
DNIESTER WITHOUT BORDERS
Lviv
Executive Summary
Kalush
Carparthians


Kamyanets-
Podilsky
Novodnistrovsk
Codri

DNIESTER WITHOUT BORDERS

Project results
Transboundary cooperation and sustainable management
in the Dniester River basin:
PHASE III – Implementation of the Action Programme (DNIESTER-III)

EXECUTIVE SUMMARY

Kyiv – 2013

Dniester without Borders. Executive Summary.

The report has been prepared by the UNECE/OSCE/UNEP Transboundary Cooperation and Sustainable Management in the Dniester River Basin: Phase III – Implementation of the Action Programme(Dniester-III) project, under the international Environment and Security initiative (ENVSEC) with the participation of organizations and experts from Moldova and Ukraine. Financial support was provided by the governments of Finland and Sweden.

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INTRODUCTION

One of the longest rivers of Eastern Europe, the picturesque Dniester, flows like a blue ribbon for 1,352 km. Rising in Ukraine's Carpathian mountains, it crosses into Moldova and then comes back to Ukraine again, to flow gently down to the Black Sea. It is the main water artery that determines environmental conditions in the two countries on its banks. The Dniester also supplies potable water to a large part of the basin, including Odessa, one of the largest cities of Ukraine. The river is also vital for developing sectors such as irrigated agriculture, hydropower and aquaculture.

This publication, The Dniester without Borders, is about the activities and achievements of the project entitled Transboundary cooperation and sustainable management in the Dniester River basin: Phase III – Implementation of the Action Programme. It is designed to share information about the experience with the wider public, and also to suggest recommendations for further activity in the Dniester basin. The report should be particularly useful and interesting to those involved in developing transboundary integrated water resources management.

The Dniester process began with a transboundary diagnostic study and the drawing up of the Programme of Action for improving water resources management in the basin. Study of the problems was gradually followed by a search for solutions and specific actions. The signing in November 2012 of a bilateral Treaty of Cooperation for protection and sustainable development of the Dniester basin is just one of a number of important goals achieved. The Dniester process was initiated in 2004 and is part of the international Environment and Security Initiative (ENVSEC).

It has always remained open for the extensive and active participation of both governmental and non-governmental organizations, think tanks and international institutions. An important part of the successful accomplishment of the project tasks was played by GRID-Arendal and Zoï Environment Network. The progress achieved results from real team-work and tangible political support from the Ministry of Environment of the Republic of Moldova and the Ministry of Environment and Natural Resources of Ukraine. And the Dniester process would certainly have been impossible if it had not been for the financial aid of the Governments of Finland and Sweden.

Positive influence came from the interaction of the ENVSEC partners. The OSCE coordinated the activity at national level; UNECE lent expert support guided by a wealth of experience of work with transboundary watercourses, while UNEP played an important part in setting the lines of cooperation in information exchange, monitoring and outreach activities, as well as in mitigating flood hazards. These organizations will continue their help to the Dniester process, maintaining friendly and equitable transboundary cooperation, while the full-weight of responsibility for successful partnership will be shouldered by a new bilateral Dniester Commission, to be established in the near future under the Treaty signed in 2012.

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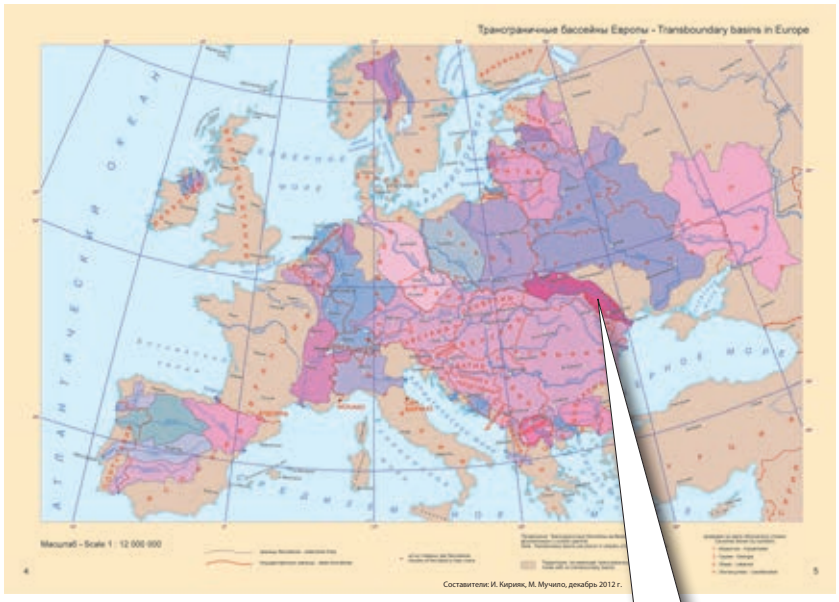

Трансграничные бассейны Европы - Transboundary basins in Europe
Масштаб - Scale 1 : 12 000 000
Составители: И. Кирияк, М. Мучило, декабрь 2012 г.


THE DNIESTER RIVER BASIN
UKRAINE
MOLDOVA
ROMANIA
Lviv
Sambir
Drohobych
Stryi
Borislav
Bolekhiv
Dolyna
Kalush
Ivano-Frankivsk
Nadvirna
Uzhhorod
Mukachevo
Berezhany
Ternopil
Terebovlia
Monastyryska
Buchach
Chortkiv
Zalischyky
Khotyn
Chernivtsi
Volochysk
Khorostkiv
Horodok
Dunaivtsi
Kamianets-Podilskyi
Sokyriany
Dniester Reservoir
Shepetivka
Polonne
Zhytomyr
Berdychiv
Boryspil
Fastiv
Bila Tserkva
Vinnytsya
Sharhorod
Mohyliv-Podilskyi
Yampil
Balti
Dubosar Reservoir
Chisinau
Bender
Tiraspol
Bilhaivka
Odesa
Pervomaysk
Balta
Dolynske
Iasi
Bacau
Suraia
Galati
Brasov
Sibiu
Cluj-Napoca
Satu Mare
Baia Mare
Black Sea
0
100
200 km
Map by UNEP/GRID-Arendal and Zoi Environment, October 2010
Elevation (m)
2500
-50
Dniester River Basin
State Borders
Regional (oblast) Boundaries in Ukraine
Transnistrean Region of the Republic of Moldova (Transnistria)

THE MILESTONES OF THE DNIESTER PROCESS

1994

The Agreement between the Government of the Republic of Moldova and the Government of Ukraine on shared use and protection of boundary waters was signed (the Agreement 1994).

A good tool for dealing with cross-border issues, mainly involving water management, but it lacks the basin approach and principles of integrated management of water resources.

2004-2006

Dniester-I project
(17 participants)

- The Transboundary diagnostic study of cooperation in the Dniester river basin developed.
- Protocol of Intentions regarding Cooperation for the Environmental Rehabilitation of the Dniester River Basin signed.
- A network of stakeholders created.

2006-2007

Dniester-II project
(50 participants)

- The Action Programme to Improve Transboundary Water Management of the Dniester River Basin in 2007-2010 was signed.
- Regulations to the 1994 Agreement on the stakeholders' participation in the work of the Authorized Representatives of the 1994 Agreement and on management of the joint website of the Dniester basin www.dniester.org were signed.

2008-2011

Dniester-III project
(100 participants)

The project base – the Action Programme – covered:

- legal framework;
- monitoring of the Dniester waters;
- protection of biodiversity;
- setting up information sharing;
- raising public awareness; reducing vulnerability to the climate and extreme floods.

