The Ministry of Ecology and
Natural Resources of Ukraine

THE UPPER DNIEPER RIVER BASIN MANAGEMENT PLAN (UKRAINE)

A BRIEF OUTLINE DESCRIPTION

Objectives

The Upper Dnieper River Basin Management Plan (Upper Dnieper RBMP) has been developed in the framework of Environmental Protection of International River Basins Project (EPIRB), funded by the European Commission, to promote understanding of key elements of the EU Water Framework Directive 2000/60/EC (WFD) and the process of planning actions for improvement of environmental quality of certain river basin sections. The Plan was developed by a team of experts led by MAMA-86 UNENGO with substantial support of EPIRB project experts and with assistance of the Ministry of Ecology and Natural Resources of Ukraine.

The RBMP was developed for all surface and groundwater bodies (WBs) in the Upper Dnieper river basin that underwent assessment of their ecological and chemical status, and included development of the monitoring program, setting environmental objectives and development of the Program of Measures to meet the objectives. The long-term aim of the RBMP is to achieve good ecological status of surface and groundwater WBs in the Upper Dnieper river basin.

Activity framework, methodology and limitations

The RBMP is a management tool, to be developed and implemented by all stakeholders including central executive bodies (the Ministry of Ecology and Natural Resources, the State Agency for Water Resources, relevant sectoral ministries), basin-level and local authorities, main water users groups and the general public. Besides that, the Plan may be applied by potential donors as a guideline document for financial decision-making.

The RBMP covers the period from 2015 to 2021 - i.e. the first 6-years planning cycle for Ukraine. The RBMP is primarily focused on surface WBs under substantial anthropogenic impacts, as reviews of available data and field surveys of groundwater resources in the basin did not reveal any substantial risks or problems (except a depression cone in Kiev groundwater aquifer). As a result, the Program of Measures predominantly seeks to improve ecological status of rivers and lakes in the basin that are now at risk of failing to meet environmental objectives, as well as of heavily modified water bodies HMWBs - (WFD and Common Implementation Strategy Guidance Document N 4).

In the framework of the Plan, for 48 WBs at risk of failing to achieve good ecological status, environmental objectives were set and relevant measures were developed for status improvement.

Among them, ecological status of 12 WBs (3 WBs are located in the Chernobyl exclusion zone and the rest have substantial hydromorphological alterations) is hardly expected to be improved in the subsequent 3 planning cycles (if at all).

In terms of its contents and structure, the RBMP follows WFD requirements and includes the following sections: description of the river basin; identification, typology and delineation of surface and groundwater WBs; a summary of significant pressures and possible anthropogenic impacts on the status of surface and groundwater, assessment of risk of failing to achieve good status by these WBs; the monitoring programs; environmental objectives; the program of measures; cost assessment and prioritization of the measures proposed; results of public consultations and the list of competent bodies.

The main challenges of RBMP development included the following ones: lack of reliable and necessary data on quantity and quality of water resources due to the fact that the existing monitoring system in Ukraine is not WFD-compliant.

According to WFD requirements, natural surface water bodies were identified (i.e. rivers and lakes). These water bodies were delineated based on their natural typology (geology, watershed altitude and watershed areas); groundwater bodies were delineated by classes and characterisation of aquifers; while heavily modified water bodies were delineated based on degrees of their modification.

European approaches to efficient water management - as set up in WFD - are based on a proactive approach that in addition to response and mitigation of adverse human impacts incorporates also risk assessments and planning of prevention measures. Such actions are intended to reduce risks of failing the achievement of good ecological status of WBs due to anthropogenic pressures under climate change.

Significant pressures and impacts in the Upper Dnieper basin were identified with application of "Drivers - Pressures - State - Impacts - Response" methodology. The analysis relied on standard matrices, state water quality monitoring data, results of field surveys of 2013 and 2014, and expert judgements. These data were used for both risk assessments and identification of WBs at risk, based on calculations of the impact indicators and risk criteria scales for point and diffuse pollution sources (e.g. Likelihood for diffuse pollution generated by Agriculture; Total share of waste water in the river from a point source pollution, etc.) and for GIS analysis. Environmental objectives for WBs were set according to the risk reduction/elimination principle. Environmental cost efficiency of the key measures was assessed to prioritise their implementation.

