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International
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zum Schutz
der Donau

Tisza River Basin Analysis 2007

Summary Report - A call for action



Foreword



Philip Weller
Executive Secretary
International Commission for the
Protection of the Danube River

There is much to be proud of in the Tisza River Basin – including unique cultures, rare flora and fauna, a rich supply of natural resources and the waters of the Tisza River itself.

But it is the cooperation between the five Tisza countries – Ukraine, Romania, Slovakia, Hungary and Serbia – that make the protection of these assets possible.

Their collaboration on the Tisza River Basin Analysis went beyond their obligations to the International Commission for the Protection of the Danube River (ICPDR) and the EU Water Framework Directive (WFD). Their work produced the first analysis of the Tisza River Basin, for which this is a summary, and highlights the issues for the region that will enable an Integrated River Basin Management Plan to be developed for the Tisza River Basin by 2009.

The results of the analysis show that there is much work to be done to protect this important region from the threat of pollution as well as from floods and droughts. It is therefore critical to follow up on the excellent work begun by the Tisza countries under the ICPDR's Tisza Group. With integrated approaches to land and water management, we can protect the Tisza River Basin. And we must do so together.



Joachim D'Eugenio
Chairman of the Tisza Group
European Commission Environment
Directorate-General Water & Marine Unit

In 2004, the European Union held the rotating Presidency of the ICPDR. One of our key objectives was to promote and strengthen cooperation in the Tisza region. Since then, enlargement rounds have brought the Tisza into the heart of the EU. Water management faces a variety of problems but if we can manage to resolve these problems in the Tisza Basin, it should be possible elsewhere.

The Tisza Analysis exceeds expectations.

It builds on the principles of EU water legislation, in particular the Water Framework Directive, and identifies major water quality problems. But it goes beyond this to cover water quantity aspects in similar depth and discusses how to strengthen relations between quantity and quality management, anticipating future directives such as the EU Flood Risk Management Directive and the EU Water Scarcity and Droughts Action Plan.

While the report indicates significant challenges ahead, transboundary cooperation is the key to solving these issues. Therefore, I call on all the Tisza countries and partners to intensify their efforts for the benefit of the Tisza people and the environment. The European Commission is committed to continue its support for this process.

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Introduction

The Tisza River is the longest tributary of the Danube and its basin is the largest sub-basin of the Danube Basin. It is home to 14 million people throughout five countries – Ukraine, Romania, Slovakia, Hungary and Serbia. The Tisza River Basin is an area rich in biodiversity, providing habitats for many species no longer found in other parts of Europe. Many areas of the region, including nature reserves and national parks, are important ecological assets.

Unfortunately, this region faces serious threats from pollution and river engineering as well as from floods and droughts.

This is why the Tisza countries have come together – to provide collective action to protect and maintain this environment. There is a long history of successful cooperation among the Tisza River Basin countries. Most recently, the Tisza countries collaborated to prepare the Tisza River Basin Analysis 2007, coordinated by the International Commission for the Protection of the Danube River (ICPDR). The report details water quality and quantity issues and the need to integrate them. The report will serve as the basis for the Tisza River Basin Management Plan and will help meet EU Directives, such as the Water Framework Directive and the Flood Directive, as well as country obligations within the ICPDR.



The work done by the Tisza countries toward a River Basin Management Plan for the Tisza Basin serves as a pilot programme for other European sub-basins.

This summary document presents the key assets and risks in the region. It is based on an extensive technical report, used as a reference for all facts and figures, which will be finalised and approved at the end of 2007. The full report presents a comprehensive environmental analysis for the surface and groundwater bodies on a Tisza Basin-wide scale. Also included are a number of actions that still need to be taken, especially by the Tisza country governments, to fill information gaps and provide a complete picture of the basin's needs. Action must be taken collectively to protect and maintain this unique region.

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Setting the Scene

The Tisza River Basin Analysis – with the cooperation of all Tisza countries – will guide the development of a plan to protect the Tisza Basin from pollution and further degradation and to reduce the risks from floods and droughts.

An important European resource

The Tisza River, the longest tributary to the Danube River, flows through five countries and drains 157,186 km².

The Tisza River Basin is one of the most picturesque regions in Europe. Mountain streams, meandering rivers and diverse landscapes are home to many unique species.

