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Strasbourg, 1 September 2015 **T-PVS/Files (2015) 12**
[files12e_2015.docx]

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

35th meeting
Strasbourg, 1-4 December 2015

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Proposed navigable waterway in the Bystroe Estuary (Danube delta) (Ukraine)

- REPORT BY THE GOVERNMENT OF UKRAINE -

Document prepared by
The Ministry of Ecology and Natural Resources of Ukraine

МІНІСТЕРСТВО ЕКОЛОГІЇ ТА ПРИРОДНИХ РЕСУРСІВ УКРАЇНИ

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MINISTRY OF ECOLOGY AND NATURAL RESOURCES OF UKRAINE

35 Mytropolyta V. Lypkivskogo Str., Kyiv, 03035, Ukraine

28.08.2015 No 5/1-9/10548-15

Ms. Ivana d'Alessandro
Secretary of the Bern Convention

Dear Ms. d'Alessandro,

Thank you for your message dated of 25 August 2015 to forward you the report of the meeting of the Ukraine-Moldova-Romania Trilateral Joint Commission in Izmail (Ukraine).

Ministry of Ecology and Natural Resources of Ukraine has agreed draft Protocol of the meeting with participants from Romania and Moldova, signed it and provided through the Ministry of Foreign Affairs of Ukraine for signature to the Ministries of Environment of the Republic of Moldova and Romania.

The Ministry sends you this draft Protocol which includes Commission's proposals on priority activities for the next period, Agenda and List of Participants.

The Ministry hopes the presented documents (including Report sent by letter of 30.06.2015 No 9/650-15) will constitute the sufficient basis for the Bureau of the Bern Convention to prepare the draft decision to the forthcoming meeting of the Standing Committee of the Bern Convention to close the opened case-file on the proposal navigable waterway through the Bystre estuary (Danube Delta, Ukraine) and initiate the follow-up monitoring of the Recommendation No 111 (2004). The Ministry believes that our trilateral Joint Commission will effectively manage the issues referred in Recommendation No 111 (2004) and provide information on the closed file as follow up.

The Ministry asks you to support considering these documents and proposal at the nearest Bureau meeting and looking forward for extended cooperation.

Sincerely yours,

Acting Minister **Sergii Kurykin**

Hryhorii Pavchuk, +380 44 206 21 92, 9-01
№5/1-9/10548-15 від 28.08.2015

PROTOCOL OF THE THIRD MEETING

of the Trilateral Joint Commission established within the framework of the Agreement between the Ministry of Environment and Spatial Planning of the Republic of Moldova, the Ministry of Waters, Forests and Environmental Protection of Romania and the Ministry of the Environment and Natural Resources of Ukraine on cooperation in the zone of Danube Delta and Lower River Prut nature protected areas, signed at Bucharest on June 5, 2000

Izmail, Ukraine, May 20 – 21, 2015

During May 20-21, 2015, in Izmail, Odessa Region, the third meeting of the Joint Commission established within the frame of the Agreement between the Ministry of Environment and Territorial Development of the Republic of Moldova, the Ministry of Waters, Forests and Environmental Protection of Romania and the Ministry of Ecology and Natural Resources of Ukraine Regarding Cooperation in the zone of Danube Delta and Lower River Prut nature protected areas signed in Bucharest on June 5, 2000, was held by invitation of the Ministry of Ecology and Natural Resources of Ukraine with the support of the Odessa Region Council and Odessa State Regional Administration.

In accordance with Art. 4 of the Agreement, the third meeting of the Joint Commission of the Agreement was arranged by Ukraine on a rotational basis. The composition of the three delegations is attached (Annex 1).

The Joint Commission agreed with the Agenda as proposed by Ukraine, with an addition from Romania. The adopted Agenda is attached (Annex 2).

Based on the adopted Agenda, the Joint Commission considered the following items:

Brief information on priority activities, based on the List adopted at the 2nd meeting of the Commission:

a) Coordination the initiatives of the Parties regarding protected areas of the Danube Delta and the Lower Prut, such as common fishing prohibition periods, common environmental protection legal framework.

The Republic of Moldova indicated that there were no quotas for catching aquatic biological resources in the Danube while such quotas did exist for the Dniester. The Republic of Moldova prohibits the capture of sturgeons which are inscribed in its Red Book. The Republic of Moldova also closely cooperates with Romania, has common fishing prohibition periods and exchanges relevant information. An agreement on fishing rules on the Prut River was signed in 2003. The Republic of Moldova noted that since there was a great demand for caviar and sturgeons, it was necessary to control poaching and smuggling.

Romania noted synchronous fishing prohibitions arranged with Ukraine and the Republic of Moldova, and ongoing cooperation on this matter between the three countries. Romania informed about its ban on sturgeon fishing until 2016 and insisted on the importance of monitoring sturgeon migration. Romania is considering extension of the ban on sturgeon fishing. Romania informed that the Tulcea Institute monitors sturgeon fry at Isaccea. Romania wants to populate the Danube River with sturgeon, with special attention to not be fishing in the Black Sea, which will cause problems related to the reproduction of species. According to Romania, the monitoring of adult sturgeons is crucial (not only juvenile and youth), and there is a need for EU funding in this respect.

Ukraine informed that a full prohibition of commercial fishing of sturgeons was imposed as early as in 2000 and in 2009 all sturgeon species were entered in the Red Data Book of Ukraine. Ukraine also prohibited scientific sturgeon fishing in order to preclude any abuses, while the fry are instantly released in live condition. Ukraine could agree to monitoring adults but only bycatch. At the site of high catches of sturgeon fry by herring nets (Pryamy Arm) fishing was permanently prohibited and the same step was proposed to be implemented by the other countries. According to Ukraine it would be

useful to strengthen cooperation in this respect between the fish resource agencies of the three countries.

The Joint Commission noted the need for enhanced monitoring of fish, especially sturgeon, and decided to set up a specific sub-working group. This sub-working group will develop detailed programs and present the expected results of monitoring.

The Joint Commission agreed that the three countries should cooperate in harmonizing their legislation with the EU rules in the field of environmental protection.

b) Development of programs for joint monitoring of the environmental factors and economic activities (including pollution sources) within the protected areas of the Danube Delta and Lower Prut and from neighbouring areas with potential impact on the natural protected areas.

Ukraine indicated that, in connection with its project of building a navigable waterway through the Bystroe estuary, it has been conducting a comprehensive monitoring of the Ukrainian section of the Danube Delta since 2004. It was proposed to deal with this issue under the specific agenda item (see below).

c) Identification of joint projects to be financed by the European Union, such as Romanian-Ukrainian-Republic of Moldova Common Operational Programme.

Ukraine noted the implementation of the trilateral project «Consolidation of the protected area network to preserve biodiversity and sustainable development of the Danube and Lower Prut deltas» financed by the European Union.

Romania informed about the existence of another project which deals with analysis and recording of pollution sources in the lower reaches of the Danube. In particular, a bilateral cooperation in treatment facilities and sewerage in settlements is on-going.

d) Creating a trilateral biosphere reserve or declaring the protected areas as a trilateral Ramsar site.

Ukraine emphasized its support to the establishment of the trilateral biosphere reserve.

The Republic of Moldova informed about the implemented steps within the frame of the biodiversity conservation strategy for 2015 – 2020. Documents have been prepared concerning the establishment of a biosphere reserve in the Lower Prut; an inventory of relevant areas was made and proposals to the Ministry of Environment of Moldova will be presented. The next step is to prepare establishment of the trilateral facility which is being already negotiated with UNESCO. Currently a common map of the biosphere reserve is being prepared and will be presented in the next report. According to the Republic of Moldova, the local population is reluctant to accept the creation of the reserve since it considers that this would significantly restrict its activities without bringing any benefits. Therefore considerable explanatory work is needed.

The Members congratulated the Republic of Moldova on the achieved results and the Joint Commission encouraged it to continue its efforts towards either establishing the Republic of Moldova protected facility or the Republic of Moldova part of the trilateral biosphere reserve.

Romania informed on the activities concerning the establishment of the biosphere reserve and invited Members to visit Tulcea with a view of further considering common matters. Romania raised the issue of the joint structure devoted to the coordination of the transboundary biosphere reserve as required by the Pamplona Recommendations.

e) Experience exchange and cooperation as regards the joint management of the natural protected areas in the border proximity.

Ukraine recalled that in the 1990s a joint Ukrainian-Romanian program for managing the bilateral Danube Delta Biosphere Reserve had existed. Ukraine proposed to create a Joint Coordination Council on managing the Danube Delta Transboundary Biosphere Reserve. The national composition of this Council could be approved individually by each country, for example through “special ministerial orders”. Ukraine underlined that, in accordance with the Man and Biosphere UNESCO program, there should be a joint body to manage the Danube Delta Transboundary Biosphere Reserve.

Romania noted that the existing framework satisfactorily covers the Pamplona requirements. According to Romania, the Joint Commission functions as the structure referred to in the Pamplona Recommendations. Moreover, the Trilateral Agreement makes reference to the participation of NGOs and the activities of thematic groups. Romania remarked that there is no permanent secretariat (as required by the Recommendations), but expressed its willingness to support such secretariat should the Joint Commission decide to create it. Also, budgetary sources should be identified. Romania also recalled the importance of exchange of experience, better cooperation in joint management of transboundary protected areas and joint trainings, in particular, for the protected area service personnel.

The Joint Commission agreed that it represented the structure referred to in the Pamplona Recommendations and instructed Romania to present at its next meeting a report on the measures further needed to ensure full compliance with these Recommendations.