Challenges: "steadily changing" political situation in both countries, a large-scale administrative reform in Ukraine, Tiraspol's formal participation.

The project ***achievements*** became possible due to project participants' responsibility and proactive attitude, political will, national experience, potential developed by previous projects.

Beneficiaries evaluated the project as currently important and highly efficient, contributing much both on practical and theoretical levels.

TRANSBOUNDARY COOPERATION IN THE DNIESTER BASIN: CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER DEVELOPMENT

Conclusions and recommendations suggested in this publication are aimed at further development of joint and sustainable management of water resources and ecosystems of the Dniester basin.

KEY CONCLUSIONS

- The Dniester process was open for participation of both governmental and non-governmental organizations and international institutions, as well as for think tanks. This ensured active and multifaceted participation of the partners that had a positive impact on the principal results, as well as on the project activity as a whole.
- The project and the Dniester process, using the already existing base for joint Moldovan and Ukrainian cooperation as a guide, benefited from cooperation under the 1994 Agreement and gained the support of its Plenipotentiaries.
- The secret of success for the project was a combination of the activities aimed at improving the legal framework and capacity building of the organizations in charge with taking specific practical measures. These two lines had a mutually positive influence.
- Using integrated water management as the principal approach both in the project and in the whole Dniester process was both very necessary and rather complicated, it took time and considerable effort; and there is still plenty to do on the institutional, political, organizational and cultural levels in both countries.
- The project engaged (although it was not always easy) representatives from Transdniestria which had a favourable impact on the overall dialogue and information sharing. In spite of the frozen conflict, there were some steps taken to bring the stakeholders together from the whole basin to manage it.

Recommendation for the Authorities in Moldova and Ukraine

- Immediate measures should be taken to create the Dniester Commission involving stakeholders from both countries. Minimal funding should be ensured for this activity.
- Restrictions on the national level to the access to the monitoring and research results, as well as to sharing this information between the cross-border states, should be removed.

Recommendations for the Dniester Commission

- There should be subsidiary working bodies put into place responsible for various areas essential for sustainable management of the river basin. Examples of such areas are monitoring and information sharing, preservation of biodiversity and raising public awareness.
- A permanent Secretariat should be set up.
- The transboundary monitoring and information system of the Dniester can be improved through integration of monitoring data, including those from the national systems, into a unified space-based system.
- To enhance the quality of the research and monitoring, the instrument depot of hydrochemical, epidemiological and biological laboratories should be upgraded, and the water quality criteria and analysis methods should be harmonized.
- The monitoring data and reports of the Dniester Commission on the condition of the Dniester basin should be made available to the stakeholders and to the public on a regular basis.
- Raising public awareness should be continued with involvement of NGOs, local and international mass media.
- A Joint Dniester River Basin Management Plan should be developed, to include the whole basin ecosystem, setting priorities and assigning joint efforts for (among other things):
    - improvement of water quality and elimination of technology-related risks;
    - enhancement of protection of biodiversity and ecosystems, including wetlands, conservation areas, spawning areas and other aquatic areas suitable for fish;
    - adaptation to climate change;
    - strengthening relations between the Dniester Commission and the public, other stakeholders and mass media.
- Capacity building should be a regular part of the work programme of the Dniester Commission.

Recommendations for the International Community

- The partners of the Environment and Security Initiative (ENVSEC), bilateral contributors and international organizations should revise their financial and political support for the Dniester Commission activity.
- The Dniester process and the new Treaty can be used as a model for further development of transboundary cooperation on water resources in the countries of Eastern Europe, Caucasus, Central Asia and worldwide.

RESULT 1: SIGNING OF THE BASIN TREATY

The evidence of the need to develop the Treaty on Cooperation in Conservation and Sustainable Development of the Dniester River Basin ("the Treaty") was as follows:

- deterioration of the state of the environment of the Dniester, to prevent which prompt and coordinated actions by Moldova and Ukraine are required;
- encouragement from multilateral conventions for the states sharing a certain natural resource to enter special agreements;
- inability of the existing Agreement between the Governments of the Republic of Moldova and Ukraine on the Joint Use and Protection of the Cross-Border Waters ("the 1994 Agreement") to ensure sustainable management of the basin's resources due to a restricted geographical and thematic range of issues covered by the document.

In 2006 at the request of the project the expert for transboundary natural resources prepared a legal analysis The status and ways to improve the international and legal base of transboundary cooperation on protection and sustainable use of the water resources of the Dniester river basin. The recommendation following the results of the analysis was the signing of a new bilateral Treaty on the Dniester river basin or a supplement to the existing bilateral 1994 Agreement.

The 1994 Agreement cannot provide for sustainable management of the Dniester river basin for a number of reasons:

- the Agreement covers only the river areas which cross national boundaries, amounting to 225 km from its total length of 1,350 km; the scope of the new Dniester Treaty covers the whole basin;
- The body to implement the 1994 Agreement is the Institute of Plenipotentiaries (management is centralized de facto in one agency), while the new document provides for establishing a bilateral commission;
- the 1994 Agreement mostly regulates water use, while the new Treaty covers the issues of protection of natural, biological and landscape resources, and sets up the principle of the integrated management and protection of the Black Sea.

The Treaty was developed by the representatives of the nature protection ministries and water management agencies with the participation of the ministries of foreign affairs and relevant NGOs of the two countries.

The Treaty was signed on November 29, 2012 in Rome at the sixth Meeting of the Parties of the UNECE Water Convention.

The purpose of the Treaty is to set up a legal and organizational foundation for cooperation between Moldova and Ukraine for rational and environmentally sound use and protection of water and other natural resources and ecosystems of the Dniester basin for the population's benefit and sustainable development of the riparian states.

Content of the Treaty

RESULT 2: IMPROVING COOPERATION ON MONITORING

Transboundary monitoring is one of the crucial tools to provide management bodies, scientists and citizens with up-to-date information for decision-making, so the project paid this subject special attention.

Joint Sanitary and Hygienic Monitoring

The Dniester, the main drinking water resource for a considerable part of Moldova and Ukraine (especially for Odessa oblast), is under serious human-induced pressure, including pollution, from both countries. There are about 8 million inhabitants within the river basin, living at very high density. The Dniester-III Project has given special attention to supporting the efforts of the basin public health authorities to control the quality of transboundary waters and to prevent waterborne diseases.

Under the project, a joint working group comprising representatives of public health authorities from Moldova and Ukraine drafted a Regulation on Cooperation on Sanitary and Hygienic Monitoring of Water Quality in the Transboundary Moldovan and Ukrainian Areas of the Dniester River Basin. The document aims to set out the main criteria of the sanitary and hygienic assessment of the transboundary waters of the Dniester basin to obtain comparable results from measuring water quality indicators. According to the Regulations, samples are to be taken simultaneously by the relevant organizations according to the agreed schedules, as well as jointly by samplers from several cities, once every three months, at two boundary points. Should any emergency pollution of the transboundary waters happen, the working group is to organize additional water sampling and analysis; to share the latest update of pollutants spillover and to provide timely information about changes in the sanitary and hygienic quality of the water .

The working group also performed six quarterly water sampling exercises from transboundary points of the basin. The samples were taken at the same time and from the same bucket, then water was analyzed in the laboratories of the two organizations involved. Analysis included parameters of sanitary chemistry, bacteriology, virology, parasitology and toxicology specified in the draft Regulation. After that the results were shared and discussed. At the first stages of the joint research there were some discrepancies (frequently these were considerable) though by the end of the project they were dramatically reduced due to discussions and clarification of research and data assessment techniques.