The Tisza River Basin provides a high diversity of habitats for plants and animals – some of which are no longer found in other parts of Europe. Furthermore, countries in the Tisza River Basin have set aside a significant amount of protected areas and national parks, including nature reserves and several Ramsar sites.

The Tisza River Basin is important to the people living there, and provides livelihoods for many through agriculture, forestry, pastures, mining, navigation, tourism and energy production.

The last 150 years of human influence, however, have caused serious problems for the basin's waters.

The waters of the Tisza Basin are under the threat of pollution from organic substances from municipalities and urban settlements, nutrients from wastewater and farming and hazardous substances from industry, mining and agriculture.

Furthermore, changes in land-use and river engineering have modified the natural structure of the river and resulted in the loss of natural floodplains and wetlands. These changes have led to an increase in extreme events, such as severe floods (the most recent in the period from 1998 to 2006), periods of devastating droughts (particularly in Hungary and Serbia) as well as landslides and erosion in the uplands.

Cooperation in the basin

The countries in the Tisza Basin have a history of excellent cooperation and have worked collaboratively to prepare an analysis of the basin detailing the pressures and impacts from pollution, river engineering works, floods and droughts. As noted in the report, action must be taken collectively to protect and maintain the river basin's ecosystem using an integrated river basin management approach combining land and water management, as well as issues of both water quality and water quantity.



The Tisza River Basin countries will prepare a River Basin Management Plan for the Tisza Basin by 2009. This will include the next steps and long-term actions required to fulfil the WFD and all other relevant legislation. This plan will provide shared approaches between all countries for environmental assessment and reduce information gaps. The plan will help countries design and implement measures to reduce pollution and impacts resulting from river engineering changes, as well as strategies to address floods and droughts, improve land management and reconnect floodplains and wetlands.



Overview

The Tisza River is located in the geographical heart of Europe. Together with its tributaries, it drains the largest catchment area in the Carpathian Mountains before flowing through the Pannonian Plain to join the Danube River.

A diversity of landscapes

The Tisza Basin is the largest sub-basin in the Danube River Basin. It is shared by Ukraine, Romania, Slovakia, Hungary and Serbia. The river rises in the Carpathian Mountains of Ukraine and is formed from the confluence of the White and Black Tisza rivers. The main tributaries of the Tisza are the Mures, Körös, Slaná, Bodrog and Somes rivers.

The Tisza River Basin at a glance

Size of the Tisza River Basin: 157,186 km²

Length of the Tisza River: 966 km

Percentage of the Tisza Basin in the Danube River Basin: 19.5%

Annual mean discharge: 830 m³/s

Natural lakes with surface area bigger than 10 km²: 2

Tributaries with surface area bigger than 1,000 km²: 37

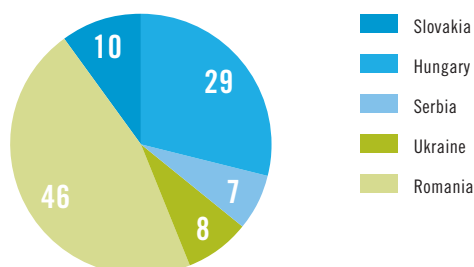
Three sections of the Tisza River

1. The mountainous Upper Tisza in Ukraine and Romania, upstream from the mouth of the Somes River
2. The Middle Tisza in Hungary receives the largest tributaries: the Bodrog and Slaná rivers bringing water from the Carpathian Mountains in Slovakia and Ukraine, as well as the Somes, Körös and Mures rivers draining the Transylvania area of Romania
3. The Lower Tisza in Hungary and Serbia, downstream from the mouth of the Mures River, where it receives the Bega and other tributaries through the Danube-Tisza-Danube Canal System

The Tisza River Basin is home to 14 million people, and land in the basin is mainly used for agriculture, grazing, nature reserves and urban areas. Forestry is an important economic sector in the uplands of the Tisza River Basin, particularly in Ukraine and Romania. The average share of forest cover is 26%, concentrated in the northern and eastern parts of the basin. There are more than 30 hydropower stations within the basin. The Tisza River is also used as a waterway from the Ukrainian-Hungarian border (downstream from the border towns of Chop and Záhony) to its confluence with the Danube – covering over 70% of the total length.