Description of the Upper Dnieper River Basin

The Dnieper River is the third largest river in Europe after the Volga and the Danube and the second largest river of the Black Sea basin. The Dnieper is a transboundary river with total watershed area of 511 thousand km^2 and length of 2200 km,: 20% of its basin area is located in the Russian Federation, 23% - within the Republic of Belarus and 57% within Ukraine.

The Dnieper River Basin

The pilot section of the Upper Dnieper basin

The Ukrainian part of the Upper Dnieper RBMP covers the upper share of the basin with the overall area of about 20 thousand km^2, from the Belarus border to the upper reach of the Kaniv HPP Water Reservoir. This section of the Upper Dnieper basin has some distinctive characteristics: the river runoff is much overregulated by the Kyiv Reservoir; due to inflow of water from the Pripyat and Desna rivers a rather large volume of river runoff is generated in this part of the catchment area. Within this basin share Kyiv is located - the largest city of the Dnieper basin and the capital city of Ukraine. Intensive urbanisation adds much to the severe anthropogenic impacts in the pilot basin. The exclusion zone of the Chornobyl NPP accident of 1986 is also located there. Within the pilot basin share, right bank tributaries (Pripyat, Uzh, Teteriv, Zdvyzh, Rokach and Irpin` rivers) and left-bank tributaries (the Desna with its tributaries: Oster, Smolyanka, Vereb, Srtryzhen, Zamglay, Snov and Sozh rivers) discharge into the Dnieper.

Relief. The highest place of the basin section is associated with Prydnieprovska uplands (220 - 240 m asl). The lowlands along the Dnieper river channel were flooded after construction of Kyiv and Kaniv water reservoirs.

Geology. The pilot Upper Dnieper basin share is located within the suture zone of two major tectonic formations: the Ukrainian crystalline shield and the Dnieper - Donetsk Depression what is reflected in complex geological structure of the area and lithologic diversity.

Soils. In the Upper Dnieper river basin, in Polissya area, sod-podzolic soils are common soils formed in high humidity conditions in pine and mixed forests on sandy sediments, as a result, these soils have low fertility. Grey forest soils are common in the left bank area of the Desna in deciduous forests. They formed in loamy soils in sufficient moisture. The content of humus in them is also small.

Vegetation. The major part of the Upper Dnieper Ukrainian pilot basin share is located in the Polissya, a mixed forests zone. Forests cover less than 50% of the area. Highest forest cover figures (up to 40 - 45 %) are observed in Northern districts of Kyivska oblast (Polisskiy and Ivankivskiy districts). A share of forests is lower in the forest-steppe zone; its northern border goes along the line from Zhytomyr - Kyiv - Nezhyn. Pines are most common (63%) in forests. Oaks, poplars, alder trees and numerous willow varieties are common in floodplain areas and nearby them. In recent years invasive plant – Amorpha fruticosa becames widespread. The most often observed among

aero-aquatic plants at shallow water/coastal areas are the following plants: common reed, narrow-leaved catoptric, bulrush, flowering rush, arrowhead, and reed grass. Establishment of water reservoirs at the Dnieper and its tributaries and shallowing of these reservoirs resulted in wide spread of aero-aquatic plants and overgrowing of shallow water areas. In recent years, a large-scale spread of water chestnut was observed.

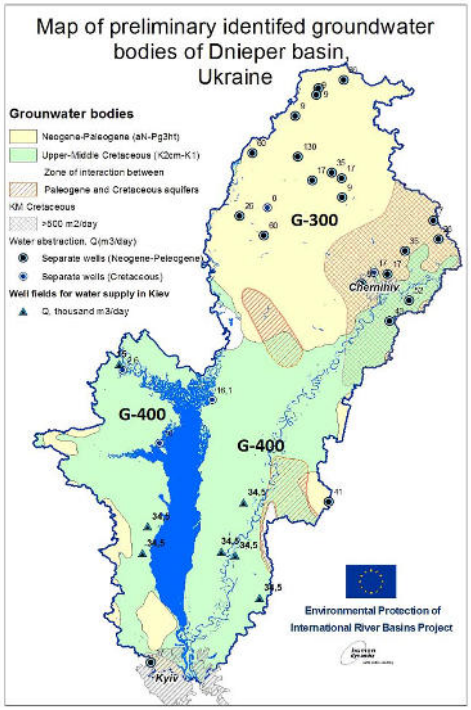
Climate. The territory has a temperate continental climate with warm summers and moderately cold winters. During a year, clear weather prevails, incoming cyclones are accompanied by sharp air temperature changes, precipitation and winds. Western and north-western winds prevail. The average annual temperature in the region is 7.1 - 7.7^{0}C in the northern Kiev region (Chornobyl meteorological station) temperature is some lower, while in Kyiv it is a little bit higher). In recent decades a warming trend was observed. In comparison with initial years of observations (1880s) the temperature increased by at least 1.5˚C. Precipitation in cold seasons most seriously influence water regime of the Dnieper and its tributaries. The average annual precipitation varies from 600 to 650 mm. Increasing air temperatures in winter seasons and in March in the recent decade led to a substantial reduction of snow cover, reduction of soil frost depths, higher underground run-off by snowmelt water and in lower floodwater levels.

