
Interim Report on the Implementation of the Joint Program of Measures in the DRBD

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for the Protection
of the Danube River

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zum Schutz
der Donau



Part A – Basin-wide overview

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Disclaimer

The data available in this report has been dealt with, and is presented, to the best of our knowledge. Nevertheless inconsistencies cannot be ruled out.

A more detailed level of information is presented for EU Member States in the national interim reports on the implementation of the programmes of measures. Hence, the “Interim Report on Progress in the Implementation of the Joint Programme of Measures in the Danube River Basin” should be read and interpreted in conjunction with the national reports. Where inconsistencies may have occurred, the national reports are likely to provide the more accurate information.

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List of Acronyms

AEWS	Accident Emergency Warning System
BAP	Best Agricultural Practice
BAT	Best Available Techniques
BEP	Best Environmental Practice
BOD	Biochemical Oxygen Demand
BREF	BAT Reference Documents
CAP	Common Agricultural Policy
CIS	Common Implementation Strategy of the European Commission
COD	Chemical Oxygen Demand
DBA	Danube Basin Analysis
DRB	Danube River Basin
DRBD	Danube River Basin District
DRBM Plan	Danube River Basin Management Plan
DRPC	Danube River Protection Convention
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EFD	European Floods Directive
EG	Expert Group
EIB	European Investment Bank
EPER	European Pollutant Emission Register
E-PRTR	European Pollutant Release and Transfer Register
EQS	Environmental Quality Standards
EU	European Union
EU MS	European Union Member States
FIP	Future Infrastructure Project
GW	Groundwater
GWB	Groundwater Body
HMWB	Heavily Modified Water Body
ICPDR	International Commission for the Protection of the Danube River
IFI	International Financial Institution
IPPC	Integrated Pollution Prevention and Control
JDS	Joint Danube Survey
JPM	Joint Programme of Measures
ND	Nitrates Directive
PE	Population Equivalent
PIAC	Principal International Alert Centres
PPP	Public Private Partnership
PRTR	Pollutant Release and Transfer Register
RBM	River Basin Management
SSD	Sewage Sludge Directive
SWMI	Significant Water Management Issue
TG	Task Group
UWWT	Urban Wastewater Treatment
UWWTD	Urban Wastewater Treatment Directive
UWWTP	Urban Waste Water Treatment Plant
WB	Water Body
WFD	Water Framework Directive

List of Annexes

- Annex 1: Guidance on the interpretation of progress in measure implementation
- Annex 2: Baseline scenario UWWT, IPPC and BAT
- Annex 3: Overview table progress in Urban Wastewater Treatment Development by 2012
- Annex 4: Baseline Scenario Nitrates Directive and BAP from 2005/2006 to 2015 - Status 2012
- Annex 5: Nitrate Vulnerable Zones in the Danube River Basin
- Annex 6: Overview table on agricultural measures
- Annex 7: Progress on measures addressing hydromorphological alterations
- Annex 8: Detailed overview of measures for groundwater

1 Introduction and background

1.1 Introduction

The EU Water Framework Directive (WFD)¹ establishes a legal framework to protect and enhance the status of all waters and protected areas including water-dependent ecosystems, prevent their deterioration and ensure long-term, sustainable use of water resources. The Directive provides an innovative approach for water management based on river basins, natural geographical and hydrological units, and sets specific deadlines for EU Member States (EU MS) to produce Programmes of Measures and River Basin Management Plans.

When the WFD was adopted in the year 2000, all countries cooperating under the Danube River Protection Convention² (DRPC) decided to make all efforts to implement the Directive throughout the whole basin. The non EU Member States committed themselves to implement the WFD within the frame of the DRPC, which represents the legal, as well as political framework for cooperation and transboundary water management in the Danube River Basin (DRB). The International Commission for the Protection of the Danube River (ICPDR) serves as the coordinating platform to compile multilateral and basin-wide issues at the “roof level”³ of the DRB.

In the case of an international river basin district extending beyond the boundaries of the Community as is the case for the DRB, WFD Article 13 (3) requires that “*Member States shall endeavour to produce a single river basin management plan*”. In accordance with this Article, the Danube countries have developed the 1st Danube River Basin Management Plan (DRBM Plan), adopted by the ICPDR in December 2009 and entailing a Joint Programme of Measures (JPM) of basin-wide importance as well as setting the framework for more detailed plans at the sub-basin and/or national level.

Article 11(7) of the WFD establishes that measures have to be made operational by December 2012. Article 15(3) states that, within three years of the publication of each river basin management plan, EU Member States shall submit an interim report to the European Commission (EC), describing progress in the implementation of the planned programme of measures. Even though the WFD does not require an internationally coordinated interim report for the whole basin (Level A) in 2012, the Ministers of the Danube countries asked the ICPDR in the Danube Declaration⁴ of 2010 to coordinate such an interim report in hand (2012 Interim Report), describing progress in the implementation of the Joint Programme of Measures (JPM) and the national programmes of measures by the end of 2012.

1.2 Objective

The objective of the 2012 Interim Report is to provide an overview on the status of measures implementation as included in the JPM of the 1st DRBM Plan. Reference date is a best estimate of the situation towards the end of 2012. Therefore, any reference to the different progress categories

- "not started",

¹ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

² Convention on Cooperation for the Protection and Sustainable Use of the Danube River (Sofia, 1994).

³ At the roof level (Part A), the ICPDR agreed on common criteria for analysis related to the DRBM Plan as the basis to address transboundary water management issues. The level of detail of the roof level (Part A) is lower than that used in the national Part B Plans of each EU MS.

⁴ At the Ministerial Meeting on 16 February 2010, the Danube Declaration was adopted by the Ministers, High Officials and the Member of the European Commission, being responsible for the implementation of the Danube River Protection Convention.

- "ongoing",
- "completed",

is to be understood as referring to the estimated situation towards the end of 2012. A detailed description on the interpretation of the different progress categories is provided in Annex 1.

The focus on measures to be implemented varies from country to country depending on different framework conditions the countries are confronted with. Therefore, the report provides an added value by allowing for a comparable overview on the state of play regarding measure implementation across the whole basin.

Furthermore, there are differences in the approaches amongst the Danube countries towards the implementation of the programmes of measures as part of their national planning processes, and therefore the national parts of the JPM. For instance, the availability of detailed implementation strategies varies for different types of measures and between the countries. The 2012 Interim Report allowed for an exchange on these different strategies during the elaboration process, stipulating an exchange on experience in place and therefore constituting added value on its own.

1.3 Scope and structure

The scope of the 2012 Interim Report is on information with regard to progress in measures implementation. It does not provide information on the effectiveness of the measures, nor about how the environment is expected to improve since this has been reported as part of the 1st DRBM Plan. Information on how the environment has improved in the meantime will be reported as part of the 2013 Update of the Danube Basin Analysis (2013 Update DBA) and the 2nd DRBM Plan to be adopted by the end of 2015.

The structure of the report builds on the structure of the 1st DRBM Plan and therefore the four “Significant Water Management Issues” (SWMI) identified in the frame of the ICPDR for the DRB, that affect directly or indirectly the status of both, surface water and 11 transboundary groundwater bodies of basin-wide importance:

- Pollution by organic substances
- Pollution by nutrients
- Pollution by hazardous substances
- Hydromorphological alterations

For transboundary groundwater bodies, the quantitative and qualitative issues are addressed in the report.

In the 1st DRBM Plan, different levels of detail and different approaches exist on the provision of information on measures addressing the different SWMIs. Due to this, information is provided in a different level of detail in the 2012 Interim Report as well. Where quantitative information was available in the JPM of the 1st DRBM Plan (e.g. in form of tables for hydromorphological measures), the 2012 Interim Report provides quantitative information as well. For other measures of the JPM included in rather qualitative format, the indication of progress in measure implementation is also demonstrated in a qualitative and descriptive form.

Beside the identified SWMIs on which the structure is based on, the report also addresses progress on important issues the ICPDR is working on such as the integration with the sectors navigation, hydropower and flood protection (Chapter 2.1.4.3.4) as well as on other issues, in particular climate adaptation, invasive alien species and sediments (Chapter 2.4).

Lighthouse Projects

For each SWMI and groundwater, the report includes concrete examples on ongoing activities with regard to measures implementation in the DRB, so-called “Lighthouse Projects” (LPs). The aim of LPs is to provide practical examples on the ongoing works in the implementation of measures for the improvement of the environmental conditions. The selection of LPs which are included in the report was agreed to be flexible – LPs do not claim to be best practice examples nor to be trans-boundary projects or of basin-wide relevance – but to be illustrative examples on ongoing activities in the DRB regarding measures implementation.

1.4 Relation to national 2012 Interim Reports

The 2012 Interim Report is based on information from all Danube countries, even though the legal obligation of the WFD to report in 2012 to the EC is binding only for the EU Member States.

For reasons of efficiency and consistency, the data collection for the 2012 Interim Report was harmonised as far as applicable with the national reporting requirements of EU Member States to the European Commission. Therefore, EU data requirements were closely followed and taken into account during the elaboration process. Since the report focuses on information on progress in the implementation of the JPM agreed on the basin-wide scale, further detailed information on the implementation of the national programmes of measures can be obtained from the national reports.

1.5 Relation to 1st and 2nd DRBM Plan

The 2012 Interim Report provides information on progress in the implementation of the JPM as included in the 1st DRBM Plan. However, there exist also clear links to the 2nd DRBM Plan to be elaborated by the end of 2015:

- Measures included in the 2nd DRBM Plan will have to be based on progress previously achieved in measures implementation, on which information is provided in the 2012 Interim Report;
- The exchange of experience on measures implementation in the course of the elaboration of the 2012 Interim Report further facilitates exchange of experience and discussions between the countries on the development of the 2nd DRBM Plan by 2015.

2 Progress in the implementation of the Joint Program of Measures

The 1st DRBM Plan from 2009 focuses on the four identified SWMIs and in addition, the transboundary groundwater bodies of basin-wide importance as a separate item. For each SWMI, the JPM 2009 is structured according to the following sub-chapters:

- Vision and management objectives
- JPM approach towards the 2015 management objectives
- Summary of measures of basin-wide importance

This 2012 Interim Report is based on the JPM but is not repeating its content. For gaining a full picture of the JPM it is necessary to refer to the 1st DRBM Plan.

Specifically for the two SWMIs organic and nutrient pollution, clear inter-linkages exist. Nutrient pollution is – just like organic pollution – mainly caused by emissions from agglomerations, industrial and agricultural activities. Therefore, the implementation of measures in order to reduce for instance

the emissions of organic pollution (e.g. by the development of urban wastewater treatment facilities) also has clear benefits for the reduction of pollution with nutrients. This fact was already taken into account during the elaboration of the 1st DRBM Plan.

In order to estimate the effectiveness of specific measures on basin-wide scale, a scenario approach has been developed which is part of the JPM 2009, relevant for both, organic and nutrient pollution, and to a certain degree also for hazardous substances pollution. Details can be obtained from the 1st DRBM Plan 2009.

2.1 Surface waters: rivers


2.1.1 Organic pollution

Among the most important issues affecting water quality in the Danube River Basin is organic pollution. In order to address this problem, the Danube countries have taken and are taking actions on the national and international level to improve wastewater treatment of cities and industry, and to achieve the ICPDR's basin-wide vision for organic pollution - zero emission of untreated wastewaters into the waters of the Danube River Basin District.

2.1.1.1 Implementation of the Urban Wastewater Treatment Directive (UWWTD)

The implementation of the Urban Wastewater Treatment Directive (UWWTD) in EU Member States and the development of wastewater infrastructure in the non EU Member States are the most important measures to reduce organic pollution in the Danube River Basin by 2015 and also nutrient pollution due to their interactions from the perspective of the WFD river basin planning cycle. The UWWTD includes the concept of setting additional requirements above the standard biological treatment (secondary treatment) of urban wastewater, based on the sensitivity of the receiving waters and their catchments into which they discharge.

