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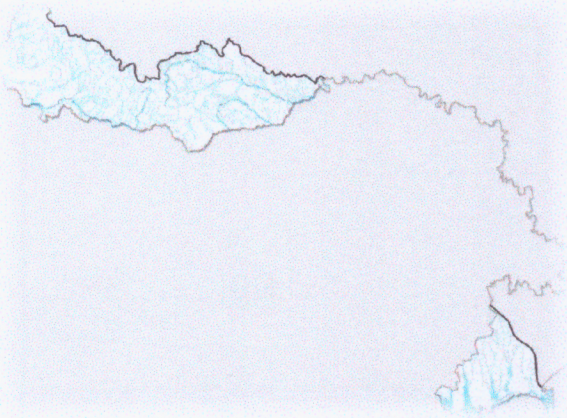
Report
on strategic environmental assessment
of the Danube River Basin Management Plan
(2025-2030)



Director of Scientific and production LLC Enterprise "Ukrekoproekt" **Bolbat D.**

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INTRODUCTION

At the current stage of society's development, the concept of balanced (sustainable) development, aimed at the integration of economic, social and environmental components of development, is gaining more and more importance in international, national and regional politics. The emergence of this concept is related to the need to solve environmental problems and take into account environmental issues in the processes of planning and decision-making regarding the socio-economic development of countries, regions and settlements.

After the signing of the Ukraine-EU Association Agreement in 2014, the process of approximating the national legislation to the EU legislation in the field of water resources management and water quality was started. In recent years, a number of laws and other regulatory acts have been developed and adopted. In particular, in 2016, the Verkhovna Rada of Ukraine adopted the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Regarding the Implementation of Integrated Approaches to Water Resources Management According to the Basin Principle," which enshrines the management of water resources according to the basin principle.

According to the Law "On Strategic Environmental Assessment", plans, as a state planning document, are subject to the strategic environmental assessment procedure, therefore the object of assessment of this SEA report is the state planning document of the national level - the Danube River Basin Management Plan (2025-2030), developed which is provided for by Article 132 of the Water Code of Ukraine.

Strategic environmental assessment - a procedure for determining, describing and evaluating the consequences of the implementation of state planning documents for the environment, including for public health, justified alternatives, developing measures to prevent, reduce and mitigate possible negative consequences, which includes determining the scope of strategic environmental assessment, drawing up a report on a strategic environmental assessment, conducting public discussion and consultations (if necessary, cross-border consultations), taking into account in the state planning document the report on a strategic environmental assessment, the results of public discussion and consultations, informing about the approval of the state planning document and is carried out in order, determined by this Law.

Strategic environmental assessment of state planning documents provides an opportunity to focus on a comprehensive analysis of the possible impact of planned activities on the environment and use the results of this analysis to prevent or mitigate environmental consequences in the process of strategic planning. Strategic environmental assessment (SEA) is a new tool for the implementation of environmental policy, which is based on a simple principle: it is easier to prevent negative environmental consequences of activities at the planning stage than to identify and correct them at the stage of implementing a strategic initiative.

The experience of many countries has demonstrated the high effectiveness of SEA as a planning tool that contributes to the quality of developed plans, programs, strategies, etc.

The strategic environmental assessment report was prepared in accordance with the Law of Ukraine "On Strategic Environmental Assessment" and methodological recommendations for strategic environmental assessment of state planning documents, approved by the order of the Ministry of Ecology and Natural Resources of Ukraine dated August 10, 2018 № 296.

The development of the SEA report will allow moving to the stage of approval of the Danube River Basin Management Plan (2025-2030), which will ensure a comprehensive and organized solution to issues related to improving the quality of water resources in the territory of the basin.

CONTENT

Sub and date | Deputy inv. No | inv. duplicate | Sub and date | inv. No. sub-

Am	How	document no.	Sub	Date
	Developer	Bilous Y.		
	Prov.	Bulgak A.		
	T. contr.	Bolbat D.		
	N. counter.	Bolbat D.		
	Utv.	Bolbat D.		

Report
on strategic environmental assessment
of the Danube river basin management plan
(2025-2030)

CONTENT

Stage	Sheet	Pages
	6	195

LLC "SPE "UEP"

Sub and date | Deputy inv. No | inv. duplicate | Sub and date | inv. No. sub-

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Report
on strategic environmental assessment
of the Danube river basin management plan
(2025-2030)

CONTENT

Stage	Sheet	Pages
	7	195

LLC "SPE "UEP"

ABBREVIATIONS AND ABBREVIATIONS

Plan, RBMP	Danube River Basin Management Plan (2025-2030)
SWM	Surface water massifs
GWM	Ground water massifs
ASWM	Artificial surface water massifs
SAFWM	Significantly altered surface water massifs
SPZ	Sanitary protection zone
WFD	Water Framework Directive of the European Union
RBR	River basin region
PE	Program of events
SPD	State planning document
SEA	Strategic environmental assessment
EIA	Environmental impact assessment
MPC	Maximum permissible concentration
PS	Polluting substances
STP	Sewage treatment plants
TP	Treatment plant
SPS	Sewage pumping stations
SHW	Solid household waste
NRF	Nature reserve fund
HES	Hydraulic engineering structures
FL	Fuel and lubricants
BWRA	Basin water resources administration
MWEP	The main water and ecological problems
SWOT	Strengths, Weaknesses, Opportunities, Threats.

SS	Severage systems
TC	Territorial communities
EGP	Erosive geological processes
ICE	Internal combustion engines
ROWR	Regional office of water resources
BOD	Biological oxygen demand
COD	Chemical oxygen demand

1 CONTENT AND MAIN GOALS OF THE PROGRAM, ITS CONNECTION WITH OTHER STATE PLANNING DOCUMENTS

1.1 Content and main goals of the RBMP

The Danube River Basin Management Plan (2025-2030) is a state planning document at the national level, which defines the main environmental goals for surface and underground waters and zones (territories) that are subject to protection and a set of measures to achieve them.

The development of the RBMP is provided for by Article 13^2 of the Water Code of Ukraine. The procedure for developing the RBMP was approved by Resolution № 336 of the Cabinet of Ministers of Ukraine dated May 18, 2017.

The RBMP project was developed by the State Water Resources Agency of Ukraine together with the State Geology and Subsoil Service of Ukraine, central and local executive bodies, local self-government bodies, other interested parties, taking into account the decisions of the basin councils of the Tisza, Prut and Siret rivers, the Black Sea and the lower Danube. Organizational measures for the development of river basin management plans and their implementation are carried out by the Ministry of Environmental Protection and Natural Resources of Ukraine and the State Water Agency.

The Danube River Basin Management Plan contributes to the implementation of the basin principle and an integrated approach to water resources management in the country and aims to achieve environmental goals for surface water, groundwater and zones (territories) subject to protection (Table 1.1.1).

Table 1.1.1 RBMP objectives

№	Object	Environmental goals
1	Surface waters	1) prevention of deterioration of the condition of all SWMs;
		2) achievement/maintenance of a good ecological and chemical state of all SWM natural categories (rivers, lakes, transitional and coastal waters);
		3) achievement/maintenance of good ecological potential and chemical state of significantly altered and artificial SWM;
		4) gradual reduction to the complete absence of contamination by hazardous substances.
2	Ground waters	1) prevention of deterioration of the condition of all medical facilities;
		2) achievement/maintenance of good quantitative and chemical condition of all GWM;

		3) prevention and limitation of groundwater pollution.
3	Zones (territories) subject to protection:	Achieving standards and goals as required by applicable law for:
		1) objects of the Emerald network;
		2) sanitary protection zones;
		3) zones of protection of valuable species of aquatic biological resources;
		4) massifs of surface / underground water used for recreational, medical, spa and health purposes, as well as water intended for bathing;
		5) zones vulnerable to (accumulation of) nitrates;
		6) vulnerable and less vulnerable zones, defined in accordance with the criteria approved by the Ministry of Environment.

In more detail about the environmental goals for each object and the predicted results in case of their achievement in table 1.1.2.

Table 1.1.2 Environmental goals for each facility provided for in the RBMP and projected changes in the event of the implementation of the PE

№	Object	The essence/purpose of the environmental goal	Methods, regulatory documents and relevant criteria	Environmental condition of the object before the implementation of measures	Projected environmental condition of the object after implementation of the measures
1	Massifs of surface water (SWM)	achieving/maintaining a "good" ecological and chemical state of the landfill	The classification of surface water bodies according to their ecological and chemical states is carried out according to the "Methodology of assigning a surface water body to one of the classes of ecological and chemical states of a surface water body, as well as assigning an artificial or significantly altered body of surface water to one of the classes of ecological potential of artificial or significantly changed massif of surface waters". For the "good" state, the values of biological indicators of the body of surface water indicate low levels of anthropogenic influence and deviate little from the values typical for	- "without risk" of not achieving a "good" ecological state/potential there are 394 SWMs, "possibly at risk" - 165 SWMs, "at risk" - 326 SWMs; - "without risk" of not achieving a "good" chemical state there are 752 SWMs, "possibly at risk" - 35 SWMs, "at risk" - 98 SWMs.	- a "good" ecological state/potential will be achieved by 438 SWM by 2030, of which 394 SWM are those that are currently "without risk" (they need to maintain this state), 31 SWM are 5% of SWM from those , which, according to the results of the anthropogenic load assessment, are "at risk" or "possibly at risk" of not achieving environmental goals, and will achieve environmental goals due to the implementation of PE measures; - other SWM of the basin, which are "at risk" or "possibly at risk" (447 SWM), can achieve "good" ecological status/potential by 2036 or 2042, subject to the implementation of PE measures.

			the body of surface water in reference conditions. The concentrations of chemical and physico-chemical indicators do not exceed the environmental quality standards established for the ecological status "good".		- a "good" chemical state will be achieved by 823 SWM by 2030, of which 752 SWM are those that are currently "without risk" (they need to maintain this state), and 62 SWM, which, according to the results of anthropogenic load assessment, are "at risk" or "possibly at risk" will achieve environmental goals no earlier than 2036 or 2042, subject to the implementation of PE measures.
2	Massifs ground water (GWM)	Achieving/maintaining a "good" chemical and quantitative state of groundwater bodies. Restoration of the monitoring network according to the state of the Ministry of Health.	The main criterion for a good quantitative state of the GWM should be considered the absence of groundwater depletion phenomena. In addition, for pressure-free GWM, the criterion of good condition is the appropriate condition of surface water bodies associated with them and the absence of a negative impact on surface ecosystems, primarily the suppression of vegetation. The criteria for a good quality (chemical) state of the GWM are the natural background content of	In the sub-basin of the Tisza River, 7 GWM were allocated, in the sub-basin of the Siret River - 4 GWM, in the sub-basin of the Prut River - 4 GWM, in the sub-basin of the lower Danube - 1 GWM. The underground water monitoring network is currently in a state of disrepair. Observations carried out in 2018-2020 did not meet the requirements of the current Procedure for State Water Monitoring in terms of either quantitative or qualitative indicators.	- it is predicted that all 7 groups of GWM of the Tysa sub-basin (3 non-pressure, 2 pressure and 2 pressure-non-pressure) can achieve a "good" quantitative and chemical state only in the 2nd cycle of the RBMP, no earlier than 2042, and only under the conditions of implementation of the proposed measures as for surface and underground waters. - 100% of the GWM of the Prut and Siret subbasins are predicted to maintain a "good" quantitative and qualitative condition until 2030.

			chemical elements and compounds, as well as the standards determined for drinking water by the State sanitary norms and rules "Hygienic requirements for drinking water intended for human consumption" (DSanPiN 2.2.4-171- 10).		- in the Lower Danube sub-basin, the 1 and only GWM will reach "good" quantitative status by 2030, and it will reach "good" chemical status in 2042.
3	Zones (territories) subject to protection, including:				
	- objects of the Emerald network	Achieving standards and goals as required by applicable law	---	There are 25 objects of the Emerald Network in the Danube basin, which cover approximately 16.8% (5059.07 km^2) of the area of the basin. None of the facilities has a developed management and development plan.	---
	- zones of sanitary protection	Achieving standards and goals as required by applicable law	- Decree of the Cabinet of Ministers of Ukraine "On the legal regime of zones of sanitary protection of water bodies" of December 18, 1998 № 2024	There are 229 water intakes in the Danube basin, which carry out water intake in the volume of more than 10 m^3 per day, of which 149 are underground water intakes, 80 are surface water intakes.	Compliance with the mode of use of water intakes in accordance with the Resolution.
	- zones of protection of valuable species of aquatic bioresources	Achieving standards and goals as required by applicable law	---	- zones of protection of valuable types of biological resources in Ukraine are not defined.	---
	- bodies of surface/groundwater	- the water quality of reservoirs and rivers	Conformity of water to standards:	As of July-August 2023, there are 8 places for public	Annual update of information on places of mass recreation in

	used for recreational, medicinal, spa and health purposes, as well as water intended for bathing	used in recreation areas must meet the requirements of sanitary legislation. - the composition and properties of water in the area of recreational water use must meet the requirements for physico-chemical and sanitary-microbiological indicators.	- DSanPiN 2.2.4-171-10 Hygienic requirements for drinking water intended for human consumption; -Order of the Ministry of Health of Ukraine "On the approval of Hygienic water quality standards of water bodies to meet drinking, household and other needs of the population" № 721 dated May 2, 2022. The need to comply with the requirements of the Resolution of the CMU dated 06.03.2002 № 264 "On approval of the Procedure for accounting for places of mass recreation of the population on water bodies"	recreation and rest in the Danube basin. According to the data of the State Emergency Service in the Odesa region, due to the martial law, recreation and rest areas in the sub-basin of the lower Danube were not used during 2022-2023	accordance with the resolution of the CMU dated 06.03.2002 № 264 "On approval of the Procedure for accounting for places of mass recreation of the population on water bodies"
	- ecological goals for zones vulnerable to (accumulation of) nitrates.	- compliance with the requirements of the EU WFD	Methodology for determining zones vulnerable to nitrates (Order of the Ministry of Environment of April 15, 2021 № 244), as required by the EU Nitrate Directive.	In order to determine the zones vulnerable to nitrates, the indicated information is of high quality and with a sufficient level of reliability. At the moment, the existing surface water monitoring network in its continuity and spatial coverage is not sufficient for the application of the developed method, and groundwater monitoring	- improvement of the monitoring network (both underground and surface water) and improvement of the database, to ensure a more detailed approach to the allocation of zones and their monitoring and, thus, to achieve full compliance with the EU WFD during the 2nd cycle of the river basin

				is not carried out at all. Therefore, for the period 2025-2030, it is proposed to define the entire territory of Ukraine as a zone vulnerable to nitrates. Applying this approach makes it possible to extend basic measures to the entire territory of the country and to plan more specific measures for bodies of surface and groundwater where there is a risk of not achieving environmental goals due to the impact of agriculture based on confirmed data.	management plan (2031-2036).
	-vulnerable and less vulnerable zones, defined in accordance with the criteria approved by the Ministry of Environment	Achieving standards and goals as required by applicable law	Order of the Ministry of Environment of January 14, 2019 № 6 (Registered in the Ministry of Justice of Ukraine on February 5, 2019 under № 125/33096) "On approval of the Procedure for determining the population equivalent of a settlement and Criteria for determining vulnerable and less vulnerable zones."	As of 2023, vulnerable and less vulnerable zones in Ukraine have not been determined. The State Water Agency has prepared a submission to local self-government bodies. The process of making relevant decisions by the competent authorities is ongoing.	Determination of vulnerable zones and their approval.

In Annex 10 to the RBMP, the environmental goals for SWM, GWM and groups of GWM, SWM within the zones (territories) subject to protection in the Danube RBR, which are planned to be achieved by 2030, and the reasons for the postponement and the setting of less stringent goals are given.

To achieve the above goals, the RBMP provides for the implementation of 294 main and 18 additional measures. The complete list of measures by sub-basins, their content is given in the relevant Annexes 13 (M5.3.1), (M5.3.2, M5.3.3), (M5.3.4) of the RBMP of the Danube River sub-basins.

Activities in the Danube basin are dominated by:

- construction/reconstruction/modernization of sewage treatment plants and sewage systems (SS). The construction of new STP and SS is planned to be carried out in 99 TCs, most in the sub-basins: Tysa (31), Prut and Siret (66);

- establishment of water protection zones and coastal protective strips;

- revitalization, restoration of the hydrological regime, clearing and improvement of the ecological condition of riverbeds, carrying out measures to mitigate channel regulation works. Such works include: management of sediments (extraction of bottom sediments), management of hydrotechnical structures (ecologically adapted mode of operation of the HES), management of vegetation (mechanical removal of trees and bushes) (73 measures).

Also, PE has scientific - research and informational and educational activities.

A brief description of the planned activities is presented in Table 1.1.3.

Table 1.1.3 Short list of RBMP measures

№	Object	Name of the event	Number of events
1	Surface waters	Measures aimed at reducing pollution by organic substances, biogenic substances and hazardous substances (diffuse and point sources).	- aimed at reducing pollution by organic substances (diffuse and point sources) - 207 measures; - aimed at reducing pollution by biogenic substances (diffuse and point sources) - 212 measures; - aimed at reducing pollution by hazardous substances (diffuse and point sources) - 209 measures.
		Measures aimed at improving/restoring the hydrological regime and morphological indicators	73
		Measures aimed at reducing the negative impact of infrastructure projects	2

		Measures aimed at reducing pollution and improving/restoring the hydrological regime and morphological indicators on transboundary SWMs	37
2	Ground waters	- measures aimed at reducing pollution (diffuse and point sources); - measures aimed at preventing groundwater depletion; - measures aimed at reducing the impact of planned infrastructure projects on the state of water.	2
3	Other measures	Other measures include the following additional measures: legislative and legal, administrative, fiscal, scientific and research, educational and educational, aimed at the introduction of new technologies, environmental and communication, project, and others.	14

The program of events (hereinafter - PE) was developed in accordance with the requirements of the "Methodical recommendations for establishing environmental goals, developing a program of measures and performing an analysis of the economic effectiveness of the program of measures of the River Basin Management Plan" (hereinafter - Methodological recommendations), approved at a meeting of the Scientific and Technical Council of the State Water Agency of Ukraine from July 12, 2023. The PE was developed by the Tisza river basin within the Transcarpathian region (the Tysa sub-basin), the Prut and Siret river basins within the Ivano-Frankivsk and Chernivtsi regions (the Prut and Siret sub-basins) and the Black Sea and Lower Danube river basin rivers within the Odesa region (the lower Danube sub-basin) according to Methodical recommendations and the Procedure for the development of the RBMP together with local executive bodies, local self-government bodies, non-governmental public organizations (hereinafter - NGOs), scientific and educational institutions (hereinafter - LEU) and other interested parties, taking into account the proposals and decisions of the basin councils of the specified sub-basins.

When developing the PE, the measures implemented or planned in the national RBMP of neighboring countries (Romania, Hungary, Slovakia, the Republic of Moldova) and the chemical state of transboundary SWM according to the monitoring data of 2022-2023 were taken into account. The PE was developed

for a period of 6 years, starting with the first cycle of the plan for 2025-2030. The start of implementation of the event must be no later than the third year after the start of the cycle (no later than January 1, 2028). During implementation, it is allowed to make additions and changes to the approved PE.

Funding of the measures provided for in the PE will be carried out at the expense of state and local budgets, as well as other sources not prohibited by law. Financing of the mentioned measures from the state budget is carried out within the limits of expenditures provided for by the State Budget of Ukraine for the relevant year.

The approval of the RBMP will allow the achievement of certain environmental goals, including ensuring balanced integrated management of water resources that does not deplete natural ecosystems and ensures the achievement/maintenance of "good" water status.

1.2 Connection of the RBMP with other state planning documents

The development of the RBMP corresponds to the Basic principles (strategy) of the state environmental policy of Ukraine for the period until 2030, approved by the Law of Ukraine dated February 28, 2019 № 2697-VIII, the Law of Ukraine "On Environmental Protection" dated June 25, 1991 № 1264-XII, goals and measures defined by the National Action Plan for Environmental Protection until 2025, approved by the Decree of the Cabinet of Ministers of Ukraine dated 04.21.2021 №. 443-r, the Water Strategy of Ukraine for the period until 2050, approved by the Decree of the Cabinet of Ministers of Ukraine dated 09.12. 2022 № 1134-r, the Marine Environmental Protection Strategy of Ukraine, approved by the order of the Cabinet of Ministers of Ukraine dated 11.10.2021 № 1240-r, and aimed at the implementation of Directive 2000/60/EC of the European Parliament and the Council of October 23, 2000 "On establishing the framework of activities Community in the field of water policy" (Water Framework Directive), which is an obligation of Ukraine within the framework of the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states, on the other hand.

During the development of the Project of the Danube River Basin Management Plan (2025-2030), tasks, measures and the degree of their implementation were taken into account, which were provided for in the previous budget programs of various levels and funds, which were implemented in the Danube river basin, in particular:

- The national target program for the development of water management and ecological improvement of the Dnipro river basin for the period until 2021;

- National target program "Drinking water of Ukraine" for 2011-2020;

- State target program for the development of land relations in Ukraine for the period until 2020;

- The national program for the development of protected affairs for the period up to 2020 (Program of NRF);

- Funds for the protection of the natural environment (hereafter PNE);

- "Regional target program for the development of water management and ecological improvement of the Tysa River basin in Zakarpattia Oblast for 2013-2021";

- Environmental Protection Program of the Transcarpathian Region for 2019-2020;

- Regional program "Drinking water of Transcarpathia" for 2006 - 2020;

- "Uzhgorod Environmental Protection Program for 2018 - 2022";

- "Regional environmental protection program until 2020", approved by the decision of the Ivano-Frankivsk Regional Council;

- "Regional target program "Drinking water" for 2012-2020", approved by the decision of the Ivano-Frankivsk Regional Council dated 04/06/2012;

- "Comprehensive program for the development of the agro-industrial complex and rural areas of the Ivano-Frankivsk region for 2016-2020";

- "Regional target program for the development of fish farming for the period until 2020", approved by the decision of the regional council dated 04.18.2013 № 898-21/2013;

- "Comprehensive program for the development of water management and flood protection in Chernivtsi region for the period until 2021";

- "Regional program "Drinking water of the Chernivtsi region for 2006 - 2020", approved by the decision of the Chernivtsi regional council dated October 6, 2005;

- Comprehensive environmental protection program "Ecology" in Chernivtsi region for 2019-2021;

- "Municipal Water Management Project of Chernivtsi, Stage 1, 2" Municipal Climate Protection Program II)";

- Regional water management development program of the Odesa region for the period until 2021;

- Odesa regional comprehensive environmental protection program for 2020-2021;

- Comprehensive program of environmental protection, rational use of natural resources and ensuring environmental safety in the Odesa region for 2014-2019";

- Regional program for the development of land relations and land protection for 2016-2020, approved by the decision of the Odesa Regional Council;

- Regional program "Drinking water of Odesa region for 2010-2013 and for the period until 2020;

- Program for improving the environmental situation in the city of Kilia for 2018-2022.

Most of the measures of environmental protection programs were underfunded or financed according to the residual principle, or the principle of urgent necessity, when a critical, emergency environmental situation is already occurring.

The main active programs related to the RBMP are:

- Flood risk management plan for individual territories within the Danube River basin area for 2023–2030;

- Nationwide targeted social program "Drinking water of Ukraine" for 2022-2026;

- "Regional development strategy of the Transcarpathian region for the period 2021 - 2027";

- Program for the development of cross-border cooperation of the Transcarpathian region for 2021-2027;

- "Comprehensive program for the development of land relations in the Chernivtsi region for 2017-2021";

- Regional program "Drinking water of Odeshchyna" for 2021-2024;

- Environmental protection programs of the Ivano-Frankivsk region for 2021-2025;

- Regional comprehensive environmental protection program of Odesa region for 2024-2028;

- Development strategies of Odesa, Ivano-Frankivsk, Chernivtsi and Odesa regions until 2027 and their communities;

- Regional, regional, local programs, programs of socio-economic development;

- Investment program for the development of enterprises;

- Program of PNE of Zakarpattia Oblast until 2030;

- National waste management plan until 2030 dated February 20, 2019;

- Comprehensive program of environmental protection measures "Ecology" in Chernivtsi region for 2022-2026;

- EU strategy for the Danube region;

- Ukraine recovery plan;

- "Danube Regional Program 2021-2027", approved by the European Commission in November 2022.

Regarding the review of the financing of regional local programs and the implementation of environmental protection measures, it can be stated that only in all 4 sub-basins of the Danube (Tysa, Prut, Siret and Lower Danube) and, in particular, in each of the 4 administrative regions that are part of the sub-basins (Zakarpatska, Ivano- Frankivsk, Chernivtsi and Odesa), targeted regional programs were developed and approved by the sessions of the regional councils according to the directions in accordance with the national target programs. For Zakarpattia Oblast, where the sub-basin of the Tysa River is completely located within the region, the allocated environmental protection funds came specifically for solving the main water and ecological problems (hereinafter - MWEP) of the Tysa RBR. For the other 3 oblasts, where the subbasins of the Danube partially occupy the territory, the funds were distributed among other river basins within the administrative territories of the oblasts. This distribution of allocations in each administrative region was different and was not determined by the needs of one or another river basin, but was decided by local, town administrative-territorial needs, unsystematically, without taking into account the basin principle of making management decisions.

Traditionally, each region developed, so to speak, "its" environmental protection development program, adding the specificity of the region. If the administrative-territorial regions of the Tisza, Prut, and Siret subbasins singled out the issues of protection against the harmful effects of water (anti-flood protection), restoration of the hydrological regime of rivers, preservation and expansion of the NRF, and the increase of forest cover, then the Odesa region of the lower Danube subbasin prioritized the issue of development in nature protection target programs agro-industrial complex, provision of water resources for irrigation needs, development of water transport and protection of land resources of the region. Each region had its own specificity in the names of the Programs, terms and stages of implementation. Some regional councils made changes to regional programs in advance, both in terms of validity and in terms of funding sources, while others left everything unchanged. Despite the specifics, the names of the regional target programs, the changes made, funds from both the state and local budgets for the implementation of the Program's activities were insufficient. Some state programs

were not funded for years, and the entire burden of solving urgent environmental and socio-economic problems of the sub-basins fell on local regional programs.

Taking into account the economic situation in the country, the state budget is not able to finance significant expenses for water management and reclamation, housing and communal or nature protection complexes, therefore, at the present time and in the near future, in order to solve the problems to which the regional programs were aimed, separate new administrative formations (TC) began to focus on their own investments, to find for this the internal reserves of enterprises and funds in the regional, district budgets and budgets of united territorial communities, to attract international technical assistance, taking into account the cross-border aspect of sub-basins. And the first to help local TCs to lay the foundation for future action planning with the involvement of international technical assistance should be a regulatory document, a "roadmap" - the first RBMP with a complete list of programs (plans) for the Danube river basin area, their content and problems that is planned to be resolved within 2025-2030.

2 CHARACTERISTICS OF THE CURRENT STATE OF THE ENVIRONMENT, INCLUDING THE HEALTH OF THE POPULATION, AND FORECAST CHANGES OF THIS CONDITION, IF THE STATE PLANNING DOCUMENT IS NOT APPROVED (ACCORDING TO ADMINISTRATIVE DATA, STATISTICAL INFORMATION AND RESEARCH RESULTS)

In the analysis and assessment of the current state of the environment of the territories within the river basin, statistical and official data of the executive authorities implementing state policy in the field of environmental protection and health protection were used. Information that is included in other SPDs related to this RBMP was also used.

The main sources of data were Regional reports on the state of the natural environment, Ecological passports, information provided in sections 1-3 of the draft Danube River Basin Management Plan (2025-2030) and management plans for the Tisza, Prut and Siret river subbasins and the lower Danube. Also, during the work, data from monitoring studies provided by the State Water Agency of Ukraine were analyzed. Additionally, other SPDs were developed, such as the Flood Risk Management Plan in individual territories within the Danube River Basin District for 2023-2030, Development Strategies for the Regions within which the relevant river basin is located.

2.1 General characteristics of the river basin

The area of the Danube river basin is divided into three parts by the area of the Dniester river basin and the water management section of the Black Sea coast between the mouth of the Danube river and the Dniester estuary, it consists of the subbasins of the Danube, Tisza, Prut, Siret rivers within the borders of Ukraine, transitional waters and coastal waters (the Black Sea water area between the coastline and a line in the territorial sea at a distance of one nautical mile from the baseline used to determine the width of the territorial sea). The border of the Danube basin runs along the state border section with the Republic of Poland, the Slovak Republic, the Republic of Hungary, Romania, the Republic of Moldova and through populated areas along the watershed line.

The pool is located within four oblasts of Ukraine (Zakarpattia, Ivano-Frankivsk, Chernivtsi and Odesa oblasts). The sub-basin of the Tisza River is entirely located within the Zakarpattia region, the sub-basin of the Prut and Siret rivers is located in the territory of Ivano-Frankivsk and Chernivtsi regions, and the sub-basin of the Lower Danube in Odesa (Figure 2.1.1).

Table 2.1.1 Share of area and population of regions within the Danube RBD, %

Regions	The share of the area of the region within the basin	The share of the population of the region within the basin
Zakarpattia	100	100
Ivano-Frankivsk	35	30
Chernivtsi	81	86
Odesa	21	14

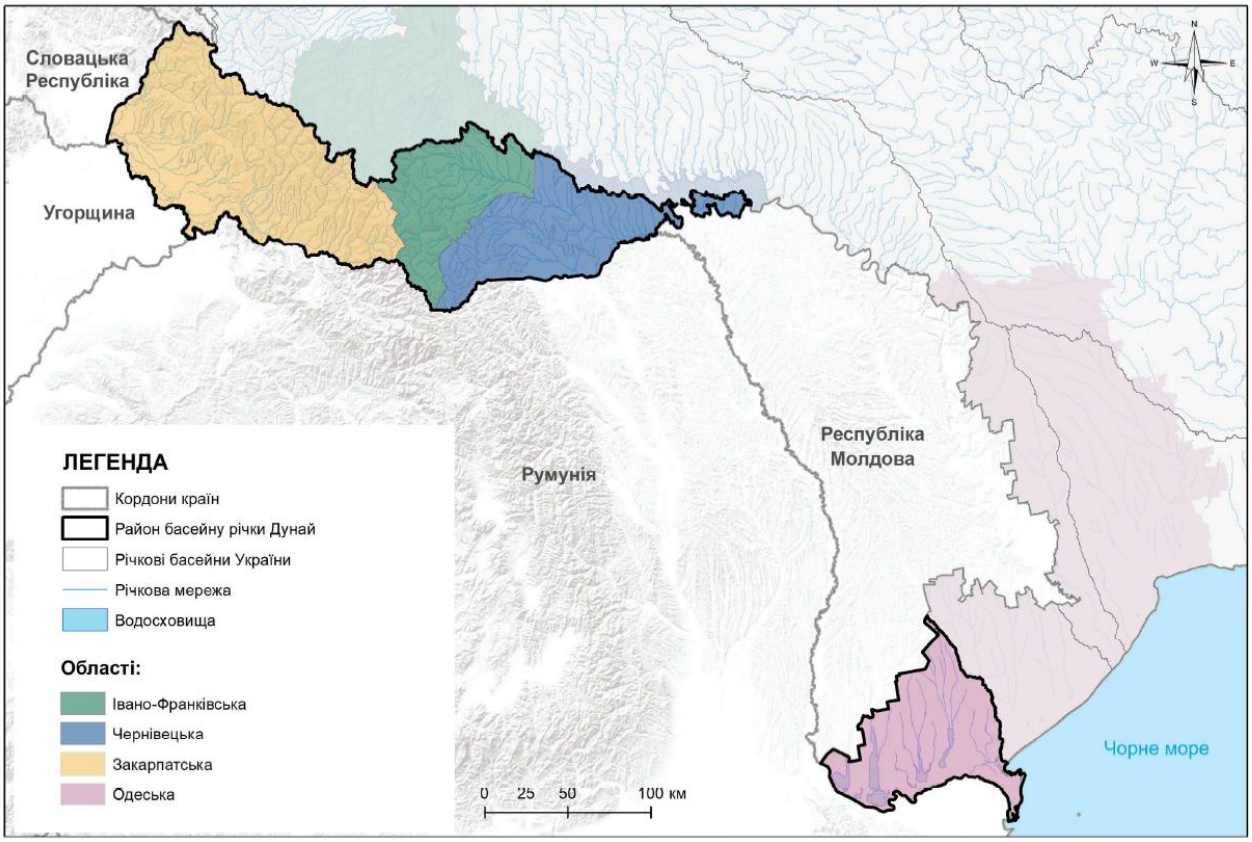


Figure 2.1.1 Administrative units of the Danube basin area

The hydrographic network of the basin includes 335 rivers with a catchment area of more than 10 km^2 and 16 lakes (with an area of more than 0.5 km^2).

The subbasin of the Tisza River is located to the south and southwest of the main watershed ridge of the Ukrainian Carpathians. The topography of the sub-basin area is mainly mountainous and changes rapidly from the highlands in the northeast (with average elevations of 1,800-2,000 meters) to lowlands in the southwest (with average elevations of 100-200 meters).

The subbasins of the Prut and Siret rivers are located to the east of the watershed ridge of the Ukrainian Carpathians. The topography of the territory of these sub-basins is mainly mountainous. The midlands of the Prut River subbasin

with average elevations of the earth's surface of 1,500-2,000 meters change to mountainous relief with average elevations of 290-550 meters in the eastern direction. In the sub-basin of the Siret River, the highlands with elevations of 900-1,100 meters decrease also in the eastern direction to the highlands with elevations of 350-500 meters.

The Lower Danube subbasin is mixed in the conditions of the lowland relief of the Black Sea Lowland. The maximum elevations of the land surface of the Lower Danube sub-basin run along the watershed line between the areas of the Danube and Black Sea river basins and do not exceed 210 meters. Cross-sectional elevations of the earth's surface of the Lower Danube subbasin are 10-180 meters.

According to the order of the Ministry of Ecology and Natural Resources of Ukraine № 103 dated March 3, 2017 "On the approval of the boundaries of the districts of river basins, sub-basins and water management areas", 8 water management areas are allocated in the Danube basin.

2.2 Climatic conditions

The Danube RBR is entirely located in temperate latitudes and is characterized by a temperate climate, but its fragmentation determines that the manifestation of a temperate climate will be different for different sub-basins. The sub-basins of the Tisza, Prut and Siret rivers are located in the forest Atlantic-continental region, and the sub-basin of the lower Danube in the steppe Atlantic-continental region.

A significant part of the subbasins of the Tisza, Prut and Siret rivers is located in the Ukrainian Carpathians. On average, 1,200 mm of atmospheric precipitation falls in this part of the Danube River Basin District, in some years up to 1,650 mm. 690-1100 mm can fall in the Transcarpathian lowland of the sub-basin of the Tisza river per year, and 650-890 mm in the Prikarpattia sub-basins of the Prut and Siret rivers. For the lower Danube sub-basin, the annual amount of atmospheric precipitation varies from 370 to 520 mm, but the average is 500 mm. The largest amount of atmospheric precipitation falls in the warm period of the year (April-October) - 60-70%. During this period, 800-1000 mm falls in the Ukrainian Carpathians, 550-600 in the Transcarpathian Lowlands, and 475-600 mm in the Precarpathia. In the sub-basin of the lower Danube, 275-325 mm falls in the warm period.

In the cold period of the year (November-March), the amount of precipitation rarely exceeds 30-40% of the annual amount. So, in the Ukrainian Carpathians in the cold period, it falls to 500-600 mm. The Transcarpathian lowland of the Tisza

River subbasin receives up to 250-300 mm. In the Carpathian part of the sub-basins of the Prut and Siret rivers, it falls to 175-300 in the cold period. In the sub-basin of the lower Danube, up to 200 mm falls in the months of the cold period.

The duration of snow cover varies from 70 to 150 days in the subbasins of the Tisza, Prut and Siret rivers, where the longest duration is in the mountainous parts of these subbasins. In the sub-basin of the lower Danube, the annual duration of snow cover rarely exceeds 40-50 days.

The air temperature distribution of the Danube River Basin District is also heterogeneous. The average long-term air temperature of the lower Danube subbasin is the highest in the basin - about 10.5°C. In the subbasins of the Tysa, Prut, and Siret rivers in the Ukrainian Carpathians, the average annual temperature is about 4.0°C, but to the southwest of the mountains, the average annual temperature rises to 8.0-9.0°C within the Transcarpathian lowlands of the Tysa River subbasin. To the northeast of the mountains, within the Carpathian region, the average annual air temperature rises to 7.0°C.

In recent years, there has been a trend towards an increase in air temperature, changes in the thermal regime and precipitation structure, an increase in the number of dangerous meteorological phenomena and extreme weather conditions, and the damage they cause to various sectors of the economy and the country's population. The biggest changes were observed during the last thirty years, which turned out to be the warmest during the period of instrumental weather observations.

The increase in air temperature is observed not only near the earth's surface, but also in the lower troposphere, accompanied by an increase in the moisture content of the troposphere, and causes an increase in the instability of the atmosphere and an increase in the intensity of convection. Such changes led to an increase in the frequency and intensity of convective weather phenomena: thunderstorms, downpours, hail, squalls, an increase in the maximum intensity of precipitation and its downpour component.

Representative trajectories of greenhouse gas concentrations (hereinafter - RTK) have different trajectories of emissions and concentrations in the atmosphere, emissions of polluting substances and features of land use in the 21st century (in particular, changes in the area of forested areas) and their corresponding consequences. Specifically, two RTK scenarios were chosen for this study: the "soft" RTK 2.6 scenario, which, according to the Paris Agreement, provides for the reduction of greenhouse gas emissions, and the "hard" RTK 8.5 scenario, which does not take into account any climate adaptation or mitigation measures . All scenarios demonstrate a stable increase in the average annual temperature during the 21st

century. in all regions. At the end of the century, the average annual air temperature averaged across regions is expected to increase by 2-5°C under various scenarios. Scenarios of global greenhouse gas emissions (Sources: USGCRP/GlobalChange.gov, UHMI 2014) As a result of the study, simulated changes in the average annual water flow of rivers (flow rates) of the RBR of Ukraine for two future periods (2041-2070 and 2071-2100) were calculated.) according to RTK 2.6 and RTK 8.5 scenarios.

The water-heat balance of river basins is too sensitive to climate changes. An increase in air temperature and a change in the nature of precipitation affect not only the hydrological regime of rivers, but also the general reserves of water resources. Climate change increases the frequency of floods and droughts, making agriculture, energy, transport and social sectors vulnerable, as they depend on water resources.

In the period 2041-2070, fluctuations in the values of the average annual flow are expected. An increase in the water flow of the rivers of the Carpathian region will manifest itself in the formation of catastrophic floods on mountain rivers and may lead to significant economic losses in all sectors of the economy and in territorial communities in the sub-basins of the Tisza, Prut and Siret. Small rivers of the southern regions experience severe water stress due to the reduction of surface runoff (by 5-25%) and its redistribution by season.

2.3 Atmospheric air

Since the maintenance of statistical information on the state of atmospheric air in the section of river basins is not foreseen, the data were considered for regions located within the Danube basin, namely Zakarpattia, Chernivtsi, Ivano-Frankivsk and Odesa regions (see Table 2.1.1).

Information on the state of atmospheric air was analyzed on the basis of data specified in reports on the state of the environment for 2022.

2.3.1 State of atmospheric air in Ivano-Frankivsk region

In the region in 2022, emissions of pollutants into the atmosphere from stationary sources amounted to 152.3 thousand tons, which in comparison with the previous year decreased by 11.6%.

A significant contribution to atmospheric air pollution is made by carbon dioxide, which reached 10.1 million tons (15.8% less compared to 2021) - the main greenhouse gas that affects climate change.

The dynamics of emissions of polluting substances into the atmosphere for 2018-2022 is presented in Table 2.3.1.1.

Table 2.3.1.1 Dynamics of emissions of polluting substances into atmospheric air for 2018-2022

Years	Discharge into atmospheric air			Density of emissions per 1 sq. km, tons	Volumes of emissions per person, kg
	In total	Including			
		Stationary sources	Movable sources		
2018	221.4	221.4	-	15.9	161.0
2019	205.02	205.02	-	14.7	149.6
2020	178.1	140.4	37.7	-	-
2021	210.3	172.4	37.9	-	-
2022	152.3	152.3	-**	-	-

*According to the data of the Main Department of Statistics in the Ivano-Frankivsk region

**Data on pollutant emissions from mobile sources for 2022 are under processing.

The main air polluters by types of economic activity continue to be enterprises supplying electricity, gas, steam and air conditioning, which account for 89.5% of regional emissions, the share of mining and quarrying is 3.5%; processing industry - 3.1%; transport, warehousing, postal and courier activities – 2.1%; agriculture, forestry and fisheries - 1.4%; other branches of the economy - less than 1% (Figure 2.3.1.1).

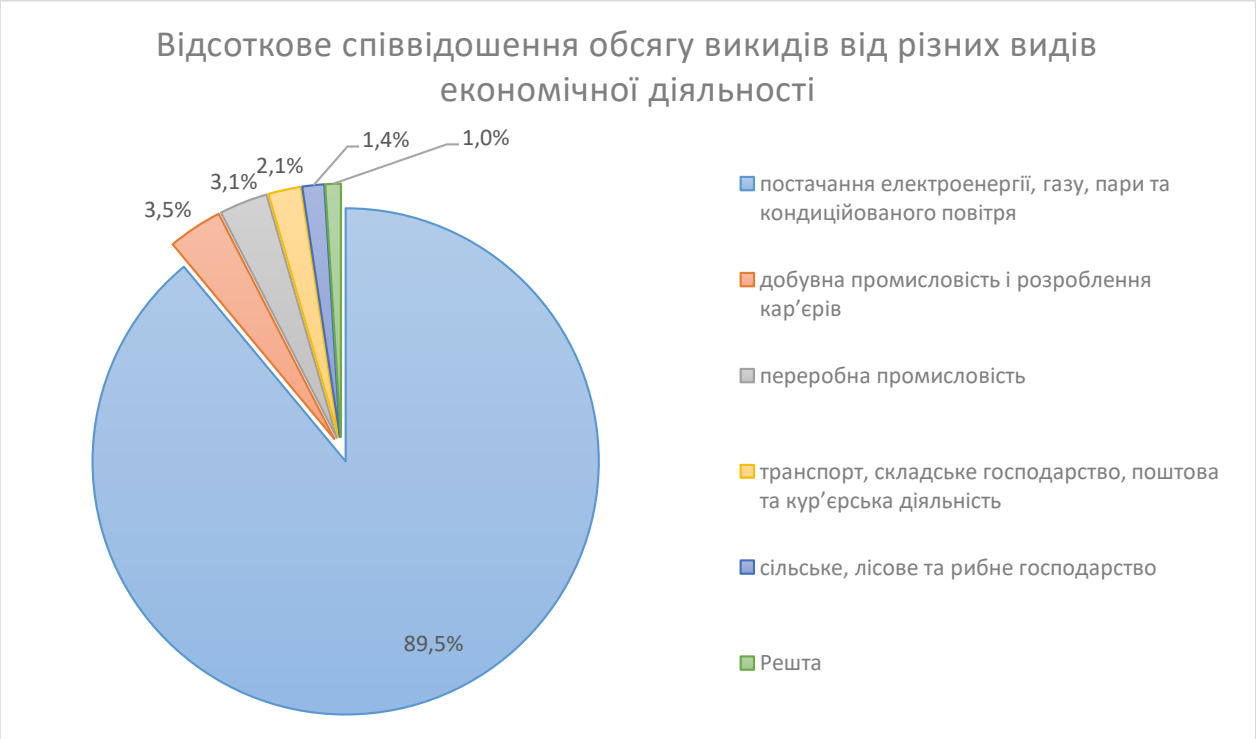


Figure 2.3.1.1 Air pollutant emissions by types of economic activity (%) in Ivano-Frankivsk region

Atmospheric air quality in populated areas of the region. According to the data of the State institution "Ivano-Frankivsk Regional Center for Disease Control and Prevention of the Ministry of Health of Ukraine" for the purpose of monitoring

the levels of atmospheric air pollution in 2022, 5,815 samples of atmospheric air in urban settlements were examined, in 154 samples exceeding the maximum permissible maximum single concentrations of pollutants. Exceedings of established standards for dust, nitrogen dioxide, ammonia, sulfur dioxide, carbon monoxide and formaldehyde were mainly recorded. In rural settlements, 3,863 samples were examined, in which no exceedance of the MPC was detected.

2.3.2 State of the atmospheric air in Zakarpattia Oblast

During 2021, there was a slight decrease in emissions of pollutants into the atmospheric air from stationary sources of pollution. The volumes of pollutants that entered the air basin in 2021 from stationary sources of pollution, according to the data of the Main Directorate of Statistics, decreased by 15% compared to 2020 and amounted to 2.8 thousand tons against 3.3 thousand tons in 2020 year Of the total number of emissions of pollutants, 29% are substances belonging to greenhouse gases, in particular, methane. In addition, 0.2 million tons are the volume of carbon dioxide emissions.

The decrease in the volume of pollutant emissions into the atmospheric air occurred due to the main atmospheric air polluters in the region of JSC "Zakarpatgaz" and main gas pipelines of the Zakarpattia regional linear production management of main gas pipelines, more specifically, from the amount of gas pumped by these enterprises.