The Joint Commission also agreed that project proposals need to be developed in respect of exchange of experience, improvement of cooperation in management and joint training, particularly of the specialists of the biosphere reserve security service.

f) Developing projects on habitats conservation and protected species.

g) Developing projects on the management of the protected areas.

It was proposed to deal with these issues under the specific agenda item (see below).

The status of implementation of Recommendation No. 111 (2004) of the Standing Committee of the Bern Convention on the proposed navigable waterway through the Bystroe estuary (Danube Delta, Ukraine)

a) Status of trilateral cooperation and monitoring data exchange

Ukraine presented detailed information on the results of monitoring for 2004-2014 that was performed in riparian, delta and marine areas that border with the deep-water navigable channel Danube-Black Sea. According to Ukraine, the monitoring program included the following:

- Regular hydrological and hydrochemical monitoring to be conducted at the baseline observation stations, in the areas of hydrotechnical works and in the zone of possible impact of the deep-water navigable channel Danube – Black Sea upon the environment, and processing the results of such monitoring.
- Regular control measurements of water and bottom sediment quality when performing dredging works in the sea approach channel of the deep-water navigable channel Danube – Black Sea and in the area of sea dumping site, and processing the results of such control measurements.
- Assessment of cumulative impacts of shipping upon the condition of land and water ecosystems.
- Assessment of condition of water areas used for fish spawning and nesting and feeding of birds.
- Comprehensive expeditionary observations of water quality and condition of the environment components. Comprehensive expeditionary observations include hydrological, hydrochemical and hydrobiological studies of the sea part of the deep-water navigable channel as well as the near bank ecosystems in the territory of the Danube biospheric reserve.
- Monitoring of the fish fauna condition and assessment of the negative impact of the Danube – Black Sea navigable channel operation on fish resources.
- Monitoring of plant and animal communities in the shoreline and reed beds of the Danube biospheric reserve in the course of the Danube – Black Sea navigable channel operation.
- Long–term observations of dynamics of the delta seaside and river bed processes with the use of space images.
- Analysis and consolidation of the observation results, development of forecasts of changes in the environment; assessment of a possible cross-border impact of maintenance dredging and shipping.

– Development of guidelines for prevention and minimization of the impacts of the deep-water navigable channel operation upon the environment, including in the cross-border context.

The results of 2004 comprehensive ecological monitoring indicated that the impacts of the activities aimed at renewal of the deep-sea navigable channel operation were characterized by Ukraine as local and limited. In other words, according to the Ukrainian environmental experts conducting the monitoring, the recorded impacts would not lead to considerable changes of the main parameters of the environment and biodiversity of the Danube Delta, and the actual changes in the controlled indicators do not exceed the forecasted values and are, most frequently, less essential. The Ukrainian experts noted that during that monitoring period the impact upon development of plant and animal communities in the Delta was connected, primarily, with climatic and seasonal hydrological changes.

The same experts did not record any transboundary impact of dredging and soil dumping at the sea dumping site (located at a distance of 8 km from the seaside of the Delta) on the Romanian territory. This is confirmed, according to Ukraine, by the results of measurements of suspended matter and pollutants made at the baseline stations.

Ukraine informed that there were no international experts involved in the monitoring. Ukraine suggested coordinating the general concept and the joint monitoring strategy so as to save funds and include, if possible, monitoring of the sturgeons.

Romania presented the results of monitoring of birds that nest in the south of the Danube Delta Biosphere Reserve nearby Musura Island. Romanian experts noted the substantial reduction of certain bird colonies due to disturbance of the reclaimed lands at the exit from the Danube Delta. Also, Romania drew the attention to a possible impact of dredging works upon the state of fry and adults of the migrating sturgeon species, which it insisted had not been properly assessed. Romania mentioned that two sturgeon monitoring stations type DKMR-01T were installed downstream-upstream of Bystroe channel to increase the confidence level of the volume of information on migration routes of adults tagged with ultrasonic. In Romania's opinion, the preservation of individual species protected by the Bern Convention necessitates a joint monitoring of these species. According to Romanian experts while migrating sturgeons seem to use the Starostambulsky Arm in the Ukrainian section, there is no information on the situation of other arms. Therefore a real picture of sturgeon and other fish species migration could be obtained only through joint monitoring in Romania and Ukraine.

Ukraine provided information pertaining to the dynamics of bird population on the reclaimed lands and to the impact of ramping of these areas, of invasive species (stray dogs) and elongation of the Sulina dam. Fishing intensity in the Bystroe Arm is reduced due to regulation of shipping. According to Ukraine a link between renewal of shipping in the Bystroe Arm and the data provided by Romania is not evident and should be studied further.

The Romanian and Ukrainian members recalled that joint monitoring as agreed 7 years ago could not be implemented because of lack of financial resources.

b) Status of conservation in the Agreement area of flora and fauna species listed in Annexes 1 and 2 of the Bern Convention

Ukraine and Romania presented information about the current state of preservation of the species protected by the Bern Convention. Within the Ukrainian section of the Danube Delta strictly protected are 5 plant species and 230 animal species. Besides, 137 species are also to be protected.

Romania also provided information concerning preservation of the indicated species which are, in their majority, common for the Romanian and Ukrainian territories. In total, 10 species of vascular plants, 19 species of mammals, 237 species of birds, 10 species of reptiles, 6 species of amphibians, 2 species of fish, 10 species of invertebrates.

Romania proposed a draft Scientific Monitoring Programme for 2015 to assess the environmental state of the Danube Delta, including the resources which will be made available by Romania to conduct the monitoring.

The Joint Commission emphasized the necessity of planning and performing joint steps aimed at improving the conservation of flora and fauna species listed in Annexes 1 and 2 of the Bern

Convention. The Joint Commission decided to ask for support from the European Union in monitoring the environmental conditions in the Danube Delta and the Lower Prut area.

The Joint Commission agreed to implement joint monitoring programmes, along the lines presented in the Romanian proposed Program, particularly those aimed at identification of causes of impacts on conservation of the species protected by the Bern Convention. The Joint Commission agreed to set up a Working Group for conducting the joint monitoring. The Romanian proposals will be considered by Working Group in order to develop its work schedule with due account of its mandate within the frame of the Commission. The number of experts from each country, as well as the international experts, will be subsequently determined.

c) ***Draft Final report on implementation of Recommendation No. 111 (2004) of the Standing Committee of the Bern Convention. Proposals for improvement of conservation in the Agreement area of flora and fauna species listed in Annexes 1 and 2 of the Bern Convention (Ukraine)***

During the meeting, Ukraine presented a draft of a "Final Report on fulfilment of Recommendation No.111 (2004) of the Standing Committee of the Bern Convention to the Romanian and Moldova Parties". Ukraine proposed this document to be sent to the Bern Convention Bureau for consideration at its next meeting for preparation of a Bern Convention Standing Committee draft resolution concerning the closure of the file. Ukraine proposed that measures contained in Recommendation No.111 should be implemented jointly by Ukraine, Romania and the Republic of Moldova, through the Joint Commission.

Romania noted that the Members of the Commission were not given the time to analyze the document prepared by Ukraine. It nevertheless observed that since this document represented the Ukrainian position on the matter, Ukraine was free to do with it whatever it choose to, including submitting it to the Standing Committee of the Bern Convention. According to Romania, the role of the Joint Commission is to deal with tangible issues of cooperation, such as joint monitoring, fishing prohibitions and alike, and not make recommendations to the bodies of the Bern Convention.

The Republic of Moldova agreed with this approach, and noted that the Standing Committee of the Bern Convention would make its decisions based on the information it received, both from the Joint Commission as well as from individual Parties.

The Joint Commission decided that the document represented Ukraine's views on the matter and thus could be used as Ukraine saw fit.

Updating information on the status of the trilateral common projects. Project "Consolidation of the nature protected areas network for biodiversity protection and sustainable development in the Danube Delta and Lower Prut River Region – PAN nature MIS ETC 1716"

The Joint Commission noted that the status of the trilateral common project "*Consolidation of the nature protected areas network for biodiversity protection and sustainable development in the Danube Delta and Lower Prut River Region – PAN nature MIS ETC 1716*" would be discussed during 28-29 May in Vilcovo, Ukraine.

Joint Commission proposals on priority activities for the next period and mechanisms for their implementation

The Joint Commission stressed the importance of the future cooperation between the three countries and expressed their willingness to enhance such cooperation in the field of environment protection, based on the agreed list of priority activities.

The Joint Commission recalled its decisions taken during its third meeting, namely:

a) The Joint Commission agreed to establish a specific sub-working group for enhanced monitoring of fish;

b) The Joint Commission agreed that the three countries should cooperate in harmonizing the three countries legislation with the EU rules in the field of environmental protection;

c) The Joint Commission encouraged the Republic of Moldova to continue its efforts towards either establishing the Republic of Moldova protected facility or the Republic of Moldova part of the trilateral biosphere reserve.

d) The Joint Commission agreed that it represented the structure referred to in the Pamplona Recommendations;

e) The Joint Commission instructed Romania to present at its next meeting a report on the measures further needed to ensure full compliance with the Pamplona Recommendations;

f) The Joint Commission agreed that project proposals need to be developed in respect of exchange of experience, improvement of cooperation in management and joint training, particularly of the specialists of the biosphere reserve security service;

g) The Joint Commission decided to ask for support from the European Union in monitoring the environmental conditions in the Danube Delta and the Lower Prut area;

h) The Joint Commission agreed to develop and implement joint monitoring programmes, particularly those aimed at identification of causes of impacts on conservation of the species protected by the Bern Convention;

i) The Joint Commission agreed to set up a Working Group for conducting the joint monitoring;

j) The Joint Commission decided that the document presented by Ukraine represented Ukraine's views on the matter and thus could be used it as Ukraine saw fit.

