

# DANUBE WATCH

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

2/2015



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# Dear readers,

I recently had the great pleasure of participating in a celebration to finalise a wetland conservation project in Austria, which was realised including support from Coca-Cola. For me, this beautiful lake full of water and teeming with birds demonstrated two things: the importance of preserving wetlands and protecting ecosystems, and how to engage the private sector in the process successfully.

Ensuring there is a sufficient amount of good quality water is critical to our business and to the communities in which we operate and from which we source. That's why Coca-Cola has made a global commitment to replenish 100% of the water we use in our beverages (aka: achieve water neutrality) by 2020. The project in Austria is part of a range of over 500 projects worldwide that add up to the 94% replenish rate we achieved in 2014.

We can't achieve this on our own: the Danube offers a supportive environment of engaged stakeholders, able partners and functioning governance which is providing a safe space for our company to engage in the long

term. For example, through a seven year partnership with WWF, Coca-Cola can support long term wetland restoration programmes across six countries leveraging investment from Coca-Cola and public sources (see article on page 12). In addition, we are working closely with ICPDR and our bottler in the 'Green Danube Partnership' to engage consumers and raise awareness amongst business.

More opportunities are ahead: the Danube River Basin Management Plan will galvanise action to adapt to climate change, achieve water security and help engage a wider user community in the basin, including industry and agriculture. I am convinced the Danube will continue to be a beacon of best practice and leadership for good river management.

*Ulrike Sapiro,*

Director Environment & Community at Coca-Cola Europe has been leading water strategy in Europe and is now moving into a broader sustainability role at The Coca-Cola Company.



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Danube Watch is available on the web at [www.icpdr.org](http://www.icpdr.org)



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## IMPRINT

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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 to improve 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.



## HYDROMORPHOLOGY WORKSHOP IN VIENNA

The evaluation of the hydromorphology of a river is a complicated business. In an attempt to help standardise the methods applied and improve the quality of the resulting assessments, the ICPDR in cooperation with the Austrian Ministry of the Environment will organise a hydromorphology workshop. This workshop will take place in the surroundings of Vienna from 23 to 25 September. Participants should be practitioners from all Danube River Basin countries.



## JOINT STATEMENT MEETING: NAVIGATION & ENVIRONMENT

Eight years have passed since the Joint Statement on Inland Navigation and Environmental Sustainability in the Danube River Basin was signed by the Danube Commission, International Sava River Basin Commission and ICPDR in 2007. Since then, regular meetings have been organised to provide a platform for discussions on navigation projects and their impact on the environment. In the autumn, a Joint Statement Meeting will be held in Vienna for the first time since 2011. The meeting will take place at the Vienna International Centre 10-11 September.

**More on the Joint Statement Meeting will soon be available at:**  
[icpdr.org/main/activities-projects/joint-statement-navigation-environment](http://icpdr.org/main/activities-projects/joint-statement-navigation-environment)



## ICPDR IMAGE VIDEO WINS FILM AWARD

The ICPDR image video was awarded a prize in the ecology category at the 10th Film, Art & Tourism (FilmAT) Festival held in Warsaw. The five minute video clip, The Danube River Basin and the ICPDR, was produced in 2013 to show the work of the ICPDR on water and flood risk management. It uses footage produced by Austrian documentary production company ScienceVision, which was filmed for the two-part documentary The Danube – Europe's Amazon. This is the second award for the film clip, following a Ramsar environmental film clip competition last autumn.

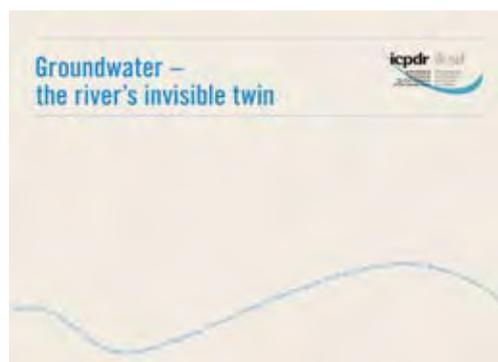
**Watch the film clip at:** [www.youtube.com/watch?v=8XmM6A1ALDY](http://www.youtube.com/watch?v=8XmM6A1ALDY)



## NEW FILM CLIP PRODUCED: GET ACTIVE!

Encouraged by the recent awards received, the ICPDR is continuing its cinematic endeavours. A new video clip – also using ScienceVision footage – was produced to call stakeholders to get active in the public consultation measures. These were organised for the draft Danube River Basin Management Plan Update 2015 and the first Flood Risk Management Plan for the Danube River Basin. The two minute clip Get Active! Public Participation for the Danube has proven a popular tool to encourage more people to express their views on the plans. We shall find out which awards are waiting for this film!

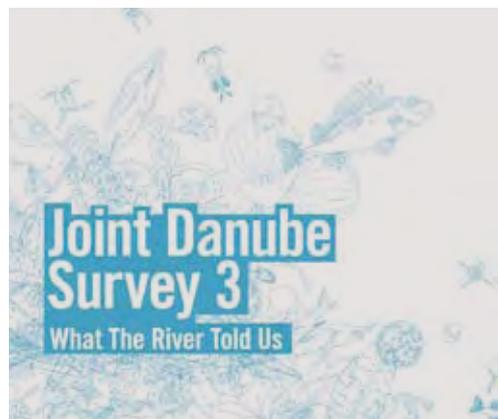
**Watch the new film clip at** [www.youtube.com/watch?v=qpjDVgC2Wug](http://www.youtube.com/watch?v=qpjDVgC2Wug)



#### **NEW GROUNDWATER BROCHURE PUBLISHED**

The objective of a new ICPDR publication is to bring the usually hidden subject of groundwater to the surface of public awareness. Groundwater – the River's Invisible Twin targets the general public and provides a concise, lively and easy-to-read introduction to this topic. Illustrations were produced especially to ensure a consistent style throughout the publication. The publication can be ordered from the ICPDR Secretariat or downloaded from the link below.

**Read more on the river's invisible twin at: <http://icpdr.org/main/issues/groundwater>**



#### **JOINT DANUBE SURVEY 3 PUBLIC REPORT AVAILABLE**

The last issue of Danube Watch was dedicated to the findings of the Joint Danube Survey 3 (JDS3). This comprehensive analysis of Danube water quality was published in a full scientific report, which weighs almost one kilo per copy – clearly a publication for specialists. To provide a more digestible overview of the main findings, a public report has been published, titled JDS3: What the River Told Us. Informative charts and the award-winning photography of Andre Künzelmann make the report visually appealing, and the content brings concise messages into balance with a solid introduction and overview. This publication can be ordered from the ICPDR Secretariat or downloaded from the link below.

**Read what the river told us at: [www.danubesurvey.org/results](http://www.danubesurvey.org/results)**

#### **SERBIA: NEW HEAD OF DELEGATION**

The ICPDR welcomes a new Head of Delegation for Serbia: Ms. Natasa Milic follows Mr Miodrag Pjescic. Danube Watch thanks the outgoing Head of Delegation for his support and is looking forward to working with Ms Milic.