The distribution of pollutant emissions into atmospheric air by types of economic activity is presented in Figure 2.3.2.1.

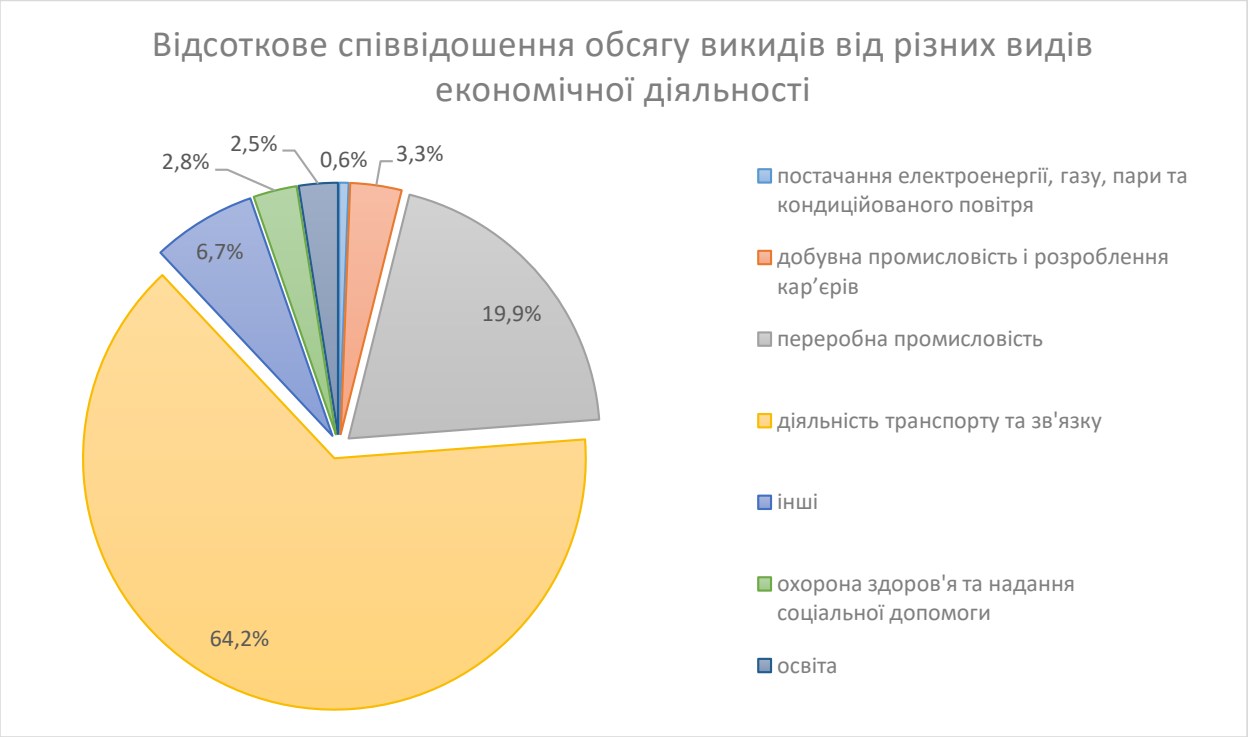


Figure 2.3.2.1 PS emissions from various economic activities (%)

Motor vehicles continue to be the main polluter of atmospheric air in Zakarpattia Oblast. It has grown significantly in recent years the number of road transport, the growth of gas stations is noted, which is a significant source of atmospheric air pollution.

Among stationary sources, the causes of atmospheric air pollution are the amount of pumped gas, outdated technical equipment, preventive maintenance work at compressor stations. Inefficient operation of outdated gas cleaning equipment is observed at the asphalt concrete plants of Zakarpattia Oblavtodor, powerful boilers of Mukachevo, Berehivo and Khust heat networks. The boiler rooms of the Ministry of Transport and Communications of Ukraine are also poorly equipped with ash collectors.

Transboundary pollution. According to the Transcarpathian Regional Center for Hydrometeorology, monitoring points for atmospheric air pollution are located only in the city of Uzhhorod.

In 2022, no transboundary air pollution was detected in the territory of Zakarpattia Oblast.

Atmospheric air quality in populated areas of the region. In 2022, 11 separate structural subdivisions of the "Transcarpathian Regional Center for Disease Control and Prevention of the Ministry of Health of Ukraine" performed atmospheric air research in populated areas of the region to determine the state of its pollution. Sampling took place at route monitoring posts, and the results of laboratory tests

were determined for 7 ingredients and were evaluated as maximum single concentrations. In 2022, 1,164 samples of atmospheric air were collected and analyzed, 7 of which were found to exceed the MPC of pollutants (0.6%): in terms of dust concentration - 4 (Mukacheve - 1, Khust - 1 and Svalyava - 2), for sulfuric anhydride – 3 (Mukacheve – 1, Khust – 2).

It is impossible to assess the possible negative impact of atmospheric air on the health of the population even in individual regions of the region based on the data of the laboratories of the Zakarpattia OTSKPH of the Ministry of Health.

2.3.3 State of atmospheric air in Chernivtsi region

In recent years, due to the decline in production activities and the transition from solid to gaseous fuels, there has been a decrease in emissions of pollutants into the air. In 2022, 1.42 thousand tons of harmful substances were released from stationary sources (in 2021 - 1.66 thousand tons).

The main source of atmospheric air pollution in the Chernivtsi region is emissions from mobile sources (exhaust gases from motor vehicles). The commissioning of the bypass road for the regional center made it possible to improve the state of atmospheric air in the city of Chernivtsi.

The dynamics of emissions into the atmospheric air of the Chernivtsi region are given below.

Table 2.3.3.1 Dynamics of atmospheric emissions of Chernivtsi region for 2020-2022

Indexes	2020 year	2021 year	2022 year
1	2	3	4
The total number of business entities that emit pollutants into the atmosphere, units.	141	127	-
The total number of entities of entrepreneurial activity registered in the state register, units.			
The total number of subjects of business activity that received permission to emit pollutants into the atmosphere (objects of II-III groups), units.	58	79	93
The potential volume of pollutant emissions into atmospheric air from stationary sources of registered business entities, thousand tons			
Emissions of pollutants into atmospheric air from stationary and mobile sources, thousand tons including:			
from stationary sources, thousand tons	1.8	1.66	1.42
from mobile sources, thousand tons			
including from road transport, thousand tons			

Emissions of pollutants into atmospheric air from stationary and mobile sources per km², t			
Pollutant emissions per unit of gross regional product, t/million UAH			
Emissions of pollutants into atmospheric air from stationary sources in the calculation per km², i.e	0.2	0.2	0.2
Emissions of pollutants into atmospheric air from stationary sources per person, kg	2.0	1.9	1.6
Emissions of pollutants into the atmosphere from mobile sources per km², i.e			

The number of emissions of polluting substances into the atmospheric air by types of economic activity is presented in figure 2.3.3.1.

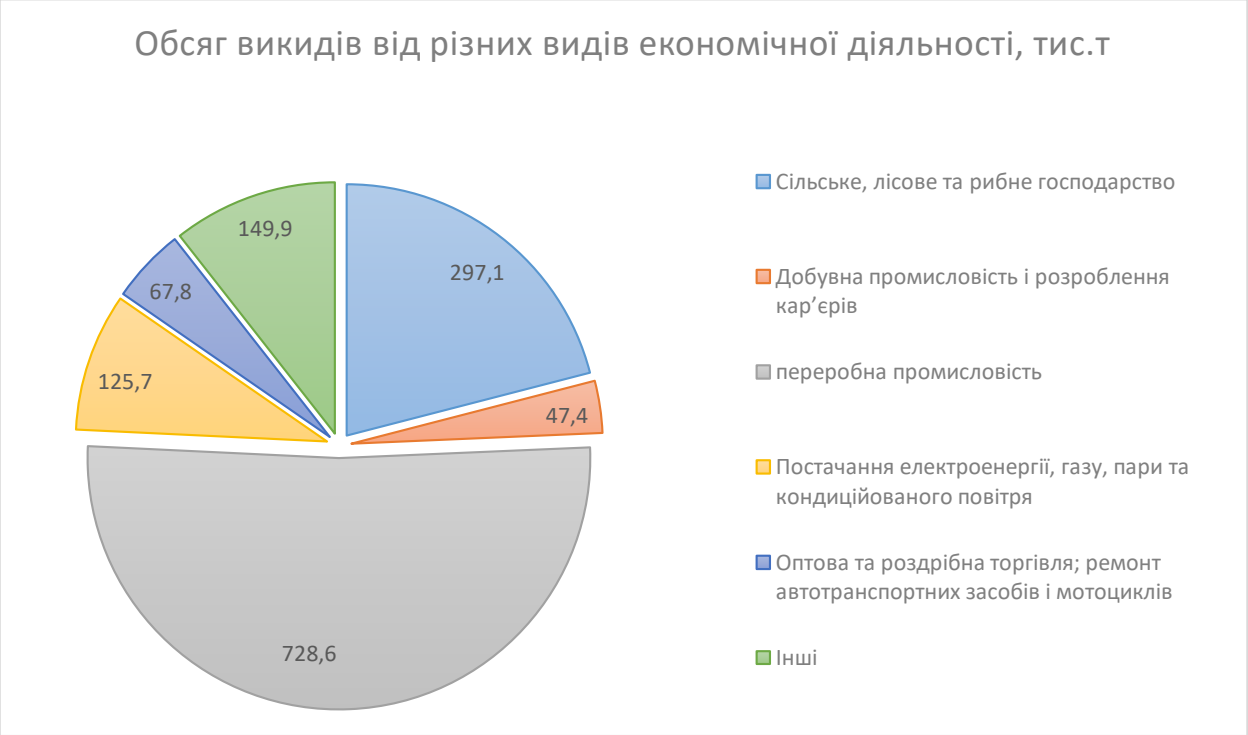


Figure 2.3.3.1 PS emissions from various economic activities in 2022, (thousand tons)

By type of economic activity, the processing industry accounts for the largest emissions (51.4% of total emissions). For agriculture, forestry and fishing - 21.0% of the total amount of emissions.

Transboundary pollution. The impact of emissions into the atmospheric air of the Chernivtsi region by the enterprises of the neighboring states of Romania and Moldova is minimal due to the absence of enterprises in the border zone of these

countries, which could exert a significant influence on the state of the atmospheric air of the region. This is also facilitated by the predominance of northwesterly winds on the territory of the rose region.

Atmospheric air quality in populated areas of the region. The Chernivtsi Regional Center for Disease Control and Prevention of the Ministry of Health of Ukraine examined 100 samples of atmospheric air in the city of Chernivtsi, namely: 16 samples for dust, 8 samples for formaldehyde, 26 samples for nitrogen dioxide, 24 samples for sulfur dioxide, 26 samples on carbon oxide. Exceeding the maximum permissible concentration has not been established.

2.3.4 State of atmospheric air in Odesa region

Odesa Oblast is a region that stands out in the economic complex of Ukraine for its transport and distribution functions, developed industry, and intensive agricultural production. The total number of enterprises that influence the state of atmospheric air in the course of their activity is more than 3,000 economic entities.

Almost three-quarters of all emissions of polluting substances in the region (70.4%) were carried out by enterprises supplying electricity, gas, steam and air conditioning, 15.9% by enterprises of the processing industry (Figure 2.3.4.1).

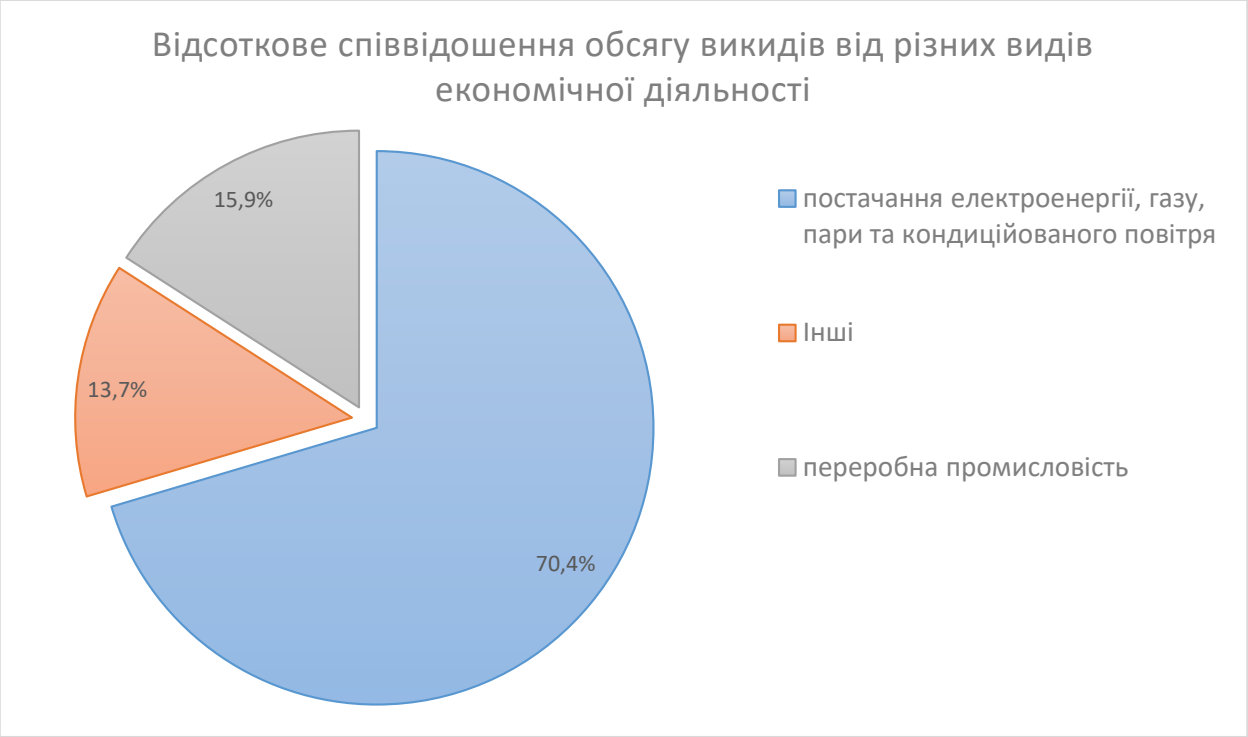


Figure 2.3.4.1 PS emissions from various economic activities (%)

The dynamics of emissions into the atmospheric air of the Odesa region are shown in table 2.3.4.1.

Table 2.3.4.1 Dynamics of emissions into the atmospheric air of the Odesa region during 2018-2021

Years	Emissions into atmospheric air, thousand tons			Density of emissions per 1 sq. km, kg	Density of emissions per 1 sq. km, kg	The volume of emissions per unit of GRP
	In total	Including				
		stationary sources	mobile sources			
2018	129.4	37.4	92.0	3884, 3	54.3	-
2019	126.8	33.1	93.7	3806.2	53.3	-
2020	123.8	42.6	81.7	3716.2	52.3	-
2021	130.4	35.9	94.5	3914.3	55.5	

The quantitative contribution of the main pollutants is: methane - 72% of the total volume, substances in the form of solid suspended particles - 8.1%, carbon monoxide - 9.1%, nitrogen dioxide - 4.3%, sulfur dioxide -2.3%, non-methane organic compounds - 1.9%, ammonia - 1.8%. Most of the emissions were carried out in the city of Odesa - 21.72 thousand tons (Figure 2.3.4.2).

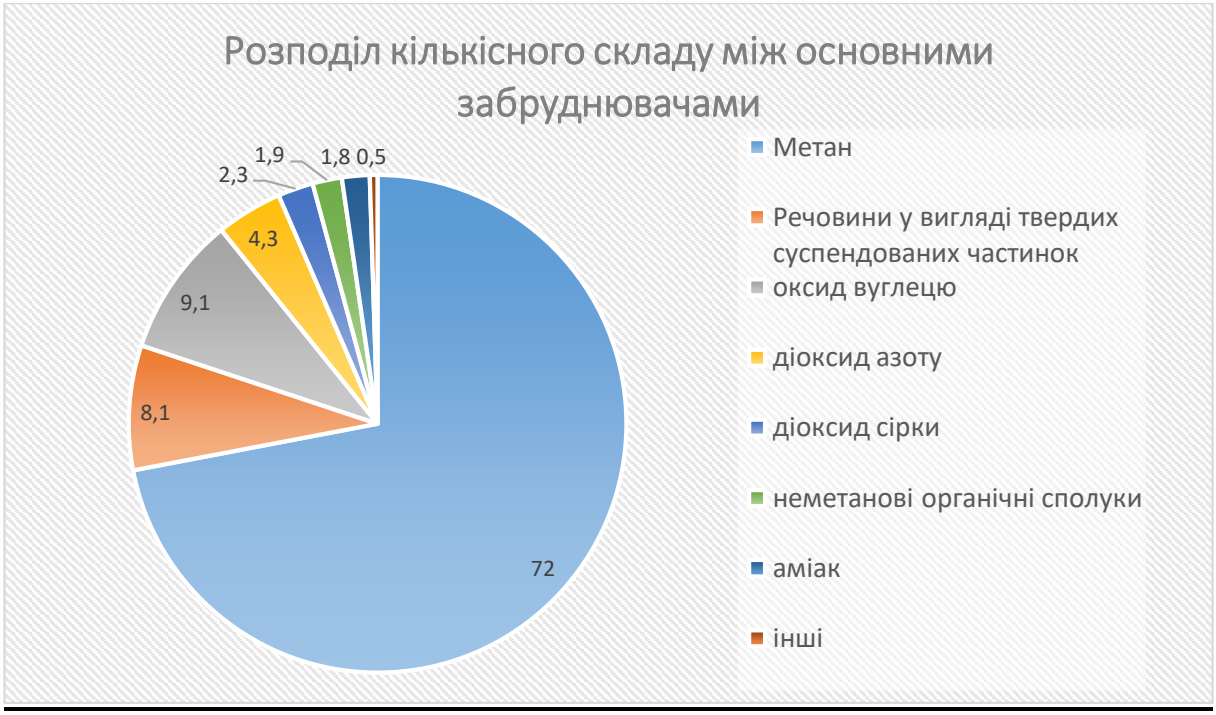


Figure 2.3.4.2 Quantitative contribution of the main air pollutants of Odesa region

It should be noted that the city of Odesa is located within the river basin of the Black Sea, not the Danube.

The monitoring of atmospheric air in Odesa was carried out by the mobile ecological laboratory of the KP "Municipal Center for Environmental Safety" of the Odesa City Council at approved control points located at the intersections of the

city's transport highways, on the borders of sanitary protection zones of potentially dangerous objects in Odesa , in the coastal zone, as well as in parks and squares, in accordance with the approved schedule plan.

Observations were carried out with automatic sampling and concentration measurements by gas analyzers for 6 pollutants (carbon monoxide, ozone, hydrogen sulfide, sulfur dioxide, dust, nitrogen dioxide).

During the reporting period, 116 visits and 1,000 observations with automatic sampling and 5,015 determinations of pollutant concentrations at established points on the territory of cities were made.

In the coastal zone, as well as in the park zone of the city, the monitoring showed the minimum content of pollutants in the atmospheric air.

According to the Hydrometeorological Center of the Black and Azov Seas, the ecological situation in many areas of the city of Odessa remained unsatisfactory, and the concentration of some harmful substances exceeded the permissible limits. One of the causes of pollution is the use of electric generators by many enterprises and private entrepreneurs due to the long-term lack of electricity in the city.

The highest level of air pollution by basic and specific substances was observed in the northern and northwestern industrial zones of the city.

The level of air pollution in the city of Odesa (IZA=14.48) is higher than the average for Ukraine (IZA in Ukraine equals 7.1). The average content of formaldehyde is 5.0 times higher than the average daily maximum permissible concentration, nitrogen dioxide - 2.0 times, dust, phenol - 1.3 times, sulfur dioxide - 1.1 times.

In general, in the city, compared to 2021, the general level of pollution has almost not changed.

2.4 Water resources

The Danube RBR on the territory of Ukraine consists of three sub-basins, which differ in terms of relief, geological rocks, soil cover, etc.

The Danube River is the second river in Europe in terms of length and basin area, it is 2,860 km long, 174 km in the Odesa region and is the main water artery in the south of Ukraine for providing water to the population and economic sectors (irrigation, drinking needs, industry, shipping and other).

The specificity of the Ukrainian part of the Tisza RBR is that it is located exclusively within the limits of one administrative-territorial unit - Zakarpattia Oblast. This fact has a positive meaning from the point of view of river subbasin management. A natural feature of the Tisza river basin is that its Ukrainian part is

located in the upper reaches of the basin, and it is here that the chemical composition of the water and most of the river's flow is formed.

An important feature of the Prut and Siret rivers is high water content. The regimes of the Tisza, Prut and Siret rivers are characterized by frequent floods of varying intensity, which poses a real threat not only to the economic sphere, but also to the lives of people living in the specified sub-basins.

Within the area of the Danube river basin are the objects of the Emerald Network, wetlands protected by the Ramsar Convention.

Taking into account the physical and geographical location of the Danube River basin area and its climatic conditions, the hydrological regime of its watercourses varies significantly across the territory. According to the characteristics of the water regime, the rivers of the Danube basin are located in three hydrological regions - Transcarpathian (sub-basin of the Tisza River), Pre-Carpathian (sub-basin of the Prut River, sub-basin of the Siret River) and Black Sea (sub-basin of the lower Danube).

The rivers of the subbasins of the Tisza, Prut, and Siret rivers (Transcarpathian and Precarpathian regions), depending on the conditions of snowmelt in the winter-spring period, as well as the amount of precipitation and its intensity in spring and summer, are characterized by mixed nutrition. The rivers of the sub-basin of the Tisza River are characterized by an unexpressed spring flood, and the water regime is characterized by flood runoff in the warm and cold periods. Floods of the cold period are usually higher than those of the warm period. On the rivers of the sub-basins of the Prut and Siret rivers, spring irrigation is more pronounced. Its beginning is marked mainly in the second or third decade of March. The maximum of spring irrigation on the rivers of the sub-basins of the Prut and Siret rivers is recorded at the end of the third decade of March - at the beginning of the first decade of April. The end of irrigation is celebrated in the second or third decade of April. The duration of irrigation on the rivers of the Transcarpathian region (subbasin of the Prut River, subbasin of the Siret River) is about 30-40 days. Floods on the rivers of these sub-basins are observed mainly in the warm period of the year. The rivers of the lower Danube sub-basin are also characterized by a mixed supply of water runoff, with a well-defined spring flood lasting 15-25 days on small rivers. The duration of waterlogging on the Danube River exceeds 50-60 days and is formed during the spring-summer period.

Such a diverse nature of the water regime determines the extremely diverse intra-annual distribution of river water flow in each of the sub-basins of the Danube river basin. The rivers of the Tisza sub-basin are characterized by floods from March

to August, during which time 55-70% of the annual flow is formed. In winter, 10-15% is formed. The spring flow of the rivers of the Prut and Siret subbasins is 40-45%, and 20% is formed in the summer. Watercourses of the lower Danube subbasin are mainly characterized by spring runoff, the share of which in some years can be 60-80%.

In the Danube RBR, the SWM determination was carried out on 335 rivers and 16 lakes (according to the data of the "Water Resources of Ukraine" geoportal of the State Water Resources Agency of Ukraine), which belong to the following categories: rivers, lakes, artificial (ASWM) and significantly changed (SAFWM), transitional waters, coastal waters (Figure 2.4.1).

Figure 2.4.1 Distribution of identified SWMs by category

The typology of the above categories of SWM is given in table 2.4.1.

Table 2.4.1 Typology of SWM of the Danube basin

Category	SWM type		
	Code	Type	Number
Rivers	UA_R_10_L_1_Si	a large river in the lowlands in silicate rocks	4
	UA_R_10_L_2_Si	a large river in the highlands in silicate rocks	6
	UA_R_10_M_1_Si	medium river in the lowland in silicate rocks	12
	UA_R_10_S_1_Si	a small river in a lowland in silicate rocks	37
	UA_R_10_S_2_Si	a small river in the highlands in silicate rocks	123

	UA_R_10_S_3_Si	a small river in low mountains in silicate rocks	155
	UA_R_10_S_4_Si	a small river in the middle mountains in silicate rocks	112
	UA_R_10_M_2_Si	medium river in the highlands in silicate rocks	33
	UA_R_10_M_3_Si	medium river in low mountains in silicate rocks	20
	UA_R_10_M_4_Si	the average river in the highlands in the silicate rock	3
	UA_R_11_L_1_Si	a large river in the lowlands in silicate rocks	6
	UA_R_11_M_1_Si	medium river in the lowland in silicate rocks	8
	UA_R_11_S_1_Si	a small river in a lowland in silicate rocks	14
	UA_R_11_S_2_Si	a small river in the highlands in silicate rocks	4
	UA_R_11_XL_1_Si	a very large river in the lowlands in silicate rocks	2
	UA_R_12_S_1_Si	a small river in a lowland in silicate rocks	9
	UA_R_12_XL_1_O	a very large river in the lowlands in organic rocks	1
	UA_R_12_XL_1_Si	a very large river in the lowlands in silicate rocks	14
	UA_R_12_M_1_Si	medium river in the lowland in silicate rocks	3
	UA_R_16_L_1_Si	a large river in the lowlands in silicate rocks	2
	UA_R_16_L_2_Si	a large river in the highlands in silicate rocks	3
	UA_R_16_S_1_Si	a small river in a lowland in silicate rocks	18
	UA_R_16_S_2_Si	a small river in the highlands in silicate rocks	64
	UA_R_16_S_3_Si	a small river in low mountains in silicate rocks	1
	UA_R_16_M_1_Si	medium river in the lowland in silicate rocks	11
	UA_R_16_M_2_Si	medium river in the highlands in silicate rocks	11
Lakes	UA_L_12_L_1_SH_O	a large lake in the lowlands is shallow in organic rocks	1
	UA_L_12_L_1_SH_Si	a large lake in the lowlands is shallow in silicate rocks	3
	UA_L_12_M_1_SH_O	the average lake in the lowlands is shallow in organic rocks	4

	UA_L_12_M_1_SH_Si	the average lake in the lowlands is shallow in silicate rocks	4
	UA_L_12_S_1_SH_O	the small lake in the lowland is shallow in organic rocks	2
	UA_L_12_S_1_SH_Si	the small lake in the lowland is shallow in silicate rocks	1
	UA_L_12_XL_1_SH_Si	a very large lake in the lowlands shallow in silicate rocks	1
Transitional waters	UA_TW_M5_M_M	mesobranch seas	1
Coastal waters	UA_CW_M5_M_SH_D_SS	mesobranch open deep silty-sandy	1
significantly changed bodies of surface water	95 SWMs are assigned to SAFWMs due to straightening. 37 SWMs are assigned to SAFWMs due to regulation. 23 SWMs are assigned to SAFWMs due to the combination of regulation and channel straightening		155
artificial bodies of surface water	34 ASWMs – canals, 2 ASWMs – bulk ponds		36

In the process of identification of groundwater bodies (GWB) in the territory of the Danube basin, 12 GWBs were identified. In the Prut and Siret subbasins, the aquifers are identical, but the areas of occurrence are different, as shown in Table 2.4.2.

Table 2.4.2 GWM and groups of GWM of the Danube basin within Zakarpattia, Ivano-Frankivsk, Chernivtsi and Odesa regions

№	Unified code of the GWM	Aquifer (complex)	Geological index	Area of GWM, km^2
Subbasin of the Tysa River				
1	UAM5310Q100	Group of GWM in the alluvial Upper Neopleistocene-Holocene sediments of floodplains and the first suprafloodplain terraces of the rivers of the mountainous part and the Solotvy Basin	aPIII+aH	1251.0
2	UAM5310Q200	Group of GWM in the weathering crust and other loose Holocene sediments of the mountain slopes of the Sedimentary Carpathians	e, p, ed, dcH	7366.0
3	UAM5310Q300	GWM in lacustrine-alluvial Middle-Upper Neopleistocene sediments of the Minai world	laPII-IIImn	1854.0
4	UAM5310Q400	GWM in lacustrine-alluvial Eopleistocene-Lower Neopleistocene sediments of the Chopa world	laE+PIčp	1090.0
5	UAM5310Q500	GWM in alluvial Pliocene-Lower Neopleistocene sediments of the ninth and tenth supraflood terraces (Kopańska terrace)	a9-10N2-EI	118.0

6	UAM5310N100	GWM in the sediments of the Ilnytsia world of the Pliocene	N2il	1307.0
7	UAM5310N200	Group of GWM in volcanogenic Pliocene sediments of the Vygorlat-Gutyn Range	N2vg	1727.0
Subbasin of the Siret River				
8	UAM5330Q100	GWM in alluvial deposits of Holocene floodplains and Upper Neopleistocene suprafloodplain terraces	a1-5PIII+aH	379.0
9	UAM5330N100	GWM in Miocene sediments	N1s1, N1ks, N1tr, N1op	844
10	UAM533PG100	GWM in Paleocene-Eocene sediments	P1-2	327
11	UAM5330K100	GWM in Upper Cretaceous sediments	K2	78
Subbasin of the Prut River				
12	UAM5320Q100	GWM in alluvial deposits of Holocene floodplains and Upper Neopleistocene suprafloodplain terraces	a1-5PIII+aH	810
13	UAM5320N100	GWM in Miocene sediments	N1s1, N1ks, N1tr, N1op	5400
14	UAM532PG100	GWM in Paleocene-Eocene sediments	P1-2	252
15	UAM5320K100	GWM in Upper Cretaceous sediments	K2	381
Subbasin of the lower Danube				
16	UAM5340N100	GWM in Upper Sarmatian sediments	N1s3	16478

Pressure-free groundwater bodies in the territory of the Danube basin are naturally protected and protected; pressure SWMs are protected. At the same time, point pollution of groundwater with nitrogen compounds is periodically observed in some areas, which, in the absence of a source, may indicate the arrival of pollution from the aquifers located above, through defective wells.

2.4.1 Water use

The main source of water intake is surface sources (94% of intake in the Danube basin). In terms of sub-basins, 95% of surface water intake is taken from the lower Danube sub-basin in the Odesa region. In the sub-basins of the Tisza, Prut and Siret rivers, the intake from underground sources is at least 40% of the total intake in the basin.

Figure 2.4.1.1 Water intake sources within the Danube basin

In 2019, water users withdrew 747.1 million m^3 of water from underground and surface water bodies in the Danube basin, which is about 7% of water withdrawal in Ukraine.

The main part of the water intake is carried out in the sub-basin of the lower Danube within the Odesa region, which is connected with the supply of water for irrigation for agricultural producers.

Figure 2.4.1.2 Percentage ratio of the volume of water intake in the sub-basins of the Tisza, Prut and Siret, Danube in 2019

The main water users within the basin are the following sectors of the economy – agriculture, housing and communal services, industry and transport (Figure 2.4.1.3).

Figure 2.4.1.3 Structure of utilization among users of the Danube basin

The characteristics of water use in the Danube basin in terms of sectors of the economy are presented in the table below.

Table 2.4.1.1 Characteristics of water use in the Danube basin (2019)

Names of economic sectors	Volume of water intake, million m^3	Volume of water used, million m^3	Share of the total intake of water within the basin, %
Industry	**3,496**	**3,691**	**<1**
including energy	0.029	0.041	
ferrous metallurgy	-	-	
Food Industry	0.639	0.856	
coal industry	-	-	
forest woodworking	1,886	1,934	
pulp and paper	0.480	0.480	
chemical and petrochemical	0.014	0.014	
Chemical Industry	0.023	0.044	
fuel industry	0.005	0.005	
oil refining industry	-	-	
gas industry	0.005	0.005	
Utilities	**40,24**	**30,37**	**5.4**
Agriculture	**699.0**	**164.0**	**94**
including fisheries	13,26	19.65	
irrigation	670.5	128.8	
agricultural enterprise	9.38	9.38	

Transport	**0.3**	**0.548**	**<1**
Forestry	**0.053**	**0.054**	**<0.1**
Others	4,011	5,237	**<1**
All in the pool	**747.1**	**203.9**	**100**

It should be noted that the main water users within the sub-basins differ due to the development of various sectors of the economy, namely:

- there are no industrial technological complexes in the sub-basin of the Tisza River that require significant volumes of water, which determines the characteristic distribution of water use with the dominance of the utility sector. The relative share of the latter in water intake in 2020 was 47% or 21.9 million m^3. The second place in terms of water use is occupied by agriculture - 23.8% (11.1 million m^3), industry in the sub-basin is only 3% (1.4 million m^3). Other sectors of the economy use 26.2% of the withdrawn water for their needs, of which transport uses less than 1% (0.1 million m^3).

- in the Prut and Siret subbasins, 67% of water resources are taken by agriculture, 29% by housing and communal services, 3% by industry, less than 1% by transport, and about 3% by other industries.

- in the lower Danube sub-basin, agriculture is the most significant water user, in particular, irrigation (operation of irrigation systems): 126.7 million m^3 (more than 90% of the total volume of fresh water used). Next, according to the decline in the volume of water use, the following branches of the national economy follow: housing and communal services: 5.623 million m^3 (4.1%); industry: 0.619 million m^3 (0.45%), in which the largest specific weight in terms of water use belongs to the woodworking industry: 0.481 million m^3 (0.35%).

The generalized structure of water use among various sectors of the economy of the Danube basin without division into sub-basins is considered below.

Communal water use. A special feature of the Danube River Basin District is the different priority of economic sectors in terms of water use for its sub-basins. Thus, in the Tysa, Prut, and Siret subbasins, the main water user is housing and communal services. While for the sub-basin of the lower Danube, irrigation (operation of irrigation systems) is predominant.

Communal water use consists in meeting the drinking and household needs of the population, enterprises of the household and communal economy, the sphere of public service, as well as industrial enterprises in settlements connected to local water supply lines. The volume of municipal water consumption depends on the number of inhabitants, the degree of orderliness of settlements and climatic conditions. Mainly, municipal water use is concentrated in large settlements, such

as: Chernivtsi, Kolomyia, Kosiv, Verkhovyna, Yaremche, Snyatyn, Kitsman, Storozhynets, Hlyboka, Mukachevo, Svalyava, Izmail, Bolgrad, Kilia, Vylkove, etc.

As a result of their activities in 2019, 40.24 million m³ of water (5.4% of the total volume of abstraction in the basin) was withdrawn by water users of the residential and communal sector, 30.37 million m³ of water was used.

The largest water users of this industry in the basin are MMKP "Mukachivvodokanal" - 8.978 million m^3, KP "Vodokanal of Uzhhorod" - 8.749 million m3, DKP "Chernivtsivokanal" - 4.766 million m^3, KP "Izmailskoe VUVKG" - 1.862 million m^3, Vynogradivskoe VUZHKG - 1.003 million m^3, Khustske VUVKG - 0.740 million m^3, Svalyavske RKPVV - 0.705 million m^3, Storozhynetsk UZHKG - 0.257 million m^3, Kitsmansk UZHKG - 0.226 million m^3, KP "Svitlo" of Kiliya - 0.173 million m^3, KP of Bolgrad City Council "Horvodokanal » – 0.141 million m^3, Hlybotsk VUZHKG - 0.131 million m^3, KP "Vilkivskyi Myshvodokanal" - 0.084 million m^3.

Industrial water use. Water withdrawal by industrial water users in 2019 amounted to <1% in the basin (3.496 million m^3). The needs of water users in the industrial sector are met from both underground and surface water bodies. 3.691 million m^3 of water was used by industry.

The largest water consumers are enterprises of the forest woodworking industry (1.886 million m^3), food (0.639 million m^3) and pulp and paper industry (0.480 million m^3).

The main industrial water users of the basin are the following enterprises: PJSC "Cellulose-Cardboard Plant", TDV "Perechynsk Forestry Chemical Plant" - 0.502 million m^3, Mamalygiv Gypsum Plant - 0.284 million m^3, State Enterprise "Ukrspirt" Zaluchanske MPD Snyatinsky district - 0.213 million m^3, UAP "FISHER-MUKACHEVO" LLC - 0.120 million m^3, PJSC "Khustsky Quarry" - 0.108 million m^3, TDV "Svalyavski mineral waters" - 0.092 million m^3, Gravel-sand quarry (Nepolokivtsi village) - 0.071 million m^3, Bukovinska Factory LLC, "Lamel" GKD, Krasnoilsk township, Storozhynetsky District - 0.06 million m^3, Chernivtsi Oil and Fat Combine (Chernivtsi) - 0.051 million m^3, "Flextronic TZOV" Plant - 0.040 million m^3, PJSC "Ukrnafta" NGVU "Nadvirnanaftogaz" in Nadvirna - 0.031 million m^3, LLC KKNK "Technobud" - 0.023 million m^3, LLC "Leoni Varing Systems UA GmbH" in Kolomyia - 0.022 million m^3.

Analysis of trends in industrial water use in the Danube basin indicates its significant reduction over the past 20 years. This is due to two reasons. First, the country's economy as a whole underwent significant restructuring, which was manifested in a significant reduction in industrial production. Secondly, economic

factors stimulate enterprises to implement waterless technologies, transition to repeated water consumption or modern technologies for economical use of water.

Water use in agriculture. Agriculture is the largest water consumer in the Danube basin. Non-returnable water consumption in agriculture accounts for 56.5% of all non-returnable water consumption in Ukraine.

The main areas of water use in agriculture are irrigation (the main share is concentrated in the lower Danube sub-basin), irrigation, fish farming (predominant in the Tisza, Prut and Siret sub-basins, including trout farms), animal husbandry, plant breeding, poultry farming. Water use in agriculture is a very important and significant direction in its socio-economic development. Unlike in industry, where it is sometimes possible to replace water in the technological process, in agriculture it cannot be replaced by anything, moreover, irrigation of agricultural crops allows you to get good results.

According to the data of the state accounting of water use for 2019, 699.0 million m^3 of water was withdrawn by agricultural entities in the basin (94% of the total water withdrawal within the basin). The needs of agricultural water supply in the basin are met mainly from surface sources. 164.0 million m^3 of water was used.

Water use in transport. Water use in transport consists in the use of water resources, both surface and underground, for various types of transport, in particular water and land.

In 2019, water users in the transport sector withdrew 0.3 million m^3 of water (<1% of total water withdrawal). The volume of water used by transport in the basin is 0.548 million m^3.

The largest water users in this industry: VSP "Lviv Territorial Administration" - 0.712 million m3, Ivano-Frankivsk water supply distances st. Hluboko-Bukovynska and st. Storozhynets - 0.056 million m^3, PJSC "Ukrzaliznytsia" state station Kolomyia - 0.036 million m^3, LLC "Operator of the gas transport system" - 0.018 million m^3, PJSC "Ukrzaliznytsia" state station Korshiv - 0.008 million m^3, separate enterprise "Motorwagon Depot Kolomyia" - 0.006 million m^3, JSC "Uzhhorodske ATP - 12107" - 0.005 million m^3.

Other types of water use. Other types of water use carry out insignificant water withdrawal in the amount of 4.011 million m^3 of water, which is <1% of the total volume of withdrawal in the basin. Among other sectors of the economy, health care, nutrition, trade, material and technical support, construction, communication, physical culture, and education can be distinguished.

2.4.2 Waste water

As for the waste water structure, 55% of the volume of wastewater is discharged into surface water bodies by agriculture, 40.5% by housing and communal services, and only 2.5% by industrial water users.

Figure 2.4.2.1 Distribution of return water discharges among sectors of the economy

About 40% of the volume of wastewater is normatively purified at treatment plants, 31% is normatively clean without purification, and 28% is polluted wastewater.

Information on discharges of return water into water bodies by category of discharged water is given in table 2.4.2.1.

Table 2.4.2.1 Discharges of return water into water bodies by category of discharged water in the Danube basin

Names of economic sectors	The volume of discharged water, million m^3	including			Share of the total discharge within the basin, %
		polluted	normatively clean without cleaning	normatively cleaned in buildings	
Industry	**3,281**	**0.077**	**0.272**	**2,647**	**2.5**
including energy ferrous metallurgy Food Industry coal industry	0.013 - 0.069 - 2,578	- - 0.032 - 0.012	0.002 - 0.009 - 0.053	0.011 - 0.028 - 2.512	

forest woodworking pulp and paper chemical and petrochemical Chemical Industry fuel industry oil refining industry gas industry	2,503 0.025 - - - -	- - - - - -	0.004 - - - - -	2,499 0.025 - - - -	
Utilities	**52.47**	**3,804**	**0.057**	**48.6**	**40.5**
Agriculture	**71.34**	**32.56**	**38.76**	**0.025**	**55.1**
including fisheries irrigation agricultural enterprise	16,23 54.70 0.416	- 32.56 -	16,23 22.14 0.392	- - 0.025	
Transport	**0.021**	**-**	**-**	**0.021**	**<0.1**
Forestry	**0.016**	**-**	**0.016**	**0.001**	**<0.1**
Others	2,272	0.089	0.525	1,676	**1.8**
All in the pool	**129.4**	**36.53**	**39.63**	**52.97**	**100**

In general, almost all (89%) of the polluted wastewater in the basin comes from agricultural water users.

Figure 2.4.2.2 Percentage ratio of polluted wastewater by economic sectors

However, if we analyze the drainage of economic sectors in terms of sub-basins, then:

- in the sub-basin of the Tisza River, more than 78% of the volume of wastewater is discharged into surface water bodies by residential and communal facilities, 16% by agriculture, and 1.2% by industrial water users. 72.2% of the wastewater treated at treatment plants is 72.2%, 18.5% is normatively clean without treatment, and 9.3% is polluted wastewater. Almost 95% of polluted wastewater comes from water users of housing and communal services.

- in the Prut and Siret subbasins, more than 70% of the volume of wastewater is discharged into surface water bodies by residential and communal facilities, 29%

by agriculture, and only 1% by industrial water users. Almost 67% of the volume of wastewater is normatively purified at treatment plants, 29% is normatively clean without purification, and 4% is polluted wastewater. Practically all (97%) of polluted wastewater comes from water users of housing and communal services.

- in the sub-basin of the lower Danube, the total drainage volume is 58.16 million m^3, incl. in total, 57.46 million m^3 (98.79%) of return sewage was discharged into surface water bodies, of which: contaminated - 32.73 million m^3 (56.96%); normatively clean without purification - 22.23 million m^3 (38.69%); standardly cleaned at treatment facilities - 2.5 million m^3 (97.6%); transit water discharged – 507.3 million m^3 (28.3% of the total water drainage volume); reversible, repeated and consecutive use amounted to 3.104 million m^3 (0.17% of the total drainage volume). The largest share of polluted wastewater, 32.556 million m^3 (99.4%), comes from agriculture.

Below is considered water drainage among economic sectors in the Danube basin without division into sub-basins.

Communal drainage. Losses of water during transportation for own needs in the communal economy are significant and amount to 14.818 million m^3. Housing and communal services are the second polluter of the basin after agriculture, as 3.804 million m^3 of polluted wastewater was discharged during 2019 (10.4% of the total discharge of polluted water within the basin).

The pace of physical wear and tear of water and sewage facilities is ahead of the dynamics of their renewal and development, which is directly dependent on the state and local budgets' ability to finance these measures. The main problems of housing and communal services are the uneven character of population coverage with water supply (for example, only 7 cities and 9 urban-type villages receive 24-hour water supply services in the Tisza sub-basin. Other settlements are provided with water according to the schedule), insufficient coverage of the population with water drainage systems, wear and tear of water pipes - sewage network, inefficient operation of treatment facilities, which leads to the supply of water to consumers of inappropriate quality and the discharge of polluted water into water bodies. The modern increase in quantitative indicators of sanitary standards for drinking water causes the need to re-equip existing water treatment plants with the introduction of the latest water treatment technologies and the construction of new ones.

Industrial drainage. There are no losses of water during transportation for own needs in industry.

The share of wastewater discharges from industrial water users is only 2.5% (3.281 million m^3), of which 0.077 million m^3 is polluted.

Drainage in agriculture. In 2019, agricultural water users discharged 71.34 million m^3 of return (wastewater) water (55.1% of the total discharge within the basin), of which 32.56 million m^3 were polluted, and 38.76 million m^3 were clean without treatment. m^3, normatively cleaned in buildings - 0.025 million m^3.

Drainage in transport. Water users in the transport sector discharged 0.021 million m^3 of return (wastewater) water (<0.1% of the total discharge within the basin), of which 0.021 million m^3 were normatively treated at facilities.

*Other types of drainage.*In 2019, water users of other types discharged return (wastewater) in the amount of 2.272 million m^3, of which 0.089 million m^3 are discharges of polluted wastewater. Other types of water use do not exert significant pressure on the state of surface waters, since in percentage terms they make up only 1.8% of the total amount of wastewater in the basin.

Thus, the main impact on the basin in 2019 was precisely agricultural activity, which led to the discharge of polluted wastewater in the volume of 32.566 million m^3 only within the lower Danube sub-basin, which is 89.1% of the total volume of polluted wastewater that entered the general the Danube basin.

In the sub-basins of the Tisza, Prut and Siret rivers, discharges from housing and communal services predominate, but the total volume of polluted wastewater is insignificant in comparison with agricultural activities.

