INITIATIVES POUR L'AVENIR DES GRANDS FLEUVES
INITIATIVES FOR THE FUTURE OF GREAT RIVERS

Synopsis sheets

Rivers of the World

THE DANUBE

Initiatives
pour l'Avenir des
Grands Fleuves

The Danube

The Danube starts at the confluence of the Brigach and the Bregth at Donaueschingen, which both flow from the Black Forest in Germany. Europe's second longest river (after the Volga) crosses nine countries before flowing into the Black Sea via a delta which separates Romania from Ukraine. Its watershed covering 802,266 km² is the most international in the world: it gathers 19 countries, more than 81 million people and a wealth of languages and cultures. The Danube's history is marked by the struggles for influence that have shaped Europe. Today, its management illustrates the challenges that confront Europe regarding environmental protection, political power and economic competitiveness.

A link in a fragmented Europe

The origins

The Greeks and then the Romans used it as a military corridor, after which the Ottoman Empire added trade in the 16th century, before the advent of the Austrian and then Austro-Hungarian Empires in the 17th and 18th centuries. Over the centuries it has forged political, cultural and religious links between Europe and Asia Minor and has called for different kinds of cooperation between the countries it crosses.

Its predominant role in river traffic during the European wars at the end of the 19th century strengthened the need to set up an institution responsible for managing navigation along its course. The first organisation set up by the Treaty of Paris following the Crimean War, in 1856, was followed in 1948 with the signature of the Belgrade Convention, which gave birth to the Danube Commission responsible for reinforcing the role of the river as a major European waterway. Almost half a century later, the Commission for the Protection of the Danube came into being to deal with increasing environmental concerns and the need for deeper cooperation in development.

Technical sheet

Discharge	6,500 m³/s
Length	2,860 km
Watershed	805,260km²

Countries crossed	Germany,Austria, Slovakia, Hungary, Croatia Serbia, Romania Bulgaria, Moldavia, Ukraine
Tributaries	Morava, Tisza, Olt, Siret, Prut, Inn, Save, Isker, Yantra)

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Characteristics
Western Bavaria: oceanic pluvial regime / Austria: mountain nival-pluvial regime / Hungary: plain nival-pluvial regime / Valachia-Moldavia: plain nival regime. Rainfall: from 2,000mm to 3,000 mm in the Alpes to 600 mm in Moravia (average: 800 mm). The continental climate causes glaciation about every one to two years out of three, capable of causing floods upstream of ice dams, especially in Hungary.

The Danube

Multiple uses

The picture of the Danube as a unifying symbol is rooted in the European imagination; among the myths associated with the Danube basin, that of the lands united under the Hapsburg dynasty remains one of the most enduring. In Strauss's *Blue Danube*, the writer Gerneth describes the river as a "silver ribbon linking nations". The poet Holderlin also exalted the fertility of this unique natural corridor of trade and migration between Rhineland Europe and the eastern gates of the continent. Images of the latter, mostly created in the 19th century, are frequently contrasted with those of the Rhine, the forge of the great Germanic myths and the mirror of the Germanic people and culture. However, the Danube conveys the more diffuse symbolism of a complex and changing river that crosses different populations and cultures.

Navigation

Faced with the ethnic and nationalist tensions in the region, the priority of the development schemes on the river and the regulations relating to it are to ensure navigability. Indeed, it is a strategic corridor and the only access to the sea for Hungary, Slovakia and Serbia. The river is navigable along three sections:

- the *Upper Danube* from Kelheim (Germany) to Komarom/Komarno (Hungary);
- the *Middle Danube* from Komarno to Drobeta Turnu-Severin (Romania);
- The *Lower Danube* from Drobeta Turnu-Severin to the delta.

Due the political instability of the region, goods traffic on the Danube fell dramatically between 1980 and 2002, slumping from 90 to 39 million tons.

The Marco Polo Programme of March 2005 considers the river a priority route of the future European multimodal network. This relies in particular on two main canals: the Rhine-Main-Danube canal inaugurated in 1992, and another built in Romania in 1984 under Ceausescu, to reach Constanta without passing via the delta. However, navigation on the latter is limited (state of the fleet, bridges, etc.). One of the aims of the EU's strategy is to increase goods transport on the river by 20% from now to 2020.

In 2016, according to the Danube Commission, 59 million tons of goods were transported on the Danube. The main goods transported are:

- Minerals, peat and other mined materials;
- Farm produce, game, wood and fish;
- Coke and refined oil products.