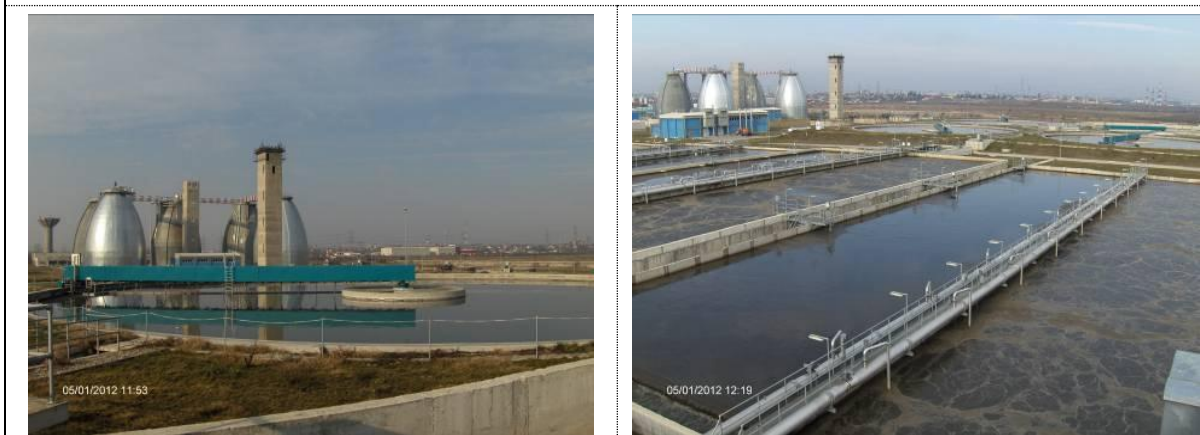
This mainly addresses additional nutrient removal for discharges into waters sensitive to eutrophication. To this extent, the EU Member States could either designate sensitive areas (Art. 5(1)), declare their whole territory as sensitive area or as catchment of sensitive area (Art. 5(8)). Within these areas, either all treatment plants above 10,000 PE (population equivalent) have to comply with limit values stipulated in Annex II of the UWWTD (Art. (5)) or the overall load of total nitrogen and total phosphorus entailing all treatment plants in that area will be reduced at least by 75%. The overview of the Danube countries approach selected for the UWWTD implementation is presented in Annex 2.

	ROMANIA City of Bucharest	Status: Under implementation
Project:	Wastewater treatment plant of Bucharest agglomeration	
<p>The project aims to rehabilitate the urban wastewater treatment plant of Bucharest agglomeration by improving the treatment capacity of the existing facility technically according to national and European legislation (UWWTD). Thus, the main objective is to enlarge the treated sewage flow capacity up to 2.2 Mio. PE with simultaneous reduction of organic pollutants (COD, BOD₅) and nutrients(nitrogen, phosphorus) in wastewater by over 90%.</p> <ul style="list-style-type: none"> ▪ Stage 1 of the project has been successfully implemented by 2011 including the construction of a waste water line treating about 55% of the total sewage flow accompanied by measures regarding the mechanical and biological treatment. Financial requirements in the amount of 108 Mio. Euros have been co-financed by ISPA grants (59%), EBRD and EIB loans (38%) and state budget funds (3%). ▪ Stage 2 with an implementation period of 4 years was started in 2012 and intends to complete the second waste water line treating about 45% of the total sewage flow. Additionally, an incinerator is planned in order to ensure the entire process of sludge management. The investment value of the measures mentioned will cover an estimated sum of 350 Mio. Euros being ensured trough cohesion funds. <p>After completing both stages, the UWWTP will ensure the treatment of the entire wastewater flow of Bucharest</p>		

agglomeration contributing to the pollution reduction in the Danube River District.

For more information please visit: http://www1.pmb.ro/pmb/primar/proiecte/Buletin_informativ_august_2009.pdf

<http://apeepurate.pmb.ro/05.%20Buletin%20informativ%20martie%202010.pdf>



At present, extensive improvements in urban wastewater treatment are under implementation throughout the basin. The total number of agglomerations for which UWWTPs will be/are constructed, upgraded or extended, is indicated in Annex 3. This sum is a bit different than it was indicated in the DRBMP and its Annex 3. Specifically, in the DRBMP a total number of 6,212 agglomerations have been reported, for which UWWTPs will be constructed / rehabilitated by 2015. Due to some changes of the programs of measures made in the national management plans 2009, and also due to rearrangements of agglomerations/agglomeration delineations in some EU Member States according to the WISE Questionnaire 2011 (article 15 UWWTD EU MS reporting to the EC), the countries have sometimes adjusted the number of their agglomerations. Also, the transition period obtained by some EU Member States for the implementation of UWWTD requirements was considered as a funding prioritisation criterion (i.e. Romania: most agglomerations between 2,000 and 10,000 PE will be in line with the UWWTD provisions after 2015, with a transition period being obtained until 2018, and therefore the agglomerations with more than 10,000 PE have a higher priority).

	BOSNIA and HERZEGOVINA	Status: Under implementation
	Municipality of Bijeljina / Republic of Srpska	
Project:	Waste Water Treatment Plant and sewerage system for the Municipality of Bijeljina	
Based on the fact that wastewater has been treated insufficiently in the past, the project aims to improve the present situation by extending the local sewerage system and restoring an old waste water treatment plant. In detail following objectives have been achieved or are currently under implementation:		
<ul style="list-style-type: none"> ▪ Construction of two Main Secondary Collectors including a system of secondary and tertiary sewers to ensure a proper wastewater disposal of 1000 respectively 1500 households by the end of the implementation phase in 2013; ▪ Refurbishment of an old WWTP due to national and EU legislation (Urban Waste Water Treatment Directive and Waste Water Sludge Management Directive) in order to connect up to 10.000 households to the public wastewater system in the year 2025; ▪ Construction of a Primary Collector in 2007 intending to connect the restored WWTP with a pumping station which is currently discharging the wastewater into an irrigation canal. 		
The project with a total amount of 15 Mio. Euro is financed by credits from EBRD, grants from SIDA, EU and IPA and municipal expenditures.		

A number of 555 UWWTPs have already been completed by 2012, and 991 are under construction/rehabilitation or planning, of which 472 are currently under construction. 528 are not started yet (for details see Annex 3). All agglomerations above 10,000 PE under construction or planned in the EU Member States contain tertiary treatment technology for N and P removal. Regarding the generated load planned to be reduced by 32,489,601 PE by 2015, 7,063,373 PE have been already reduced by 2012, which represents 22% of the organic pollution reduction.

2.1.1.2 Implementation of the Integrated Pollution Prevention Control (IPPC) Directive

Organic point source pollution coming from industrial units is partly addressed by the IPPC Directive as well as a number of specialised EU Directives covering specific sectors and specific Best Available Techniques (BAT) regulations. According to the IPPC Directive, authorities need to ensure that measures of pollution prevention and control are up-to-date with the latest developments in BAT for those larger installations falling under the umbrella of the Directive.

The EU Member States have been implementing the IPPC Directive by October 2007, and as of end 2006 over 200 facilities had permits, which were reported to the “European Pollutant Emission Register” (EPER). Romania and Bulgaria have, however, received gradual transition periods up to 2015 for the implementation of the IPPC Directive. Additional facilities would be receiving IPPC permits and implementing BREF up to this date. It is expected that all IPPC facilities in the EU Member States will meet the IPPC requirements according to the legal timelines.

Installations regulated under IPPC may impact the water environment, for instance through direct or indirect discharges of pollutants. IPPC requires installations to operate under conditions defined in permits compliant with Best Available Techniques (BAT), and to respect environmental quality standards established in EU legislation. Therefore, ensuring integration of the implementation of the WFD, UWWTD and IPPC Directives is a challenge in the Danube River Basin. The EU Member States in the DRB have implemented the IPPC Directive (Romania and Bulgaria until 2015) and Croatia has a transition period until 2017. All EU Member States in the basin and Serbia report under the “European Pollutant Release and Transfer Register” (E-PRTR) where information on releases and transfers of pollutants from industrial installations is included. The E-PRTR is a comprehensive online register which contains information on emissions of pollutants to air, water and land by industrial facilities. The new dataset contains information for the year 2010 and updated information for the earlier years 2007 – 2009. The full dataset of E-PRTR is hosted by the European Environment Agency (EEA) in its data service.

2.1.1.3 Implementation of the Sewage Sludge Directive




The progressive implementation of the Urban Waste Water Treatment Directive 91/271/EEC is increasing the quantities of sewage sludge requiring disposal. The Sewage Sludge Directive (SSD) 86/278/EEC seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and human beings. The European Commission is currently assessing whether the current Directive should be reviewed, especially on setting the limit values for heavy metals. The EU Member States are required to report under the SSD every two years.

2.1.1.4 ICPDR BAT industrial sector recommendations

All countries except Bosnia and Herzegovina have implemented BAT in the chemical, food, chemical pulping and papermaking industries (see Annex 2). Further, efforts are taken to continuously implement and update BAT (DE, AT, CZ, SK, SI, HU, RO) or to develop new ones (BA for food industry).

2.1.2 Nutrient pollution

The implementation of the agreed management objectives to achieve the ICPDR's basin-wide vision for nutrient pollution – “*the balanced management of nutrient emissions via point and diffuse sources in the entire Danube River Basin District that neither the waters of the DRBD nor the Black Sea are threatened or impacted by eutrophication*” is done generally through a wide range of measure types: enforcement, codes of good practices, metering and tariffs, awareness raising and education, voluntary agreements.

	BOSNIA and HERZEGOVINA	Status: Completed
City of Odzak / Federation Bosnia and Herzegovina		
Project:	Design, Reconstruction and Operation of a Waste Water Treatment Plant for the City of Odzak	
<p>As the waste water treatment plant of Odzak has been built in the 1990's, it was not able to cope with the growing number of households being connected to the local sewage system any more. This is why the current project aims to extend the existing facility from primary to secondary treatment managing a sewage flow of 10.000 PE and in this context considering the fact that water consumption has increased due to the rehabilitation of the water supply system. To meet the requirements mentioned above and to minimize negative impacts of organic water pollution following measures are currently under implementation:</p>		
<ul style="list-style-type: none"> ▪ Adjustment of the WWTP to secondary treatment accompanied by additional technical measures such as the construction of ▪ A sludge silo & sludge drying beds; ▪ An effluent chlorination plant. 		
<p>Regarding the project funding Bosnia and Herzegovina has received a grant from Global Environmental Facility (GEF) through the International Bank for Reconstruction and Development (IBRD) supporting water quality projects.</p>		
		

Due to the existing strong inter-linkages between the sources of nutrient emissions and measures to reduce respective pollution with those from organic pollution, the program of measures under the implementation in the Danube countries includes measures related to the improvement of wastewater treatment and the application of BAT for industry and agriculture. It also includes measures to control diffuse nutrient pollution, measures to reduce phosphate emissions from household laundry and dishwater detergents, and, finally, measures addressing the nitrogen pollution from atmospheric deposition.

On the basin-wide level, the Danube countries implemented basic measures according to Art. 11 WFD, such as the implementation of the UWWTD and the EU Nitrates Directive (EU MS), but also other voluntary measures contributing to nutrient reduction related to farming practices and land use management having a direct impact on water status. Also information on financing through EU rural development programs was provided.

2.1.2.1 Implementation and enforcement of the EU Nitrates Directive

The EU Nitrates Directive (ND) intends to reduce water pollution caused by nitrates from agricultural sources. Of the plans and strategies identified, the integration of the ND into WFD is central to ensure the legal alignment of the Nitrates Action Programmes (NAPs) and RBMP/PoMs. Since its agreement in 1991, implementation in the Danube countries has evolved (see Annex 4) and as the evidence base has grown in the designation of Nitrate Vulnerable Zones (NVZs) and introduction of a strengthened range of measures in the NAP that farms within NVZs must comply with. NAPs have been established in the EU Member States by either applying the whole territory approach or by applying the programs in the designated NVZs under the Nitrates Directive (see Annex 5). The action programmes include the maximum amounts of animal manure that can be applied to land every year, which is equivalent to 210 kg N per ha for the first NAPs and 170 kg N per ha for the next ones. Also Codes of Good Agricultural Practice (CGAP) must be elaborated and are mandatory in the NVZs and voluntary outside the NVZs.

To ensure that actions are successfully carried out, an implementation framework has been developed, and responsibilities as well as agreed timeframes have been incorporated into specific actions.

