Modi, elected in spring 2014. With efforts to foster intersectoral cooperation to manage the river basin, sharing experiences with other river basin commissions (such as for the Rhine, Elbe and Danube) has been beneficial.

Learning from the ICPDR. The preparation for the Second Danube River Basin Management Plan – to be adopted in December – provided an excellent opportunity for the NMCG to gain insight into how the ICPDR steers the complex task of coordinating 14 countries to manage a large river basin. There are lessons to learn from this challenge for the coordination of the Federal States and the Central Government in India within the Ganga River Basin.

A representative and expert from NMCG went to Vienna for 10 days in September 2015 and was told about the ICPDR and its history, to the Danube River Basin and the ICPDR contracting parties. He also learned about the ICPDR's legal framework, objectives and tools,

as operational and surveillance monitoring, status analysis, joint programme of measures, and methods of public consultation and participation. The visit included trips to the Slovak Hydrometeorological Institute in Bratislava, the Waste Water Treatment Plant in Vienna, the Ministry of Water, Environment Agriculture and Forestry in Vienna, and the Schloss Orth National Park.

The objective of this 'on-the-job-training' visit was to learn about the key challenges of river basin planning, assessment and management in the Danube River Basin. Of particular interest were issues of water quality, river hydromorphology and the biological and technical interaction of surface and groundwater, cross-sectoral perspectives, impacts generated by other sectors like hydropower, inland navigation and agriculture, which – in relation to ecosystem health – have a significant influence on the river. Other topics addressed during the visit weremonitoring, including biological monitoring, data assessment and management, GIS, governance, stakeholder participation and communication. The visit was organised and financed through the Indo-German cooperation project 'Advice and knowledge exchange on river basin management'.

Lessons from the Danube. Learning more about the EU Water Framework Directive and the Floods Directive and how they form the core basis of ICPDR was extremely useful. In addition, the ICPDR's monitoring activities are fairly refined and the GIS database is quite strong and hence the results can be better visualised and presented than by NMCG.

Perhaps one of the biggest payoffs from the experience is the ICPDR's largest activity. The Joint Danube Survey, the biggest river expedition in the world, which has been carried out every six years, is a useful exercise and provides valuable information on the status of the Danube and the results of activities undertaken. Thanks to the visit to the ICDPR, there are intentions in India to try to stage a survey of the Ganga River to ascertain the status of Ganga every six years along the lines of the Joint Danube Survey.

THE GANGA RIVER AT A GLANCE

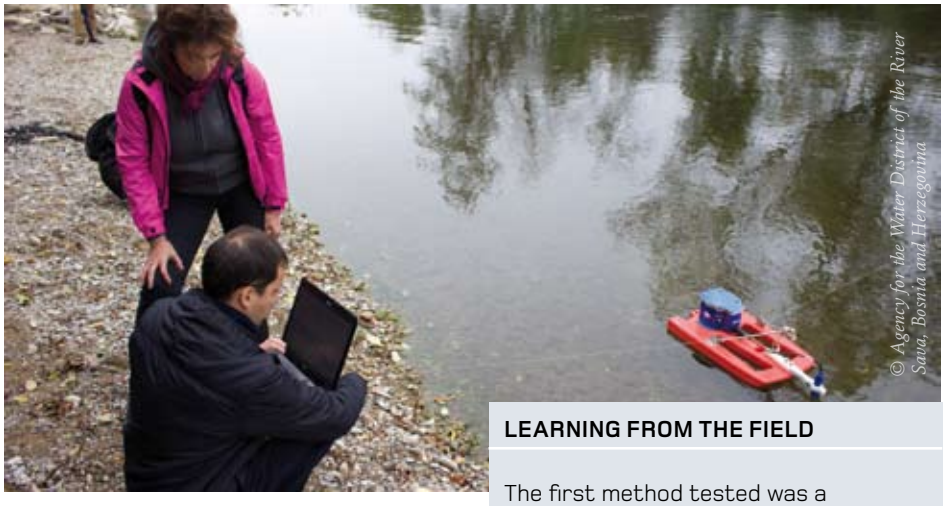
Length: 2,525 km
Source: Gaumukh (Gangotri Glacier)
Major tributaries: Batwa, Chambal, Damodar, Gandak, Ganga, Ghagra, Gomti, Hindon, Kali, Khan, Kosi, Kshipra, Ramganga and Yamuna rivers
Basin size: 1,080,000km^2
Drainage area: 861,404km^2
Population in the basin: 450 million

For more about the Ganga River and the Ganga River Basin Authority, please visit: www.moef.nic.in/sites/default/files/ngrba/index.html.