The Joint Commission decided that draft Protocol of the meeting will be prepared by Ukraine and discussed electronically.

The Joint Commission agreed to hold its next meeting in Odessa, Ukraine, in October 2015.

Annexes 1 and 2 are integral parts of this Protocol.

On behalf of the Ministry of Ecology and Natural Resources of Ukraine	**On behalf of the Ministry of Environment, Waters and Forests of Romania**	**Ministry of Environment of Republic of Moldova**
Dr. Ihor Ivanenko **Director** **Department of Protected Areas**	**Mr. Lucian Eduard Simion** **Governor** **Danube Delta Biosphere Reserve Administration**	

Annex 1

List of Participants

1. Delegation of Ukraine:

- ***Members of the Commission***

Mr Igor Ivanenko, Director of the Department of Protected Areas, Ministry of Ecology and Natural Resources, Head of delegation, Chair of the Commission

Mr Ruslan Gidora, I Secretary, II European Department, Ministry of Foreign Affairs of Ukraine

Mr Oleksandr Voloshkevich, Director of the Danube Biosphere Reserve

- ***Experts***

Mr Oleksander Vasenko, Deputy Director of the Ukrainian Scientific Research Institute of Ecological Problems

Ms Olga Kiosse, Chief Specialist, Department for Ecology and Natural Resources, Odessa Regional Administration

Mr Ivan Cheroy, Head of the Danube Basin Administration of Water Resources

Mr Mychailo Kornilov, Deputy Director of the Danube Hydrometeorological Observatory

Mr Oleg Skaraiev, Director of the State Enterprise "Izmail Forestry"

Mr Oleg Diakov, Project Manager of the Project "Consolidation of the nature protected areas network for biodiversity protection and sustainable development (SD) in the Danube Delta (DD) and Lower Prut River Region (LPRR) - PAN Nature MIS ETC 1716"

Mr Andriy Abramchenko, Head of the Izmail District State Administration

Mr Yuriy Maslov, Head of the Committee on Budget, Economic Policy and Banking, Odessa Regional Council

2. Delegation of the Republic of Moldova:

- ***Members of the Commission***

Ms Veronica Josu, Deputy Head of the Natural Resources and Biodiversity Directorate, Ministry of Environment, Head of delegation

Mr Iurie Ursu, Director of the Fisheries Service, Ministry of Environment

3. Delegation of Romania:

- ***Members of the Commission***

Mr Eduard Lucían Simion, Danube Delta Biosphere Reserve Authority Governor, Head of delegation

Ms Antoaneta Oprişan, Advisor, Biodiversity Directorate, Ministry of Environment, Waters and Forests, Focal point for the Bern Convention

Mr Felix Zaharia, Ist Secretary, International Law and Treaties Department, Ministry of Foreign Affairs, Member of the Bern Convention Bureau

- **Experts**

Mr Marian Tudor, Director of the Danube Delta National Research Institute

Ms Ana Drapa, Advisor, Water Resources Management Directorate, Ministry of Environment, Waters and Forests

Mr Ion Munteanu, Head of Unit Danube Delta Biosphere Reserve Administration

Ms Claudia Lăcrămioara Chioaru, Deputy General Director, General Directorate of European Affairs and International Relations, Ministry of Environment, Waters and Forests

Ms Adela Paţiu, Advisor for European Affairs, General Directorate of European Affairs and International Relations, Ministry of Environment, Waters and Forests

Mr Gheorghe Scintee, The Romanian National Environmental Guard (Romanian-Ukrainian translator)

Annex 2

Agenda of the third meeting of the Trilateral Joint Commission Izmail, Ukraine, 20-21 May 2015

20 May 2015

14.00-18.00	Arrival of participants and accommodation
18.00-20.00	Informal meeting of the delegations

21 May 2015

8.30-9.00	Registration
9.00-9.20	Greetings of delegations
9.20-9.30	Approval of the agenda
9.30-10.15	Brief information on priority activities
10.15-13.00	The status of implementation of Recommendation No. 111 (2004) of the Standing Committee of the Bern Convention on the proposed navigable waterway through the Bystroe estuary (Danube Delta, Ukraine) a) state of trilateral cooperation and monitoring data exchange
11.00-11.20	Coffee break
	b) status of conservation in the Agreement area of flora and fauna species listed in Annexes 1 and 2 of the Bern Convention
	c) draft Final Report of Ukraine on the Recommendation No. 111 (2004) of the Standing Committee of the Bern Convention. Proposals for improvement of conservation in the Agreement area of flora and fauna species listed in Annexes 1 and 2 of the Bern Convention
13.00-14.00	Lunch break
14.00-14.30	Updating information on the status of the trilateral common projects, including on the project concerning “Consolidation of the nature protected areas network for biodiversity protection and sustainable development (SD) in the Danube Delta (DD) and Lower Prut River Region (LPRR) – PAN Nature MIS ETC 1716”
14.30-15.00	Implementation of the UNESCO Pamplona Recommendations for the Establishment and Functioning of Transboundary Biosphere Reserves
15.00-15.30	Joint Commission proposals on priority activities for the next period and mechanisms for their implementation
15.30-16.00	Adopting the Protocol of the meeting. Closure of the meeting

MINISTRY OF ECOLOGY AND NATURAL RESOURCES OF UKRAINE

DEPARTMENT OF PROTECTED AREAS

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30.06.2015
No 9/650-15

COMPLAINT N 2004/1 – CASE-FILE OPEN ON UKRAINE: PROPOSED NAVIGABLE WATERWAY IN THE BYSTROE ESTUARY (DANUBE DELTA)"

Thank you for your kind suggestion (letter of 27 April 2015 DG-IV IdA/vdc) to forward you the report of the meeting of the Ukraine-Moldova-Romania Trilateral Joint Commission and the list of agreed recommended actions, which was held on 20-21 May, 2015 in Izmail (Ukraine).

Making reference to the vacation period reasons, Romanian partners kindly invited Ukrainian Party to postpone the finalizing of the Protocol of the meeting. Any way the Commission agreed to improve joint monitoring and management of the species protected by the Bern Convention.

We are pleased to provide the Secretariat of Bern Convention with the following documents such as: Updated report on executing of Recommendation No 111 (2004) of the Standing Committee of the Bern Convention on the proposal navigable waterway through the Bystre estuary (Danube Delta, Ukraine) which based on the monitoring within the Danube Delta since 2004; and Report on the monitoring data in 2014.

I hope the presented documents will constitute the significant basement and conclusive proof for the Bureau of Bern Convention to have an irrefutable reason to dismiss the open case-file and initiate the follow-up monitoring of the Recommendation 111.

Annexes: above mentioned.

Director of the Department of Protected Areas **Igor Ivanenko**

UPDATED REPORT OF UKRAINE

ON EXECUTING OF RECOMMENDATION NO 111 (2004) OF THE STANDING COMMITTEE OF THE BERN CONVENTION ON THE PROPOSAL NAVIGABLE WATERWAY THROUGH THE BYSTRE ESTUARY (DANUBE DELTA, UKRAINE) ADOPTED BY THE STANDING COMMITTEE ON 3 DECEMBER 2004

Recommends Ukraine to:

1. suspend works, except the completion of phase 1, and do not proceed with phase 2 of the project until:

- **the EIA for phase 2 is undertaken to international standards and submitted to the relevant international experts and organizations**

According to this recommendation activities within the Phase 2 is not initiated. Ukrainian side handed, pursuant to Articles 2.3, 2.6, 3.8, 4.1, 4.2 of the Espoo Convention, to the Romanian side over the documentation of Environment Impact Assessment (EIA) for the project "Creation the deepwater navigable route Danube – Black Sea on Ukrainian section of the Delta. Full development" (Note of the Embassy of Ukraine in Romania from 19.01.2009 No 96). The above mentioned EIA is developed in accordance with article 4 of the Espoo Convention.

Ukraine has provided an international assessment of the EIA, which was attended by experts and scientists of different national and international institutions - altogether 17 experts.

On 5th of March, 2015, the Ministry of Ecology and Natural Resources of Ukraine organized consultations between Ukrainian and Romanian representatives on implementation of decisions IV/2, V/2 та V/4 of Conference of Parties of the Espoo Convention on navigable channel "Danube – Black Sea". Parties recognized the needs for bilateral monitoring of Danube Delta. The Romanian side confirmed its intention not express the claims to the first phase of the project "Creation the deepwater navigable route Danube – Black Sea on Ukrainian section of the Delta. Full development" and offered to consider the second phase of the project as a new project. Such proposal provides an opportunity to resolve disputed issues in the framework of the recommendations of Bern Convention, Espoo Convention and Aarhus Conventions and the same time intensify cooperation under the Bern Convention to prepare for the meeting to be held in May 2015. After this meeting the Ministry of Ecology and Natural Resources of Ukraine has sent to the Ministry of Environment and Climate Change of Romania the Final summary research report "Comprehensive Environmental Monitoring during the Construction and Operation of the Danube – Black Sea Deepwater Navigable Route in 2014: Maritime Access Channel".