Surface water bodies

In the Upper Dnieper river basin, 140 surface water bodies (SWB) were identified, including 121 river SWBs, 19 lake SWBs and 7 heavily modified WBs. All rivers with watershed areas over 50 km^2 were considered for purposes of identification. The rivers were subdivided into 4 main river types based on their geographic and morphological parameters. Among the river WBs, 88 natural, 7 artificial and 24 heavily modified river WBs were identified. Based on analysis of available data, 48 river WBs were identified as WBs at risk of failing to achieve good ecological status. Due to lack of information and unreliable data, 40 WBs were identified as WBs possibly at risk. More than 40 river WBs were studied in the course of field surveys for assessment of their hydrobiological, hydrochemical and hydromorphological parameters and for further analysis. The lake WBs were subdivided into 12 natural lakes, 2 artificial lakes and 5 heavily modified lake WBs. The lakes were classified into 6 main types. In the majority of cases, these lakes are floodplain ones, they are closely hydraulically connected with the main river channel and have similar environmental conditions.

Groundwater bodies

Groundwater bodies were identified by geologic zones and natural parameters of existing aquifers. Four groundwater WBs were identified and delineated in the Upper Dnieper basin: two WBs in nonartesian aquifers and two WBs in artesian aquifers. All four groundwater WBs are of good quantitative and chemical status. Only the Cretaceous aquifer in Kiev area is affected by a depression cone of 30 km radius with up to 40 m decrease of the groundwater level due to intensive water extraction from the aquifer. Now, water from all these groundwater WBs is used for drinking and industrial water supply.



Key significant water resource management problems/drivers, significant pressures and impacts

The range of significant water management problems in the Upper Dnieper river basin that result in direct or indirect adverse impacts on quality of surface water, includes the following ones:

- organic pollution;
- pollution by nutrients (nitrogen and phosphorous compounds);
- pollution by hazardous substances;
- hydromorphological alterations;

Direct or indirect pressures on quality of groundwater include pollution by hazardous substances and uncontrolled water abstraction.

According to the analysis conducted, the main pressure on surface water bodies in the Upper Dnieper river basin is caused by pollution from point and diffuses sources. Organic pollutants, nutrients and hazardous substances enter surface water bodies with discharges of untreated/insufficiently treated wastewater flows from WWTFs of water utilities and industrial facilities (point sources) or with surface run-off and storm water discharges (diffuse pollution sources) from urbanised areas in the basin.

Wastewater treatment facilities that were initially constructed in 1960s, provide mechanical (primary) and biological (secondary) wastewater treatment and cannot substantially reduce organic and nitrogen loads levels in treated wastewater, and they almost fail to reduce phosphorous loads in municipal and industrial wastewater flows. As a result, levels of pollutants in WWTPs discharges (particularly organic pollutants, nutrients, oil products and phenols) exceed (sometimes in several tens of times) their levels in river water. Despite the fact that in recent years discharges from the Bortnychi WWTP have been decreased almost in two times, the loads of organic matter, NH_4 and P.

Storm water collection and treatment systems are not available in the majority of human settlements and industrial sites, animal/poultry farms. As a result, surface run-off and storm water from these territories are diffuse sources of contamination of surface and groundwater WBs in the basin by organic substances, nutrients and hazardous substances.

According to Ecological Passports, 60 environmentally hazardous enterprises are located in Kyiv and Chernigiv Regions. Usually, these enterprises discharge their wastewater to municipal sewers for treatment at WWTPs with municipal wastewater. Only a few industrial enterprises in Kiev (Darnytska CHPP, CHPP-2, the Cardboard and Paper Factory) operate their own wastewater treatment units and discharge treated wastewater into the Dnieper. TPP-5 and TPP-6 of Kyivenergo Company with 2 sludge collectors, chemical units, lime and vanadium sludge collectors, Darnytsa CHPP and CHPP-2, as well as enterprises of the Chornobyl exclusion zone, pose threats of chemical contamination of surface water and groundwater in the basin.