Distribution of the area between the Tisza Countries

% in each country



History of cooperation

The Danube River Protection Convention is the overall legal instrument for cooperation and trans-boundary water management in the Danube River Basin. Signed in 1994, it aims to ensure that surface waters and groundwater within the basin are managed sustainably and equitably. The International Commission for the Protection of the Danube River (ICPDR), with its secretariat based in Vienna, was established in 1998 to achieve the goals of the Convention.

The Tisza River Basin and the EU Water Framework Directive

One of the key elements of the EU Water Framework Directive (WFD) is to ensure that all waters meet the requirements of 'good status' by 2015. The first step towards the objective is to create a River Basin Management Plan by 2009. The EU Member States can supplement the River Basin Management Plan with more detailed programmes and management plans for sub-basins. The Tisza Group countries have established a Tisza River Sub-basin initiative to produce a sub-basin level Tisza River Basin Management Plan by 2009, integrating issues on flood and water quantity management.

Since the WFD came into force in 2000, the ICPDR was nominated as the platform to coordinate the implementation of the Directive. In addition to Danube-wide planning, the ICPDR also takes an active role in sub-basin planning by supporting and encouraging, and assisting stakeholder involvement by bringing local and regional planners into, the planning process.

At the first ministerial meeting of the ICPDR in 2004, representatives of the five Tisza countries signed a Memorandum of Understanding, agreeing to prepare a River Basin Management Plan for the Tisza River Basin by the end of 2009. The 'Tisza Group' was created to prepare and coordinate all activities for the preparation of the Tisza River Basin Management Plan. The Tisza Group also serves as a platform for strengthening coordination and information exchange among relevant international, regional and national bodies and projects in the Tisza River Basin.



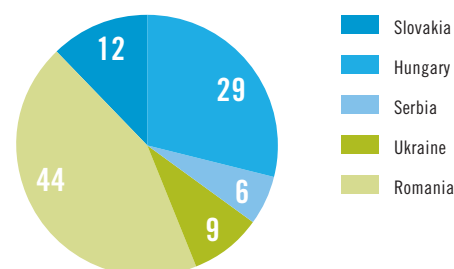
Public Participation in River Basin Management

Various initiatives have been taken within the framework of the ICPDR to promote public participation as a core principle in sustainable water management. Organisations, representing civil society or private industry, as well as international organisations are granted rights and opportunities to become observers and participate in the ICPDR and its Expert Group Meetings, participate in discussions, intervene or present their materials or documents. Several observers participate in the activities of the Tisza Group and this cooperation has proven to be successful in ensuring that different concerns and approaches help influence and shape current water management in the sub-basin.

Distribution of the population in the Tisza Countries

14 million people live in the Tisza River Basin.

% in each country



Key Natural Values

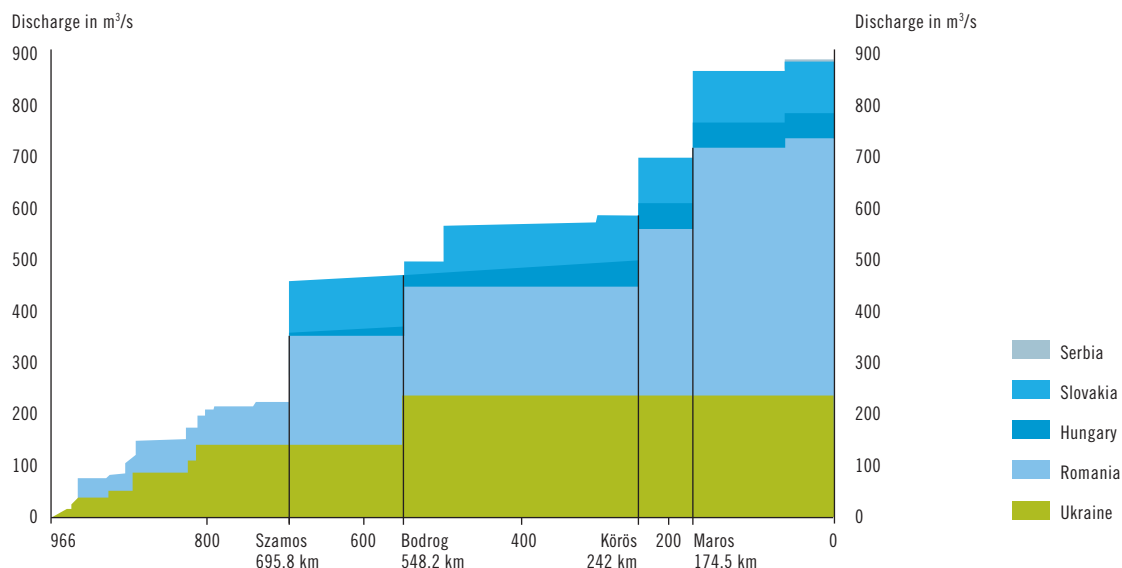
The Tisza River Basin is an important European resource, boasting a high diversity of landscapes which provide habitats for unique species of animal and plant life, such as the Tisza ‘flower’ or mayfly (*Palingenia longicauda*), with a significant number of protected areas and national parks.