– **the public consultation on the EIA for phase 2 takes place and the proposals made during the discussions are duly considered**

In recent years Ukraine has initiated public hearings on the implementation of this project. Despite numerous attempts of the Ukrainian side to bring on both as on the Romanian territory and the Ukrainian side public hearings on these issues in accordance with the recommendations and requirements of international organizations and agreements and procedures, the Romanian side has avoided the cooperation on this matter. The consultations with representatives of the European Commission on the draft of deepwater navigable way Danube – Black Sea took place on October 8, 2010 in Kyiv (Ukraine). During the consultations the sides discussed the issues of the project renewing of deepwater navigable route Danube – Black Sea. Ukrainian side informed the European Commission and the Secretariat of the Espoo Convention on the Romanian side refused to take part in the Ukrainian – Romanian negotiations on the implementation of the Espoo Convention.

- **the data collected during the additional monitoring program with involvement of international experts is analysed and adequate recommendations are elaborated**

Ukrainian Party as a result of numerous international meetings with the Romanian side, UNEP, UNESCO, European Commission, International Commission for Protection of the Danube River

(ICPDR), secretariats of the Ramsar and Aarhus Conventions and the Espoo Convention, the World Wildlife Fund, Center for International Environmental Law and International Union for Conservation of Nature on developing of Ukraine the project t DNP Danube – Black Sea, as well as consideration of additional data monitoring programs prepared appropriate recommendations on which was completed EIA project.

Since 2004, in the area of the project "Creation the deepwater navigable route Danube – Black Sea on Ukrainian section of the Delta. Full development" had been implemented environmental monitoring, the results of which indicate a lack of actual and potential transboundary impact of planned works on the conservation of wild flora and fauna within the competence of the Bern Convention (the Report attached).

2. provide additional information on ecological and socio-economic aspects of alternative solutions and viable options of further development of shipping activities in the Ukrainian part of the Danube Delta; to this end prepare an Environmental Impact Assessment report with independent international experts, including from neighbouring states

While developing the project "Establishment of the deepwater navigable route in the Ukrainian part of the delta" all alternatives to the route of waterway are thoroughly considered. More detailed information can be obtained in the document "Evaluation of the likely transboundary environmental impacts of deepwater navigable route Danube – Black Sea on Ukrainian section of the Delta' (Revision 2), part 3 "Description of the proposed activity, its objectives and alternatives" for the link: http://www. menr.gov.ua/content/article/7098. EIA for Phase 1 of projects and for Phase of full development was presented to the international community, national scientific and public organizations, and posted on the Internet - websites GP "Delta-pilot" and the Ministry of Transport of Ukraine.

These documents were considered by international experts, specialists from neighboring countries. The final document took into account their concerns and was amended in 2008 with a separate analysis of impacts in a transboundary context.

3. provide, for measures of ecological compensation and mitigation for any possible environmental damage; in that context finalize the official approval of proposed zonation which foresees the considerable expansion both in quality and quantity of the protected area; analyse the impact of phase 1 of the project

These measures are described in detail in the document "Evaluation of the potential transboundary environmental impacts of DNP Danube – Black Sea on Ukrainian section of the delta" (Revision 2), Section 5.3.7, "Analysis of the structure of possible transboundary cumulative effects of shipping, habitats losses and / or disturbance/ of fish life and birds and the assassement of mitigating measures effectiveness" and section 7 "Measures to minimize the potential negative transboundary environmental impact", which could be found at the link: http://www.menr.gov.ua/content/article/7098 .

As a result of comprehensive monitoring measures for environmental compensation are designed, size of payment for water pollution and for the dredging damage caused to fish stocks are specified. These measures are a part of the project "Creating of the deepwater navigable route Danube – Black Sea on Ukrainian section of the Delta. Full development". Environmental compensation payments were carried out in full accordance with the civil and environmental legislation of Ukraine regarding to international standards. By the Order of the Ministry of Environment of Ukraine of 22.10.2008 No 538 the Regulations of the Danube Biosphere Reserve approved and set of differential protection regime, rehabilitation and use of natural systems set up by functional zoning. Management Plan of the Danube Biosphere Reserve approved by the Order of the Ministry of 04.10.2010 No 435 and functional zoning of the Reserve is revised, considering, additional territories, those became pert to the Danube Biosphere Reserve.

The negotiations with World Wildlife Fund on possible ecological compensation measures were continued as well.

4. invite in the coming months the international community to participate in a process to elaborate a Strategic Development Plan for the region that would stress the sustainability of social and economic activities and would assure the maintenance of the unique ecological values of the area and their long-term preservation

In order to create conditions for sustainable development of the Danube region, the efficiency of its domestic natural resources and economic potential, living standards, resolving socio-economic and environmental problems "The program of integrated development of Ukrainian Danube in 2004 – 2011 years" is implemented according to the Resolution of the Cabinet of Ministers of Ukraine dated March 31, 2004 No 428

One of the main priorities of Ukraine has become an active part in the preparation and subsequent implementation of measures within the EU Strategy for the Danube Region (EUSDR), which was approved in 2011. These measures will take into account the interests of all basin countries, especially those outside the EU Member States.

June 13, 2011 in Izmail a public hearings "The priorities of the Ukrainian National Action Plan for the Danube Strategy the EU" held as part of the International Fund "Renaissance" project "Informing and public participation encouraging in developing of the National Action Plan for the European Strategy for the Danube Region". Proposals to this Plan are elaborated.

Decision of the Odessa Regional Council (26.04.2015 № 432-VI) approved the Strategic Plan for competitiveness and economic development of the Danube economic sub-region for the period of 2012 – 2022 years. This plan is designed by Expert Committee on Strategic Economic Development Planning by the US Agency for International Development as part of USAID "Local Investment and National Competitiveness".

Order of the Odessa Regional State Administration from 04.09.2012 g. No 942 / A-2012 approved measures to implement the Strategic Plan of the competitiveness and economic development of the Danube economic sub-region for 2012 – 2022 years.

Odessa region of Ukraine is an active member of the Euroregion "Lower Danube" and plays substantial role in cooperation with the Agency of Transbondary Cooperation of Euroregion "Lower Danube".

On November 25, 2014, the Government of Ukraine has approved the new Concept of the State Regional Development Program for Ukrainian Danube 2014─2017 years, which aimed to solve actual issues of the.

5. consolidate a large area of strict protection free as far as possible of human interference, placing outside the protected area economic activities that are likely to negatively affect biological diversity, such as industrial activities linked to shipping, new building, etc.

Ukraine has taken appropriate measures to enhance the conservation status of the Danube Delta Biosphere Reserve and to expand its territory. By the Decree of President of Ukraine of 02.02.2004 No 117/2004 "On the expansion of the Danube Delta Biosphere Reserve" its area was increased to 3850 hectares and 1295 hectares were granted to permanent use of the Danube Biosphere Reserve, which increased the area of strict conservation. According to UNESCO Programme "Man and Biosphere" in the Management Plan of the Danube Biosphere Reserve it is thoroughly regulated the measures for strict protection of natural complexes and objects of the biosphere reserve.

Recommends Moldova, Romania and Ukraine to:

6. Complete national legal procedures for entry into force of the Agreement between Moldova, Romania and Ukraine on cooperation in the area of protected natural areas Danube Delta and the lower part of the Prut River

Agreement between the Ministry of Environment and Territorial Planning of the Republic of Moldova, Ministry of Water, Forests and Environmental Protection of Romania and the Ministry of Environment and Natural Resources of Ukraine on cooperation in the zone of the Danube Delta and

Lower River Prut nature protected areas, signed by Ukraine June 5, 2000 and after completion of internal procedures came into force on October 4, 2006.

In accordance with paragraph 2 of Article 4 of this Agreement in March 2011 in Bucharest, Romania, hosted the first meeting of the Joint Trilateral Commission. The meeting discussed coordinated initiatives of the protected areas of the Danube Delta and Lower Prut, the development of joint monitoring programs of environmental factors and economic activities, a trilateral biosphere reserve, experience exchange and cooperation for the joint management of protected areas in the border region.

The second meeting of the Joint Commission was held in the city Tulcea, Romania, on 28th of November, 2013. At the meeting Parties exchanged information on the results of environmental monitoring of protected areas and cites in Danube Delta. The Romanian Party has noted improvement of habitats and biodiversity within the biosphere reserve in the Danube Delta through the implementation of measures financially supported by the States and the European Union. It was noted that Recovery flushing in the areas of Ermak island in the Ukrainian part of the Danube Delta is one of the best examples of environmental activities in the region. The Parties underlined and welcomed the successful implementation of more than 15 bilateral and international environmental projects in the Danube Delta. Parties agreed that it is necessary to continue developing and strengthening of trilateral cooperation to improve the integrity of the ecosystem of the Danube Delta region; they stressed the need for further monitoring and exchanging data on the ecological condition of the Danube Delta.

The third meeting of the Joint Commission was held in the city Izmail, Ukraine (20 – 21 May 2015). The Parties exchanged information on monitoring data for 2014, reviewed the implementation of Recommendation number 111 (2004) of the Standing Committee of the Bern Convention on the proposal navigable waterway through the Bystre Estuary (Danube Delta, Ukraine**)**, the state of conservation of flora and fauna species listed in Annexes 1 and 2 of the Bern Convention; considered and approved the draft of Final Report on the implementation of Recommendation number 111 (2004) of the Standing Committee of the Bern Convention; discussed proposals to improve conservation of species of flora and fauna listed in Annexes 1 and 2 of Bern Convention in the framework of trilateral Agreement; exchanged updated information on the status of joint trilateral projects, in particular, project "Consolidation of the network of protected areas for biodiversity conservation and sustainable development of the region of the Danube Delta and Lower Prut – PAN Nature - code MIS-ETC 1716"; discussed the proposal of the Joint Commission on the priorities for the next period and mechanisms for their implementation. Particular attention was paid to measures for the conservation of flora and fauna species of interest in the framework of the Bern Convention.