Babu Nair is an expert in policy interventions at NMCG. *Kerstin Bark* is an independent consultant for Deutsche Gesellschaft für Internationale Zusammerarbeit (GIZ), coordinating the project 'Advice and knowledge exchange on river basin management'.

Taking hydromorphology assessments for a test drive

Natural conditions vary greatly across the Danube River Basin, so naturally assessment standards must be tailored for each country. Sharing experiences on the methodologies used can help countries develop the right approach about for them.



Collecting information on hydromorphological pressures is needed for a range of WFD requirements, including water body delineation, identification of heavily modified or artificial water bodies, pressure and impact analysis, setting monitoring standards, developing biological assessment methods and developing a programme of measures.

Good hydromorphology is essential to meet the requirements of the EU Water Framework Directive (WFD), which requires that waters must provide good conditions, such as migration routes and sustainable habitats, for natural species to live in good health.

"The main challenge is to establish the way to regularly assess hydromorphological changes and their link to aquatic species and habitats," says Dragana Ninkovic, Lead Research Engineer at the JAROSLAV CERNI Institute for the development of Water Resources in Belgrade, Serbia. "Since there's no exact (mathematical, numerical, etc.) method, it is a real challenge to balance between strict and mild rating which both can cause wrong assessment and thus inappropriate measures."

In a survey prepared for the ICPDR Hydromorphology Workshop held this September in Vienna, only half the Danube countries responding had developed an assessment methodology for all the WFD hydromorphology quality elements. To help countries develop one, the workshop presented several different approaches and took workshop participants out in the field to the Pielach River in Lower Austria to test drive four of the methodologies.

LEARNING FROM THE FIELD

The first method tested was a pragmatic approach used in Austria. This methodology divides the catchment into 500m stretches, assessing each stretch using two parameters: bank dynamics and river bed dynamics. Although this provides only a rough classification of the river, it is possible to cover the whole river net of the country using this approach.

The next was an approach used in Slovakia taking precise measurements of eight key indicators: river planform, habitat diversity, flow regime and dynamics, sediment and fish continuity, local channel morphology, later connectivity, riparian zone and floodplain. An index calculated for the individual river stretch is then applied to the whole territory. While time consuming, this method provides very detailed information on the spot, which is vital for planning a programme of measures.

Strict or flexible. A method used in Hungary assesses nine parameters: channel section, extent of artificial material, erosion or deposition, impact of water abstraction, impact of water discharges, longitudinal continuity, bank structures and modifications, adjacent land-use and floodplain connectivity. This methodology was the strictest of the approaches presented, as the worst result of all of the parameters is taken for the entire assessment.

The European Committee for Standardisation method assesses ten parameters: channel geometry, substrates, channel vegetation and organic debris, erosion and deposition character, flow, longitudinal continuity, bank structure and modifications, vegetation on adjacent land and river and floodplain connectivity. This shows how the status of a particular parameter affects the whole water body, but does not provide specific information about the location of pressures.

The field work allowed participants to see the advantages and disadvantages of each approach first hand, as well as the opportunity to discuss the level of accuracy needed for specific conditions in each country. "Although all approaches are country-specific," says Ninkovic, "Serbia can use experience gained from each of them."

The experience also proved valuable to countries which had already developed a methodology. "It was very interesting to get some criticism which made sense – things that I hadn't really thought of before," says Helena Mühlmann at the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management. A background paper on all the approaches presented will be distributed next year.