Different Danube countries have taken different approaches regarding the designation of NVZs or applying the whole territory approach. The whole territorial approach was applied by Austria, Germany and Slovenia, while in Czech Republic, Hungary, Romania, Slovakia and Bulgaria, NVZs were identified. If a country applies the whole territory approach, this does not necessarily mean that the country's whole territory is a vulnerable zone.

The implementation process of the Nitrates Directive is ongoing in all EU Member States as a continuous activity. If necessary, every 4th year a new action program can be established and should be implemented. The implementation in non EU Member States is within a range of 2019 – 2021 (BA and HR) for its full implementation.

In general, several countries have communicated at least one of the following actions towards the implementation of the Nitrates Directive:




- Update of the Codes of Good Agricultural Practices
- Further designate or enforce Nitrate Vulnerable Zones
- Refine requirements/restrictions related to manure storage, management and application
- Implementation of agricultural measures provided in the action programs
- Implement/enforce controls related to agricultural practices

The **designation of Nitrates Vulnerable Zones** has recently been revised or it is under revision in several countries, and these areas represent an average of 55% of the total agricultural land. In the non EU Member States, even though the NVZs according to the ND are not defined, there are plans where the provisions of the ND can be found in the legislation (HR, RS) or efforts are undertaken within the frame of different agricultural pollution control projects (MD, RS).

Detailed information on the measures implemented under the ND as well as of other measures related to farming practices and land use management are presented in the next sub-chapter.

2.1.2.2 Packages of measures related to farming practices and land use management

The most commonly used technical measures to reduce negative impacts caused by agriculture are input reduction measures, measures addressing diffuse pollution concerning both fertilizer and pesticide use, livestock farming oriented measures focusing on the reduction of impacts from animal rearing, the use of manure as a fertilizer, changes in crop production practices as well as improving drainage systems.

	SERBIA Republic of Serbia	Status: Finalised
Project: Danube River Enterprise Pollution Reduction Project (DREPR)		
<p>The project aims to promote environmentally friendly practices in the Danube River Basin by reducing nutrients being discharged into the Danube River and its tributaries from livestock farms and slaughterhouses. In this context, a package of measures has been implemented including</p> <ul style="list-style-type: none"> ▪ the operation of almost 120 nutrient management plans, the construction of manure tanks as well as the provision of technical equipment supporting appropriate manure disposal. Furthermore a Training Information Centre for farmers and administrative staff has been established. ▪ the accomplishment of a groundwater monitoring in order to achieve a “Good Agricultural Practice”. The data gained from this survey will be then used as a basis for a long term monitoring researching the efficiency of the previous measures. ▪ the realization of several studies (e.g. regarding the adoption and implementation of the Nitrates Directive or measures for pollution reduction from agricultural sources). <p>Financial support will be provided by the GEF Investment Fund for Nutrient reduction in the Black Sea / Danube Basin, the Swedish International Development Cooperation Agency (SIDA) and the European Agency for Reconstruction under supervision of the World Bank.</p> <p>For more information please visit: http://www.drepr.org</p>		
		

Land use interventions in the Danube basin are used to control agriculture input by applying the following measures, grouped, characterised and assessed in Annex 6:

Afforestation of agricultural land has shown a general increasing trend, even in cases with no legal obligations for such measures.

Afforestation of former arable land is currently a common change in land use in many Danube countries (CZ, SI, HU, RO, RS, BG, MD, UA). In addition to wood production, the new forests will provide a variety of environmental services, such as carbon sequestration or improved water quality. At the same time there may be negative impacts, such as reduced groundwater recharge on a long term.

The EU adopted a “Green Paper on Forest Protection and Information”, based on the EU Forest Action Plan. It is important to consider the impacts of climate change on forests, in terms of increase in water stress, risk of storm damage, fire, changes in nutrient balance in soil and migration of tree species as well as other organisms. The result is the loss of carbon and biodiversity.

Restrictions of some agricultural activities on slopes are implemented either as basic measures or as supplementary measures for slopes higher than 10%.

Livestock farming oriented measures through **manure storage capacity**, generally of a period of 2 to 6 months, depending on climatic conditions and on how often manure is applied, according to the

Code of Good Agricultural Practices. In most countries the manure/slurry storage capacity is regulated. The values can differ even within the countries dependant on different regions or on different production (e.g. type of animals). For example DE, AT, HU, HR, RS, SK and BG have 6 months storage capacity, while SK has 12 months when its application is once per year. CZ will also have 6 months as of 2014.

Prohibition periods for applying fertilizer and manure are applied in some cases according to the Action Program for Nitrates Vulnerable Zones, for every locality located in vulnerable zones, considering the local climatic conditions, land use and the timing. They can range between 3 to 6 ½ months depending on crop types and organic fertilizer types. In other cases, the period is generally agreed between 15 October or 1st November until 31st January or 15th February of the following year on arable land, and 15th November until 31st January or 15th February of the following year on grass land.

Avoiding the application of fertilisers and manure to high-risk areas helps preventing the mobilisation and transfer of nitrates and phosphorus to the watercourses. Risk areas can be, for example, areas with flushes draining to a nearby watercourse, cracked soils over field drains or fields with high phosphorus values.

Losses of phosphorus on eroded soil particles and by leaching are greatest on high phosphorus index soils. Applying manure to these areas will increase the phosphorus content of the soil and increase the amounts lost. This method is most effective against losses of phosphorus where the primary mechanism of transport is surface runoff.

Avoiding the spreading of fertilisers and manure during high-risk periods reduces the availability of nitrates for loss through leaching and of phosphorus for loss in surface runoff. High-risk periods can occur, for example, when there is a high risk of surface flow, rapid movement to field drains from wet soils or when there is little or no crop uptake.

Surface runoff risk is greatest when rain falls onto sloping ground with saturated, frozen or snow-covered soils. Rapid flow of nutrients through the soil is most likely to occur from drained soils when they are wet and rainfall follows soon after applying fertilisers. Avoiding the application of nitrogen in autumn reduces the amount of nitrates available for leaching by over-winter rainfall, as implemented for example by HU, CZ, HR, RS or MD.

Limitation of nitrogen and phosphorous application on agricultural land and on grass land are required either according to the Nitrates Directive, with maximum values of 170 kg N/ha, respectively 210 kg N/ha from livestock manure for the first Action Program, or according to the provisions of the Code of Good Agricultural Practice. For instance, in Moldova only mineral fertilizers containing 10 kg N/ha should be applied in order to prevent mineral nitrogen depletion.

The **introduction of the Code of Good Agricultural** practices in line with ND requirements is extensively used by the Danube countries, either based on the whole territory approach (DE, AT, SI), or the Nitrates Vulnerable Zones (CZ, SK, HU, RO, BG). In some countries (HR, RS, MD), implementation in 2013 is under discussion, or to be considered as a recommended action (UA).

As a low input farming measure, **organic farming** is voluntary. In this category, there is a general increasing trend of the area of organic farming in the basin.

Soil erosion caused by water and wind affects both agricultural production and the environment. Loss of soil through erosion of cultivated land is a widespread problem in rural areas. To decrease the risks of soil erosion and improve soil quality, the Danube countries implemented several supplementary measures, such as **buffer stripes** (e.g. in DE, AT, HU, RO, SI, MD or UA) and **erosion-minimizing cultivation systems** (e.g. catch crops, no wide-row crop on soil threatened by erosion) reported in DE, AT, HU, BG or CZ. Several measures to reduce nutrient runoff implemented in the basin also have a positive effect on soil erosion.

Establishment of wetlands, through the creation, maintenance and recovery of wetlands is carried out in several countries (SK, HU, SI, HR, RO, BG, MD and UA). The main purpose of these measures is flood protection, water quality enhancement, and to protect wetlands and habitat areas.

On-farm Nutrient Balances systems are positive, results-oriented policy initiatives in several countries in the DRB. This approach considers the farm as a whole nutrient system, measuring nutrients that enter (such as fertilizer or feed) and leave (such as animals, milk or manure) the farm. The number of farmers that choose for themselves how they attain the determined goal varies between the countries, ranging from 2 to 100%.

Beside technical measures as presented before, several other measures or actions are mentioned in the DRBM Plan and reported by the Danube countries. In this category there are non technical measures such as on **Farm Advice/Extension Services**, which support the implementation of technical measures largely utilized in the Danube countries.

2.1.2.3 Introduction of phosphate-free detergents

The ICPDR has initiated a process to support the introduction of P-free detergents in the Danube countries. Scenarios calculated in the DRBMP show that a ban of phosphate-containing laundry detergents by 2012 and dishwasher detergents by 2015 (Phosphate-Ban Scenario-Nutrients) would reduce the levels of phosphates by approximately 2,000 tons a year to a level of only 5% above the values of the 1960s. This would mean that the management objective by 2015 set forward in the Danube River Basin Management Plan of 2009 related to the reduction of the phosphate load would be almost achieved. Whereas improvements of waste water treatment plants are large, capital-intensive and long-term projects, a ban on phosphates from an early stage of the plan's implementation is considered a fast and efficient measure to reduce nutrient emissions into surface waters.

Ministers of the Danube countries have committed themselves at the Ministerial Meeting in 2010, to initiate the introduction of a maximum limit for the content of total phosphorus of 0.2 to 0.5% P weight/weight, in laundry detergents for consumer use, if possible by 2012 and to work towards a market launch of polyphosphate-free dishwasher detergents for consumer use until 2015.

Alternatives to phosphate based detergents are available. Laundry detergents on the German and Austrian market are almost completely phosphate-free. The Czech Republic permits content of P up to 0.5% of weight in laundry detergents, except for detergents determined for industrial use and agents for dishwashers. Some countries, such as Germany and Austria, successfully reduced, and others, such as Hungary, are decreasing the amounts of phosphates through industry agreements. In Croatia, Serbia, Romania and Ukraine, legislation or voluntary agreements are under development. In other Danube countries such as Bosnia and Herzegovina and Slovenia, the switch to phosphate-free detergents was market-driven.

At the European level, the European Council adopted the Regulation (EU) no 259/2012 of the European parliament and of the Council of 14 March 2012 amending Regulation (EC) No 648/2004 as regards the use of phosphates and other phosphorus compounds in consumer laundry detergents and consumer automatic dishwasher detergents.

The limit value for consumer laundry detergents is set at "0.5 grams of phosphorus per washing process in a standard washing machine" and it will be applicable from 30 June 2013.

The limit value for consumer automatic dishwasher detergents is set at "0.3 grams of phosphorus in a standard dosage" and it will be applicable from 1 January 2017 but is subject to confirmation through a "thorough assessment in the light of the most recent scientific data and taking into account available alternatives to the use of phosphates".

A reduction of phosphate in detergents is expected to have a significant influence on decreasing nutrient loads in the Danube, particularly in the short term before all countries have built a complete

network of sewers and wastewater treatment, and it will not attract additional costs to consumers or governments.

2.1.3 Hazardous substances pollution

The Danube countries have agreed in the DRBM Plan on the basin-wide vision for hazardous substances pollution aiming that “*no risk or threat to human health and the aquatic ecosystem of the waters in the Danube River Basin District and Black Sea waters impacted by the Danube River discharge*”. Danube countries are making much progress in supplementing the insufficient information of the 2009 DRBM Plan, improving the understanding on the magnitude and implications of problems associated with hazardous substances at a basin-wide level, and taken actions in implementing relevant EU Directives, such as the UWWTD and the IPPC Directive, to ensure the reduction and elimination of discharges of the hazardous substances.

In accordance with Article 4 of the WFD, EU Member States should implement the necessary measures in accordance with Article 16(1) and (8) of that Directive, with the aim of progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.

According to Article 5 of the Directive 2008/105/EC on Environmental Quality Standards in the Field of Water Policy (the EQS Directive), EU Member States are obliged to establish an inventory of emissions, discharges and losses of all priority substances and pollutants listed in Part A of Annex I to this Directive.

Pursuant to Article 5(6), technical guidelines for the establishment of inventories are to be adopted in accordance with the WFD regulatory procedure. These guidelines aim to help EU Member States to establish the inventories and to reduce the burden by focusing on substances that are relevant at the River Basin District (RBD) level. European wide comparability of the results is another objective.