**"No man ever steps in the same river twice," wrote the Greek philosopher Heraclitus, "for it's not the same river and he's not the same man." The Danube changes much on its 2857km long journey from the Black Forest to the Black Sea: from source to mouth, it passes 10 countries, 4 capitals and draws water from 19 countries. But even more remarkable is how much the Danube has been changed over the centuries. From agriculture to navigation and flood defence to generating energy, as society has changed so too have the ways in which we have used the river. As a result, the Danube today is a very different river from the one those living in the basin might have stepped into even 150 years ago.**

The classical division of the river into the Upper, Middle and Lower Danube, though justified from the standpoint of geological formations, only offers a generalised view

of the Danube system. The reality, like the river itself, is more nuanced.

**The Upper Danube.** In former times, the upper section of the river showed patterns that you would normally expect to find in the lower course of a river, such as the former meander reaches of the German Danube that alternated with sinuous, braiding and canyon sections. Owing to the large alpine tributaries of the Isar and Inn rivers, the Austrian Danube showed a distinct mountainous character with intense river dynamics.

The river featured broad sections – anabranches – that diverted from the main course of the river to rejoin again later; braiding and meandering patterns alternated with narrow canyon sections.

Today, Austrian tributaries contribute 22% to the Danube's total runoff to the Black Sea at the delta. Before channelisation, the bedload transport of gravel and sand in Vienna probably amounted to

about 500,000m<sup>3</sup> annually and the suspended load to 6-7 million tonnes. The intense morphological turnover in the alluvial sections largely counteracted the development of distinct natural levees along the river banks.

**The Middle Danube.** Moving downstream from Austria where the Danube River enters the Pannonian Plain, the channel slope drops significantly from 0.43% to 0.1%. Consequently, the Danube deposited most of its bedload between Bratislava and Komárno/Komárom, where an extensive island delta, (the so-called 'Small and Large Accumulation Islands') had formed after the last ice age.

Downstream from the Hungarian Danube bend, the Danube split into two major arms followed by a longer meandering section. In particular, the river developed distinct meander bends and extensive wetlands in what is today the Ramsar-protected



## Historical patterns along the Danube's course

Human activities in the Danube River basin have had a significant impact on the natural environment of the river and consequently have greatly altered the course of the river itself.



Above: With increasing channel depth and lower flow velocities sailing ships could sail on the Lower Danube, like in Vidin, Bulgaria, around 1840. Credit: IHG/BOKU Vienna. Right: Meandering section of the Middle Danube in today's Ramsar-protected area Gemenc in Hungary painted by L. F. Marsigli 1726. Credit: Vienna University Library.



area Gemenc in Hungary and the Kopački rit Nature Park in Croatia. Here, gradual deposits increased the lateral river banks, in the form of natural levees, which prolonged the inundation in the floodplain.

In northern Serbia, the hydrological influence of the Alps diminishes with the confluence of the large lowland tributaries of the Tisza and Sava rivers. Downstream from the 100 km-long cataract reach of the Iron Gate where the Danube enters the Wallachian, or Romanian, Plain, the channel slope drops to 0.04%.

**The Lower Danube.** The 550km-long main arm of the Danube along the Ro-

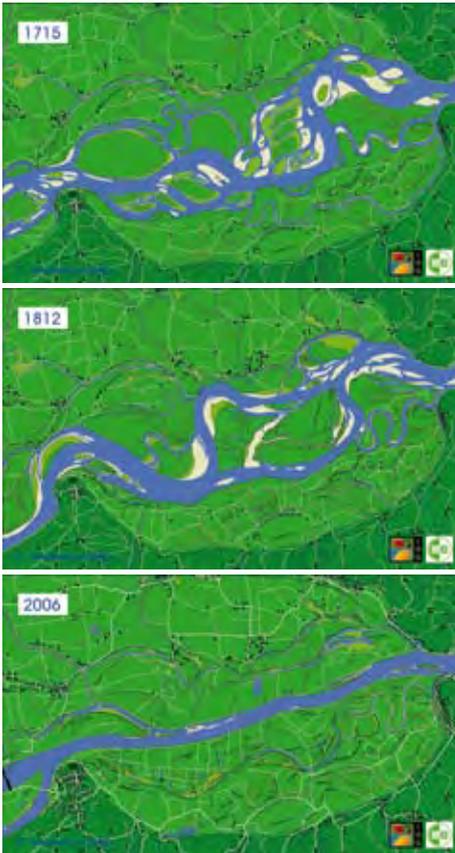
manian/Bulgarian border to Silistra was mostly straight to slightly sinuous, but also showed braided and meandering patterns with fine to medium gravel and sand as the main substrate. Braiding intensified downstream of Silistra and long side arms enclosed two large islands – Balta Ialomita and Balta Braila – with extensive wetlands and numerous natural lakes. In addition, the dominant substrate changed to sand, frequently interspersed with mud, silt, loam and clay.

For the last 100km of the river's course at the Danube Delta, the slope decreases to 0.001%. With numerous side arms, oxbows and natural lakes, the three major Danube

channels compose a complex system of branches that divide and reconnect.

### Human modifications to river landscapes.

River dynamics, sediment transport and river patterns are greatly affected by climate changes and human influences. Therefore, discussing a specific morphological state of a river system requires consideration of the climatic, hydrologic and societal conditions at the time. As the first detailed historical maps originate from the late 18<sup>th</sup>/early 19<sup>th</sup> century – a period known as the late phase of the Little Ice Age – the state of the Danube River at that time is usually taken as a reference state



Channel changes of the Danube River in the Austrian Marchland floodplain from 1715 to 2006. Credit: FWF project Marchland 1715-1991, Nr. P14959-B06.

to assess later human modifications to the river landscape.

Besides local bank protection measures, the first direct human interventions in the Danube's morphology were caused by the increasing importance of inland waterway navigation in the late Middle Ages. Later in the 16th century, the first larger dike systems for flood protection were set up in the large floodplains of the Middle and Lower Danube, in what is now Hungary, Serbia, Bulgaria and Romania. By the late 18th century, considerable efforts had been made to install flood protection levees close to urban areas such as Vienna or Bratislava.

The rise of the steamship in 1850 significantly increased river channelisation efforts, and by 1890, mid-flow channelisation was largely accomplished along the Bavarian, Austrian, and shortly thereafter Slovak and Hungarian sections, while the Lower Danube remained less channelised. The channelisation measures were designed mainly for mean flow and higher flows up to one year flood. In the lowland Danube section between Győr and the Iron Gates

work focused more on land reclamation and flood protection.

#### Consequences of a disconnected river.

In the alluvial Danube sections, channelisation measures resulted in a typical sequence of changes in river morphology: the loss of flowing side arms and a significant increase in one-side connected backwaters, transformation of the backwater systems to isolated water bodies or dead arms, and terrestrialisation of the remaining water bodies. As a consequence, within 150 years, approximately half of the former water bodies have vanished in alluvial sections of the Upper Danube.

The variety of natural channel patterns along the Danube's course has changed to a uniform channel design largely independent from site-specific geological conditions. Former river landscapes with complex channel networks are now divided into two clearly distinguishable units: the river and the floodplain.

The heavily truncated river dynamics (erosion, regeneration of habitats) have significantly affected the hydromorphology of the river: it has led to a vertical decoupling between the river (i.e. the water and groundwater table) and the level of the floodplain terrain. Generally, the channelised river sections showed intensive incisions of the channel bottoms soon after regulation.