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

Nitrogen pollution in the Danube Basin

Nitrogen is vital for aquatic ecosystems, supporting the growth of algae and plants which provide food and habitat for fish and smaller organisms that live in water. But too much nitrogen in the water can result in serious environmental and human health issues.

to estimate spatial patterns of nitrogen emissions in the basin and assess the various contributing pathways.

Subsurface flow is the most important pathway for nitrogen emissions, responsible for about 50% of all nitrogen emissions in the Danube Basin. Diffuse inputs dominate the basin-wide nitrogen emissions– with roughly 80% of the total load. Emissions from point sources, such as waste water treatment plants and industrial dischargers, contribute 20%of the total load.

The main emission sources are agricultural fields with 40% of the total load. Urban areas – such as waste water discharges, runoff from paved surfaces and combined sewer overflows – as well as natural lands where atmospheric deposition provides nitrogen input are significant source areas as well.

pathways make up a major part of the total nitrogen emissions. A key set of best agricultural practices related to farming and land management has been identified, which are in line with the provisions of the EU Nitrates Directive and the pillars of the Common Agricultural Policy in the EU Member States. In addition to regulatory actions to comply with basic standards, economic incentives for farmers can ensure higher efficiency and better practical performance in implementing measures.

However, further efforts are needed to achieve better use of the available financial instruments and to appropriately finance and implement agricultural measures.

Adam Kovacs is the Technical Expert for Pollution Control at the ICPDR Secretariat.

The main nitrogen emission sources are agricultural fields with 40% of the total load. Excessive amounts *of nitrogen in the water can lead to low levels of dissolved oxygen in the water which, in turn, can kill fish and other aquatic animals.*

Credit for the pie graph: Draft DRBM Plan – Update 2015

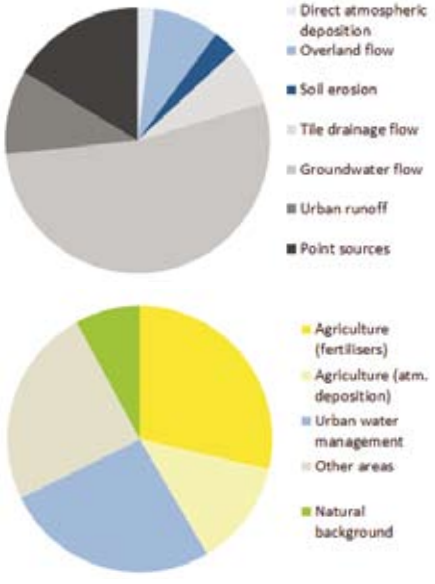
Nitrogen pollution causes substantial changes to water ecosystems. Nitrogen (together with phosphorus) contributes to eutrophication, a process through which oxygen in the water is reduced, plant and animal species suffocate and water quality worsens – limiting human uses as well. What's more, significant amounts of nitrogen can reach lakes and seas via natural hydrologic transport processes, influencing water quality far downstream from the sources.n and the International Sava River Basin Commission.

According to recent calculations, the total nitrogen emissions in the Danube River Basin are about 600,000 tons per year. This assessment comes from the MONERIS (MOdelling Nutrient Emissions in RIver Systems) water quality model which has been used for the entire basin and for current hydrological conditions (2009-2012)

Finding solutions for the future. Current measures have substantially reduced nitrogen inputs into surface waters and groundwater in the Danube River Basin, but further efforts are still needed.The current long-term average (2003-2012) of observed nitrogen river loads at the mouth of the Danube is about 500,000 tons per year.

These fluxes are still considerably higher than those of the early 1960s – a period representing river loads under low pressures. The Black Sea could further benefit by potentially reducing loads by 40%, which would require decreasing both the point source and diffuse emissions generated in the Danube Basin.

To further reduce nitrogen pollution, waste water treatment plants must be upgraded with nitrogen-removal technology, however measures to introduce best practices in agriculture and land management are especially needed, since diffuse



You call me different names,
but I am one river. I remember
how quiet it was before people.

I remember when I flowed blue.
I remember when I flowed brown.
And I remember the times I flowed red.

I watched you build your cities and bridges.
And I watched you tear them down.
You have swam in me, fished in me, and
drunk me.