In order to unify approaches to the research, doctors from the laboratories from the Dniester basin completed training seminars on joint water sampling. Special attention was paid to one of the most

acute issues in the basin – viral diseases. Virologists from both sides of the river completed an internship in the Republic of Belarus.

Chemical agents and equipment were purchased for the laboratories.

The joint activities of the working group demonstrated the necessity and efficiency of such cooperation. Such model partnership can be an effective and functional model within the framework of the future Dniester Commission.

Transboundary Monitoring of the Dniester River: Analysis and Recommendations

At the early project stages there was a suggestion to analyze the entire system of the monitoring of surface waters in the Dniester basin. The research Transboundary Monitoring of the Dniester River: Analysis and Assessment was to identify discrepancies between the present day transboundary monitoring of the river and the real needs of transboundary management of the river basin. Some findings of the research are presented below.

The monitoring in the transboundary areas of the Dniester involves public health authorities, hydrometeorological services, environment inspectorates and water supply organizations. Together they keep track of 100 parameters: each organisation is responsible for monitoring at least 14 and possibly 62 parameters.

In a number of places, within the transboundary areas of the Dniester or near them, monitoring approved at the national level is carried out at the national level by several organizations that have different tasks, responsibilities and interests with regard to the river. However, it would be more efficient if sampling and analysis, for instance, on physical and chemical parameters were made by only one of them, with the results shared among other organizations. That would result in a saving of financial resources and would help avoid discrepancies in data groups.

Data from individual laboratories differed from those obtained by other organizations, sometimes by as much as 50%, which emphasizes the importance of qualification verifications of the labs.

The system of centralized metadata collection from various organizations is well enough developed in Ukraine; however, in its work each of the organizations uses data from its own surveillance only. In Moldova monitoring data are not collected and stored in a centralized way.

Some of the hydrometeorological centres of the neighbouring states share their hydrological information with each other, as well as annual reports prepared in accordance with The Regulation of Ukrainian and Moldovan Cooperation in Monitoring of Cross-border Water Quality. But in general monitoring data sharing needs improvement.

Currently there is no sufficiently clear view of demands for the transboundary monitoring data, except a general wish to know the environmental condition of the Dniester at the points where it flows into the countries' territories and out of them. So it is recommended that the competent authorities should clearly specify the type of information they expect from such monitoring.

In the research it is advised to encourage international meetings, to analyze and assess the data of the transboundary water quality surveillance (annually, over the last 35 years), to improve the scientific and technological base of the laboratories, to carry out qualification verifications of the laboratories of the countries and between them, and to share and jointly use monitoring data at the national and international levels.

Joint Moldovan and Ukrainian Hydrochemical Expedition Dniester-2011

Regular surveillance of the Dniester's water quality is today carried out by the state monitoring systems of Moldova and Ukraine. Under the 1994 Agreement the countries share the surveillance data, but only in cross-border areas of the river and on a limited set of parameters. The last joint water quality investigation along the entire length of the Dniester – from its source in the Carpathian Mountains to the outflow to the Black Sea – was made in 1997. In July 2011 Moldova and Ukraine initiated a new joint hydrochemical expedition from the source to the estuary of the Dniester, the first one over the recent 14 years.

For the full version of the report please see www.dniester.org

The tasks of the expedition were to collect specific information about the quality of water and bottom deposits at various stretches of the river and to enhance transboundary cooperation.

During the expedition five laboratories from Moldova and Ukraine collected more than 1,600 samples of water and bottom deposits from 44 points down the Dniester.

The results of the joint investigation showed that:

- The downstream Dniester is more polluted than further upstream, the water quality gradually worsening on such parameters as acidity, contents of organic substances and salts;
- The downstream river is also more polluted with petroleum products, pesticides, polyaromatic and volatile hydrocarbons. Considering that salt composition and contents of dissolved salts predominantly depends on natural processes, increased concentrations of organic substances is associated with land-based sources of pollution (waste water discharges, washouts from the surface, industrial facilities, storage areas for toxic chemicals etc.);
- The content of nitrogen and phosphorus in the river fluctuates from one point to another irregularly. In total the nutrient load in 2011 was a little higher than in 1997, which can be indicative of increasing pollution of the river;
- When the water passes through the Dniester reservoirs, suspended solids are removed, the water becomes more transparent, and the reservoirs of the hydro-electric plant notably reduce the temperature of water below the dam, while also improving the amount of oxygen dissolved in it. In fact the fully silt-covered Dubăsari reservoir lets the water pass unchanged, except that because of the large surface and shallow depth of the reservoir the water here warms significantly in the summer;
- In the bottom deposits from the river bed and the Dniester reservoirs petroleum products and pesticides were commonly found; today their number poses no apparent hazard for the water environment, but in future there should be a more detailed investigation of the deeper layers of the deposits, which in the course of the expedition were not studied and can contain historical pollution;
- A comparison of the results of the expeditions of 1997 and 2011 gives no evidence of sustained change in the Dniester's water quality; at the same time in 2011 less dissolved salts and heavy metals were found in the water, but more phosphorus, nitrogen and copper than in 1997, while the amounts of ammonium and organic substances in the water remained practically unchanged;
- In general the quality of the Dniester's water can be assessed as "very good" or

"good" only along the first 150 km from its headwaters; downstream, and especially along the last 200-250 km of the river, and in its silted estuary, it deteriorates drastically, so the viability of water ecosystems and the sustainability of water management in the lower part of the basin are at stake.

The organizers of the expedition made a number of recommendations, the principal one being about the necessity of a long-term interstate basin programme for the mitigation of pollution in the Dniester basin. Such a programme should identify sources and ways in which water and bottom deposits are polluted, set priorities, and come up with measures focused on the improvement of water quality in the entire basin. Every five to six years basin investigations of the Dniester's water quality should be made; new aspects of joint expeditions should be the research and mapping of the pollution of the bottom and water quality changes according to the depth, analysis of the influence of wastewater and large tributaries on the quality of the Dniester bed water, and the influence of hazardous compounds on water ecosystems and humans. To raise the quality of investigations the instruments available to the hydrochemical labs of the basin should also be upgraded, and the criteria and methods of water quality analysis should be unified.

The activities of the environmental monitoring team under the Institute of the Plenipotentiaries under the 1994 Agreement (the former was supported by the project) resulted in finalizing and signing a revised version of The Regulation of Ukrainian and Moldovan Cooperation on Monitoring of Cross-border Water Quality, as well as in drawing up a concept of a project proposal for harmonization of the laboratory research procedures.

RESULT 3: INTEGRATION OF FISH FAUNA CONSERVATION INTO RIVER MANAGEMENT

Essential changes to the Dniester basin ecosystem were caused by closing the Ochakovskoye delta arm, construction of a navigable channel to the Belgorod-Dniester port, intensive reclamation of its flood plain (the building of dykes on of haughlands and flooded areas for agricultural land use, construction of fish farms), industrial development and water pollution with household effluents and intensive use of chemicals in agriculture, and construction of the Dubăsari and Dniester water reservoirs. construction resulted in separation of the river basin into three isolated areas, with the fish fauna evolving autonomously in each of them which interfered with the natural migration ways of sturgeons and other fish species and changed the migration of solid sediment that make up spawning areas downstream.