At the same time, floods have repeatedly deposited fine sediments in the stabilised floodplains, gradually raising the terrain surface. These processes have fostered a drying-out of wetland areas and terrestrialization processes. As a consequence, along the Upper Danube, the mean depth of the groundwater table of floodplains at mean flow has nearly doubled since the early 19th century.

**The effect of hydropower plants.** This process has been amplified by the construction of hydropower plants at the Danube and its tributaries. Interrupting the river continuum prevents bedload transport and fosters the retention of suspended load in the impoundments. The almost complete loss of sediment supply from the Upper Danube catchment has increased the sediment deficit for the entire Danube system. Today, ongoing channel incision is a major concern; for example, downstream from Vienna erosion every year is lowering the riverbed annually by 2–3.5 cm, along the

Hungarian Danube about 1–3 cm (by as much as 10–17 cm directly downstream from the Gabčíkovo hydropower plant) and at the Lower Danube by 2–3 cm. In addition, construction of hydropower plants hydrologically decoupled large parts of the floodplains from the main channel. Of the nearly 41,600 km<sup>2</sup> of former floodplains in the early 19th century, only 19% (or 7850 km<sup>2</sup>) has remained intact in the entire Danube Basin.

Overall, riverine ecosystems of the Danube system are currently characterised by the replacement of dynamic processes with unidirectional developments. These include ongoing incision of the river bed, sedimentation in floodplains, terrestrialisation, and missing regeneration of typical floodplain habitats and their riparian vegetation. (The article is based on the FWF project URBWATER P25796-G18.)

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# Hydromorphology: the Danube perspective

In 2000, the ground-breaking EU Water Framework Directive (WFD) introduced a new legal basis for modern water management. Since then, any water use has to be sustainable, ensuring that the environmental objectives of maintaining good chemical and ecological status are achieved in all surface water bodies.



**Since the EU WFD entered into force, rivers are recognised not only as diluters for (treated) waste water discharges or water supply for industrial uses, but also as ecosystems, which have to be protected and enhanced.**

The holistic view of rivers and lakes is that as well as (physico-) chemical conditions, type-specific hydrological, morphological and river continuity (hydromorphological) aspects of the Danube are crucial for the good functioning of the aquatic environment. The specific hydromorphological components that are relevant to ecological status and support the biology of a water body are listed in the table below.

## **Hydrological regime**

Quantity and dynamics of flow  
Connection to groundwater bodies

## **River continuity**

for aquatic organisms  
for sediment transport

## **Morphology**

River depth and width variations  
Structure and substrate of river bed  
Structure and conditions of riparian zone  
Flow velocities

In 2004, the ICPDR performed the Danube Basin Analysis. It identified flood protection, hydropower and navigation as the main drivers responsible for significant alteration of the hydromorphological ('hymo') conditions in the Danube and its larger tributaries. As hymo modifications and their impacts posed a considerable risk that water bodies would fail to meet the environmental objective of having good ecological status, "hydromorphological alterations" were declared to be one of the "significant water management issues" of basin wide importance.

The key hydromorphological pressures in the Danube basin include the disruption of longitudinal ecological continuity; the alteration of river morphology and habitats; the disconnection of adjacent wetlands, floodplains and impoundments; and water abstractions or diversions and hydropeaking (abrupt flow fluctuations due to electricity production on demand).

The 1st Danube Basin Management Plan set operational management objectives for hymo alterations. Because of the high number of pressures, restoration measures have to be gradually implemented and prioritised. The measures of 2009-2015 were successfully implemented with regard to:

- Restoration of river continuity and construction of more than 100 fish migration aids,
- Reconnection and hydrological improvement of more than 50,000 ha of wetlands and floodplains, and
- Restoration of ecological flows, measures at impoundments or addressing hydropeaking in dozens of cases.

Many pressures have not yet been solved, for example there are more than 600 migration barriers. Further effort will have to be made in the coming years. Synergies with flood management can contribute to cost-effective solutions. Inter-sectoral cooperation, especially with the hydropower and navigation sector, is key to ensure the sustainability of future infrastructure projects and to minimise impacts on water status.

*Veronika Koller-Kreimel* is a freshwater biologist at the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management and chairs the ICPDR Hydromorphology Task Group.



## A return to nature: river revitalisation efforts in Austria

Recent projects along the Danube and its tributaries are working to restore riverbanks, preserve habitats and protect biodiversity by bringing natural dynamics back to the river.

Since the 16th century, people have been changing the natural course of the rivers in the Danube River Basin, mainly for flood defence, hydropower generation and navigation. These changes have drastically altered the Danube and its tributaries, reducing habitats and endangering a number of species. To combat these

effects, several projects in Austria are working to rebuild environmental features and reintroduce wildlife by restoring the natural functions of the river.

**Wachau Valley.** A five-year project which began this January aims to restore floodplain forests and protect important flora

*A small herd of rugged Konik horses, closely related to the extinct European wild horse, has been reintroduced to a reserve near Marchegg as part of an innovative grassland management plan where their grazing activities will help create ideal living conditions for a host of wildlife.*

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and fauna in the Wachau Valley, one of the last free-flowing sections of the Austrian Danube.

The project, called Wilderness Wetland Wachau, is coordinated by Austrian waterway company viadonau and supported by Life+. It will establish two new protected wilderness areas on the islands of Pritzenau

and Schönbühel. The project will include work to create a 1.4km free-flowing sidearm and introduce a new inflow/overflow area to an existing sidearm, as well as build approximately 2.8km of new natural riverbanks along side arms.

Much work will also be done to create or restore habitats, including creating 20 ponds to be used as spawning grounds for amphibians and installing four artificial nests for White-tailed Eagles. The project will also aid the conservation of the Black Poplar by reforestation with saplings and restricting the use of 300-year-old trees.

Once the project is completed it is expected to improve the conservation status of several species protected under the EU Habitat and Birds Directives by restoring the floodplain forests and reconnecting those floodplains back to the river.

**Lower Morava floodplains.** Regulation measures over the last century have left limited habitats for now-endangered flora and fauna and downgraded the river to 'moderate status' according to the EU Water Framework Directive. A six-year project begun in 2011, supported by the Life+ project and led by project partners viadonau, WWF Austria and the Fishery Council of Lower Austria, aims to restore floodplains on the Lower Morava between Angern and the confluence at Markthof.

The project's most important objective is to restore river dynamics by re-establishing the characteristic island landscape and improving connectivity. Altogether 8km of river branches will be revitalised and six branches which have been artificially cut off will be reconnected, benefitting fish as well as aquatic birds. In addition, cropland surrounding the restoration areas will be converted into grassland and measures will be taken to control the introduction and spread of invasive species such as Maple Ash to conserve the floodplain forest. Further work will set up measures to preserve habitats for species such as storks, kites, eagles and common terns, and to stabilise the population of European Weather Loach.

One aim of the project which has already been successful, to reintroduce Konik horses to a reserve near Marchegg as part of an innovative grassland management plan. This small yet rugged breed of horse is closely related to the extinct European wild horse and is well suited to the conditions of the area. After being introduced to the reserve in May 2015, the horses will maintain the landscape of a vast meadow area through their natural grazing, improving habitats for insects and the bird species that prey on them. The reserve is designed to allow the horses to meet their basic needs on their own and live out their lives naturally.

The project has nearly reached its half-way point and the next stage will be to secure approval from the Slovakian side for further restoration measures, as defined in a bilateral treaty regarding water manage-

ment issues on the Morava River. Once the project is completed, it is expected to revitalise an area of about 200 hectares, improving at least seven pan-European habitats and benefiting 26 species under the EU Habitats and Birds Directives.