Furthermore, the preamble of the EQS Directive (Recital 20) foresees the need to have an appropriate tool for quantifying losses of substances occurring naturally, or produced through natural processes, in which case complete cessation or phase out from all potential sources is impossible.

In addition, the Directive 2008/105/EC requires the EU Member States to improve the knowledge and data available on sources of priority substances and ways in which pollution occurs in order to identify targeted and effective control options.

In response to these requirements and based on the DRBM Plan findings, the main effort carried out by the Danube countries in the reporting period relates to the contribution for the development of the “Technical guidance on the preparation of an inventory of emissions, discharges and losses of priority and priority hazardous substances” in a joint exercise of the EU Drafting Group on Priority Substances under the WFD Common Implementation Strategy (Working Group E). The Water Directors endorsed the guidance without amendment at their meeting on 7-9 December 2011.

It is expected that the inventories would give information on the relevance of priority substances at the spatial scale of the RBD or the national part of an international Danube River Basin, and on the loads discharged to the aquatic environment, thus supporting MS in subsequent river basin management and WFD implementation.

Based on the EU Drafting Group on Priority Substances recommendations, a Danube case study is under the development, based on an agreed concept and timeframe. The objectives of the case study are to make use of the guidelines in preparing national inventories on discharges, emissions and losses in accordance with article 5 of the EQS Directive in the DRB, and to test in a two-step approach the guidelines for specific substances of Danube basin wide relevance.

The first testing phase “Significance analysis” has been completed and it was compiled for all substances based on data on quality monitoring of water, sediment and biota, information on production and use pattern. Initial testing results provided information on the priority substances

causing non-compliance. The result of this analysis will provide a qualitative assessment which will reflect the significance and related reasoning of various relevance of substances found in different Danube countries.

The results of the ongoing second testing phase “**In depth analysis for significant substance**” will identify the national used methodology applied for the relevant substance, facilitate the basin wide compilation of substances which are basin wide significant or regional/local significant, propose methods for analysis for each substance, and provide advice on the monitoring needs of substances where data gaps exist (possibly via the Joint Danube Survey 3).

The final outcome of the case study would be the achievement of a thorough priority substances reduction planning process at national level. This will be beneficial for facilities to develop rigorous plans to reduce their use and creation of priority toxic substances and substance groupings, examine the use and creation of substances throughout their facility, and to methodically evaluate all areas where toxic substance reduction options could be implemented.

After the finalization of the case study, the countries will develop the harmonised, comparable and coordinated basin wide inventories of priority substances linked with the E-PRTR reports and update the existing ICPDR List of Priority Substances.

Measures to prevent and control accidental pollution

A better structure to the reporting obligations on a basin wide scale is proposed to ensure an efficient system for exchange of information needed to prevent accidents and to provide information during accidents through:

- (i) new templates available for inventories of the Accident Sites, Contaminated Sites and Mining Sites.
- (ii) involvement of all countries in the preparation of the inventories,
- (ii) establishment of a procedure to ensure a permanent update of national reports,
- (iii) ensuring a procedure to check the criteria, the ranking and assessment results of the risk sites done at the national level, and
- (iv) prepare yearly reports on accidental pollution events for each country and a basin wide compilation with all risk sites visualized in maps.

It is expected that the updated inventories shall provide a clear picture on the potential risk sites as well of the possible targets to reduce and control accidental pollution.

An evaluation of the quality and quantity of prevention measures, or of the safety rating of the Accident Risk Sites concerned, is ongoing.

Lessons learned from the major accidents in 2010

The Ajka spill revealed the need for quick communication of data on an accident to downstream countries, as well as maintenance and upgrade of facilities to prevent future accidents. It is extremely important that a rapid reaction of ICPDR’s Accident Emergency Warning System (AEWS) helps during accidents to create confidence and avoid any suspicions of hiding facts. The reaction time between an accident and its perception by the Principal International Alert Centres in the Danube River Basin (PIAC) must be minimized. 24/7 PIAC operation is essential for ensuring this.

2.1.4 Hydromorphological alterations

In the 1st DRBM Plan, hydropower generation, navigation and flood protection, next to others, were identified as the key water uses that cause hydromorphological alterations, resulting in the following key hydromorphological pressure components of basin-wide importance which are addressed by the JPM:

- a) Interruption of river and habitat continuity;
- b) Disconnection of adjacent wetlands/floodplains;
- c) Hydrological alterations.

In addition, potential pressures that may result from future infrastructure projects are also dealt with in the JPM.

The starting point for the assessment are the measures indicated for each of the pressures as included in the JPM. The planned measures are again summarised in the respective overview tables on progress in measure implementation (Table 1 to Table 4). However, since further updates and developments on the national programmes of measures were performed following the final data collection for the 1st DRBM Plan, updated information on the finally agreed measures for each of the pressures are included additionally in the tables, being the basis for the assessment of progress in measures implementation. Updates were in particular made due to the following reasons:

- Development of national prioritisation concepts, concrete localisation of measures in addition to those reported under the JPM and functionality checks of already existing measures (e.g. in case of river and habitat continuity interruptions for fish migration);
- Further developments of assessment methods (for status and GEP) and corrections in the aggregation of information (e.g. in the case of wetlands/floodplains, impoundments and water abstractions);
- Agreement on measures following the reporting deadline for the 1st DRBM Plan (e.g. in case of wetlands/floodplains).

Several countries indicated that for different measures which are under implementation, feasibility studies were already conducted as well technical, administrative or public procurement procedures were launched following an accomplished planning and licensing phase.

Different reasons were indicated causing delays in measure implementation, including the lack of financial resources or difficulties in solving issues related to ownership questions. Also the dependency on decisions related to the improvement of the Danube for inland navigation was indicated, next to the need for further assessments (e.g. on ecological flow requirements).

2.1.4.1 Interruption of river and habitat continuity

As indicated in the JPM, the overall goal for the restoration of river and habitat continuum is free migration routes for fish in the DRBD rivers with catchment areas >4,000 km², as this will be crucial for achieving and maintaining good ecological status/potential for the future. As a result of the objective setting undertaken on the national level, the Danube countries have reported on the measures that will be undertaken by 2015 to ensure fish migration, e.g. by the construction of fish migration aids. Measures that are taken are intended to ensure upstream migration of fish as well as supporting fish protection and downstream migration, next to helping to improve the migration of other fauna.

932 interruptions, forming a migration barrier, are located in the DRBD, of which 56 are located in the Danube River itself. In the JPM it is indicated that by 2015, 108 fish migration aids will be constructed that should ensure the migration of all fish species and age classes according to best available techniques. For the remaining continuity interruptions, either exemptions according to WFD Article 4(4) and 4(5) have been applied or the status will have to be clarified. For some cases it was indicated in the JPM that measures may not be necessary as the ecological status/potential is already achieved in 2009 despite the presence of a continuity interruption.

Table 1 and Figure 1 provide an overview on progress in the implementation of measures for the improvement of river and habitat continuity as well as on updated information on the number of finally agreed measures on the national level.

Measures on river and habitat continuity interruptions					
Number of measures to be implemented by 2015		Implementation status by end 2012 (reference to measures as agreed on national level)			
Indicated in the 1 st DRBM Plan	Updated information as agreed on national level	Not started	Planning on-going	Construction on-going	Completed
108	136	5.1%	77.1%	9.6%	7.4%

Table 1: Overview table on progress in measures implementation for the improvement of river and habitat continuity

In total, 108 measures were indicated in the 1st DRBM Plan, whereas 136 measures were reported by the Danube countries to be finally agreed on national level to be implemented by 2015. By the end of 2012, 7.4% of the agreed measures are already completed and 9.6% of the measures are in the construction phase. For the majority of measures - 77.1% - the planning process is on-going, while for 5.1% of the agreed measures the implementation process was not started but implementation is still intended by 2015. Further details on the agreed measures and the implementation status for each of the Danube countries can be obtained from Annex 7.

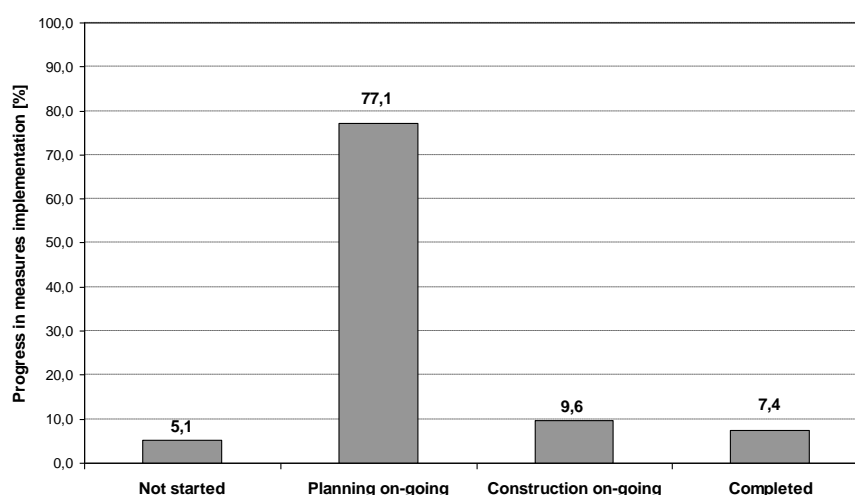



Figure 1: Implementation status of measures on the restoration of river and habitat continuity

	AUSTRIA	Status: Under implementation / realised
	Upper & Lower Austria	
Project:	Program to enhance production of renewable energy from small hydropower accompanied by measures to improve the ecological status of rivers	
	Two revitalization programs have been initiated in two Austrian provinces to improve the efficiency and environmental sustainability of electricity production from hydropower. Thus, the projected steps include	
	<ul style="list-style-type: none"> ▪ the refurbishment of existing facilities considering ecological measures (i.e. fish passes, ecological minimum flow) by providing financial support and consultancy of technical experts, as well as ▪ the installation of new hydropower plants replacing old ones by ensuring BAT and BEP. 	
	Achievements of the Revitalization Program in Upper Austria (2009):	
	<ul style="list-style-type: none"> ▪ Between 2004 – 2009, 258 small hydro power plants have been modernized, beside 56 plants which have been completely new installed replacing old ones; 	

- Considerable ecological improvements of rivers in Upper Austria have been achieved while at the same time renewable energy production was significantly increased on average by more than 40%;
- The program in the amount of 5 million Euros triggered a total investment of 45 million Euros (1:9);

Same results can be expected for the program in Lower Austria, where a similar project is currently under implementation.

For more information please visit: www.kleinwasserkraft.at



Kraftwerk Agonitz © Energie AG Oberösterreich

	SLOVAKIA	Status: Realised
Region of Stredné Slovensko / Town of Lubeník		
Project:	Restoring the longitudinal continuity of the Muráň river	
<p>Although the Muráň river in general is perceived a well-preserved river, some stretches were degraded in the past due to the construction of several weirs for industrial purpose having negative impacts on the riverine ecosystem.</p>		
<p>As the area is well known for several important species (e.g. Carpathian brook lamprey and thick shelled river mussel), restoration measures have been implemented, including</p>		
<ul style="list-style-type: none"> ▪ Weir removal at Revúčka Lehota (difference in water level: 1.7 m) and replacement by a low gradient rough slide; ▪ Placement of several boulder lines into regulated river stretches. 		
<p>Especially the removal of the barrier at Revúčka Lehota was an important step towards the restoration of the river continuity and the improvement of the river morphology as it was preventing seven fish species from access to their former natural habitats upstream of the weir.</p>		
<p>To further improve the ecological status further measures are already planned for the closer future (e.g. restoration of oxbow lakes).</p>		
<p>For more information please visit: www.muranska-planina.sk</p>		
		

Update ecological prioritisation approach for continuity restoration in the DRB

In order to support decisions on measures to restore river and habitat continuity in an ecologically efficient way at the basin-wide scale, the ICPDR developed an ecological prioritisation approach for

continuity restoration in the Danube River Basin. This approach is part of the DRBM Plan⁵ (Annex 18). The ICPDR was asked in the Danube Declaration 2010⁶ “to further develop and make full use of the ecological prioritisation approach for measures to restore river and habitat continuity”. Work on the update of the approach is currently ongoing. The updated approach is planned to be included in the update of the Danube Basin Analysis according to Article 5 of the WFD.