A unique world

The Tisza River Basin is blessed with a rich biodiversity, including many species no longer found in Western Europe. Large carnivores are found in the mountains, including brown bear (*Ursus arctos*), lynx (*Lynx lynx*), wolf (*Canis lupus lupus*) and otter (*Lutra lutra*). The variety of habitats in the region supports many vulnerable, threatened and critically endangered species such as the Corn crake (*Crex crex*), Geoffroy’s bat (*Myotis emarginatus*), European Ground Squirrel (*Spermophilus citellus*) and Russian sturgeon (*Acipenser gueldens-taedtii*). The upper Tisza Basin is an important migration route for

fish, notably Nase (*Chondrostoma nasus*), Barbel (*Barbus barbus*) and Sterlet (*Acipenser ruthenus*). The area supports a rich wetland fauna of dragonflies (*Odonata*) and nesting water birds, including all eight European Heron species (*Ardea cinerea*, *Ardea purpurea*, *Lxobrychus minutus*, *Botaurus stellaris*, *Egretta garzetta*, *Nycticorax nycticorax*, *Ardeola ralloides* and *Bubulcus ibis*). The basin is also home to rare plants such as *Galium bailloni*, *Fumaria jankae* and *Thero-Salicornietea*.

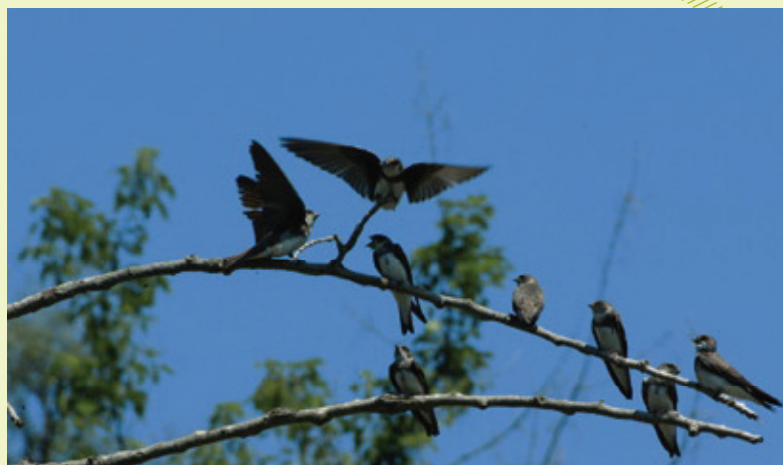
Longitudinal profile of the Tisza River and contribution of water from each country (in %) to the mean discharge of the Tisza (in m³/s)