**Bad Deutsch-Altenburg.** The stretch of the Danube between Vienna and the Slovakian border is a difficult bottleneck for inland navigation. The continuous degradation of the riverbed in this area – by up to 3.5cm a year – has jeopardised the ecological balance of the Donau-Auen National Park. To improve this stretch of the river, the Integrated River Engineering Project to the east of Vienna, coordinated by viadonau, was created to balance the interests of navigation with ecological needs. A pilot project was completed last year for a 3km stretch of this area, providing valuable experience on revitalisation measures, which can be applied to the whole area.

The pilot project, Pilot Project Bad Deutsch-Altenburg, was co-financed under the Ten-T programme, and construction on the project took place between February 2012 and July 2014. The pilot project tested Granulometric River Bed Improvement by adding larger gravel sizes (between 40mm and 70mm) to reduce river bed erosion, which is expected to provide the river with better protection against further deepening.

The pilot project included work to reduce and reshape groynes for environmental optimisation, as well as to restore and lower riverbanks in two sections. Finally, the pilot project reconnected the Jöhler side arm. This 1.4km side arm is now the first permanent side arm in the national park.

Although construction on the pilot project has finished, extensive monitoring of the work is ongoing to evaluate the hydromorphological aspects of the project, and a stakeholder forum was established during the project to review progress and make recommendations (see also interview DW 1/15). The forum participants, along with the accompanying scientific advisory board, issued a conclusion statement affirming that the test made it possible to gather significant knowledge, which is now needed to solve the remaining challenges at the Danube east of Vienna.

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



*The continuous degradation of the riverbed between Vienna and the Slovakian border – of up to 3.5cm a year – has jeopardised the ecological balance of the Donau-Auen National Park.*

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## Working together for a living Danube

A partnership between WWF and The Coca-Cola Company is restoring wetlands and initiating a regional movement for good water stewardship.

**Wetlands are hotspots of biodiversity and provide a myriad of benefits and services, including flood protection, drinking water, nutrient removal, wood and fibre, biomass, tourism and recreation, food, fish and fowl.**

Despite this, the Danube has seen 80% of its floodplains and wetlands disappear over the past 150 years. Damage to the river has mainly been caused by diking, dredging and damming to meet the needs of hydro-electric power and shipping, and to keep floodwaters at bay. This has resulted in plummeting fish and wildlife populations, a decrease in water quality and damage to wetlands, which can no longer provide much needed biodiversity hotspots or act as buffers to floodwaters.

That's why WWF and The Coca-Cola Company (TCCC) have initiated a seven year partnership to restore vital wetlands and floodplains along the River Danube and its tributaries (see also "Dear Readers"). The ambitious project aims to increase the river capacity by the equivalent of 4800 Olympic-sized swimming pools (12 million m<sup>3</sup>) and to restore over 7422 football pitches worth of wetland habitat (53km<sup>2</sup>) by 2020.

**Restoring 'Europe's Amazon'.** In Hungary, the project focuses on restoration work

along the Barcs-Old-Drava former meander, in cooperation with Croatia. The area is part of the future five-country Mura-Drava-Danube Trans-Boundary Biosphere Reserve. It is sometimes referred to as 'Europe's Amazon', as it stretches from Austria, across Slovenia, Hungary, Croatia and into Serbia.

This trans-boundary restoration work will demonstrate a relatively simple and cost effective way of improving the ecological status of the wetlands and surrounding forests, so as to develop ecotourism. The project is supported by the EU LIFE+ programme with The Coca-Cola Foundation contribution to co-finance. Later, an additional wetland restoration project in Hungary will enhance river morphology and improve the conditions for riverine species.

In Croatia, the project will focus on restoration activities along the Drava River

part of the area. The aim is to restore or recreate eight sidearms that will improve natural river dynamics and habitats, flood risk mitigation, ecotourism and recreation.

**Reconnecting wetlands.** In Serbia, the project includes restoration work on the Bestrement oxbow, situated in the Special Nature Reserve Gornje Podunavlje. This area lies on the Danube floodplain, but is disconnected from the river by dikes and is almost totally overgrown with reeds and willows that are closing the open water. In the past the area was a very important breeding site and migration stop-over for up to 700 pairs of heron, but it has vanished as a result of drying and lack of feeding sites. The aim is to improve the water regime throughout the year using existing irrigation canals by the construction of a sluice.

In Romania, the projects will focus on restoration work at the Garla Mare Fish Farm along the Lower Danube Green

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*The partnership between WWF and The Coca-Cola Company will reconnect former floodplains to the river system by, for example, opening dikes and dams, creating channels, as well as retaining water on the floodplains by working closely with relevant local authorities and stakeholders.*



© WWF/Canon Klara Henning Grab

Corridor, the location for one of Europe's most ambitious wetland protection and restoration initiatives. The aim is to connect the transformed wetlands to the natural flood pulse of the Danube River. This will not only produce ecological benefits, but will improve the river's retention capacity in the event of future flooding. It will also provide ground for sustainable land use such as grazing or bee keeping. In total, 5 million m<sup>3</sup> of freshwater (or the volume of almost 2000 Olympic-sized



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Connecting the transformed wetlands to the natural flood pulse of the river will not only produce ecological benefits, but also improve the river's retention capacity in the event of future flooding.  
.....

**LIVING DANUBE TOUR**

A regional movement is on its way for wetland conservation and restoration, as well as good water stewardship. By the summer of 2015, the Living Danube Tour, which started in Serbia just before Danube Day 2014, will have visited more than 25 locations in Bulgaria, Croatia, Hungary and Romania, allowing visitors to learn more about the Danube, the benefits we all receive from the river and the potential threats. A quiz website on [www.panda.org/livingdanube](http://www.panda.org/livingdanube) tests visitors' knowledge about the river and lets them care for a virtual section of it.

swimming pools) will be preserved or returned to nature. Further wetland restoration projects in Romania will support the habitat of freshwater species, reduce the flood risks and enhance sustainable land use.

**Removing migration obstacles.** In Bulgaria, the project aims to restore over 30km of river habitats along the Danube tributaries that are home to six threatened and endangered fish and mollusk species by removing migration obstacles, restoring the gravel riverbed and building a fish pass. This restoration work, along with targeted conservation activities for these species (such as restocking), will help improve the river's conservation status. The project is also supported by the EU LIFE+ programme.

In addition, another wetland restoration project in Bulgaria – whose site is under consideration – will enhance the natural condition of the river ecosystem, encourage sustainable land use and provide space for rare and threatened species.

**Revitalising habitats.** In Austria, the partnership has already restored the last soda lakes, a unique habitat next to the Neusiedler See and close to Coca-Cola's Edelstal production facility. These last lakes – with their milky-white waters – are threatened by poor drainage channels and consequently by lower ground water levels, which result in an interruption of salt transport from the groundwater to the soil surface.

The aim of the project is to close drainage ditches and thus raise the groundwater table to former levels, which leads to 650,000 to 1,000,000 m<sup>3</sup> of water being brought back to nature. The activities will also benefit local tourism, which is dependent on the abundance of fauna – mainly birds – around the salt habitats, as well as agriculture, which also suffers from the current low ground water level.