7. develop constructive dialogue between the national and local authorities, local communities, non-governmental organizations, and scientists, and communicate openly about the progress of decision making

During 2007 – 2011 years there were implemented the numbers of joint activities such as consulting, Internet conferences, media forums, public hearings with involving the governmental, public and non-governmental organizations representatives concerning further developing of the Project.

In October, 2010 in Kyiv it was held the consultations with the EU on the project of the deepwater navigable route "Danube – Black Sea". During the consultations the sides discussed the issues of project renewing of deepwater route "Danube – Black Sea", the works under Phase I and Phase II of the project implementation, information on the monitoring of the Ukrainian part of Danube Delta, the steps taken for implementation of the Espoo Convention as part of the deepwater navigable route "Danube – Black Sea". Ukrainian side informed the European Commission and the Secretariat of the Espoo Convention about rejection of the Romanian side to participate in bilateral Ukrainian-Romanian negotiations on implementation of the provisions of the Espoo Convention.

8. welcoming Ukraine's initiative to launch a scientific monitoring programme to assess, in the long term, the environmental state of the Danube delta, including the effects of the navigable waterway and the success of any mitigation and compensation measures, invite experts from the Danube basin countries to participate in the programme and hold periodic meetings and consultation

In 2004 Ukraine has launched a system of integrated monitoring of the Danube Delta environment, which contains the program of environmental and engineering monitoring, combines various types of research, such as regular monitoring, comprehensive examination and special types of studies. To carry out these programs dozens of leading scientific and engineering institutions were attracted. The coordination of these activities is carried by Ukrainian Research Institute of Ecological Problems.

Summarized results of monitoring conducted during 2004 – 2014, to make the following main conclusions on the state of the ecosystem of the Ukrainian part the Danube Delta during the DNP to restore Danube – Black Sea for Phase 1.

The trend value for the flow redistribution between the Kiliya and Tulcea Mouths (Branches) of the Danube is the constant growth of the fate of Romanian Tulcea Mouth runoff (from 33% to 51% in 50 years of observations) and, accordingly, decreasing in the fate of the runoff of the Kiliya Mouth. Hydraulic and dredging of the mouth on a bar counter of Bystre estuary in a general decrease in runoff system of the Kiliya Mouth, contributing only to stabilize the water flow of the Bystre Estuary but have no cross-border impact. Forecast calculations show that developing of the Georgiivsky Mouth will be a decisive factor in determining the dynamics of water content of main branches of the Danube Delta, in the case of any construction works. The reduction in the its length in 1981 – 1992 from109 to 76 km (30%) by building undocked channels still increases overcut of the cross-sectional channels and activation of the Georgiivsky and Tulcea Mouths.

The significant effect to present-day morphological processes on the sea edge of the Kiliya part of the Danube Delta is caused by: reducing of solid runoff of Danube River; flow redistribution between the Tulcea and Kiliya Mouths; raising the Black Sea level. According to satellite monitoring data there is some cyclical in forming the spits, but conclusions about the dynamics and frequency can be done in a few years of observations.

Formation of hydrochemical regime of seaside caused by, mainly, the flow volume and transformation of Danube waters, meteorological and hydrological conditions of the area and development of production-destruction processes.

Long-term hydrobiological studies allow to affirm the absence of direct impact of the renewing and maintenance of waterway Danube – Black Sea to the biotic communities of phytoplankton, zooplankton, zoobenthos, fish fauna of the studied water bodies, except for certain violations of local community structures in the immediate areas of hydraulic engineering works.

Overall, the results of monitoring carried out during the restoration and maintenance of DWW Danube – Black Sea, not the facts recorded of the decrease of species diversity of flora and fauna in protected areas.

There was not registered any cross-border impact of dredging (held only on the sea approach channel to support its passport characteristics) and dumping soil on marine underwater dump, located in the distance of 8 km from the sea edge of the Danube Delta, waters in Romania is not fixed, as evidenced by the results of the determinations of concentrations of pollutants and suspended substances on background stations.

The comprehensive monitoring results form 2004 showed that the impacts of DWW renewing can be characterized as a local and limited. That is, recorded impacts do not result in significant changes in basic parameters of the environment and biodiversity of the Danube Delta, and actual changes in controlled parameters do not exceed the forecast, and often less substantial. Impact on plant and animal communities of the delta development during the reporting period was mainly related to climatic and seasonal hydrological changes.
In early 2011 under the auspices of the International Commission for the Protection of the Danube

River (ICPDR) and UN ECE, Ukraine, Romania and Moldova launched the project "Joint environmental monitoring, evaluation and exchange of information for integrated management of the Danube Delta region".

9. use the framework of that agreement and the Bern Convention to promote dialogue on environmental issues affecting the biological diversity of the Danube Delta

Several international projects for improvement of transboundary cooperation and Danube Delta biodiversity conservation have been realized, namely:

- *Phare Project (CBC RO 2004/016.942.01.01.19) "Integrated System for Monitoring the Environment Factors, Biodiversity and Natural Resources in the Danube Delta Transborder Biosphere Reserve (Romania/Ukraine)" in the frameworks of European Union Neighbourhood Programme, Romania/Ukraine, 2004-2006.*

The main objective of the project (to improve cross-border integration between boundary regions by posing good bases for sustainable economic development) was achieved by implementing its main activities including: the elaboration and implementation of the joint integrated monitoring program for the Cross Border Biosphere Reserve "Danube Delta" (Romania/Ukraine), based on the inventories of existing ecological situation in the both sides of the Danube Delta and by ensuring facilities for the implementation the joint monitoring program (to facilitate the joint survey actions, samples collection and processing, data transfer), purchasing a mobile laboratory and endowing it for sample collecting and analyze; the establishment of a joint working group responsible for the implementation of the monitoring program; the organization of the field expeditions for joint survey and for samples collecting and processing; ensuring the data processing and transferring to the reserves authorities to be used in the prevention and reducing the effects on both sides of the cross-border protected area, or for substantiation the harmonized measures/decisions regarding the management of the Cross Border Biosphere Reserve "Danube Delta" (Romania/Ukraine); the dissemination of the results on the web page of the cross-border biosphere reserve, through information materials produced under the project and media releases.

- *Phare Project (CBC RO 2004/016.942.01.01.19) «Cross border cooperation demonstrating the multiple use and benefits of wetlands restoration (in Zagen and Stensovsko Zhebrianski Plavni Polders) in Danube Delta Cross Border Biosphere Reserve (Romania/Ukraine)», 2007 – 2009.*

The project contributed to the overall objective to improve cross-border integration between border regions laying the foundation for sustainable economic development. It was helped a new cycle of sustainable development, by improving environmental protection and management in the areas, by demonstrating the role of wetland restoration in ecology, economy, recreation, community involvement, monitoring, research and education. Project objective was achieved through the implementation of its main activities: developing a feasibility study and an impact study for the restoration of Zagen polder in Romania, by organizing study visits for learning from the experience of Stensovsko Zhebrianski Plavni restoration in Ukraine, and use of multiple benefits deriving from EU wetland restoration (border areas), dissemination of results through informative materials (leaflets, mass media). At the end, the project was produced a Feasibility study and an Impact study for the restoration of Zagen polder in Romania. Based on these two studies, the next stage was started investments for restoration work, aiming to transform a wetland without economic importance in a place for recreation, research and education, that was introduced in the tourist offer for visitors. This was served to environmental education activities for children and students, as a practical demonstration of sustainable development for a protected area. After restoration the recreation area was administered by Tulcea City Hall, becoming a source of income for local budget and providing jobs for local population.

- *WWF Project in framework of ENRTP (European Commission) "Climate Proofing the Danube Delta through Integrated Land and Water Management", Romania/Ukraine/Moldova, 2011 – 2013.*

The main objective of the project was to lay the groundwork for a timely and thorough adaptation of Ukrainian, Moldovan and Romanian areas of the region of the Danube Delta to the changing climatic conditions. Adaptation to new environmental conditions should be holistic and systematic and

should occur at all levels, including the management personnel, local businesses, communities and natural systems.

To achieve this goal it was carried out a comprehensive study of the possible impact of climate change on the Danube Delta, on which basis it was developed the "Cross-border Climate Adaptation Strategy of the Danube Delta". These documents helped governments and environmental organizations of three countries to understand the overall picture of the expected changes and directions of work of the region to adapt to them. They laid the foundation for a comprehensive solution to the problem that will be more effective than individual actions on climate change adaptation.

The project also helped the local communities to reduce the greenhouse gases emissions through the use of biomass, instead of fossil fuels as a source of the heat. In the Ukrainian Danube Delta it will be the pilot project for the generation of "green" energy from reed biomass and shrubs. Harvesting of the biomass was contributed to restoration of the reedbeds, as well as to provide new sources of income for local businesses and population. After the realization of the pilot project, there were conducted the trainings and meetings for the stakeholders to share the experience in implementing of the similar projects.

- *Project of the European Commission "Consolidation of the nature protected areas network for biodiversity protection and sustainable development in the Danube Delta and Lower Prut River Region – PAN Nature (code MIS ETC 1716), Romania/Ukraine/Moldova, 2013 – 2015.*

Overall objective of the given project is to reduce the loss of biodiversity and to improve the local people's livelihoods through introducing an integrated approach to the management of natural resources in the transboundary Danube Delta and Lower Prut River Region, and strengthening community involvement in the sustainable development of the region.