EDONAUDUNAJDUNADANUBEDONAUDUNAJDUNADANUBEDONAUDUNAJDUNADANUBEDON

Ihr nennt mich mit unterschied-
lichen Namen, aber ich bin ein
Fluss. Ich erinnere mich, wie ruhig
es war, in den Zeiten vor den
Menschen.

Ich erinnere mich daran, dass ich blau
geflossen bin. Ich erinnere mich daran,
dass ich braun geflossen bin. Und ich
erinnere mich an die Zeiten, als ich rot
geflossen bin.

Ich sah Euch die Städte und Brücken zu bau-
en. Und ich sah Euch, sie wieder abzureissen..
Ihr seid in mir geschwommen, ihr habt in mir
gefischt, und ihr habt mich getrunken.

DANUBEDONAUDUNAJDUNADANUBEDONAUDUNAJ

Voláte ma rôznymi menami, ale ja
som jedna rieka. Pamätám sa na to,
aký bol kľud, než prišli ľudia.

Pamätám sa, ako som tiekol modrý.
Pamätám sa, ako som tiekol hnedý.
A pamätám sa na časy, keď som tiekol
červený.

Videl som vás stavať mestá a mosty.
A ja som vás videl ich aj búrať.
Plávali ste vo mne, chytali ste ryby vo mne,
pili ste ma.

JAUDUNAJDUNADANUBEDONAUDUNAJDUNADANUBEDONAUDUNAJDUNA

Különböző neveken hívtok, de
ugyanaz a folyó vagyok.
Emlékszem, milyen nyugodtak
voltak az idők az emberek előtt.

Emlékszem arra, amikor kéken folytam.
Pamätám sa, ako som tiekol hnedý.
És emlékszem azokra az időkre, amikor
vörösen folytam.

Láttalak benneteket városokat és hidakat
építeni. És láttalak benneteket megint leb-
ontani őket. Úsztatok bennem, halásztatok
bennem, ittatok engem.

Remember the river: using art to connect students to the Danube

The Mária Valéria Bridge between Slovakia and Hungary has been destroyed twice. After it was last rebuilt in 2001, Karol Frühauf conceived of the Bridge Guard Residency to invite artists from around the world to 'guard' the bridge by using art to strengthen the connection between people on both sides of it I came to Štúrovo, Slovakia, as the 33rd bridge guard to develop a creative writing project about how the Danube River connects 83 million people in 19 countries in the Danube River Basin.

The Remember the River project began with visiting high schools in Štúrovo (Slovakia) and Esztergom (Hungary), guiding students in writing down their memories of the Danube River on slips of paper. Each student had a personal story about the river, whether feeding ducks, boating, or falling in as a kid. These slips of paper were combined into a chain of memories.

Using these memories, I created a simple children's story/poem imagining what the Danube River would remember about us: the quiet before people arrived, wars, floods and pollution being dumped into its waters. The story was translated into Slovakian, Hungarian, and German, and students from a Štúrovo art class illustrated the text, which we laid out on one long piece of paper as if the text were the river itself.

Our effect on the river. When reading the story with groups of students, we discussed how the river's 'memories' of people may be different from what we remember about the river. We explored

You have sailed on me, thrown stones in me, and harnessed me for power. As you used me, I watched every one of you.

You have passed by me like a river. I remember you before you knew my name. And I will remember you when you are old and forget my name again.

I will remember you always. Will you remember me? You call me different names, but I am one river. Danube

JAUDUNAJDUNA

Ihr habt auf mir gesegelt, habt ihr Steine in mich geworfen, und habt mich für Stromerzeugung gebraucht.. Während ihr mich genutzt habt, habe ich euch jeden von euch einzeln beobachtet.

Ihr seid an mir vorbeigegangen wie ein Fluss. Ich erinnere mich an euch in den Zeiten, als ihr mich noch nicht beim Namen nanntet. Und ich werde mich erinnern, wenn ihr alt sein werdet und meinen Namen wieder vergesst.