Feasibility study to re-open the Iron Gate Dams for free fish migration

One specific challenge with regard to addressing river and habitat continuity interruptions in the DRB are the Iron Gate dams I & II at the border between Romania and Serbia. They represent the first impassable obstacles for fish migration along the River Danube from the Black Sea. Restoration of river continuity at these sites would re-open a reach of more than 800 km, providing access to habitats and spawning grounds along the Danube and its tributaries for sturgeons and other migratory fish species. Therefore, the reconnection of the historic migration routes at the Iron Gate dams (via appropriate measures such as fish migration aids) is an important step helping to restore the Danube fisheries and improving water status.

Due to the very particular challenge at the Iron Gate dams (size of the structures and transboundary relevance), the ICPDR is actively facilitating to find appropriate solutions. The 1st DRBM Plan indicates that as a first step a feasibility study on the possibilities of measures which can be taken to restore fish migration should be performed. In a second step, based on the results of the feasibility study, respective technical measures are planned to be implemented.

A scoping mission to the Iron Gate dams on possibilities to ensure fish migration was performed in May 2011 with representatives from FAO, Romania, Serbia, the ICPDR and external experts. Work on securing the necessary funding for the feasibility study is ongoing.

The importance of the issue is also highlighted in the frame of the EU Strategy for the Danube Region (EUSDR), with the feasibility study included as a project in the EUSDR Action Plan⁷, and a specific target on sturgeon conservation under Priority Area 6 ‘Biodiversity’ - to “*Secure viable populations of Danube sturgeon species and other indigenous fish species by 2020*”. In order to facilitate the achievement of this target, the ‘Danube Sturgeon Task Force’ (DSTF) was established in the frame of the EUSDR, indicated to have the “*potential to become a flagship activity in the environmental pillar of the EUSDR*”⁸. The DSTF comprises of relevant stakeholders, including experts from the Danube countries and the ICPDR, cooperating to reactivate and implement the Danube Sturgeon Action Plan from 2005⁹, adopted by all Danube countries under the Bern Convention.

2.1.4.2 Disconnection of adjacent floodplains / wetlands

The 1st DRBM Plan concluded that 80% of the former wetlands in the DRBD are considered to be disconnected, in particular due to the expansion of agricultural uses and river engineering works concerning mainly flood control, navigation and power generation. Therefore, significant restoration efforts and measures are needed, facilitating the achievement of WFD objectives by helping to improve biological parameters.

In the 1st DRBM Plan, 95 wetlands/floodplains (covering 612,745 ha) with potential to be re-connected to the Danube River and its tributaries have been identified in 2009. From the 612,745 ha,

⁵ http://www.icpdr.org/participate/sites/icpdr.org.participate/files/DRBM_Plan_2009_Annexes.pdf

⁶ <http://www.icpdr.org/main/sites/default/files/Ministerial%20Declaration%20FINAL.pdf>

⁷ http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/danube/action_plan_danube.pdf

⁸ Report to the European Commission. Implementation of the EUSDR Priority Area 6 to preserve biodiversity, landscapes and the quality of air and soils. Reporting period 13 April 2011 – 30 June 2012.

⁹

<https://wcd.coe.int/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=1304173&SecMode=1&DocId=1440994&Usage=2>

62,300 ha were indicated in the JPM to be reconnected to DRBD rivers by 2015, whereas an area of 45,308 ha will be reconnected to the Danube River itself. Due to the application of WFD Article 4(4), further efforts on the re-connection of floodplains / wetlands are expected within the second and third RBM cycles.

Table 2 provides information on progress in the implementation of measures addressing disconnected adjacent floodplains / wetlands with regard to the number and area to be reconnected or where the hydrological regime is improved. The table was updated on finally agreed measures on the national level to be implemented by 2015.

Since an adjacent floodplain / wetland might require several measures for reconnection and improvement of the conditions, the column “completed” provides in addition information on floodplains / wetlands where some of the required measures were already completed but further measures are planned (“partly reconnected”). In case all measures for a certain floodplain / wetland are already implemented, this is indicated in the tables with “totally reconnected”. This definition helps to further clarify the actual situation regarding floodplain / wetland reconnection and the implementation of measures for the improvement of the hydrological regime. However, it can be the case that significant shares of certain floodplains / wetlands, which are indicated to be “partially reconnected”, are not yet benefiting from measures.

Figure 2 illustrates progress in measures implementation with regard to the percentage of the areas being in certain implementation stages with the target date end of 2012.

Measures on disconnected adjacent floodplains / wetlands						
Measures to be implemented by 2015		Implementation status by end 2012 (reference to measures as agreed on national level)				
Indicated in the 1st DRBM Plan	Updated information as agreed on national level	Not started	Planning on-going	Construction on-going	Completed	
					Partially re-connected	Totally re-connected
Number of adjacent floodplains / wetlands						
11	11	0 (0%)	1 (9.1%)	1 (9.1%)	6 (54.5%)	3 (27.3%)
Area of adjacent floodplains / wetlands						
62,300ha	62,300ha	0 ha (0%)	330 ha (0.5%)	9,895 ha (15.9%)	46,544 ha (74.7%)	5,531 ha (8.9%)

Table 2: Overview table on progress in measures implementation on disconnected adjacent floodplains / wetlands

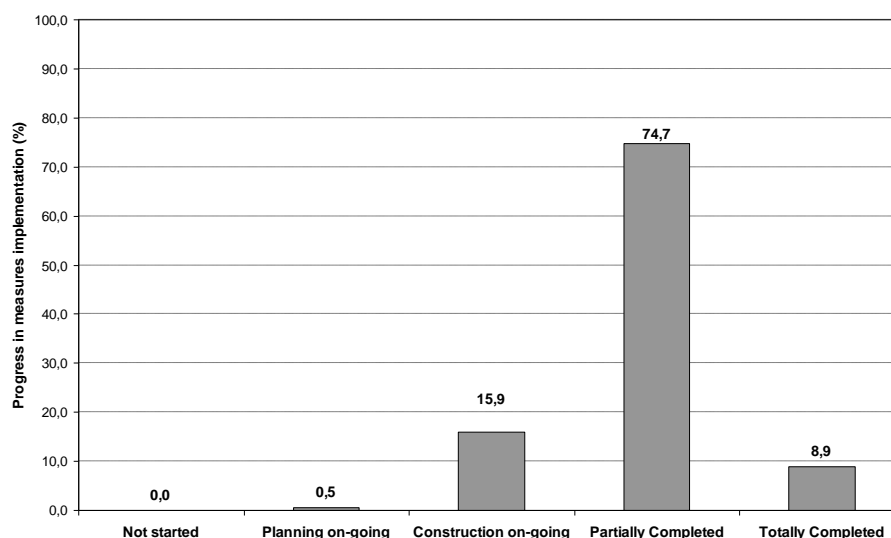



Figure 2: Implementation status measures on disconnected adjacent floodplains / wetlands (based on the area)

In total, 11 adjacent floodplains / wetlands, covering an area of 62,300 ha, were indicated in the 1st DRBM Plan to be addressed by measures by 2015.

By the end of 2012, the required measures for reconnection were completed for 3 adjacent floodplains / wetlands, covering an area of 5,531 ha, and some of the planned measures have already been implemented but not the whole range of required measures for reconnection fully completed for 6 adjacent floodplains / wetlands, covering an area of 46,544 ha. Construction works are ongoing for one floodplain / wetland with an area of 9,895 ha and one floodplain / wetland, or the reconnection of an area of 330 ha, is currently in the planning phase.

Further details on the agreed measures and the implementation status for each of the Danube countries can be obtained from Annex 7.

Finally, to determine the implementation steps for restoration and reconnection of lost floodplains and wetlands along the Danube River and its tributaries, the development of a priority ranking, taking into account flood retention, nutrient reduction and wetland/floodplain re-connection, is indicated in the DRBM Plan. Discussions on this issue are ongoing in the frame of the ICPDR.

	GERMANY	Status: Realised
	Neuburg - Ingolstadt (Bavaria)	
Project:	Dynamic Development of Danube Wetlands between Neuburg and Ingolstadt	
<p>The Danube floodplain between Neuburg and Ingolstadt is with its 2,100 ha one of the largest remaining alluvial forests in Germany, but has lost a lot of its natural dynamic in the 19th and 20th century due to river regulation measures. Thus, the current project aims to improve river continuum and flood plain dynamics by implementing a package of different measures including the</p> <ul style="list-style-type: none"> ▪ Construction of a water outlet upstream of Bergheim barrage into a new 8 km bypassing river system; the discharge of 2-5 m³/s creates new stream habitats and establishes the longitudinal continuity in the Danube ▪ Construction of a 2nd outlet upstream of Bergheim hydropower station assuring frequent controlled floodings (average 2 to 3-times per year, 20 days mean duration) with a maximal discharge of 25 m³/s and a flooded area of about 100 ha; this provides a reconnection of the Danube with the adjacent alluvial forest ▪ Artificial depression of the ground water table in the lower flood plain at low water level in the Danube to simulate 		

natural fluctuations of the ground water using a new built 1.5 km long drainage ditch

The project with a total investment of 15 Mio. Euro is accompanied by a monitoring programme to evaluate the efficiency of the measures taken.

For more information please visit: http://www.wwa-in.bayern.de/fluesse_seen/massnahmen/mass05/index.htm



	<p>SLOVENIA</p>	<p>Status: Realised</p>
	<p>Prekmurje / Murska Sobota</p>	
<p>Project:</p>	<p>Conservation of the biodiversity of the Mura river in Slovenia</p>	
<p>The main objective of the project is to restore the ecological character of the Mura river corridor ensuring the conservation of existing natural resources and maintaining local biodiversity. To meet the needs of wetland ecology, several activities of technical character have been performed on a 15.2 km² large flood area of the Mura River. Implemented measures include:</p>		
<ul style="list-style-type: none"> ▪ Connection of the main river channel with the side branches including their sustainable restoration and maintenance; ▪ Installation of smaller inflow / outflow structures and mechanism (wooden lock lifters, openings) along the oxbow lakes and branches; ▪ Lifting of the water level in the main channel to guarantee water inflow into the side branches also at times of average and lower discharges; ▪ Widening of the main channel to promote natural succession including erosion of river banks and development of gravel bars; ▪ Implementation of sustainable alluvial forest maintenance. 		
<p>For more information please visit: www.biomura.si</p>		

2.1.4.3 Hydrological alterations

As shown in the pressure analysis and assessment of the 1st DRBM Plan, hydrological alterations impact the status of water bodies due to different reasons, including alterations and reductions of flow velocities and the flow regime or alterations in quantity and flow dynamics of rivers. The main pressure types in the DRBD causing hydrological alterations are in numbers: 449 water bodies affected by impoundments, 140 water bodies by water abstractions and 89 water bodies affected by hydropowering. Therefore it was concluded that hydrological alterations are key pressures that require measures on the basin-wide scale.

Most of the impounded water bodies are designated to be heavily modified and the good ecological potential (GEP) has to be achieved, what is also the case for water bodies affected by hydropowering. Regarding water abstractions, discharges of a minimum ecological flow are foreseen, ensuring that the biological quality elements are in good ecological status respectively good ecological potential.

Overall, the JPM foresees that 139 measures to improve impacts on water bodies caused by hydrological alterations will be implemented by 2015. Details on progress in measure implementation will be addressed in the individual sub-chapters on each pressure type.

2.1.4.3.1 Impoundments

Impoundments are caused by barriers that - in addition to interrupting river/habitat continuity – alter the upstream flow conditions of rivers. The character of the river is changed to lake-like types due to decrease of flow velocities and eventual alteration of flow discharge. Possible measures which can be taken to improve the environmental situation are for instance, apart from ensuring fish migration at the barriers, in particular morphological measures like the restoration and revitalisation of habitats and river banks, the diversification of channel profiles but also the reconnection of backwaters or modifications in the operation of facilities.

52 measures are indicated in the JPM to be implemented by 2015, addressing impoundments. Table 3 provides an overview on progress in measure implementation by the end of 2012.