Specific objectives were: to improve institutional framework for the transboundary management of protected areas in the region by fostering activities of the Joint Trilateral Commission; to assist Republic of Moldova with establishing a Biosphere Reserve in the Lower Prut area; to extend protected areas in the Ukrainian part of the Danube Delta and make a pilot rehabilitation of degraded wetland ecosystems; to strengthen cooperation in the management of Danube Delta Transboundary Biosphere Reserve (Romania/Ukraine); to set up a joint fire prevention and warning system in the Danube Delta Transboundary Biosphere Reserve.

Recommends that Ukraine

10. call, under the auspices of the Council of Europe, for a meeting of the states signatories of the Agreement to discuss relevant matters concerning this and other issues dealt with in the Agreement

Recommendation No 111 (2004) was discussed at all three meetings of the Joint Commission of the Agreement in 2011, 2013 and 2015.

Kyiv, 2015

UDC 504.064.3:282.243.7

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APPROVED BY
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25.12.2014

FINAL SUMMARY RESEARCH REPORT

Comprehensive Environmental Monitoring during the Construction and Operation of the Danube – Black Sea Deep Navigation Route in 2014: Maritime Access Channel

(Contract No. 1320/1.1 of 16.04.2014)

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2015

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INTRODUCTION

In 2014, the monitoring activities were carried out in line with the Terms of Reference for the Contract No. 1320/1.1 of 16.04.2014 and the 2014 Comprehensive Environmental Monitoring Programme for the Operational Phase of the Danube – Black Sea Navigation Route: the Maritime Access Channel".

USRIEP (the Ministry of Ecology of Ukraine) as the Main Contractor subcontracted the following organizations to undertake various components of the assignment: the Danube Hydrometeorological Observatory, Odessa Centre of the Southern Scientific Research Institute of Marine Fisheries and Oceanography, ChornomorNDIProject State Enterprise, Danube Biosphere Reserve of the NASU, Institute of Marine Biology of the NAS of Ukraine (IMB NASU), and Ukrainian State Design Institute for Fish Industry ("UkrRybProject").

Key activities included in the 2014 Monitoring Programme are listed below:

- Undertake regular hydrological and hydrochemical monitoring at the baseline monitoring sites, at the hydro-engineering work sites and within the potential area of influence of the Danube-Black Sea Deep Navigation Route on the environment and process the monitoring results;
- Undertake the water and bottom sediment quality control measurements during dredging operations in the maritime access channel of the navigation route and in the area of the offshore dredge spoil dump and process the results;
- Assess the cumulative impact of shipping on the terrestrial and aquatic ecosystems;
- Assess the condition of fish spawning habitats and bird nesting and foraging habitats;
- Undertake a comprehensive field survey to assess water quality and condition of various environmental components. A comprehensive field survey includes the hydrological, hydrochemical and hydrobiological surveys in the maritime section of the navigation route, as well as a survey for assessing the status of riparian ecosystems in the Danube Biosphere Reserve (DBR);
- Monitor the state of fish fauna and assess adverse impact on fish resources during the operation of the Danube-Black Sea Navigation Route;
- Prepare a scientific and biological justification required to understand whether the maintenance dredging works including the use of the offshore dredge spoils dump can be carried out in the maritime access channel of the navigation route during the spawning ban;
- Develop fish protection measures and produce an initial estimate of damage caused to biological resources by maintenance dredging operations in the maritime access channel of the navigation route;
- Produce a quarterly estimate damage incurred to the aquatic environment and fish resources and associated compensation payments; and assess the remaining disposal capacity of dredge spoils dump sites (including the offshore dump etc.).
- Monitor the condition of flora and fauna communities inhabiting the riparian and wetland areas in the Danube Biosphere Reserve during the operation of the navigation route;
- Review and summarise the monitoring results, forecast changes in the state of environment; and assess potential transboundary impacts of maintenance dredging and shipping operations;
- Formulate recommendations on preventing and minimizing the environmental impacts associated with the operation of the navigation route, including those that may have a transboundary dimension.

In the course of monitoring activities, the main emphasis was placed upon tracking impacts associated with the maintenance dredging works in the maritime access channel, both direct and indirect, on the ecological status of the seashore, and other natural and anthropogenic factors that shape the situation in the study area (hydrological regime, river water and sediment flows, water chemistry, maritime delta dynamics, condition of food resources supporting fish fauna etc.). A number

of other issues also required serious attention. These include the status of aquatic and riparian ecosystems of the DBR adjacent to the work site and collection of required information regarding transboundary impacts in line with the provisions of the Espoo Convention with a focus on those impacts that have been identified by the Inquiry Commission as the 'likely significant adverse transboundary impacts. These include:

1. Impact of dredging on the distribution of the flow discharge between the Bystre and the Starostambulski branches and on the water level dynamics along the Bystre branch, resulting in loss of floodplain habitats, important for fish (spawning and nursery) and birds (nesting, feeding);
2. Impact of habitat loss by coverage of riparian dump sites and dredging through the offshore sandbar and measures for bank protection on birdlife and fish;
3. Impact on the increase of suspended sediment concentration, downstream of the dredging site on fish;
4. Impact on the turbidity of marine waters as a result of dumping of spoil at the dumpsite at sea, under conditions of southbound alongshore currents;
5. Impact of repeated maintenance dredging hampering the recovery processes of affected areas for fish in the long term;
6. Cumulative impact of loss and/or disturbance of habitats and by shipping traffic on fish and bird life on a large scale and long time.

This Report contains information on the actual status and progress of the Monitoring Programme, data on the actual state of the environment in the area of the Danube-Black Sea Navigation Route, as well as review of this data, forecast of potential change, and proposals/recommendations on minimizing existing local impacts based on the 2014 monitoring results.

1. HYDROLOGICAL AND HYDROCHEMICAL MONITORING IN THE DANUBE RIVER (DHMO, USRIEP)

In 2014, the Danube Hydrometeorological Observatory carried out the regular hydrological and hydrochemical monitoring activities as per the Comprehensive Environmental Monitoring Programme and the Terms of Reference to the Subcontractor Agreement with USRIEP.

The hydrological monitoring programme included the measurement of water level and temperature on a daily basis and the monitoring of ice phenomena in winter. These observations were conducted at eleven stations, five of which were also used for the daily monitoring of turbidity levels. In the first six-month period of 2014, the expert team undertook the river expedition on the Tymofiy Bohatyr motor to examine the spatial and temporal variability of water and sediment flow in the Danube and delta branches. As a result of this expedition, the water and suspended solid flow discharge data was collected for 21 measurement locations.

In line with the Terms of Reference, the hydrochemical monitoring was undertaken in the Danube River and in the Chilia Arm branches. In 2014, the number of monitoring locations in the Danube and its branches remained the same as in the previous year, i.e. 17. The sample processing programme included boat-based tests and tests conducted at the laboratories of DHMO and USRIEP (for samples collected during seasonal field surveys). According to the methodological guidelines, all samples were filtered apart from those intended for the subsequent determination of COD, total phosphorus, transparency and dissolved oxygen.

The hydrological and hydrochemical monitoring techniques used in this reporting period were the same as in the previous years.

The following conclusions can be made on the basis of the 2014 hydrological and hydrochemical monitoring results:

The 2014 hydrological and hydrochemical monitoring programme in the Ukrainian part of the Danube River was fully completed.

In the mouth section of the Danube, the winter of 2013-2014 was mild and relatively dry, the spring and summer of 2014 were warm and wet, and the autumn that year was moderately warm and wet. The average annual air temperature was 11.7^{0}C, or 1.1^{0}C higher than normal. The total annual precipitation in 2014 was 634 mm (130% of the norm).

A catastrophic rainfall and flooding occurred in the Middle Danube Basin in mid-May. As a result of the natural subsidence of flood wave and regulation of flood flow by the Iron Gate dam, maximum annual water levels in the Ukrainian part of the Danube River were recorded in the end of May and were pretty close to being dangerously high (Figure 1.1).

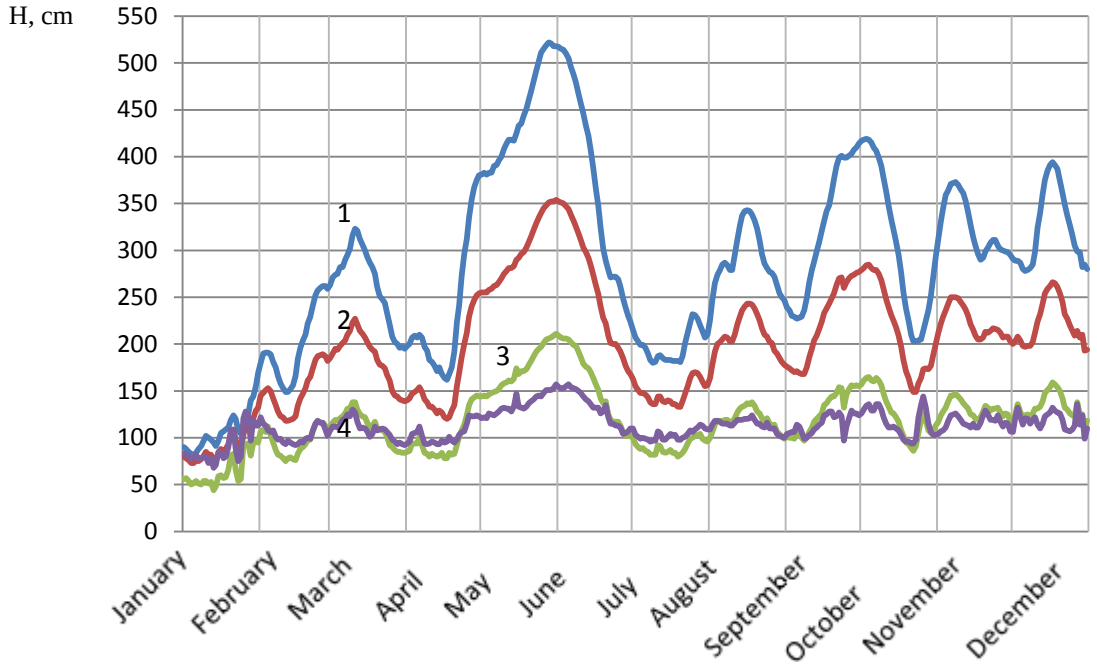

***Figure 1.1**. Combined Water Level Graphs for the Danube Delta*
***(1** - Reni, **2**- Izmail, **3** - Chilia, **4** - Vylkove)*

Abnormal variations of water levels were recorded in autumn 2014 when several flooding events occurred after heavy rainfalls instead of low flows typically observed during the autumn low-water period. The highest water level (415 cm above the station datum) was recorded in Reni on 30.09.2014.