Ich werde mich immer an euch erinnern. Werdet ihr euch an mich erinnern? Ihr nennt mich mit unterschiedlichen Namen, aber ich bin ein Fluss. Donau

DUNADANUBEDONAUDUNAJDUNADANUBEDONAUDUNAJDUNADANUBEDONAUDUNAJDUNA

Plachtili ste na mne, hádzali ste kamene do mňa, a použili ste ma na výrobu prúdu. Počas toho, čo ste ma používali, som pozoroval každého z vás.

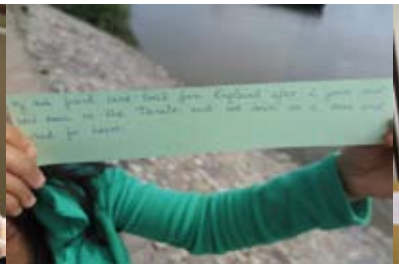
Šli ste okolo mňa ako rieka. Pamätam sa na vás v časoch, keď ste ma ešte nemenovali. A budem sa na vás pamätať, keď budete starí, abudete na moje meno zabúdať.

Ja sa na vás budem vždy pamätať. Budete sa vy na mňa pamätať? Voláte ma rôznymi menami, ale ja som jedna rieka. Dunaj

Hajóztatok rajtam, köveket dobáltatok belém és erőműveket építettetek rám. Figyeltem minden embert, aki használt engem.

Folyóként mentetek el mellettem. Emlékszem rátok azokból az időkből, amikor még nem neveztetek meg engem. És emlékezni fogok rátok, amikor öregek lesztek és megintelfelejtitek a nevemet.

Mindig emlékezni fogok rátok. Fogtok ti rám emlékezni? Különböző neveken hívtok, de ugyanaz a folyó vagyok. Duna

Students on both sides of the Danube in Hungary and Slovakia have compiled their memories of the river into a paper chain, linking their recollections together to explore how the Danube crosses borders and unifies people

our memories of the river, what the river would remember about us, and the research and threats to the Danube presented by the ICPDR.Looking at the environmental impact of the river from a different perspective allowed us to commit to its protection with renewed enthusiasm.

The chain of memories and illustrated story was presented at the annual AquaPhone performance. When Mária Valéria Bridge was destroyed, people would go down to the river to talk to each other on the other bank half a kilometre away. The AquaPhone performance combines written text in German, Slovakian, and Hungarian and is accompanied by improvised music to represent the people who communicated by calling to each other. The AquaPhone performance and Bridge Guard Residency inspired me to rethink how to engage students in thinking about the environmental challenges facing the Danube River.

Future goals. I'm working to expand the Remember the River project by translating the story into all the languages spoken along the Danube River Basin. I'd like to collaborate with organisations working on Danube River Education and find ways to use art and storytelling to remember the river and build bridges between young learners.

For more about the project visit http://www.bridgeguard.org/ and to watch the presentation of the chain of memories and illustrated story, visit https://www.youtube.com/watch?v=Eoy-ijTru28.

Torran Anderson is an environmental educator/writer at torrananderson.com.

The road to environmentally sustainable inland waterway navigation

A Joint Statement provides guidance for the maintenance and development of current and future inland navigation infrastructure, and is the only platform of its kind in the basin bringing together experts in transport and environmental protection to work toward shared goals for the river.

A Joint Statement is the only platform of its kind in the basin bringing together experts in the fields of inland waterway transport and environmental protection to find solutions that balance the goals of the navigation sector with the environmental needs of the river.

Inland navigation can contribute to more environmentally sustainable transport, particularly where it substitutes for road transport, but it can also have a negative effect on ecosystems. Recognising this potential conflict, the 'Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin' was drawn up in 2007, led by the ICPDR with the Danube Commission and the International Sava River Basin Commission.

Much progress has been made in implementing the proposals set out in the Joint Statement, especially in establishing a dialogue between the navigation and environment community. "The Joint Statement process has encouraged inland navigation projects to take biodiversity conservation aspects, EU environmental legislation such as the Water Framework Directive and stakeholder involvement more seriously," says Irene Lucius, Regional Conservation Director of the WWF's Danube-Carpathian Programme. "This is undoubtedly an important step forward."