According to Directive 2013/39/EC that amends Directive 2000/60/EC and Directive 2008/105/EC, now, in order to assess chemical status of water bodies, it is necessary to measure 45 priority (hazardous) substances and "certain other pollutants" and check them against relevant environmental quality standards (EQS).

Analysis of the WFD list of 33 Priority pollutants and available information on pollution sources in the Upper Dnieper basin suggests that at least 13 substances from the list should be permanently a subject for WBs monitoring, including 5 persistent organic pollutants (POPs): persistent pesticides (endosulfan, DDT, hexachlorobenzene, hexachlorocyclohexane, pentachlorobenzene); Highly Hazardous Pesticides (alachlor, atrazine, chlorpyrifos, trifluralin) and heavy metals (cadmium, lead, mercury, nickel).

Analysis of official data and field surveys show that 18 of 24 studied river WBs may be categorised as WBs at risk of failing to achieve good chemical status according to EU WFD environmental quality standards (EQS). Analysis of water quality data (based on state monitoring results) shows that all surface WBs demonstrate levels of copper, zinc, chromium (6+) and manganese higher the limits set for fish breeding waters. At the same time, manganese levels in water demonstrate some seasonal fluctuations (maximal levels are observed in winter and flood seasons when water is enriched by suspended organic matter washed out from bogged areas in the Pripyat, Teteriv and Irsha river cathments).

Today it is impossible to evaluate chemical status of water bodies in the river basin due to a lack of data and unreliable monitoring information on priority (hazardous) substance and "certain other pollutants" according to WFD requirements, as the existing water monitoring system of Ukraine does not comply with European requirements.

At the same time, in the Upper Dnieper basin, many sources of pollution by such priority hazardous substances exist. Among them, diffuse pollution sources are both important and the least studied ones, including:

- rain-storm water runoffs in Kiev, Chernigiv, Vyshgorod and other settlements, including surface run-off from industrial sites of Kiev and Chernigov, polluted by fuel and lubricants, oil products and heavy metals;
- surface runoff from cultivated fields, polluted by mineral fertilisers, agrochemicals and pesticides;
- Effluents from animal and poultry farms;
- Effluents from cottages, tourist facilities and restaurants in coastal areas of the Kiev Reservoir and the Desna;

- Atmospheric emissions from Coal TPPs and vehicles in human settlements;
- Surface runoff from contaminated areas in the Chornobyl zone, polluted by radionuclides and heavy metals.