2.4.3 Risks for water resources of the basin

The socio-economic structure of the basin creates prerequisites for the formation of anthropogenic load that affects surface waters. The main factors of anthropogenic load include:

- people. The population within the basin is 3.532 million people;
- enterprises of various branches of the economy;
- agriculture, which belongs to one of the branches of the economy of the basin and is characterized by a high level of development;
- transverse structures on small and medium-sized rivers prevent the free passage of water, sediments and the migration of hydrobionts, and also change the transit mode of rivers to an accumulation one.

Surface waters

Assessment of the risk of non-achievement of environmental goals from point sources of pollution. According to the results of the assessment of anthropogenic loads from point sources of pollution and their impact on the state of the SWM of the basin, the risk of not achieving a "good" ecological state/potential (Fig. 2.4.3.1) was established for:

- 696 SWMs – "without risk";

- 90 SWM – "possibly at risk";
- 99 SWM – "at risk".

Figure 2.4.3.1 Assessment of the risk of not achieving a good ecological state / potential based on the results of the assessment of anthropogenic loads from point sources

Assessment of the risk of non-achievement of environmental goals from diffuse sources of pollution. According to the results of the assessment of anthropogenic loads from diffuse sources of pollution and their influence on the state of the SWM of the basin, the risk of not achieving a "good" ecological state/potential (Fig. 2.4.3.2) was established for:

- 579 SWM - "without risk";
- 175 SWMs – "possibly at risk";
- 131 SWMs are "at risk".

Figure 2.4.3.2 Assessment of the risk of not achieving a good ecological state / potential based on the results of the assessment of anthropogenic loads from diffuse sources

Assessment of the risk of not achieving ecological goals: hydromorphological changes. According to the results of the assessment of hydromorphological changes, it was established:

- 694 SWMs – "without risk";
- 155 SWMs – "at risk";
- 36 SWM – not defined.

Figure 2.4.3.3 Assessment of the risk of not achieving a good ecological state / potential based on the results of the assessment of anthropogenic loads: hydromorphological changes

A generalized assessment of the risk of not achieving good ecological status/potential is provided in section 3 of the SEA report.

Factors affecting the possibility of not achieving good ecological status/potential of SWM are discussed below.

The influence of military operations on the state of surface water bodies

In contrast to the lower Danube sub-basin, the Tisza, Prut and Siret sub-basins have not been affected by military operations.

1. Pollution by (organic, biogenic, dangerous) substances, which is caused by:

➢ destruction, stoppage, violation of the technological process of enterprises (including warehouses, oil product bases).

As of September 2023, emergency discharges of sunflower oil were recorded in the lower Danube sub-basin as a result of enemy shelling and the destruction of the infrastructure of the Rhenia port (see the table below).

Table 2.4.3.1 List of cases of destruction, stoppages, violations of the technological process of enterprises in the Danube basin

№	Date	Name of the object	Object type	A hazardous substance that has	Case type

				become a pollutant	
1	07/24/2023	THE RHINE BRANCH OF THE STATE ENTERPRISE "ADMINISTRATION OF SEA PORTS OF UKRAINE" (THE RHINE SEA PORT ADMINISTRATION), EDRPOU code 38728465	Port infrastructure	Sunflower oil	Destruction of infrastructure

- direct ingress of polluting substances from rockets, shells of military equipment, their washing, seepage in combat zones. Artillery shells, rockets and other munitions mainly consist of a metal shell filled with an explosive substance, fuel and a detonator.

Explosives are classified into primary (quick mercury, lead azide, teneres (THPC)) and secondary (THE, hexane, tetryl, TNT, picric acid, plastid-4, ammonites, dynamons, ammonals).

Metals are associated pollutants. The most common is lead, as well as antimony, copper, cadmium, chromium, mercury, arsenic, nickel, bismuth and tungsten. As a rule, metals are concentrated in the pit.

Illumination rockets burn at altitude and disperse metals over large areas. Pyrotechnics may contain barium, antimony, strontium, copper, magnesium, manganese, chromium and lead. Unlike explosives and fuels, metals occur naturally in the environment, so their background concentrations must be measured.

The detonation of rockets, artillery shells and mines produces a number of chemical compounds - carbon monoxide and carbon dioxide, water vapor, nitrous oxide, nitrogen, etc. Also, a number of toxic elements evaporate, in particular, sulfur and nitrogen oxides.

Pollution by organic substances. The main cause of pollution by organic substances is the insufficient level of wastewater treatment or the absence of treatment at all. Organic pollution can lead to significant changes in the oxygen balance of surface waters and, as a result, to changes in the species composition of hydrobionts or even their death. As a rule, the arrival of organic substances with wastewater is estimated by indirect indicators of BOD5 and COD.

*Diffuse sources.*Pollution by organic substances due to diffuse sources is mainly determined by rural households that are not connected to sewage networks. Drainage of such individual farms is carried out by accumulation in sumps, from which wastewater is filtered into the nearest groundwater horizons.

During the calendar year, the total input of organic substances (BOD5, COD) to the SWM from distributed sources of pollution in the basin is significantly greater than from point sources. The reason for this is the low level of connection of the population of the basin to sewage treatment facilities.

In the rural settlements of the basin and small towns and individual cities, return (waste) water is diverted to sedimentation tanks, sewage-accumulators, from where pollutants easily enter the groundwater and are transported with them to the surface water.

The following rivers play a key role in the pollution of the basin by organic substances from diffuse sources: the lower reaches of the Tysa (Berehiv district), Latoritsa (Mukachiv and Uzhgorod districts), Borzhava (Khust district, Berehiv district (from the village of Velyki Kom'yati to the mouth)), Prut, Peremiska, Lubizhnya, Oslava, White Oslava, Krasna, Tovmachik, Tovmach, Pistinka, Brusturka, Lyuchka, Akra, Rybnytsia, Volitsa.

Point sources. The main cause of pollution by organic substances is insufficient or absent wastewater treatment after use by settlements, industrial and agricultural enterprises. Such pollution can affect the composition of aquatic species and the ecological status. For the decomposition of organic substances, a lot of oxygen is consumed, the content of which in the water decreases sharply and causes the cessation of the life of aquatic organisms. Organic pollution formed from the specified sources is evaluated according to BOD5, COD indicators.

According to the reports on water use in form № 2TP-vodhosp (annual) in 2020, the total volume of wastewater discharged into surface water bodies of the Danube River basin amounted to 123.690 million m^3, including: polluted without cleaning - 21.936 million m^3, contaminated insufficiently cleaned - 3.893 million m^3, normatively clean without cleaning - 46.009 million m^3 and normatively cleaned - 51.852 million m^3 (Figure 2.4.3.4).

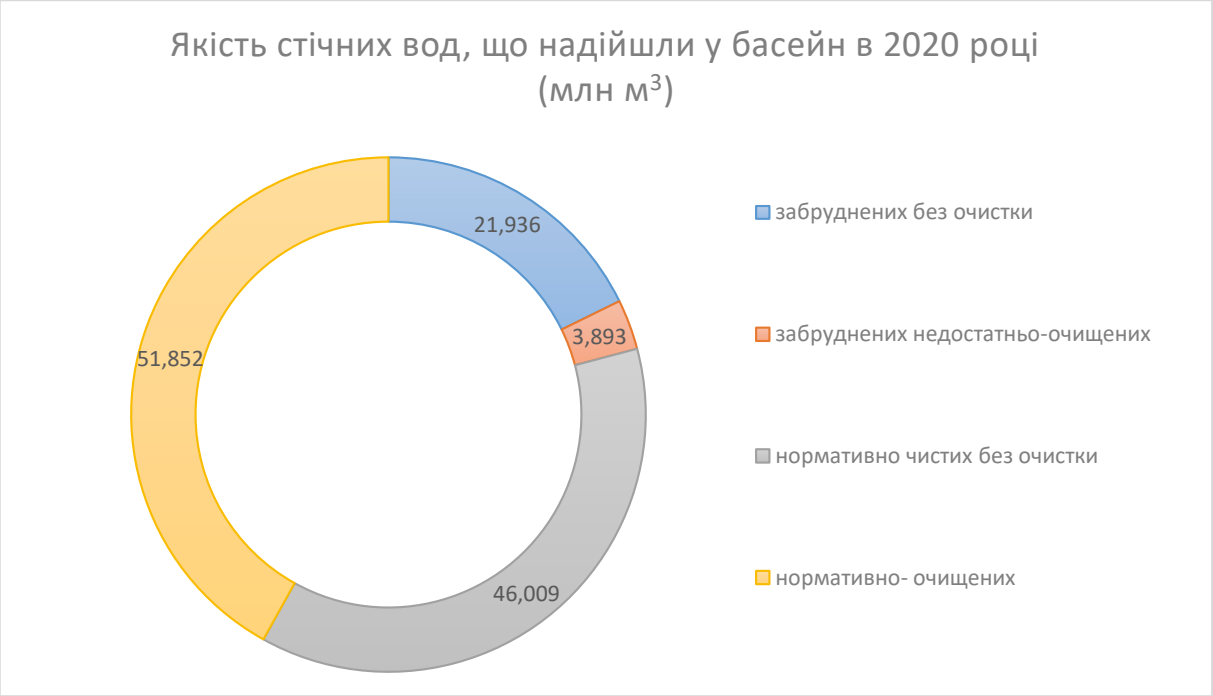


Figure 2.4.3.4 Volumes of drainage in the Danube basin in 2020, million m^3

In 2020, the discharge of return (wastewater) water into the surface water bodies of the Danube River Basin by economic sectors was: agriculture (including fisheries) – 65.733 million m³, housing and communal services – 52.720 million m³, industry – 3.141 million m³, others - 2.096 million m³.

In 2020, pollution by organic substances from communal point sources amounted to 785.4 t for BOD5 and 1982.5 t for COD. The largest cities: Uzhgorod, Chernivtsi, Mukachevo determine the dominant share of pollution by organic substances.

The degree of purification of wastewater from the STP varies significantly. STP of most cities are in an extremely worn condition, as they were built back in Soviet times. Over the past 30 years, the development of cities has led to an increase in the amount of return (waste) water, which several times exceeds the design capacity of the STP, as a result of which a significant amount of insufficiently treated or untreated return (waste) water enters the Danube basin.

Among the industrial enterprises, the organic pollution of the SWM of the Danube subbasins occurs mainly at the expense of the paper and food industries. Pollution by organic substances from industrial point sources amounted to 9.1 t for BOD5 and 98.9 t for COD.

Pollution by organic substances from agricultural point sources is insignificant and in 2020 amounted to 1.3 t for BOD5 and 0.9 t for COD.

Pollution by biogenic substances.Biogenic substances enter the Danube subbasins from point sources (agglomerations, industry, agriculture) and diffuse sources (surface runoff, precipitation). Diffuse sources are partly of natural and anthropogenic origin (mainly agriculture).

Diffuse sources. The type of land cover is the dominant factor of anthropogenic load from diffuse sources.

According to the physical and geographical division, there are clear differences in the types of land cover, which significantly affects the emission of elements. Thus, in the direction from the source to the mouth of the Prut and Siret rivers, there is a decrease in the degree of afforestation of the territory, while the share of agricultural land, which provides the main supply of biogenic elements, is on the contrary increasing. Disturbance of the soil cover due to plowing leads to significant losses of biogenic substances due to deflation and water runoff.

Another important indicator of the formation of anthropogenic load from diffuse sources of pollution is the intensity of agriculture, which is expressed, first of all, in the amount of applied fertilizers. Most of the mineral fertilizers applied to various crops are nitrogen fertilizers.

There is no intensive agricultural production in the upper reaches of the Prut and Siret rivers, in the mountainous zone, where temperatures are low and rainfall is high. Meat and dairy cattle breeding and sheep breeding are developed here.

In the Tisza sub-basin, diffuse pollution from the territory of former enterprises of the wood chemical industry (Perechynskyi, Velikobychkivskyi, and Svalyavskyi wood-chemical plants) and solid waste disposal sites (hereinafter referred to as SWM) is a particular danger.

Point sources. Pollution by biogenic substances from point sources is mainly caused by the discharge of insufficiently purified or untreated return water into surface water bodies (after use by settlements, industry and agricultural objects), as a result of which their concentration in water bodies increases significantly.

Within the Danube basin with return (waste) waters in 2020, the following was received:

- 182.8 tons of ammonium nitrogen;
- 107738.1 kg of total nitrogen;
- 941.4 tons of nitrates;
- 27.6 tons of nitrites;
- 116101.5 kg of phosphates;
- 17869.9 kg of total phosphorus.

The largest cities: Uzhhorod, Chernivtsi, Mukachevo determine the dominant share of pollution by biogenic substances.

Pollution by biogenic substances from industrial wastewater is insignificant.

Return (waste) water from health care facilities, mainly sanatoriums in Transcarpathia, forms a large part of the pollution. The composition of the return (wastewater) water of these institutions is similar to that of municipal enterprises, and is mainly represented by compounds of nitrogen and phosphorus. In most cases, sanatoriums, in addition to health functions, also perform the role of communal enterprises in the settlements where they are located.

***Pollution by hazardous substances*.**Currently, the available information on the discharge of priority pollutants in the Danube sub-basins is quite limited. According to the data of the state accounting of water use, reporting on water use in the form № 2TP-water farm (annual), approved by the order of the Ministry of Ecology and Natural Resources of Ukraine № 78 dated 16.03.2015, for the period 2016-2021, none of the economic entities in the basin Danube did not provide information on the presence of polluting substances in return (wastewater) discharges, which were included in the list of priority polluting substances by Order № 45 of the Ministry of Natural Resources of Ukraine.

Monitoring of the content of priority and other dangerous substances in surface waters and bottom sediments of the Tisza, Prut and Siret subbasins showed that the water and bottom sediments contain organic substances, including priority ones, such as: pesticides, pharmaceuticals, polyaromatic hydrocarbons, halogenated hydrocarbons, and also heavy metals (cadmium, lead, nickel).

Monitoring results showed that the concentration of diphthalates (2-ethylhexyl) (a widely used plasticizer), naphthalene, cadmium, lead and nickel exceeded the environmental quality standard for priority substances in water. In addition, elevated concentrations of polyaromatic hydrocarbons, which are indicators of oil products, were found in each of the studied surface water samples taken from the Tisza River sub-basin.

According to the results of the monitoring of priority pollutants in the Tysa, Prut and Siret subbasins, 32 dangerous specific pollutants were identified (27 synthetic pollutants and 5 non-synthetic pollutants (heavy metals: cadmium, nickel, mercury, lead, zinc). The list of dangerous substances is given in table 2.4.3.2.

Table 2.4.3.2 Specific pollutants (synthetic pollutants) for the Tisza, Prut and Siret subbasins

Registration number of the	**Indicators for establishing the environmental status of the SWM**	**Average annual concentration, µg/dm^3**	**Maximum concentration, µg/dm^3**

chemical substance			
74070-46-5	Aclonifen µg/dm3	-	0.14
62-53-3	Aniline, µg/dm3	1.5	16.0
98-10-2	Benzenesulfonamide, µg/dm3	100.0	n.v
95-16-9	Benzothiazole, µg/dm3	2.0	n.v
92-52-4	Biphenyl, µg/dm3	1.0	3.6
80-05-7	Bisphenol A, µg/dm3	10.0	460.0
1702-17-6	Clopyralid, µg/dm3	70.0	300.0
13684-56-5	Desmedifam, µg/dm3	1.0	15.0
84-74-2	Dibutyl phthalate, µg/dm3	10.0	48.0
122-39-4	Diphenamine, µg/dm3	1.6	31.0
26225-79-6	Ethgofumesate, µg/dm3	6.4	50.0
67-66-3	Trichloromethane (chloroform) µg/dm3	3.24	-
85-01-8	Phenanthrene, µg/dm3	0.38	2.0
50-00-0	Formaldehyde, µg/dm3	5.0	50.0
206-44-0	Fluoranthene µg/dm3	0.046	0.35
205-99-2	Benzo (b) fluoranthene µg/dm3	-	0.053
207-08-9	Benzo (k) fluoranthene µg/dm3	-	0.045
1071-83-6	Glyphosad, µg/dm3	15.0	n.v
74-90-8	Cyanides, µg/dm3	5.0	n.v
94-74-6	MCPA, µg/dm3	1.6	15.0
128-37-0	4-methyl-2,6-di-tert butylphenol, µg/dm3	1.4	17.0
1336-36-3	Polychlorinated biphenyls and their derivatives, µg/dm3	0.01	n.v
40487-42-1	Pendimethalin, µg/dm3	0.3	2.0
79-00-5	1,1,2-trichloroethane, µg/dm3	300.0	n.v
108-88-3	Toluene, µg/dm3	100.0	n.v
100-42-5	Vinylbenzene (styrene), µg/dm3	0.63	60.0
1330-20-7	Xylene (isomers), µg/dm3	10.0	n.v

Sources of hazardous pollutants entering the Tisza River sub-basin can be industrial sources, including machine-building, wood-chemical industry, mining facilities, animal husbandry and food industry, industrial and municipal waste.

Accidental pollution and the impact of polluted territories (landfills, sites, zones, etc). "Dangerous" industrial activity is poorly developed in the Danube basin, but there are potential sources of accidental pollution both through discharges of wastewater and through washing from the territories of sites where production waste is stored (table 2.4.3.3).

Recent studies in the Tisza, Prut and Siret sub-basins revealed an excess of synthetic substances: poisonous chemicals, pharmaceuticals and substances used in perfumery, polyaromatic hydrocarbons, halogenated hydrocarbons, heavy metals:

zinc, copper, cadmium, nickel and lead, which confirms a significant anthropogenic load on the SWM of subbasins.

Table 2.4.3.3 List of objects in the Danube basin for which there are risks of accidental pollution

№	Name of the object
1	Municipal enterprise "Vodokanal city of Uzhhorod", city of Uzhhorod
2	Municipal enterprise "Miskvodokanal" of the Mukachevo City Council, Mukachevo city
3	Limited Liability Company "Vodokanal Karpatviz", city of Berehove
4	Municipal enterprise of the Chop city council "Vodokanal of the city of Chop", town of Chop
5	"Khust Production Department of Water Supply and Sewerage", city of Khust
6	Municipal enterprise "Vodokanal" Tyachiv city council, Tyachiv
7	Communal enterprise of the Volovets settlement council "Vodokanalservis", Volovets village
8	"Vynogradiv production management of water supply and sewerage", city of Vynogradiv
9	Communal Service Enterprise, Velikiy Bereznyi village
10	Communal enterprise of the Mizhhirya settlement council "Mizhhirske VUZHKG", Mizhhirya village
11	Rakhiv communal enterprise "Rakhivteplo", city of Rakhiv
12	Communal enterprise "UZhKG "Solotvyno", Solotvino village
13	Communal unitary enterprise "Komunalnyk", city of Vyzhnytsia
14	Hlyboka production department of housing and communal services, Hlyboka village
15	Kitsman Production Department of Housing and Communal Services, Kitsman city
16	Municipal enterprise "Chernivtsivodokanal", city of Chernivtsi
17	Communal enterprise "Storozhynetske ZHCH", city of Storozhynets
18	Communal enterprise "Novoselytsia City Heat Network", city of Novoselytsia
19	Verkhovyna Water Supply and Sewage Management, Verkhovyna village
20	Communal enterprise "Kolomiyavodokanal", city of Kolomyia
21	Hvizdetski plant of communal enterprises, Hvizdets village
22	Communal enterprise "Zabolotivskyi KKP", village of Zabolotiv
23	Housing and communal enterprise "Technoservice", Pyadyky village
24	Communal enterprise "Selyshne KP", Vorokhta village
25	Communal enterprise "Silsky Vodnik", Turka village
26	Communal enterprise "Komunalnyk", city of Perechyn
27	PRIVATE LIMITED LIABILITY COMPANY "ITSKK", Izmail city
28	KP "SVITLO", city of Kilia

According to the data of the register of waste disposal sites (hereinafter referred to as waste disposal sites), there are 85 certified waste disposal sites in the sub-basins of the Tysa, Prut and Siret rivers (62 in Zakarpattia Oblast, 10 in Chernivtsi Oblast, 13 in Ivano-Frankivsk Oblast).

One of the most acute environmental problems remains the issue related to waste (its generation, accumulation, utilization, removal, removal to places of unorganized storage, etc.). Most of the operating landfills have exhausted their

capacity, filled to 80-85%, and the term of operation of landfills in the city of Vynohradov, Zakarpattia Oblast, has expired. Due to the mountainous nature, high population density, the neighborhood with 4 countries of the European Union, the only water basin of the Tisza River, the protected area, a number of settlements in the Transcarpathian region are deprived of the opportunity to choose land plots for landfills. This applies to the cities of Rakhiv, Tyachiv, Vynohradiv, Berehovo, Perechyn, the village of Velikiy Berezny, rural settlements in mountainous regions. Centralized solid waste collection and disposal in the region is carried out by 36 specialized enterprises, the largest of which are: AVE Uzhgorod LLC, ABE Vynogradiv LLC, AVE Mukachevo LLC, and Bereg Vertical LLC. These business entities carry out the removal of solid household waste (hereinafter - solid waste) from 199 settlements of the region. In total, centralized collection of solid waste is organized in 491 settlements in the region, which is 80.75% of the total number (608) of settlements in the region. Collection of household waste from the population and subjects of economic activity is also carried out independently by enterprises and organizations, separate private structures and specialized communal services under village councils. There are no household waste disposal facilities.

Separate collection of solid waste (glass, plastic, waste paper and scrap metal) has been implemented in the cities of Uzhgorod, Perechyn, Irshava, Rakhiv, Svalyava, the village of V. Bychkiv and in 23 territorial communities (a total of 187 settlements in the region). Resource-valuable solid waste components are transferred to specialized enterprises (a total of 52 economic entities in the region). Collected waste is mainly sent for disposal outside the region. According to the data of the Main Department of Statistics, there is 1 facility for disposal of hazardous waste, 24 facilities for incineration of waste for the purpose of obtaining energy, 5 facilities for incineration of waste for the purpose of thermal processing, 35 other facilities for disposal (except for incineration) of waste.

There is no storage of unsuitable or prohibited pesticides and poisonous chemicals on the territory of Zakarpattia Oblast. However, according to the data of the Mukachiv District State Administration, there are 41 reinforced concrete containers in which chemical means of plant protection were stored on the territory of 8 settlements of the Mukachiv District. Also in the village 225 tons of pesticide-contaminated soil are stored in Rokosovo, Khust district, which, according to the conclusion of the Ukrainian Research Institute of Environmental Problems (Kharkiv), is toxic waste of the first and second classes of danger to the health of the population and needs urgent removal outside the region.

The main way of handling solid household waste in the Chernivtsi region is landfilling. Most of the solid household waste is buried at 1 landfill in Chernivtsi and 282 organized landfills with a total area of 260 hectares. Today, the situation has become particularly acute: landfills in the region are a big problem, their number is growing every year. The created landfills are one of the main sources of environmental pollution. Tons of garbage are dumped on roadsides and forests. In the region, separate collection of household waste is ensured in 39 settlements. 17 enterprises of the region have 50 plants for incineration of waste and 3 enterprises have 4 plants for disposal and processing of waste with a total capacity of 28.7 thousand tons/year and 2.3 thousand tons/year, respectively.

On the territory of Ivano-Frankivsk region, there are 15 continuously operating landfills for solid household waste, of which 8 are certified. The largest landfills in the region in the Pruta sub-basin are located near the city of Kolomyia, the city of Nadvirna (the village of Pniv). Separate collection of solid household waste has been partially introduced in 57 settlements and 6 cities of regional importance.

Hydromorphological changes. Hydromorphological changes are one of the main water-ecological problems (MWEP) that prevent the achievement of the environmental goals established and fixed in the RBMP. Hydromorphological changes, as a result of economic activity, affect the conditions of existence of aquatic communities. The presence of hydromorphological changes in SWMs leads to the deterioration of the ecological status of many SWMs in the Danube basin.

Dams and other artificial transverse structures located in riverbeds were built, first of all, for the accumulation of water, with its subsequent use for the needs of agriculture, water supply for the population and industry. In the Danube basin, 60 SWMs have been identified, where there is a violation of the continuity of the flow of water and environments (regularity).

Morphological changes. The main factors that negatively affect the natural morphology of the Danube riverbeds, their banks and floodplains are urbanization, flood protection, agriculture and shipping. As a result of these types of activities, the river in certain areas undergoes straightening, dredging, the banks are strengthened, the part of the floodplain adjacent to the channel is plowed up, and its natural vegetation changes.

In the basin, 118 SWMs underwent modification of the river morphology (straightening). The decrease in the variability of the depth and width of the channel, the violation of the natural balance of erosion and accumulation, the narrowing of the space between the dams and the limitation of free meandering leads to the

impoverishment of the composition and the decrease in the number of biological indicators - fish, benthic invertebrates, higher aquatic vegetation, and phytoplankton.

885 SWMs have been identified in the Danube basin. Based on data on existing transverse structures in the channel, places of water intakes and level fluctuations, as well as using space images, topographic and cadastral maps, 155 SWMs (18% of all identified SWMs) have been identified as ISWMs and 36 SWMs have been identified as artificial SWMs. All these SWMs should be considered as such, where there is a risk of not achieving "good" ecological potential.

Based on the analysis of the main water-ecological problems associated with hydromorphological loads in the Danube basin, it can be concluded that 155 SWMs of the basin, defined as ISWMs, need restoration (revitalization).

Most cases of hydromorphological changes occur in small rivers of the Danube basin. Small rivers, according to the classification of rivers by the area of the basin, which was used in determining the SWM, are rivers with an area of up to 100 km^2.

Ground waters

As of the end of 2023, the assessment of the ecological state / risk assessment of the GWM has not been carried out due to the lack of monitoring, as well as a limited number of observation points.

Groundwater pollution. In the conditions of rural urbanization, the man-made load on GWM is related to the agricultural activities of the population: intensive farming and gardening with intensive use of fertilizers, pesticides and herbicides prevails. Livestock breeding is carried out mainly in stationary conditions.

Experiments conducted during the study of the elements of the underground water regime in the early 90s of the last century show that land reclamation measures disrupt the natural hydraulic and hydrochemical connection between aquifers and contribute to the deterioration of the quality of underground and surface waters.

During the laying of main drainage channels, the surface layer of poorly permeable rocks was completely or partially destroyed, which led to the deterioration of the protection of GWM within the entire plain. Negative processes of groundwater quality deterioration are observed during flood filling of channels and in the post-flood period of filtration. Within the ameliorative systems, the intensity of surface and underground water pollution is increasing as a result of agricultural production (mineral and organic fertilizers, pesticides, etc.). Filtration of oxygen-enriched flood waters from channels leads to an increase in iron oxide in the water and its accumulation in the soil. In addition, in a number of areas during

the flood period, an increase in groundwater mineralization and soil salinization was noted.

Currently, a significant part of the reclamation network is out of order - the canals are silted up, overgrown with various vegetation, the sluice gates are out of order

The mining and industrial type of man-made load is very common within the development of GWM. It includes water intakes of fresh and mineral underground water, open and underground mineral development, areas of geological prospecting for oil and gas.

An important place among the types and objects of man-made (anthropogenic) load, which negatively affects GWM, is household pollution due to the lack of centralized sewage treatment and discharge of domestic wastewater in rural settlements and partly in cities. There are solid waste dumps near almost every settlement. They are not sorted and disposed of on an industrial scale.

Groundwater masses in pressureless horizons within the lower Danube subbasin are conditionally protected. In the roof of underground waters lie loams and clays with a total capacity of 20-40 m. Inflow of pollution to aquifers is possible due to defective operational wells, as well as in irrigation areas. Point contamination of groundwater with compounds of the nitrogen group is observed within the population centers. Also, the presence of synthetic surface-active substances, oil products, and pesticides in concentrations that do not exceed the maximum permissible is recorded in aquifers. In the areas of intensive exploitation, the influence of technogenesis affects the level regime.

The impact of technogenesis on groundwater bodies in pressure aquifers is mainly affected by the level regime. As a result of long-term intensive exploitation, depression funnels were formed. The reduction in groundwater extraction observed in recent years is helping to restore groundwater levels.

In pressure aquifers in production wells, there is also point contamination of groundwater with compounds of the nitrogen group, the presence of synthetic surface-active substances, petroleum products, and pesticides in concentrations that do not exceed the maximum permissible is noted.

2.5 Land resources and soils

Subbasin of the Tisza River

Varieties of sod-podzolic soils predominate in the lowland area, brown mountain-forest and meadow-forest types prevail in the mountainous area, meadow and meadow clayey soils lie on the floodplain terraces of rivers.

Vertical differentiation of soils is clearly observed within the mountainous part of the territory. In the high mountain range, mountain-meadow-brown earth soils are common at altitudes of 1100-1200 m; on the forestless areas, turf and brown earth soils are widespread.

The gentler mountain slopes are covered with loamy brown earth-podzolic soils. On gentle slopes and in river valleys, meadow-brown earth soils are formed.

The Transcarpathian lowland is covered with sod-podzolic gley and gley or brown gley soils.

In the valleys of the Borzhava and Irshava rivers, swamp-mud and meadow-mud soils predominate. In the upper reaches of the Uzh, Latoritsa, and Rika rivers, light brown forest soils were formed, and in the upper reaches of the Borzhava, Tereblya, Teresva, Chorna, and Bila Tysa rivers, brown mountain forest soils were formed. The dominant type of soil in the lower reaches of the Uzh, Latorytsia, and Borzhava rivers is sod-podzolic, gley soils.

Subbasins of the Prut and Siret rivers

In the valley of the Prut River, chernozems are more common: podzolized, shallow and deep low-humus soils. In the lower reaches, the lack of moisture caused the spread of southern chernozems and chestnut soils with signs of salinization.

Part of the sub-basin of the Prut River, within the mountains, consists of sandy-light- and medium-loamy, in places sod-podzolic soils in a complex with podzolized, occasionally mountain-peat-podzolic soils. The riverbed consists mostly of sandy-pebble and pebble-stone soils.

In the mountainous part of the Siret River sub-basin, medium-podzolic and mountain-podzolic borozems prevail, in the foothills and on the plain they are replaced by turf-medium-podzolic surface-gley soils, and in the river valleys - turf-podzolic-gley soils combined with onion-podzolic soils. According to the mechanical composition, the soils in the mountains are sandy-medium loamy, on the plains - slightly loamy. The underlying layer has low water permeability.

Subbasin of the lower Danube

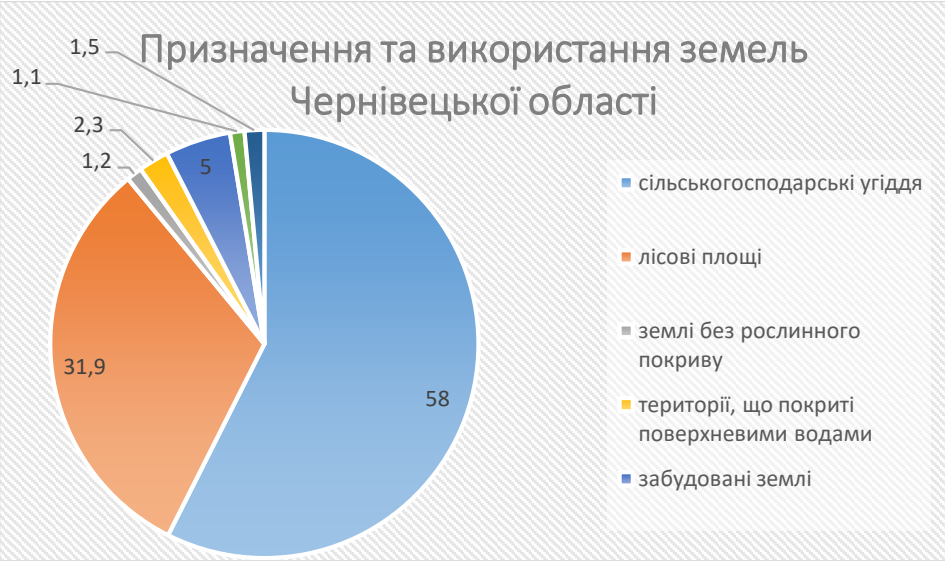
The soil background in the region consists of ordinary chernozems and southern chernozems, within the Danube terrace plain and in the southwest of the watershed plain - exclusively micellar-carbonate.

Chernozems were formed under the conditions of sedge-sedge and sagebrush-sedge-sedge vegetation in combination with some annual and biennial grasses. The chernozems of the region are characterized by high biological activity, which

contributes to the mineralization of organic substances, a well-defined and strong "coprogenic" structure, high porosity (up to 50-55%) and water permeability (filtration coefficient 1.5-3.5 mm/min).

The granulometric composition of chernozems is the usual heavy loam, towards the south the composition becomes somewhat lighter, and medium-loam varieties of southern chernozems dominate within the terrace plain. In the profile of ordinary chernozems, at a depth of 85-120 (130) cm, a well-defined white-eye horizon (usually the Phca horizon), in southern chernozems, it approaches a depth of 65-90 cm. The carbonate content in this horizon reaches 17-22%. Gypsum horizon in the profile of chernozems to a depth of 2-3 m is not traceable. Initial chernozems are not salted to a depth of 5-7 m, and often deeper.

The use and purpose of land within the regions covered by the Danube basin are analyzed below.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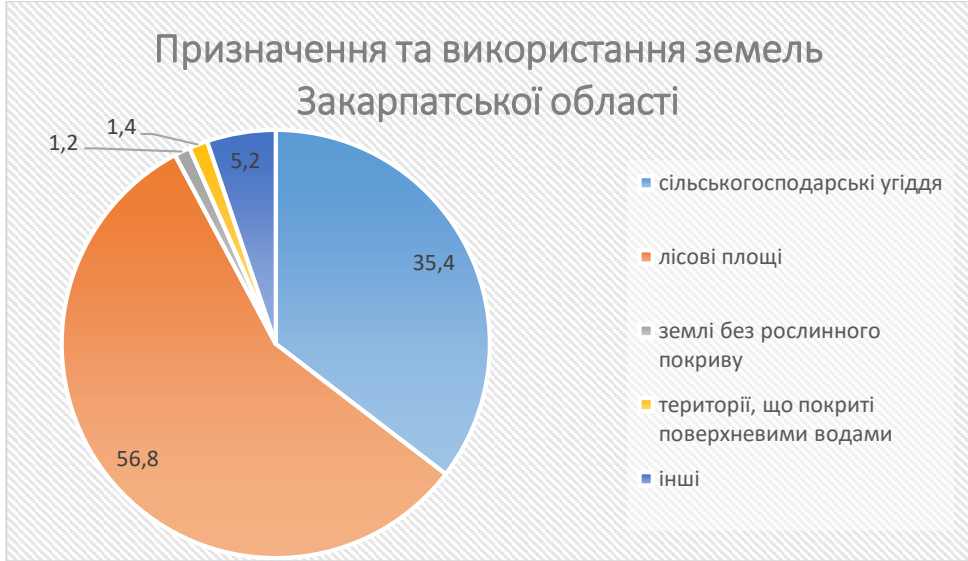
1,2
5
31,9
58
сільськогосподарські угіддя
лісові площі
землі без рослинного покриву
території, що покриті поверхневими водами
забудовані землі


Призначення та використання земель Закарпатської області
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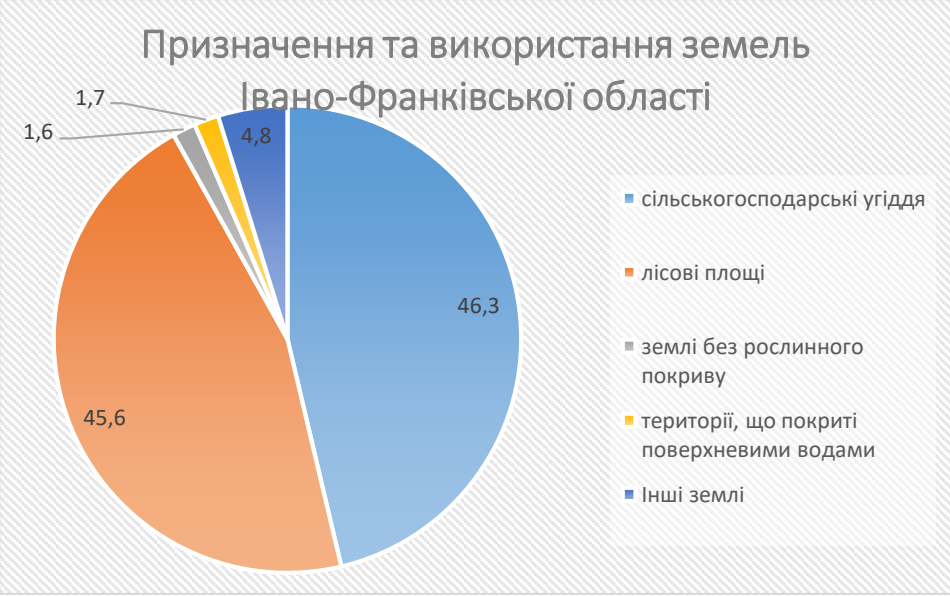
1,4
5,2
35,4
56,8
сільськогосподарські угіддя
лісові площі
землі без рослинного покриву
території, що покриті поверхневими водами
інші


Призначення та використання земель Івано-Франківської області
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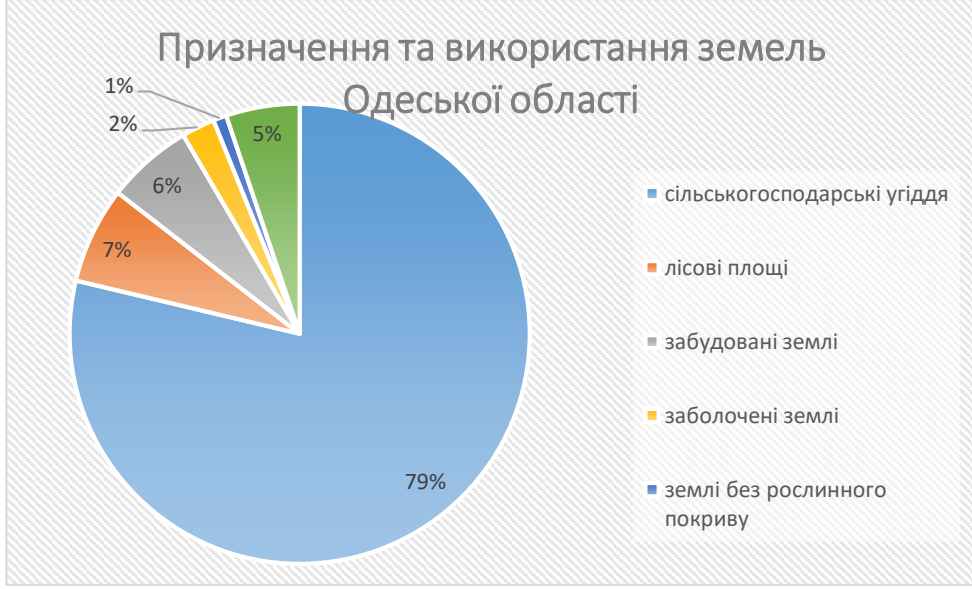
4,8
46,3
45,6
сільськогосподарські угіддя
лісові площі
землі без рослинного покриву
території, що покриті поверхневими водами
Інші землі


Призначення та використання земель Одеської області
1%
2%
5%
6%
7%
79%
сільськогосподарські угіддя
лісові площі
забудовані землі
заболочені землі
землі без рослинного покриву

Thus, according to the results of the analysis of land use, a large percentage of forested areas is observed within the regions of the Danube basin, except for the Odesa region, where agricultural land dominates significantly.

Agriculture and forestry are the leading sectors of the economy within the basin.

2.6 Geology and subsoil

Subbasin of the Tisza River

The subbasin is located within the young (alpine) fold structure of the Carpathians and covers the central part of the Ukrainian segment of the fold Carpathians with the adjacent Transcarpathian internal trough.

The formation of two structural floors takes part in the geological structure of the territory. The lower structural floor forms the foundation of the Transcarpathian depression and the Folded Carpathians. In the basement of the depression, intensely dislocated sedimentary, volcanic and metamorphic formations of the Paleozoic and Mesozoic-Cenozoic periods are developed. The folded Carpathians are formed by carbonate-terrigenous and terrigenous Mesozoic-Cenozoic formations, which make up several structural-facies zones. They are intensively located and form a package of covering structures.

Inner Carpathians: Transcarpathian Inner Depression, Vyhorlat-Hutyn Range and Berehiv Uplift and "buried" volcanoes (rhyolites, andesites, basalts, their tuffs and tuff rocks). Pennine zone of rocks: Pennine zone (limestones, argillites, sandstones with gravelites and conglomerates). Zone of Marmara rocks: Monastyretskyi and Vezhanskyi covers (conglomerates, marls, sandstones, argillites with gravelites, limestones, siltstones). Marmaros massif: Dilovetskyi and limestones and dolomites, granite-porphyries, granitogneisses, amphibolites, gabbros, tuffs, phyllites, argillites, siltstones, sandstones, tuffs, coal, conglomerates). sandstones in places with limestones), the Kamianopotsky cover and the Krosnen zone (sandstones, limestones, argillites, in places spilites, diabases and their tuffs), Porkuletskyi, Duklyanskyi, Chernogorskyi and Skibovyi covers (flysch, argillites, marls, sandstones, siltstones).

Deposits of the upper structural floor fill the Transcarpathian internal depression. These are Neogene-Quaternary sedimentary, volcanogenic and volcanomict, sometimes coal-bearing molasses formations, lying mostly subhorizontally and forming a cover complex.

On the territory of the sub-basin there are deposits of minerals, in particular lead and zinc (Muzhievo, Berehivske), mercury (Dubrynichi, Turya Bystra,

Vyshkovo), rock salt (Solotvyno, Tereblya). Enrichment of waters with sulfate ions and heavy metal ions is also observed in the places where sulphide (pyrmes) mineralization occurs in the zone of the Marmara Rocks and the roofs of the Marmara Massif.

Subbasins of the Prut and Siret rivers

Part of the Prut sub-basin is located in the Carpathians and is composed of Mesozoic deposits (shales, quartzites), overlain by flysch (sandstones, clays, marls and limestones) of the Tertiary period and a layer of Quaternary alluvial rubble deposits.

The analysis of the geological structure of the Prut sub-basin showed that the aquifers in the southern part of the Pre-Carpathian depression are the most water-enriched. In areas along the left slope of the Prut, the waters are associated with alluvial deposits of the Eopleistocene and Lower Pleistocene. The water-bearing rocks here are sands and pebbles of the floodplain terraces with a thickness of up to 20 m.

The mountainous part of the Siret River subbasin is composed of Paleozoic mica and other metamorphic shales, the foothills - sandstones, clay shales and limestones (mainly chalk), the flat part - sandstones, marls, limestones and clay shales. In the layers of sand and sandstone at a depth of 250-300 m, there are aquifers with water that is suitable for drinking and other technical purposes, but they do not have a continuous distribution.

Subbasin of the lower Danube

Precambrian, Paleozoic, Mesozoic and Cenozoic sediments are observed in the geological structure of the sub-basin.

In the section, there are fine and medium-grained calcareous sands, in which there are lenses and layers of weakly cemented sandstones, marls of greenish and light gray color, dense and cracked, clays and siltstones. The Neogene system is widespread and is represented by Miocene and Pliocene sediments. Upper Pliocene amovial deposits of the terraces are developed in the southern part of the basin, and are represented by sands of different composition with layers of clay and inclusions of gravel and pebbles. They lie at depths from 1 m to 25 m.

Upper Pliocene sediments are developed in the southern part of the basin, represented by clay, sand, siltstone, and loam.

Deluvial formations are almost everywhere distributed on the slopes of river valleys, gullies, ravines and reservoirs. They are represented by sandy-clay rocks, sandy loams and loams, limestones. The power ranges from 0.5 to 15 m.

2.7 Biodiversity and landscapes

2.7.1 Flora

Subbasin of the Tisza River

The Ukrainian Carpathians belong to the Central European province of the broad-leaved region. Forest fund lands predominate within Zakarpattia Oblast. The dendrological composition includes 10 coniferous and more than 150 deciduous tree and shrub species. On the area of the Ukrainian Carpathians covered with forests - 41% is occupied by spruce, 35% by beech. The remaining species cover smaller areas: oak - 9%, spruce - 5%, hornbeam - 4%. Species such as birch, maple, ash, and alder occupy 6% of the area covered by forests.

Altitude vegetation zones are distinguished: foothill oak, low mountain beech, upper mountain spruce, subalpine shrub-meadow, alpine.

In the foothill belt, which rises up to 400-500 (700) m, oak forests prevail, spruce-beech forests and derived hornbeam, beech, spruce, aspen-alder forests are also common. The low mountain belt on various slopes rises from 500-700 m to 1000-1200 m and 1350-1450 m, it is dominated by tall beech, spruce-beech, hornbeam-beech and oak-beech forests. Pure spruce forests occupy the upper parts of the slopes of Chornohora, Rakhiv mountains, and Gorgan. In the subalpine zone at altitudes of 1200-1500 m, 1650-1850 m there are thickets of mountain pine, juniper bushes, green alder, East Carpathian rhododendron, cereal and various grass meadows. The alpine zone includes herbaceous and shrub communities above 1800-1850 m; they have a fragmentary distribution.