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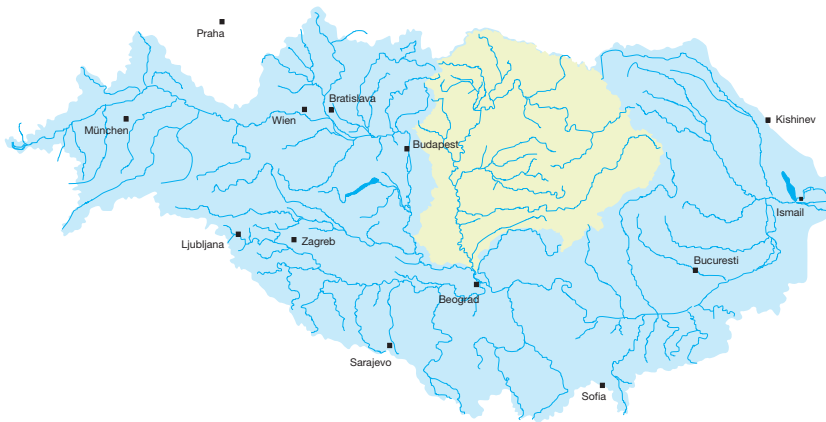
The region has outstanding natural ecological values such as unique freshwater wetland ecosystems, 167 larger oxbow-lakes, more than 300 riparian wetlands and 12 Ramsar sites.

Within the most important protected areas for species and habitats in the upper and middle Tisza, there are two areas in Slovakia: a 50,000 ha protected area on the Slaná River which is partially shared with Hungary, and a 10,000 ha protected wetland on the Latorica River near the Ukrainian border. In Romania, nature reserves and national parks in the upper Tisza River Basin represent a total surface area of 194,271 ha. Nature conservation is an important economic component in the Ukrainian upper Tisza River Basin - protected areas occupy 1,600 km², or more than 12% of the Zakarpatska Oblast area. Five National Parks -- the Aggteleki, Hortobágyi, Körös-Maros, Bükk, Kiskunsági -- and several protected areas are located in the middle and lower Tisza.



Map – Tisza River Basin Overview

Danube River Basin District



Landuse



LEGEND

- Tisza River Sub-basin
- Danube River Basin District (DRB)
- Tisza and Danube
- Lakes (surface area > 10 km²)
- National borders
- Cities 50,000–100,000 inhabitants
- Cities 100,000–250,000 inhabitants
- Cities 250,000–1,000,000 inhabitants

Aggregated landuse classes:

- Coniferous forest
- Deciduous forest
- Grassland
- Wetlands
- Arable land
- Urbanized area
- Sparsely vegetated area





Key Risks – Quality

A healthy river system requires balancing the needs of the region's people and economy with the needs of the river for clean waters and ample habitats for wildlife.

The results of human influence

Human influence in the region during recent centuries – including activities such as farming, forestry, mining and river engineering, all essential to the livelihoods of the people in the basin – contributed to problems in the form of pollution and changes to the natural form of the river.

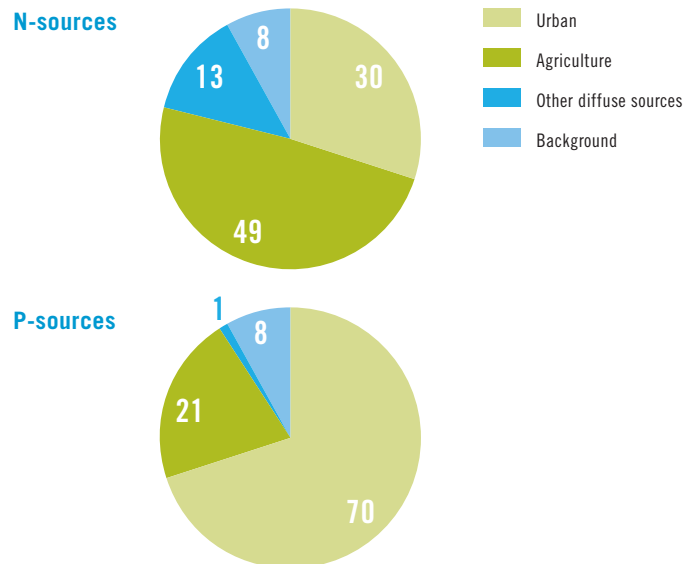
The impacts of pollution are significant in the Tisza River Basin and affect human health, the access to healthy fisheries, the safety of settlements and the development of a successful tourism industry.

These pressures were evaluated by the Tisza River Basin Analysis 2007 to determine the likelihood of achieving a 'good status' for the waters of the Tisza River Basin as expected by the EU Water Framework Directive (WFD).