Measures on impoundments					
Number of measures to be implemented by 2015		Implementation status by end 2012 (reference to measures as agreed on national level)			
Indicated in the 1 st DRBM Plan	Updated information as agreed on national level	Not started	Planning on-going	Construction on-going	Completed
52	52	13.5%	82.7%	3.8%	0%

Table 3: Overview table on progress in measures implementation on impoundments

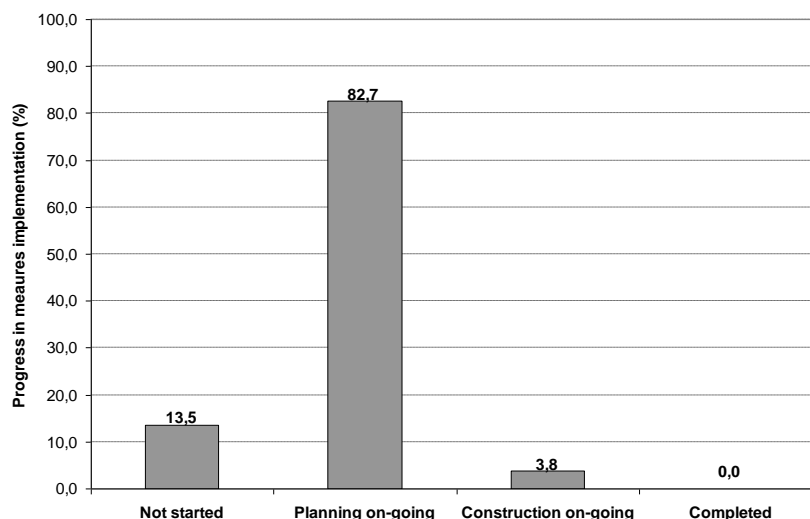



Figure 3: Implementation status measures on impoundments

In total, 52 impoundments were reported to be improved by 2015, whereas by the end of 2012 for none of the agreed measures the implementation was already completed but 3.8% are in the construction phase. The major share of measures on impoundments is with 82.7% still in the planning phase and for 13.5% of the measures implementation was not started by the end of 2012 (see Figure 3).

Further details on the agreed measures and the implementation status for each of the Danube countries can be obtained from Annex 7.

	SLOVENIA	Status: Under implementation
	Štajerska / Maribor	
Project:	Bank revitalization on the Ptujsko jezero accumulation	
<p>The 'Ptujsko jezero' impoundment is located on the Drava River downstream from Maribor and is the largest impoundment in Slovenia. It was built in 1979 with hard engineering materials – banks were reinforced with asphalt bank protection.</p> <p>Currently, bank revitalization is ongoing and under construction. The main objectives of the project can be summarised as follows:</p> <ul style="list-style-type: none"> ▪ To stop further degradation of existing bank protection due to water level fluctuation; ▪ To minimize the amount of silt sediment in the impoundment, silt is used in the revitalization procedure. First a wall of wood is set at the bank, followed by silt which is pumped on the bank and planted with riparian vegetation. After some time the wall of wood decomposes and riparian vegetation assures additional bank stabilization (see pictures below); ▪ To improve habitats for key animal and plant species (the whole impoundment is within a Natura 2000 area); ▪ To increase the aesthetic value of the impoundment with a higher potential for recreation and tourism. <p>For more information please visit: www.dem.si</p>		



2.1.4.3.2 Water abstractions

In the 1st DRBM Plan, the key water uses causing significant alterations through water abstractions were identified as mainly hydropower generation, agriculture and forestry respectively irrigation and public water supply. Furthermore, other uses such as cooling water, manufacturing industry and navigation were also indicated. These abstractions significantly reduce the flow and quantity of water and impact the water status in case where the minimum ecological flow of rivers is not guaranteed.

The pressure analysis concluded that 140 water abstractions cause alterations in water flow in DRBD rivers, whereas 42 measures were indicated in the JPM to be implemented by 2015. Table 4 provides an overview on progress in measure implementation by the end of 2012. The table was updated on finally agreed measures on the national level to be implemented by 2015.

Measures on water abstractions					
Number of measures to be implemented by 2015		Implementation status by end 2012 (reference to measures as agreed on national level)			
Indicated in the 1 st DRBM Plan	Updated information as agreed on national level	Not started	Planning on-going	Construction on-going	Completed
42	42	16.7%	73.8%	4.8%	4.8%

Table 4: Overview table on progress in measures implementation on water abstractions

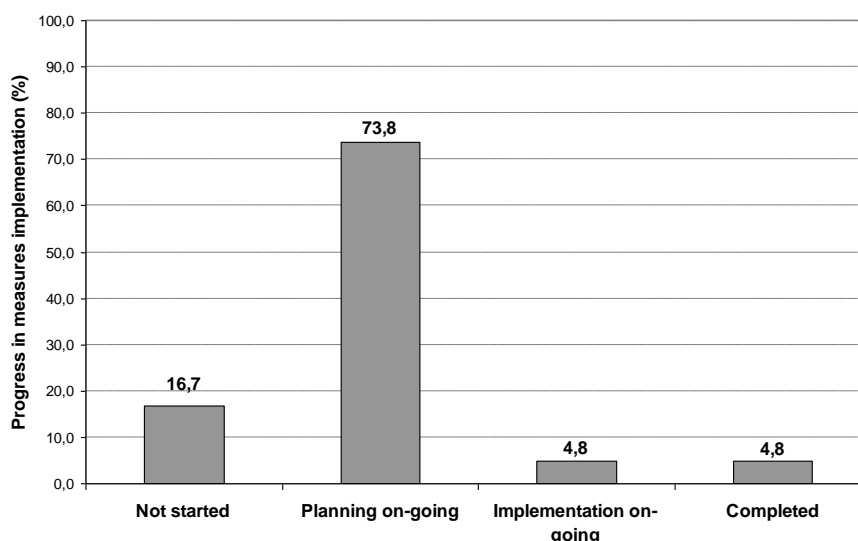


Figure 4: Implementation status measures on water abstractions

In total, 42 measures were indicated in the 1st DRBM Plan to be implemented by 2015. By the end of 2012, for 4.8% of the agreed measures the implementation was completed. 4.8% of the measures are in the construction phase and the majority of measures is with 73.8% in the planning phase. For 16.7% of the measures the implementation phase was not started yet (see Figure 4).

For measures where planning is currently on-going, studies on ecological flow requirements at existing water uses were reported to be undertaken. The results of these assessments will feed into the negotiations on residual flows downstream of existing water abstractions.

	CZECH REPUBLIC	Status: Under implementation
	South Moravia Region	
Project:	Rehabilitation of a raceway to increase the minimum residual water flow to the Dyje river	
Initial point for the implementation of the project is the operation of the “Vranov nad Dyjí” Hydropower Plant and its negative impacts on the ecosystem of the Dyje river (Thaya) in the National Park Podyjí (Thayatal) due to water abstraction.		
To ensure that sufficient water is restored to the river especially during the peak operation of the hydropower plant, a package of measures is currently being realized, including the restoration of a former mill race.		
Thus the measure mentioned above aims to increase the amount of water being transferred from the weir impoundment in Vranov to the Dyje river to positively affect the hydrological as well as the hydromorphological conditions of the river system.		


2.1.4.3.3 Hydropeaking

Hydropeaking is a pressure type that occurs by generation of peak energy supply by hydropower stations. Altered flow regimes below hydropower plants occur in 89 water bodies of the DRBD. Out of those, 32 are causing significant water level fluctuations larger than 1 metre/day below a hydropower plant (or less in the case of known negative effects on biology). 3 measures addressing hydropeaking were reported by Austria in the JPM to be implemented by 2015.

Water bodies affected by hydropeaking in Austria are mostly fulfilling the requirements according to WFD Article 4(3) and are therefore designated as heavily modified water bodies (HMWB). Usually there is a lack of space in the alpine valleys to build a balance reservoir to achieve good status in the respective river stretch. There are some project ideas to build new hydropower stations which - as an additional effect to electricity generation - also contribute to decrease the existing hydropeaking effects on ecology considerably.

As the knowledge about restoration measures which increase the ecological situation significantly is generally low (including Austria), the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, together with the hydropower sector, commissioned a scientific study in 2010 to investigate the most cost effective measures, taking into account the most common hydropeaking situations in the Austrian rivers.

The outcome of the study will be the main basis to clarify whether the good ecological potential is already achieved in Austrian water bodies where hydropeaking can be observed, or if additional cost-effective measures are required which do not have an adverse effect on peak load production.

	AUSTRIA Nation-wide relevance	Status: Under implementation
Project:	HyTEC - Hydromorphological and Temperature Experimental Channel	
<p>In Austria, river stretches with a total amount of 785 kilometres are negatively affected by the impacts of hydropeaking. Referring to this, the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, in collaboration with the hydropower sector, commissioned a scientific study in order to elaborate appropriate measures for improvement and to meet the requirements of a “good ecological status” in 2015 as requested by the EU Water Framework Directive.</p> <p>The study, which is developed by the University of Natural Resources and Life Sciences Vienna (Institute of Hydrobiology and Aquatic Ecosystem Management), will be finalised in March 2013 and costs around EUR 800,000.</p> <p>It pursues two main objectives:</p> <ul style="list-style-type: none"> ▪ ecological assessment of hydropeaking effects on aquatic biocenosis (Part I) and ▪ conducting of hydropeaking experiments in two testing channels in the field (Part II); <p>Part I is supposed to give an overview of existing pressures and data regarding hydropeaking in Austrian rivers. Therefore, a database is set up and possible information deficiencies on fish ecology and riverine benthos are eliminated in order to guarantee a comprehensive analysis of hydropeaking impacts on aquatic living conditions.</p> <p>Part II of the project aims to research the impacts of hydropeaking on fish life and benthic invertebrates by creating artificial surge/downsurge situations in two testing channels as certain effects cannot be assessed on the affected river sections themselves.</p> <p>The results of both parts being complemented by the outcomes of other national and international hydropeaking projects will be the basis for the development of recommendations and measures for the improvement of affected water bodies.</p> <p>For further information please visit: http://hydropeaking.boku.ac.at/hytec.htm</p>		



2.1.4.3.4 Future infrastructure projects

As analysed in the 1st DRBM Plan, future infrastructure projects (i.e. navigation, hydropower, flood protection) may have negative impacts on water status and need to be addressed accordingly. In order to prevent and reduce basin-wide and transboundary effects from future infrastructure projects in the DRBD, the development and application of BAT and BEP is crucial. For new infrastructure projects, it is of particular importance that environmental requirements are considered as an integral part of the planning and implementation process, beside the involvement of stakeholders right from the beginning.

The intention of developing respective processes and guidance documents in this regard is indicated in the 1st DRBM Plan. Such a process was already started for the navigation sector (Joint Statement) but similar approaches were launched in the frame of the ICPDR in the meantime.

Sector dialogue inland navigation

The ICPDR initiated in cooperation with the Danube (Navigation) Commission and the International Sava River Basin Commission a cross-sectoral discussion process involving all relevant stakeholders and NGOs, which led to a “Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin”¹⁰. In October 2007, the “Joint Statement” was concluded and subsequently agreed by the three commissions involved.

As a follow-up, in the frame of the PLATINA project¹¹, an FP7 project consisting of 23 partners from nine different countries, the “PLATINA Manual on Good Practices in Sustainable Waterway Planning” was developed. The preparation of the manual was executed from 2008-2010, including desk studies, expert reflections and several stakeholder consultations. The Manual presents best practice examples on ecological waterway management that are in line with the Joint Statement and the Danube River Basin Management Plan.

Annual meetings took place aiming at an exchange on gained experience with the implementation of the Joint Statement and the facilitation of integrated planning approaches by taking environmental requirements into account from the beginning.

Guiding Principles on Sustainable Hydropower Development in the Danube Basin

The fact that future hydropower development offers additional reduction potential for greenhouse gas emissions but at the same time may cause negative impacts on the riverine ecology was recognised by Danube countries, imposing the requirement of a sustainable, balanced and integrated approach.

¹⁰ <http://www.icpdr.org/main/activities-projects/joint-statement-navigation-environment>

¹¹ <http://www.icpdr.org/main/activities-projects/eu-platina-project-platform-implementation-naiades>

Acknowledging the challenge of sustainable hydropower development in the frame of the existing legal and policy framework, the ICPDR was asked in the Danube Declaration 2010¹² “to organise in close cooperation with the hydropower sector and all relevant stakeholders a broad discussion process with the aim of developing guiding principles on integrating environmental aspects in the use of existing hydropower plants, including a possible increase of their efficiency, as well as in the planning and construction of new hydropower plants”.