Since 2007, The Coca-Cola Company and WWF have worked together to conserve and protect freshwater resources around the world while helping to improve the efficiency of Coca-Cola's global operations. To date, the partnership has

led to major conservation gains, including helping to improve the ecological health of seven of the world's most important freshwater basins across five continents, helping improve the Coca-Cola system's water efficiency by 20%, working to prevent 5 million metric tons of CO2 emissions across Coca-Cola's global manufacturing operations, and promoting more sustainable agricultural practices in the company's supply chain.

*Laurice Ereifej* is Regional Head of Freshwater at WWF Danube-Carpathian Programme.



# The heart of the Huchen population beats on the Balkans

Although self-sustaining populations of this flagship species can still be found, plans for new hydropower projects are putting this endangered species at further risk.

**The Huchen (Huchohucho) – also referred to as Danube Salmon – is a fascinating species. It is the top predator of our rivers – and is very rare. It is fast, strong, elegant and big. It’s probably the most popular fish species in the whole Danube basin, the only area on the planet where it exists. Fishermen love the Huchen and so do environmentalists, an unusual pairing of interests.**

In 2013 EuroNatur and Riverwatch launched a campaign called ‘Save the Blue Heart of Europe’ to protect the rivers on the Balkan Peninsula. The Huchen was chosen as a flagship species for this campaign because it requires exactly what the campaign aims to preserve: healthy, free-flowing rivers with gravel beds and water that is rich in oxygen.

However, discussions with fish experts made clear that knowledge about the dis-

tribution of Huchen in Slovenia and Montenegro is extremely limited. Although several EU-funded Life+ projects to save small remaining populations in Germany and Austria have been launched, there is almost no information about the Huchen population in the core territory of the species.

**Dams change the physical and chemical conditions in the river fundamentally for the Huchen and are one of the major reasons for the enormous decline of the global population. It is an either-or decision; you can have either Huchen or dams. You can’t have both.**

To fill these knowledge gaps, the campaign team organised a study into the distribution of Huchen on the Balkans, as well as an assessment into any planned hydropower plants that could have a sig-

*Without a master plan with no-go areas for hydropower development, beautiful Balkan rivers like the Tara River could be lost, and one of the most enigmatic species as well.*

nificant impact on Huchen. The results of both studies were astonishing.

**Finding Huchen habitats.** Jörg Freyhof, European Chair of the IUCN/SSC Freshwater Fish Specialist Group, from the German Centre for Integrative Biodiversity Research, and Steven Weiss, from the Institute of the Zoology, Karl-Franzens University, Graz, coordinated the study into the distribution of the Huchen on the Balkans, which involved 18 experts from 7 countries. Self-sustaining populations of Huchen

were found in 43 rivers along a total length of 1,822 kilometres. This corresponds to 65% of all known Huchen stretches worldwide, highlighting the importance of Balkan rivers for the survival of the species. Moreover, the Balkans harbour nearly all major habitats for this species, including six of the seven river reaches greater than 100km long of global Huchen habitats: the Sava, Kolpa/Kupa, Una, Sana, Drina and Lim rivers.

That is the good news: the heart of the Huchen population beats strongly on the Balkans, but they are at risk. The major threat to the Huchen is hydropower development, and this threat is massive.

**The Huchen populations at a crossroad.**

Dams change the physical and chemical conditions in the river fundamentally for the Huchen and are one of the major reasons for the enormous decline of the global population. The decision to build dams means one cannot have Huchen: you can have either Huchen or dams. You can't have both.

An assessment conducted by Ulrich Schwarz, Consultant Engineer for Geography Fluvius Floodplain Ecology and River

simply incompatible," adds Freyhof.

One of the most important Huchen rivers in Europe is the Sava River in Slovenia. With its tributaries, the Sava provides 317 kilometres of habitats for Huchen – the second longest stretch on the Balkans, surpassed only by the Drina River. However, 11 dams are in the pipeline along the Sava, right in the middle of an EU Member State where Huchen are legally protected.

**"The existence of Huchen and hydropower development is simply incompatible," says Jörg Freyhof, European Chair of the IUCN/SSC Freshwater Fish Specialist Group from the German Centre for Integrative Biodiversity Research.**

Opposition to the damming is rising, and not only from the environmental movement. More and more anglers are supporting the Save the Blue Heart of Europe campaign. "For us, the Huchen is the king of rivers. Wherever it lives, anglers from all over the world are willing to pay more for a fishing licence. Thus, the Huchen ultimately generates an increased income for the region. We support the Huchen and oppose the dams," says Miroslav Zaberl,

are often supported by international financial institutions, banks and western companies. "The international financiers have not generally been as careful as they would have been if these things were being built in their courtyards," Albanian Prime Minister Edi Rama said in a recent interview with the Guardian. "It is the curse of poor countries." Moreover, Rama said that he asked the EBRD to finance small-scale agricultural production instead, but "they were more interested in hydro".

The aim of the Save the Blue Heart of Europe campaign is to stop this unregulated hydropower boom. A master plan for the Balkan rivers must be prepared with defined no-go areas for hydropower development. Otherwise we will lose the most beautiful rivers of Europe and one of the most enigmatic species of Europe's freshwater fauna, the Huchen. That cannot be our vision for the Danube basin.

**For more information about the Save the Blue Heart of Europe campaign, please visit: [www.balkanrivers.net](http://www.balkanrivers.net). You can find the Huchen study here: [http://balkanrivers.net/sites/default/files/Huchen\\_Study\\_2015.pdf](http://balkanrivers.net/sites/default/files/Huchen_Study_2015.pdf)**



*The Huchen was chosen as a flagship species for the 'Save the Blue Heart of Europe' campaign because it requires exactly what the campaign aims to preserve: healthy, free-flowing rivers with gravel beds and water that is rich in oxygen.*

Basin Management, identified a total of 93 dam projects planned in river reaches supporting this remarkable species. At least 1,000 kilometres of Huchen rivers on the Balkans would be drowned by reservoirs or severely degraded by hydropeaking below the dams. "Balkan rivers are paramount for the survival of the Huchen. If these dams are constructed, we predict that about 70% of the Balkan population would be lost," says Weiss.

"The consequences will be presumably even more dire since the remaining populations would be too small to be able to survive in the long run. The existence of Huchen and hydropower development is

President of the Slovenian Angling Alliance, which represents 12,000 anglers in Slovenia.

**Dam boom on Balkans.** Unfortunately, the threat from dams is only one piece of a much larger problem on the Balkans. All in all, evidence reveals some 2000 dam projects proposed between Slovenia and Albania, and a recent study shows that the dam lobby ignores not only legally protected species like the Huchen, but also protected areas. About 535 hydropower plants are planned inside strictly protected sites – 113 of them in national parks.

To make matters worse, these dam projects

*Ulrich Eichelmann* is CEO of Riverwatch and coordinator of the campaign Save the Blue Heart of Europe.



## Bringing biodiversity back to the floodplains

Austria's largest hydropower plant operator VERBUND is working to reconnect the Traisen River to Austria's largest enclosed wetlands.