The surface water conditions of the Tisza Basin

The Tisza River Basin Analysis shows that much of the basin's water bodies are 'at risk' or 'possibly at risk' of failing to meet the expectations of the WFD due to pollution from organic substances from municipalities and settlements, nutrients from wastewater and farming and hazardous substances from industry and mining. The river is highly at risk due to extensive river engineering works in the basin for navigation, flood protection and hydropower needs, which resulted in a high percentage of provisionally heavily modified water bodies of the Tisza River (nearly 50% of the total length of the Tisza River was identified as provisionally heavily modified). These alterations impact the natural ecology of rivers by changing flow characteristics, restricting fish migration and isolating rivers from wetlands and floodplains.

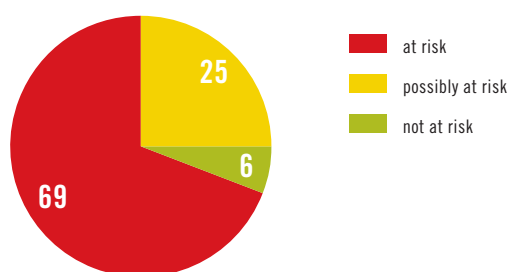
Percentage of 'N' and 'P' sources



Sources of nutrient pollution

The main sources of nitrogen are derived from agricultural sources (e.g. excess fertiliser, inappropriate storage and use of manure). If the levels of nutrients (for example, nitrogen and phosphorus) are too high, then this can lead to eutrophication – a process whereby biological growth is over-fertilised resulting in the consumption of too much oxygen and the potential creation of a 'dead zone'. Throughout the Danube Basin, considerable efforts have been directed at reducing nutrients entering the rivers and thus reducing the problems of eutrophication in the Black Sea.

Surface water bodies at risk/possibly at risk/not at risk of failing to meet WFD good status on the Tisza River



A significant conclusion from the preliminary analysis is that there is still much work to be done in collecting basic information about the pressures and their impacts on the basin. The current risk assessment shows that the countries of the basin have classified much of the main Tisza River as being 'at risk' of failing to meet the directive's objective of 'good status'. In addition the risk assessment indicates that more work is needed to harmonise the approach to estimating the risk of failure.



The role of wetlands

Wetlands and floodplains form an integral part of river systems, providing a variety of different habitats for wildlife, reducing nutrients, trapping sediments, aiding flood protection and recharging groundwater. Many of the wetlands and floodplains in the Tisza Basin were lost during the last centuries in order to create farmland, generate electricity and improve water transport. The results left a natural river modified, and in some cases the canalisation of former natural rivers has accentuated floods in downstream communities.

Good news for groundwater

Groundwater is an important resource in the basin. Most groundwater bodies are used for drinking water, as well as for agriculture and industry. The majority of the basin's significant groundwater resources were identified to be 'not at risk' of failing the WFD's requirements for chemical status.

Key Risks – Quantity

The substantial demands on water resources in the region – for drinking water, as well as for agriculture and industry – together with the impacts of climatic changes, can result in water shortages or excess water that can be disastrous.

Meeting demands for water

Water is a valuable commodity, and groundwater in particular is subject to a variety of uses. The Tisza River Basin Analysis 2007 shows that current water supplies are sufficient, and that 85% of transboundary groundwater bodies were determined to be ‘not at risk’ of failing to meet quantity expectations. Of the remaining transboundary groundwater bodies, 3% were identified in Hungary as ‘at risk’ and 12% were identified in Serbia and Ukraine as ‘possibly at risk’.

However, while current reserves are sufficient, there is concern that increasing demands for agricultural irrigation, together with a fluctuating climate, may require additional efforts to manage resources fairly for all the people living in the basin.

Future demand for water

From data on planned water uses, the total annual water demand for the Tisza River Basin in 2015 is estimated to be approximately 1.5 billion m³ – or 5.5% to 6% of the total annual runoff. Water use for irrigation will increase significantly as all Tisza Basin countries plan to upgrade existing irrigation systems and to build new ones. The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities.



Understanding floods and droughts

During the 19th century extensive river training and flood control measures shortened the length of the river by 30% to the 966 km it is today.