The component dealing with integrating issues of biodiversity conservation into the policy and practice of water resources management was comprehensive. It focused on the improvement of the legal framework, the study of the current condition of fish in the Middle and Lower Dniester, drawing up recommendations on conservation of especially valuable river areas and taking practical measures (e.g., buying a motorboat to fight poaching). Implementation of these involved representatives of the authorities, non-governmental and research organizations from Moldova and Ukraine, which ensured conversion of the science-based solutions into the practice and development of integrated recommendations on fish conservation.

There is a working group on the use and conservation of aquatic living resources under the 1994 Agreement. However the group could not achieve much because of limited funding. The support of this group by the project resulted in a document, Conservation of Aquatic Biological Resources and Regulation of Fishing in the Dniester River Basin, which became an annex to the Dniester Treaty signed on November 29, 2012 in Rome.

The project also purchased special equipment, needed for the expedition described earlier and for further field studies of the Dniester fish fauna.

For the full version of the report please see www.dniester.org

Besides, the project supported joint research by Moldovan and Ukrainian scientists (for the first time since 1992), aimed at investigation of the condition of fish in the Lower Dniester, as well as at identifying parts of the Lower Dniester areas particularly valuable for providing for the vital needs of fish (potential wintering holes, wintering and nursery grounds). In the course of 13 expeditions to 16 points within the area from the Dubăsari power plant to the Dniester estuary (about 350 km), a group of Moldovan and Ukrainian experts took depth measurements at 496 points, fished at 175 f more, and took 43 water samples for analysis.

The joint research showed that:

1. more than 130 potential wintering holes were found in the beds of the Dniester, Turunchuk and Deep Turunchuk; as this research was carried out for the first time since 1980 in Ukraine and for the first time ever in Moldova, and only eight wintering holes of the total found were listed as protected habitats, the data were delivered to the relevant fish and nature protection agencies of the two countries;
2. spawning conditions in the Dniester lower course in 2011 were unfavourable, and spawning itself was ineffective due to a low level of water in the river that will cause a drastic decrease in fish population in 2013-2014; fish reproduction is also hindered by the lack of spawning grounds due to the building of embankments along a considerable part of the Dniester river, the disturbance of the ecological water release from the Dniester reservoir, the destruction of spawning grounds by sand and gravel extraction, and the development (building houses) of the floodplains;
3. over the last 10 years the species composition of the fish fauna in the Dniester halved, while commercial species fell by a third; commercial fish species are gradually being replaced with less valuable and alien species in the Lower Dniester;
4. the fact that a considerable number of hybrids were found in the catches gives evidence of an unfavourable environmental situation in the water of the Lower Dniester basin [hybrids spontaneously emerge in nature due to the spawning grounds' forced closeness];
5. fish stocking in the Dniester estuary in 2011 was insufficient to increase commercial stocks and conserve the fish fauna, it is possible only by improving and extending areas for natural spawning grounds;
6. there is a need to revise and expand lists of rare and endangered fish species; the future of such species depends in many ways on the implementation of conservation measures (e.g. on artificial propagation and on the rehabilitation of spawning grounds);
7. due to the worsening state of the environment in the Lower Dniester there is an intensive expansion of parasites (Cnidosporidia, Plathelminthes, Apicomplexa) which should be considered by sanitary and veterinary services to prevent the spread of parasitic diseases.

Recommendations of the research on the improvement of natural fish reproduction conditions and the conservation of natural spawning grounds include: amelioration of streams, maintenance proper ecological water release from the Dniester reservoir, development of artificial spawning grounds, dispersal of baby fish in case floodplain lakes and water streams dry up, a ban on sand and gravel extraction, abiding by the norms of agricultural and construction activities in the sanitary and conservation zone of the water bodies, and complying with a ban on fishing in the spawning period. It is also recommended that joint measures should be developed and implemented for the protection of the fish species listed in the Red Books of Moldova and Ukraine, and to set up a working group on sustainable management of fish fauna under the new interstate Dniester River Basin Treaty and the Commission.

RESULT 4: IMPROVING INFORMATION SHARING AT THE BASIN LEVEL

Data required to manage the Dniester river basin are provided by no more than thirty Moldovan and Ukrainian government institutions and the former are often incomplete, fragmented and incoherent. To identify if the information at the disposal of various organizations is available and whether it is of the appropriate quality, as well as the conditions of access to it, is not an easy task due to administrative, technical and cultural reasons. Nevertheless, the Dniester-III project managed to overcome a number of obstacles and ensure that the sharing of certain data was up and running between the two countries.

Improving interaction between institutions

In the framework of the project a bilateral information group was set up which encouraged inter-institutional cooperation through identifying the national organizations which produced information and making an inventory of the data at their disposal. The project also contributed to holding the first national seminars with all the keepers of information needed to manage the river basin.

Dniester-III resulted in the draft regulations on collection and sharing of information between the two countries through the Dniester geoportal (see below). The equipment and software needed for the organizations engaged in the project was purchased.

For the geoportal please see dniester.grida.no/ru/

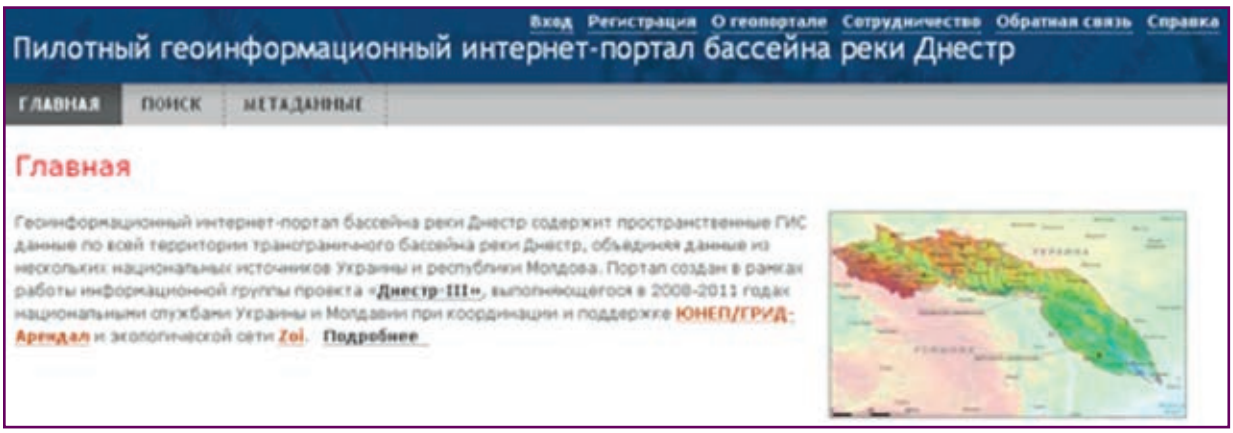
Development of the geoportal for the Dniester basin

The geoportal was developed to enhance information collection, sharing and use. Shared data are visualized on the base of a geoinformation system built on ArcGISServer 10.2. The portal consists of 38 layers and makes it possible to download, update and display certain social, economic and geophysical data, and to locate hydrological stations and monitoring data. The software features made it possible to use satellite images to analyze land cover (Truemarble Image, Geocover Image).

To ensure the confidentiality of certain information the portal gives users restricted access (with passwords).

One of the project accomplishments is a dynamic map, the Water Quality Index. It was made in cooperation with the project Capacity Building in Data Administration for Assessing Transboundary Water Resources in the EECCA Countries.