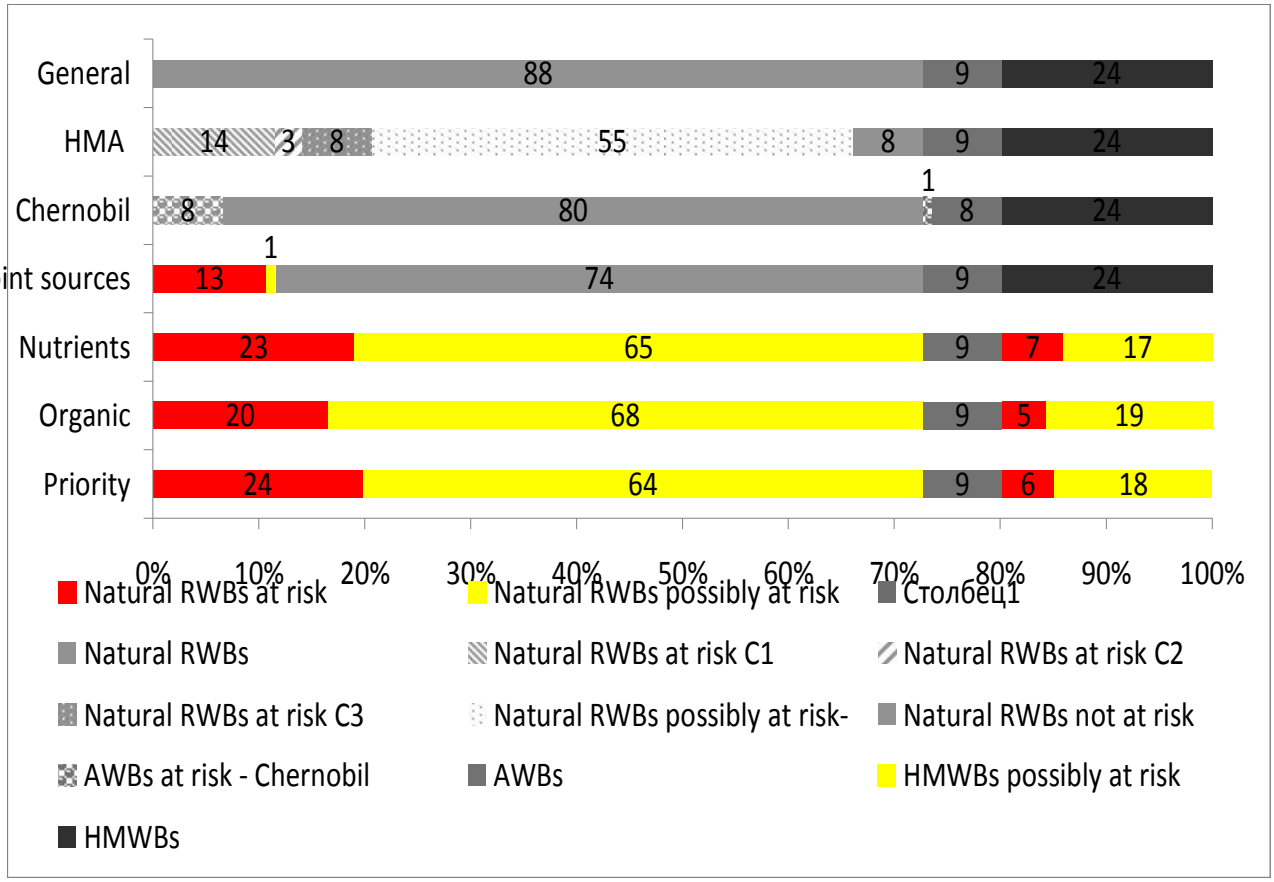
It is worth to note that in the basin about 1.3 million people live in settlements without centralised sewers and use cesspits or sceptic tanks that often are diffuse sources of pollution of surface WBs and water wells. However, it is impossible to assess pressures from these pollution sources now due to lack of statistical data.

In 1960-1980s, the Dnieper underwent serious hydromorphological alterations due to construction of Kyiv and Kaniv reservoirs. These reservoirs, as well as ponds in the Upper Dnieper basin significantly affect ecological status of water bodies in the basin. The main factors of hydromorphological alterations in WBs of the basin include the following ones:
- hydropeaking due to construction of dams and operations of HPPs, permanent flooding of coastal areas (meadows, forests, cultivated lands, human settlements), coast erosion;
- substantial alterations in hydrological regimes (flow velocity, sedimentation, thermal and ice regimes);
- changes in water quality, changes in habitats of aquatic organisms.

Based on analysis of hydromorphological alterations, 8 river WBs were found to be not at risk of HM alterations, 25 river WBs were found to be at risk of failing to achieve environmental objectives due to HM alterations. 4 WBs of the Dnieper, Borzna, Stryzhen and Lyubich rivers were found to be at risk according to overregulation/impoundment effect criterion. WBs downstream of the Kyiv HPP dam are at risk due to Hydropeaking with > 1:5 amplitudes. 14 surface WBs of the Vyr, Borzna, Dubrovka, Zamglay, Stryzhen, Bilous (tributary) and Desna rivers were identified as WBs at risk due to HM alterations - interruption, river-channel straightening. 55river WBs were classified as WBs possibly at risk due to lack of sufficient information.

Besides that, 6 artificial WBs were identified in the basin (including drainage channels in irrigation systems), as well as 8 heavily modified water bodies with hard modifying banks, beds, water courses and with hydraulic structures.

As lakes in the Upper Dnieper basin are of floodplain nature they have close hydraulic connection with the main rivers beds. All lakes in highly urbanised territories, they are used for recreation and can be identified as WBs at risk of failing to achieve environmental objectives.



Results of the risk analysis for the Upper Dnieper River water bodies (number WBs): general typology and pressure/impact from: hydromorphological alterations (HMA): C1- >70% of overall water body length is allocated to Morphological Quality Class 3-5; C2 - several impoundments are in place and affect >30% of the overall water body length; C3 - Intense deformation processes distorting the shape of the channel and coastal topography); point sources of pollution, organic pollution and priority pollutants.