.....  
*The goal of the project is to reconnect the Traisen to the nearby water bodies and the surrounding wetlands of the Tullnerfelder floodplains, thereby creating a link to Austria's largest enclosed wetlands.*

**The broad-bodied chaser dragonfly is not a particularly extraordinary dragonfly; it is a fairly common dragonfly usually found near new, shallow waters. However its appearance along the lower reaches of the Traisen River is a good sign, showing that nature is beginning to take hold of the brand new riverbed in the area.**

The Traisen River, one of the largest Danube tributaries in Lower Austria, runs for 7.5km through the Tullnerfelder Donau-Auen, a Natura 2000 site which is the largest alluvial forest in Austria. However, the river was heavily modified following the construction of the Altenwörth hydropower plant in 1976. It currently runs in a regulated bed which doesn't give the river any possibility to expand and which becomes further entrenched year in and year out. The river has been cut off from the surrounding riparian forest, offering few habitats for typical wetland flora and fauna found in floodplains, and fish migration has been almost completely obstructed by obstacles.

In 2008, a plan was approved to create a new Traisen River, one that would be closely linked with the wetlands, offer diverse habitats, and restore fish accessibility. The project is coordinated and mainly financed by VERBUND Hydro Power GmbH (VHP), with co-financing from the LIFE+ programme. Further project partners are the Lower Austrian Fishery Association, the Lower Austrian Landscape Funds, viadonau, as well as the Federal Water Engineering Administration. VHP is Austria's leading electricity provider and operator of ten Danube hydro power plants.

**A complex landscape project.** The project will establish a meandering river, which can further develop dynamically in the future and provide new habitats in bodies of flowing water. The project will create a new dynamic riverbed and restore large-scale flooding zones to increase the habitat for white willow woods from 6% to 100%. "The goal of the LIFE+ Traisen project is



the recovery of a diverse wetlands area, which can be left to its own resources and the natural cycle," outlined Karl Heinz Gruber, board member of VERBUND Hydro Power GmbH. "The project complements our longstanding, successful practice of constructing and operating our power plants in harmony with nature."

Construction of fish passes in the floodplain area and on various existing water bodies will make permanent fish migration possible on the new Traisen River, benefitting at least 40 fish species. The gravel dredged up for the new course of the river will be used partly to construct new spawning grounds for fish in the Danube and a large part of the gravel will also be placed back downstream from



## NETWORK DANUBE

The Life+ project Network Danube, initiated by VHP in 2011 and running through 2017, aims to restore accessibility for fish at selected sections of the Danube. Improvements for fish include the creation of new habitats through the construction of bypass channels with manifold structures, which will benefit 17 fish species protected by the Flora-Fauna-Habitats Directive, and connect four Natura-2000 areas through the creation of 'ecological stepping stones'. This project will be the largest of its kind in Austria, with a total investment of

around 25 million Euros and six financing partners (the EU, Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, state governments of Upper and Lower Austria, and Upper and Lower Austrian Fishery Associations), and the impact of the measures will extend far beyond the boundaries of the actual projects themselves.

### **Ottensheim-Wilhering bypass channel**

In early 2015, VHP began construction of Europe's longest fish ladder to date at the Ottensheim-Wilhering power

plant. Via a 14.2km diversion route through the Innbach-Aschach river, the natural discharge dynamics of the tributaries are simulated by means of season-dependent water volumes and new habitats are thus created. This bypass channel best meets the high ecological and technical requirements for passability for fish. Furthermore, through the near-natural design of the construction with deep pools, fords and inlets, the project will create additional habitats for fish and other animals.

Once completed in autumn 2016, the fish ladder will bypass the Ottensheim-Wilhering power plant, with the diversion channel in the southern Eferding Basin. It will integrate sections of the Brandstätter tributary, the Aschach diversion stream and the Innbach River. The channel will therefore run parallel to the old Brandstätter tributary and flow into the residual water section of the Aschach near the village of Brandstatt. Together with the module 'Abwinden-Asten power plant secondary channel at the beginning of the backwater area', the project will create a habitat compound on the Danube in Austria that has a unique size and quality.

**Abwinden-Asten power plant head of reservoir backwater**

Approximately 500m of the head of reservoir area at Abwinden-Asten power plant will be restructured. The rip-rap at the banks will be removed to create new habitats for fish and other aquatic fauna. Some 200,000m<sup>3</sup> of gravel will be moved, mostly for measures in the head-of-reservoir area as well as for reshaping the estu-

ary areas on the left bank's sediment distributor stream and the Große Rodl on the opposite bank.

**Abwinden-Asten power plant bypass channel**

The Abwinden-Asten power plant will be equipped with a vertical slot to bridge a total difference in height of 9.3 m at low tide between reservoir area and tailrace. Using the best available international technology, the access will lie downstream from the turbine outlets, ensuring that the fish ladder can be easily located, especially for the spawning migration of species that love the current (nase, barb and Danube salmon). The exit will lie downstream of the Traun estuary, enabling fish swimming upstream to travel further in the Danube or to migrate into the Traun.

**Melk power plant head of reservoir gravel banks**

New gravel banks at the so-called 'Ybbscher Scheibe' in the Melk power plant head of reservoir will expand on the successful Danube-Ybbs LIFE+ networking project. The shoreline will be structured between river kilome-

tres 2057.70 and 2054.90, to create a sequence of gravel banks and gravel islands through which calm flow zones will emerge, along with shallow gravel surfaces that are flooded at low and mean-flow conditions. This will improve water ecology conditions, especially in relation to the reproduction conditions for fish species requiring gravelly, flooded shallow water zones.

**Greifenstein power plant – continuous accessibility**

The Greifenstein power plant is getting a near-natural bypass stream to serve as a fish migration channel to overcome a height difference of 12 metres. The bypass stream is almost 4km long and runs independently from the famous Gießgang in the Greifenstein floodplain. The design of the entry is particularly challenging, as it must have a sufficiently attractive current at different water levels in order to point the way for the fish. After the completion of the construction works, the effectiveness of the fish migration channels will be evaluated in 2020.

**For more information, please visit: [www.life-netzwerk-donau.at](http://www.life-netzwerk-donau.at)**

the Danube, to prevent erosion. In October 2014 the first stage of construction, a roughly 2km-long curved section of the new Traisen, was completed and handed back over to nature.

The main work will be completed by 2016, and the ecological diversity will benefit not only nature, but also the neighbouring municipalities, fishermen and tourists. "Lower Austria is well-known for its nature and it can be proud of this Europe-wide model project," says Stephan Pernkopf, member of the provincial government. "Nature and people equally profit here from a diverse floodplain landscape, which gives the river more space and which can keep back water masses when flooding occurs."

**For more information on the project, visit: [www.life-traisen.at](http://www.life-traisen.at).**

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



*The lower reaches of the Traisen River between Traismauer and Zwentendorf will be revitalised with a lively floodplains landscape. Specialists will enhance the course of the river and landscape with meanders, shallow water zones and pools following plans by ecology experts.*



“With a top-down approach only, we are losing local actors.”

## The Voice of the Danube

In early July, more than 80 stakeholders of the ICPDR attended a workshop where they expressed their views on the draft Danube River Basin Management Plan and Danube Flood Risk Management Plan. The event marks the peak of an intense public consultation campaign, which aims to involve the people of the Danube in the drafting of ICPDR policies from the beginning.

It was an intense programme that lasted over a day and a half: a workshop under the title Voice of the Danube, which gave policy makers of the ICPDR an opportunity to learn about the needs of those affected by these policies – the people of the Danube Basin. The two draft management plans – the Danube River Basin Management Plan and the Danube Flood Risk Management Plan – were discussed in detail to provide input before they are finalised in the autumn. These two plans will be the most important work programmes for the ICPDR until 2021.