The “Guiding Principles on Sustainable Hydropower Development in the Danube Basin” are currently developed in the frame of a number of expert meetings and workshops and will support the Danube countries in identifying clear criteria and principles to meet the requirements of sustainable hydropower development by taking into account environmental and water protection requirements.

Sector dialogue River Basin Management – Flood Risk Management

The WFD CIS policy paper on WFD and Hydromorphological pressures¹³ declares that flood risk management is probably the policy with the best potentialities for synergies with other aspects of water management, provided that adequate strategies are implemented.

In some cases, traditional engineering solutions (dams, channelization or dykes) have not delivered the expected results. Thus, another approach of flood risk management is now promoted: an integrated flood risk management focusing on prevention, protection and preparedness (including forecasting). In this framework, making space for river and coastal flooding in the areas where the human and economic stakes are relatively low, represents a more sustainable way of dealing with floods. The conservation and the restoration of the natural functions of wetlands and floodplains, with their ability to retain floodwaters and reduce the flood pulse, are a key feature of this strategy, thus allowing important opportunities for synergies with WFD implementation.

In order to facilitate the approach of integrated flood risk management, the ICPDR developed a list of issues for the coordinated implementation of the WFD and the EU Floods Directive 2007/60/EC¹⁴ (EFD) in the DRBD. Making best use of potential synergies for the coordinated implementation of both directives is therefore recognised and will be aimed for during the next steps in the implementation process of both directives.

2.2 Surface waters: lakes, transitional waters, coastal waters

The Razim Lake in Romania has been evaluated as being in good ecological status and therefore no measures for hydro morphological alterations are necessary.

Regarding the two coastal water bodies in Romania, affected by significant hydro morphological alterations, the projects and their related mitigation measures will be promoted taking into consideration the philosophy of the Joint Statement on Guiding Principles for the Development of Inland Navigation and Environment in the DRB.

2.3 Groundwater

Information on the implementation of measures was collected for groundwater bodies of basin-wide importance showing failure to achieve environmental objectives in the DRBMP. This chapter summarizes the key facts while all the details can be found in Annex 8.

¹² <http://www.icpdr.org/main/publications/ministerial-meeting-2010-danube-basin-shared-waters-joint-responsibilities>


¹³

http://circa.europa.eu/Public/irc/env/wfd/library?!=/framework_directive/thematic_documents/hydromorphology/hydromorphology/_EN_1.0_&a=d

¹⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0060:EN:NOT>

2.3.1 Groundwater quality

The DRBM Plan indicated that contamination with nitrates was a key factor against achieving good chemical status of several GWBs of basin-wide importance. Hence, in line with the management objectives set in the DRBMP, it was considered essential to eliminate or reduce the amount of nitrates entering groundwater bodies in the DRBD. Prevention of deterioration of groundwater quality and of any significant and sustained upward trend in concentrations of nitrates in groundwater was planned to be achieved primarily through the implementation of the EU Nitrates Directive and the EU UWWTD.

	ROMANIA Republic of Romania	Status: Under implementation
Project:	Integrated nutrients pollution control	
<p>The project aims to reduce nutrient pollution of surface water in order to achieve a good ecological status and of groundwater bodies in order to achieve a good chemical status and to positively effect the quality of the drinking water. To meet the national and EU legal requirements a set of activities is currently under implementation including financial support and technical assistance of measures promoting a Good Agricultural Practice. Main elements of the project are:</p> <p>Investments on environmental measures within nitrates vulnerable zones such as the</p> <ul style="list-style-type: none"> ▪ Development of 11 Training and Demonstration Centers for farmers to promote Good Agricultural Practice; ▪ Development of new or improved facilities for manure storage (animal and domestic waste management); ▪ Support in strengthening regulatory framework (Nitrates Directive, Good Agricultural Practice); ▪ Extension of the existing water supply and sewerage system as well as the establishment of vegetation buffer strips to protect adjacent watercourses; <p>Further components include the implementation of feasibility studies and promotion of public awareness (workshops, field visits, knowledge transfer).</p> <p>The project with a total value of 60.04 Mio. Euro is financed by the Romanian Government through a 50 Mio. Euro World Bank loan being supplemented by a GEF grant of 5.5 Mio. USD and local funds.</p> <p>For more information please visit: http://www.inpcp.ro/ro/page/13/welcome.html</p>		

Groundwater bodies of basin-wide importance failing good chemical status (due to nitrates) were reported from Hungary and Romania. Reviewing the progress of the implementation of the Joint Programme of Measures the reduction of pollution by nitrates should be mainly accomplished by basic measures (mainly the implementation of UWWTD and NO₃-D but also the IPPC) and supplementary measures. Measures implementation (construction planning and construction of UWWTD related measures) has already started, even partly completed but mainly on-going after 2012.

Some UWWTD and IPPC related measures were reported by Romania to be already completed such as the construction of new sewer systems respectively the reduction of pollution of the groundwater body No. 5. Considerably larger investments (~ 32 Mio Euro) in Romania, where the construction planning and the construction are still on-going after 2012, comprise the planning and construction or extension of sewer systems serving about 106,000 inhabitants. Hungary reported to increase the rate of connection to sewer systems in the South Great Plain Region from 52.4% of the settlements in 2008 to 82.4% by 2015 and in the West Trans-Danubian Region from 75.8% to 89.8%..

The NO₃-D related measures in Romania implemented and under implementation after 2012 comprise the application of the code of good agricultural practice (e.g. construction of manure storage) and the application of specific action programmes at certain localities with estimated costs of about 22 Mio Euro. Hungary reported about revision of the Nitrate vulnerable zones which is on-going after 2012.

Romania reported the elaboration of a research study as a supplementary measure tackling nitrate pollution in the related groundwater body.

It has to be pointed out that the progress in implementation of the JPM reported in the chapters on pollution by organic substances, nutrients and hazardous substances for surface water bodies, has consequently a positive effect on the improvement of the chemical status of groundwaters.

Full details on the implementation of the JPM in the GWBs of basin-wide importance is given in Annex 8.

2.3.2 Groundwater quantity

The ICPDR vision for groundwater quantity stipulates that water use in the DRBD has to be appropriately balanced taking into account the conceptual models for particular GWBs and should not exceed the available groundwater resource in the DRBD. In line with this vision, the over-abstraction of GWBs within the DRBD should be avoided by effective groundwater and surface water management. Therefore, appropriate controls regarding abstraction of fresh surface water and groundwater and impoundment of fresh surface waters (including a register or registers of water abstractions) must be put in place as well as the requirements for prior authorisation of such abstraction and impoundment. In line with the WFD, it must be ensured that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction.

The concept of registers of groundwater abstractions is well developed in those DRB countries which have aggregated transboundary groundwater bodies of basin-wide importance. The Ministry of Environment and Water in Bulgaria maintains a national register of abstraction permits. A central register of groundwater abstractions based on the National Water Law is updated annually in Slovakia. In Hungary, a groundwater abstractions register is published yearly. It contains data on the withdrawals of the operating, monitoring and reserve wells. In Bavaria, water suppliers are obliged to report annual data to local authorities on overall water abstraction and specific abstractions from spring sources. Bavaria and Austria cooperate on the annual preparation of a register of abstractions from the thermal water of the Lower Bavarian - Upper Austrian molasses basin (GWB1). In Romania, the National Administration "Romanian Waters" maintains the national register of abstraction permits according to the National Water Law.

Groundwater bodies of basin-wide importance failing good quantitative status were reported from Hungary and Serbia.

Poor quantitative status is tackled by Hungary through the revision of relevant legislation by 2013 concerning the licensing of domestic wells, construction and rehabilitation projects (completed and on-going), demand management measures (on-going after 2012) and inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by droughts (not started by the end of 2012).

Serbia focuses its measures on research, development and demonstration projects and construction designs for new GW sources. The implementation of all these measures is on-going after 2012.

Full details on the implementation of the JPM in the GWBs of basin-wide importance are given in Annex 8.

2.4 Other issues

Adaptation to Climate Change

The ICPDR was asked in the 'Danube Declaration'¹⁵ to develop until 2012 a Climate Adaptation Strategy for the Danube River Basin. This strategy should be based on a step-by-step approach and

¹⁵ Danube Declaration: <http://www.icpdr.org/main/sites/default/files/Ministerial%20Declaration%20FINAL.pdf>

encompass an overview of relevant research and data collection, a vulnerability assessment, ensure that measures and projects are climate proof respectively “no regret measures” and ensure that climate adaptation issues are fully integrated in the 2nd Danube River Basin Management Plan in 2015.

The ‘ICPDR Strategy on Adaptation to Climate Change’ is based on the “Danube Study – Climate Change Adaptation”¹⁶, providing foundations for a common, Danube-wide understanding of future impacts of climate change on water resources and suitable adaptation measures. The Strategy was developed during 2012, with broad participation of relevant ICPDR Expert Groups and Task Groups, including nominated experts and ICPDR Observer Organisations, and guides the way on how to address and incorporate adaptation to climate change in ICPDR activities.

Invasive alien species

The Danube River Basin is very vulnerable to invasive species given its direct linkages with other large water bodies. The Danube is a part of the Southern Invasive Corridor (Black Sea - Danube-Main/Danube Canal - Main-Rhine - North Sea waterway), one of Europe’s four most important routes for invasive species, and therefore exposed to intensive colonisation by invasive species. Results of the second Joint Danube Survey (2007) revealed that invasive species have become a major concern for the Danube and that their further classification and analysis is vital for effective river basin management and, especially, for the correct assessment of the ecological status of surface waters.

The Monitoring and Assessment Expert Group initiated elaboration of a comprehensive list of the Danube invasive alien species which is currently under preparation by Hungary and Serbia. This document will be supportive to achieving a common understanding on the issue of invasive alien species in the Danube River Basin including their impact on the assessment of the ecological status of surface waters.

Sediment quality and quantity

The issue of quality and quantity of sediments has been addressed in the first Danube River Basin Management Plan 2009, but the overall conclusion was that more investigations are needed to decide on the significance of this issue. Based on this conclusion, the ICPDR asked Austria, Hungary and Romania to act as the Lead Countries in updating the available knowledge on sediment management in the Danube River Basin. In the frame of this activity, a proposal for a joint project on “Danube Sediment Management - Assessment for Restoration of Sediment Balance in the Danube River Basin” has been developed under the leadership of Hungary. Since the project was not financed under the South East Europe Transnational Cooperation Programme, multiple efforts will have to be continued to secure the necessary funding.

2.5 Activities towards financing the Joint Programme of Measures

2.5.1 Donors Meeting on financing of Joint Programme of Measures

The Danube River Basin Management Plan and the associated Joint Programme of Measures identifies a number of actions necessary in the Danube River Basin to achieve the “Good Status” or “Good Potential” of water throughout the Danube. These actions include policy changes as well as actions requiring technical assistance and investment. In order to facilitate and secure that funding needs for actions to improve water quality are met, the ICPDR convened on 18-19 May 2010 in Belgrade a Donors meeting on financing of the Joint Programme of Measures, involving members of the ICPDR delegations and representatives of financial institutions and programmes.

The general objective of the meeting was to present and discuss the results of the Danube River basin Management Plan and to acknowledge that the mobilization of JPM financing is key to reaching the

¹⁶ Prasch, M., Koch, F., Weidinger, R., Mauser, W. (2012): Danube Study - Climate Change Adaptation. Ludwig-Maximilians-University Munich, Department of Geography. Final Report (available on icpdr-website)

good water status in the Danube River Basin, and that the ICPDR is ready to provide the forum where such dialogue should take place to meet financing challenges that exist.

More specifically, the objectives were to:

- (i) make known the funding needs for the actions identified in the JPM,
- (ii) explore existing potential funding of the actions needed,
- (iii) determine any obstacles that donors and IFIs face, which hinder enhanced engagement in terms of financing many projects,
- (iv) see what role the IFIs and bilateral donors should play in order to facilitate large private sector engagement, and
- (v) brainstorm and discuss the actions needed for securing the long term matching of needs and funds for the measures identified in the Joint Programme of Measures.