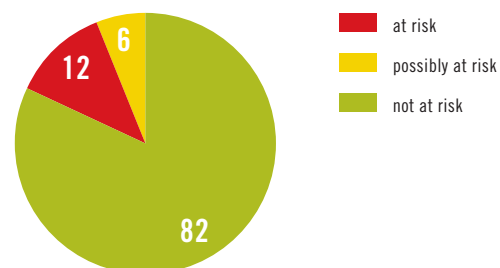
Floods are natural phenomena, but they can turn into disasters causing widespread damage, health problems and even deaths. This is especially the case where rivers have been cut off from their natural floodplains or are confined to man-made channels where houses and industrial sites have been constructed in areas that are naturally prone to flooding. Recent years have seen an increase in extreme events in the Tisza River Basin with devastating results.

Floods in the Tisza River Basin can form in any season as a result of rainstorms and/or snowmelt. The lowland area of the Tisza River Basin can be extensively inundated due to sudden snowmelt, heavy precipitation or as a result of groundwater. This excess water can cause significant damage to agriculture or infrastructure and settlements. In addition, flood waters can also wash pollutants directly into the river, further endangering the ecosystem.

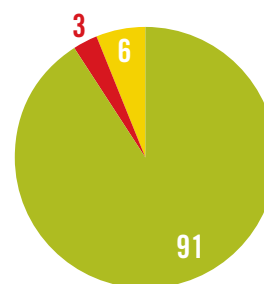
A drought is an extended period of time when a region experiences a shortage of water. Even a short intense drought can cause significant damage to the ecosystem and agriculture and harm the local economy. Water shortages in Serbia and Hungary have caused substantial damage to agriculture in recent years.

Groundwater resources status

Quality



Quantity



The Tisza River Basin reserves of groundwaters are considered to be mainly of good status with regards to quality and quantity. However, predicted increases in demand from irrigation and diffuse pollution from agriculture could threaten this good status if appropriate integrated management actions are not implemented.

The impact of climate change

The effects of climate change cannot be ignored. Recent models of global and regional changes have indicated that significant impacts on the waters of the Tisza River Basin may be expected in the future, in particular:

- Reduced average water flow
- Increase in extreme events such as floods and droughts
- Significant regional and local variations

Climate fluctuations will likely have an impact on the water quality and ecology of the river basin and learning to adapt to extreme events from further changes will be an important challenge for people living in the Tisza River Basin.

Key Solutions & Challenges

Action must be taken collectively to maintain and protect the ecosystem with an integrated river basin management approach combining land and water management, as well as balancing water quality and water quantity.

Working together

The threats to the Tisza River Basin must be addressed and managed through enhanced international planning and measures. The Tisza River Basin Analysis 2007 provides vital information to successfully develop the Integrated River Basin Management Plan.

The Tisza River Basin Management Plan will integrate issues of both water quality and water quantity in a combined approach for land and water management.

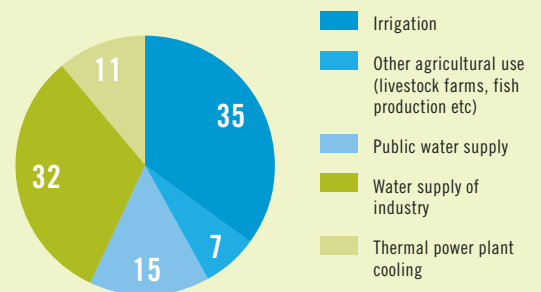
The Tisza River Basin countries have collaboratively prepared the Analysis which will be converted into a plan of action, with support from the EU and other financing institutions. The Tisza countries will then implement the plan under their EU and ICPDR commitments.

Identifying the next steps

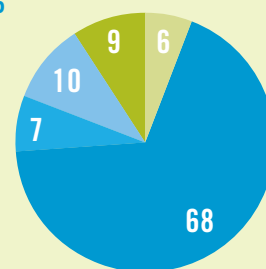
While the Tisza countries have undertaken much work, there are still many areas that need to be addressed to successfully develop a River Basin Management Plan for the Tisza Basin. The Analysis has helped to identify the gaps in data and information that need to be delivered, and the bilateral and multilateral agreements on issues such as determination of risk of failure to meet “good status” and risks related to floods and drought that still need to be completed.

Estimation of consumptive use (present status and scenario for 2015)

present status



scenario 2015



The figures show the main water users of the Tisza River Basin area and their consumptive uses. Agriculture has the highest demand for water (irrigation and other uses). Based on the scenarios, a significant increase for irrigation can be expected in the Tisza River Basin area by 2015.