The European Marco Polo programme is aimed at providing financial support to the modal transfer of goods transported by road to other modes of transport (short maritime hauls, rail and river). Two programmes have been launched to date: Marco Polo I (2003-2006) and Marco Polo II (2007-2013), the latter was granted a budget of €450 million. The projects selected must combat the congestion of the European road network and improve the environmental performances of the goods transport system. Nearly 80% of the funds granted for the period 2003-2009 were spent on modal transfer projects.
For further information on the programmes and projects selected:
http://ec.europa.eu/transport/marcopolo/

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Multiple uses

Energy production

The Danube is a major source of energy, especially for Austria, which has nine hydropower plants, Slovakia, with the dams I and II of Gabčikovo, and Serbia and Romania with the hydropower plants of Djerdap I and II. Some countries like Germany, Hungary, Bulgaria and Romania have also built a large number of nuclear power plants on or close to the banks of the river. **Austria obtains about 25% of its energy requirements from the Danube, Slovakia 10%, Serbia 37% and Romania 27.6%.**

Certain dam projects have nonetheless led to strong protests from the ecological associations of neighbouring countries. The dam project of Bos-Nagymaros in Hungary, a project intended to complete the hydropower developments built in Slovakia (Gabcikovo I and II), has caused a diplomatic row that continues today. In Austria, another project was also abandoned in 1984 at Hainburg, downstream of Vienna.

Tourism

The Danube, as the other European inland waterways, has seen exponential growth in river tourism that began in 1990. 170 river cruisers plied the river in 2015 (additional 70 cruises compared to 2010). In 2002, they were only 60.

The passenger traffic on river cruisers involved mostly "short distance" trips from Passau-Vienna-Bratislava-Budapest and in the Danube delta for an ecological tourism.

<u>Number of passengers transported on the Danube:</u>

The number of passengers transported on all types of passenger boat amounted to more than 2 million.

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Structures

Flood protection

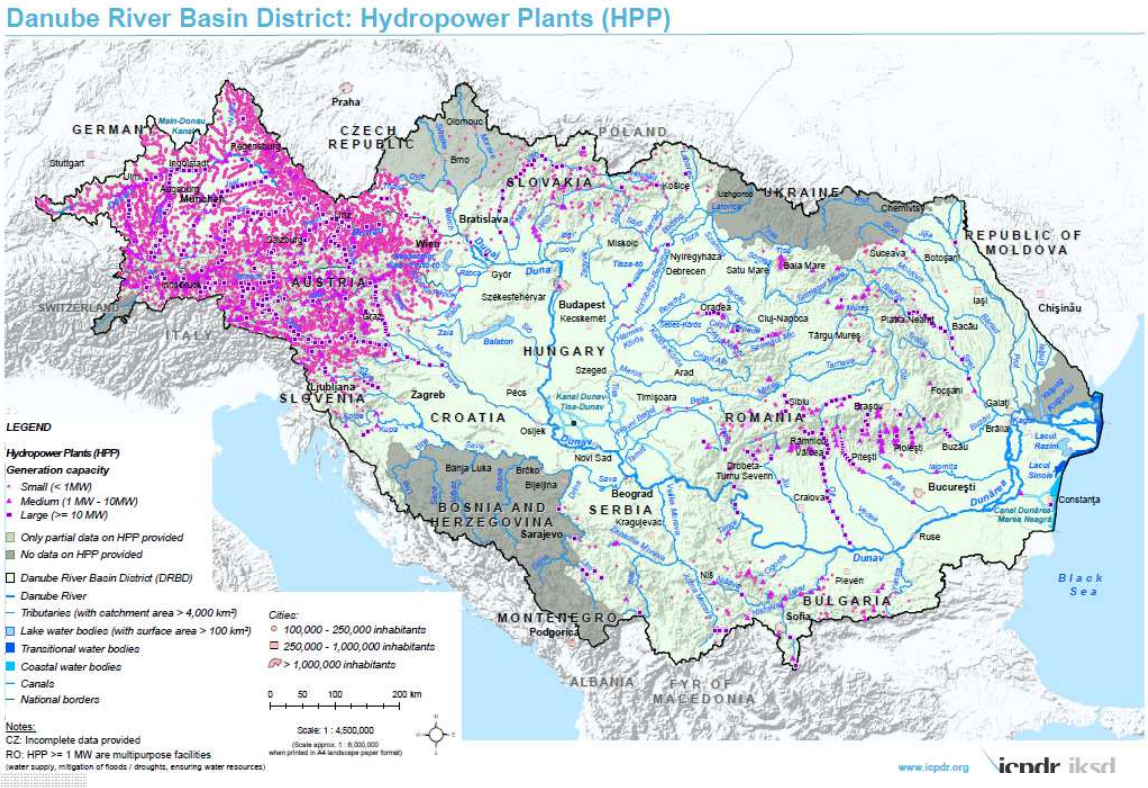
80% of the Danube's course is regulated by dikes that have been built since the 16th century. Today, only a fifth of the flood plains that existed adjacent to the Danube remain.

Hydroelectricity production

Since the natural slope of the Upper Danube is well-suited for hydroelectricity production, a large number of hydropower development schemes have been built. There are 59 dams on the first 1,000 km – from its source up to Gabcikovo. The course of the river is interrupted by three additional dams after Bratislava.