Forest vegetation. In the Ukrainian Carpathians, 1,305 syntaxons of the dominant classification have been described in the association rank, or about 70% of the phytocenofund of the forests of Ukraine [47]. Compared to other types of vegetation, the forest vegetation of Transcarpathia is characterized by the greatest cenotic wealth. It is represented by 10 formations and more than 600 associations of the dominant classification, which is about 50% of the syntaxons of the forests of Ukraine. Until now, only beech forests have been covered by studies of forest vegetation according to floristic classification. Of the 34 associations of the order Fagetalia sylvaticae found on the territory of Ukraine, 9 are found on the territory of Transcarpathia [48].

In the Ukrainian Carpathians, the most widespread are spruce forests of the Piceetea abietae formation. On them, according to the data of Z.P. Bilous and others. [49], accounts for 46.4% of the forest area. A slightly different area is presented by O.V. Crested [50], namely 37.7%. The second place is occupied by the forests of the

Fagetea sylvaticae formation - 35.1 - 37.7% [49,50], the third - Abietea albae - 6.8% [51].

Due to the wide range of natural conditions, both thermophilic forests with the participation of Mediterranean species (Fraxinus ornus L., Tilia tomentosa Moench, Quercus pubescens Willd., Q. dalechampii Ten.) and boreal type forests are common in Transcarpathia.

The picture of the ratio of forest areas of different formations in Transcarpathia differs from the general one for the Ukrainian Carpathians. The most widespread forests of the Fagetea sylvaticae formation, which occupy 58.1% of the forested area, as well as in the central and southern parts of their range (Germany, Austria, Bosnia and Herzegovina, North Macedonia, Serbia, Slovenia, Croatia, Montenegro, Kosovo, Albania) , where beech forests have the greatest concentration and highest productivity (the percentage of beech forests is 50-60% of the total area of forests, and the stock of wood is 800-1000 m3 per 1 ha) [52]. As you know, the eastern limit of the continuous distribution of beech is in the Carpathians and it coincides with the border of the Precarpathian foothills. The main altitudes are 400-1200 m above sea level. A particularly valuable part of the functional core of the forest ecosystems of Transcarpathia is the old-growth forests of Fagus sylvatica L., which are included in the list of the most valuable World Heritage sites.

The Ugolsko-Shirokoluzhan old-growth beech forests are one of the largest in area of old-growth forests in Europe [53], as are the floodplain oak-ash forests in the floodplain of the Borzhava River, which are also similar in structure to old-growth forests. This gives the region of Transcarpathia a special scientific value.

The largest and most valuable areas of floodplain forests of the Transcarpathian lowland are concentrated in the floodplains of Latoritsa, Borzhava, and Tysa. They are included in the "Prytisyanskyi" RLP and are protected in several forest reserves.

The floodplain forests below the Latoritsa River are concentrated on the banks of old trees, branches and the river bed itself. The floodplain ash groves, which are characterized by a high floristic diversity, are of special scientific and natural historical value.

In the lower reaches of the Borzhava River, forest massifs are mainly formed by elm-ash and hornbeam oak forests of different ages with the participation of Quercus robur L. and Fraxinus angustifolia Vahl. and are considered one of the largest in terms of area (2,500 hectares) of continuous areas of floodplain forests in Ukraine and Europe. Some sections of these forests can be considered equivalent to

primeval forest ecosystems, which have already disappeared in Europe, based on their structure and age characteristics [54].

Willow-poplar and poplar forests with Populus nigra L., where the age of the trees is more than 100 years old, and a floodplain alder forest with Alnus glutinosa (L.) P. Gaertn, were formed along the Tisza riverbed. in the Egresh tract, it is the largest in terms of area and one of the most preserved vilshnyaks in Transcarpathia.

In the lowest areas of the forests in the mentioned years, swampy alder trees with the participation of rare species such as Urtica kioviensis Rogov., Matteucia struthiopteris (L.) Tod. and sphagnum mosses. Some of them are protected on the territory of the above-mentioned park, and some tracts have been declared forest reserves (the Silash tracts (75.5 ha of Berehovoderzhspeclishosp), Egresh (37.4 ha of Vynohradiv Forestry), Ostrosh (30.0 ha of Mukachevo Forestry) [54]. alder-ash and alder forests with areas of tall grass swamps were formed in parts of the relief of some protected tracts. Among them, there are small patches of sphagnum mosses - Sphagnum palustre L., S. centrale C. Jens., S. capillifolium (Ehrh.) Hedw. that some alder trees arose on the site of former sedge-sphagnum or willow-sedge bogs after land reclamation, which often occurred in the lowlands in the post-glacial era [55]. It is interesting to note that in the moist thickets of the lowlands and foothills of Transcarpathia (surroundings of the villages of Oleshnyk and Pushkinovo (Vynogradivskyi district), the village of Novobarovo (Tyachivskyi district), there are mounds with sphagnum mosses, among which such species as Sphagnum palustre and S. capillifolium were found. Together with them, on such mounds, we found Pleurosium schreberi (Willd. ex Brid) Mitt. - a characteristic species of coniferous forests and, which is not particularly characteristic of modern lowland forests - Vaccinium vitis-ideae L.

A significant proportion of forest vegetation syntaxons of Transcarpathia are unique in structure and species composition and are not common anywhere else in Ukraine.

Swamp vegetation. Hanging eutrophic downy-sedge or downy-sedge bogs are especially characteristic of the Ukrainian Carpathians and their southern megaslope, which are most often formed along streambeds and at sources. In the studied region, the largest number of them was noted in the Eastern Beskids, which is due to the presence of significant areas of post-forest meadows.

Wetlands of Hungarian lilac, in which the understory layer is formed by the Eastern Carpathian endemic and relict Syringa josikaea J.Jacq. ex Rchb., grow exclusively in the Eastern Carpathians on the territory of Ukraine and Romania. In the Ukrainian Carpathians, they are limited mainly to the southern megaslope (9

localities) and only one locality is known from the northern megaslope. According to S. M. Stoyk [56, 57], they have been preserved in the Ukrainian Carpathians since the Pleistocene era.

In the studied region, swamp phytocenoses with the participation of some boreal species, for example, with Menyanthes trifoliata L., which are found in Gorgani, and occasionally in the highlands of Montenegro, Svidivka, and the Maramoros Alps, are rare. Conversely, in lowland Ukraine, this species often occurs in mesotrophic bogs and on the periphery of oligotrophic bogs.

A feature of the vegetation cover of the swamps of the Ukrainian Carpathians is the presence of horsetail-hypne and especially unique horsetail-sphagnum coenoses, unknown from the plain part of Ukraine. The first were described by Yu. R. Shelyag-Sosonk for the Upper Dniester Beskids, and the second by T. L. Andrienko in the upper reaches of the Terebli and Svichi rivers.

In the alpine belt of the Ukrainian Carpathians, there are rare mesotrophic mountain pine-sphagnum bogs, which is a common feature of the bog vegetation of the highlands of European mountain systems [58].

In the Carpathians, cenoses of tufted sedges are rare, and in the flat part of the country they are relatively common.

The oligotrophic marshes of the upper reaches of the Tisza River basin have a number of features characteristic of this type of vegetation in the Ukrainian Carpathians as a whole, which distinguish them from the vegetation of the marshes of the plain part of Ukraine. The main difference between mountain bogs is the presence of Sphagnum capillifolium in the composition of the moss layer, which, as noted by M. Ya. Katz [59], is a characteristic feature of mountain bogs in Western Europe [60]. Over the past decades, this species has become the dominant moss layer in almost all oligotrophic bogs, and Sphagnum fuscum, which often performed the same phytocoenotic role as Sphagnum capillifolium, is now very rare, while it is a common component of the moss layer in the bogs of the flat part of Ukraine . Sphagnum robustum (Russ.) Röll also belongs to the mountain species of bog flora. Most of its occurrences are recorded in Transcarpathia, although occasionally it also occurs in Polissia.

An important feature of the modern swamp vegetation of the Ukrainian Carpathians and the studied region, in particular, is the relatively rare occurrence of forest swamps in which the tree layer is formed by Picea abies (L.) H. Karst., Alnus glutinosa (L.) P. Gaertn. and A. incapa (L.) Moench, while, for example, pine-sphagnum, pine-birch-sphagnum, birch-sphagnum and alder-sphagnum swamps are widespread in the Ukrainian Polissia. Spruce-sphagnum bogs occur occasionally in

this region. However, according to Hungarian researchers, previously birch-sphagnum and alder-sphagnum phytocenoses occurred quite often in the flat part of Transcarpathia and gradually disappeared due to the draining of the swamps.

On the territory of Transcarpathia, compared to other types of vegetation, swamp vegetation has undergone the most profound changes (primarily under the influence of land reclamation). Its area has decreased by almost 90% only in the Transcarpathian Lowland. For example, the Chornyi Mochar swamp, which was the largest and occupied about 15,000 ha, or about 1/5 of the lowland territory, was completely reclaimed before the first half of the last century [61, 55].

Aquatic vegetation. Most of the reservoirs are located in the lowlands and in the foothills. These are mainly artificial shallow reservoirs that warm up well, floodplain lakes created in the floodplains of rivers to regulate their flow, canals and fishing ponds. There are 102 artificial reservoirs, with the exception of canals, with a surface area of 1-2 hectares to several tens of hectares and an average depth of 1.0-1.5 m. Natural reservoirs include alpine lakes of mainly glacial origin (oligotrophic type), rivers, sleeves, as well as old trees (mesotrophic type) formed in the lowland part of river basins. In the mountainous part, the riverbeds are narrow, with a fast current (1.0-4.0 m/sec.) and steep banks, which does not contribute to the development of higher aquatic vegetation. In small streams and in the coastal part of mountain rivers, groups formed by Fontinalis antipyretica L are often found. Conversely, in the lowlands, riverbeds, ponds and canals are abundantly overgrown with aquatic macrophytes, which form groups of classes Potametea Klika in Klika et Novak 1941, Lemnetea O. Bolos et Masclans 1955, less often Charetea F. Fukarek ex Krausch 1964. In their coastal parts, groups of hygrophilous tall grasses of the class PhragmitoMagno-Caricetea Klika in Klika et Novak 1941 are formed. In the coastal strips, mainly of sleeves and old trees, groups of the class IsoëtoNano-Juncetea Br.- Bl. et Tx. ex Br.-Bl. et al. 1952. Over the past decades, small salt lakes have formed at the sites of salt mines, around which halophytic groups have formed, dominated by Carex distans, Puccinella distans, Typha laxmannii and some others. Until recently, they were not recorded in the studied area. A feature of the higher aquatic vegetation of Transcarpathia is the presence in its composition of species that are very rare in Europe, included in the "Red Book of Ukraine" (2009) (Marsilea quadrifolia L., Nymphoides peltata (SGGmel.) O.Kuntze), as well as rare groups (Wolffietum arrhizae Miyawaki et J. Tüxen 1960, Ricciocarpetum natantis Segal 1963 em Tüxen 1947, Nymphoidetum peltatae (All. 1922) Muller et Gors 1960). Ephemeral communities are formed in small and shallow drying reservoirs from the lowland to the belts of beech and spruce forests, mainly from representatives of the

genera Lemna, Chara, Callitriche, Eleocharis, less often Potamogeton natans, Batrachium trichophyllum, etc. settle here. In the lowlands, communities dominated by Elodea canadensis, Myriophyllum verticillatum, Lemna minor, Potamogeton natans, less often Nuphar lutea, Potamogeton trichoides, Hottonia palustris, Najas minor, N. marina, Salvinia natans, etc., are formed in the lowlands in such reservoirs.

Artificial non-drying reservoirs, in connection with the weakening of anthropogenic influence, have become the habitat of natural higher aquatic vegetation over the last decade. In some canals, floodplain artificial lakes and ponds, mass reproduction of relict species such as Trapa natans, Salvinia natans, Nuphar lutea and very rarely Marsilea quadrifolia is observed. Overgrowths of the latter type were observed in canals earlier [62, 63]. However, as noted by D. V. Dubina [64], the increase in areas of aquatic vegetation due to the creation of artificial reservoirs and shallowing of rivers in no way compensates for the loss of species and coenotic diversity of vegetation of this type of organization. In most cases, unformed groups are unstable. Meanwhile, with excessive overgrowth of even rare groups such as Trapetum natantis, Salvinietum natantis (channels in the lowlands), there is a hyperaccumulation of organic matter, a decrease in water quality indicators and an impoverishment of biodiversity.

In natural slow-flowing reservoirs with a comparatively smaller fluctuation of the water level (sleeves, old lakes), ecological series have several directions, monodominant groups are formed less often, and the cenotic composition of phytocenoses is more diverse: for example, in the Latoritsa River branch with a very slow current, muddy-sandy bottom sediments and with a depth of 1.0-1.5 m, the vegetation cover is formed by the following ecological series: Carex acuta → Scirpus lacustris (Sparganium erectum, Glyceria maxima) → Hydrocharis morsus-ranae (Elodea canadensis, Nymphoides peltata) → Stratiotes aloides → Trapa natans → Nuphar lutea (Nymphaea candida, N. alba). Aquatic phytocenosis has a variegated structure, no grouping occupies relatively large areas, almost no monodominant groups are formed. With a faster current in the same conditions, the following ecological series are observed: Glyceria maxima (Sparganium erectum) → Sagittaria sagittifolia → Sparganium emersum → Nuphar lutea. On shoals with muddy bottoms: Eleocharis palustris (Eleocharis acicularis) → Scirpus lacustris → Sparganium erectum → Hydrocharis morsus-ranae → Nymphoides peltata → Elodea canadensis.

Most often, the coastal parts of flowing water bodies, both natural and artificial, are occupied by a strip of Carex riparia Curtis and C. acuta L., behind it a strip is formed mainly of Sparganium erectum L. or Sparganium emersum Rehman,

and in deeper areas - Stratiotes aloides L. In the lowlands, especially in the Berehiv district, the water surface of many channels with a width of 10.0-15.0 m and a depth of 1.0-1.5 m is completely covered by Stratiotes aloides L., and shallow (up to 1 m) and narrow (3.0-4, 0 m) – Salvinia natans L., less often Spirodela polyrrhiza (L.) Schleid. Wolffia arrhiza (L.) Horkel ex Wimmer grows only in the Vynogradivsky district (the area has the warmest climate). It was noted that the central - the deepest parts of the slow-flowing channels are occupied by Nuphar lutea (L.) Smith.

Another structure of vegetation belts is formed in impermeable eutrophic water bodies: Carex riparia → Glyceria maxima (Typha latifolia, Scirpus lacustris) → Sparganium erectum (Oenanthe aquatica (L.) Poir) → Hottonia palustris → Elodea canadensis → Lemna minor → Potamogeton trichoides.

In the lower forest zone, overgrowth of artificial mesotrophic small and shallow (up to 1 m) water bodies is represented by ecological series: Scirpus sylvaticus → Typha latifolia → Eleocharis palustris → Potamogeton natans; Carex rostrata (C. vesicaria) → Equisetum fluviatile → Potamogeton natans.

In small depressions and ravines with a muddy and gravelly bottom, along mountain roads in the same belt at altitudes of 700-850 m above sea level, the following rows are observed: Scirpus sylvaticus (Sparganium erectum, Leersia orisoides) → Eleocharis palustris → Callitriche palustris → Lemna minor ; Scirpus sylvaticus → Glyceria fluitans → Veronica beccabunga (Callitriche palustris) Typha latifolia (Alisma plantago-aquatica) → Eleocharis palustris → Lemna minor → Chara vulgaris. Shallow low-flow water bodies formed near or near the outlet of mineral springs in the same belt are overgrown as follows: Scirpus sylvaticus (S. tabernaemontani) → Equisetum fluviatile → Callitriche palustris → Potamogeton crispus → Zannichelia palustris.

Subbasins of the Prut and Siret rivers

About 35% of the area of the Prut River subbasin is occupied by broad-leaved and coniferous forests. In the wooded Carpathians, the landscape zonation is pronounced. The foothill zone is characterized by oak and hornbeam forests, where along with the summer oak, the winter oak and the Western European beech, typical for Western Europe, grow.

The lower slopes of the mountains (300-600 m) are occupied by broad-leaved forests (summer oak, hornbeam, beech, maple, linden, sometimes with admixtures of spruce and fir). Such forests are also found above 600 m, but they are somewhat changed, with increasing altitude beech begins to dominate and the role of conifers increases. Spruce forests dominate at an altitude of 1350-1600 m. The tops of the mountains are occupied by subalpine meadows, thickets of mountain pine and alder.

The left-bank part of the Prut River sub-basin is mostly open and plowed with sparse forest masses.

A large part of the sub-basin of the Siret River (41% of the total area) is occupied by forests. The foothills and mountain slopes up to a height of 600 m are mainly oak, above and up to 1000 m the beech forest predominates, and even higher, up to 1300 m, there is a coniferous forest. The tops of individual mountains are open and represent subalpine meadows - meadows. In the flat part, the forest has survived only in places, the rest of the area is plowed and occupied by meadows.

1,253 species of vascular plants belonging to 499 genera, 112 families, 8 classes and 5 divisions were found in the coenoflora of the grass communities of the Prut River. 62.6% of their species diversity is concentrated in the 10 leading families of grass groups: Asteraceae (178 species/14.21%), Poaceae (103/8.22), Fabaceae (78/6.23), Rosaceae (63 /5.03), Scrophulariaceae (59/4.71), Lamiaceae (58/4.63), Cyperaceae (57/4.55), Ranunculaceae (53/4.23), Caryophyllaceae (46/3.67) , Apiaceae (46/3.67) [65].

In general, the coenoflora of grass communities in the research region reflects the typical Palearctic flora of the Fabaceae type (Khokhryakov, 2000), which is also characteristic of the territory of Ukraine (Zaverukha, 1985). At the same time, the high positions of the Cyperaceae family in the family spectra of individual unions (Juncion trifidi, Calthion palustris, Filipendulion ulmariae, Mentho longifoliae-Juncion inflexi, Deschampsion cespitosae, Molinion caeruleae) give it a boreal touch, and the Rosaceae family (Bromo pannonici-Festucion csikhegyensis unions, CirsioBrachypodion pinnati, Festucion valesiacae, Arrhenatherion elatioris, Triseto flavescentis-Polygonion bistortae, Calamagrostion arundinaceae, Calamagrostion villosae) - is similar to flora of the Central European type [65].

The presence of the studied groups of representatives of the genera Abies, Acer, Alnus, Amorpha, Betula, Carpinus, Crataegus, Fraxinus, Juniperus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rosa, Rubus, Salix attracts attention, which is generally atypical for grass ecosystems and indicates the presence of sylvatization processes, the cause of which is the cessation of haying and grazing [65].

Subbasin of the lower Danube

The vegetation cover of the sub-basin area is mainly steppe. According to modern geobotanical zoning, the territory belongs to the Danube-Dniester geobotanical district with sedge-sedge and sagebrush-sedge steppes in a complex with halophyte groups and salt meadows. The Danube geobotanical floodplain-delta area with sedge-reed thickets - floodplains - stands out separately.

In the valleys of the rivers and in the floodplain of the Danube river, floodplain meadows are developing. The Danube lowland is occupied by floodplains, which are represented by a complex of aquatic and riparian vegetation with the participation of tall grasses (reeds, reeds, cattails), grassy marshes, and floodplain forests of white willow.

The southern steppe subzone is characterized by the predominance of grassy sedge-forage associations and a decrease in the share of steppe forbs, which is represented by ephemerals (cornflower, veronica), ephemeroids (goose onion, tulips, steppe hyacinth), and in low relief by moisture-loving species (Romanian alfalfa , dry steppe sage, etc.). On the coast of the Black Sea, the grass cover is dominated by sedge, combed ryegrass, spiked hemlock, and wormwood. Many of the plants are listed in the Red Book of Ukraine (water nut, astragalus, cuckoos, cowslips, etc.).

2.7.2 Fauna

The ichthyofauna of the Danube includes about 70 species of fish. There are 6 sturgeon species, 5 of which are listed as endangered species. The following are of industrial importance: beluga, sturgeon, sevryuga, sterlet, catfish, tench, carp, pike and herring.

Subbasin of the Tisza River

The total number of animal species in the region is more than 30,000 species of fauna. Both invertebrates and vertebrates are common in the region. Among invertebrates there are representatives of more than 20 types of organisms, most of which are protozoans. About 400 species of vertebrates, 80 species of mammals, 287 species of birds, of which 197 are nesting, 10 species of reptiles, 16 amphibians, 60 fish, 100 molluscs. The most common species in Transcarpathia: mole, fox, wolf, hare, squirrel, ermine, forest marten, wild boar, roe deer, red deer. Among the rare species, the Danube salmon, sterlet, owl, golden eagle, alpine curlew, lynx, and otter should be noted.

Endangered species - sparrow owl, hairy owl, bats: large and small horseshoe bat, Bechstein's night owl, pond owl, Natterer's owl, tricolor and others. The number of animal species listed in the Red Book of Ukraine has increased: capercaillie, forest cat, black stork and brown bear. New species appeared in the nesting avifauna: crested blackbird and white-eyed blackbird. The state of the spotted salamander population is stable. In low-lying areas, a relict species of fish - Kramer's umbra - has been preserved in the system of reclamation channels.

Subbasins of the Prut and Siret rivers

The animal world in the subbasins is diverse. There are only 435 species of vertebrate fauna within the Ukrainian Carpathians. There are inhabitants of Central European broad-leaved forests - red deer, European roe deer, bog turtle; representatives of the Mediterranean - green frog, spotted salamander, as well as residents of the Siberian taiga - capercaillie, grouse.

There are many endemics - the Carpathian squirrel, the Carpathian newt. A brown bear migrates from river valleys to subalpine shrubs for the summer. Predators include martens, ferrets, lynxes, and wolves.

Almost 200 species of birds live in forests, gardens, fields and reservoirs. Most of them are forest dwellers (numerous species of rowan trees: woodpeckers, pigeons). Wetlands are inhabited by coots, waders, herons, and storks. Mountain plover, jay, mountain shrew, Carpathian capercaillie are found.

In the rivers of the sub-basins, there are various types of fish: Ukrainian lamprey, sterlet, brook trout, rainbow trout, pike, bream, bream, bream, crucian carp, tench, tench, pikeperch, perch, gobies, crucian carp, bream, catfish, roach, carp . Fast current, stony, thin muddy bottom, poverty of plankton and poorly developed vegetation determined the composition of the ichthyofauna. Here, rhyophilic, omnivorous species that lay their eggs on a stony or sandy-sandy substrate are common.

Subbasin of the lower Danube

In terms of the number of species of fauna, the Danube Delta is almost the richest place in modern Europe.

The fauna of the subbasin is represented by steppe, forest-steppe and intrazonal species, among which birds, mammals, reptiles, and fish are common. Within the region, two zoogeographic districts are allocated - Danube-Dniester and Black Sea and one zoogeographic section - the Lower Danube delta intrazonal section.

The entire territory of the basin belongs to the Black Sea-Azov steppe province, within which two zoogeographic districts are distinguished. In the Danube-Dniester zoogeographic district, the main faunal complex is steppe, and in agrocenoses - forest. There are a lot of birds here, including the harrier, woodpecker, woodcock, pheasant, gray partridge. Mammals include a wild rabbit, a hamster, a white-toothed blind dog, and a steppe (light) ferret.

The fauna of the lower Danube, which forms the Lower Danube delta intrazonal area, is extremely rich. Several dozen species of fauna are listed in the Red Book of the World and the Red Book of Ukraine and are subject to protection.

The Danube Biosphere Reserve is located in the sub-basin of the lower Danube, on the territory of which 11 species (as many subspecies) of amphibians and 6 species (7 subspecies) of reptiles have been reliably registered. The swift lizard in the Lower Danube is represented by two subspecies - Black Sea (Lacerta agilis euxinica) and Kherson (L. a. chersonensis) swift lizards, as well as hybrids between them. All amphibian fauna of the DBZ (100%) is included in national and international lists of rare animals, and among reptiles, 5 species (83.3%) are included in the above-mentioned lists (Appendix II of the Berne Convention, Red Book of the International Union for Conservation of Nature IUCN (IUCN)).

In terms of zoogeographical batracho- and herpetofauna, the DBZ includes two Danube forms (the Danube newt, the Danube form of the common newt), one West Pontic subspecies (the Black Sea pond lizard), one East European subspecies (the Kherson pond lizard), one Balkan species (the Crimean lizard), one Central Asian species (variegated frog), one Palaeoarctic forest species (gray toad), five European forms (red-bellied toad, common garlic frog, edible and pond frog, sharp-nosed frog) and five species whose origin is associated with the Ancient Mediterranean (green toad, common frog, lake frog, terrapin, common and water snake).

Most species and subspecies of the herpetofauna of the DBZ have large or medium-sized habitats, small habitats have Danube forms of newts, the Black Sea lizard and the Crimean lizard. The first two are endemic to the Danube region, the second subspecies is endemic to the Western Black Sea region, and the last one is endemic to the Eastern Mediterranean.

Various biotopes with a good food base and convenient places for nesting, a relatively warm climate and, most importantly, insignificant anthropogenic pressure, caused such a great diversity of species and a high number of birds in the Danube Delta. In this regard, it is one of the richest places in Europe. Almost 350 species of birds are known to inhabit it (Radu, 1979; Zhmud, 1999; Munteanu, 2000). The total number of birds that are in the delta at certain times of the year reaches several million individuals (Zhmud, 1996; Zhmud et al., 2005; Zhmud, 1996, etc.).

The Danube Delta is also of international importance for birds. From 1977 to the second half of 2021, 302 species of birds have been recorded in the territory of the Danube Biosphere Reserve and its adjacent territories.

The species diversity of mammals of the DBZ is due to the specificity of the delta lands, which include large areas of aquatic and near-aquatic biotopes of various types. As a result, the theriofauna of the reserve includes a significant number of aquatic, semi-aquatic and near-aquatic species of mammals, among which

representatives of the marten family - otter, ermine and European mink - are especially important from the point of view of nature conservation. It should be noted that for the mink of European territory, the Danube deltas are very important for the preservation of the gene pool of this species on the European continent. The presence of steppe and related biotopes in the vicinity of the Stentsivsko-Zhebryaniv plains leads to the presence of a significant number of steppe species among the animals of the DBZ - stone marten, marten, steppe ferret, etc. The protected part of the sea adjacent to the delta is visited by all three species of Black Sea dolphins – bottlenose dolphins, bottlenose dolphins and bottlenose dolphins. As of the second half of 2021, 46 species of mammals have been reliably recorded on the territory of the Danube Biosphere Reserve.

The rare species of ichthyofauna of the reserve primarily include species listed in the Red Book of Ukraine and the European Red List: beluga (Huso huso L.), stickleback (Acipenser nudiventris Lovetszky), Atlantic sturgeon (Acipenser sturio L.), sterlet (Acipenser ruthenus L.), cuttlefish (Rutilus frisii Nordmann), shemaya (Chalcalburnus chalcoides Guld.), umbra (Umbra crameri Walbaum), Black Sea salmon (Salmo trutta labrax Pallas), Danube salmon (Hucho hucho L.), Black Sea seahorse (Hippocampus ramulosus Leach), sea cock (Trigla lucerna L.), striped ruff (Gymnocephalus schraetser L.), large shrike (Zingel zingel L.), small shrike (Z. streber Siebold), light humpback (Umbrina cirrosa L.), red goby (Neogobius eurycephalus Pallas), although some species have not been observed in the observation area in recent years (Movchan, 2001; Movchan et al., 2003). Also, rare fish species are included in the appendices of international conventions.

2.8 Natural territories and objects

There are 25 objects of the Emerald Network in the Danube basin, which cover approximately 16.8% (5059.07 km^2) of the area of the basin. The distribution by category of objects of the Emerald network is shown in Figure 2.8.1.

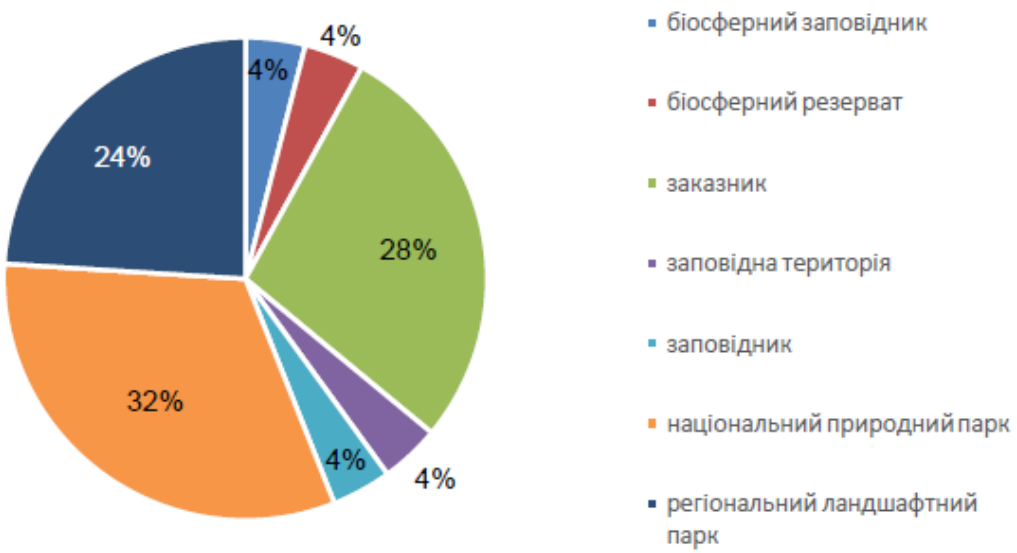


Figure 2.8.1 Distribution of Emerald Network objects by category, %

None of the facilities has a developed management and development plan. The list of objects of the Emerald network of the Danube basin is given in table 2.8.1.

Table 2.8.1 List of objects of the Emerald network within the Danube basin

№	River basin	River subbasin	Name of the territory	Code	Brief description
1	Danube	Yew	"Carpathian Biosphere Reserve"	UA0000006	The reserve was created with the aim of preserving the unique for Europe areas of wild nature, among which the beech forests are especially valuable. The task of the reserve is to protect and restore endangered flora and fauna, including endemics of the Ukrainian part of the Carpathians. Flora and fauna are represented by more than a thousand species of higher vascular plants. Here are found: 67 species of mammals, 193 species of birds, 10 species of reptiles, 15 species of amphibians, 29 species of fish, more than 3000 species of invertebrates. 64 species of plants and 72 species of animals listed in the IUCN Red Book and the Red Book of Ukraine, as well as in the European Red List, have been noted in the reserve.
2	Danube	Yew	NPP "Synevir"	UA0000026	Synevyr Lake is recognized as a wetland of international importance (Ramsar Convention) and is one of the seven natural wonders of Ukraine. Flora: the total number of plant species growing on the territory of the park is 1,726, of which 53 are listed in the Red Book of Ukraine. Fauna: the total number of species of vertebrates inhabiting the territory of the park is 169, of which 43 are listed in the Red Book of Ukraine.
3	Danube	Yew	Uzhansk NPP	UA0000032	The national park is located in the northwest of the Zakarpattia region and is part of the world's first tripartite Ukrainian-Polish-Slovakian international biosphere reserve "Eastern Carpathians", which is included in the UNESCO World Network of Biosphere Reserves. The Uzhan NPP consists of five nature protection research departments and currently occupies an area of 39,159 hectares, including 14,900 hectares of expropriated territory.
4	Danube	Yew	NPP "Enchanted Territory"	UA0000041	Since July 13, 2017, the sites of the "Enchanted Krai" NPP, "Irshavka" (93.97 ha) and "Veliky Dil" (1164.16 ha) have been included in the UNESCO world heritage as one of the massifs of Beech primeval forests of the Carpathians and other regions of Europe. The following rare species of animals are found in the park: Carpathian red deer, European roe deer, brown bear, wild boar, European badger, Eurasian lynx, forest cat, European beaver, brook trout and European grayling.

5	Danube	Yew	RLP "Prytisyanskyi"	UA0000113	Extremely high biodiversity is concentrated in these territories. The most valuable are the floodplain forests, where 20% of the rare species of Transcarpathia have survived. In particular, elm-ash forests, in which 10-20% are trees 120-300 years old. Most of these forests are on the verge of destruction and need protection. The fauna is extremely diverse: up to 74% of Transcarpathian mammal species, more than 60 species of butterflies, 160 species of water beetles, 278 species of turun beetles, 12 species of amphibians and five species of reptiles have been recorded. At different times of the year, from 158 to 192 species of birds occur here out of 229 species found in Transcarpathia. A third of all bats in Ukraine are found in the Borzhava floodplain complex. According to research, there are certain types of invertebrates found only in the Transcarpathian region on the park's territory. In general, more than 20% of species listed in the Red Book of Ukraine, about 7% of the European Red List and 65% of species rare for Transcarpathia were recorded in floodplain and near-flood areas.
6	Danube	Yew	Interstate Ukrainian-Romanian Biosphere Reserve "Marmaro and Chivchyno-Hryniav Mountains"	UA0000117	The most valuable from a sociological point of view are the fragments of completely indigenous groups of cedar-spruce forests (Pineto (cembrae) – Piceetum (abietis) vaccinioso (myrtilli) – hylocomiosum). As part of the formation of spruce forests, the most widespread groupings are the association of spruces (Piceetum (abietis) oxalidoso (acetosellae)). Among the rare species of flora in the meadow vegetation groupings, mountain arnica, smooth sedge (Lathyrus laevigatus (Waldst et Kit.) Gren.), blue pigeon (Polemonium caeruleum L.), as well as black eagles (Aquilegia nigricans), listed in the Red Book of Ukraine, grow Baumg.), large astrantia (Astrantia major L.), crescent moonwort (Botrychium lunaria (L.), shade sedge (Carex umbrosa Host), Carpathian cornflower (Centaurea carpatica (Porc.) Porc.) green tongue (Coeloglossum viride (L .) C. Hartm.), late autumn flower (Colchicum autumnale L.), Heiffel saffron (Crocus heuffelianus Herb.), Dactylorhiza cordigera (Fries) Soo), stemless gentian (Gentiana acaulis L.), long-horned gorse (Gymnadenia conopsea (L.) R. Br.), forest lily, or curly (native name - royal curls) (Lilium martagon L.), cuckoo's tears egg-shaped (Listera ovata L.) R. Br.), decorated cuckoo (Orchis signifera Vest) and burnt (O. ustulata L.).

					Poa rehmanni (Aschers et Graebn.) Woloszcz. and Primula poloninensis (Domin) An. Fed. are included in the European Red List. All-Carpathian endemics – bells (Campanula serrata (Kit.) Hendrych) and round-leaved king-leaf (Leucanthemum rotundifolium (Waldst. et Kit.) DC.) • 22 types of dwellings, 57 species. The predominant habitats are: E2.2 Plain and low-mountain hay meadows (100); G1.12 Boreo-alpine riverside galleries (130); G1.6 Beech forests (5600); G1.A1 Oak-ash-hornbeam forests on eutrophic and mesotrophic soils (450); G3.1B Alpine and Carpathian subalpine spruce forests (6100).
7	Danube	Yew	NPP "Eastern Svidovets"	UA0000259	The flora is particularly rich and diverse. Indicators of beech forests are represented by lichens in the Red Book: lobaria broad and lung, usneia flowering and the longest, and mushrooms - coral-like heritium and clavariadelphus tovkachikov. In the local primeval forests there are animals that are typical for the entire forest belt of the Carpathians. Among rare birds, there are long-tailed owls, hairy owls and sparrow owls. All species of woodpeckers characteristic of broad-leaved forests are also noted here. Some of the double nesters, such as the white-backed woodpecker and blue pigeon, are practically not found outside the primeval forests or are extremely rare.
8	Danube	Yew	RLP "Polonina Borzhava"	UA0000263	Polonyna Borzhava is a unique nature conservation area, part of the Emerald network (registration number UA0000263). The flora and fauna of the ridge includes dozens of red book species of plants and animals, and international migration routes of birds and bats pass through the ridge itself.
9	Danube	Yew	NPP "Okli Ged"	UA0000268	The area is 2.96 km2. 6 types of dwellings, 11 types. The predominant habitats are: G1.7 Thermophilic deciduous forests (40); G1.A1 Oak-ash-hornbeam forests on eutrophic and mesotrophic soils (220)
10	Danube	Yew	RLP "Vynogradivska Tysa"	UA0000269	The area is 59.64 km2. • 16 types of dwellings, 41 species. Predominant habitats are: C3.55 Weakly overgrown gravel banks of rivers (100); C3.62 Unvegetated gravel banks of rivers (400); E3.4 Wet or humid eutrophic and mesotrophic meadows (900); F9.1 Riparian shrubs (120); G1.11 River willow forests (2200)
11	Danube	Yew	RLP "Ponizzya Borzhavy"	UA0000270	The area is 40.49 km2. 13 types of dwellings, 40 species. The predominant habitats are: G1.22 Mixed oak-elm-ash forests of large rivers (2000); G1.A1 Oak-ash-hornbeam forests on eutrophic and mesotrophic soils (1000)

12	Danube	Yew	RLP "Koson"	UA0000271	The area is 2.49 km2. 3 types of habitats, 125 species. Predominant habitats are: E1.2 Perennial herbaceous calciphytic communities and steppes (120); G1.7 Thermophilic deciduous forests (42).
13	Danube	Prut and Siret	Carpathian National Natural Park	UA0000014	Created to preserve the unique forest ecosystems of Central Europe. 1,260 species of higher spore and vascular plants grow on the territory of the park, of which 155 species are bryophytes. 80 species of plants are included in the Red Book of Ukraine: Eastern Carpathian rhododendron, mountain arnica, pink rhodiola, white dream, northern linnea, common lambsquarters, river plantain, European cedar pine, small-fruited cranberry, a significant number of sedge species that occur in post-forest meadows and upland marshes , and other. Three types of plants are included in the European Red List: Carpathian borscht, Filyarsky honeysuckle, and Polonsky primrose. 32 plant groups are listed in the Green Book of Ukraine: 3 forest, 4 shrub, 12 meadow and 9 swamp. In general, 56 species of mammals, 114 species of birds, 11 species of fish, 10 species of amphibians, and 7 species of reptiles represent the faunal diversity of the park. 44 species of fauna are included in the Red Book of Ukraine, in particular, Carpathian and Alpine newts, spotted salamander, copperhead, black stork, golden eagle, harrier, peregrine falcon, capercaillie, three-toed woodpecker, badger, otter, lynx, etc., and in the European Red List — 11 species: wolf, brown bear, brown eared wolf, hazel wolf, skunk, grape slug and others.
14	Danube	Prut and Siret	Vyzhnytskyi National Natural Park	UA0000028	A total of 960 species of vascular plants were found on the territory of the national park (of which 40 species are listed in the Red Book of Ukraine. 236 species of bryophytes were registered. Among the rare, endangered and uncommon species of beech and fir-beech forests, a significant group of sedges, listed in the Red Book of Ukraine, should be noted . In general, the vertebrate fauna of the national park is represented by 1 species of roundmouths, 20 species of fish, 12 — amphibians, 7 — reptiles, 141 species; — birds, 52 species of mammals. Of these, 62 species are listed in the Red Book of Ukraine, and 11 species are listed in the European Red List.
15	Danube	Prut and Siret	National Nature Park "Hutsulshchyna"	UA0000033	The national park was created with the aim of preserving, reproducing and rationally using the genetic resources of the plant and animal world, unique natural complexes and the ethno-cultural environment of the Pokut-Bukovyna Carpathians.

					There are 1,175 plant species in the flora of the Hutsulshchyna National Park. Including Angiosperms (flowers) 764 species, Gymnosperms - 9, Ferns - 25, Horsetails - 7, Plauniformes - 3 (810 vascular species in total), Moss - 161 species. A total of 971 species of higher plants. There are 204 species of lower plants together with mushrooms. As a result of the conducted research, it was established that there are 11 plant groups listed in the Green Book of Ukraine (1987) on the territory of the Hutsulshchyna National Park, which are characterized by a mostly fragmented distribution. Boar, red deer, European roe deer, fox, badger, forest marten, otter, forest cat are found in the forests, and higher in the mountains - brown bear, lynx. Small mammals include the Carpathian squirrel, ermine, common shrew, common vole, wood mouse, wood dormouse, hedgehog, etc. The species composition of birds is not the same by season. Settlement, migratory and migratory birds find shelter here, in general, the park's avifauna includes about 190 species.
16	Danube	Prut and Siret	Chernivtsi regional landscape park	UA0000085	Protect conditionally indigenous pure beech, pure oak from scotch oak and beech-oak forests with common and scotch oak, oak-fir, fir-oak, fir-beech, beech-fir, fir-beech-oak, hornbeam-fir-beech, hornbeam-beech-oak and other mixed forests. A unique berry-bearing yew tree has been preserved in the second tier ("Tysovy Yar" botanical monument of national importance with an area of 10 hectares). 25 plant species listed in the Red Book of Ukraine are protected.
17	Danube	Prut and Siret	Order "Zubrovitsa"	UA0000084	The status was granted for the purpose of preserving the forest massif within the Pokutsko-Bukovyna Carpathians as a habitat for bison and other wild animals.
18	Danube	Prut and Siret	"Verkhovynskyi" customer	UA0000115	The Verkhovyna National Nature Park was created with the aim of ensuring the protection of nature and the preservation of biodiversity and the integrity of the natural complexes of the Chyvchyna and Hryniav mountains.
19	Danube	Prut and Siret	Order "Cheremoskyi"	UA0000125	The status was granted to preserve the biodiversity of the coastal area and water area of the Cheremosh River (from the town of Vyzhnytsia upstream) and the White Cheremosh River with its tributaries as a valuable source of fish.
20	Danube	Prut and Siret	Order "Ryabchyk"	UA0000194	The area is 8.37 km2.
21	Danube	lower Danube	Danube Biosphere Reserve	UA0000018	By the decision of the International Coordination Committee of the UNESCO program "Man and the Biosphere" dated December 9, 1998, the reserve was

					included in the world network of biosphere reserves as part of the bilateral Romanian-Ukrainian biosphere reserve "Danube Delta". The flora of the Danube Biosphere Reserve includes about 950 species of vascular plants belonging to 371 genera and 97 families. In terms of the number of species of fauna, the Danube Delta is almost the richest place in modern Europe.
22	Danube	lower Danube	Systema Dunaiskykh Ozer (System of the Danube Lakes)	UA0000142	Located in the Danube Delta of Odesa Region. The origin of these lakes is different. Some of them are the remains of sea bays, others are floating lakes and old lakes that appeared as a result of drifting of old river beds. Currently, the water level of most lakes is regulated with the help of locks and other hydraulic structures.
23	Danube	lower Danube	Besarabskyi Kolkhikum	UA0000158	Bessarabian Colchicum (UA0000158), category – reserve. located in the Bolhrad district of the Odesa region.
24	Danube	lower Danube	Izmailski Ostrovy (Izmail Islands)	UA0000182	Category - reserve, area 35.43 km2, located in Izmail district. The islands are of alluvial origin. The topography of the islands is formed by river embankments on which floodplain forest grows in combination with meadow vegetation. A unique island ecosystem in the Danube Delta with a unique landscape, flora and fauna has been preserved here.
25	Danube	lower Danube	Pivdennobesarabskyi (South Bessarabian)	UA0000597	The area is 160.20 km2. The territory is allocated for the conservation of Emys orbicularis, Falco cherrug, Buteo rufinus, which received the status "IN MOD"; Tadorna ferruginea - "IN MIN". According to the decisions of the above-mentioned seminars, the following settlements received the corresponding statuses: C2.34, E1.2, F3.247, X18 – "IN MOD"; C3.2 - "IN MAJOR". The above-mentioned species and habitats are given status according to their conservation status within the biogeographical region in which the site is located

In particular, the following particularly valuable natural areas are located within the sub-basins:

- five wetlands of international importance (Ramsar sites), the Carpathian Biosphere Reserve and the "Uzhanskyi" National Nature Park, which have international status, are located in the Tisza sub-basin;

- in the Prut sub-basin there are two wetlands of international importance located within the territory of the Carpathian National Nature Park, which were designated by the Secretariat of the Ramsar Convention in 2019. Functioning as flood regulators and freshwater reservoirs, the wetland is a habitat for biodiversity, including endemic, rare and endangered species listed in the Red Book of Ukraine and the IUCN Red List. Thanks to its favorable climate and attractive landscapes, the wetland is very popular with visitors. Human activity has a significant impact on the ecosystems of these territories. There are certain gaps in the management of these ecosystems, including an integrated monitoring system.

- the Danube reservoirs (Kagul, Kartal, Yalpug-Kugurlui, Katlabug, Saf'yani, China) and the Danube Biosphere Reserve are located in the sub-basin of the lower Danube, the wetlands located in the basin of the Ukrainian part of the Danube are protected by the Ramsar Convention.

Information on other environmental protection zones (sanitary protection zones; protection zones of valuable species of aquatic biological resources; bodies of surface/groundwater used for recreational, medical, resort and health purposes, as well as waters intended for bathing; zones vulnerable to (accumulation) of nitrates; vulnerable and less vulnerable zones, determined in accordance with the criteria approved by the Ministry of Environment) is presented in section 3 of the draft RBMP.

2.9 Safety of life and health of the population

The total population of the river basin is about 3.532 million people, which is 8.5% of the population of Ukraine.