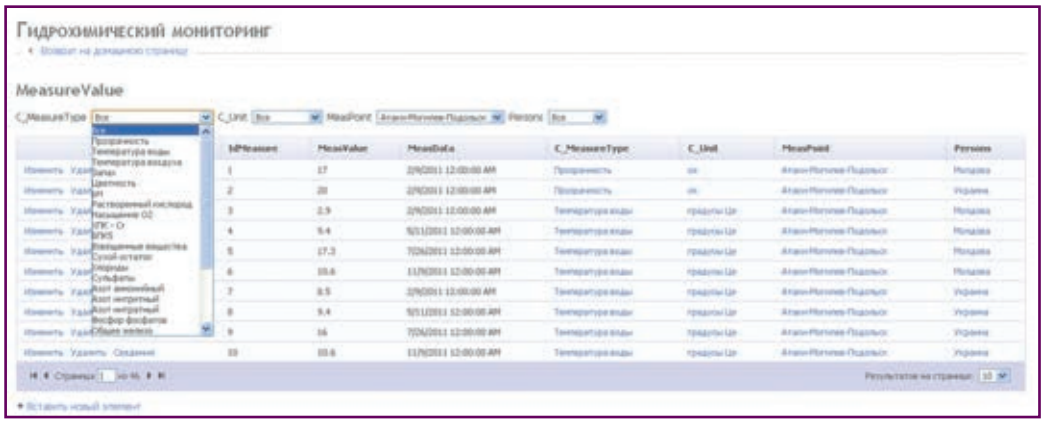
Some of the system's demo functions are clearly illustrated below.



Home page

Layers: transparency, soils and river network of the basin

Layers: waste waters discharge and river network of the basin



A data sheet with transboundary monitoring points and a range of options for a search

The introduction of the basin geo-information system encouraged the development of additional systems at the local level: in Ukraine a GIS and a database were made for the Ukrainian part of the Dniester basin, and in Tiraspol a pilot GIS was developed for the left bank part of the Moldovan sector of the Dniester basin, based on open access software.

RESULT 5: RAISING PUBLIC AWARENESS ON WATER AND ENVIRONMENT ISSUES

In planning the public awareness component of the Dniester-III project, suggestions from governmental and non-governmental sectors were equally taken into consideration, while support was given predominantly to those activities that are performed on a regular basis and contribute to transboundary cooperation.

The project supported (together with other contributors) a basin-wide creative competition for children and young people, The Dniester Water Colours. In 2009 the competition was held in Ukraine only, but it appeared to be of so much interest that in subsequent years it became basin-wide.

The competition categories are “A Drawing”, “A Photo”, “A Video or Slide Show”, “A Water Resources Rehabilitation Activity” and “A Short Story, a Poem, a Scientific and Publicistic Essay”.

Nikolayevskiy Cement Plant . Darina Larinets

The Spring of the Light . Viktor Sokarev

Together with other contributors the project supported the annual transboundary Dniester Festival and celebration of International Water Day, and conferences on studying problems, solving them and cooperating in the river basin.

20 shells for carcass canoes were bought for research and training expeditions. The canoes have already been used for the Dniester-2010 and Dniester-2011 expeditions for students of biology and geography departments from both banks of the river to study the fish of the Lower Dniester.

The spring of the Dniester was fitted out (in the village of Vovche, in Lviv oblast, Ukraine): the well was refined, an information board and a signpost to the spring were placed.

47 information boards were installed in picturesque cultural and historical places of the Dniester basin.

A press tour along the Dniester and a master class on environmental journalism were organised. The participants visited both picturesque sites (the Dniester canyon, the Dzhurinsky waterfall) and large industrial plants and factories (the Lukor PVC production plant, an industrial city of Kalush, the Dniester hydropower generation system). The master class instructors were a former BBC journalist, Alex Kirby, chief editor of the Swiss weekly Die Wochenzeitung, Susan Boos, and one of the leading environmental journalists of Ukraine, Oleh Listopad.

After the press tour some 30 examples of printed and broadcast material were published in Moldova (including Transdniestria), Ukraine, Switzerland and the UK, and a special issue "The Dniester is a River of Life" of "The Versions" newspaper was released (the city of Chernivtsi).

REDUCING VULNERABILITY TO THE CLIMATE CHANGE AND EXTREME FLOODS

The amount and quality of water resources is an important issue in studying climate change and adaptation to its consequences. It is an issue for transboundary basins where in the process of adaptation one should take into consideration not only the impact of climate change on the hydrological cycle and, consequently, on the economic sectors, but also a need to cooperate with neighbouring countries.

The project on reduction of the risks of climate change and flooding was developed after a catastrophic flood in 2008. The project involves representatives of governmental, research and non-governmental organizations. It is part of the programme of the UNECE transboundary pilot projects on adaptation to climate change and is implemented under the umbrella of the Dniester-III project.

In 2010 the project prepared two studies about the existing information on climate change and analysis of vulnerability to it, as well as practice in preventing floods and mitigating damage caused by them in Moldova and Ukraine.

For full versions of the reports please see www.dniester.org

Backcasting and forecasting of temperature and precipitation values were based on data from hydrological and meteorological observations in line with the seven regional climatic models (the RCM) and on the basis of the regional model (REMO). The forecast of changes for the Dniester basin is as follows:

- for the upper part of the basin the most significant warming is expected in February, September (with increased precipitations) and August (with decreased precipitations);
- maximum warming with decreased precipitations is expected in the lower part of the Dniester in February, August, October, November and overall for the year;
- January is expected to be the warmest in the middle part of the basin, while the amount of precipitations will be increased in July;
- in general, milder and more humid winters are expected; spring will be almost without change; it will be hotter and drier in early summer, but the midsummer will bring heavier and longer-lasting precipitations; late summer is expected to be drought-prone; September is going to be warmer and more humid, while the rest of autumn is expected to be more and warmer.

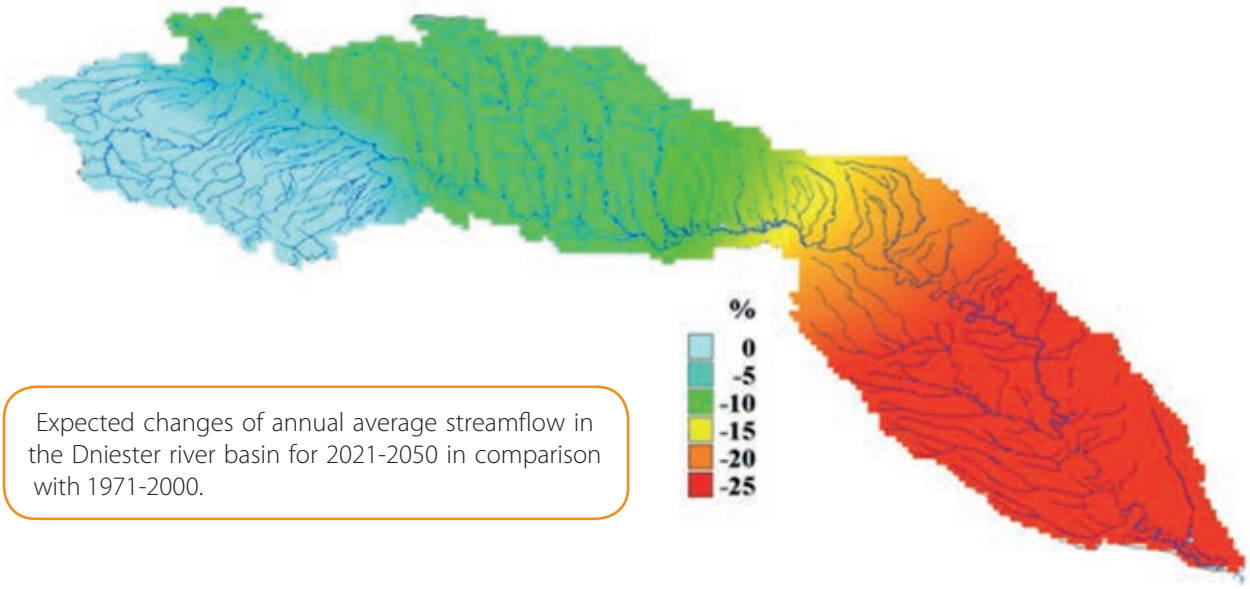
A simulation of the frequency and intensity of extreme weather events was made for the upper, middle and lower parts of the Dniester. It demonstrated that due to earlier springs and longer summers, by the middle of the 21st century the duration of the warm period could become almost 2-3 weeks longer in comparison with 1971-2000. The growing season will be 8-10 days and 9-12 days longer respectively. Owing to the rise in both maximum and minimum air temperature, we can expect that the number of days with severe frosts will be reduced, while really hot days will be more in number. The moisture regime will be changed too: the number of rainy days in the upper and middle parts of the river may increase, while in the lower part dry days may be more in number. A change in seasonal temperature variation and an increase in the intensity and duration of precipitations, can cause a rise in the intensity and number of floods.