The main hydropower dam system is located in the Iron Gates (cf. References) passage, where two dams are operated jointly by Romania and Serbia. Downstream of Bratislava, the Gabcikovo dam is the second largest such structure on the Danube. Commissioned in 1992, it is located in what was the largest wetland in the region before its construction.

Other construction projects are in the study phase, notably on the Bavarian section of the Danube, as well as on tributaries such as the Sava and the Drava, along the border between Croatia and Hungary. The dam of **Novo Virje** (planned installed capacity: 121 MW), for example, is strongly contested due to the impacts that it will have on the Mura and the Drava between the Austrian border and the Danube. The impacts of the existing development schemes and the new projects are taken into account in the framework of the Danube River Basin Management Plan (DRBM Plan).



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Structures

Navigation

Country	Locks
Germany	Poikam (km 2,402) Regensburg (Ratisbonne, km 2,381) Geisling (km 2,354) Straubing (km 2,322) Kachlet (km 2,231) Jochenstein (km 2,203)
Austria	Aschach (km 2,162) Ottensheim-Wilhering (km 2,147) Abwinden-Asten (km 2,120) Wallsee-Mitterkirchen (km 2,095) Ybbs-Persenbeug (km 2,060) Melk (km 2038) Altenwörth (km 1,980) Greifenstein (km 1,949) Vienna Freudenau (km 1,921)
Slovakia	Gabčikovo I et canal de Gabčikovo (km 1853) Gabčikovo II (km 1821)
Serbia-Romania	Djerdap I (km 943) Djerdap II (km 863)

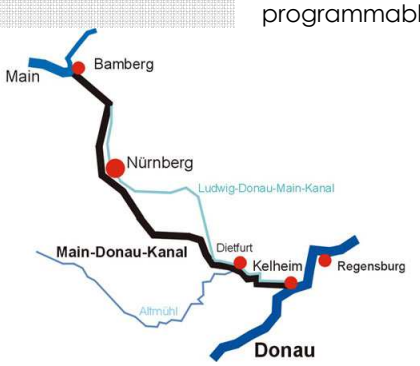
The Main-Danube Canal

The **Main-Danube canal** stretches from Bamberg to Kelheim and is part of the Rhine-Main-Danube river link between the North Sea to the Black Sea.

Construction: 1960-1992
Period of construction:
- The Bamberg-Nuremberg section ("Europa Kanal"), 72 km long, has seven locks and was developed between 1962 and 1972.
- The Nuremberg-Kelheim canal, 99 kilometres long, has sixteen locks. It was commissioned in 1992.

The project came up against several problems in the 1970s and 80s:
- Strong protest from ecologists relating to the impacts of excavating a section of 34 km on the local fauna and flora;
- Reduce funding and pessimistic cost-benefit analyses in terms of freight traffic.

The locks were upgraded between 2001 and 2007: installation of computers and programmable controllers. (cost: €1.3 million per lock).



The Danube

Governance and international cooperation

The system of governance

Navigation management: The Danube Commission

1. History

The first regulations relating to the transnational management of the Danube concerned navigation: the first organisation was founded in 1856 by the Treaty of Paris (the European Commission of the Danube). The current Danube Commission was founded in 1948 by the Belgrade Convention on navigation on the Danube. Thus regulations had become more precise during the first half of the 20th century with the signature of bi and multilateral agreements, notably in view to regulating navigation.

2. Main activities

On a daily basis, the Commission works to harmonise the principal texts on the standards required to navigate on the Danube and on other sectors of the single inland waterway system in Europe. Its purpose is to ensure the reciprocal recognition of these documents, contribute to improving navigation conditions and increasing safety, and finally to create other conditions necessary for integrating the Danube in the European system as a major transport corridor. It also draws up projects for large structures and in certain cases carries out the works.

3. Members

The members of the Danube Commission, whose head office is in Budapest, are Germany, Austria, Bulgaria, Croatia, Hungary, Moldavia, Romania, Russia, Serbia, Slovakia and Ukraine. France, Turkey, the Netherlands and the Czech Republic have observer status.

The Commission demonstrated its efficiency following the destruction by NATO in 1999 of the Novi Sad bridge, which blocked navigation. However, it is structurally handicapped by the non-obligatory nature of its decisions.

Environmental management: the International Commission for the Protection of the Danube River (ICPDR)

1. Objectives

The geopolitical situation changed in the 1980s and the disappearance of the Iron Curtain. Furthermore, in the 1990s reports from the United Nations Economic Commission for Europe and the European Environment Agency highlighted the alarming condition of the river. In 1991, the countries of the basin set up the **Environmental Programme for the Danube River Basin (EPDRB**), and in 1994 the **Danube River Protection Convention**, supported by the European Union, the World Bank and the Global Environment Facility.

This convention provides the Danube with a Commission like that set up for the Rhine. The International Commission for the Protection of the Danube has three main objectives:

- Ensure the sustainable and fair development of the resource,
- Control flood risks and accidental pollution,
- Reduce the pollutant load flowing into the Black Sea.