The redistribution of river flow in the Danube Delta is governed by both natural processes and anthropogenic factors. The current pattern is characterized by an increase in flow discharged via the Tuclea system of branches and a decrease in flow received by the Chilia system. In 2012-2014, the average flow discharged via the Chilia Arm accounted for 49% of the total flow received in the upper section of the Danube Delta.

During the spring high-flow period, the highest flow discharge rate in the upper section of the Danube Delta was 13700 m^3/s at a 10% probability, which means an average recurrence interval of 10 years. With an average annual total flow discharged through the Danube River being 205 cubic kilometres per year, the 2014 total flow reached 237.6 km^3 and 119 km^3 (50%) of that was discharged through the Chilia Arm.

Overall, 33.2 million tonnes of suspended solids was discharged to the Black Sea with the Danube River flow. Of that, 7.93 million tonnes (23.9%) was discharged via the Bystre Branch.

Based on the results of systemic monitoring activities and field surveys conducted throughout 2014 to assess the river water quality in the Ukrainian part of the Danube Basin on the basis of chemical parameters, the following conclusions can be made:

- Changes in water chemistry in the Danube Delta largely depended upon the hydrological regime including flow abundance and water temperature, as well as on the transport of suspended solids with surface runoff;

- The following water quality guidelines were found to be exceeded in the Ukrainian part of the Danube Delta:
  - MAC Limits set for waters designated for domestic use were exceeded for the following parameters: COD (in the sections where river water could be used for drinking water supply purposes); phenols; and total iron;
  - MAC Limits set for waters designated for fishery were exceeded for the following parameters: BOD; nitrites; phenols; total iron; manganese, zinc, surfactants, and suspended solids;
- The exceedances of the MAC Limits were observed starting from the transboundary section (the R01 monitoring site, Danube River, Mile 71, upstream of Reni). This is the section where the highest pollution levels and MAC Limit exceedances are recorded most frequently;
- The levels of dissolved oxygen remained relatively high throughout the year, reduced levels were observed during the summer; the levels of oxygen in water were in inverse dependence on water temperature. No exceedances of guideline levels were observed; like the previous year, the lowest level of dissolved oxygen was recorded in August and was equal to 0.95 MAC Limit (fishery), which was better than in the previous year;
- The BOD_5 levels in the reporting period also look better than those observed in the previous year; this year's average level of BOD_5 is lowest in eight years. No exceedances of guideline levels were observed during the year even in the locations where the actual levels were assessed against guidelines set for drinking water supply sources (R01, R06, R07, and R10);
- The MAC Limit set for COD and for waters designated for domestic use was found to be exceeded only in the locations where the actual water quality is assessed against the criteria set for drinking water supply sources (R01, R06, R07, and R10). The measured levels of COD and the ratio of permanganate oxidability to dichromate oxidability (0.27) indicate that the poorly oxidized compounds prevail over those that are easily oxidized, but this picture has been typical of the Danube River for many years;
- The concentrations of nitrogen in mineral forms were not significant, the exceedances of the MAC Limit set for waters designated for fishery were only observed for nitrite nitrogen, becoming more pronounced during the warm period; the highest nitrite concentrations were recorded in August and September though the MAC Limit set for waters designated for domestic water supply were not exceeded;
- The concentrations of mineral phosphorus remained within the guidelines (MAC Limits for domestic uses and fishery) throughout the year;
- The concentrations of suspended solids in water varied considerably throughout the year and tended to increase during flooding and rainfall events, being an indication of intensive washout and transport of soil particles with surface runoff. The exceedances of the MAC Limit (fishery) were observed throughout the year in all monitoring locations starting from the R01 location (Danube River, Mile 71) in the transboundary section;
- The Danube River water can be characterized by the domination of hydrocarbonate and calcium ions. Total mineralization in the study area varied throughout the year within a range from 307 to 414 mg/l, the highest levels were observed in January; the 2014 levels were slightly lower (-15 mg/l) than the average level recorded in the previous year;
- The concentrations of petroleum products were not significant throughout the year, being below detection limit in the majority of samples collected and within the MAC Limit in all other samples;
- The levels of surfactants remained minor throughout the year, being below the detection limit in the majority of samples, though occasional exceedances also occurred – mainly in December;
- The concentrations of volatile phenols exceeded the MAC Limit in various periods of the year and in all monitoring locations though the mean yearly concentrations remained within the MAC Limit. The most significant increases in phenol concentrations were observed during the warm period (August, September);

- A picture of metal contamination in the Danube River can be described as follows:
  - The concentrations of iron exceeded the MAC Limits for domestic water supply and fishery throughout the year in all monitoring locations, showing the largest margin of exceedance among all other monitored metals;
  - The concentrations of manganese and zinc also exceeded the MAC Limit for fishery in all monitoring locations but remained within the MAC Limit for domestic water supply;
  - The levels of nickel in the majority of samples were within the MAC Limits though occasional exceedances (up to 1.9 times the MAC Limit for fishery) were observed;
  - The elevated levels of metals in the bottom sediments were observed in the entire Ukrainian part of the Danube Basin and the highest concentrations were recorded in the transboundary section near the R01 monitoring location (Danube River, Mile 71);
- The review of the 2014 monitoring results in the context of the international guidelines on metals indicates that the guideline values were exceeded for copper in water and nickel and bottom sediments. But these exceedances were only occasional and relatively minor (up to 1.1 times the MAC Limit for copper in water and 1.4 times the MAC Limit for nickel in bottom sediments);
- The chlorinated organic pesticides (DDT and derivatives) were found to be occasionally present in water samples collected in the mouth section of the Danube at concentrations below the MAC Limit for fishery (<0.1 MAC Limit); the highest concentrations were recorded in April and May. Relatively significant concentrations of DDT and derivatives were periodically observed in various times and in different places, including the transboundary monitoring locations R01 and R02. Other monitored chlorinated organic pesticides such as HCCH and HCB were not present in the Danube River water at detectable concentrations in the reporting year.

Based on the review of the monitoring results, it can be concluded that river water in the Danube Delta is contaminated by organic compounds, nitrites and metals at levels exceeding the applicable guidelines. The elevated levels of chemical contaminants in the river water and metals in the bottom sediments are observed recorded starting from the transboundary section (the R01 monitoring location, Danube River, Mile 71).

2. ASSESSMENT OF ECOLOGICAL STATUS OF THE DANUBE RIVER BASED ON THE HYDROBIOLOGICAL AND HYDROCHEMICAL INDICATORS (USRIEP)

Hydrobiological Monitoring Results

In 2014, the state of hydrobiological communities was assessed during the spring/autumn (June), summer/autumn (September) and autumn/winter (November) periods.

Samples were collected along the Danube – Black Sea Navigation Route (Tables 2.1-2.3); the sampling process included measuring water temperature, Secchi disk transparency, and dissolved oxygen. In some sampling locations, samples were collected to determine the presence of specific compounds that may have toxic effect (heavy metals) in water and bottom sediments.