The impact of climate change on the streamflow of the Dniester basin was studied based on the streamflow records for selected indicator basins (the Dniester tributaries) and data provided by observation stations located along the main bed of the Dniester. The indicator basins reflect the

conditions of stream flow generation in three parts of the basin: the Carpathian, Volyno-Podilska and the lower part. The streamflow was simulated considering basic climatic parameters (air temperature, atmospheric precipitations and land surface evaporation) for the period 2021-2050 compared with the control period of 1971-2000.

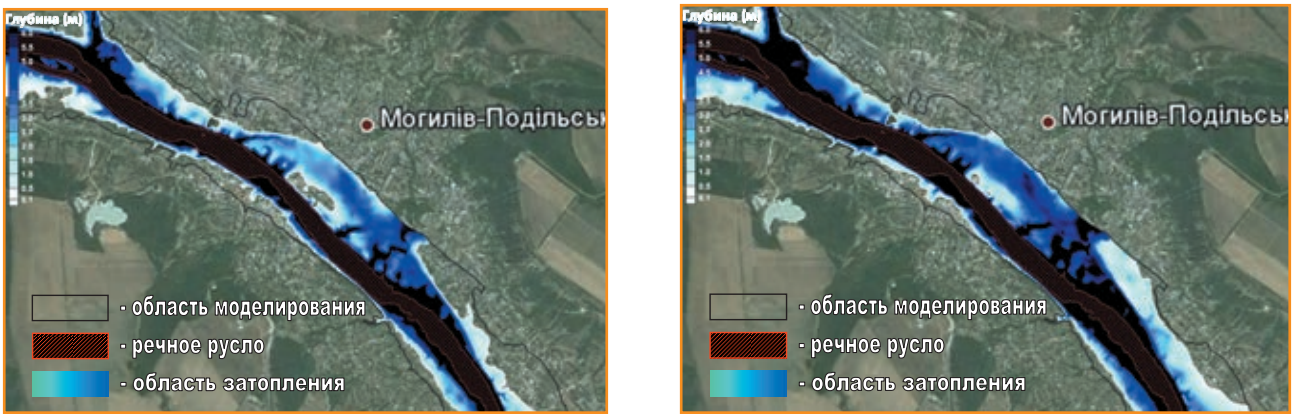
For the Carpathian and Volyno-Podilska parts of the basin the expected changes of annual average streamflow will be within the limits of natural water content variability. The annual average streamflow is likely to become 24% less for the lower part of the river which, however, will not cause any substantial changes in its annual average streamflow, as the tributaries of the lower stream have no notable influence on its overall water regime.

In the Carpathian and Volyno-Podilska parts of the basin the minimum streamflow may slightly increase.



Expected changes of annual average streamflow in the Dniester river basin for 2021-2050 in comparison with 1971-2000.

For the purposes of modelling and mapping of flooding on the selected pilot territories (Mogyliv-Podilsky – Ataki and the Dubăsari water power plant – Mayaki) the depth of the river bed was measured. In the reach between Mogyliv-Podilsky and Ataki a two-dimension simulation of the flooding of the surrounding plain under extreme flood conditions was made, on the assumption of the possible growth of floods by 15% under the influence of climate change, and the model was calibrated and verified on the basis of the data on floods of 2008 and 2010.

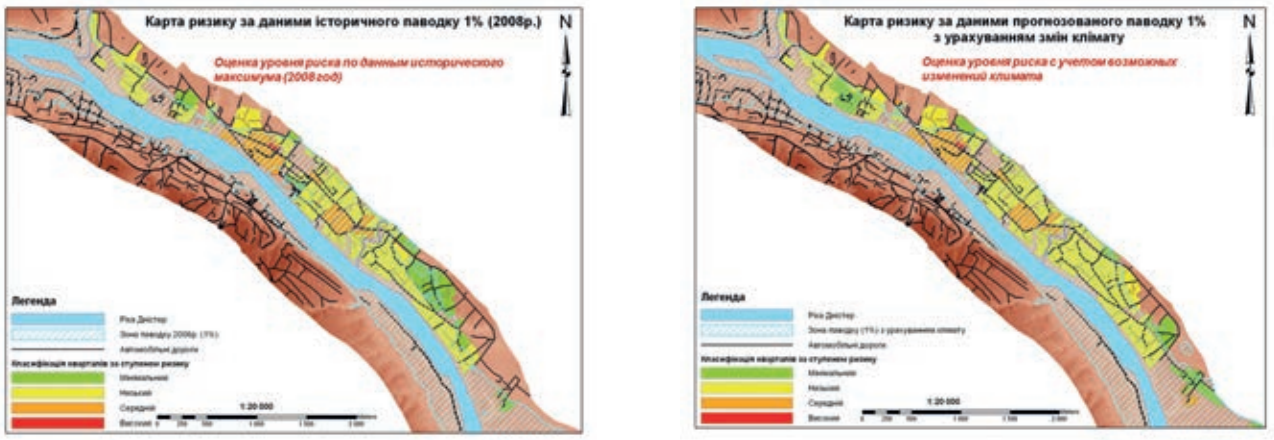


a b

Simulation of maximum depths of the flood plain flooding in the reach between Mogyliv-Podilsky and Ataki: (a) – in current conditions, (b) – with possible future climate change

Based on maps of probable flooding and functional land-use planning of the city of Mogyliv-Podilsky, through processing of the simulation, results in the GIS levels were calculated and maps were generated of risks to human life and activity from flooding under current and future conditions. As the maps show, when the flood levels grow higher, the area at risk expands, and the risk level in particular parts goes up.

In the second reach (Dubăsari – Mayaki) levels of water and its spill over the dams were calculated in current and possible future conditions. The analysis shows that levels of water and its spillage can increase under the influence of climate change.