Since the formation of statistical information by the state statistical bodies regarding the demographic and social situation is provided only in terms of oblasts, not river basins, the health status of residents of each of the oblasts located within the Danube basin is briefly analyzed below.

Ivano-Frankivsk region

As of February 1, 2022 (according to the State Statistics Service of Ukraine), the population (estimated) of Ivano-Frankivsk Oblast was 1,350,565 people.

In the composition of the population, there is a predominance of women by gender, and rural residents by place of residence.

Table 2.9.1 Growth (decrease) in the population of Ivano-Frankivsk region in January 2022

Region	Total increase, decrease (–)	Including:	
		natural increase, reduction (–)	migration increase, decrease (–)
Ivano-Frankivsk	-1257	-1242	-15

Below, according to information from the official website of the Main Department of Statistics in the Ivano-Frankivsk region (https://ifstat.gov.ua/) shows the prevalence of types of disease among the population during 1995-2017.

Table 2.9.2 Morbidity indicators of the population during 1995 - 2017

Year	everything	neoplasm	diseases of the nervous system[1]	diseases of the circulatory system	respiratory diseases	diseases of the skin and subcutaneous tissue	diseases of the musculoskeletal system and connective tissue	diseases of the genitourinary system	congenital anomalies (developmental defects), deformities and chromosomal disorders	injuries, poisoning and some other consequences of external causes
1995	936.9	7.9	97.5	46.1	399.3	58.0	40.1	55.1	2.1	63.7
1996	945.1	8.2	100.8	47.9	392.4	55.2	42.3	56.7	2.0	64.9
1997	953.7	7.7	98.3	48.3	409.9	58.6	42.2	60.6	1.9	56.4
1998	1017.4	9.3	107.8	59.4	420.9	63.7	49.3	66.9	2.1	54.4
1999	1063.7	9.6	105.6	64.9	449.2	63.2	47.0	66.5	2.1	55.5
2000	1100.2	9.6	32.2	91.8	447.1	65.2	50.9	65.2	2.0	57.3
2001	1150.1	10.1	32.9	91.9	478.3	66.6	50.3	67.5	1.8	54.1
2002	1139.0	10.0	34.2	99.1	454.7	71.0	51.9	64.6	1.5	54.9
2003	1204.7	10.1	36.6	102.4	496.2	73.0	56.2	68.6	1.7	59.8
2004	1209.2	10.4	38.1	103.2	495.4	73.8	56.5	70.6	1.6	59.1
2005	1186.5	10.3	38.6	101.4	485.6	76.9	55.7	68.2	1.5	58.3
2006	1185.8	10.1	38.1	103.2	482.8	76.7	56.6	68.2	1.5	59.6
2007	1167.9	9.2	38.0	100.3	488.2	79.6	55.5	65.0	1.4	56.0
2008	1164.8	9.0	37.4	90.8	496.5	77.2	54.9	63.9	1.4	55.6
2009	1261.3	9.8	39.9	94.6	569.1	77.8	55.9	67.8	1.5	60.7
2010	1215.7	10.2	41.6	91.3	532.6	77.9	58.4	63.5	1.6	59.0
2011	1202.0	10.3	41.0	90.1	525.9	76.2	57.1	63.4	1.7	59.6
2012	1201.5	11.1	41.6	90.0	521.4	74.7	55.7	67.2	1.4	58.0
2013	1197.5	11.4	42.3	89.4	519.8	74.1	54.8	70.0	1.4	58.8
2014	1202.0	11.3	42.2	88.6	528.0	75.0	53.2	68.1	1.3	57.9
2015	1187.9	11.0	43.8	86.9	516.7	75.8	51.5	67.5	1,2	55.2
2016	1191.9	10.7	41.9	85.2	533.8	74.4	50.7	68.2	1.3	53.6
2017	1165.6	11.2	41.3	80.6	517.3	73.3	50.8	66.8	1.3	56.2

According to Table 2.9.2, in 2017, a decrease in the overall morbidity rate among the population was observed. Most cases are observed of diseases of the respiratory system and blood circulation.

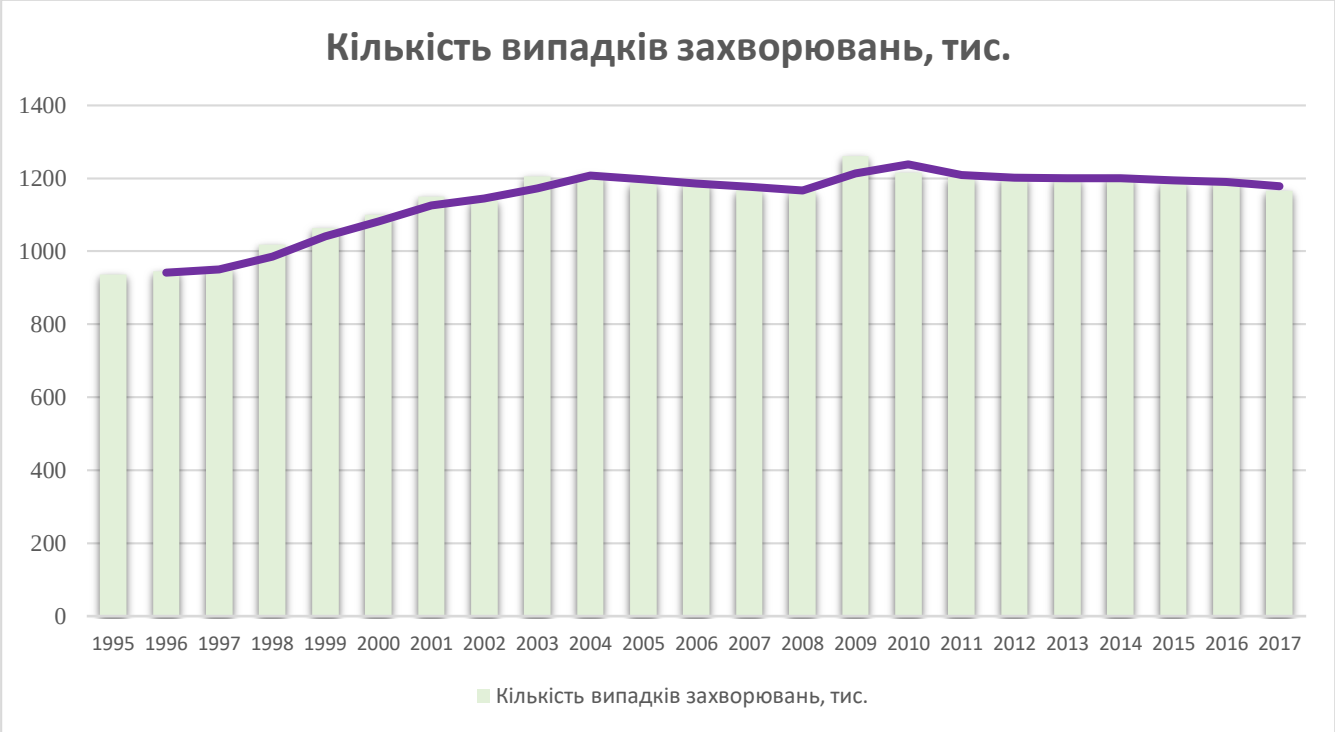


Figure 2.9.1 Disease level of residents of Ivano-Frankivsk region during 1995-2017

Transcarpathian region

As of February 1, 2022 (according to the State Statistics Service of Ukraine), the population (estimated) of Zakarpattia Oblast was 1,243,721 people. According to the data of the State Statistics Service of Ukraine, there is a decrease in the population in the region, which in 2022 amounted to -(minus) 755 people.

Table 2.9.3 Growth (decrease) in the population of Zakarpattia Oblast in January 2022

Region	Total increase, decrease (–)	Including:	
		natural increase, reduction (–)	migration increase, decrease (–)
Zakarpattia	-755	-862	107

Below, according to the information of the official website of the Main Department of Statistics in Zakarpattia Oblast (https://uz.ukrstat.gov.ua/) shows the prevalence of types of disease among the population during 1995-2017.

Table 2.9.4 Morbidity indicators of the population during 1995 - 2017

	Кількість уперше зареєстрованих випадків захворювань, тис. – усього	У тому числі								
		новоутво-рення	хвороби нервової системи[1]	хвороби системи кровообігу	хвороби органів дихання	хвороби шкіри та підшкірної клітковини	хвороби кістково-м'язової системи і сполучної тканини	хвороби сечостатевої системи	уроджені аномалії (вади розвитку), деформації та хромосомні порушення	травми, отруєння та деякі інші наслідки дії зовнішніх причин
1995	751,4	4,8	72,2	53,4	296,5	52,3	37,7	37,2	1,9	47,1
1996	752,5	5,9	72,6	61,5	288,8	50,6	38,0	37,3	2,3	51,0
1997	776,0	5,9	78,0	62,6	311,6	51,1	37,7	38,5	2,2	44,6
1998	792,9	6,0	79,0	72,5	308,5	51,0	38,2	38,3	2,3	43,6
1999	834,5	7,0	22,0	92,2	316,0	43,9	35,5	38,5	2,3	48,9
2000	849,2	6,2	21,0	97,7	314,2	42,6	35,9	37,5	2,1	44,7
2001	904,7	7,5	21,9	104,5	344,3	43,6	39,8	41,2	2,1	44,0
2002	883,5	8,3	24,0	110,9	323,0	41,6	41,6	41,1	1,9	46,0
2003	882,5	9,0	23,0	113,7	324,3	41,3	38,5	39,7	2,0	46,6
2004	860,1	7,2	19,7	111,1	312,9	38,9	42,1	39,0	1,9	50,6
2005	841,8	6,4	19,5	107,8	315,0	41,1	39,2	37,1	1,9	48,0
2006	809,6	8,1	19,3	97,8	301,9	42,0	38,6	36,2	1,7	46,5
2007	831,0	6,9	19,2	95,5	326,7	40,5	40,3	36,2	1,6	44,7
2008	837,4	7,6	19,3	94,1	337,3	43,8	40,4	35,7	1,8	48,4
2009	841,7	8,0	20,0	91,4	355,9	41,3	36,8	37,6	1,9	48,4
2010	817,5	8,4	20,5	79,7	338,7	41,0	35,9	38,0	1,9	48,8
2011	795,7	8,1	20,8	74,7	335,1	38,2	33,5	37,0	1,9	48,1
2012	792,9	7,9	19,9	68,1	336,0	40,8	31,9	34,8	1,8	48,3
2013	775,7	8,1	18,8	62,1	329,9	41,4	30,6	34,2	1,7	48,4
2014	752,5	8,1	18,7	58,7	328,4	36,4	29,0	32,4	1,5	48,2
2015	760,5	8,2	18,9	60,1	341,4	36,2	28,5	30,6	1,7	47,4
2016	767,4	8,4	18,5	61,0	346,6	36,9	29,5	29,9	1,4	48,8
2017	737,6	8,4	19,3	61,0	325,8	35,4	29,2	32,4	1,4	45,1

[1] Згідно з МКХ-10, починаючи з 1999р., з класу хвороб нервової системи і органів чуття вилучені і сформовані в окремі класи хвороби ока та його придаткового парату і хвороби вуха та соскоподібного відростка.

According to the morbidity indicators, a wave-like trend of the total number of diseases is observed. Diseases of the respiratory system and circulatory systems predominate among the diseases.

Figure 2.9.2 Disease level of residents of Zakarpattia Oblast during 1995-2017

Chernivtsi region

The available population in Chernivtsi region as of February 1, 2022 (according to the State Statistics Service of Ukraine) was 889,928 people. According to the data of the State Statistics Service of Ukraine, there is a decrease in the population in the territory of the region, which in 2022 amounted to -(minus) 529 people.

Table 2.9.5 Growth (decrease) in the population of Chernivtsi region in January 2022

Region	Total increase, decrease (–)	Including:	
		natural increase, reduction (–)	migration increase, decrease (–)
Chernivtsi	-529	-678	149

Below, according to the information on the official website of the Main Department of Statistics in Chernivtsi region (http://www.cv.ukrstat.gov.ua/) shows the prevalence of types of disease among the population during 1995-2017.

Table 2.9.6 Morbidity indicators of the population during 1995 - 2017

Year	everything	neoplasm	diseases of the nervous system[1]	diseases of the circulatory system	respiratory diseases	diseases of the skin and subcutaneous tissue	diseases of the musculoskeletal system and connective tissue	diseases of the genitourinary system	congenital anomalies (developmental defects), deformities and chromosomal disorders	injuries, poisoning and some other consequences of external causes
1995	590	6	63	31	265	34	33	37	1	30
1996	589	6	61	34	262	29	34	42	1	30
1997	665	7	73	28	299	37	46	52	1	29
1998	675	6	74	32	295	34	49	61	1	28
1999	685	7	67	45	310	34	42	60	1	26
2000	670	6	20	31	296	37	44	55	1	25
2001	675	6	22	29	305	36	44	52	1	24
2002	649	7	24	28	293	33	41	51	1	22
2003	663	5	23	28	296	35	42	53	1	23
2004	664	5	21	43	295	35	42	50	2	22
2005	636	6	20	33	293	36	41	48	2	22
2006	625	5	20	35	287	35	39	44	1	22
2007	659	5	18	45	308	40	35	45	1	23
2008	633	5	19	32	301	37	35	43	1	22
2009	672	5	19	43	331	37	35	42	1	22
2010	644	5	18	44	298	40	33	43	1	22
2011	629	5	18	42	285	39	31	42	1	23

2012	614	6	18	40	275	38	31	41	1	25
2013	594	6	17	39	267	38	32	37	1	24
2014	576	6	16	39	261	36	29	35	1	21
2015	572	5	15	36	261	37	29	39	1	20
2016	583	6	15	36	268	42	28	37	1	21
2017	572	5	15	33	259	37	27	39	1	22

[1]According to ICD-10, since 1999, diseases of the eye and its appendages and diseases of the ear and mastoid were removed from the class of diseases of the nervous system and sense organs and formed into separate classes.

The trend of the total number of diseases has a wave-like dynamics. The most common diseases among residents of the region are diseases of the respiratory system, genitourinary system, skin and subcutaneous tissue.

Figure 2.9.3 Disease level of residents of Chernivtsi region during 1995-2017

In recent years, there has been a decrease in the total number of diseases. Diseases of the respiratory organs prevail.

Odesa region

As of February 1, 2022, the population was 2,349,749 people. According to the data of the State Statistics Service of Ukraine, there is a decrease in the population in the territory of the region, which in 2022 amounted to -(minus) 1,643 people.

Table 2.9.7 Growth (decrease) in the Odesa Region population in January 2022

Region		Including:/

	Total increase, decrease (-)/	natural increase, reduction (-)/	migration growth, reduction (-)/
Odesa	-1643	-2058	415

The demographic situation in Odesa region is characterized by:

- reduction of the existing population;

- the deterioration of indicators of the natural movement of the population, which were characterized by an increase in the volume of natural population reduction;

- an increase in the volume of migratory growth of the population.

Thus, the gradual reduction of the existing population, fluctuations in birth and death rates, and the rapid reduction in migration growth have affected the density of the existing population, which is gradually decreasing.

Changes occurring with the natural movement of the population gradually cause changes in the age composition of the population. Currently, the demographic situation in Odesa region is characterized by 2 negative processes - negative natural growth and population aging.

Table 2.9.8, according to the statistical information provided on the official website of the Main Department of Statistics in the Odesa region (http://od.ukrstat.gov.ua/), presents the prevalence of diseases among the population of the region.

Table 2.9.8 Morbidity indicators of the population during 1998 - 2017 in the Odesa region

Year	everything	neoplasm	diseases of the nervous system[1]	diseases of the circulatory system	respiratory diseases	diseases of the skin and subcutaneous tissue	diseases of the musculoskeletal system and connective tissue	diseases of the genitourinary system	congenital anomalies (developmental defects),	injuries, poisoning and some other consequences o external causes
1998	1531.5	18.7	193.3	99.4	634.3	100.2	74.3	74.8	2.5	116.8
1999	1543.8	17.3	46.5	109.1	637.1	97.4	73.3	83.0	2.4	113.5
2000	1564.1	18.0	44.9	111.5	650.8	97.1	71.8	89.1	2,3	114.7
2001	1564.4	17.8	44.7	117.7	644.1	97.7	71.9	88.2	2,3	111.6
2002	1565.3	17.3	45.7	121.1	635.2	100.5	73.4	88.2	2.4	110.7
2003	1568.6	16.5	46.4	137.4	635.6	97.5	72.6	88.2	2,3	114.6
2004	1584.7	17.2	46.4	134.6	651.6	94.5	72.8	87.2	2.1	113.8
2005	1624.3	18.8	47.5	137.3	672.8	94.8	72.9	91.6	2.1	118.7
2006	1634.1	18.3	47.8	140.8	675.5	95.9	75.1	93.1	2.1	121.9
2007	1655.5	18.4	47.4	143.2	676.7	96.7	76.1	95.0	2.1	126.3

2008	1674.0	18.9	48.1	145.3	686.1	93.7	76.5	99.6	2.1	127.0
2009	1721.5	19.0	49.1	147.5	725.2	95.7	78.9	103.9	2,3	125.7
2010	1728.3	19.0	50.8	151.1	728.6	93.3	78.9	104.8	2.5	125.0
2011	1741.0	19.6	50.0	147.6	739.1	91.7	80.7	105.1	2.6	123.6
2012	1746.5	20.7	52.2	153.1	716.8	97.1	82.4	109.2	2.4	121.1
2013	1717.9	20.1	51.0	138.4	733.5	93.5	77.6	107.8	2,3	118.6
2014	1652.3	19.2	47.8	129.0	721.7	91.0	68.3	104.0	2,2	114.9
2015	1630.4	18.4	47.8	127.8	721.5	91.7	65.2	101.8	2,2	112.7
2016	1632.5	16.0	50.0	126.3	721.0	99.6	66.4	99.4	2,3	111.4
2017	1618.8	16.3	48.5	119.7	721.2	96.9	64.3	98.5	2.4	109.3

Thus, according to statistical information, there is a predominance of diseases of respiratory organs, circulatory systems and injuries, poisoning and some other consequences of external causes. During 1998 - 2017, a wave-like trend of total cases of the disease is recorded (see Figure 2.9.4).

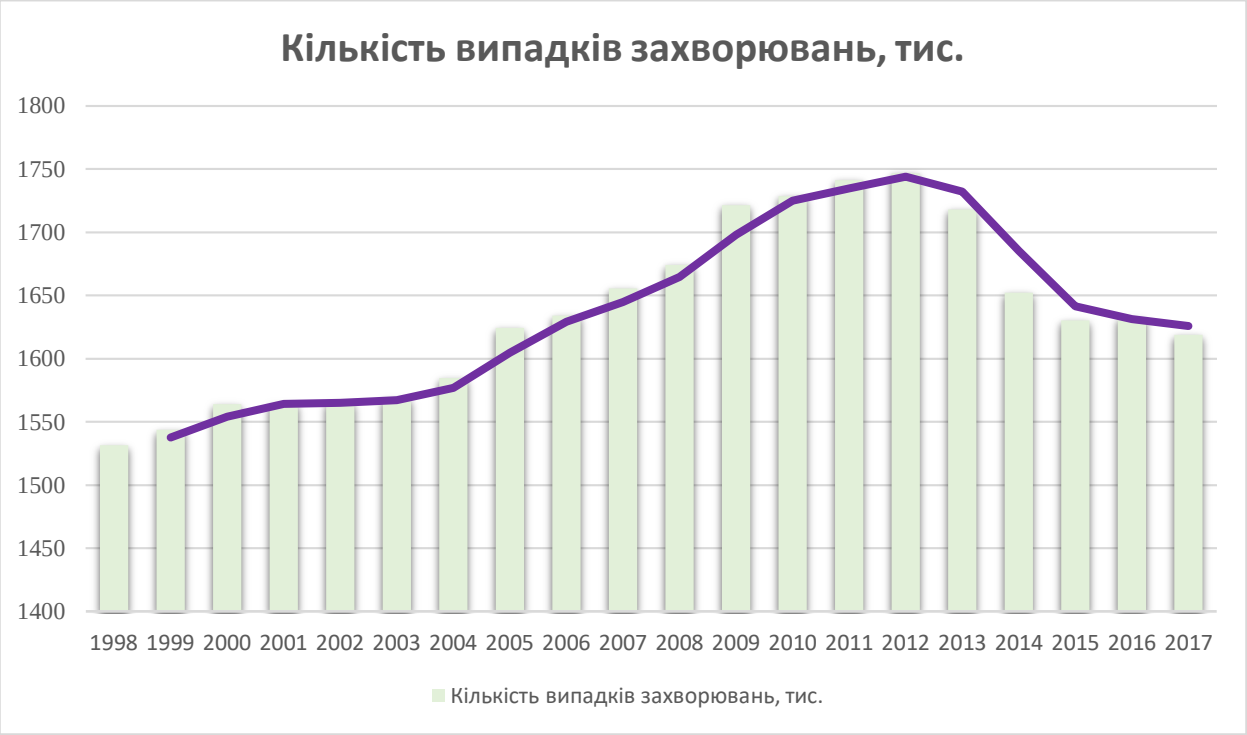


Figure 2.9.4 The total number of diseases among the population of Odesa region during 1998-2017

Since 2013, there has been a clear trend towards a decrease in the overall incidence rate. Among the diseases, the most common are diseases of the respiratory system, blood circulation and injuries, poisoning and some other consequences of external causes.

Thus, in all areas of the basin there is a decrease in the population and prevalence of respiratory diseases.

2.10 Material assets, economic development

In the sub-basin of the Tisza River, the main branches of industrial production include: processing industry, extractive industry and quarry development, chemical and petrochemical, food industry, engineering.

In the sub-basin of the Prut and Siret rivers, the main branches of industrial production include: chemical and petrochemical industry, production of construction products, wood, wood products, light industry, machine building, production and distribution of electricity, food industry and processing of agricultural products.

In the sub-basin of the lower Danube, the leading industry is agriculture.

In 2019, the GRP of the Danube RDR amounted to UAH 164.366 billion. The dynamics of this indicator throughout the studied period of 2015-2019 shows a tendency to grow at different rates in different periods - the highest GRP growth rates were observed in 2017 (at the level of 30%), while in 2019 these rates decreased (to the level of 17 %). The share of GRP of the basin in the total GDP of the country is almost 4% (table 2.10.1).

Table 2.10.1 Dynamics of the GRP of the Danube RDR, 2015-2019

Indexes	2015	2016	2017	2018	2019
GRP in actual prices, billion UAH	71,847	81,921	106,490	127,864	148,910
The share of GRP of the river basin in the total GDP of Ukraine, %	3.6	3,4	3.6	3.6	3.7
GRP growth rate of the basin, % compared to the previous year	100	114.0	130.0	120.1	116.5

In the Danube River Basin District, by region, the prevailing indicator of the GRP share is in Zakarpattia Oblast (41% of the basin's GRP). 24% of the GRP of the basin is formed within the Chernivtsi region, 17% of the GRP each in Ivano-Frankivsk and Odesa. At the same time, the share of the population is only 14%. This indicates a more developed economic activity in Odesa region.

The indicator of GRP per capita within the Danube basin is UAH 54.5 thousand, which is almost half as much as in the whole of Ukraine (as of 2019, GRP per capita is UAH 94.7 thousand).

The value of GVA in actual prices is UAH 131.092 billion for the territory of the basin or 3.8% of the total volume of GVA of Ukraine. In the overall structure of GVA of the basin, the largest share is agriculture, forestry and fishing, which accounts for UAH 18.6 billion or 14%, and its share in the total GVA of Ukraine is 5.2%. GVA by types of economic activity of the Danube basin is presented in table 24. Among the water-dependent sectors of the economy, the processing industry has a rather high share in the overall GVA structure of the basin - UAH 12.7 billion or 9.7%, which corresponds to 3.0% of the total GVA of Ukraine. The share of water-

dependent types of economic activity in the basin is 41.5%. Other, non-water-dependent types of economic activity in the Danube basin account for almost 60% of the total GVA.

Table 2.10.2 GVA of the Danube RBR by economic sectors, 2019.

Branches of the economy	GVA, million hryvnias	Share in GVA of Ukraine, %	Share in the GVA of the pool, %
agriculture, forestry and fisheries	18585.2	5.2	14.2
mining and quarrying	2367.03	1.1	1.8
processing industry	12705.4	3.0	9.7
supply of electricity, gas, steam and air conditioning	5165.77	4.1	3.9
water supply; sewerage, waste management	511.52	3.5	0.4
transport, warehousing, postal and courier activities	15069.2	5.7	11.5
TOTAL water-dependent types of economic activity	54404	3.9	41.5
other types of economic activity	76688	3.8	58.5
ALL AROUND THE POOL	**131092**	3.8	**100**

The dynamics of GVA volumes of water-dependent types of economic activity of the Danube River basin during 2015-2019 decreased from 48% in 2016 to 41.6% in 2019 of the GVA of the basin and shows a downward trend. The fall in the total value of GVA of water-dependent industries occurred due to the decrease over the last 5 years of GVA of agriculture, forestry and fisheries. The rest of the water-dependent sectors of the economy show fluctuations in GVA, the processing industry shows a slight increase in the share of GVA. In turn, the growth of the total volume of GVA of the Danube basin occurs mainly at the expense of other, non-water-dependent sectors of the economy.

2.11 Objects of cultural heritage

The list of objects of cultural heritage of Ivano-Frankivsk, Chernivtsi, Odesa and Zakarpattia regions can be found on the website of the Ministry of Culture and Information Policy of Ukraine in the section "Activities" → "Cultural heritage" by following the link:https://mcip.gov.ua/kulturna-spadshchyna/derzhavnyy-reiestr-nerukhomykh-pam-iatok-ukrainy/

Ivano-Frankivsk region

On the territory of the Ivano-Frankivsk region, the following are classified as cultural heritage sites:

- 31 objects of national importance;
- 49 objects of local importance.

Odesa region

On the territory of the Odesa region, the following are classified as cultural heritage sites:

- 27 objects of national significance;
- 1084 objects of local importance.

Chernivtsi region

On the territory of Chernivtsi region, the following are classified as cultural heritage sites:

- 50 objects of national importance;
- 657 objects of local importance.

Transcarpathian region

On the territory of the Transcarpathian region, the following are classified as cultural heritage sites:

- 54 objects of national significance;
- 44 objects of local importance.

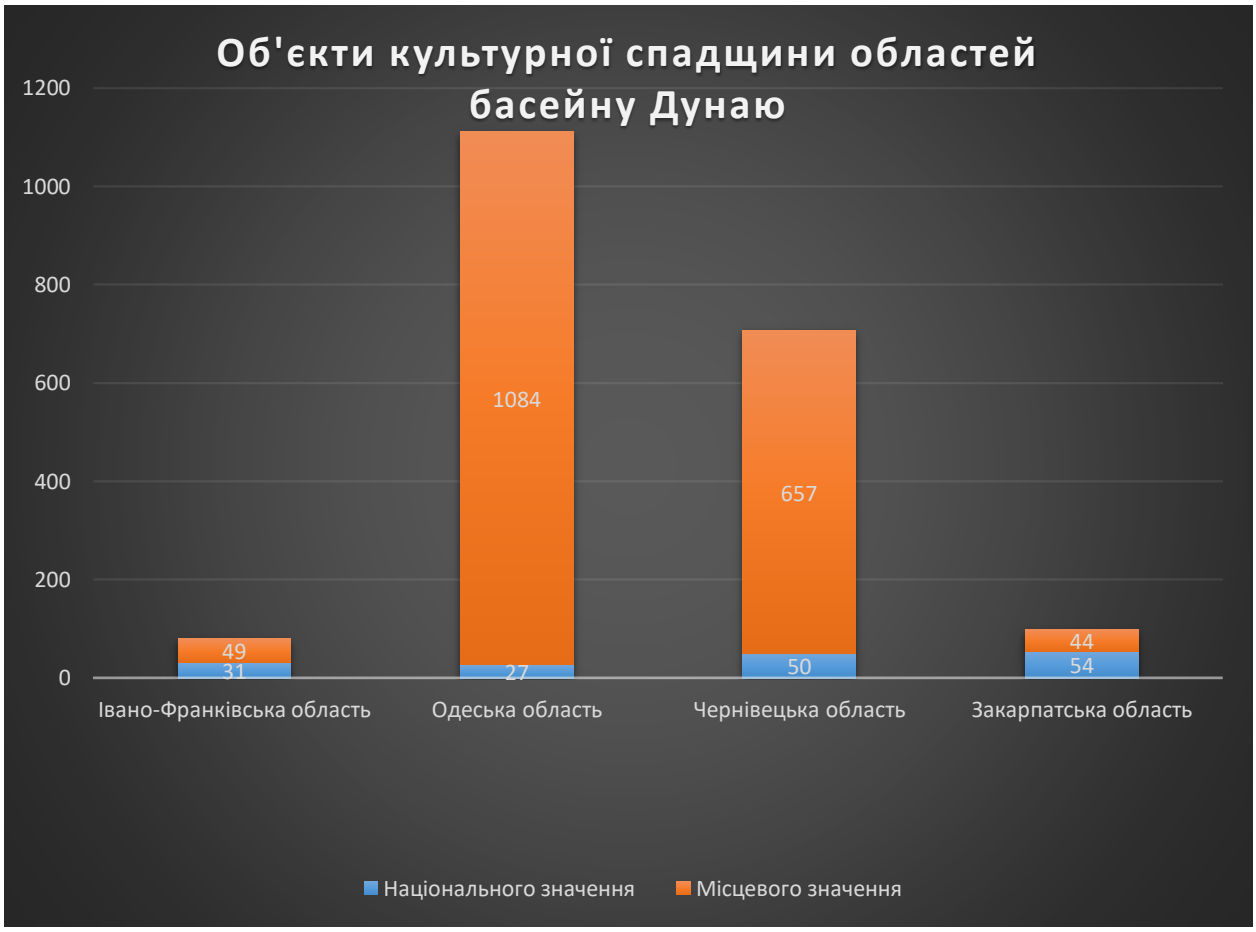


Figure 2.11.1 The number of cultural heritage sites within the regions of the Danube basin

According to the analyzed data, the largest number of cultural heritage sites are located within the borders of Chernivtsi and Odesa regions, which contributes to their tourist potential.

2.12 Projected changes in the state of the environment if the state planning document is not approved

The purpose of the RBMP is to implement measures aimed at achieving/maintaining a "good" ecological and chemical state of surface water bodies, a "good" chemical and quantitative state of groundwater bodies, as well as a "good" ecological potential of artificial or significantly altered surface water bodies.

At the moment, among the most important factors that cause the deterioration of the quality of SWM and GWM of the Danube basin are:

- pollution by organic and biogenic substances, which is caused by an insufficient level of wastewater treatment or the absence of treatment at all due to the obsolescence and wear and tear of treatment facilities;

- entry of hazardous substances from point sources (machine-building enterprises, forest chemical industry, mining facilities, animal husbandry and food industry, industrial and municipal waste);

- a significant number of potential sources of emergency pollution both through discharges of wastewater and through washing from the territories of sites where production waste is stored, in particular, 28 objects have been identified for which there are risks of emergency pollution;

- an inefficient waste management system, which leads to the exhaustion of existing landfills of their capacities (filling level of 80-85%) and the formation of unauthorized landfills, including on the banks of rivers;

- violation of the continuity of the flow of water and environments for 60 SWM due to the placed dams and other artificial transverse structures;

- a significant number of SWMs that have undergone hydromorphological changes and need revitalization (155 SWMs). The main factors are urbanization, flood protection, agriculture and shipping.

- pollution of groundwater with nitrogenous compounds due to excessive use of fertilizers, herbicides and pesticides;

- domestic pollution due to the lack of centralized sewage treatment and discharge of domestic wastewater in rural settlements and, partially, in cities;

- climate change, which has a negative impact on the hydrological regime of rivers and general reserves of water resources. Climate change increases the

frequency of floods and droughts, making agriculture, energy, transport and social sectors vulnerable, as they depend on water resources;

- clogging of water bodies with solid household waste, including plastic;

- insufficient research of invasive species of the Danube basin, which cause biological pollution of waters.

Expected changes to the current state of the environment, if the state planning document is not adopted and implemented, include:

− deterioration of the state of water resources due to the lack of treatment facilities, incomplete coverage of residential neighborhoods by centralized sewerage and, in part, outdated equipment of sewage networks and treatment facilities, increased losses of water resources during transportation due to outdated water supply networks;

− deterioration of the hydrological condition of rivers, narrowing and siltation of riverbed sections, as well as the absence of coastal protective strips of water bodies established in a certain order;

- deterioration of the natural characteristics of riverbeds and floodplains;

- general deterioration of the environment.

Therefore, if the Danube River Basin Management Plan (2025–2030) is not approved, positive changes in the state of the environment and public health are not expected, but on the contrary, it will lead to a deterioration of the existing state of water resources in the Danube Basin and the environment in general.

3 CHARACTERISTICS OF THE STATE OF THE ENVIRONMENT, THE LIVING CONDITIONS OF THE POPULATION AND THE STATE OF ITS HEALTH IN THE TERRITORIES WHICH ARE LIKELY TO BE INFLUENCED (ACCORDING TO ADMINISTRATIVE DATA, STATISTICAL INFORMATION AND RESEARCH RESULTS)

The environmental goals and planned measures of the RBMP are aimed at improvementecological and chemical statethe Danube river basin, which is territorially located within 4 regions. The basin is located on the border of Zakarpattia, Ivano-Frankivsk, Odesa and Chernivtsi regions (see table 2.1.1).

The catchment area of the basin within Ukraine is 30,059 km^2. The basin covers 5% of the territory of Ukraine.

More details about the territories likely to be affected by the implementation of the Plan are described below.

Massifs of surface waters

In the Danube RBR, SWM determination was carried out on 335 rivers and 16 lakes (according to the data of the "Water Resources of Ukraine" geoportal of the State Water Resources Agency of Ukraine), within which 885 SWMs were allocated.

Table 3.1 Categories of SWM within the Danube RBR

No	Category	Number
1	Rivers	676 SWM
2	Lakes	16 SWM
2	Masses of surface water have changed significantly	155 SWM, of which: - 95 SWMs are assigned to SAFWMs due to straightening. - 37 SWMs are assigned to SAFWMs due to regulation. - 23 SWMs are classified as SAFWMs due to the combination of regulation and channel straightening
3	Artificial bodies of surface water	36 ASWM of them: - 34 ASWM – channels, - 2 ASWM – bulk ponds
4	Transitional waters	1
5	Coastal waters	1

The socio-economic structure of the basin creates prerequisites for the formation of anthropogenic load that affects surface waters. Anthropogenic load is mainly due to:

- the population, which within the basin is 3.532 million people;

- the development of enterprises in various sectors of the economy;

- the development of agriculture, which belongs to one of the branches of the economy of the basin and is characterized by a high level of development;

- the presence of transverse structures on small and medium-sized rivers, making it impossible for free passage of water, sediments and the migration of hydrobionts, as well as changing the transit mode of rivers to an accumulation one.

The assessment of the anthropogenic load on the SWM was carried out according to the Methodological recommendations for the analysis of the main anthropogenic loads and their effects on the state of surface waters, which were approved at the meeting of the Scientific and Technical Council of the State Water Agency on April 20, 2023, protocol № 2.

According to the results of the analysis of anthropogenic load on the basis of chemical and physicochemical components, and hydromorphological changes, it was established that:

- 394 SWM - "without risk";
- 165 SWM - "possibly at risk";
- 326 SWM. "at risk" (Figure 3.1).

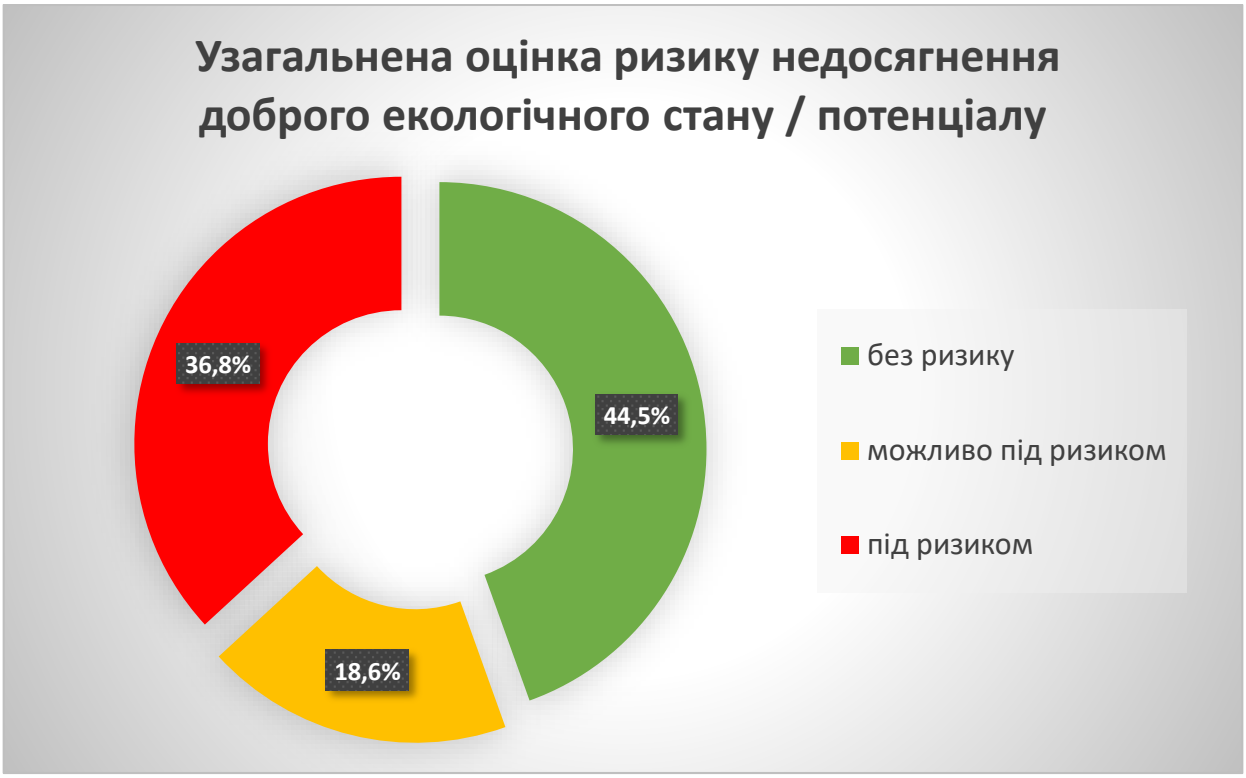


Figure 3.1 Generalized assessment of the risk of not achieving good ecological status/potential of the SWM

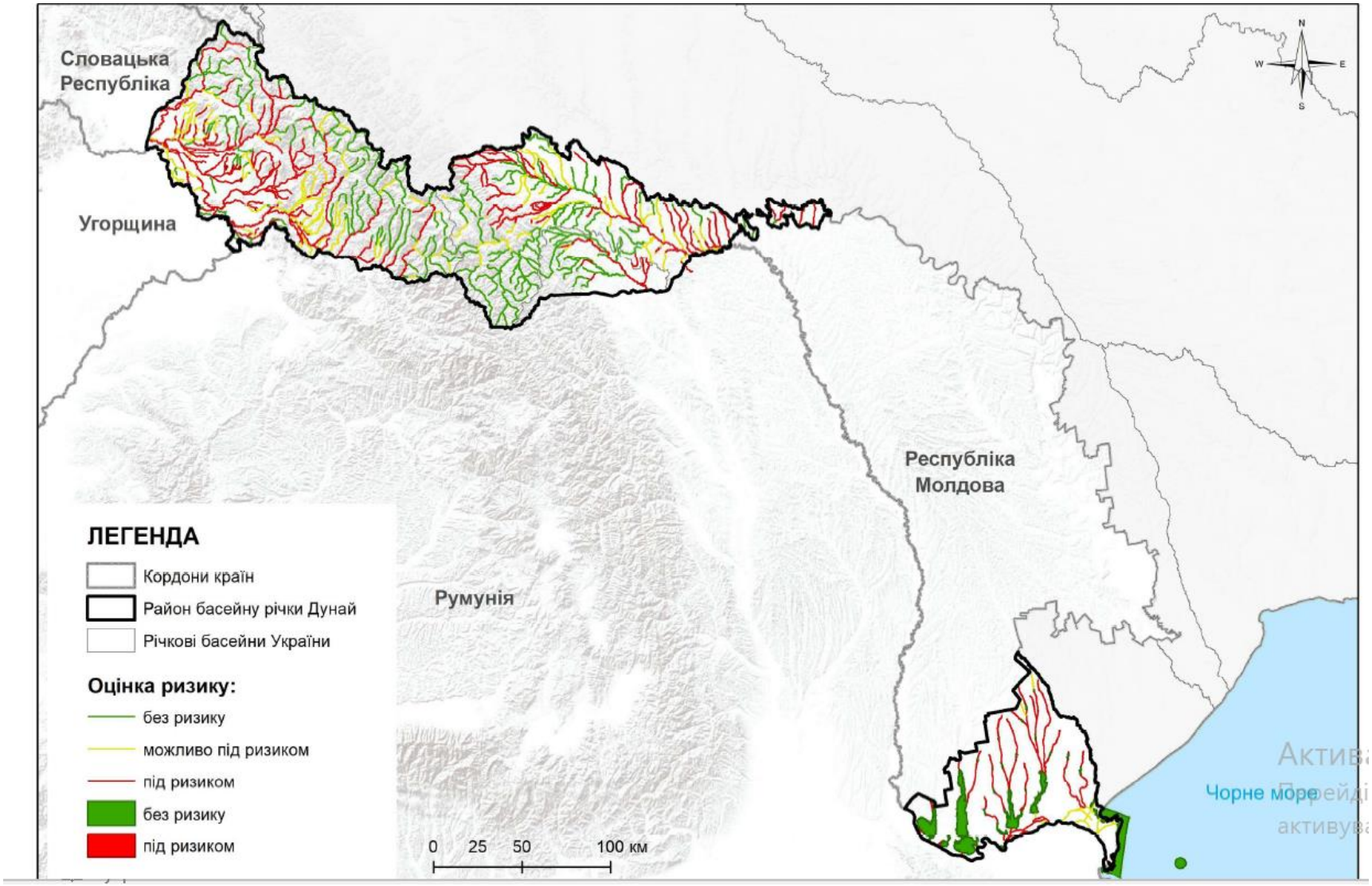


Figure 3.2 Generalized assessment of the risk of not achieving good ecological status/potential of the SWM

"Good" ecological status/potential will be achieved by 438 SWM by 2030, of which 394 SWM are those that are currently "without risk" (they need to maintain this status), 31 SWM are 5% of SWM from those which, according to the results of anthropogenic load assessment, are "at risk" or "possibly at risk" of not achieving environmental goals, and will achieve environmental goals due to the implementation of PE measures.

Other SWM in the basin that are "at risk" or "possibly at risk" (447 SWM) may achieve "good" ecological status/potential by 2036 or 2042, subject to the implementation of PE measures.

Figure 3.3 The number of SWMs that will achieve "good" ecological status/potential due to the implementation of the PE

According to the results of the assessment of the anthropogenic load on the Danube Basin SWM, there are 752 SWM"without risk" of not achieving a "good" chemical state, "possibly at risk" - 35 SWM, and "at risk" - 98 SWM (Figure 3.4).

Figure 3.4 Generalized assessment of the risk of not achieving a good chemical state of SWM

A graphical representation of SWMs that are without risk, possibly at risk, and at risk of not achieving good chemical status is shown in Figure 3.5.