However, despite the progress made, important further steps are still to be taken. "Some projects are still being implemented with critical hydrological or ecological data missing," says Lucius, "and without sound understanding of how EU environmental legislation such as the Water Framework and Habitats Directives are to be applied."

Dejan Komatina, Secretary of the International Sava River Basin Commission, said that broadening the scope of the information exchange to include reporting on relevant environment protection projects "would enable the information flow in both directions – from the navigation sector to the environmental protection sector and vice versa – and affect the ownership in a positive way."

Fairway rehabilitation and maintenance. Inland navigation transport services are dependent on stable fairway conditions and a number of guidance activities are working to ensure efficiency. The Fairway Rehabilitation and Maintenance Master Plan, developed under the EU Strategy for the Danube Region and endorsed in 2014, identifies 11 stretches causing the biggest navigational problems and highlights the measures to ensure effective waterway infrastructure parameters along the Danube and its tributaries.

To realize the Master Plan, the five-year FAIRway project began this July to elaborate coordinated national action plans, procure equipment for hydrological services, execute and evaluate pilot programmes, develop innovative approaches such as aerial monitoring and prepare future implementation projects.

In addition, a waterway maintenance group under PLATINA II is developing a manual on best practices in waterway maintenance for the end of 2015. The manual will collect lessons learned from practice across river corridors and make recommendations for practical implementation.

Largest EU investment in transport. Some €11.93 billion has been allocated for the first call for proposals under the European Commission's Connecting Europe Facility Transport (CEF-T) infrastructure policy – representing the largest ever EU investment in transport infrastructure modes of all kinds, including inland waterways. The main priorities for funding of the 2014 CEF-T calls were major cross-border projects and projects addressing the main bottlenecks on the nine TEN-T multimodal corridors.

The second call for CEF-Transport funding opened in November this year with a closing date in February 2016. Some €7 billion will be available for cohesion countries and €1 billion for the €3 horizontal priorities of the CEF, including Motorway of the Sea projects. The results of the second call will be announced in June 2016.

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

Danube Adventure: learning about the river in a playful way

A new online game provides children with an exciting opportunity to engage with the Danube. A clever mix between a quiz and skills games, Danube Adventure is a new chapter in the success story of ICPDR education activities.

Smart games like Danube Adventure can help children gain an understanding about the complexity of rivers and ecosystems, so that they in turn will care about protecting these precious resources as they become concerned adults.

If children can understand the complexity of rivers and ecosystems, they will care about their protection and become concerned adults – this is the essence behind the ICPDR's environmental education projects, and the reason for their impressive success. Now, nine years after the launch of the Danube Box teaching kit, another milestone has been reached: the launch of Danube Adventure, an online educational game.

Educational games – sometimes also called 'smart games' – have become increasingly popular with the rise of social media and smart phones. In Austria, ere has been significant interest in the game playDanube and a fan base has been built since its launch in 2011. Smart games rely on popular game designs to convey both stimulation and information.

For Danube Adventure, the objective is to build on the success of Danube Box and transfer the contents – knowledge about the Danube, water and the life that depends on it – to a contemporary medium.

A digital river with real results. Danube Adventure targets children between the ages of 10 and 14 years. The players can choose different avatars to take part in their Danube Adventure along the three segments of the Danube which they have to complete. On their upstream journey, they encounter multiple choice questions through which credits can be earned. Once a certain credit score is reached, more avatars become available for the player to use.

To keep the attention span high, the journey is interrupted by 'skills games', which provide additional challenges and learning opportunities. For example, in one of the skills games, players take a rest from their journey to catch quickly emerging bubbles representing objects that should not be in the river, such as plastic bags or broken bottles. Back on the river, a database with hundreds of questions teaches children about animals, plants, hydrology, history and geography of the river and the countries along its banks.

Danube Adventure can be played on both computers and phones, is platform-independent and suitable for slower internet connections. Just like Danube Box, the educational game is a product of the 'Green Danube Partnership' between the ICPDR and the Coca-Cola System. It was developed by the Hungarian digital media agency Person and will be presented in more detail in the next issue of Danube Watch.