Danube

Governance and international cooperation

A **Strategic Action Plan (SAP**) guides the Commissions' activities in implementing the Convention for the Protection of the Danube, by identifying the most polluted sites and proposing proposals for rehabilitation.

2. Members

It now comprises 15 members and has its head office at Vienna: Austria, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Moldavia, Montenegro, Romania, Slovakia, Slovenia, Serbia, Ukraine and the European Union.

Other countries cooperate closely with the ICPDR in the framework of the European Framework Directive on Water: Italy, Switzerland, Poland, Albania, the former Yugoslav Republic of Macedonia.

3. Main activities

1- evaluating the state of surface and underground water in the Danube basin,
2- developing actions to conserve and improve water quality,
3- collecting information on the implementation and progress of these actions.
4- supporting the contracting parties and other pertinent entities in implementing these actions.

The ICPDR is currently at work with its second basin management plan (2015-2021). In addition, it supports the development of programmes for each of the Danube's sub-basins and the partner regions (Tisza, Prut, Black Sea, Delta, the EU's strategy for the Danube, etc.).

The ICPDR is organised around the International Commission responsible for determining strategy, for the Conference of the Parties which meets at least once a year, and a permanent work group which expresses opinions and prepares decisions. In addition, it relies on a large number of expert groups (EG) – some of which are dedicated to implementing the European Framework Directive on Water and the EU directive on floods, as well as on other work groups (WG).
21 organisations currently hold the status of observer in the ICPDR.

Tourism: the Danube Tourism Commission

The Danube Tourism Commission has gathered all the countries crossed, apart from the Republic of Moldavia and Ukraine, since 1972. Its role is to provide assistance in taking unified and coordinated measures to promote the thriving tourism industry on the river and, since 1998, on the Main-Danube Canal. Its head office is located in Vienna, Austria.

Furthermore, a **Danube Day** has been held every year on 29 June, since 2004, dedicated to activities relating to the river: work groups, awareness and education campaigns, etc.

The Danube

Governance and international cooperation

The European strategy for the Danube

The European Union, the twelfth signatory of the Convention for the Protection of the Danube of 1994, actively supports cross border cooperation in the region.

In 1997, it made the river part of Corridor VII of its policy to link the countries of Central and Eastern Europe wishing to join the EU.

NB: The Pan European corridors designate the routes of Central and Eastern Europe identified in 1994 as routes requiring major investments over 10/15 years.

The Danube cooperation process: a link between the different cooperation structures

The Danube Cooperation Process endows the Danube basin with an intergovernmental framework. It was launched on **27 May 2002** at Vienna by a declaration signed by the representatives of the countries crossed by the Danube, by the EU's Commissioner for Foreign Affairs at the time, Chris Patten, and the special coordinator of the Pact of Stability for Southeast Europe, Erhard Busek (a function that was terminated in 2008). It brings together the Danube Commission, the ICPDR, the CEI (Central European Initiative), the SEECP (the South East European Cooperation Process), the Adriatic and Ionian Initiative and the Management Committee of Corridor VII. This process functions by way of an **annual conference** between high ranking civil servants and **a ministerial meeting** every two years.

Its objective is to "*promote diversified cooperation to create an area of prosperity and progress in the Danube region*", "*develop understanding and solidarity between the members and to promote European identity and integration*".

This process reinforces the different international institutions described previously. Biannual cultural events are organised with the Danube Conference on Art and Culture. The non-exploited potential of the river is emphasised as is the interest of setting up Euro-regions and different forms of cross border and interregional cooperation.

However, this process lacks a secretariat and a specific budget. Its basic purpose is to encourage European integration.

Example of cooperation 1: managing flood risks for the River Morava.

The Morava, a tributary of the Danube, is shared by Austria, the Czech Republic and Slovakia. This river is dangerous due to the floods caused by regional rainfalls and flash floods. The damage caused by the flood of 2006, above all regarding farmland, was estimated at €35 million.

There is no joint basin commission for the Morava, but bilateral agreements between the three countries concern forecasting, sharing information and flood warnings. Furthermore, the Central Europe Flood Risk Management and Evaluation (CEFRAME) project concerns the Morava, the Dyje (the main tributary of the Morava), the Danube and the river Leitha. It has led to a study and inventory, a flood risk analysis, a map, a proposal to harmonise safety and the development of better practices.

The Danube

Governance and international cooperation

The strategy for the Danube

The European Commission adopted **a strategy for the Danube region** in April 2011. The aim of this strategy is to develop synergies and cooperation between existing policies and initiatives implemented in the region. It was formulated through consultation with the authorities of the region and the different stakeholders.

The projects above all concern transport, environmental protection, economic development and security:

Transport: the enlargement of Europe and the creation of a pan-European multimodal transport network:

- The Marco Polo programme intended to promote inter-modality
- Launched in March 2005, *Donauhanse* (Interreg IIIB) favours cooperation between the cities and ports linked by the Danube (€1.9 million).
- The "Also Danube" project oriented towards the utilisation of river waterways between the Black Sea and the ARA ports (Antwerp – Rotterdam – Amsterdam).
- INTERMODA for integrating the continent's logistics.
- The construction of a second port between Bulgaria and Romania to open a route between Northern European and Central and Eastern Europe.