The workshop organisers, the ICPDR in cooperation with Global Water Partnership, put great emphasis on limited presentations to allow for as much discussion time as possible. This resulted in lively

contributions from more than 80 participants.

In order to extract knowledge from everybody attending the workshop, the so-called Danube Café format was chosen. The participants were divided into five working groups. Guided by a facilitator and watched closely by a rapporteur, the groups spent approximately 30 minutes in discussion, before the facilitator and rapporteur moved and the next topic was presented to the group.

This approach guaranteed that everybody worked on every topic in small groups regardless of their specialisation – hydropower specialists discussed wetland reconnection, biodiversity experts spoke about climate change, corporate representatives reflected on the need for increasing

flood retention spaces. The potpourri of delegates and the original format ensured there was a maximum of creativity in the discussion.

The five topics at the core of this discussion reflected the main topics of the two management plans: hazardous substance and nutrient pollution, hydromorphological alterations and integration issues, public participation and communication, flood risk management, and the financing of measures proposed by the plans.

In addition, observer organisations and other stakeholders had a chance to present statements, join in plenary discussions or raise questions in writing. The workshop was opened by ICPDR President Dražen Kurečić, who recalled the importance of the two management plans for the years to come and their considerable impact on the lives of people, not least in the light of the devastating floods that the Sava sub-basin experienced last year.

The Art Nouveau building of the Croatian National Archive provided an appropriate frame for the workshop: symbols of wisdom and scholastic traditions on walls and façades provided a source of intellectual inspiration. Modern media linked the traditional venue with the world outside – all presentations were published via a live stream and social media such as Twitter and Facebook allowed for direct interaction with the public – 39 tweets from the event resulted in nearly 7000 impressions and numerous interactions.

And now that the Voice of the Danube has spoken, it is up to the ICPDR to take its messages on board. The comments collected are currently structured and will feed into a report provided to the relevant ICPDR expert groups who will then revise the management plans in the autumn. They will be adopted by the ICPDR at its plenary meeting in December, and by then a final report on all public consultation work will be published. Each comment will be recorded in this report with a note explaining either how it was taken into consideration or on what grounds it was dismissed. In either case, the opinions expressed by the stakeholders will be treated with utmost respect.

*Benedikt Mandl* is the Technical Expert for Public Participation and Communication in the ICPDR Secretariat, and the Executive Editor of Danube Watch.



“The concept of ‘More space for the rivers’ is well known, but there is no strategy in place to do this in practice. We should work on that.”



“A sediment management tool is needed. Rivers should also be passable for sediments.”



Workshop participants had a chance to engage in discussions during the “Danube Cafe”. The statements quoted here are from these sessions, they were not made by the people shown in the photo collage.

“We need a communication person and a planner working very tightly together.”



“Following last year’s flood disaster, people decided to reconstruct their houses at the same place. This is a complete nonsense, but the state is even supporting that.”



“It has to be clear clear that whoever is responsible for the facilitation of public participation is connected with the plans.”

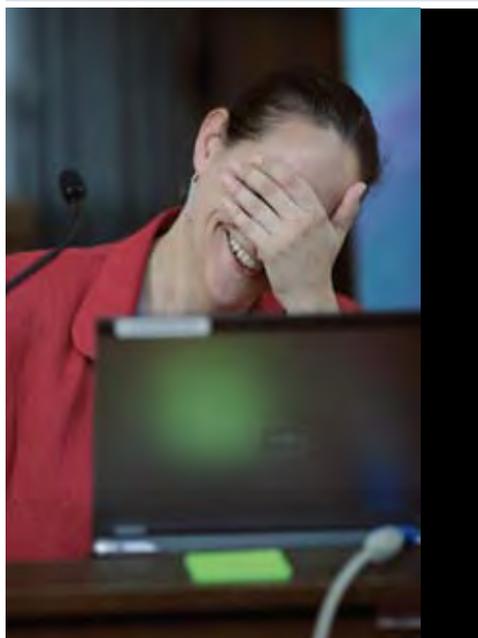


“Governments are not able to decide on the priorities for water management.”

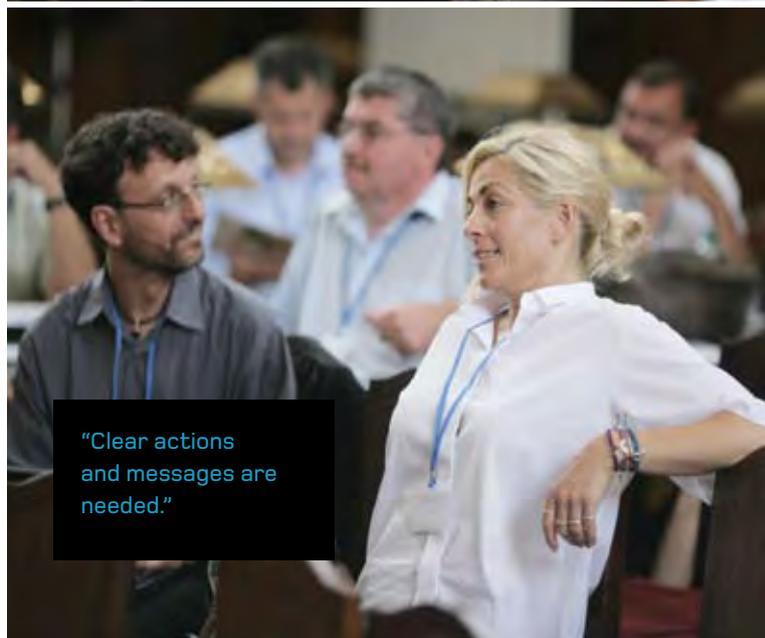


The **Voice of the Danube** workshop was part of a range of public consultation efforts for the draft Danube River Basin Management Plan Update 2015 and the first Flood Risk Management Plan for the Danube River. Other measures in line with this included a social media campaign, online questionnaires and the collection of comments submitted in writing. All four of these consultation channels will contribute to a final report.

Public consultation is required by the Water Framework Directive; however, the ICPDR goes far beyond these legal requirements in its commitment to involve stakeholders. This is because the commission is convinced that active public participation facilitates broader support for policies and leads to increased efficiency in the implementation of measures. Public participation is an ongoing process and builds on the involvement of 23 observer organisations in ICPDR expert groups, public information activities, outreach and consultation work.



“In my paintings I try to recreate the movement of water in the river, which is in perpetual motion, headlong, rebellious, changing constantly in new colours and picturesque structures,” says Bratislava-based Bulgarian artist Radostina Doganova when explaining her paintings. Ms Doganova generously provided several large-format oil paintings with a Danube theme. Every stakeholder views the river differently – what could possibly be a better means to link everybody with the Danube than an abstract reflection on the river provided by art? **Learn more about Ms Doganova’s artwork at: [www.radostinadoganova.com](http://www.radostinadoganova.com)**



“Clear actions and messages are needed.”



Experts will identify the sources of nitrate pollution in the Great Lakes of Nicaragua using information on the isotopic signatures for nitrogen, oxygen and boron from water samples collected during rainy and base flow periods.

# Tracking pollution to its source

Isotopic techniques are helping to identify nitrate sources and estimate their contributions to water pollution.