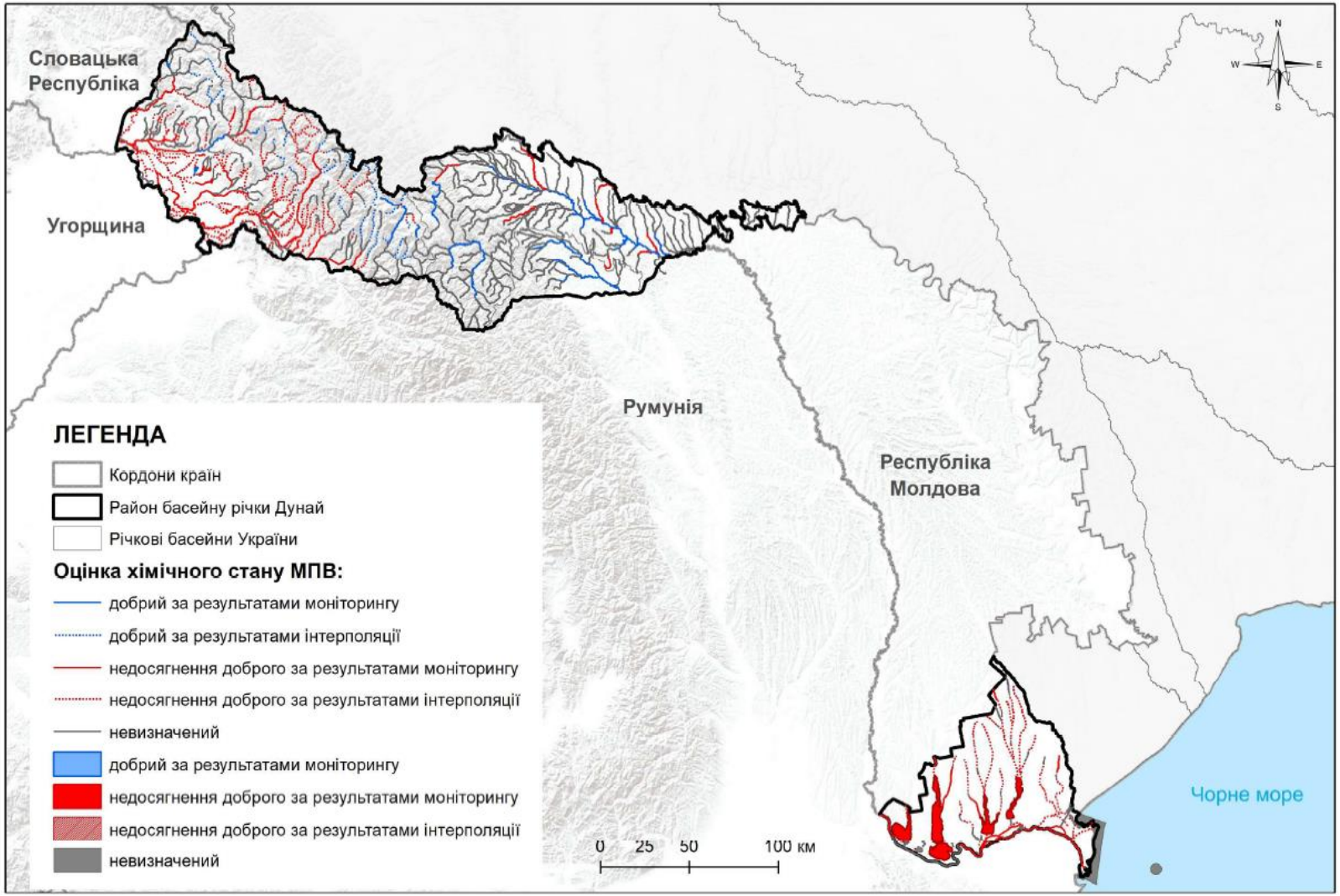


Figure 3.5 Chemical state of the SWM of the Danube basin

By 2030, 823 SWMwill reach a "good" chemical state, of which 752 SWMare those that are currently "without risk" (they need to maintain this state), and 62 SWM, which, according to the results of the anthropogenic load assessment, are " at risk" or "possibly at risk", will achieve environmental goals no earlier than 2036 or 2042, subject to the implementation of environmental protection measures (Figure 3.6).

Figure 3.6 The number of SWMs that will achieve a "good" chemical state due to the implementation of the PE

In Annex 10 to the RBMP, the environmental goals of SWM, GWM and groups of GWM, SWM within the zones (territories) subject to protection in the Danube RBR, the deadlines for their achievement, the reasons for postponement and the establishment of less strict goals are given.

Massifs of ground waters

The underground water monitoring network is currently in a state of disrepair. Observations carried out in 2018-2020 did not meet the requirements of the current Procedure for State Water Monitoring in terms of either quantitative or qualitative indicators.

In the process of identifying groundwater bodies (GWB), 7 GWB were identified in the Tysa River sub-basin, 4 GWB in the Siret River sub-basin, 4 GWB in the Prut River sub-basin, and 1 GWB in the Lower Danube sub-basin.

The underground waters of the basin are used for water supply, including centralized water supply. Therefore, GWM are under pressure. However, the extraction of groundwater does not exceed the estimated resources and operational reserves of groundwater. The exploitation of groundwater did not lead to significant changes in the level regime, and the decrease in the operational load in recent years contributes to the restoration of water levels.

The environmental goals for the Danube RBR GWM are to preserve the existing status of the GWM. Failure to achieve environmental goals is possible in case of continued uncontrolled use of groundwater (construction of wells without projects, with violation of drilling technology, using plastic casing pipes); failure to take measures to identify and eliminate non-operating unmanaged wells.

Among the identified at the current stage of work, the "good" quantitative and chemical state of the GWM and their groups, all 7 groups of GWM of the Tisza sub-basin (3 non-pressure, 2 pressure and 2 pressure-non-pressure) are forecasted to reach only in the 2nd cycle of the RBMP, no earlier than 2042. and only under the conditions of implementation of the proposed measures for both surface and underground waters. It is predicted that 100% of the GWM of the Prut and Siret sub-basins will maintain a "good" quantitative and qualitative condition until 2030. And in the Lower Danube sub-basin, the 1 and only GWM will reach "good" quantitative status by 2030, and it will reach "good" chemical status in 2042.

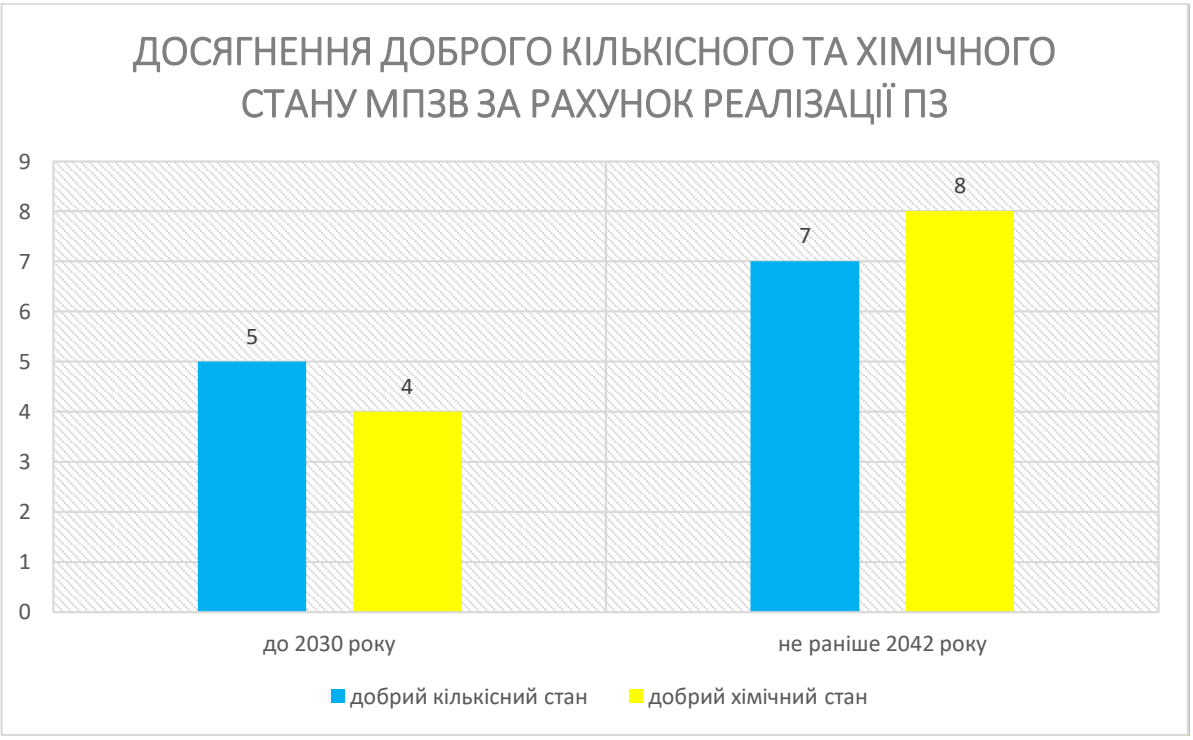


Figure 3.7 The number of GWM that will reach "good" quantitative and chemical status in the Danube basin

But the primary goal is to resume groundwater monitoring in the basin, which has effectively been suspended in recent years. In the absence of groundwater monitoring, achieving all the listed goals is unlikely. The unsatisfactory state of groundwater monitoring over the past decades, and, accordingly, the insufficient information about the current state of the GWM allows determining environmental goals only in the most general form. In the process of monitoring, the environmental goals for each GWM should be clarified.

If we analyze, not only the massifs of surface and underground waters, but also the settlements on the territories of which, in accordance with the PE, work will be carried out with:

- construction/reconstruction of sewage treatment facilities and sewage networks;

- revitalization, clearing, restoration and improvement of the ecological condition of riverbeds;

- construction of a waste processing plant in Polyanska TC;

- and other measures that involve preparatory, construction or installation work, the settlements/communities of Chernivtsi, Ivano-Frankivsk, Odesa and Zakarpattia regions specified in the PE will be affected accordingly.

The list did not take into account educational measures, the establishment of water protection zones and coastal protective strips of water bodies, since such works do not involve any preparatory or construction work that may affect the quality of atmospheric air, soil, water resources and the health of the population .

In accordance with the requirements of the Law of Ukraine "On Drainage and Wastewater Treatment" dated January 12, 2023 № 2887-XX, with the aim of ensuring high-quality centralized drainage while simultaneously reducing the impact of return (wastewater) water on SWM, for 201 settlements (36%) of the basin Danube, the population equivalent of which is 2,000 or more, it is planned to build/renovate the STP and SS. The proposed measures to reduce pollution by organic, biogenic and hazardous substances and their implementation in terms of: new construction or reconstruction/modernization indicate the following: reconstruction/modernization of STP and SS will require 31 TC, including 15 with tertiary (proper) wastewater treatment extraction of nitrogen and phosphorus compounds. The construction of new STP and SS is planned to be carried out in 99 TCs, most in the sub-basins: Tysa (31), Prut and Siret (66).

Channel regulation works in the Tysa, Prut and Siret subbasins are planned to be carried out on 50 SWMs, measures to improve hydromorphological indicators on 11 SAFWMs.

The vast majority of measures relate specifically to communities/settlements with PE from 2.0 to 10.0 thousand. There are 234 (79%) of such measures, for communities with PE from 10 to 100.0 thousand - only 51 (18%) are practical measures in administrative, district centers: Mukachevo, Berehove, Khust, Tyachiv, Rakhiv (Tysia sub-basin); Kolomyia, Yaremche, Vashkivtsi, Storozhynets, Krasnoilsk, Nizhny Verbizh, Stopchativ, Milieve, Chornoguzy, Slobidka, Velikiy Kuchuriv (Prut and Siret subbasins); Reni, Kilia, Izmail (lower Danube subbasin). There are only 9 (3%) measures for the agglomeration with PE more than 100.0 thousand, and these are measures for TC cities: Uzhhorod and Chernivtsi. Such social specificity of the measures is caused by the fact that the vast majority of residents of the western regions of Ukraine, in the sub-basins of the Tisza, Prut and Siret, live in rural areas.

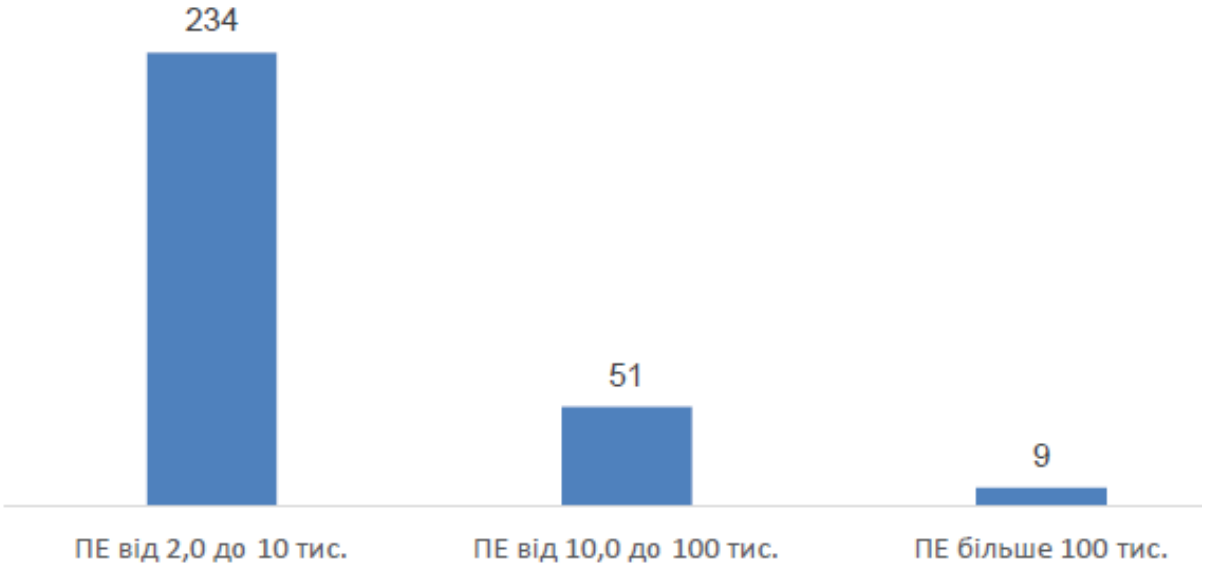


Figure 3.8 Number of measures depending on PE in the Danube basin

At the stage of drawing up the SEA, the impact that will be exerted on settlements from the implementation of the above-mentioned measures can only be presented in a generalized form (in more detail in section 6 of this Report). Works on construction/reconstruction of facilities, revitalization, clearing of reservoirs, construction of a waste processing plant require the development of separate project documentation, the assessment of which will be carried out in accordance with the Law "On Environmental Impact Assessment".

The current state of the environment, the living conditions of the population and the state of their health in the territories of the Danube basin are described in section 2 of the Report.

4 ENVIRONMENTAL PROBLEMS, INCLUDING RISKS OF IMPACT ON THE HEALTH OF THE POPULATION, WHICH ARE RELATED TO THE STATE PLANNING DOCUMENT, IN PARTICULAR REGARDING AREAS WITH NATURE PROTECTION STATUS (ACCORDING TO ADMINISTRATIVE DATA, STATISTICAL INFORMATION AND RESULTS RESEARCH VOLUMES)

Water resources of the country are a source of drinking water for the population. And taking into account the fact that their reserves are unevenly distributed across the territory of Ukraine (they are the largest in the west, the smallest in the southern regions), this requires their rational use and protection from pollution.

Environmental safety of the natural environment has an important impact on human health and well-being. Environmental factors contribute to morbidity and mortality statistics of the population. The influence of the environmental situation (along with genetic factors and lifestyle) is a fundamental factor that determines the state of health of the population.

The condition of the human body depends on the air, lifestyle, quality of food, and drinking water. Part of the population still uses water supply, means of sanitation and hygiene that do not meet safety requirements, which makes a significant contribution to morbidity and, as a result, mortality, which could have been avoided. A large proportion of disease cases is related to the state of water ecosystems, which can be improved by implementing environmental protection measures. According to the World Health Organization, more than 80% of the diseases known today are associated with the unsatisfactory quality of drinking water, so the priority for improving the quality of drinking water is: updating and improving water supply systems, arranging sanitary protection zones of drinking water sources at water intakes, construction and reconstruction of water treatment systems using new technologies.

In order to determine the expediency, sufficiency, acceptability and reasonableness of measures and projects envisaged by the RBMP project, it is first of all necessary to analyze the environmental problems that need to be solved.

The ecological problems of the Danube basin were determined on the basis of the data provided in the Danube River Basin Management Plan (2025-2030) and the information provided in section 2 of this Report.

Part of the environmental problems affecting the state of SWM and GWM are considered in subsection 2.4.3 of the SEA report.

The main share of polluted wastewater comes from agricultural water users (89%), which is caused by the insufficient degree of wastewater treatment after use by agricultural enterprises, which are the largest water consumers in the Danube basin. The destruction of the reclamation network also has an additional impact, which leads to siltation of channels, overgrowth of various vegetation and contamination of surface and underground waters with mineral and organic fertilizers, pesticides, etc.

In addition, the source of organic compounds is mainly rural households that are not served by the sewage network. Water drainage in such individual farms is carried out on the topography of the area by accumulation in sumps. Taking into account all of the above, most of the Plan's activities are aimed at the construction/reconstruction of treatment facilities and sewage networks.

The main environmental problems of the Danube basin territories, relevant to the state planning document, are listed in Table 4.1.

Table 4.1 Environmental problems of the Danube basin

Component	Environmental problem	Factor/cause
Massifs of surface waters	1) Pollution by (organic, biogenic, dangerous) substances caused by the destruction, stoppage, violation of the technological process of enterprises (including warehouses, oil product bases	Military operations. 1 case was recorded in the Danube subbasin (see table 2.4.3.1)
	2) pollution by organic substances	Source: insufficiently treated or untreated sewage. The reason: the unsatisfactory state of sewage treatment facilities (STP) of agglomerations (point pollution) and wear/damage/absence of drainage systems to sewage networks (diffuse pollution).
	3) pollution by biogenic substances	Source: insufficiently treated or untreated wastewater from settlements, industry and agricultural facilities, intensive agriculture. Reason: unsatisfactory condition of sewage treatment facilities (STP) (point pollution). Wear/damage/absence of water drainage systems, excessive application of fertilizers and pesticides during land cultivation, wash-off from the territories of former enterprises of the forest chemical industry and solid waste disposal sites (diffuse pollution).
	4) contamination with dangerous substances	Source: discharges of machine-building enterprises, forest chemical industry, mining facilities, animal

		husbandry and food industry, industrial and municipal waste.
	5) a significant number of objects for which there are risks of accidental pollution	Source: 28 objects (see table 2.4.3.3). The reason: wastewater discharges and washes from the areas of sites where production waste is stored.
	6) hydromorphological changes (disruption of the free flow of rivers, morphological changes).	Source: dams and other artificial transverse structures, straightening, dredging, plowing. Reasons: Urbanization, flood protection, agriculture and shipping.
Massifs of ground waters	1) Absence of a monitoring system of the GWM	The underground water monitoring network is currently in a state of disrepair. Observations carried out in 2018-2020 did not meet the requirements of the current Procedure for State Water Monitoring in either quantitative or qualitative terms.
	2) Pollution of GWM	Source: enterprises of various branches of industry and agriculture (point sources). Territories, industrial zones, agricultural lands (diffuse sources), domestic wastewater. The reason: wastewater from industrial enterprises (point pollution), excessive use of pesticides and fertilizers (diffuse pollution), unsatisfactory state of the reclamation network, lack of centralized sewage treatment and discharge of domestic sewage in rural settlements and partly in cities.
SWM, GWM, natural vegetation	Other significant anthropogenic influences, including: 1) climate change	The water-heat balance of the river basin is too sensitive to climate changes. An increase in air

		temperature and a change in the nature of precipitation affect not only the hydrological regime of rivers, but also the general reserves of water resources. Climate change increases the frequency of floods and droughts, making agriculture, energy, transport and social sectors vulnerable, as they depend on water resources.
	2) clogging of water bodies with solid household waste, including plastic	Source: solid household waste, unauthorized and spontaneous landfills The reason: inefficient system of collection, transportation and disposal of waste, low culture of waste management of the population. Clogging of the rivers of the Tisza sub-basin with municipal waste is of great concern to neighboring countries. In particular, since 2020, more than 50 cases of municipal waste littering the Hungarian territory during floods have been recorded. First of all, these are PET bottles, the number of which in the Tisza during floods is 50-100 bottles per minute, sometimes this figure reaches 300 bottles per minute
	3) an inefficient waste management system, which causes overloading of landfills and the creation of unauthorized landfills.	Source: solid household waste, unauthorized and spontaneous landfills. The organic matter contained in the waste forms a leachate with a complex chemical composition. Penetration of leachate into groundwater leads to pollution that spreads over

		considerable distances. Groundwater pollution is the greatest danger to human health. Heavy metals (lead, cadmium, zinc, copper, cobalt, chromium, iron), chemical compounds (petroleum products, nitrates, phosphates) and bacteria (groups of Escherichia coli, enterococci) enter the human body from drinking water. The reason: an inefficient system of waste collection, transport and disposal, low waste management culture of the population.
	4) spread of invasive species	Source: alien species that displace natural communities. The reason: insufficient research on invasive species.
Objects of the Emerald network	1) lack of management and development plans for the Emerald Network facilities	The reason: underfunding, including due to hostilities.
Zones of protection of valuable species of aquatic bioresources	1) Uncertainty of zones for the protection of valuable species of biological resources in Ukraine	The reason: due to the lack of an appropriate legislative and regulatory framework, zones for the protection of valuable species of biological resources in Ukraine have not been defined
Zones vulnerable to (accumulation of) nitrates	1) Lack of information of high quality and with a sufficient level of reliability to determine zones vulnerable to (accumulation of) nitrates	The reason: an imperfect system of the monitoring network (both underground and surface water).

Analyzing the above-mentioned environmental problems of the Danube basin, there is a need to adopt the Plan, since the PE specified in Annex 13 to the RBMP is aimed at solving most of the basin's problems.

It is rather difficult to directly link certain consequences for the health of the population with the impact of specific measures of the Plan, since the impact on health is often non-specific and indirect in nature, characterized by the presence of a time gap between the moment of occurrence and the manifestation of the consequences. However, it can be assumed that the implementation of RBMP measures will improve the ecological and chemical state of SWM, the chemical and quantitative state of GWM, as well as the good ecological potential of artificial or significantly altered surface water bodies.

On the basis of the analyzed information on the existing ecological problems of the basin and the assessment of the current state of the environment, which is given in section 2 of the SEA Report, a SWOT table was compiled - an analysis with a list of strengths and weaknesses, opportunities and threats (Table 4.2).

SWOT analysis is an effective tool for making strategic, short- and long-term management decisions regarding the further improvement of the SPD, taking into account regional characteristics. Weaknesses, opportunities and threats identified during the SWOT analysis can be used in making strategic, short- and long-term management decisions.

Table 4.2 SWOT - analysis of the ecological situation in the territory of the Danube basin

Strengths	Weak sides
1. Climatic, landscape and biological diversity	1. The war in Ukraine, which causes economic instability.
2. Rich natural, forest, water and recreational and health and balneological resources. One of the highest indicators of the territory of the nature reserve fund in the country. The presence of wetlands protected by the Ramsar Convention.	2. Lack of an optimal number of studies of invasive species within the basin.
3. High percentage of afforestation of territories.	3. Lack of groundwater monitoring since 2018, unknown condition of water intake facilities.
4. High tourist attraction	4. Impossibility of determining zones vulnerable to (accumulation of) nitrates.
5. Availability of historical and cultural monuments in the territories of the Danube RBR regions.	5. Negative demographic trends, in particular due to negative natural population growth.
6. Active cooperation with international technical assistance projects. Involvement in international and cross-border projects	6. Acceleration of water flow on mountain slopes due to large-scale transformations of forest landscapes and logging, massive illegal logging
7. Attracting funds from international financial organizations	7. Clogging of riverbeds and banks of the Danube basin with household waste, introduction of foreign species of fish, animals and plants. Pollution of water bodies with nutrients and organic substances.
8. Increasing the level of public activity.	8. Inefficient waste management, as a result of which most landfills are filled to 80-85%, unauthorized landfills are created.
9. Low level of emissions compared to other regions of Ukraine.	9. Availability of objects on the territory of the regionfor which there are risks of accidental pollution (28 objects).
10.Gradual implementation of EU Directives and Regulations in the field of water resources management.	10. Technical and moral wear and tear of existing water intakes, water pumping stations, pumping equipment and networks, use of outdated technologies; low level of coverage of rural settlements by centralized water supply and drainage.

11. Extraction of underground water does not exceed the estimated resources and operational reserves of underground water. The exploitation of groundwater did not lead to significant changes in the level regime, and the decrease in the operational load in recent years contributes to the restoration of water levels.	11. A significant number of SWMs that have undergone hydromorphological changes and need revitalization (155 SWMs).
	12. Significant man-made load on the Ministry of Agriculture due to agricultural activities.
	13. Wear and tear of a significant part of the reclamation network - channels are silted up, overgrown with various vegetation, sluice gates are out of order
	14. Lack of management and development plans for the objects of the Emerald network.
	15. The return on the use of water resources is 7.4%, which means that the costs are higher than the tax revenues for water services.
Opportunities	**Threats**
1. The end of the war on the territory of Ukraine.	1. "Freezing" the war/ preservation of the existing situation.
2. Attracting grant funds for the implementation of regional development projects, including the implementation of environmental protection measures.	2. The forecast for the consistent growth of water intake due to the growth of the needs of the economic sectors, which will contribute to the additional load on water resources.
3. Growing popularity of rural green tourism, objects of cultural and architectural heritage among the population of Ukraine and foreign tourists.	3. A difficult demographic situation: the preservation of the negative trends towards further natural reduction of the population, primarily children, young people and the population of working age, due to population aging, a significant excess of the death rate over the birth rate, migration reduction of the population
4. Full restoration of funding of previously acceptable environmental protection programs.	4. Low level of environmental awareness and responsibility on the part of the population and business entities.
5. Improvement of the hydrological regime of rivers due to revitalization, clearing, restoration of riverbeds	5. Strengthening the impact of global climate change trends on natural and urbo-eco-ecosystems and the unforeseeable acceleration of global climate change processes.

6. Improvement of the state of SWMs due to reconstruction, modernization and construction of new treatment facilities, sewage networks.	6. Technogenic and economic activity in the border territories of Romania and Hungary, which negatively affects the ecological condition of the Tisza River watercourse within the territory of the region.
7. Expansion of the surface water quality monitoring system and renewal of groundwater monitoring.	7. Low level of coordination of practical measures and actions of neighboring countries and Ukraine in solving the problem of anti-flood structures and coastal fortifications in transboundary waters.
8. Ecological education of the population at the expense of conducting scientific and educational activities.	8. Occurrence of natural (floods, landslides, mudslides, erosion) and man-made emergencies, in particular as a result of irrational use of natural resources; deterioration of the environment of the region as a result of unbalanced nature use, pollution of territories by landfills.
9. Recognition of some SWMs as vulnerable zones for which appropriate measures will be developed taking into account their characteristics.	9. Deterioration of the state of STP and SS, which will lead to more discharges of polluted wastewater.
10. Improvement of sanitary and hygienic conditions for the population.	10. Destruction and gradual degradation of the territories of NRF, eco-network, Smaragdova network as a result of anthropogenic activity.
11. Positive changes in the field of waste management due to the construction of a waste processing plant in the Polyansk Territorial Community	11. Increasing the area of solid waste landfills and creating unauthorized landfills.
12. Strengthening the requirements of environmental legislation.	12. Significant spread of invasive species that will displace natural communities.
13. Production of environmentally friendly agricultural products	13. Plowing of coastal strips and their pollution with household waste.
14. Further development of the tourist and recreational sphere.	

5 OBLIGATIONS IN THE FIELD OF ENVIRONMENTAL PROTECTION, INCLUDING THOSE RELATED TO THE PREVENTION OF A NEGATIVE IMPACT ON THE HEALTH OF THE POPULATION, ESTABLISHED AT THE INTERNATIONAL, STATE AND OTHER LEVELS, RELATING TO THE STATE PLANNING DOCUMENT, AND ALSO THE WAYS OF ACCOUNTING FOR SUCH OBLIGATIONS DURING STATE PLANNING DOCUMENT PREPARATION

According to the Law of Ukraine "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period Until 2030", SEA is one of the main tools for the implementation of the state environmental policy, which will make it possible to prevent a negative impact on the surrounding natural environment and establish compliance of planned or implemented activities with norms and the requirements of legislation on environmental protection, rational use and reproduction of natural resources, ensuring environmental safety.

In 2012, the Order of the Ministry of Ecology and Natural Resources of Ukraine (from 17.12.2012 № 659) approved the Basic Plan for the Adaptation of Environmental Legislation of Ukraine to the legislation of the European Union (Basic Plan of Approximation). In particular, according to this plan, it is necessary to bring the legal framework of Ukraine into compliance with the requirements of "Directive 2001/42/EC on the assessment of the impact of individual plans and programs on the environment."

The section highlights information about various directives, strategies, plans and programs operating at the international, national, regional and local levels, which to one degree or another determine the prerequisites for the adoption of planned measures and projects in the Danube River Basin Management Plan (2025-2030).

The section is based on the analysis of the goals of state policy documents in the field of environmental protection and public health, which are related to the goals of development at the national level and directly relate to the SPD.

The results of the analysis determine the degree of consideration of the above-mentioned goals of state policy documents and their implementation in the SPD

5.1 Main international and national obligations

In accordance with the Decree of the President of Ukraine "On Sustainable Development Goals of Ukraine for the period until 2030" (№ 722/2019), compliance with the Sustainable Development Goals of Ukraine for the period until 2030, which are coordinated with the global goals for sustainable development until 2030,

announced by the resolution, must be ensured of the United Nations General Assembly dated September 25, 2015 № 70/1.

Ukraine's international obligations in the field of water resources management and water quality are based on the following provisions:

- Directive 2000/60/EU establishing a framework for Community action in the field of water policy with as changed and supplemented, introduced by Decision № 2455/2001/EU and Directive 2009/31/EU (paragraphs 1719, 1772, 1779);

- Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources, as changed and supplemented by Regulation (EC) № 1882/2003 (paragraphs 1720, 1721, 1746)

- Council Directive 91/271/EEC concerning urban waste-water treatment as changed and supplemented by Directive № 98/15/EU and Regulation (EU) № 1882/2003 and Regulation (EU) № 1137/2008 (paragraphs 1722, 1774, 1776);

- Directive 2007/60/EU assessment and management of flood risks (paragraphs 1743, 1777);

- Directive (EU) 2008/56/EC establishing a framework for community action in the field of marine environmental policy (paragraphs 1744, 1745, 1773, 1775);

- Regulation (EU) № 782/2003 of the European Parliament and of the Council on the prohibition of organotin compounds on ships (paragraphs 1723);

- Directive 2001/42/EU on the assessment of the effects of certain plans and programmes on the environment;

- The plan of measures for the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states, on the other hand, approved by Resolution № 1106 of the Cabinet of Ministers of Ukraine dated October 25, 2017.

In addition, in accordance with Article 9 of the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the Government of Ukraine concluded the following bilateral agreements on the protection of border/transboundary waters, the responsibility for the implementation of which is assigned to the State Water Agency:

- Agreement between the Government of Ukraine and the Government of the Republic of Hungary on issues of water management in border waters;

- Agreement between the Government of Ukraine and the Government of the Republic of Poland on cooperation in the field of water management in border waters;

- Agreement between the Government of Ukraine and the Government of the Slovak Republic on issues of water management in border waters;

- Agreement between the Cabinet of Ministers of Ukraine and the Government of the Republic of Belarus on joint use and protection of transboundary waters;

- Agreement between the Government of Ukraine and the Government of Romania on cooperation in the field of water management in border waters;

- Agreement between the Government of Ukraine and the Government of the Republic of Moldova on joint use and protection of border waters.

The main international legal documents regarding the prevention of negative impact on public health at the stage of development and adoption of state planning documents are the Protocol on Strategic Environmental Assessment (SEA Protocol) to the Convention on Environmental Impact Assessment in a Transboundary Context (Espo Convention), ratified by the Supreme by the Council of Ukraine (№. 562-УIII from 01.07.2015), and Directive 2001/42/EU on the assessment of the impact of certain plans and programs on the environment, the implementation of which is provided for by the Association Agreement between Ukraine and the EU. In Ukraine, SEA is regulated by the Law of Ukraine "On Strategic Environmental Assessment" (№ 2354-UIII dated March 20, 2018).

At the national level, Ukraine's obligations in the field of water resources management, as well as environmental protection and sustainable use of natural resources, are enshrined in the following normative acts:

- Water Code of Ukraine;

-Land Code of Ukraine;

- Code of Ukraine on subsoil;

- Decree of the President of Ukraine dated September 30, 2019 No. 722 "On the Sustainable Development Goals of Ukraine for the period until 2030";

- Law of Ukraine "On Ensuring Sanitary and Epidemic Welfare of the Population";

- Law of Ukraine «On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030»

- Law of Ukraine dated 04.10.2016 No. 1641-VIII "On Amendments to Certain Legislative Acts of Ukraine Regarding the Implementation of Integrated Approaches to Water Resources Management According to the Basin Principle";

- Law of Ukraine dated January 14, 2000 No. 1389-XIV "On Land Reclamation";

- Resolution of the Verkhovna Rada of March 5, 1998 No. 188/98-VR "On the Main Directions of the State Policy of Ukraine in the Field of Environmental Protection, Use of Natural Resources and Ensuring Environmental Safety";

- Law of Ukraine "On Environmental Protection" dated June 25, 1991 No. 1264-XII;

- Law of Ukraine "On ecological network";

- Law of Ukraine "On Waste Management";

- National Action Plan for Environmental Protection until 2025, approved by the order of the Cabinet of Ministers of Ukraine dated 21.04.2021 № 443-r;

- Water Strategy of Ukraine until 2050, approved by the order of the Cabinet of Ministers of Ukraine dated 09.12.2022 № 1134-r;

- Marine environmental protection strategy of Ukraine, approved by the order of the Cabinet of Ministers of Ukraine dated October 11, 2021 #1240;

- Plan of measures for the implementation of the Concept of implementation of state policy in the field of climate change for the period until 2030, approved by the order of the Cabinet of Ministers of Ukraine dated 06.12.2017 No. 932-r;

- The National Action Plan for Combating Land Degradation and Desertification, approved by the Cabinet of Ministers of Ukraine Decree No. 271 dated March 30, 2016;

- the decision of the Coordinating Council on Combating Land Degradation and Desertification, established in accordance with the Resolution of the Cabinet of Ministers of Ukraine dated 18.01.2017 No. 20, in particular regarding the approval of voluntary national tasks presented to the National Academy of Sciences to achieve a neutral level of land degradation (hereinafter referred to as "NRDS") in the direction of "Maintenance of the content of organic matter (humus) in soils", as well as supporting measures to achieve NSRD in the areas of "Restoration of irrigation and improvement of the ecological and amelioration condition of irrigated lands" and "Restoration and sustainable use of peatlands" (https://mepr.gov.ua/news/32479.html). The relevant tasks and measures regarding the NSRD are also indicated in the decision of the National Security and Defense Council of Ukraine dated 23.03.2021 № 111/2021 "On challenges and threats to the national security of Ukraine in the environmental sphere and priority measures for their neutralization;

- Irrigation and drainage strategy in Ukraine for the period up to 2030, approved by the order of the Cabinet of Ministers of Ukraine № 688 dated August 14, 2019;

- Plan of measures for the implementation of the Irrigation and Drainage Strategy in Ukraine for the period until 2030, approved by the order of the Cabinet of Ministers of Ukraine dated October 21, 2020 № 1567-r;

- National plan for waste management until 2030, approved by the order of the Cabinet of Ministers of Ukraine dated February 20, 2019 № 117-r;

- State strategy of regional development for 2021-2027, approved by Resolution of the Cabinet of Ministers of Ukraine dated August 5, 2020 № 695;

- National economic strategy for the period until 2030, approved by the resolution of the Cabinet of Ministers of Ukraine dated 03.03.2021 № 179;

- The strategy of environmental security and adaptation to climate change for the period up to 2030 and the operational plan for its implementation in 2022-2024, approved by the order of the Cabinet of Ministers of Ukraine dated October 20, 2021 № 1363-r;

- The State Forest Management Strategy of Ukraine until 2035 and the operational plan for its implementation in 2022-2024, approved by the order of the Cabinet of Ministers of Ukraine dated December 29, 2021 № 1777-r;

- Energy strategy of Ukraine for the period until 2050, approved by the order of the Cabinet of Ministers of Ukraine dated 04/21/2023 №. 373-r.

5.2 Ways of taking into account obligations during the preparation of the state planning document

In general, the goals of the RBMP are in line with the strategic goals of Ukraine's environmental policy. Principles of the Environmental Policy of Ukraine defined by the Law of Ukraine On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030. The purpose of the state environmental policy and its strategic goals are presented in Figure 5.2.1.

Figure 5.2.1 Purpose and strategic goals of the State Environmental Policy of Ukraine

The analysis of compliance of the goals of the Danube River Basin Management Plan (2025-2030) with the strategic goals of the state environmental policy of Ukraine is presented in table. 5.2.1.

Table 5.2.1 Analysis of the compliance of the RBMP goals with the strategic goals of the state environmental policy of Ukraine

Strategic goals of the state environmental policy of Ukraine according to the Law of Ukraine "On the Key Principles (Strategy) of the State Environmental Policy of Ukraine for the Period till 2030"	**Strategy Tasks, which are included in the RBMP**	**In which way were included in the draft Danube River Basin Management Plan (2025-2030)**
Goal 1. Formation of environmental values and implementation of principles of sustainable consumption and production in society	1) introduction of education for balanced (sustainable) development, environmental education and upbringing, activities of sensitisation to form environmental values in society and increase its environmental awareness;	Goal 1 "Formation of environmental values and principles of sustainable consumption and production in the society" is taken into account in the RBMP through the implementation of the following measures: Tisza sub-basin measures (M5.3.1): - measure №100 "Information and awareness raising activities in the field of solid waste management in the Tisa River sub-basin in the territory of 64 TC of Zakarpattia oblast"; - measure №102 "Informational and educational work on the protection, conservation and restoration of water resources in the Tisza sub-basin of the 64th TC of the Transcarpathian region". measures of the Prut and Siret sub-basin (M5.3.2, M5.3.3): - Measure №167 "Educational activities in the Prut and Siret sub-basins in Chernivtsi and Ivano-Frankivsk regions";
	2) assess attitudes and raise public awareness about the importance, benefits and tools of sustainable consumption and production, the state and values of biodiversity and the measures that need to be implemented for its conservation, restoration and sustainable use;	
	3) ensuring practical implementation of the results of modern and fundamental environmental research and continuous interaction between scientists and government agencies;	
	4) consideration of the recommendations of environmental scientific institutions	

	when making managerial decisions and preparing draft regulatory acts; 5) developing partnership between sectors of society in order to involve all stakeholders in the planning and implementation of environmental policy; 6) ensuring public participation in management decision-making in the field of environmental protection and nature management; 7) ensuring compliance with the environmental rights and obligations of citizens, public access to justice in the field of environmental protection and nature management.	
Goal 2. Ensuring sustainable development of the natural resource potential of Ukraine	1) improvement of the cadastral system of natural resources, state statistical reporting on the use of natural resources and environmental pollution;	The PE for the Prut and Siret sub-basins envisages: -measure №164 "Research and inventory of the main massifs of wetlands in Chernivtsi region"; - measure №165 "Study of the current state of spread of invasive fish species in the sub-basins of the Prut and Siret rivers and their control"; - measure №166 "Monitoring the lowering of riverbeds in the Ukrainian part of the Prut and Siret sub-basins". In the lower Danube sub-basin: -measure №26 "Economic and environmental certification of water users in the Lower Danube sub-basin on the basis of digitalization of 16 TC in Bilhorod-Dnistrovskyi rayon, Bolhradskyi rayon, Izmailskyi rayon of Odesa oblast" - measure №28 "Modernization of the hydrological infrastructure management system and

		hydrological monitoring of water management systems "Kyslytskyi arm of the Stepovyi arm - floodplain of the Stepovyi arm - Lake China" Safianivska TC, Izmail district, Odesa region"; - measure №29 "Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems "Safiany - Katlabukh" Safianivska TC, Izmail district, Odesa region"; - measure №30 "Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems "Kyslytskyi Rukav - Staronekrasivski Plains - Lung Lakes" Izmail TC, Izmail district, Odesa region" - measure № 31 "Modeling of water and salt balance and water quality in the Danube Lake Katlabukh, Safianivska TC, Izmail district, Odesa region"
	2) reducing the loss of biological and landscape diversity, in particular by improving the principles of establishing an ecological network, its expansion and sustainable use, as well as preserving unique natural landscapes; 3) conservation and restoration of the number of species of natural flora and fauna, including migratory animal species, their habitats, rare and endangered, species of the animal and plant world and typical natural plant communities subject to protection;	Reducing the loss of biological and landscape diversity and reducing the negative impact of urbanization processes on the environment will be ensured by - construction/reconstruction of STP and SS, which will reduce the degree of anthropogenic impact on water resources, including those belonging to the Emerald Network, protected areas and the eco-network - revitalization, clearing, restoration and maintenance of a favorable hydrological regime of riverbeds, and measures to mitigate channel adjustment works will restore the state of the

	4) reducing the negative impact of urbanisation processes on the environment, ending the destruction of the natural environment within cities, in particular, preventing unjustified destruction of green spaces within cities during construction or other works, illegal allotment of land plots of green spaces for construction;	ecosystem or natural processes occurring in the ecosystem that has been degraded, damaged or destroyed. Revitalization will also help to protect local biodiversity and combat invasive plant species. - Establishment of water protection zones and coastal protection strips of water bodies will ensure the introduction of certain restrictions on the use of water resources, including a ban on plowing land
	5) ensuring sustainable water resources management based on the basin principle;	Sustainable water management on a basin basis is ensured through the development and approval of the Danube River Basin Management Plan (2025-2030)
	6) ensuring sustainable use and protection of land, improving the state of affected ecosystems and promoting the achievement of a neutral level of land degradation, raising awareness of the population, landowners and land users about land degradation problems;	For the purpose of proper land protection and restrictions on its use, the RBMP envisages a number of measures to establish water protection zones and coastal protection strips.
Goal 3. Ensuring the integration of environmental policy into the process of decision-making on socio-economic development of Ukraine	1) improving air quality;	The reconstruction of the treatment facilities will include the replacement of outdated pumping equipment with new energy-saving equipment, which will reduce air emissions from stationary sources.

	2) improving water quality and managing water resources, including the marine environment. Complete gradual cessation of the discharge of untreated and insufficiently treated wastewater into water bodies and ensuring that the degree of wastewater treatment meets the established norms and standards, as well as prevention of underground water contamination;	Improvement of water quality will be ensured through the implementation of measures aimed at reducing pollution by organic substances (207 measures), nutrients (212 measures) and hazardous substances (209 measures), including - Construction/reconstruction of STP and SS. The reconstruction/modernization of STP and SS is required in 31 TC, and the construction of new STP and SS is planned in 99 TC. - Establishment of water protection zones and coastal protection strips in each administrative-territorial region of the Danube basin - "Creation of wastewater treatment and solid waste disposal complexes in the waters of the Danube seaports of five territorial communities in Izmail district, Odesa region" (№3 from the list of activities of the Lower Danube sub-basin). - "Assessment, monitoring of changes in the state of water intake and implementation of works on the restoration of water intakes of the Polyana forestry, Polyana territorial community, Mukachevo district, Transcarpathian region" (№71 from the list of measures of the Tisza sub-basin). - "Construction of a waste processing plant in the Polyana territorial community, Mukachevo district, Zakarpattia region" (measure №98 from the list of measures of the Tisza sub-basin). - "Rehabilitation of the territory of the former oil storage facility and prevention of pollution by oil products in the border area of Reni TC, Izmail

		district, Odesa region" (№2 from the list of measures of the Lower Danube sub-basin).
	3) preventing and adapting to climate change;	Climate change affects the hydrological state of rivers, so the PE for a set of actions aimed at improving/restoring the hydrological regime and morphological indicators (73 measures) - revitalization of rivers, establishment of water protection zones, coastal protection strips, restoration and maintenance of a favorable hydrological regime of water bodies, improvement of the ecological state of river channels, and implementation of measures to mitigate channel regulation works
	4) ensuring the preservation and protection of nature;	Improving the quality of water resources and establishing coastal protection zones.
	5) reducing industrial pollution and the risk of industrial accidents;	The construction/reconstruction of the STP and SS increase the efficiency of the treatment facilities and the degree of wastewater treatment. Replacement of worn-out equipment will reduce the risk of industrial accidents. In addition, measure №2 of the Lower Danube sub-basin "Rehabilitation of the former oil storage facility and prevention of oil pollution in the border area of Reniisky TC, Izmail district, Odesa region" will prevent oil pollution of the Danube river bank.
	6) conservation of biodiversity and landscapes;	The conservation of biodiversity and landscapes will be ensured by improving the quality of water bodies, including those belonging to protected areas, the eco-network, and the Emerald Network. Also, a measure to preserve natural landscapes is

		the establishment of water protection zones and coastal protection strips of water bodies.
	7) control and prevention of biological pollution;	- Measure №101 of the Tisza sub-basin "Measures to localize and remove invasive plants (Ragweed and Sosnowski hogweed) in the coastal protection zones of the Tisza sub-basin in Transcarpathian region" is aimed at removing invasive species that are considered biological pollutants - Measure №165 of the Prut and Siret sub-basin "Study of the current state of spread of invasive fish species in the Prut and Siret sub-basins and their control" is aimed at a comprehensive study and clarification of the impact of invasive fish species in the Prut, Siret and Cheremosh rivers.
	8) inclusion of issues related to the value of biodiversity in national, local, strategic, policy documents and plans for the development of the economy and its sectors;	The RBMP includes a number of measures to conserve and restore biodiversity.
Goal 4. Reducing environmental risks in order to minimise their impact on ecosystems, socio-economic development and public health	1) reducing the level of air and water pollution;	Air pollution will be reduced by replacing outdated equipment with energy-efficient pumping equipment. The construction of new STP and SS reconstruction of the existing ones will improve the efficiency of wastewater treatment at industrial and municipal enterprises.
	2) reducing human impact on the ecosystems of the Black and Azov seas;	
	3) preventing the spread of invasive species and controlling the appearance and spread of such species in natural ecosystems, including marine ones;	The following measures are planned to prevent the spread of invasive species and control them: - Measure №101 of the Tisza sub-basin "Measures to localize and remove invasive plants (Ragweed and Sosnowski hogweed) in the coastal protection zones of the Tisza sub-basin in Zakarpattia oblast"

		is aimed at removing invasive species that are considered biological pollutants - Measure №165 of the Prut and Siret sub-basin "Study of the current state of spread of invasive fish species in the Prut and Siret sub-basins and their control" is aimed at a comprehensive study and clarification of the impact of invasive fish species in the Prut, Siret and Cheremosh rivers.
Goal 5. Improvement and development of the state environmental management system	1) implementing the principles of good environmental governance, constant dialogue with stakeholders on the preparation and adoption of strategic decisions;	Maintaining an ongoing dialogue with stakeholders on the preparation and adoption of strategic decisions is taken into account through consultations with executive authorities and public discussions in the process of the strategic environmental assessment of the RBMP.
	2) developing and improving environmental legislation and increasing the level of compliance with it, in particular, approximating the legislation of Ukraine to the law (acquis) of the European Union;	The development and approval of the RBMP is aimed at implementing 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 (Water Framework Directive), which is Ukraine's obligation under the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their Member States, on the other hand.
	3) strengthening the ability of environmental management to carry out comprehensive monitoring of the natural environment condition and state control in the field of environmental protection, rational use, substitution and protection of natural resources.	To strengthen the capacities of environmental management in conducting comprehensive environmental monitoring, the PE provided: - Measure №164 for the Prut and Siret sub-basin "Research and inventory of the main massifs of wetlands in Chernivtsi region";

		- Measure №166 "Monitoring the lowering of riverbeds in the Ukrainian part of the Prut and Siret sub-basins". - Measure №26 for the Lower Danube "Economic and environmental certification of water users in the Lower Danube sub-basin on the basis of digitalization of 16 TC in Bilhorod-Dnistrovskyi rayon, Bolhradskyi rayon, Izmailskyi rayon of Odesa oblast"; - Measure №28 "Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems "Kyslytskyi arm of the Stepovyi arm - floodplain of the Stepovyi arm - Lake China" Safianivska TC, Izmail district, Odesa region"; - Measure №29 "Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems "Safiany - Katlabukh" Safianivska TC, Izmail district, Odesa region"; - Measure №30 "Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems "Kyslytskyi Rukav - Staronekrasivski Plains - Lung Lakes" Izmail TC, Izmail district, Odesa region". It is also planned to conduct an inventory, rehabilitate observation wells and monitor groundwater in the sub-basins of the Tisa, Prut and Siret rivers.