Other projects:

- The "Clean Rivers Operation" project, which carries out pollution clean up projects on the five border zones of the Danube. (cooperation between Hungary and Romania to preserve water)

Tools:

Although the Strategy is now endowed with specific funds, it is estimated that €100 million can be made available through European structural funds to implement the projects concerned.

The DABLAS Task Force is intended to bring the parties involved together and harmonise standards and practices.

Furthermore, teams of experts assigned by the ICPDR are responsible for applying the European Commission's Framework Directive on Water, a core legal document that has regulated water management in the Member States since 2000 (it requires in particular that "in the case of an international hydrographic district extending beyond the borders of the community, the Member States shall do their utmost to produce a single basin management plan").

Example of cooperation 2: cooperation on the umbrella report on the Danube

Ukraine, Moldavia, Bosnia-Herzégovina and Croatia, which do not belong to the EU but which are members of the ICPDR, have accepted to participate in preparing an analysis of the Danube basin ("Danube river basin analysis" – DRBA). This cooperation consists in:
- funding by the ICPDR of the projects necessary for the DRBA,
- the non-member countries becoming familiar with the EU's regulations.

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What river for tomorrow?

Between the fall of the communist regimes and the process of European integration, the countries of the region have undergone major reforms, making it even more complicated to forge a stable and common vision of energy and the environment. To this must be added the number of stakeholders and the diversity of their socioeconomic situations: the number of States in the basin has risen from 8 in 1970 to 19 today, in a difficult context.

Management is often limited to bilateral treaties and coordination by politicians is hampered by their proliferation (43), since most of the countries have signed several different treaties.

Underexploited navigation potential

According to the Danube Commission, political disputes and the "lack of *consensus on a full channel development plan and its funding*" mean that the Danube's transport potential is underexploited. Despite the opening of the Rhine–Main–Danube canal, trade on the Danube at present amounts to only 15% of that carried out the Rhine.
The growth of traffic differs greatly according to geographic locality – between the East and West of the basin – and sector (regions where agriculture and the production of raw materials are strong are those most concerned by the Danube). Though increasing, trade has still not reached the level that existed before the war in Yugoslavia and the embargo against Serbia-Montenegro decided by the EU and the UN.
The problems of bottlenecks affecting the road network in the region (particularly in Austria) should nonetheless increase interest in the river in the years to come.

According to Mr Otto Schwetz, manager of Corridor VII, the settlement of institutional and legal problems linked to the modernisation of installations (for €450 million) would boost growth by 6% a year.

The countries putting the most energy behind developing river traffic are Austria and Germany, which recover privileged access to their hinterlands. They are followed by Romania.

A lack of international cooperation

The European Union wants to act as a driving force in Danubian cooperation, in the framework of progressive emergence of environmental awareness progressive.

The shortcomings of cooperation are visible in commercial shipping. The capacity of the ports of Ismail, in Ukraine, and Galați, in Romania is limited, as is that of the Austrian port of Linz. There is no major hub port for transporting goods to the Black Sea. In addition, some countries start projects in spite of the opposition of neighbouring countries and environmental associations, as in Moldavia which inaugurated a port and an oil terminal at Giurgiuleşti in v2007.

Project for canals that would allow bypassing Romania to reach the Black Sea demonstrate the predominance of national interests. The Ukrainian canal of Bystroe, excavated between 1995 and 2007, is used to bypass the Sulina branch of the Danube, under Romanian jurisdiction. Others are still present in people's minds, like the 200 kilometre canal between Roussé and Varna, which should divert traffic to Bulgaria.

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What river for tomorrow?

Increase funding capacities

The European Union grants aid to new countries to implement water policies in line with the FDW. However, restoring the river requires major works that the countries involved – most of which are located downstream, the region most threatened – cannot carry out for want of resources.

Protecting ecological heritage

It is estimated that the water of, the Danube is three times more polluted than that of the Rhine. Frequent industrial accidents, such as the Romanian poisoning of the tributary river Tisza in 2000, and the Hungarian toxic "red tide" in 2010, weaken the Danube basin. The delta is both a filter and a storage place for these pollutions. Faced with 120,000 hectares of marsh dried to be transformed into arable land under Ceausescu, a company has been started to develop the marshes. Levees and dams have been breached to allow the river to flow over 4,500 hectares.

In 1917, Stefan Zweig declared "this river must cease to be divided by borders into empires, and become the main artery of a unified Central Europe, the pacific mediator between the East and West". A century later, it is on this capacity of States to cooperate that the success of the EU's voluntarism and that of certain States in favour of shared management depend.