Protected territories

In the Ukrainian share of the pilot Upper Dnieper river basin, four types of protected territories exist (for protection of rivers, water supply sources and wildlife habitats, as well as the Chornobyl NPP exclusion zone), including the following ones:

1) water protection zones, riversides, waterway protected strips;
2) sanitary protection zones of water supply sources, including surface water and groundwater intakes;
3) areas of Nature preserve fund and
4) the Chornobyl exclusion zone.

The monitoring program for the Upper Dnieper river basin

Surface water bodies. Two key WFD environmental objectives for surface water include: prevention of deterioration of status for all surface water bodies and achieving good status for surface WBs. Status of surface WBs is determined by their ecological and chemical status. Monitoring and evaluation programs are required to confirm achievement of these objectives. WFD set out three types of monitoring programs: surveillance, operational and investigative monitoring.

The monitoring program for surface water bodies in the Ukrainian section of the Upper Dnieper river basin covers:

- categories of surface WBs: rivers and lakes;
- protected areas as defined in Art. 6 WFD;
- artificial and heavily modified WBs.

In order to achieve objectives of **surveillance monitoring** of surface water bodies, that should ensure assessment of long-term changes of WBs status in natural conditions and due to substantial anthropogenic impacts, 7 sampling points with reference conditions were selected in the Upper Dnieper river basin for each of 4 river WBs types, as well as 2 observation points for lakes.

The program of **operational monitoring** is particularly focused on monitoring of efficiency of supplementary measures that seek to achieve WFD objectives for water bodies "possibly at risk". The program is intended to collect information on efficiency of specific actions being implemented in the Upper Dnieper basin.

Objectives of the operational monitoring program include:
- to identify status of WBs categorised as WBs at risk of failing to achieve environmental objectives;
- to evaluate any changes in status of these WBs due to implementation of the program of measures.

WFD also stipulated the third type of monitoring - i.e. **investigative monitoring** that is necessary in extraordinary situations, when a WB is at risk of failing to achieve WFD environmental objectives due to some very specific reasons. This monitoring is intended to respond to new information in potential risks associated with new pollutants or due to other changes. However, in the framework of the current RBMP, no investigative monitoring activities are stipulated in the Upper Dnieper river basin.

Ecological status assessment

Monitoring data are needed for assessment of ecological status for each ecological quality element for each surface water category. According to WFD, in order to assess a WB ecological status, it is necessary to measure biological, hydromorphological, physical-chemical parameters and relevant pollutants. In the course of classifying a WB by its ecological status/potential, first of all biological quality elements are assessed (species composition and abundance of aquatic organisms: fish, plants, algae, invertebrates, etc.). Every biological element in natural WBs is evaluated by deviation of observed parameters (if any) from type-specific reference conditions. Reference conditions mean conditions of biological quality elements that are observed in the absence of pollution or disturbance (or at least with minimal disturbance).

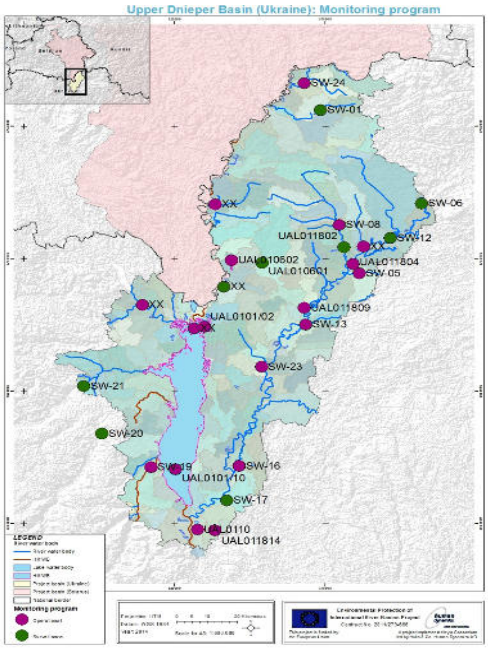
Physical-chemical and hydromorphological quality elements are supplementary to biological ones and are used for overall ecological status assessment. Chemical status of surface water bodies is associated with 45 pollutants listed in Annex X to WFD (Directive 2000/60/EC and Directive 2008/105/EC) and Directive 2013/39/EU that amends them.