The key messages from the meeting include:

- (i) The DRBMP provides an account of the financing needs for the Danube countries to achieve WFD objectives, but the JPM is not a set of nationally prioritized “bankable” measures
- (ii) Availability of funding is not the primary constraint - but feasibility studies notably for WWTP that take financial feasibility into adequate account.
- (iii) World Bank and others are willing to engage, support policy dialogue, studies, and provide finance of the JPM
- (iv) IFI’s underline the importance also of the intangible values provided by the DRBMP such as consensus building and international cooperation and their positive impact on financing decisions
- (v) Cost reflective tariffs for water are critical for sustainability of measures - affordability for the poorest segments of population should not determine overall tariff levels.
- (vi) Governments hold the key - moving from “decentralization” and “financing gap” to real prioritization, medium-term investment planning, enforcement and facilitating access to funding as well as resourcing the necessary parts of the project cycle to get things done.

2.5.2 Actions that are needed to facilitate the JPM financing

There are some suggestions provided by the Danube countries within the frame of the relevant expert group structures, which are summarized by thematic:

2.5.2.1 Implementation of the Water Framework Directive at national level

There is a need of a clear policy frame providing long term security for environmental investments. The financing needs for project investments emerged from the WFD process implemented in the DRB, through the development of the DRBMP and related JPM. Significant financial resources are needed to put in place the full range of measures necessary to achieve the management objectives for investment in Urban Wastewater Treatment, investment in diffuse pollution reduction, in improving lateral and longitudinal connectivity (fish bypass, flood plain reconnection), in flood protection, and as well a combination of investment and policy initiatives.

The WFD implementation is a national responsibility and as such the financing of measures is the responsibility of each national government (or private owners and operators of facilities which influence water quality).

It is important to reinforce the capacity of the countries to identify and prepare environmental investment projects and build stakeholders' (municipalities and enterprises) institutional capacity to develop project pipelines and to develop and finance investment projects.

Further important points include the following:

- Improving access to good practice studies with the aim of facilitating the development of investment projects.
- Identify options for co-financing needed to supplement the IFI loans while considering the large investments effort required by the countries.
- Realistic planning of investments is needed in line with the WFD/JPM requirements and funding availability.
- Considerable expectations from EU CAP in support of agri-environmental measures are justified only if Rural Development Program funds are increased substantially.
- Absorption of funds in the requested timetable is a big issue which needs consideration knowing that human resources, financial room for manoeuvre, and pro-active co-financing planning around grants are needed to ensure absorption.

2.5.2.2 IFIs issues, roles and contributions to the financing the Joint Program of Measures

There exist several possibilities for financing measures, whereas it is essential to ensure coordination with the European Commission on co-financing and on funding programmes. Furthermore, there is a need to investigate co-financing opportunities with other IFIs and bilateral sources.

The needs for alternative finance, management and technical approaches - role of Public Private Partnerships (PPP) – political sensitivity, problems especially for assuming private sector involvement and responsibilities in leveraging private spending against public spending, as well as tariff affordability issues are recognised as essential ingredients in ensuring financing of the JPM.

2.5.3 Information on the EU Strategy for the Danube Region (EUSDR)

The EUSDR was formally adopted by the European Council under Hungarian EU Presidency on 24 June 2011 . The Strategy includes both the overall Strategy and the Action Plan which outlines 11 Priority areas of action.

Pillar II of the Action Plan (Protection of the Environment in the Danube Region) with Priority area 4 (Water Quality), Priority area 5 (Environmental Risks) and Priority area 6 (Biodiversity), includes numerous actions which are based upon or expected to be carried out also in the frame of the ICPDR.

The EUSDR provides the framework for the discussion and promotion of project proposals and the ICPDR is actively involved in providing the directions and support to meet the challenges that exist.

3 Conclusions

Organic pollution

Discharge of untreated urban wastewaters into surface water bodies creates significant problems in the basin. Often sewage is only subject to mechanical treatment before being discharged directly into rivers. The compiled information provides a clear picture of the results achieved by the individual Danube countries, the gaps to be filled and the investment projects, which need further technical and financial support. The level of implementation of the Urban Wastewater Treatment Directive (UWWTD) varies amongst EU Member States, for which good results are registered for agglomerations > 10,000 PE, and the other countries which are currently implementing the UWWTD in line with the transition periods agreed with the European Commission or national legislation. Biological and tertiary treatment (organic and nutrient removal) is being applied for a large number of the upgraded and new wastewater treatment plants, as required by the UWWTD concept of setting objectives for the regulation of activities based on the nature of the environment into which they discharge (Article 5). Furthermore, demands for nitrogen and phosphorus removal for wastewater treatment plants in rural communities (agglomerations between 2,000-10,000 PE), representing approx. 40% of the Danube River Basin, are lower than for urban settlements (agglomerations with more than 10,000 PE).

The report is, however, highlighting both the implementation efforts and further planning. This is especially the case for those EU Directives that require substantial administrative reform and financial investments (UWWTD, IPPC). The non EU Member States, in the absence of a specific legal requirement for industrial installations in the DRB, have the opportunity to implement Best Available Techniques on a voluntary basis. There are additional benefits for those installations which are in countries that will have legal requirements in the future.

The reporting on the JPM highlights that many investments and actions are happening, and by the end of 2012, a number of 555 UWWTPs have been constructed, upgraded or extended which will, as expected, contribute to a considerable reduction of BOD₅ and COD loads. Significant further efforts for the next RBM cycles will still be necessary for meeting the WFD environmental objectives on the basin-wide scale in regard to organic pollution.

Nutrient pollution

Nutrient removal is required to avoid eutrophication in many DRB surface waters and the Black Sea North Western Shelf, in particular taking into account the character of the receiving coastal waters as a sensitive area under the UWWTD. The nutrient loads discharged from the DRB are an important factor responsible for the deterioration and eutrophication of parts of the Black Sea ecosystem.

The DRBM Plan highlighted that the nitrogen load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's and therefore, the management objectives and the WFD environmental objectives on the basin-wide scale will not be achieved by 2015. For phosphorous the respective management objective and the WFD environmental objectives on the basin-wide scale will not be achieved by 2015, as the level will be still 15 % above the level in the 1960's.

However, information on the last three years' efforts shows that all Danube countries have taken major steps on the implementation of the JPM as agreed in the DRBM Plan.

The implementation of the Nitrates Directive in EU Member States, an improved application of the concept of BAT in non EU Member States and the reductions in nutrient pollution achieved in

UWWT with nitrogen and phosphorus removal for agglomerations >10,000 PE will reduce nutrient pollution considerably. The introduction of limitations on phosphorus in detergents, i.e. a phosphorus limitation in laundry detergents by 30 June 2013 and in dishwasher detergents in January 2017, is seen as a cost effective and necessary measure to complement the efforts of implementing urban wastewater treatment and reach the level in the 1960's for phosphorus.

Hazardous substances pollution

In the DRBM Plan it was estimated that the management objectives and WFD environmental objectives will not be achieved by 2015 regarding hazardous substances, however, there is a need for more monitoring data on hazardous substances, as well as information on sources and relevant pathways. Therefore, the Danube countries have worked to improve the present lack of knowledge on the sources, pathways, discharges and losses of hazardous substances and contributed to the development and testing of a guidance document for preparing an inventory of emissions, losses and discharges of priority substances. The results of testing will facilitate the production of the new ICPDR "List of priority substances" and the basin-wide inventory of emissions, losses and discharges of priority substances.

However, the significant uncertainty in our current knowledge of pressures due to hazardous substances, as well as their impact on water status, is ongoing and needs to be improved in the future. It is expected that the planned investigation in the frame of Joint Danube Survey 3 will give a first overview along the Danube of the concentrations of the hazardous substances in the urban waste water system. Together with the in-stream investigations and the bank-filtration analysis, a better understanding of the pressures and impacts of hazardous substances will be possible. To ensure a useful differentiation of the results, additional information on the point and diffuse sources of hazardous substances (industrial plants, agriculture and agglomerations) and the treatment facilities have to be collected.

For the DRB, the expected inventory of emissions, losses and discharges of priority substances should be the basis for ICPDR actions to achieve comparable results.

Hydromorphological alterations

With the implementation of the WFD, hydromorphological aspects were introduced into water management due to their key relevance for the ecosystem and the achievement of 'good status'. A number of hydromorphological measures were selected in the 1st DRBM Plan, including measures on the improvement of river and habitat continuity, the re-connection of adjacent floodplains/wetlands, addressing hydrological alterations like impoundments, water abstractions and hydropeaking, as well as the issue of future infrastructure projects and the way such projects can be implemented in a sustainable way.

A number of those measures are already completed or the construction is ongoing. The bulk of the measures is currently in the planning phase (e.g. technical planning phase, licensing procedures, public procurement procedures), to be completed after 2012. The main reasons which were identified for causing delays are existing administrative hurdles (e.g. solving ownership questions or existing permits valid for a long time period putting a challenge on adaptive management), partly still existing shortcomings with regard to the know-how on technical issues (cause-and-effect relationship between measures and the effect on the biology), as well as the lack of financial resources for full measures implementation.

Regarding technical questions, experience is expected to grow with the currently ongoing implementation of hydromorphological measures, allowing for a more targeted and effective selection of measures for the next WFD cycle. Technical guidance documents, which are currently under development in some Danube countries (e.g. on the design and construction of fish migration aids), can help not only in terms of taking the right technical steps but also supporting the administration

and water-related economic sectors by setting a clear framework for implementation of cost effective solutions. This is supported by the ongoing activities on integration taking place with different sectors in the frame of the ICPDR, i.e. with inland navigation, hydropower and flood risk management, besides strategic approaches for targeting measures in a most efficient way (i.e. the update of the ecological prioritisation approach for continuity restoration in the Danube River Basin, respectively ongoing discussions on a priority ranking with regard to the re-connection of adjacent floodplains/wetlands).

In summary, major achievements were reached by introducing hydromorphological aspects in water management on the technical level, what is in need to be mirrored and further backed up also on the political level, with the allocation of the required financial resources and clear political support.

Groundwater

Pollution by nitrates is the key pressure causing failure to achieve good chemical status in groundwater bodies of basin-wide importance. The reduction of pollution by nitrates will be mainly accomplished by proper implementation of EU legislation in particular by construction of UWWTPs and sewer systems, introduction of nitrate reduction action programmes and the IPPC-related measures. The implementation of necessary measures has already started but they will be mainly ongoing after 2012.

Groundwater use in the DRBD has to be appropriately balanced and should not exceed the available groundwater resource. The concept of registers of groundwater abstractions is well-developed in the DRB countries which have aggregated transboundary groundwater bodies of basin-wide importance. The measures addressing poor quantitative status include licensing of domestic wells, construction and rehabilitation projects, demand management measures, promotion of adapted agricultural production such as low water requiring crops in areas affected by droughts, development of research, development and demonstration projects and construction designs for new groundwater sources. The implementation of most of these measures exceeds beyond 2012.

Financing of the Joint Program of Measures

The Joint Programme of Measures identified a number of actions necessary in the Danube River Basin which include policy changes as well as actions requiring technical assistance and investment.

Over the last years, the Danube and the Black Sea have shown positive environmental responses, and this can be attributed to the huge efforts the countries have taken in nutrient reduction actions, improvement of wastewater treatment, addressing hydromorphological alterations but also due to a number of EU-supported funding programmes, GEF-supported projects, and interventions for the international community and IFIs.

With regard to improvement of hydromorphological conditions for instance, although no specific instruments explicitly targeting this issue are in place at EU level, some instruments exist also allowing to provide financial support for related measures on hydromorphology, e.g. LIFE+, the European Agricultural Fund for Rural Development, or cohesion and structural funds.

In order to facilitate and secure that funding needs for actions to improve water quality are met, the ICPDR initiated a dialogue with representatives of financial institutions and programmes, what is crucial specifically in times of economic crisis which represent a challenge for the allocation of necessary funding for environmental measures. The funding needs for the actions identified in the JPM are well known for the IFIs and bilateral donors and there are already positive signs as well for large private sector engagement ready to discuss the actions needed for securing the long term matching of needs and funds for the identified measures.