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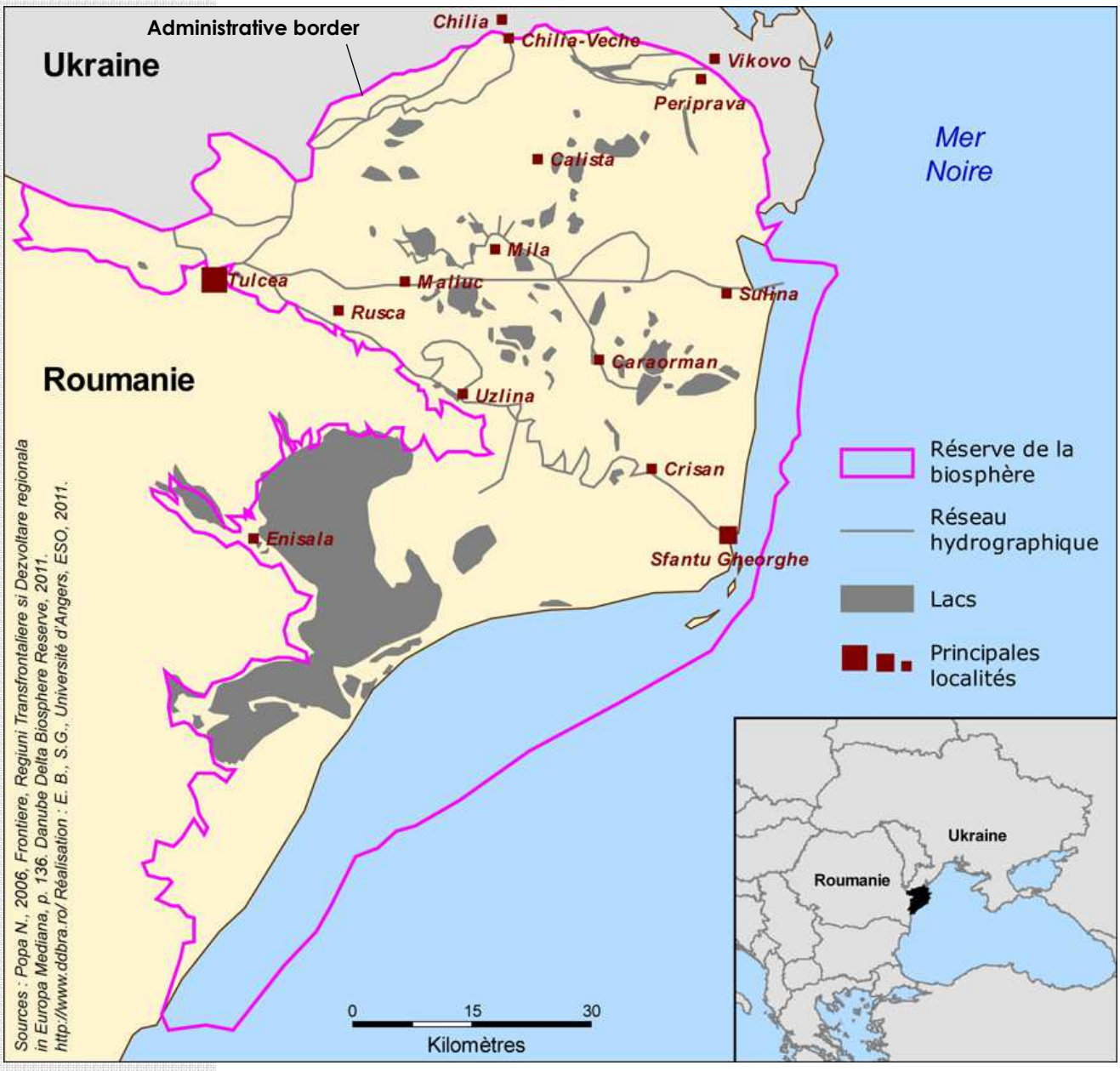
What river for tomorrow?

Environmental challenges in the delta of the Danube.



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The Iron Gates: an (isolated?) example of fruitful cooperation in the region

History

The dam system of the Iron Gates (Djerdap dams I and II) was built between 1964 and 1984 between Serbia and Romania. Built and operated by the two countries, it is now a symbol of Romanian-Serbian cooperation.

The name Iron Gates comes from the era of the Austro-Hungarian and Ottoman Empires, during which a huge iron chain crossed the river at the narrowest point, forming a customs post for ships sailing on the river.

Discharge: 5,500 m³/s

Total volume of reservoirs: 3.2 billion m^3

Total length of reservoirs: 270 km

Djerdap I (1977):

Location: 943 km from the mouth of the Danube / 10 km usptream of Kladovo

12 turbines including 6 for each country

Installed capacity: 2,050 MW

Annual production: 5.4 TWh (Romania) / 5.65 (Serbia)

Navigation is controlled by two locks, one Romanian and one Serbian. Since the dam provides the shortest distance by road between Bucharest and Belgrade,it is one of the busiest points of passage across the border.