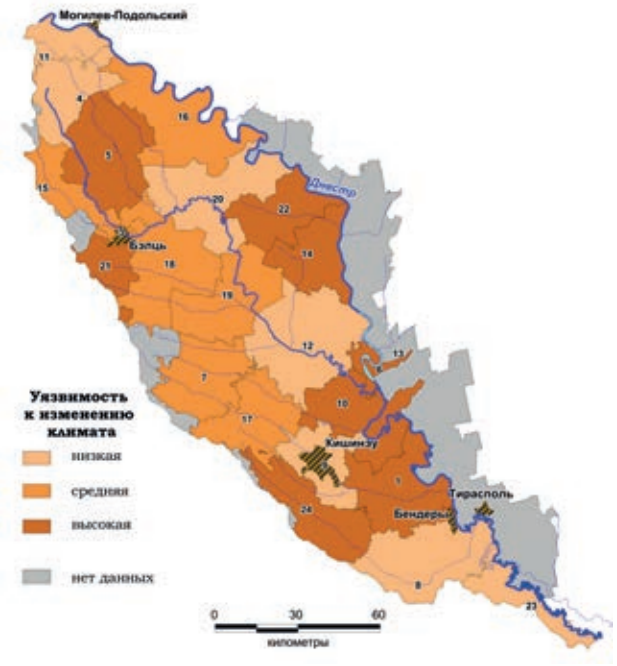
a b

The map of risk level for human life and activities i from flooding in conditions of current (a) and possible future (6b) climate

Automated stations for water level observation were installed in 2012 in the cities of Galych (the Ivano-Frankivsk oblast) and Zaleshchyiki (the Ternopil oblast). An analysis of the distribution and use of data about floods in the Dniester basin was prepared on various levels. An international seminar on interstate flood data sharing was held, and assistance in improving flood information distribution strategies was also provided to selected areas.

The analysis of vulnerability of the Dniester basin to climate change was based on the study conducted by the project, the data from the literature and consultations with representatives of various organizations and sectors of the economy. The results of the analysis will form the backbone of the development of measures on adaptation to climate change and on flood protection, and they will also be a big boost for revising water use priorities.

The development of measures and joint plans for adaptation to climate change will be agreed with national adaptation strategies and projects to develop sectoral adaptation plans and measures. The foundation for the joint plans and measures will be the vulnerability analysis described above.



Vulnerability to climate change of the right bank of the Dniester calculated as a function of sensitivity to climate change and adaptation potential of individual parts of Moldova.

For successful implementation of the project results the existing cooperation should be continued, and the measures of adaptation and flood risk reduction developed so far should be integrated into the national strategies of adaptation to climate change. The project results will also be helpful in adopting updated Rules for operation of the Dniester water reservoirs, which are currently being developed. It should be noted that use of the project ideas and results also depends on strengthening the long-term institutional structure of interstate cooperation in the basin, including the establishment of the bilateral Dniester Commission.

REVIEW OF DNIESTER-III PROJECT ACTIVITIES AND RESULTS

General

- Six meetings of the project members held.
- The text of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes translated into Ukrainian.
- Three e-newsletters about the project released.
- The publication of The Dniester without Borders.

Result 1: Signing of the Dniester Basin Treaty

- Comments of Moldovan and Ukrainian stakeholders and public collected and included into the draft Treaty; in Ukraine a consultation meeting with stakeholders held, accompanying documents and responses to ministries that provided suggestions for the project prepared.
- Signing of the Treaty declared as a recommendation at the meeting of the heads of the Commonwealth of Independent States governments and at the 13th meeting of the Intergovernmental Ukrainian and Moldovan Joint Commission on Trade and Economic Cooperation.
- In Moldova and Ukraine the draft Treaty received intra-agency and interagency approval.
- Official negotiations on finalising the text and preparing the Treaty for signing held between Moldova and Ukraine. The Treaty on Cooperation on Conservation and Sustainable Development of the Dniester River Basin signed on November 29, 2012 in Rome at the Sixth Meeting of the Parties to the UNECE Convention on Transboundary Waters.

Result 2: Improving cooperation on monitoring

Joint sanitary and hygienic monitoring

- Five meetings of the working group on sanitary and hygienic monitoring of Moldova and Ukraine held.
- Six joint water sample-taking and analysis organized in the points of the Dniester inflow to Moldova and to Ukraine and three such exercises held near the town of Soroci. The results published in the pilot information system of the Dniester basin.
- Draft Regulation on Cooperation on Sanitary and Hygienic Monitoring of Water Quality in the Transboundary Moldovan and Ukrainian Areas of the Dniester River Basin prepared for signing. Two seminars on joint processing of water samples by Moldovan and Ukrainian health authorities held.
- Together with the University of Helsinki a research study on improvement of virological monitoring in the Dniester river basin conducted.
- A seminar on virological diagnostics for representatives of the Odessa oblast Sanitary and Epidemiological Service and the National Public Health Center (Chisinau) held on the base of the Republican Research and Practical Center for Epidemiology and Microbiology of the Republic of Belarus.
- Personal computers, a light meter, a microscope, three cool boxes, an integrated instrument (a light meter, a thermometer etc.) and a printer purchased for the health authorities of Moldova.
- For virological laboratories of Chisinau and Odessa the following equipment bought: water sampling installations; kits for collection and concentration of viruses from potable water, from surface waters, water sources and wells; immuno-enzymometric test systems for detection of rotavirus antigens in people and animals; test systems for detection of enterovirus and HAV antigens in the immuno-enzymometric analysis; kits of reagents and consumables for the PCR-based diagnostics; sterile vessels and environments for cell-culture studies.
- A bridge to facilitate water sampling produced and installed in the vicinity of the villages of Mayaki and Palanka.

Transboundary monitoring

- Research conducted on Transboundary Monitoring of the Dniester River: Analysis and Assessment.
- Two extended meetings of working groups on water and environmental monitoring and basin laboratories supported.
- An updated version of the Regulation of Ukrainian and Moldovan Cooperation on Cross-border Water Quality Monitoring finalized and signed.
- A concept of project proposal on harmonization of laboratory study procedures drafted.

- A joint Moldovan-Ukrainian hydrochemical expedition from the source to the mouth of the Dniester conducted. Its results published in the pilot information system of the Dniester basin.

Result 3: Integration of fish fauna conservation issues into river management

- Two meetings of the Moldovan and Ukrainian group of experts on use and protection of aquatic living resources supported.
- A draft annex, Conservation of Aquatic Biological Resources and Regulation of Fishing in the Dniester River Basin, to the Dniester River Basin Treaty prepared for signing and signed along with the Treaty in November 2012.
- Joint Moldovan and Ukrainian integrated ichthyological research of the Middle and Lower Dniester organized.
- An echo-sounder and a GPS navigator purchased for Moldovan fisheries scientists.
- A motorboat 'Amur-M' bought for the Fisheries Inspectorate of the Ministry of Environment of the Republic of Moldova.

Result 4: Improving information sharing on the basin level

- Five meetings of the information group and a seminar on the GIS operation held.
- A pilot GIS developed and made available on http://enrin.grida.no/dniester/.
- ArcView 9.3 hardware and software bought and installed in Ukraine and Moldova (including Transdniestria).
- Draft Regulation on Information Collection and Sharing between the Republic of Moldova and Ukraine within the GIS of the Dniester River Basin developed and approved in Moldova.
- Information on the geoportal of the Dniester river basin and data obtained as a result of field studies under Dniester-III project published on http://enrin.grida.no/dniester/.
- An interactive regularly updated basin water quality layer produced by the project entitled Capacity Building in Data Administration for Assessing Transboundary Water Resources in the EECCA Countries, integrated into the pilot GIS.
- The Environmental Atlas of the Dniester River Basin developed and published. Its electronic version is available on http://enrin.grida.no/dniester/.