Experience your own Danube Adventure at www.danubeadventure.org!

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Danube Day 2015

On 29 June each year, the 14 countries of the Danube Basin join together in celebrating one of Europe's greatest river systems, as well as the people and wildlife that rely on it. In 2015, activities from public meetings and educational workshops to cultural and artistic displays paid tribute to a cleaner, safer river following 21 years of international cooperation. Below are just some of the Danube Day activities which were held across the basin highlighting the shared desire and responsibility to protect this precious resource.

The ICPDR would like to thank all the organisations involved in Danube Day 2015. For more information about events and organisers, visit www.danubeday.org.

GERMANY 1
At Ulm-Gögglingen, the public learned more about efforts to give the river more space and enhance back water. At the Danube Office Ulm/Neu-Ulm celebrations focused on wildlife, with children learning about beavers and creating their own beaver tails to see what it's like to live along the river. The village of Rott am Lech in Upper Bavaria celebrated the community's 2012 Wastewater-Innovations Award with the dedication of an innovative wastewater plant by Ulrike Scharf, Bavarian State Minister of the Environment and Consumer Protection.
© Tancik/Donaubüro Ulm/ Neu-Ulm

AUSTRIA 2
Celebrations at Vienna's Museum Quartier brought the many sides of water management to the future generation. Young people learned about the plants and animals of the Danube Basin and got up close and personal with Danube sturgeons and European tertapins. Visitors learned about water quality through activities like building a mini treatment plant or seeing the world through a microscope, and exhibitions of a police boat and a mobile flood protection wall shared important lessons about safety and protection.
© unique-relations.at

SLOVENIA 8
Competitions for young people in Slovenia sought solutions to water issues through science and laughter. More than 600 students from 28 schools from across Slovenia took part in the annual Water Detectives competition, demonstrating their talents in research, writing, art and science. Budding comedians competing in this year's 7th My River.si challenge had to write and perform a stand-up routine on the theme of sustainable development, with entries coming from secondary and primary schools and even kindergartens. The five best acts performed at the competition's finale at the Ljubljana City Museum on 29 May, attended by rap artist, Zlatko, and kayaker, Jost Zakrajšek..
© Ministry of Agriculture and Environment, Republic of Slovenia

BOSNIA-HERZEGOVINA 4
This year's International Danube Art Master competition came with a special twist: the young artists were tasked with building costumes from materials found at local rivers and lakes. Iman Maljić of Aleksa Santic School in Sarajevo, Bosnia and Herzegovina won with the artwork ‚Black Swan', a melancholic arrangement with plastic waste bags and contrast to a living, white swan. It was chosen from over 600 artworks from 190 individual schools, involving 1314 children in 11 countries of the Danube River Basin. The Danube Art Master is organised annually by the ICPDR with support from the Green Danube Partnership from the Coca-Cola System through Global Water Partnership Central and Eastern Europe. *© ICPDR*

HUNGARY 6
The General Directorate of Water Management in Hungary organised a conference for Water Management Sciences. "Preserving water resources for the next generation will be the greatest problem of the 21st century," said István Láng, Deputy Director of OVF, "Danube Day is a good opportunity to remind us of this responsibility."
© General Directorate of Water Management, Hungary

SERBIA 10
Danube Day celebrations in Serbia were completely dedicated to children and students. From workshops on the educational toolkit Danube Box in Zemun, to an 'environmental triathlon' in Belgrade, children focused on the impact of water pollution and the importance of preserving the Danube and its ecosystems. "Creating the right habits and educating children about the environment will contribute to a better treatment of our rivers in the future," said Natasa Milic, Acting Director of the Republic Directorate for Water of the Ministry of Agriculture and Environmental Protection. *© Ministry of Agriculture and Environmental Protection – Republic Water Directorate, Serbia*