Djerdap II (1984):

Location: 863 km from the mouth of the Danube

20 turbines including 10 for each country

Installed capacity: 591 MW including 321 MW (Romania) / 270 MW (Serbia)

Annual production: 1.3 TWh (Romania) / 1.31 TWh (Serbia)

Serbia is considering the construction of a new hydropower plant with a lower installed capacity called Djerdap III.

Environmental issues and cooperation

Its opponents emphasise that the cascade of dams prevents the periodic flooding of alluvial forests and impedes the movement of fish.

Two national parks have been created to preserve the region's flora and fauna: that of Djerdap in Serbia (1974) and that of the Iron Gate in Romania (2001).

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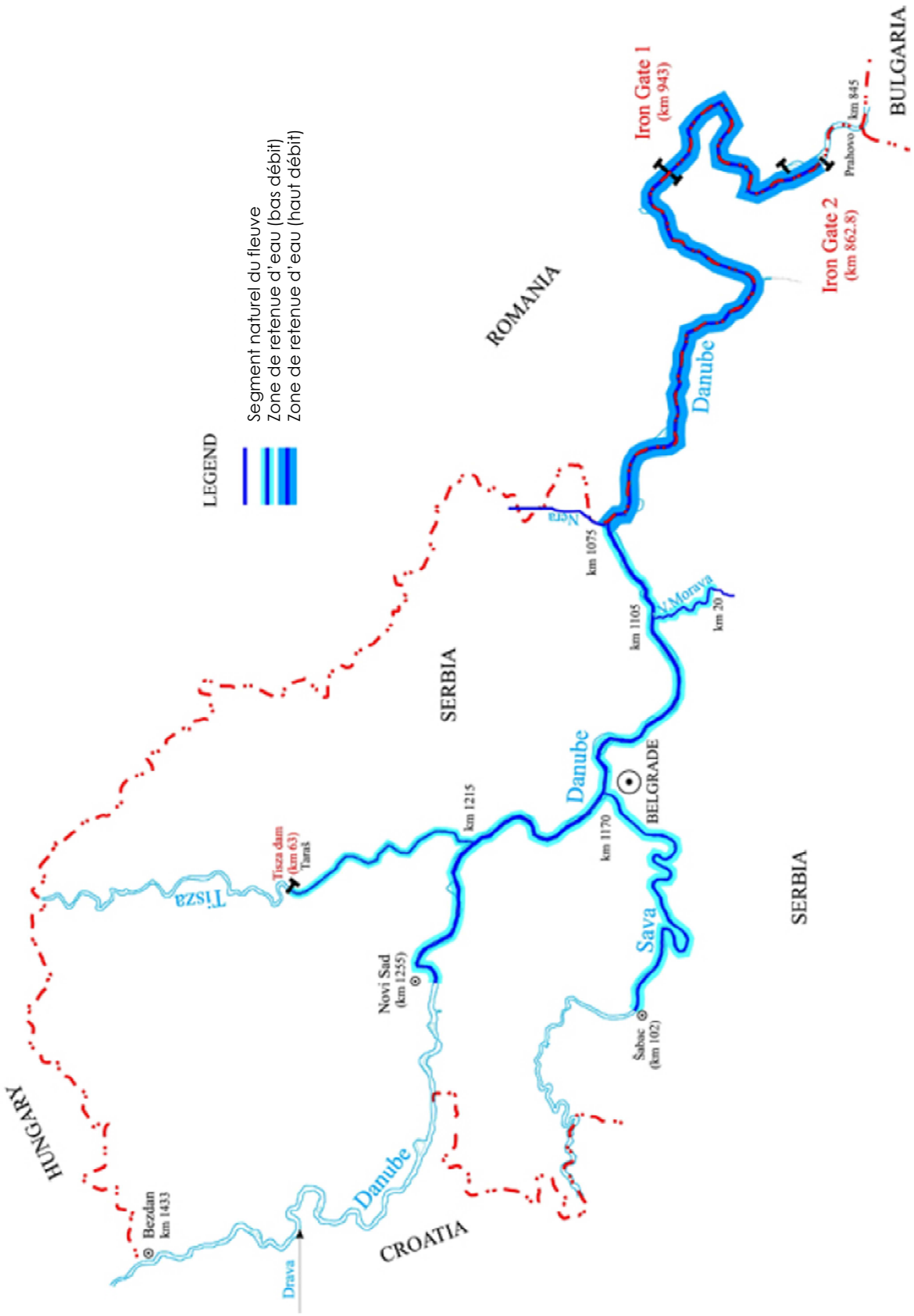

The Danube

References

Dam of Gabcikovo-Nagymaros: a symbol of conflict over a resource

Birth of a project

1977: signature of a bilateral treaty between Hungary and Czechoslovakia to build a lock system and a hydropower plant.

The development of a section of the Danube between Bratislava and Budapest, of about 200 km, including twenty in Czechoslovakia (now Slovakia), 142 km of border between the two countries, and about 40 km in Hungary.