Result 5: Raising public awareness of water and environment issues

- Celebration of the International Day of Water and the Dniester Festival and two annual international conferences supported.
- An annual basin-wide creativity competition for children and youth, The Dniester Water Colours, supported: albums and CDs with the best pieces of work released, Russian subtitles to a film about the competition produced, the announcement poster published, prizes for the winners bought.
- 20 shells for canoes for research and training expeditions along the Dniester bought.
- 47 information boards produced and installed in crowded areas of the Dniester basin.
- The Dniester source fitted out: the well was refined, an information board and a signpost to the spring were placed. A press tour along the Dniester and a master class on environmental journalism conducted, a special issue of The Versions newspaper (the city of Chernivtsi) containing the press tour materials published and distributed.

Reducing vulnerability to extreme floods and climate change

- A project proposal on an additional component to the Dniester-III project developed upon request of the governments of Moldova and Ukraine.
- The working group held six meetings.
- Research on climate change in the Dniester basin, vulnerability and practice of preventing floods and mitigation of damage caused by them performed.
- Climate change in the Dniester basin analysed and simulated, the influence of climate changes on the streamflow in the basin assessed for the period up to 2050.
- Field studies conducted with simulation and mapping of the flooding hazard in the vicinity of Mogyliv-Podilsky–Ataki and in the reach between Dubasari and Mayaki.
- Points of installation and specification defined for two automatic water level observation stations in the Ukrainian part of the Dniester basin; the stations installed in the cities of Zaleschiki and Galich. Vulnerability of the Dniester basin to climate change, the practice of spreading information about the flood threat at the local, national and international levels and about possible ways to improve it analyzed.

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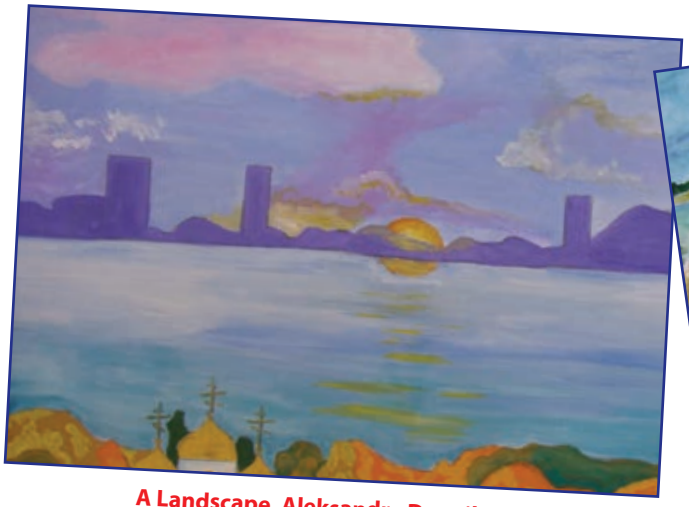
The Dniester Water Colours

Storks. Olga Gibner

The Dniester Riverbanks. Roman Mazur



A Landscape. Aleksandra Dynnikova

The Dniester Landscapes. Mikhail Baka

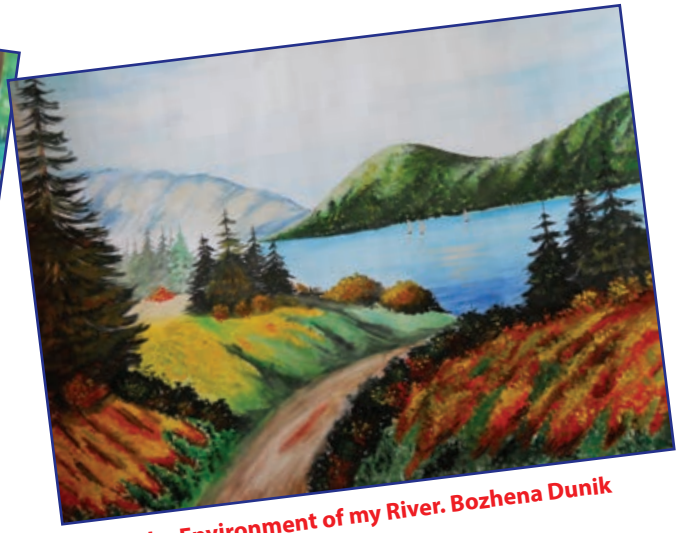
A River is Flowing. Yuliya Kovtun

A Firth is Sleeping. Tatyana Orlova

Owls. Yuliya Yanova

Is there a Chance? Tatyana Konyak

The Dniester Source. Yuliya Lyahovych

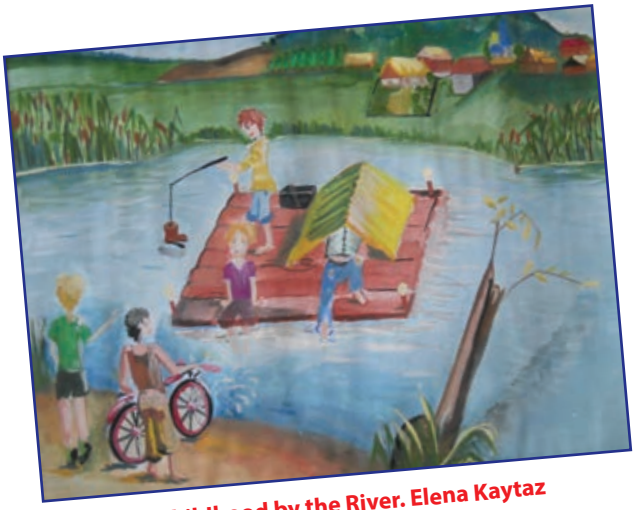


The Environment of my River. Bozhena Dunik

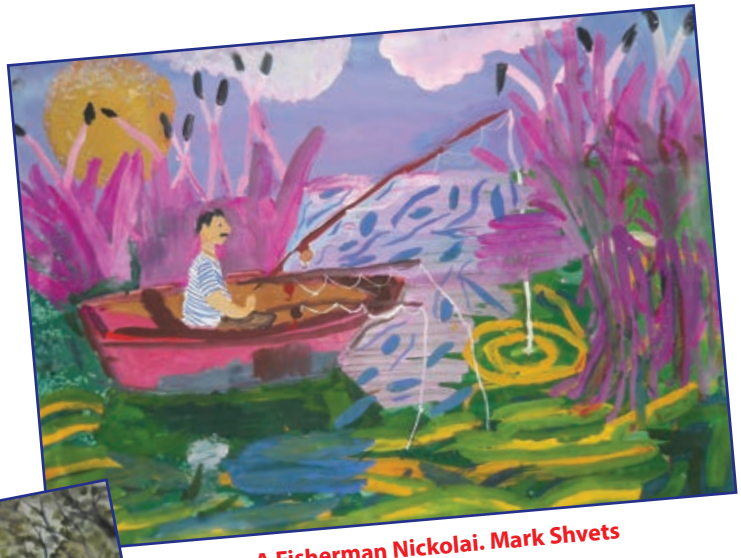
A River by a Road. Oleg Strogush

An Evening at the Dniester. Mariya Bessonova

Autumn Colours of the Dniester. Vktoriya Puzankova



A Childhood by the River. Elena Kaytaz



A Fisherman Nickolai. Mark Shvets

A Clean Stream. Polina Grishkova

Cypovo. Veronika Untim


Chisinau


Tiraspol
Odessa