The fertile soil surrounding the Great Lakes of Nicaragua provides the ideal conditions for cattle farming and plantations. However, poor agricultural practices allow fertilisers to run off into streams and collect in lake water. As a result, the last two decades have seen the Great Lakes suffer from a build up of excess nutrients at an accelerated pace.

Nutrient pollution is a pressure that Danube countries know all too well. Excessive nutrients – especially nitrogen and phosphorus – enter the Danube Basin mostly from agricultural sources and disturb the ecological balance of the river and the Black Sea. These nutrients encourage phytoplankton to grow and reproduce more rapidly causing algal blooms, which can block sunlight to plants below the surface and deplete oxygen in the water, killing off other aquatic life.

To combat nutrient pollution, water managers at sites such as the Great Lakes of Nicaragua are turning to isotopes to identify the source of pollution.

**Using isotopic and nuclear techniques.** The International Atomic Energy Agency (IAEA) and Food and Agriculture Organisation (FAO) through the Soil and Water Management and Crop Nutrition Section in the Joint IAEA/FAO Division of Nuclear Techniques in Food and Agriculture (the Joint Division) is supporting its Member

States to reduce agricultural pollution using isotopic and nuclear techniques.

Isotopes are variants of a particular chemical element; while all isotopes of a given element have the same number of protons in each atom, they differ in the number of neutrons. Nitrates originating from different pollution sources have a distinctive isotopic signature and it is possible to measure such ratios in water. Analysis of non-radioactive, or stable, isotopes can be used to identify the nitrate sources and to estimate their contribution to nitrate pollution.

In a complex natural environment, nitrates undergo rapid transformation, which can complicate the identification of nitrate sources in agricultural landscapes. To overcome this, the fingerprint of a third isotope – boron – is used for efficient discrimination of different sources. This dual isotopic tracer technique is being used to identify sources of nitrate pollution and develop management strategies for the Great Lakes of Nicaragua as well as Inle Lake in Myanmar.

**Getting at the source of pollution.** Unsustainable agricultural practices, deforestation and a rapid boom in tourism in and around the Inle watershed areas of Myanmar have accelerated the deterioration of water quality. As a result, the socio-economic, environmental and ecosystem support provided by the lake has gradually decreased over the past several years. To address the environmental pressures of the area, the government of Myanmar initiated an integrated watershed management

approach. Under this approach, determining sources of nitrate pollution will be a key component in developing land use and management practices to reduce nitrogen loads and improve water quality in the lake.

For both Inle and the Great Lakes of Nicaragua systems, these projects will collect water samples during rainy and base flow periods and measure the isotopic signatures for nitrogen, oxygen and boron. Using that information and by analysing land use practices in the catchments, experts will identify the sources of nitrate pollution in the area.

Monitoring lakes and rivers for water quality provide information on the trend and overall status of the quality of surface waters. However, only by knowing and identifying the sources of nitrates can farm management practices be introduced to improve and reduce such pollution and protect water quality for the future.

*Karuppan Sakadevan* is a Technical Officer and Lee Heng is Section Head at the Soil and Water Management & Crop Nutrition Section of the Joint FAO/IAEA Division of the International Atomic Energy Agency in Vienna, Austria.

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*To address the environmental pressures of Inle Lake, Myanmar – including unsustainable agricultural practices, deforestation, and a rapid boom in tourism in the area – the government of Myanmar has initiated an integrated watershed management approach.*

**NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE**

In the past, the Joint Division has worked with its Member States to reduce soil erosion and sedimentation through soil conservation measures using fallout radionuclides (FRN) and compound specific stable isotope (CSSI) techniques. These help quantify land use impacts of soil erosion and identify erosion hotspots in agricultural landscapes. For more information on these techniques, please visit: [www-naweb.iaea.org/nafa/swmn/index.html](http://www-naweb.iaea.org/nafa/swmn/index.html). Comprehensive guidelines for this work can be found at: [www-pub.iaea.org/books/IAEABooks/10501/Guidelines-for-Using-Fallout-Radionuclides-to-Assess-Erosion-and-Effectiveness-of-Soil-Conservation-Strategies](http://www-pub.iaea.org/books/IAEABooks/10501/Guidelines-for-Using-Fallout-Radionuclides-to-Assess-Erosion-and-Effectiveness-of-Soil-Conservation-Strategies)



← The Danube and its tributaries are a key migration routes, but engineering works provide significant barriers for fish. Fold out for more information on expected improvements for interruptions in continuity.



<b>ICPDR MEETINGS</b>	For final dates, please consult the ICPDR calendar, available at <a href="http://www.icpdr.org">www.icpdr.org</a> .
22-28/8/2015	STOCKHOLM, SWEDEN <b>WORLD WATER WEEK</b>
25-26/8/2015	MAGDEBURG, GERMANY <b>MEETING OF THE EXECUTIVE SECRETARIES OF THE EUROPEAN WATER COMMISSIONS</b>
8-10/9/2015	BRNO, CZECH REPUBLIC <b>14<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON WATER MANAGEMENT AND HYDRAULIC ENGINEERING</b>
10-11/9/2015	VIENNA, AUSTRIA <b>6<sup>TH</sup> JOINT STATEMENT MEETING</b>
17-18/9/2015	ZAGREB, CROATIA <b>21<sup>ST</sup> GROUNDWATER TASK GROUP MEETING</b>
22/9/2015	VIENNA, AUSTRIA <b>15<sup>TH</sup> HYMO TASK GROUP MEETING</b>
23-25/9/2015	VIENNA, AUSTRIA <b>WORKSHOP HYDROMORPHOLOGICAL METHODOLOGIES</b>
1-2/10/2015 (T.B.C.)	ROMANIA (T.B.C.) <b>12<sup>TH</sup> ECON TASK GROUP MEETING</b>
6-7/10/2015	BRATISLAVA, SLOVAKIA <b>22<sup>ND</sup> MONITORING AND ASSESSMENT EXPERT GROUP MEETING</b>
8-9/10/2015	KOBLENZ, GERMANY <b>21<sup>ST</sup> INFORMATION MANAGEMENT AND GIS EXPERT GROUP MEETING</b>
14-15/10/2015	BUDAPEST, HUNGARY <b>28<sup>TH</sup> FLOOD PROTECTION EXPERT GROUP MEETING</b>
15-16/10/2015	BUDAPEST, HUNGARY <b>18<sup>TH</sup> PUBLIC PARTICIPATION EXPERT GROUP MEETING</b>
21-22/10/2015	BRATISLAVA, SLOVAKIA <b>42<sup>ND</sup> RIVER BASIN MANAGEMENT EXPERT GROUP MEETING</b>
11-12/11/2015	ZAGREB, CROATIA <b>WORKSHOP ON FLOOD RISK MANAGEMENT MEASURES AND LINKS WITH WFD</b>
17-20/11/2015	BUDAPEST, HUNGARY <b>7<sup>TH</sup> SESSION OF THE MOP TO THE UNECE WATER CONVENTION</b>
1-2/12/2015	VIENNA, AUSTRIA <b>18<sup>TH</sup> ICPDR ORDINARY MEETING</b>
<b>DW 03/15</b>	<b>UPCOMING ISSUE</b>
	<b>Danube Water Program</b> <b>Danube Day 2015 Review</b> <b>Management Plans for the Danube River Basin</b>