Objectives:
- Electricity production
- Improve navigation
- Flood protection

The problem of the partial disappearance of the inner delta was already a concern at this moment.

Obstructions

Protests were made in Hungary in the 1980s, underlining the project's negative environmen tal impact.
1989: Hungary suspended works and then withdrew from the project under pressure from the population.

From a bilateral project to international jurisprudence

1993: Slovakia, which had already completed 90% of its share of the works, filed a complaint against Hungary ay the international Court of Justice for failure to abide by the Budapest agreements of 1977.
On its side, Hungary also appealed to the ICJ by accusing Slovakia of diverting the water of the Danube into the artificial canal of Gabcikovo.

1997: The International Court of Justice issued its first judgement in which it condemned both countries for failing to abide by the treaty. Confronted by the impossibility of clarifying an interpretation of this decision, in 1998 Slovakia demanded a new one which is still the subject of negotiations.

This project has given rise to a new form of cooperation: regional conflicts have given way to the international scale and a new actor has become essential in finding a solution to the conflict: the ICJ.

What is more, the project has now become a symbol of the increasing importance given to environmental protection faced with a controversial development project.

Today, the existing hydropower plant, Gabcikovo, has an installed capacity of 720 MW. After it was privatised in 2006, its management was transferred from the public company Slovenske Elektrarne to a majority private shareholder, the Italian company Enel SpA. The plant supplies 10% of the energy used in Slovakia.

Vue d'ensemble actuelle

barrage et centrale hydro-électrique

centrale nucléaire

frontière

division administrative

zone urbanisée

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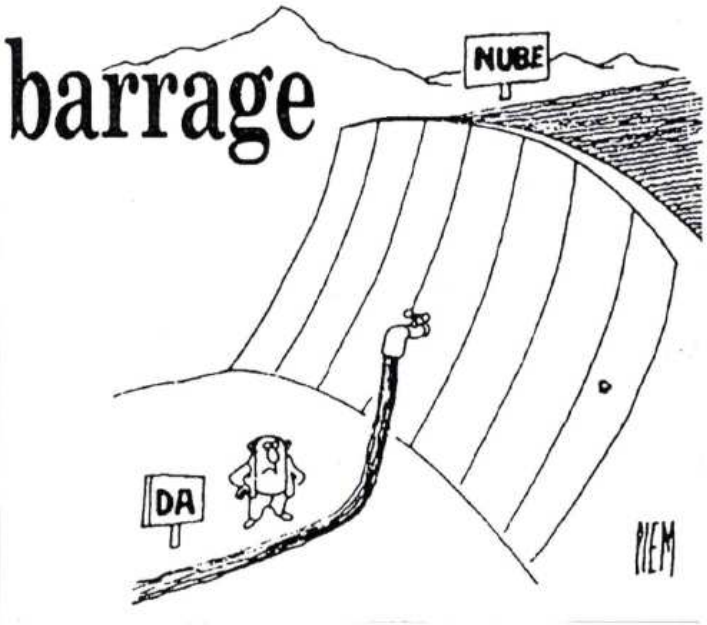
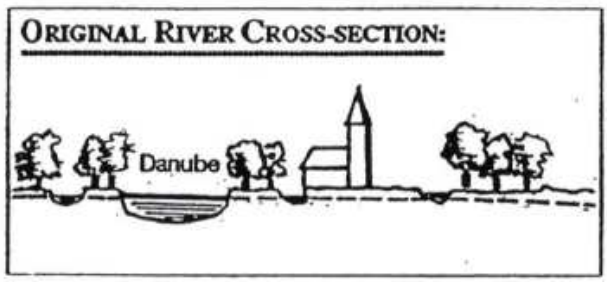
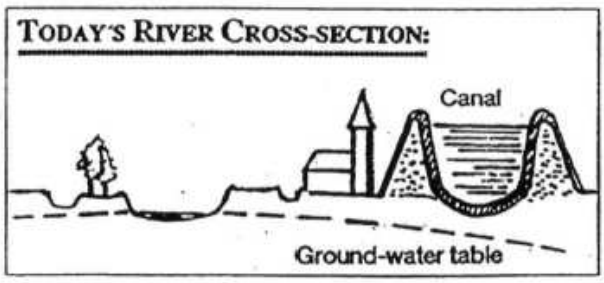
References

Appendices – the international dispute over the project



"Budapest, Bratislava: the battle of the dam", *La Croix*, 23 October 1992.





- The Danube - essential part of Europe's Natural Heritage
- Av. 2.000 m^3/sec of water flowing in the Danube
- Dynamic changes of ground- and river water, Central Europe's largest drinking water reservoir
- 200 km^2 European-wide unique floodplain ecosystem

- Gabcikovo, mega-powerstation, 30 km channel
- 85 % of the water in the channel, only 15 % in the Danube bed
- Storage lake, impact on the ground-water table, endangering of the drinking water for millions of people
- Drying up and destruction of the riverine landscape