CROATIA 3
Danube Day celebrations in Croatia began in Vukovar, where the children's choir, Vukovar's Doves, performed for local residents and prominent guests such as Ivica Plišić, Head of Croatian Waters and Head of the Croatian Delegation to the ICPDR, as well as Dražen Kurečić, Assistant Minister of Agriculture and ICPDR President for 2015. The programme then took to the water aboard the ship 'The Dove of Vučedol' where the ship sounded a traditional greeting of three blasts before entering the city of Ilok. *© Ministry of Agriculture, Republic of Croatia*

SLOVAKIA 5
Over 4000 people turned out for Danube Day celebrations in Slovakia, held at the Gabčíkovo Dam and Hydropower Plant. Visitors were treated to a view of the river they don't usually get to see, with boat trips through navigation locks, helicopter tours over the dam, and free guided excursions through the hydropower plant. River rescue teams and a recue dog squad gave a dramatic live demonstration of operations to prevent terrorist attacks using boats and helicopters right on the river. *© Vodohospodárska výstavba, š.p.*

BULGARIA 7,8,9
Art joined ecology in celebrations in every municipality along the Danube in Bulgaria. Danube Day coincided with the city festival in Svishtov this year, where a variety of artist and ecological initiatives took place, while the village of Baikal celebrated for three days with a riverbank clean-up, and children participated in a workshop with traditional art studios. Young environmentalists from Lom created artistic installations to call for keeping the river clean, and a unique exhibition of archival images of the Danube River was organised in Ruse. *© Danube River Basin Directorate Bulgaria*

UKRAINE 11
*Plas*tic waste was turned into treasure in Ukraine, where a competition to collect more plastic bottles resulted in five schools collecting nearly one ton of plastic bottles. The winner, Yasinska School Number 1, collected 343 kg of recyclables. In Rakhiv, Zakarpattya, 80 schoolchildren from the area participated in an ecological fashion show as part of the 'Tisza Masquerade' in the frame of the Danube Art Master competition. Costumes were made of natural materials as well as from waste such as plastic or cardboard. *© Zakarpattya Oblast Branch of All-Ukrainian League*

ROMANIA 12
Huge celebrations were held all across Romania, attracting over 8000 visitors to a wide range of activities from artistic and cultural displays to educational workshops. By far the most impressive display of cooperation was the largest clean up action along the Danube River which took place in Tulcea County. Over 300 children from seven communities along the Danube River collected over 2500 bags of waste, signalling the enormous dedication of all Danube Delta residents to the importance of cleaning the Danube Delta and of waste collection. *© Ministry of Environment, Waters and Forests/National Administration 'Romanian Waters'*

MOLDOVA
Activities to celebrate Danube Day along the Prut River in Moldova focused on getting the public involved in river issues. Local authorities in the Lower and Middle Prut region held a discussion on implementation of the Danube Strategy and investigated further options for cooperation. Cultural events also took the stage as folk groups from the Lower Prut region performed traditional music and a children's festival of folk music and dance was held alongside an exhibition of their artwork.
© Centre Ecological Agency (Biodiversity Office), Moldova

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ICPDR MEETINGS	For final dates, please consult the ICPDR calendar, available at www.icpdr.org.
1–2/12/2015	VIENNA, AUSTRIA
	18TH ICPDR ORDINARY MEETING
9/2/2016	VIENNA, AUSTRIA
	ICPDR MINISTERIAL MEETING
2–4/3/2016	VIENNA, AUSTRIA
	IRF EUROPEAN RIVERPRIZE & RIVER RESTORATION SYMPOSIUM
5–6/4/2016	VIENNA, AUSTRIA
	8TH ACCIDENT PREVENTION & CONTROL EXPERT GROUP MEETING
7–8/4/2016	VIENNA, AUSTRIA
	MARS WORKSHOP ON MULTIPLE STRESSORS IN RIVER BASIN MANAGEMENT
19–20/4/2016	INGOLSTADT, GERMANY
	23RD MONITORING & ASSESSMENT EXPERT GROUP MEETING
21–22/4/2016	LJUBLJANA, SLOVENIA
	19TH PUBLIC PARTICIPATION EXPERT GROUP MEETING
DW 01/16	UPCOMING ISSUE
	ICPDR Ministerial Meeting Presidency of Czech Republic Water management in Danube Basin until 2021

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