In order to achieve "good chemical status", measured indicators for specific pollutants should meet two complementary environmental quality standards:

- annual average - environmental quality standard, applying to the arithmetic mean of one year of data, with monthly sampling presumed;
- maximal concentration - environmental quality standard, applying to the maximum concentration in the annual set of data.

Recommendations for groundwater monitoring program in the Upper Dnieper river basin

Groundwater monitoring programs include monitoring of quantitative and qualitative water parameters in all delineated groundwater WBs in the river basin. Main objectives of quantitative monitoring include study of long-term trends of water levels and assessment of saltwater or other intrusions caused by groundwater abstraction. Qualitative monitoring of groundwater WBs include operational, surveillance and investigative monitorings, as well as monitoring of GW drinking water sources, monitoring of habitats, prevent or limit monitoring. It is necessary to extend and develop the already existing network of GW monitoring wells in the Upper Dnieper basin, while retaining 8 wells at water intakes in Kyiv and Chernigiv have to use for operational monitoring of GWBs exploited.



Sampling locations for the SW Monitoring Programme in the Dnieper pilot river basin

Environmental objectives and exemptions

According to WFD requirements, the following environmental objectives should be achieved for WBs in 15 years:

a) good ecological/chemical status of surface WBs;

b) good ecological potential and chemical status of HMWBs and AWBs;

c) good chemical/quantitative status of GWBs.

<u>According to WFD, the following objectives were set for the Upper Dnieper RBMP:</u>

- achievement of good ecological status for all WBs;
- prevention of deterioration of ecological status of WBs;
- ensuring sustainable water management;
- meeting specific requirements to protected areas.

For WBs with high and good ecological status, the objective is to maintain the existing status. WBs with moderate or poor ecological status shall be addressed with measures that allow an achievement of environmental objectives within the WFD planning cycles.

Environmental objectives have been set for all WBs in the Upper Dnieper river basin according to WFD requirements. Accounting for results of (a) pressures and impacts analysis, (b) risk assessments and (c) monitoring, environmental objectives were set for the each delineated WBs and relevant measures were considered to achieve the objectives within 6-years WFD planning cycles.

Environmental objectives

The list of key environmental objectives for delineated surface WBs in the Upper Dnieper river basin - WBs at risk of failing to achieve environmental objectives in 2015, includes the following ones:

- for WBs with identified pollution of ammonia nitrogen, phosphorus, organic substances, copper, cadmium, zinc, chromium, phenols the **OBJECTIVE** is *to reduce levels of these pollutants in water to applicable environmental quality standards,*

- for WBs with identified pollution of hexachlorobenzene the **OBJECTIVE is** *to ensure absence of the pollutant in water*,

- for WBs contaminated by DDT the **OBJECTIVE is** *to ensure absence of the pollutant in water*,

- for WBs with hydromorphological alterations: over-regulation/impoundment effects the **OBJECTIVE is** *to restore the natural hydrological regime in over-regulated WBs and to restore flow continuity*,

- for WBs with hydromorphological alterations: channel straightening the **OBJECTIVE** is *to restore natural morphology of river channels*.

The list of key environmental objectives for GWBs at risk in 2015, includes the following ones:

- due to the depression cone in the Cenomanian aquifer the **OBJECTIVE** is *to reduce the depression cone.*

Application of exemptions according to Art. 4 of EU WFD

According to Art. 4 EU WFD, due to some reasons, exemption may be applied in such cases, when good ecological/chemical/quantitative status or good potential of WBs cannot be achieved within the first planning cycle (by 2021), may be achieved later on or may not achieved at all. Requirements for exemptions should be taken into account in the course of setting environmental objectives.
Application of exemptions requires comprehensive tests that justify for each WB why relevant measures can only be applied (a) after the first planning cycle and with extension of deadline, or (b) through applying a less stringent environmental objective.

Such tests show if the needed measure to achieve environmental objectives and good status/potential:
- is not feasible to be implemented within the first planning cycle due to natural conditions;
- is technically not feasible or
- is technically feasible but disproportionally expensive.

According to results of analysis of 48 surface WBs: 25 WBs are at risk of failing to achieve good ecological status due to hydromorphological alterations, such as channel straightening and impoundments, 9 WBs are at risk due to impacts of diffuse pollution sources in the Chornobyl zone, 6 WBs are AWBs, and 8 WBs are HMWBs. Preliminary expert assessments suggest that the above WBs would not achieve good ecological status by 2021, after implementation of the first cycle of the Program of Measures.