In Table 5.2.2, it is presented the ways of taking into account the environmental protection obligations, including those related to prevention of negative impacts on public health, established at the international, national and other levels during the preparation of the RBMP.

Taking into account the results of the analysis presented in Tables 5.2.1 - 5.2.2, it can be concluded that the RBMP meets the environmental policy objectives set at the international, national and regional levels, takes into account most of them and proposes a set of measures aimed at improving the state of the water resources of the Danube basin.

Table 5.2.2 Ways of taking into account obligations during the preparation of the RBMP project

A document defining obligations	Provisions of the document relating to water resources.	Ways of taking into account obligations during the preparation of the state planning document
Directive 2000/60/EC on establishing the framework for Community activities in the field of water policy as amended by Decision № 2455/2001/EC and Directive 2009/31/EC (paragraphs 1719, 1772, 1779)	The purpose of this Directive is to preserve and improve the status of the aquatic environment in the Community. First of all, the achievement of this goal is related to the quality of the corresponding waters. An additional element of ensuring good water quality is the control of quantity, and therefore quantity instruments must also be put in place to help achieve the goal of ensuring good quality. The most important goal of this Directive is the complete elimination of priority hazardous substances and the promotion of their concentrations in the marine environment close to the values of background concentrations for substances of natural origin.	The goals of RBMP are to achieve/maintain a "good" ecological and chemical state of surface water bodies, a "good" chemical and quantitative state of groundwater bodies, as well as a "good" ecological potential of artificial or significantly altered surface water bodies. The number of measures aimed at reducing SWM pollution and improving water quality in the Danube basin is as follows: - measures aimed at reducing pollution by organic substances (diffuse and point sources) - 207 measures; - measures aimed at reducing pollution by biogenic substances (diffuse and point sources) - 212 measures; - measures aimed at reducing pollution by hazardous substances (diffuse and point sources) - 209 measures. Measures aimed at improving/restoring the hydrological regime and morphological indicators – 73.
Council Directive 91/676/EEC on the protection of waters against pollution caused by nitrates from agricultural sources, as amended by Regulation (EC) № 1882/2003 (paragraphs 1720, 1721, 1746)	The purpose of this Directive is: - reduction of water pollution caused or caused by nitrates from agricultural sources and prevention of such pollution in the future.	At the moment, the existing surface water monitoring network in its continuity and spatial coverage is not sufficient for the application of the developed method, and groundwater monitoring is not carried out at all. Therefore, the priority is to improve the monitoring network (both groundwater and surface water) and improve the database in order to provide a more detailed

		approach to the allocation of zones and their monitoring and thus achieve full compliance with the EU WFD during the 2nd cycle of the plan river basin management (2031-2036). This PE provides: - inventory, restoration of observation wells and monitoring of groundwater in the sub-basins of the Tisza, Prut and Siret rivers.
Council Directive 91/271/EEC on urban waste water treatment as amended by Directive No. 98/15/EC and Regulation (EC) No. 1882/2003 and Regulation (EC) No. 1137/2008 (paragraphs 1722, 1774, 1776);	This Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industries. The purpose of the Directive is to protect the natural environment from the negative impact of the above wastewater discharges.	In the RBMP, most of the measures are related to the construction/reconstruction of sewage treatment facilities and sewage networks, which will ensure the optimal level of wastewater treatment that enters water bodies and, accordingly, improve their ecological condition.
Directive 2007/60/EU on the assessment and management of flooding risks (clauses 1743, 1777);	Directive 2007/60/EC was adopted to regulate relations between EU member states in the field of prevention and reduction of the negative consequences of floods in affected areas, as well as to coordinate the development of disaster risk management plans.	RBMP provides a number of measures for revitalization, restoration of the hydrological regime of rivers, improvement of the ecological condition, which will minimize the risks of flooding. The establishment of water protection zones and coastal strips will contribute to the proper use of the lands of the water fund, which includes, among other things, a ban on plowing.
- Directive 2008/56/EU on establishing the framework for Community activities in the field of environmental policy in relation to the marine environment	This Directive should inter alia promote the integration of environmental aspects into all relevant policies and promote the environmental principle in the future maritime policy of the European Union.	The development of the RBMP is aimed at the implementation of Directive 2000/60/EU of the European Parliament and of the Council of October 23, 2000 "On the establishment of a framework for the activities of the Community in the field of water policy" (Water Framework Directive), which is an obligation of Ukraine

(paragraphs 1744, 1745, 1773, 1775);		within the framework of the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states, on the other hand.
- Directive 2001/42/EC on the assessment of the impact of individual plans and programs on the environment	The purpose of this Directive is to ensure a high level of environmental protection and to promote the integration of environmental considerations in the preparation and approval of projects and programs by ensuring, in accordance with the requirements of this Directive, the assessment of the state of the environment during the implementation of individual projects and programs that can significantly affect the state of the natural environment.	This requirement is fulfilled by carrying out a strategic environmental assessment of the project of the Danube River Basin Management Plan (2025-2030) in accordance with the Law "On Strategic Environmental Assessment". The purpose of the strategic environmental assessment is to promote sustainable development by ensuring environmental protection, the safety of the population's life and health, and the integration of environmental requirements during the development and approval of state planning documents.
The Law of Ukraine "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period Until 2030"	The main goals of the State Environmental Policy of Ukraine are shown in figure 5.2.1. In particular, among the problems in the Strategy, the following is highlighted: "The state management system in the field of water protection needs urgent reform and transition to integrated management of water resources according to the basin principle"	The approval of the RBMP will contribute to the sustainable management of water resources according to the basin principle. An analysis of the compliance of the RBMP goals with the tasks of the Strategy is given in table 5.2.1.
Law of Ukraine "On Environmental Protection"	The task of legislation on environmental protection is to regulate relations in the field of protection, use and reproduction of natural resources, ensuring environmental safety, preventing and eliminating the negative impact of economic and other activities on the natural environment, preserving natural resources, the genetic fund of living nature, landscapes and other natural complexes, unique territories and natural objects related to historical and cultural heritage	RBMP was developed taking into account the requirements of environmental legislation. The PE is aimed at effective management in the field of water resources and improving their condition. Construction/reconstruction of treatment facilities and sewage networks will increase the efficiency of the treatment facilities, increase the volume of normatively treated wastewater, which is a measure to prevent and eliminate the negative

		impact of economic activity on the natural environment.
National action plan for environmental protection for the period until 2025	Action 22 of the Plan: Ensuring the effective work of basin councils, including by involving them in solving urgent problems of water protection and rational use of water resources within the relevant area of the river basin. Measure 32: Improvement of organizational and economic measures to ensure rational use and protection of water and reproduction of water resources. Measure 68: Implementation of a new procedure for state water monitoring, in particular by further equipping laboratories, improving the network of monitoring observations for the needs of integrated management of water resources according to the basin principle in accordance with the EU Water Framework Directive and the EU Marine Strategy Framework Directive. Activity 69: Development and approval of river basin management plans.	The Prut and Sireta Basin Council, the Lower Danube Basin Council and the Tisza River Basin Council were involved in the development of the Danube River Basin Management Plan project (2025-2030). In order to improve monitoring observations on the quality of water resources, the RBMP provides for conducting an inventory, restoring observation wells and conducting groundwater monitoring in the sub-basins of the Tisza, Prut and Siret rivers, as well as the modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems. The development and approval of the RBMP corresponds to measure 69 of the National Environmental Protection Action Plan for the period up to 2025.
Water strategy of Ukraine for the period until 2050	Among the goals of the strategy, the following are highlighted: Goal 1. Ensuring equal access to high-quality drinking water that is safe for human health and appropriate sanitary and preventive measures. Goal 2. Improving the quality of water bodies by achieving and maintaining a "good" ecological and chemical state of surface water bodies, the ecological potential of artificial or significantly altered surface water bodies, and the quantitative and chemical state of groundwater bodies. Goal 3. Provision of the necessary amount of water resources for the restoration and improvement of water ecosystems and the achievement of sustainable water intake and water supply.	The ecological goals for surface and underground waters, reflected in the RBMP, fully meet and ensure the fulfillment of goals 1, 2, 3, 4, 5 of the Water Strategy of Ukraine for the period until 2050. In addition, the environmental goals of the Danube River Basin Management Plan (2025-2030) are identical to goal 2 of the Strategy, and the approval of the RBMP is the fulfillment of the task to achieve goal 2 of the Water Strategy of Ukraine.

	Goal 4. Reduce the growing risks of water scarcity and water surplus. Goal 5. Introduction of integrated management of water resources according to the basin principle and the principles of the Organization for Economic Cooperation and Development (OECD) regarding water governance in the areas of river basins, in coastal and sea waters. The tasks for achieving goal 2 are: - ensuring the preparation and implementation of river basin management plans in accordance with the provisions of Directive 2000/60/EU of the European Parliament and the Council "On establishing the framework of the Community's activities in the field of water policy" dated October 23, 2000.	
Marine environmental protection strategy of Ukraine	This Strategy defines the following strategic goals of marine environmental protection policy and priority tasks. Strategic goal 1. Reducing the risk to human health associated with the pollution and clogging of sea waters and the coastal protective strip, preventing the degradation of marine ecosystems and promoting their reproduction by reducing the level of pollution of the seas and minimizing the anthropogenic burden on marine ecosystems. Tasks for achieving goal 1 include: - "...in particular, the achievement by administrative means and levers of economic influence of compliance with the established norms and standards of the degree of purification of urban wastewater and return water of industrial and agricultural economic entities"; - initiation and completion of the construction of urban sewage treatment plants, as well as sewage treatment plants of industrial, agricultural and other objects, the activities of which significantly affect the ecological state of the seas, as well as the introduction of modern methods of treatment (processing) and disposal of waste generated at sewage treatment plants;	The task of achieving strategic goal 1 "Reducing the risk to human health associated with the pollution and clogging of sea waters and the coastal protective strip, preventing the degradation of marine ecosystems and promoting their reproduction by reducing the level of pollution of the seas and minimizing the anthropogenic burden on marine ecosystems. » Marine environmental protection strategies of Ukraine were taken into account in the RBMP through the presence of the following measures: - construction/reconstruction of a sewage treatment plant and sewage treatment plant, which will allow to bring the level of wastewater treatment up to the established standards. - establishment of water protection zones and coastal protection strips within the Danube basin area in order to determine the relevant restrictions on the use of land to the State Land Cadastre and

	- establishing and rendering in nature the borders of water protection zones and coastal protective strips of seas, sea bays and estuaries and ensuring the regularization of the coastal protective strip of seas; - ensuring control over pollution and littering of the sea from ships, preventing the spread of marine invasive alien species with ballast water. Strategic goal 2. Preservation and reproduction of biological diversity, natural landscapes of the coastal protective strip and habitats of biological species. Objective 2 tasks include: - implementation of measures to prevent the emergence of new species of plants and animals dangerous for local flora and fauna.	mark the specified boundaries on the area with informational signs. The establishment of water protection zones will preserve biodiversity, prevent the degradation of natural landscapes by establishing clear restrictions on the use of water fund lands.
Plan of measures for the implementation of the Concept of implementation of state policy in the field of climate change for the period up to 2030	Measure 10. Ensuring the inclusion of climate change adaptation measures in river basin management plans as part of the implementation of integrated approaches to water resources management based on the basin principle	PE RBMP provides for measures to reduce the impact of climate change. The water-heat balance of the river basin is too sensitive to climate changes. An increase in air temperature and a change in the nature of precipitation affect not only the hydrological regime of rivers, but also the general reserves of water resources. Climate change increases the frequency of floods and droughts. Negative manifestations of the change in the hydrological regime of rivers are: siltation of riverbeds, overgrowth of riverbeds (which, in particular, leads to their narrowing), intensification of erosion of the riverbed and banks, loss of hydraulic diversity, disappearance of hydromorphological forms (flows, factories, rapids, etc.), change of natural vegetation the part of the floodplain adjacent to the channel, its overgrowth with shrubs and trees.

		In order to improve the hydrological characteristics of the watercourses of the rivers of the Polish-Lithuanian Commonwealth, measures for revitalization, clearing, and improvement of the ecological condition of the riverbeds are provided.
National Action Plan to Combat Land Degradation and Desertification	Measure 6. Implementation of an integrated water resources management system based on the basin principle through the development and implementation of river basin management plans that include measures or separate drought management plans	The development of this RBMP corresponds to measure 6 of the National Action Plan on Combating Land Degradation and Desertification. In order to effectively combat droughts and desertification, the PE provides: - revitalization, clearing of riverbeds, which will allow to restore free flow and prevent the drying out of certain areas in conditions of a warming trend. - establishment of water protection zones and coastal protective strips of water bodies.
Irrigation and drainage strategy in Ukraine for the period until 2030. Action plan for the implementation of the Irrigation and Drainage Strategy in Ukraine for the period up to 2030	Task 2 of the Plan. Modernization of inter-farm networks, in particular: - replacement of pumping and power equipment at main pumping stations, pumping stations and drainage stations, as well as implementation of measures to install anti-filtration linings on channels; - equipping inter-farm systems with modern means of water accounting and automation of water supply, water distribution and drainage processes, which can be installed at water intake facilities of water treatment units in order to bring its quality indicators to the established requirements.	During the construction of new CHPs and the reconstruction of existing ones, it is planned to replace outdated pumping equipment with new energy-efficient ones.
National waste management plan until 2030	Event #37. Construction of regional landfills for non-hazardous waste. Event 16. Carrying out activities to raise awareness of waste management in schools and preschool educational institutions.	Measure № 98 of the Tysa sub-basin involves the construction of a waste processing plant in Polyanska TC. The capacity of the plant will allow processing of newly generated SWM, which will be collected on the territory of the region, as well

	Event 18. Development and distribution of information materials on waste management and sustainable consumption. Event 19. Popularization in mass media of encouraging proper handling of household waste.	as raw materials from existing old landfills that need rehabilitation. Educational activities are planned to include: - event № 100 of the Tisza sub-basin "Informative, explanatory and educational work in the field of solid household waste (SHW) management in the sub-basin of the Tisza River on the territory of 64 TC of Zakarpattia region"; - event № 167 of the Prut and Siret sub-basins "Educational activities in the Prut and Siret sub-basins in the territory of Chernivtsi and Ivano-Frankivsk regions".
State strategy of regional development for 2021-2027	Tasks in the direction "Development of rural areas" 1. Implementation of support for integrated projects for the development of rural areas, a mandatory component of which is the provision of rural settlements with water supply and drainage. Tasks in the direction of "Development of engineering infrastructure" 4. Ensuring the implementation of a complex of measures for the development, rehabilitation and revitalization of centralized water supply and centralized water drainage systems, ensuring the availability of quality services in this area, in particular by building new systems using the latest technologies, reconstructing existing ones taking into account the needs of territorial communities.	There are a number of measures that provide for the construction of sewage treatment plants and sewerage networks in rural settlements, therefore these measures correspond to the tasks under the "Development of rural areas" direction of the State Regional Development Strategy for 2021-2027.
National economic strategy for the period until 2030	According to strategic goal 3 "Ensuring a safe environment for the population. There are ways to achieve this goal water resources and seas, which involves the following tasks: - transition to integrated management of water resources according to the basin principle; - development and approval of river basin management plans.	The development and approval of the Danube River Basin Management Plan (2025-2030) corresponds to strategic goal 3 of the National Economic Strategy for the period until 2030 and the corresponding tasks set by it.
The strategy of environmental security and adaptation to	Among the objectives of the Strategy are: - achieving a "good" ecological state of waters.	The strategic environmental goal of the RBMP is to achieve/maintain a "good" ecological and

climate change for the period up to 2030 and the operational plan for its implementation in 2022-2024	- inclusion of measures for environmental safety and adaptation to climate change in national, regional strategies, river basin management plans; - raising the awareness of representatives of central and local state authorities and local self-government bodies, which are authorized to make decisions in the field of the natural environment, on issues of mitigation and adaptation to climate change. Tasks aimed at achieving the set goals: - promoting the achievement of a "good" ecological state of the Black and Azov seas, river basin areas; - construction of new, reconstruction and modernization of treatment facilities; - formation of action plans for adaptation to climate change in the areas of water resources management (within the river basin management plan), preservation of biodiversity, forest resources, energy, public health, agriculture and soils, transport and infrastructure, tourism; - increasing the level of public awareness of environmental problems and the consequences of climate change;	chemical state of surface water bodies, a "good" chemical and quantitative state of groundwater bodies, as well as a "good" ecological potential of artificial or significantly altered surface water bodies. Also, the RBMP takes into account the features of climate change and the impact of this factor on the state of water resources in the Danube basin. Also among the measures of the Plan are actions aimed at increasing the level of environmental awareness among the population and representatives of local self-government. Measures aimed at achieving the above goals: - construction/reconstruction of STP, SS. - revitalization, clearing of riverbeds, which will allow to restore free flow and prevent the drying out of certain areas in conditions of a warming trend. - conducting educational events.
State forest management strategy of Ukraine until 2035 and operational plan for its implementation in 2022-2024	Strategic goal: Ensuring environmental sustainability will be ensured, including, by: - protection of land, soil and water, preservation of biodiversity in forests.	RBMP measures are aimed at achieving defined environmental goals, including ensuring balanced integrated management of water resources that does not deplete natural ecosystems and ensures achievement/maintenance of "good" water status. This indicates a movement in the direction of proper protection and management of water resources. For the proper protection of lands and soils, the establishment of water protection zones and coastal protective strips of water objects is foreseen, which will allow introducing certain restrictions on the use of such areas.

		Also within the boundaries of Polyansky and Ploskivsky forests, it is planned to carry out works with assessment, monitoring of changes in the condition of the water intake and carrying out work on the restoration of water intakes (event № 71 to the Tysa sub-basin).
Energy strategy of Ukraine for the period until 2050	The edition of the Strategy is not freely available, so it is impossible to analyze the provisions of the document related to water resources.	----

5.3 EIA procedure

The SPD is implemented through the implementation of specific measures (294 main and 18 additional measures). Among the PE SPD there are measures that, in accordance with the Law of Ukraine "On Environmental Impact Assessment", will be subject to an environmental impact assessment before making a decision on the implementation of the planned activity, in particular, this applies to such measures as:

- construction/reconstruction/modernization of sewage treatment facilities and sewage networks, reconstruction of industrial wastewater treatment facilities. Since treatment facilities are of different capacities, the planned construction in accordance with Article 3 of the Law on Environmental Impact Assessment may fall under both the first (wastewater treatment facilities with a capacity exceeding the equivalent of a population of 150 thousand people) and under the second (wastewater treatment facilities with drainage of 10,000 cubic meters per day or more) category of types of planned activities that may have a significant impact on the environment and are subject to an environmental impact assessment;

- revitalization of rivers, which includes clearing, dredging and regulation, belongs to the second category of types of planned activities (clearing and dredging of riverbeds and bottoms, bank fortification, changes and stabilization of the condition of riverbeds);

- the construction of a waste processing plant in Polyanska TC may fall under the first (non-hazardous waste treatment facilities with a capacity of 100 tons per day or more) and the second (non-hazardous waste treatment facilities with a capacity of less than 100 tons per day day) category of types of planned activities that may have a significant impact on the environment and are subject to environmental impact assessment;

Since the SPD lacks specific information on the locations of the specified existing and planned infrastructure facilities (geographic coordinates, cadastral numbers of land plots, etc.), their placement should be specified by other state planning documents, in particular, urban planning documentation.

For the above-mentioned works, the environmental impact assessment procedure should be started at the stage of the work project or technical and economic feasibility studies. Due to the presence of specific technological solutions in the project documentation, it will be possible to analyze in more detail the possible negative impact on the environment, its scale, as well as to develop measures aimed at prevention, diversion, avoidance, reduction, elimination of a significant negative impact on the environment.

5.4 Compliance with the requirements of the SEA procedure

In Ukraine, the SEA procedure is regulated by the Law of Ukraine "On Strategic Environmental Assessment" (№ 2354-UIII dated March 20, 2018). According to Article 9 of the Law, the stages of strategic environmental assessment are:

1) determination of the scope of the strategic environmental assessment;

2) drawing up a report on strategic environmental assessment;

3) conducting public discussion and consultations in the manner provided for in Articles 12 and 13 of this Law, cross-border consultations in the manner provided for in Article 14 of this Law;

4) consideration of the strategic environmental assessment report, results of public discussion and consultations;

5) informing about the approval of the state planning document;

6) monitoring the consequences of the implementation of the state planning document for the environment, including for the health of the population.

In order to determine the scope of research, environmental assessment methods, and the level of detail of information to be included in the SEA report, the State Water Agency of Ukraine prepared a statement on determining the scope of a strategic environmental assessment (hereinafter referred to as the Statement), which was entered into the Unified Register of Strategic Environmental Assessment for consultations with Ministry of Environment and Ministry of Health of Ukraine (registration number of the case in the SEA register - 26-12-4034-23).

Also, in order to receive and take into account suggestions and comments from the public, the Notice of Publication of the Application and the Application was posted on the official website of the State Water Agency of Ukraine(https://davr.gov.ua/povidomlennya-pro-oprilyudnennya-zayavi-pro-viznachennya-obsyagu-strategichnoi-ekologichnoi-ocinki-proyektu-planu-upravlinnya-richkovim-basejnom-dunayu-20252030)(see Annex 1).

Remarks and proposals received during consultations with the Ministry of Environment and the Ministry of Health, as well as public discussions, were taken into account when compiling this Report or were reasonably rejected.

The SEA report, together with the Notice of publication of the project of the state planning document and the strategic environmental assessment report, will be published on the official website of the State Water Agency of Ukraine and entered into the Unified Register of SEA.

Taking into account the significant amount of information reflected in the RBMP and for more effective interaction with the public, the period of public discussion of the Report will be 30 days.

Comments and suggestions to the draft state planning document and report on strategic environmental assessment, received within the established period, will be considered in a mandatory manner and entered into the Unified register of strategic environmental assessment.

Based on the results of public discussion and consultations with the executive authorities, certificates will be prepared that summarize the comments and suggestions received and indicate how they are taken into account in the state planning document and the strategic environmental assessment report.

In the future, informing about the approval of the RBMP will be carried out in accordance with the requirements of Article 16 of the Law, and monitoring of the consequences of the implementation of the state planning document for the environment, including for public health, in accordance with Article 17.

6 DESCRIPTION OF ENVIRONMENTAL CONSEQUENCES, INCLUDING POPULATION HEALTH, INCLUDING SECONDARY, CUMULATIVE, SYNERGIC, SHORT-, MEDIUM- AND LONG-TERM (1, 3-5 AND 10-15 YEARS, RESPECTIVELY, AND IF NECESSARY - 50- 100 YEARS), PERMANENT AND TEMPORARY, POSITIVE AND NEGATIVE CONSEQUENCES

According to the "Methodical recommendations for the implementation of strategic environmental assessment of state planning documents", approved by the Order of the Ministry of Ecology and Natural Resources of Ukraine № 296 of 10.08.2018, this section describes the consequences of the environment, including for the health of the population - any probable consequences for flora, fauna, biodiversity, soil, climate, air, water, landscape (including man-made), natural areas and objects, the safety of life of the population and its health, material assets, objects of cultural heritage and the interaction of these factors.

By origin, the environmental impact can be primary, that is, directly related to the impact of the project on the ecosystem (atmosphere pollution during construction and operation by fuel combustion products and dust emissions during earthworks and movement of motor vehicles within the construction site) and secondary, which is a consequence of primary changes in the ecosystem.

The primary environmental impact from the implementation of measures proposed by the Program on the basis of the analysis carried out in sections 2 - 4 for the population, the state of the atmospheric environment, water resources, soils, biodiversity and nature conservation areas is assessed as acceptable, however, since for most measures it is necessary to conduct an impact assessment on environment, its clarification will be ensured during the passage of the relevant procedure.

Secondary consequences – direct full or partial change of an element of the environment, which will lead to destruction, change of the environment (for example, pollution of natural habitats will harm species of fauna that depend on this habitat). Accordingly, the secondary impact is considered acceptable based on the acceptability of the primary impact.

Cumulative impacts mean the set of impacts from the implementation of the planned activity and other types of human activity that exist or are planned in the near future, which may lead to significant negative or positive impacts on the environment or socio-economic conditions, and which would not have occurred in the event of the absence of other types of activities, except for the planned activity itself. Cumulative impact at the construction stage should be evaluated in the environmental impact assessment process, since the SPD lacks specific data on the

number of special equipment that will be involved, the terms of the works, the coordinates of the work locations. In order to analyze the cumulative impact in detail, it is necessary to accurately determine the nature of the construction works carried out near/around the object and whether their volume can cause a cumulative impact on atmospheric air, water resources, soils and other components.

Cumulative effects can arise from factors that are insignificant in their individual actions, which, working together over a long period of time, gradually accumulating, summing up later in the same area, can cause significant consequences. Accumulation of impacts occurs when anthropogenic impact or other physical or chemical impacts on the ecosystem over time exceed its ability to assimilate or transform them.

Synergistic effects are the total effect, which consists in the fact that when two or more factors interact, their effect significantly outweighs the effect of each individual component. If the project decisions, which will be provided by separate project documentation, are followed, the possibility of synergistic consequences is minimal.

As temporary consequences, those formed during the construction/reconstruction of STP and SS, revitalization of rivers are considered, as permanent - those that arise after the implementation of the specified works.

Temporary consequences are associated with the involvement of construction equipment and will have a negative impact of a temporary, local nature, which is calculated exclusively for the period of performance of works.

It should be noted that a reliable assessment of the likely consequences of construction works and revitalization of rivers is possible only if:

- project documentation;
- the number of special equipment to be involved and its composition;
- term of works;
- specific geographical coordinates for the analysis of the characteristics of the territory of the planned activity.

All this should be taken into account when carrying out an environmental impact assessment in accordance with the Law "On Environmental Impact Assessment". Since the SPD does not have any technical and economic indicators, the probable consequences are defined in a generalized form.

The greatest impact on the environment during project approval is expected at the stage of construction works on the territory where new sewage treatment facilities and networks are planned, as well as revitalization works, etc. This impact will have a short-term and temporary local character.

The long-term and permanent consequences of the implementation of the Danube River Basin Management Plan include positive changes related to the achievement of environmental goals for the massifs of surface and underground waters of the basin. As a result of the implementation of the PE, a positive impact is also expected related to the health of the population and ensuring the population's access to sanitation conditions.

In general, the implementation of the Danube River Basin Management Plan (2025–2030) will have the following consequences (see Table 6.1).

Table 6.1 Probable consequences for the environment, including for public health, as a result of the implementation of RBMP measures

Components of the environment	Sources of influence	Possible consequences	Nature of influence
At the stage of carrying out preparatory, construction and installation works, works on the reconstruction of STP and SS, as well as revitalization of rivers			
Atmospheric air	ICE of construction machinery	Pollution of surface air space by fuel combustion products (nitrogen oxide, carbon oxide, sulfur dioxide, soot, dust); noise (acoustic) and vibration impact;	*Negative, local, direct, short-term
Climate	ICE of construction machinery	Hazardous waste emissions, which include CO_2, which is a greenhouse gas.	*Acceptable, local, direct, short-term
Aquatic resources	Carrying out construction works on the lands of the water fund, extraction of bottom sediments	- temporary deterioration of transparency and increase of water turbidity downstream; - a change in the hydrological parameters of the watercourse, including a change in the water level, the speed of the current, and the isolation of individual sections of the river; - an increase in the concentration of suspended substances in the water, which reduce the biological activity of the water system as a whole; - sedimentation of scaly suspended particles on the bottom of the river downstream leads to a decrease in the number of benthic communities; - a change in the chemical characteristics of the habitat, when	*Negative, local, direct, short-term

		chemicals buried in the subsoil and released during its development enter and dissolve in water.	
Land resources and soils	Implementation of measures for the construction and reconstruction of sewage treatment facilities and networks.	violation of the upper fertile soil layer	*Negative, local, direct, short-term
Waste	Implementation of measures for the construction and reconstruction of sewage treatment facilities and networks	Increase in the amount of construction waste, solid household waste	* Due to the temporary storage of waste in specially designated places and their subsequent transfer to specialized enterprises for disposal/disposal, the impact is characterized as acceptable.
Biodiversity	Revitalization, cleaning of rivers, implementation of measures for the construction and reconstruction of sewage treatment facilities and networks.	Mechanical removal of shrubs and aquatic vegetation. Carrying out clearing works will lead to the destruction of the benthic coenosis, increase in turbidity, decrease in water transparency, negative impact on zoo- and phytoplankton of the river and higher aquatic vegetation in these areas. In case of non-observance of the ban on carrying out work during the spawning period, significant damage to the ichthyofauna will occur. As a result of the construction of new facilities or the reconstruction of existing ones, the vegetation cover is likely to be disturbed.	*Negative, local, direct, short-term
Health of the population	Implementation of measures for the construction and reconstruction	Noise and vibration load, additional income of PS	* Acceptable, local, indirect, short-term

	of sewage treatment facilities and networks.		
After implementation of planned activities			
Atmospheric air	Stationary sources of pollution	Due to the installation of energy-efficient pumps at reconstructed sewage treatment plants.	Positive
	Stationary sources of pollution	Emergence of new stationary sources of emissions at newly created treatment facilities	*Acceptable
Climate	Stationary sources of pollution	Newly created stationary sources of emissions at sewage treatment plants are probably not capable of causing climate change	*Acceptable
Aquatic resources	Operation of newly built and reconstructed sewage treatment facilities	reduction of pollution by organic, biogenic and dangerous substances of water resources;	Positive
	Removal of barriers in rivers	ensuring the continuity of the water flow	
	Revitalization of small rivers	restoration (improvement) of hydromorphological characteristics of watercourses	
Land resources and soils	Operation of newly built and reconstructed sewage treatment facilities.	reduction of soil pollution by sewage effluents;	Positive
	Establishment of water protection zones and coastal protection strips	preservation and restoration of natural diversity	Positive
	Reducing the amount of landfilled waste	The tendency to decrease the area of unauthorized landfills and landfills that pollute the soil	Positive
Waste	---	The generation of additional waste in the long term is not planned	---
	Work of the waste processing plant in Polyanska TC	The waste processing plant will provide the following processes: - solid waste sorting;	Positive

		- composting (production of biofertilizer); - processing of bulky waste; - processing of automobile tires into tiles; - sale of final processing products; - sale of renewable fuel from waste (SRF, RDF) to cement factories and thermal power plants (TPP).	
Biodiversity	Removal of barriers in the rivers of the Danube basin	improving flow continuity for biota migration;	Positive
Health of the population	Operation of newly built and reconstructed sewage treatment facilities, as well as sewage networks	providing 100% of the population with access to sanitation conditions	Positive

** The impact must be analyzed in detail at the environmental impact assessment stage in accordance with the Law "On Environmental Impact Assessment"*

Accordingly, water resources receive the greatest positive impact from the implementation of RBMP measures, since the PE includes measures aimed at reducing pollution by organic, biogenic and hazardous substances from point and diffuse sources, measures to improve/restore the hydrological regime and morphological indicators in the event of a violation of free flow rivers, hydraulic connection between riverbeds and their floodplains, hydrological changes, modification of river morphology, as well as other additional measures aimed at achieving and/or preserving the "good" state/potential of the SWM. Individual measures belong to several MWEP. The largest share of measures aimed at reducing SWM pollution (68%).

The general structure of the planned activities is shown in the figure below.

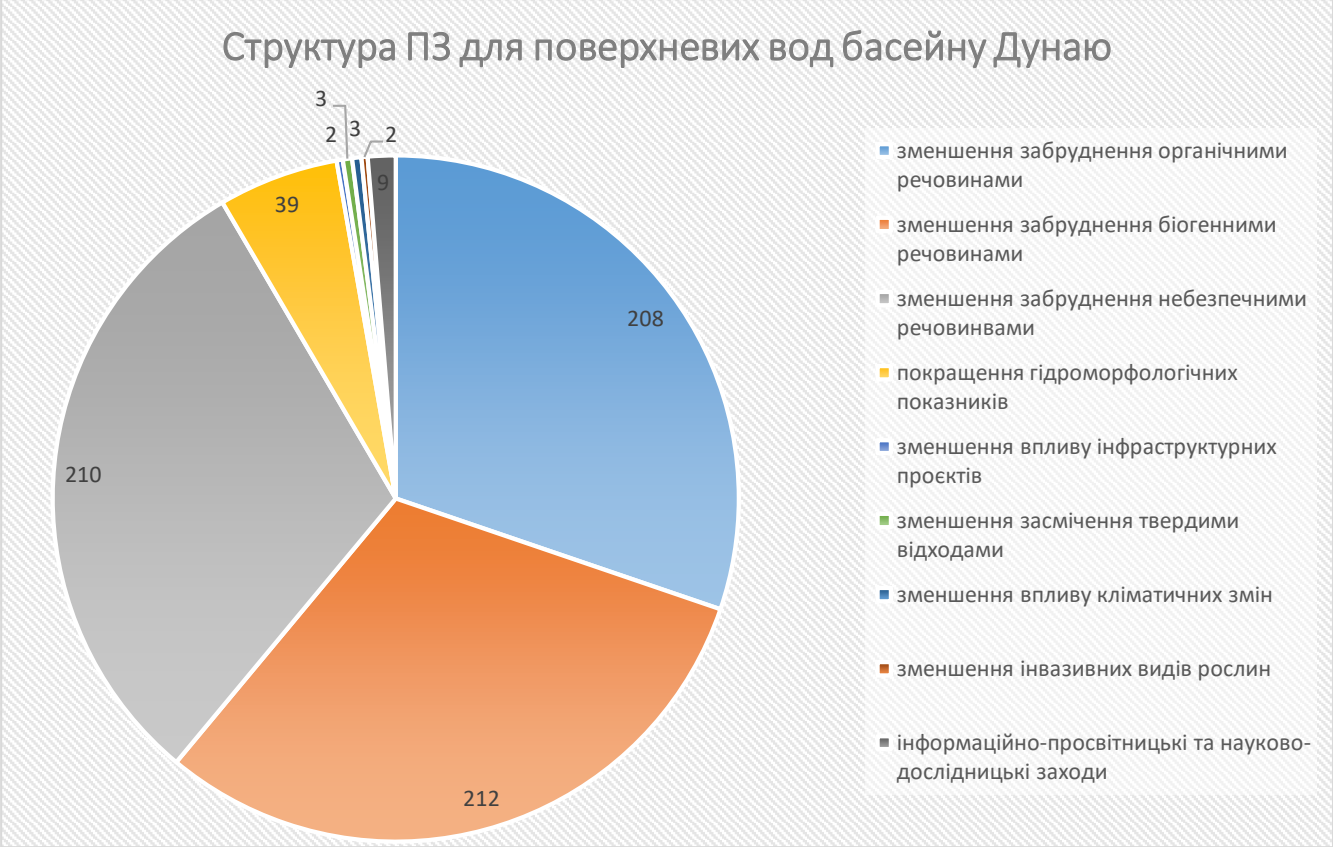


Figure 6.1 Structure of PE for SWM

The implementation of the Danube River Basin Management Plan will also lead to an improvement in the condition of other environmental components, in particular:

- reducing the impact on atmospheric air and climate change due to the replacement of equipment at sewage treatment plants with modern, energy-efficient ones.

- reduction of the impact on land resources and soils due to the reduction of sewage pollution due to the reconstruction of drainage networks, reconstruction and construction of treatment facilities, reduction of the amount of landfilled waste due to the construction of a waste processing plant in Polyanska TC;

- improving the biodiversity of the territory by improving the continuity of flows for the migration of biota, arranging a fish passage, establishing water protection zones and coastal protection strips.

- improving the quality of life and health of the population through access to sanitation (connecting the population to sewage treatment facilities and networks), providing the population with potable water from centralized water supply sources and improving the quality of water in surface water bodies that can be used in for recreational purposes.

Therefore, the implementation of the Danube River Basin Management Plan (2025–2030) will have a positive ecological and sanitary impact on the territory of the basin. An insignificant impact on the environment from the implementation of project solutions is expected only at the stage of construction works.

The scale and nature of the impact from the implementation of measures subject to environmental impact assessment according to the Law "On environmental impact assessment" should be investigated and specified in detail at the stage of the above procedure.

7 MEASURES TO BE TAKEN TO PREVENT, REDUCE AND MITIGATE THE NEGATIVE CONSEQUENCES OF IMPLEMENTATION OF THE STATE PLANNING DOCUMENT

In general, the RBMP does not provide for measures that would have a significant negative long-term impact on the environment. Measures to prevent, reduce and mitigate the negative consequences of implementation of RBMP measures (table 7.1.) are based on the impacts assessed in section 6 of the report and international experience of activities in similar conditions. However, such measures are general recommendations for the elimination of negative consequences, while detailed measures must be considered in each specific case during the implementation of ways to achieve the identified priorities, as well as in the process of granting environmental permits, carrying out an environmental impact assessment of the planned activity.

Also, it is necessary to provide measures to comply with the regimes of coastal protective strips of watercourses in accordance with the requirements of Articles 60, 61 of the Land Code of Ukraine and Articles 88, 89 of the Water Code of Ukraine, as well as compliance with the requirements of Article 86 of the Water Code of Ukraine when carrying out works on the lands of the water fund.

Among the measures of the Program, which are likely to have a temporary negative impact on the environment (at the stage of construction works), the following are highlighted:

- construction/reconstruction of sewage treatment facilities and sewage networks;

- revitalization, clearing, restoration of the hydrological regime and improvement of the ecological condition of riverbeds (channel regulation works);

- construction of a waste processing plant in Polyanska TC and other works involving the involvement of special equipment.

Below are summarized measures to prevent the reduction and mitigation of negative consequences that must be taken at the stage of construction/reconstruction works.

Table 7.1 Measures expected to be taken to prevent, reduce and mitigate the negative consequences of the implementation of the state planning document

A component of the environment	**The reason for the negative impact**	**Measures to be taken to prevent, reduce and mitigate the negative consequences of implementing the Program measure**
Atmospheric air	The operation of internal combustion engines (ICE) of	- the use of special motor oils, additives to them and fuel, modifiers of kinematic

	special equipment during construction and reconstruction works, which causes additional emissions of hazardous substances into the atmosphere	units of cars, the introduction of catalytic converters of fuel, etc. on motor vehicles, which will lead to a decrease in fuel consumption, a decrease in pollutant emissions and an increase in the motor resources of engines; - use of quality fuel; - approval of the plan-schedule of work of construction machines, which excludes the simultaneous operation of all mechanisms; - prohibition of idling machines; - prediction of the necessary measures for the protection of atmospheric air at the stage of development of project documentation; - compliance with current legislation during construction and installation works.
Aquatic resources	Carrying out works on clearing, dredging and regulation of riverbeds, construction/reconstruction/ modernization of treatment facilities within water bodies, which will cause deterioration of transparency and increase of water turbidity, change of hydrological parameters of the watercourse, increase in the concentration of suspended substances in the water, which reduce the biological activity of the water system, etc.	Before starting all works, it is necessary to pass the environmental impact assessment procedure in accordance with the Law "On environmental impact assessment". During the performance of works, it is mandatory to comply with the requirements of Art. 80 of the Water Code of Ukraine. In addition, to minimize the impact on water resources, the following restrictions will be applied: - approval of areas and terms of implementation of measures with fish protection bodies; - carry out work in the interim period; - when carrying out engineering works, ensure the preservation of the water object in terms of water protection against pollution and clogging; - to provide for the rational storage of bottom sediments, which will be formed as a result of the implementation of measures to clean the river;

		- ensure the maximum preservation of the existing relief in accordance with the natural slopes; - prevent violation of the coastline; - clearing works to be carried out exclusively within the limits defined by the project; - to carry out the EIA procedure in accordance with the Law "On Environmental Impact Assessment"; - a ban on works and activities that are sources of increased noise and disturbance during the period of mass reproduction of wild animals from April 1 to June 15; during the spawning period and during the feeding period of young fish; - carrying out calculations of damages caused to aquatic biological resources as a result of clearing the river in the zone of technical turbidity and in the zone of sedimentation of turbidity downstream and provide for their compensation; - prohibition of washing machines and mechanisms in places from which wastewater can enter the main, distribution, discharge network, rivers and reservoirs
Soils	A negative impact is possible during construction works in the event of: - non-compliance with project requirements and decisions; - emergence of emergency situations; - spillage of fuel and lubricants (FL) during the operation of special equipment. As a result of oil products entering the soil, anaerobic conditions arise, the oxidation-reduction potential changes, and	To prevent the occurrence of negative consequences during construction and reconstruction works: - mandatory compliance with the requirements and stages specified in the work execution project and construction organization project; - allow construction machines and mechanisms to work only in good condition, without fuel and oil leaks. In case of accidental spillage of PMM, it is urgent to cover the contaminated areas with sand, followed by its transfer for decontamination

	the carbon-nitrogen balance is disturbed.	
Biodiversity	Carrying out works on clearing, dredging and regulation of riverbeds, construction/reconstruction/ modernization of treatment facilities within water bodies.	In order to reduce the impact on aquatic biological resources during river cleaning, work will not be carried out from April 1 to June 15 (during the period of mass reproduction of wild animals) and during the spawning period and during the feeding period of young fish. In the places of work, it is necessary: - monitor the presence of protected plants and ban the collection of rare plant species; - monitor the presence of protected species of animals and prohibit their removal from the habitat; - control the destruction of natural habitats (biotopes) from Appendix 1 of Resolution No. 4 (1996) to the Convention on the Protection of Wild Flora and Fauna and Natural Habitats in Europe.
Ecological network, recreational areas	Carrying out works on clearing, dredging and regulation of riverbeds, construction/reconstruction/ modernization of treatment facilities within water bodies	In order to reduce the impact on the areas belonging to the lands of the water fund, only serviceable equipment and special equipment will be used to prevent the occurrence of emergency situations. In addition, work will not be carried out during the spawning period. Compliance with the requirements of the Law on Land Protection will be ensured, and work will not be carried out during the period of mass reproduction of wild animals. Limiting the entry of vehicles to the territory of the recreation zone and avoiding clogging of the recreation zone will be ensured.
Waste	During construction and reconstruction, it is possible to generate waste (tires, machine filters, construction debris, etc.).	To minimize the impact of waste generation, it is necessary to: - to ensure control and compliance with the requirements of current legislation

	In case of lack of organized collection and timely removal of garbage, unauthorized waste dumps and natural garbage can occur within the streets and roads of populated areas, recreation areas, on the shores of water bodies.	during work to prevent the threat of construction waste being stored on project sites, dumping it in undesignated places, etc.; - solving the issue of separate collection of waste, namely: containers for collecting solid waste and separate collection of solid waste; - regulation and organization of garbage collection and timely removal.

In addition to the measures listed above, post-project monitoring is an effective tool for preventing negative impact and timely responding to it. The specifics of such monitoring, namely the periodicity and the monitored component, are determined for each project separately in the process of environmental impact assessment.