Water quality evaluation must be improved by:

- Unifying the approaches of risk assessment between countries, as well as providing data (such as results from water quality monitoring) for impact assessment to validate risk estimation
- Refining the assessment of the risk of failing to meet 'good status'
- Improving the monitoring of all parameters required by the WFD

Water quantity evaluation must be improved by:

- Improving data on water uses
- Developing flood maps including flood hazard and risk maps

The management of water quality and quantity must be better integrated by:

- Improving flood risk maps
- Improving inventories of pollution hot spots
- Collecting and organizing information on planned infrastructure projects
- Improving assessments regarding excessive river engineering projects
- Defining minimum flows for ecological quality and pressure criteria



A plan of action for the Tisza River Basin

Through the end of 2007, the Tisza countries have committed to continue bilateral and multilateral discussions to unify assessment methods, finalise the Tisza River Basin Analysis 2007 and to develop a plan of action toward completing the Tisza River Basin Management Plan.

By the end of 2008, the plan calls for:

- Preparation of a draft Tisza River Basin Management Plan for public consultation
- Preparation of a 'Programme of Measures' to address the priority issues of organic, nutrient and hazardous substance pollution as well as the impacts of extensive river engineering
- Validation of risk assessment using the new WFD-compliant national monitoring data
- Compilation of a list of future infrastructure plans and projects

And by the end of 2009, following the public consultation, the plan calls for Tisza countries to complete the final Integrated River Basin Management Plan, including flood-related aspects.

Long-term actions

It is critical to follow up on the work begun in the Tisza River Basin Analysis in order to protect the Tisza ecosystems from pollution as well as from floods and droughts. Success will depend on the dedicated cooperation from all countries and continuing work on long-term actions:

- Implementation of the measures of the Integrated River Basin Management Plan
- Developing strategies and implementing plans to adapt to climate change
- Improving flood risk management within the Tisza River Basin including the restoration of floodplains and wetlands
- Ensuring equitable balances of water resources between the needs of the countries and the environment

Conclusions

With the Tisza River Basin Analysis 2007, the ground has been set for all countries in the basin to work together to manage their land and water operations for the benefit of the environment and the people living in the region.

A milestone for river protection

The Tisza River Basin Analysis 2007 is the analysis of the Tisza Basin environment and impacts on it, toward the fulfilment of the EU Water Framework Directive. As such, it is a major step by the Tisza countries to protect and maintain important resources in the river basin. The report characterises the Tisza River Basin by identifying key environmental and water management problems in relation to water quality and water quantity, and creates the basis for the development of the integrated Tisza River Basin Management Plan by 2009.

Moving beyond expectations

The Tisza River Basin Analysis 2007, supported by an EU grant, has undergone the same process taken by the Danube countries to produce the Danube River Basin Analysis 2004 (Roof Report) at the Danube River Basin level. However, the analysis for the Tisza goes beyond the work of the Roof Report in several significant ways:

- The Tisza River Basin Analysis addresses issues specific to the sub-basin level, such as local mining.
- The analysis includes new data from Ukraine and Serbia, which was previously unavailable for the Roof Report.
- The analysis integrates management issues of both water quantity and water quality to manage both jointly.

Integration of water quality and quantity in land and water planning will be essential. To achieve this success in the Tisza River Basin, countries must work together and with all other partners.



The results of the analysis will be used to develop the Tisza River Basin Management Plan and Programme of Measures for implementation by 2015. Although the analysis shows that there are still many areas where additional work is needed, the Tisza Group and the countries of the Tisza River Basin have achieved significant progress and serve as an outstanding example of cooperation.



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The competent authorities for WFD implementation in the Tisza Countries

Ukraine	Ministry for Environmental Protection, www.menr.gov.ua State Committee for Water Management, www.schw.gov.ua
Romania	Ministry of Environment and Sustainable Development, www.mappm.ro National Administration "Apele Romane", www.rowater.ro
Slovak Republic	Ministry of the Environment, www.enviro.gov.sk
Hungary	Ministry of Environment and Water, www.kvvm.hu
Serbia	Ministry of Agriculture, Forestry and Water Management, www.minpolj.sr.gov.yu

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