A summary of the economic analysis of water use in the Upper Dnieper river basin

According to Art. 2 (38) EU WFD, 'water services' means all services provided for households, public institutions or any economic activity:

- abstraction, impoundment, storage, treatment and distribution of surface water and groundwater;
- wastewater collection and treatment at WWTPs with their further discharge to surface water.

Out of 4.99 million residents living in the pilot Upper Dnieper basin, about 97.7% reside in urban areas. The share of population connected to centralised water supply substantially varies between urban and rural areas - while in urban areas from 50 to 100% of residents have access to centralised water supply, rural residents often rely on water wells. Main problems of the water supply sector are associated with poor infrastructure and lack of funds to cover operation costs, at the background of lack of investments.

According to the Constitution of Ukraine, the Government is responsible for environmental protection, mitigation of consequences of the Chornobyl disaster and protection of the genetic pool of the population of Ukraine. The State Budget of Ukraine is the major source of financing for funding environmental protection measures. Regulations for collection of revenues and distribution of allocations from the State Budget are set by relevant annual laws. Development of economic relations and mechanisms in the water sector is an objective need, it is necessary to value water resources as a component of the national wealth, to evaluate their taxation capacity and options to generate budget revenues by rent for commercial use of water resources, to implement Polluter Pays Principle, to ensure cost recovery for water supply and sanitation services accounting for the need to maintain and develop relevant infrastructures.

Cost-efficiency as the criterion for selection of measures to meet targets

Based on results of expert assessments and analysis of dedicated state programs, costs of proposed measures were preliminary assessed. The overall costs of the measures were estimated at the level of about € **1 054 560 000** for the first planning cycle, or about **€ 200** per capita if we account for the whole population of the Upper Dnieper basin.

The program of measures

Basic and supplementary measures for maintenance and restoration of water bodies

According to recommendations of the Guidance on development of programs of measures, the Program of Measures should include basic and supplementary measures. Basic measures apply to all water bodies in the Upper Dnieper river basin and seek to comply with the due Ukrainian legislation. These measures will maintain high or good status of water bodies and will ensure achievement of good status by WBs at risk.

Supplementary measures include specific measures for particular WB at risk of failing to achieve good ecological status/potential. These measures ensure the improvement of ecological status of the WBs by 2021.

Basic measures are based on the national legislation and include:

- measures to streamline and modernise institutional and economic mechanisms for protection and recovery of water resources;
- measures to promote efficient and sustainable water use ;
- measures to protect drinking water sources;
- measures to control water abstraction and recharging of surface water and groundwater;
- measures to control point and diffuse pollution sources;
- measures to control priority substances (Annex X to EU WFD);
- measures to prevent all activities that affected water status;
- measures to avoid accidental spills/releases (oil spills, etc.).

In the case of Ukraine, the range of basic measures in the Program of Measures should include measures for harmonisation/approximation of the due environmental legislation of Ukraine to EU environmental acquis, including inter alia EU directives in the sphere of water quality and water resources management - the ones listed in Annex XXX to the EU-Ukraine Association Agreement. These measures are mandatory for execution by central executive bodies by December 2017 (applicable for the first planning cycle of the Upper Dnieper RBMP).

Competent bodies

The national authorities responsible for the Upper Dnieper River Basin management are the Ministry of Ecology and Natural Resources of Ukraine, the State Agency of Water Resources of Ukraine with its regional subsidiary - Dnieper Basin Management Directorate and the State Service for Geology and Mineral Resources of Ukraine.

Public participation and public consultations

The Ministry of Ecology and Natural Resources of Ukraine organized a stakeholder meeting to present and discuss the draft Upper Dnieper RBMP. The event was the starting point of stakeholders' consultations on the draft Upper Dnieper River Basin Management Plan. The consultations continued for four months - from April 29 to August 31, 2015. Consultation documents were posted on the Ministry's web-site menr.gov.ua. Stakeholders were provided opportunities to mail their comments to the following e-mail addresses: bon@menr.gov.ua, dnipro@menr.gov.ua.

Overall, in the course of the consultations, 74 comments were submitted by stakeholders and the general public, including 49 written comments from individual representatives of concerned public and 25 comments that were presented at the stakeholder consultative meeting in Kiev on April 29. Overall, 62 comments of stakeholders and the general public were taken into due account and incorporated into the final Upper Dnieper RBMP draft.

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