The indicated negative impacts are temporary and will cease after the completion of the works. Analyzing the RBMP measures, no long-term negative impact from their implementation is predicted. At the same time, the implementation of the measures provided for by the RBMP project will have a positive impact on the environment, in particular the quality of SWM and GWM.

Below are additionally proposed expedient and achievable measures, which are expected to be taken at the stages of the implementation of the plan.

A generalized list of measures that are expected to be taken to prevent, reduce and mitigate negative consequences in achieving the strategic goals and objectives of the RBMP:

1. Organization and implementation of an effective system of permanent monitoring of the actual impact on the environment of the implementation of RBMP measures and projects, including the selection of qualified experts, the formation of feedback and the implementation of procedures for possible adjustments or changes to the projects based on the monitoring data of the components of the state of the environment.

2. Provision of a permanent monitoring system with the necessary technical means (analytical instrument complexes and regional networks of their placement on the territory of the region) and computer equipment and licensed PE, as well as standardized methods of measuring the state of the environment and calculating and summarizing the results of measurements of the components of the state of the environment.

3. Formation of a system of informing the public and organization of effective forms of public discussion regarding the prevention, reduction and mitigation of negative consequences of impact on the components of the environment in the process of implementing measures and projects of the RBMP, including on the basis of monitoring data and with the formation of public proposals and recommendations.

At all stages of the implementation of the RBMP, the planned decisions will be made in accordance with the norms and rules of environmental protection and environmental safety requirements, including in accordance with the requirements of the Laws of Ukraine "On Environmental Protection", "On Atmospheric Air Protection", "On Land Protection" etc.

8 RATIONALE FOR SELECTION OF VALID ALTERNATIVES CONSIDERED, DESCRIPTION OF HOW THE STRATEGIC ENVIRONMENTAL ASSESSMENT WAS CARRIED OUT, INCLUDING ANY COMPLICATIONS (LACK OF INFORMATION AND TECHNICAL RESOURCES DURING PERFORMING SUCH ASSESSMENT)

This section contains the rationale for choosing the justified alternatives that were considered, a description of the way in which the strategic environmental assessment was carried out, including any complications (lack of information and technical means during the implementation of such an assessment).

During the preparation of the strategic environmental assessment report, the expediency and acceptability of the planned activity and the justification of economic, technical, organizational, state-legal and other measures to ensure environmental safety were determined, as well as the impact on the environment, the forecast of the impact on the environment, based on the specifics planned activity taking into account natural, social and man-made conditions.

The program is aimed at coordinating the actions of the Ministry of the Environment, the State Water Agency, the State Geodesy, the State Geotechnical Inspectorate, the Tisza BWRA, the Prut and Siret BWRA, the Black Sea and Lower Danube River BWRA and other executive authorities, local self-government bodies with the aim of improving the ecological state of the water resources of the Danube Basin.

8.1 Justified alternatives

At the stage of drafting the Application on determining the scope of the strategic environmental assessment, two justified alternatives were considered, namely:

- alternative 1: "Zero scenario" - i.e. description, forecasting and assessment of the situation in case of non-approval of the RBMP project.

- alternative 2: approval of the RBMP in the proposed version.

However, during the preparation of this SEA Report, the authors suggest considering the following alternatives:

- alternative 1: "Zero scenario" - i.e. description, forecasting and assessment of the situation in case of non-approval of the RBMP project.

- alternative 2: approval of the RBMP with the possibility of making additions and changes to the approved PE during the period of implementation of the plan.

- alternative 3: approval of the RBMP without the possibility of making additions and changes to the approved PE.

Consequences of adopting alternative 1

The RBMP is the only state planning document that ensures the management of water resources according to the basin principle, failure to approve the RBMP will make it impossible to carry out systematic, coordinated and consistent measures aimed at achieving/maintaining a "good" state of water within the river basin area. As a result, there is a high probability of deterioration of the state of the Danube basin's SWM and GWM. Over time, due to the obsolescence or lack of treatment facilities at all, the ecological status from "good" can reach the level of "bad"/"very bad", and the chemical status of rivers from "good" can reach the level of "not good".

In addition, without an active groundwater monitoring network, it is impossible to monitor the state of groundwater resources, namely the degree of their depletion and compliance with the qualitative composition of DSanPiN 2.2.4-171-10.

Consequences of adopting alternative 2

Alternative 2 envisages the possibility of making additions and changes to the approved PE during the period of implementation of the RBMP. Currently, Ukraine is under martial law, and the financing of environmental protection measures may be delayed, since a significant part of the budget funds is directed to maintaining the country's defense capabilities. Therefore, during the implementation of the Plan (2025-2030), the best option is to envisage mechanisms that would allow changes to be made and the actions of the Plan to be supplemented. This will contribute to a comprehensive, more effective, faster solution of issues related to the improvement of the water resources of the basin. In addition, in the event of the appearance of new problems that are not foreseen at this stage, thanks to the possibility of making additions, it will be possible to develop and implement the necessary measures.

Consequences of adopting alternative 3

The approval of the RBMP without the possibility of making additions and changes to the approved PE is a short-sighted and ineffective step, since in the event of the discovery of new problems that may arise during the period of implementation of the Plan (2025-2030), the implementation of additional measures will be possible only after the adoption of individual programs, strategies, plans , which will lead to significant expenditure of time and budget.

Therefore, according to the results of the analysis, it was determined that in the framework of the hypothetical scenario under alternative 1, there is a high probability of deterioration of the ecological and chemical state of the SWM and the chemical and quantitative state of the GWM, which in turn will affect the health of the residents of the settlements within the basin.

The approval of the RBMP without the possibility of making changes and additions according to the hypothetical alternative 3 is an ineffective option, which will only cause additional costs of time and budget funds for the adoption of new plans.

The most optimal option, based on the results of the analysis of the goals and measures of the RBMP, is the adoption of alternative 2, i.e. the approval of the RBMP with the possibility of making additions and changes to the approved PE during the period of implementation of the plan. This approach will allow to approve additional measures in case of new environmental problems.

8.2 Methods used in the preparation of the Report

The following main methods were used during the preparation of the SEA for the RBMP:

- use of data available in RBMP, regional reports on the state of the environment, environmental passports of regions, data of the State Statistics Office, data of the State Water Agency, information included in other legislative acts and programs related to the project of the state planning document, monitoring data state of the environment, expert assessments; other available information;

- use of such analytical methods as comparative analysis, trend analysis, SWOT analysis;

- methods of public participation: informing, consulting, commenting, discussion.

The strategic environmental assessment of the RBMP was carried out in a way that provided for the following algorithm of actions:

1) identification of key environmental problems of the Danube basin;

2) assessment of the state of the environment and identification of trends characteristic of individual components of the environment and the state of health of the population within the basin;

3) analysis of compliance of RBMP goals with strategic goals of state environmental policy;

4) development of measures to mitigate probable negative impacts of the implementation of the RBMP;

5) formulation of proposals for monitoring; preparation of a report on the SEA of RBMP.

8.3 Difficulties that arose during the development of the SEA report

During the preparation of the SEA Report, the following difficulties were identified:

- lack of data on the quantitative and qualitative state of the Ministry of Health due to the cessation of monitoring since 2018;

- lack of recommendations on the choice of analysis methods according to the stage of SPD;

- lack of methods that allow for long-term forecasts of the impact of planned activities on the environment.

9 MEASURES PROVIDED FOR MONITORING THE CONSEQUENCES OF THE EXECUTION OF THE STATE PLANNING DOCUMENT FOR THE ENVIRONMENT, INCLUDING THE HEALTH OF THE POPULATION

Monitoring is carried out in order to identify the consequences of the implementation of the state planning document for the environment, including for the health of the population, to ensure the implementation of measures to prevent, reduce and mitigate the negative consequences of the implementation of the state planning document, as well as in the case of detection of negative consequences that were not foreseen a report on a strategic environmental assessment, taking measures to eliminate them.

The monitoring program consists of a list of actions and measures, each of which has a specific purpose, key indicators and criteria for evaluation. The procedure for monitoring was approved by Resolution № 1272 of the Cabinet of Ministers of Ukraine dated December 16, 2020 "On approval of the Procedure for monitoring the consequences of the implementation of the state planning document for the environment, including for the health of the population" (hereinafter - the Resolution).

To carry out monitoring, the customer of the state planning document develops measures taking into account the results of public discussion, consultations with executive authorities in the process of carrying out a strategic environmental assessment and cross-border consultations (if they are carried out). Implementation of such measures provides the opportunity to:

- identification of the consequences of the implementation of the state planning document for the environment, including for the health of the population, namely secondary, cumulative, synergistic, short-term (for one year), permanent and temporary, positive and negative consequences;

- prevention, reduction and compensation of negative consequences caused by the implementation of the state planning document;

- identification of negative consequences of the implementation of the state planning document for the environment, including for the health of the population, not provided for in the report on the strategic environmental assessment.

In order to ensure the systematicity and objectivity of observations of changes in the state of the environment, including the state of health of the population, it is necessary to determine:

- the content of the measures provided for monitoring and the terms of their implementation;

- quantitative and qualitative indicators, their units of measurement and target values of such indicators in accordance with each of those defined in the report on the strategic environmental assessment of the consequences of the implementation of the state planning document for the environment, including for the health of the population;

- quantitative and qualitative indicators, their measurement units and target values of such indicators to prevent, reduce and mitigate the negative consequences of the implementation of the state planning document for the environment, including for public health;

- methods of determining each of the indicators, which make it possible to measure them quickly and without excessive costs;

- periodicity of measuring indicators, conducting their analysis and comparison with target values;

- means and methods of detecting the presence or absence of consequences for the environment, including for the health of the population, taking into account the possibility of detecting negative consequences of the implementation of the state planning document, not provided for in the strategic environmental assessment report.

It is planned to monitor the consequences of the implementation of the RBMP once a year. Since the RBMP is a state planning document with a limited validity period, it is proposed to monitor its implementation, limited to the period starting from the next year after the adoption of the Plan, until the end of its validity period - 2030.

Since the RBMP measures are designed to achieve/maintain a "good" ecological and chemical state of surface water bodies, a "good" chemical and quantitative state of groundwater bodies, as well as a "good" ecological potential of artificial or significantly changed surface water bodies, tracking the effectiveness of the implemented measures directly related to studies of changes in the quality of SWM and GWM.

Monitoring of surface waters.

Monitoring of surface water is carried out in accordance with the Procedure for State Water Monitoring, approved by Resolution № 758 of the CMU dated September 19, 2018. The subjects of state water monitoring are the Ministry of Environment, the State Water Agency and the State Emergency Service.

Every year, starting from 2020, the monitoring programs of surface water bodies are approved by the relevant orders of the Ministry of Environment (from

12.31.2020 № 410, from 01.05.2022 No. 1 and from 01.17.2023 No. 27) and are brought to implementation by the State Water Agency.

In the Danube basin in 2022, monitoring was carried out at 101 monitoring points at 83 SWMs, of which:

- on cross-border SWMs, determined in accordance with interstate agreements on cooperation - 18;

- on SWM, from which water is taken to meet the drinking and household needs of the population - 11.

The list of points of monitoring of surface waters of the Danube basin is indicated in Annex 6 to the RBMP.

The effectiveness of the proposed measures is reflected in the change of such characteristics as the hydromorphological, chemical, ecological condition and ecological potential of the SWM and the quantitative and chemical state of the GWM. In this regard, the monitoring of the effectiveness of the implemented RBMP measures will be based on the indicators listed in Table 9.1.

Table 9.1 Indicators reflecting the consequences of the implementation of the RBMP for surface waters

Environmental component	Characteristic	Method of determination	Units of measurement	Periodicity
SWM	Hydromorphological state	It is carried out in accordance with the Methodology approved by the order of the UkrTsGM No. 23 dated February 19, 2019 for five classes.	class "excellent", "good", "satisfactory", "bad", "very bad"	The frequency of sampling must meet the requirements specified in Appendix 1 to the Procedure for State Water Monitoring, approved by Resolution № 758 of the Cabinet of Ministers of Ukraine dated September 19, 2018
	Chemical state	It is based on the determination of concentrations of priority substances specified in Directive 2008/105/EC, taking into account Directive 2013/39/EU250, which sets the limit values of environmental quality standards. In Ukraine, currently, to assess the state of the SWM, the order of the Ministry of Natural Resources dated February 6, 2017 No. 45, registered with the Ministry of Justice of Ukraine on February 20, 2017 under No. 235/30103, defines a list of indicators for which environmental quality standards are established in Appendix 8 of the order of the Ministry of Natural Resources dated 14.01.2019 No. 5 "On the approval of the Methodology for assigning a body of surface water to one of the classes of ecological and chemical state of the body of surface water, as well as assigning an artificial or significantly altered body of surface water to one of the classes of ecological potential of an artificial or significantly altered body of surface water." Statistically processed data of measurements of the content of pollutants in surface waters conducted at 109 monitoring	class "good", "lack of good"	

		points were used to assess the chemical state of the SWM, namely: average and maximum values.		
	Environmental condition	Determination of the ecological state of the massif of surface waters is carried out by biological, hydro-morphological, chemical and physico-chemical indicators that generally characterize the state. Attribution of SWM to a certain ecological state is carried out in accordance with the order of the Ministry of Natural Resources dated 14.01.2019 No. 5 "On the approval of the Methodology for assigning a body of surface water to one of the classes of ecological and chemical status of the body of surface water, as well as assigning an artificial or significantly changed body of surface water to one of classes of ecological potential of an artificial or significantly modified body of surface water".	state "excellent", "good", "satisfactory", "bad", "very bad"	
	Ecological potential	The determination of the ecological potential for an artificial or significantly altered body of surface water is carried out according to the biological and physicochemical indicators given in Appendix 7 to the "Methodology for assigning a body of surface water to one of the classes of ecological and chemical states of the body of surface water, as well as the assignment of artificial or significantly altered massif of surface waters to one of the classes of ecological potential of artificial or significantly changed massif of surface waters".	class good", "satisfactory", "bad", "very bad"	

Groundwater monitoring.The quantitative and chemical state of groundwater is monitored within the framework of the state groundwater monitoring system, and changes in state are predicted both under natural conditions and under the influence of human activity. Quantitative and chemical monitoring is carried out in the same observation wells. Monitoring is carried out both in pressure-free and pressure-bearing aquifers under the following conditions: natural, slightly disturbed and disturbed. Disturbed conditions are investigated within operational water intakes.

State monitoring of groundwater includes diagnostic and operational monitoring, the indicators and periodicity of which are determined in accordance with the WRD and are listed in Appendix 2 of the Procedure for State Water Monitoring. The components of the state monitoring of groundwater bodies are the monitoring of quantitative, chemical and physico-chemical indicators. The procedure for conducting state water monitoring does not determine the monitoring network (in particular, the number of monitoring points), but establishes the periodicity and studied indicators. The components of the state monitoring of groundwater are the monitoring of quantitative, chemical and physico-chemical indicators.

Table 9.2 Indicators reflecting the consequences of implementing the RBMP for groundwater

Subject of monitoring	**Characteristic**	**Periodicity**
Diagnostic monitoring**		
State Geological Survey	levels	one three times a month
	Temperature, redox potential, permanganate oxidizability, mineralization	at least twice a year
	macro components: - calcium, magnesium, sodium, potassium, bicarbonate ions, common ferrum, fluorine	four times a year
	micro components	once a year
	pollutants according to the list approved by the Ministry of Natural Resources	four times a year
	specific synthetic pollutants (pesticides, pharmaceuticals and other substances)	once every two six years
	specific non-synthetic pollutants (uranium, radium, radon and other substances)	
Operational monitoring***		
	Hydrogeological regime:	one five times a month

State Geological Survey	groundwater levels	
	general hardness, carbonate, non-carbonate mineralization	quarterly, at least twice a year
	phenols petroleum products synthetic surfactants	once every two years
	macro components: hydrocarbonate ions, calcium, potassium, magnesium sodium, silicon, common ferrum, fluorine	quarterly, at least twice a year
	micro components: aluminum, argentum, beryllium, cobalt, copper, manganese, molybdenum, nickel, selenium, strontium, chromium, zinc	once a year
	pollutants according to the list of pollutants for determining the chemical state of surface and underground water bodies and the ecological potential of artificial or significantly modified surface water bodies, approved by the Ministry of Natural Resources	quarterly, at least twice a year
	specific synthetic pollutants (pesticides, pharmaceuticals and other substances);	once every six years
	specific non-synthetic pollutants (uranium, radium, radon and other substances)	

*** The data is clarified and supplemented taking into account the specifics of the array.*

**** The data are clarified and supplemented taking into account the specifics of the array and based on the results of diagnostic monitoring*

The periodicity of observations and the list of controlled indicators for groundwater are defined in Appendix 2 of the Procedure for State Water Monitoring.

In order to assess the completeness and quality of the implementation of program measures, the implementation of the RBMP will be monitored, which will make it possible to quickly make the necessary management decisions. The general list of indicators - indicators of the degree of implementation of RBMP measures and their effectiveness is presented in table 9.3.

Table 9.3 Indicator indicators of the degree of implementation of the RBMP

Indicator indicators of the degree of implementation of the RBMP

No	The essence of the RBMP event	Indicator	Unit
1	Construction/reconstruction/modernization of water treatment facilities and water drainage networks, sewerage networks	The number of objects that were built, reconstructed and modernized	units
2	Construction/reconstruction/modernization of water treatment facilities and water drainage networks, sewerage networks	Volume of treated wastewater	thousand m3/day
3	Revitalization of rivers	The length of the restoration areas, the total length of the deepening,	km
4	Inventory, recovery of observation wells and groundwater monitoring in the Danube basin	Number of wells	The number of wells in working condition
5	Measures for the localization and removal of invasive plants (Ambrosia Polynolista and Sosnovsky Borschivnik) in the coastal protective strips of the sub-basin of the Tisza River Zakarpattia Oblast	Length of cleared areas	km
6	Conducting research to determine the impact of invasive species on the state of surface water bodies in the Danube river basin area	The number of carried out real-time expedition research	number of studies
7	Conducting informational and educational and scientific and research activities	The number of conducted campaigns (thematic lectures, educational hours in educational institutions, seminars, etc.)	the number of conducted events
8	Rehabilitation of the territory of the former oil storage and prevention of pollution by products of oil refining in the border strip of Reniiska TC	The area of rehabilitated (reclaimed) land	Ha
9	Establishment of water protection zones and coastal protection strips within the Danube river basin area	The length of established water protection zones	km
10	Modernization of the hydrological infrastructure management system and hydrological monitoring of water management systems	The number of installed remote control and management of water facilities	units

The State Water Agency, within five working days from the date of approval of the state planning document, will place on its official website (https://davr.gov.ua/) and enter the approved state planning document into the Unified Register of Strategic Environmental Assessment (except for information that, according to to the law constitutes a state secret or belongs to information with limited access), the decision on its approval, measures provided for monitoring the consequences of the implementation of the state planning document, and will notify the Ministry of the Environment about this in writing.

Monitoring results will be published on the official website (https://davr.gov.ua/) and the Unified Register of Strategic Environmental Assessment once a year during the term of the state planning document and one year after the end of such term. In reports on the implementation of RBMP measures, the following will be recorded and analyzed:

a) execution of each task of the project;

b) unfulfilled tasks, reasons for rejection, suggestions;

c) financing needs;

d) proposals for improving the current decision-making system.

10 DESCRIPTION OF LIKELY TRANSBOUNDARY CONSEQUENCES FOR THE ENVIRONMENT, INCLUDING PUBLIC HEALTH (IF PRESENT)

The transboundary Danube basin is located on the territory of 19 countries: Austria, Bulgaria, Czech Republic, Germany, Hungary, Slovakia, Slovenia, Romania, Croatia, Bosnia and Herzegovina, Moldova, Montenegro, Serbia, Ukraine, Italy, Poland, Albania, Macedonia, Switzerland.

Romania, Hungary, Slovakia, and the Republic of Moldova are neighbors to the territory of Ukraine with border/cross-border waters of the Danube.

In accordance with Article 9 of the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the Government of Ukraine concluded bilateral agreements on the protection of border/transboundary waters, the responsibility for the implementation of which is assigned to the State Water Agency:

- Agreement between the Government of Ukraine and the Government of the Republic of Hungary on issues of water management in border waters dated November 11, 1997;

- Agreement between the Government of Ukraine and the Government of the Slovak Republic on issues of water management in border waters dated June 14, 1994;

- Agreement between the Government of Ukraine and the Government of Romania on cooperation in the field of water management in border waters dated September 30, 1997;

- Agreement between the Government of Ukraine and the Government of the Republic of Moldova on joint use and protection of border waters dated November 23, 1994;

Based on the information of subsection 8.1.4 of the RBMP, the program of measures includes measures aimed at reducing the pollution of cross-border SWMs of the Danube basin by means of reconstruction/construction of SPCs and CM of agglomerations:

- Rakhiv, Velikiy Bychkiv, Solotvino, Teresva, Tyachiv, Vynohradiv, Piyterfolvo, Vylok, Chop, Mukachevo, Uzhhorod, Storozhnytsia (sub-basin of the Tysa River);

- Chernivtsi, Novoselitsa, Marshintsi, Mamalyga, Vanchikivtsi, Tarasivtsi, Podvirne, Zelena, Podvir'ivka, Lukachivka, Vashkivtsi (subbasin of the Prut River);

- Storozhynets, Ropcha, Cherepkivtsi, Petrichanka, Turyatka (subbasin of the Siret River).

The PE also provides for separate measures to improve/restore the hydrological regime and morphological indicators (mitigation of channel regulation works on the Tisza River, the Ukrainian-Romanian border).

The specified measures are planned to be implemented in 2025-2030 on the transboundary SWM of the sub-basins, which will have a potential impact on the neighboring countries of the Danube basin, in particular,

Romania:

- UA_M5.3.1_0007, UA_M5.3.1_0008 (Tysa River), UA_M5.3.2_0007 (Prut River), UA_M5.3.3_0005, UA_M5.3.3_0006 (Syret River);

Hungary:

- UA_M5.3.1_00011, UA_M5.3.1_0012, UA_M5.3.1_0014 (Tysa River), UA_M5.3.1_0204 (SAFWM, Stariy Batar River);

Slovakia:

- UA_M5.3.1_0300 (Latoritsa River), UA_M5.3.1_0433 (Uzh River);

Republic of Moldova:

- UA_M5.3.2_0231 (SAFWM, Patsapule River), UA_M5.3.2_0233, (Zelena River), UA_M5.3.2_0235, (Medvedka River), UA_M5.3.2_0239 (Viliya River), UA_M5.3.2_0242 (SAFWM, Lopatinka River).

The figure below shows the number of activities at cross-border SWMs by the countries of the Danube basin.

Figure 10.1 Number of activities on cross-border SWM with neighboring countries of the Danube basin

The main impact during the reconstruction/construction of STP and SS and measures to improve/restore the hydrological regime and morphological indicators will be on:

- influence on the atmospheric air due to additional inflows of air pollution into the air pool. Probably, the concentration of PS will not exceed the background values in the territories of neighboring states, as it will disperse with distance.

- aquatic resources. When carrying out work in riverbeds with the extraction of bottom sediments, a temporary deterioration of transparency and an increase in the level of turbidity of water downstream is possible; a change in the hydrological parameters of the watercourse, including a change in the water level, the speed of the current, and the isolation of individual sections of the river; an increase in the concentration of suspended substances in the water, which reduce the biological activity of the water system as a whole; sedimentation of scaly suspended particles on the bottom of the river downstream leads to a decrease in the number of the benthic community; a change in the chemical characteristics of the habitat, when chemicals buried in the subsoil and released during its development enter and dissolve in water.

Many years of research experience and field observations of the effect of dredging on the aquatic environment have shown that its pressure on the aquatic environment is insignificant, and in the control area (at a distance of 250 m from the work point), the concentrations of pollutants do not exceed the maximum permissible.

Development, transportation and storage will lead to seepage and partial erosion of the soil, which will cause about 5% of the soil during development, 7% of the soil during storage and 0.01% of the soil during transportation to enter the aquatic environment.

The analysis of the results obtained from previously conducted monitoring studies showed that the values of changes in the concentration of suspended substances in the areas of rock crushing are close, and at a distance of 250 meters during the period of work, the concentration of suspended substances corresponds to the background. According to the observations, man-made action is directly localized in the areas of work.

Therefore, according to the results of the PE review, there is no possibility of negative cross-border consequences as a result of the approval and implementation of the Danube Regional Development Plan (2025-2030). The RBMP does not contain measures that may have a negative impact on the environment of other countries that are part of the hydrographic area of the basin. On the contrary, the

measures that will be implemented on the Ukrainian part of the watercourse will ensure the reduction of pollution by organic, biogenic and hazardous substances after the construction of the STP and the improvement of hydrological characteristics after the implementation of riverbed cleaning measures.

At the SEA stage, it is quite difficult to reliably assess the scale of the likely cross-border impact. After all, the PE does not contain information about the phasing of the work, the deadline for the work and the equipment that will be involved. Revitalization is a type of planned activity that can have a significant impact on the environment and is subject to an impact assessment. According to clause 10, part 3 of Art. 3 ("conducting works on clearing and dredging of riverbeds and bottoms, shore fortification, changes and stabilization of the condition of riverbeds") of the Law "On environmental impact assessment" planned works must undergo an environmental impact assessment. During the preparation of the report with EIA, developers must take into account project decisions and, accordingly, analyze the scale of cross-border influence.

11 SUMMARY OF A NON-TECHNICAL NATURE

The summary summarizes the main information in paragraphs 1-10 of the "SEA Content" section for a general audience.

The report on the strategic environmental assessment of the project of the Danube River Basin Management Plan (2025-2030) contains an analysis of the impact of the implementation of the PE on various components of the natural environment and public health.

The ecological problems of the Danube basin were analyzed in chapter 4 of this Report.

RBMP measures are focused on achieving/maintaining a "good" ecological and chemical state of surface water bodies, a "good" chemical and quantitative state of groundwater bodies, as well as a "good" ecological potential of artificial or significantly altered surface water bodies.

"Good" ecological status/potential will be achieved by 438 SWM by 2030, of which 394 SWM are those that are currently "without risk" (they need to maintain this status), 31 SWM are 5% of SWM from those which, according to the results of anthropogenic load assessment, are "at risk" or "possibly at risk" of not achieving environmental goals, and will achieve environmental goals due to the implementation of PE measures.

Other SWM in the basin that are "at risk" or "possibly at risk" (447 SWM) may achieve "good" ecological status/potential by 2036 or 2042, subject to the implementation of PE measures.

By 2030, 823 SWM will reach a "good" chemical state, of which 752 SWM are those that are currently "without risk" (they need to maintain this state), and 62 SWM, which, according to the results of the anthropogenic load assessment, are " at risk" or "possibly at risk", will achieve environmental goals no earlier than 2036 or 2042, subject to the implementation of PE measures.

In the sub-basin of the Tisza River, 7 GWM were allocated, in the sub-basin of the Siret River - 4 GWM, in the sub-basin of the Prut River - 4 GWM, in the sub-basin of the lower Danube - 1 GWM. Among the identified at the current stage of work, the "good" quantitative and chemical state of the GWM and their groups, all 7 groups of GWM of the Tisza sub-basin (3 non-pressure, 2 pressure and 2 pressure-non-pressure) are forecasted to reach only in the 2nd cycle of the RBMP, no earlier than 2042. and only under the conditions of implementation of the proposed measures for both surface and underground waters. It is predicted that 100% of the GWM of the Prut and Siret sub-basins will maintain a "good" quantitative and

qualitative condition until 2030. And in the Lower Danube sub-basin, the 1 and only GWM will reach "good" quantitative status by 2030, and it will reach "good" chemical status in 2042.

The RBMP provides for the implementation of 294 main and 18 additional measures with the possibility of making additions and changes to the approved PE, which is especially important, taking into account the state of war on the territory of Ukraine and the lack of reliable information about the state of the Ministry of Defense. The main part of the measures is aimed at the construction/reconstruction/modernization of treatment facilities, sewage networks, revitalization, clearing, restoration and improvement of the ecological condition of riverbeds.

In order to minimize possible negative consequences that may arise from the implementation of the PE, measures to mitigate such impacts are proposed, which are highlighted in section 7 of the Report.

During the development of the SEA, it was determined that the goals of the RBMP correspond to the strategic goals of the environmental policy of Ukraine, which are defined by the Law of Ukraine "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period Until 2030". In addition, Chapter 5 of this Report analyzes the ways of taking into account the obligations operating at the international, national and regional levels and determines how exactly they are taken in the RBMP.

In view of all the above, it can be stated that, in general, the development of the RBMP was carried out taking into account the likely effects on the environment and the state of health of the population and the desire to eliminate negative consequences. Implementation of the Plan will contribute to improving the state of water resources and, accordingly, the health of the population within the Danube basin.

REFERENCES

1. LU "On strategic environmental assessment" dated March 20, 2018;
2. LU "On environmental impact assessment" dated 05/23/2017;
3. LU "On state targeted programs" dated March 18, 2004;
4. LU "On the Basic principles (strategy) of the state environmental policy of Ukraine for the period until 2030" dated February 28, 2019;
5. LU "On waste management" dated June 20, 2022;
6. LU "On environmental protection" dated June 25, 1991;
7. Order of the Ministry of Ecology and Natural Resources of Ukraine dated July 18, 2019 № 260 "On Amendments to the Methodological Recommendations for Strategic Environmental Assessment of State Planning Documents";
8. Order of the Ministry of Ecology and Natural Resources of Ukraine dated August 10, 2018 № 296 "On Approval of Methodological Recommendations for Strategic Environmental Assessment of State Planning Documents";
9. Order of the Ministry of Ecology and Natural Resources of Ukraine dated December 29, 2018 № 465 "Amendments to the Methodological Recommendations for Strategic Environmental Assessment of State Planning Documents";
10. Regional report on the state of the natural environment in Odesa region for 2022. - 2023.
11. Regional report on the state of the natural environment in Zakarpattia Oblast for 2022. - 2023.
12. Regional report on the state of the natural environment in the Chernivtsi region for 2022. - 2023.
13. Regional report on the state of the natural environment in Ivano-Frankivsk region for 2022. - 2023.
14. Ministry of Environmental Protection and Natural Resources of Ukraine. Overview of the state of implementation of EU Directives and Regulations in the field of water resources protection and use / Ministry of Environment Protection and Natural Resources of Ukraine.
15. Flood risk management plan for individual territories within the Danube basin area for 2023–2030;
16. EU directives in the field of water resources management: a guide. – Rivne: "Volyn Shores", 2019. – 224 p.
17. Main Department of Statistics in Chernivtsi Region [Electronic resource] - Access mode: http://www.cv.ukrstat.gov.ua/.

18.Main Department of Statistics in Ivano-Frankivsk Region [Electronic resource] - Access mode: https://ifstat.gov.ua/.

19.Main Department of Statistics in Zakarpattia Oblast [Electronic resource] - Access mode: https://uz.ukrstat.gov.ua/.

20. Main Department of Statistics in Odesa Region [Electronic resource] - Access mode: http://od.ukrstat.gov.ua/.

21.The concept of implementation of the state policy in the field of climate change for the period until 2030, approved by the order of the Cabinet of Ministers of Ukraine of December 7, 2016 No. 932-r;

22. Catalog of rivers of Ukraine / Compiled by G. I. Shvets, N. I. Drozd, S. P. Levchenko. Responsible editor V. I. Moklyak. — K.: Publishing House of the Academy of Sciences of the Ukrainian SSR, Institute of Hydrology and Hydrotechnics, 1957. — 191 p.;

23. Geoportal "Maps of Ukraine" [Electronic resource] - Mode of access to the resource:https://geomap.land.kiev.ua/

24. Emerald Network - General Viewer [Electronic resource] – Resource access mode:https://emerald.eea.europa.eu/.

25. Directive 2000/60/EC on establishing the framework of Community activities in the field of water policy as amended by Decision No. 2455/2001/EC and Directive 2009/31/EC (paragraphs 1719, 1772, 1779).

26. Council Directive 91/676/EEC on the protection of waters against pollution caused by nitrates from agricultural sources, as amended by Regulation (EC) No. 1882/2003 (paragraphs 1720, 1721, 1746).

27. Council Directive 91/271/EEC on urban wastewater treatment as amended by Directive No. 98/15/EC and Regulation (EC) No. 1882/2003 and Regulation (EC) No. 1137/2008 (paragraphs 1722, 1774 , 1776).

28. Directive 2007/60/EC on the assessment and management of flooding risks (paragraphs 1743, 1777).

29. Directive 2008/56/EU on establishing the framework for Community activities in the field of environmental policy in relation to the marine environment (paragraphs 1744, 1745, 1773, 1775).

30. Directive 2001/42/EC on the assessment of the impact of individual plans and programs on the environment.

31. National action plan for environmental protection for the period until 2025

32. Water strategy of Ukraine for the period until 2050

33. Marine environmental protection strategy of Ukraine.

34. Plan of measures for implementation of the Concept of implementation of state policy in the field of climate change for the period up to 2030.

35. National action plan to combat land degradation and desertification.

36. Irrigation and drainage strategy in Ukraine for the period until 2030.

37. Action plan for the implementation of the Irrigation and Drainage Strategy in Ukraine for the period until 2030.

38. National waste management plan until 2030.

39. State strategy of regional development for 2021-2027.

40. National economic strategy for the period up to 2030.

41. Strategy of environmental security and adaptation to climate change for the period up to 2030 and operational plan for its implementation in 2022-2024.

42. State forest management strategy of Ukraine until 2035 and operational plan for its implementation in 2022-2024.

43. Energy strategy of Ukraine for the period until 2050.

44. Nationwide targeted social program "Drinking water of Ukraine" for 2022 - 2026;

45. Geoportal "Water Resources of Ukraine" (http://geoportal.davr.gov.ua:81/) ;

46. ANALYSIS OF THE IMPACT OF CLIMATE CHANGES ON WATER RESOURCES OF UKRAINE (research summary). / Snizhko S., Shevchenko O., Didovets Yu. // Ed. S.S. Sadogurska Ecodia Center for Environmental Initiatives, 2021, 32 p.

47. Ustymenko P.M. Phytocoenotaxonomic diversity of Ukraine: phytosozology, methodology, analysis and applied aspects / Author's abstract ...doctor of biol. sciences, special 03.00.05 botany. - K, 2005. - 37 p.

48. Onyshchenko V. A. Forests of the order Fagetalia sylvaticae in Ukraine. / Ed. S.L. Mosyakin - K.: Altpress, 2009. - 212 p. (31 associations in total);

49. Bilous Z.P., Vainagii I.V., Golubets M.A. etc. Biological productivity of spruce forests of the Carpathians. - K.: Nauk. dumka, 1975. - 237 p.

50. Chubaty O.V. Protective role of Carpathian forests. – Uzhgorod: Karpaty, 1968. – 136 p.;

51. Andrienko T.L., Popovych S.Yu., Shelyag-Sosonko Yu.R. Hanging swamps of the Ukrainian Carpathians // Ukr. nerd journal – 1982. – 67, No. 7. – P. 936 – 945;

52. Molotkov P.I. Beech forests and farming in them. - M.: Lesnaya pro myshlennost, 1966. - 226 p.

53. Old forests in the center of Europe. Guide to the forests of the Carpathian Biosphere Reserve // Ed. U. Brandley, Ya. Dovganicha. – Swiss Federal Institute for Forest, Snow and Landscape Research, Biermensdorf, Switzerland; Rakhiv, KBZ, Ukraine, 2003. – 192 p.

54. Kish R., Prots B., Polyanovskyi A. and others. Regional landscape park "Prytisyanskyi" - preservation of the natural heritage of lowland Transcarpathia. – Uzhgorod: Art Line, 2009. – 20 p.

55. Simon T. Montan eleme az Eszaki-Alföld flórajában és gövénytakarójában. III. // Ann. Biol. Univ. Hung. - 1954 [1952], 2. - P. 249-286.

56. Stoyko S.M., Milkina L.I., Zhizhyn M.P. Nature protection of the Ukrainian Carpathians and adjacent territories. - K.: Nauk. dumka, 1980. - 264 p.

57. Stoyko S.M., Milkina L.I., Yashchenko P.T. etc. Rare phytocenoses of the western regions of Ukraine (Regional "Green Book"). – Lviv: POLLY, 1997. – 190 p.

58. Andrienko T.L., Popovych S.M. Swamps of Transcarpathia.// Natural resources of Transcarpathia. – Uzhhorod: Karpaty, 1987. – P. 161-166.

59. Kats N.Ya. Swamps and peatlands. - M.: Uchpedgiz, 1941. - 400 p.

60. Bradis E.M., Andrienko T.L., Lykhobabina E.P. Oligotrophic swamps of Transcarpathian region // Ukr. nerd Journal, 1969. – 26, No. 1. - pp. 29-34.

61. Laslo G. A tozeglakop es elofordulasuk Magyarorszagon. – Budapest: Fritz Armin konyvnyomdaja, 1915. – 158 old.

62. Komendar V.Y., Fodor S.S. Water ferns in Transcarpathia // Karpatsky reserves. - Uzhhorod, 1966. - P. 119-122.

63. Commander V.I. Aquatic and coastal vegetation in reservoirs of the Uzhhorod and Berehiv districts // About the protection of the nature of the Carpathians / Zakarpattia. region from the Ukr. tva of nature protection. – Uzhhorod: Karpaty, 1973. – P. 31-40.

64. Dubina D.V. Higher aquatic vegetation of Ukraine. - K.: Fitosociotsentr, 2006. - 214 p.

65. Bujak V.V. ASSESSMENT OF PHYTODIVERSITY OF GRASS ECOSYSTEMS OF PRUTU AND SIRETU BASINS (WITHIN UKRAINE) USING INFORMATION TECHNOLOGIES: Author's Ref.... Dr. biological of science - K., 2020. - 48 p.

APPLICATIONS

Appendix 1 Placement of the Notice of publication of the statement on determining the scope of the strategic environmental assessment and statements on determining the scope of the strategic environmental assessment on the website of the State Water Agency of Ukraine

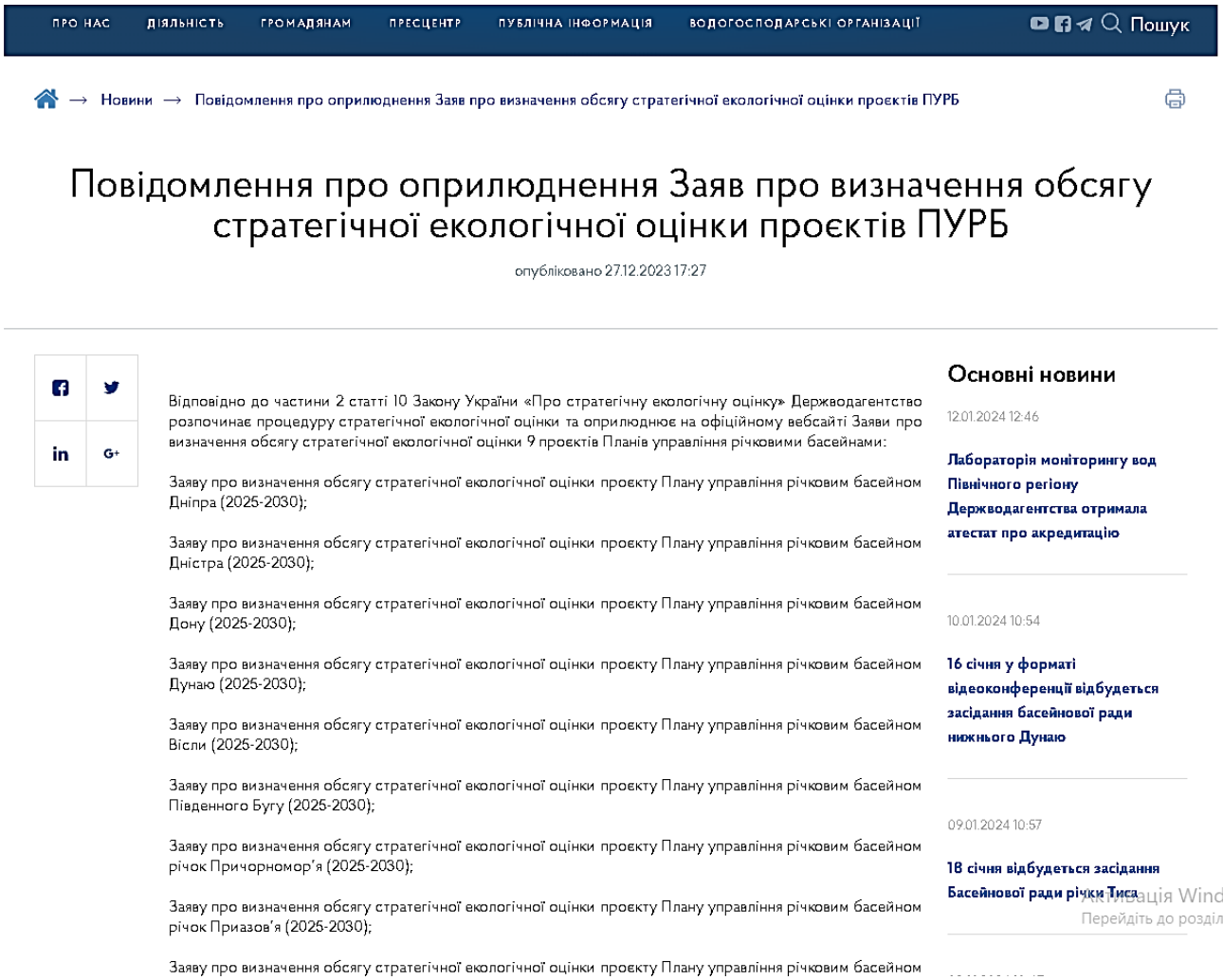


Figure 1 Placement of the Notice of applications on determining the scope of the strategic environmental assessment on the website of the State Water Agency of Ukraine (https://davr.gov.ua/news/povidomlennya-pro-oprilyudnennya-zayav-pro-viznachennya-obsyagu-strategichnoi-ekologichnoi-ocinki-proyektiv-RBMP-)

Figure 2 Placement of the Notice of applications for determining the scope of the strategic environmental assessment on the website of the State Water Agency of Ukraine (https://davr.gov.ua/povidomlennya-pro-oprilyudnennya-zayavi-pro-viznachennya-obsyagu-strategichnoi-ekologichnoi-ocinki-proyektu-planu-upravlinnya-richkovim-basejnom-dunayu-20252030)

Appendix 2 Certificate № 227

Certificate No. 227 dated 11/15/2019 on the completion of advanced training on the topic "Environmental impact assessment (EIA) in Ukraine: features and first implementation experience. Strategic environmental assessment"

ДЕРЖАВНЕ АГЕНТСТВО ВОДНИХ РЕСУРСІВ УКРАЇНИ
ЦЕНТР ПІДВИЩЕННЯ КВАЛІФІКАЦІЇ ПРАЦІВНИКІВ ВОДНОГО ГОСПОДАРСТВА

Свідоцтво

підтверджує, що

Пашняк Анастасія Володимирівна

З 13 по 15 листопада 2019 року пройшов(ла) підвищення кваліфікації за темою: «Здійснення оцінки впливу на довкілля (ОВД) в Україні: особливості та перший досвід впровадження. Стратегічна екологічна оцінка»

Директор Т.Капуста

Свідоцтво № 227
від 15.11.2019

Appendix 3 Certificate № 230

Certificate No. 230 dated 11/15/2019 on advanced training "Environmental impact assessment (EIA) in Ukraine: features and implementation experience. Strategic environmental assessment."

ДЕРЖАВНЕ АГЕНТСТВО ВОДНИХ РЕСУРСІВ УКРАЇНИ
ЦЕНТР ПІДВИЩЕННЯ КВАЛІФІКАЦІЇ ПРАЦІВНИКІВ ВОДНОГО ГОСПОДАРСТВА

Свідоцтво

підтверджує, що

Болбат Дмитро Володимирович

З 13 по 15 листопада 2019 року пройшов(ла) підвищення кваліфікації за темою: «Здійснення оцінки впливу на довкілля (ОВД) в Україні: особливості та перший досвід впровадження. Стратегічна екологічна оцінка»

Директор Т.Капуста

Свідоцтво № 230
від 15.11.2019

Appendix 4 Certificate № 229

Certificate No. 229 dated November 15, 2019 on advanced training "Environmental impact assessment (EIA) in Ukraine: features and implementation experience. Strategic environmental assessment."

ДЕРЖАВНЕ АГЕНТСТВО ВОДНИХ РЕСУРСІВ УКРАЇНИ
ЦЕНТР ПІДВИЩЕННЯ КВАЛІФІКАЦІЇ ПРАЦІВНИКІВ ВОДНОГО ГОСПОДАРСТВА

Свідоцтво

підтверджує, що

Вербова Альона Сергіївна

З 13 по 15 листопада 2019 року пройшов(ла) підвищення кваліфікації за темою: «Здійснення оцінки впливу на довкілля (ОВД) в Україні: особливості та перший досвід впровадження. Стратегічна екологічна оцінка»

Директор Т.Капуста

Свідоцтво № 229
від 15.11.2019

Директор
ТОВ «НВП «УКРЕКОПРОЕКТ»
БОЛБАТ А.В.
ЗГІДНО З ОРИГІНАЛОМ