Table 2.1. *Sampling Sites Used by USRIEP (June 2014)*

No.	Sampling Site Code and Name	Distance to the mouth	Description	Date	Sample Type
1	R01, 2 km upstream of Reni	71 Mile	Left bank, centre	12.06.14	Hydrochemical, hydrobiological
2	R06, 1 km downstream of Izmail	89 km	Centre	13.06.14	Hydrochemical, hydrobiological
3	R07, upstream of Kilia	49 km	Centre	13.06.14	Hydrobiological
4	R09, downstream of Kilia	32 km	Left bank	14.06.14	Hydrochemical, hydrobiological
5	R10, 1 km upstream of Vylkove	21 km	Left bank	14.06.14	Hydrochemical, hydrobiological
6	R11, Ochakivsky Branch	17 km	Centre	15.06.14	Hydrobiological
7	R14, Ochakivsky Branch	6 km	Centre	15.06.14	Hydrobiological

8	R12, Starostambulske Branch	11 km	Centre	15.06.14	Hydrobiological
9	R13/9, Bystre Branch	9 km	Centre	16.06.14	Hydrobiological
10	R13/1, Bystre Branch	1 km	Centre	16.06.14	Hydrochemical, hydrobiological
11	R13/0, Bystre Branch	Near the dam		16.06.14	Hydrobiological

Table 2.2. *Sampling Locations Used by USRIEP (September 2014)*

No.	Sampling Site Code and Name	Distance to the mouth	Description	Date	Sample Type
1	R01, km upstream of Reni	71 Mile	Left bank	14.09.14	Hydrochemical, hydrobiological
2	R06, 1 km downstream of Izmail	89 km	Centre	15.09.14	Hydrochemical, hydrobiological
3	R07, upstream of Kilia	49 km	Centre	15.09.14	Hydrobiological
4	R09, downstream of Kilia	32 km	Left bank	16.09.14	Hydrochemical, hydrobiological
5	R10, 1 km upstream of Vylkove	21 km	Left bank	17.09.14	Hydrochemical, hydrobiological
6	R11, Ochakivsky Branch	17 km	Centre	18.09.14	Hydrobiological
7	R14, Ochakivsky Branch	6 km	Centre	18.09.14	Hydrobiological
8	R12, Starostambulske Branch	11 km	Centre	18.09.14	Hydrobiological
9	R13/9, Bystre Branch	9 km	Centre	18.09.14	Hydrobiological
10	R13/1, Bystre Branch	1 km	Centre	18.09.14	Hydrobiological
11	R13/0, Bystre Branch	0 km	Centre	18.09.14	Hydrobiological

Table 2.3. *Sampling Locations Used by USRIEP (November 2014)*

No.	Sampling Site Code and Name	Distance to the mouth	Description	Date	Sample Type
1	R01, km upstream of Reni	71 Mile	Left bank	20.11.14	Hydrochemical, hydrobiological
2	R06, 1 km downstream of Izmail	89 km	Centre	21.11.14	Hydrochemical, hydrobiological
3	R07, upstream of Kilia	49 km	Centre	22.11.14	Hydrobiological
4	R09, downstream of Kilia	32 km	Left bank	22.11.14	Hydrochemical, hydrobiological
5	R10, 1 km upstream of Vylkove	21 km	Left bank	18.11.14	Hydrochemical, hydrobiological
6	R11, Ochakivsky Branch	17 km	Centre	18.11.14	Hydrobiological
7	R14, Ochakivsky Branch	6 km	Centre	18.11.14	Hydrobiological
8	R12, Starostambulske Branch	11 km	Centre	19.11.14	Hydrobiological
9	R13/9, Bystre Branch	9 km	Centre	19.11.14	Hydrochemical, hydrobiological
10	R13/1, Bystre Branch	1 km	Centre	19.11.14	Hydrobiological
11	R13/0, Bystre Branch	0 km	Centre	19.11.14	Hydrobiological

In 2014, 227 taxonomic units representing 8 freshwater phytoplankton groups were identified in the algological communities.

The most diverse species composition was demonstrated by diatoms that are considered to be typical of the river phytoplankton communities (113 species). Green algae ranked second in terms of species diversity (61 species), with the blue-green algae ranking third (17 species). Euglena algae were also noticeably diverse (15 species). Other groups showed lower levels of species diversity.

The majority of the identified phytoplankton species represented the freshwater/brackish water communities. *Synedra gaillonii*, a typically marine species, occurred individually and was encountered in the Danube River near the dam in September.

A gradual reduction in the total number of phytoplankton species (from 161 to 133 species) was observed from June to November and was caused by seasonal decreases in temperature. The most significant reduction occurred among the green algae species that are sensitive to weather changes, and in the euglena and yellow-green algae groups.

The total abundance of phytoplankton ranged from 5.33 million cells/l (upstream of Reni, Mile 71, June) to 153.6 million cells/l near the dam in September. The dynamics of the total phytoplankton abundance was mainly attributed to the small-cell representatives of the blue-green algae group.

The phytoplankton biomass values in the sampled locations in the Danube River ranged from 0.756 mg/l in November (downstream of Izmail) to 6.17 mg/l in the same location in September. In the tested samples, the major contributors to the phytoplankton biomass were the diatom algae (typical representatives of the river phytoplankton communities), blue green and green algae. The contributions of plankton algae and other groups were less significant.

The phytoplankton biomass development indicators varied in the range from 'very low' to 'above moderate', suggesting that the trophic state of the water body varied from being 'oligotrophic' to being 'eutrophic' in various seasons and locations.

The values of the Pantle & Buck saprobe index ranged from 1.56 in June to 1.69 in November.

In various seasons of the year, the zooplankton community comprised 25 species (June), 35 species (September), and 34 species (November); overall, 39 taxa were recorded in 2014 (accompanying species were not taken into account).

The zooplankton abundance levels were low and were similar to mean historical levels. As regards the trophic state, the zooplankton development ranged from the extremely low to very low, corresponding to the 'oligotrophic' category.

The results of the saprobe state assessment based on zooplankton indices indicate that the saprobe state has changed little in the recent years and generally remained within the beta-mesosaprobic zone, corresponding to the 'sufficiently clean' and 'good' water quality categories.

Based on the measured concentrations of chlorophyll 'a' and according to the Classification of the Ukrainian Water Bodies by their Trophic State, the survey locations sampled in 2014 can be generally classified as 'oligo-mesotrophic', corresponding to Category 1 as described in the Ecological Status Assessment Methodology for Surface Waters (which means an 'excellent' ecological status and 'very clean' level of quality). Under the ICPDR classification, the measured concentrations of chlorophyll also correspond to Class I. Generally, the 2014 survey results correlated well with the results received in the previous years.

To summarize the 2014 survey results, it can be concluded that no noticeable changes in the Danube River ecosystem condition were identified based on the biological assessment.

Water Quality Assessment in the Ukrainian Part of the Danube Basin

The environmental situation in the Ukrainian part of the Danube Basin in 2014 was assessed using the chemical monitoring data collected through regular monitoring conducted by DHMO and field surveys undertaken by USRIEP.

The water quality and ecological status of the Danube River within Ukraine were assessed using the national water quality classification system adopted in Ukraine.

The national water quality assessment methodology is based on the integral water quality indices and the specified water quality classes used to classify a water sample into one of seven water quality categories. Under this classification, a water body is considered to have a safe status if its water quality meets the criteria set for Water Quality Categories 1-3.

The mean annual values of indicators required to determine a water quality category were estimated for all key monitoring locations and for the entire length of the river covered by the survey.

A suite of indicators used in the surface water quality classification includes general and specific indicators. The assessment of water quality in the key monitoring locations in the Ukrainian part of the Danube Delta was undertaken using the following three groups of indicators:

- Mineralisation and components (sum of ions, chlorides, sulphates);
- Trophic and saprobe indices: suspended solids, dissolved oxygen, pH, dissolved organic substances (based on BOD5 and COD), and key nutrient compounds (ammonium nitrogen, nitrate nitrogen, nitrite nitrogen, and phosphates);
- Specific substances: petroleum products, surfactants, phenols; heavy metals (total iron, zinc, copper, and nickel).

Based on the average values of indices, the water in the study area can be described as being clean to relatively clean (Class II, Categories 2 to 3). Where the indices reflected the worst-case situation, the water quality ranged from 'slightly polluted' to 'moderately polluted' (Class III, Categories 4 to 5).

No significant variations in the values of ecological indices were observed among different sampling locations nor were there any clear trends in their spatial distribution.

At the same time, seasonal variations were much more pronounced. The worst-case indices and indicator values were recorded in March.

The trophic and saprobe indices played a key role in shaping the ecological status of all monitored locations during all seasons.

Based on the 2014 results of water quality assessment, the following conclusions can be drawn for the Ukrainian part of the Danube Delta:

- The water quality estimates on the basis of the trophic and saprobe indices seem to be generally worse than estimates produced using other indicators.
- Based on the average annual estimates, no significant differences in water quality were observed among individual sampling locations.
- Seasonal variations in the average values of indices were observed during the survey; it appears that the river has the worst water quality in March.
- Based on the average estimated values of indices, the river water in the Ukrainian part of the Danube Delta corresponded to Class II, Categories 2 to 3 ('very good to good' ecological status, 'clean to relatively clean' level of quality); based on the worst-case average values, it is classified as Class III, Categories 4 to 5 ('satisfactory to moderate' ecological status and 'slightly to moderately polluted' level of quality).
- The results of the ecological status assessment of the Ukrainian part of the Danube Delta remained virtually unchanged as compared to the previous years.

3. ENVIRONMENTAL MONITORING DURING THE OPERATION OF THE DANUBE – BLACK SEA DEEP NAVIGATION ROUTE (MARITIME SECTION) (IMB NAS OF UKRAINE)

- The field surveys aiming to monitor environmental impacts during the operation of the Danube-Black Sea Navigation Route (maritime section) were undertaken from 10 to 13 September 2014 and from 8 to 13 November 2014 in the maritime section of the Chilia Arm of the Danube River.
- From 11 to 12 September 2014, survey works were completed at 14 comprehensive monitoring stations, and soil samples were collected at 2 stations (7–3 and 7–4).
- Similarly, survey works were completed at 16 comprehensive monitoring stations from 9 to 10 November 2014 (Figure 3.1).
- At each monitoring station, a suite of hydrological, hydrochemical and hydrobiological tests was completed using standard sampling and testing techniques. At each station, a grab sampler was used to sample zoobenthos and soil for chemical and particle size distribution tests, as well as to collect water samples for determining the salinity level, phyto- and zooplankton values, and

chemical composition. Water temperature and salinity levels in the surface and bottom layers were measured aboard during sampling.

- Weather observations and water transparency tests were conducted in each monitoring location, and wave characteristics were also determined at the maritime stations. The GPS-12 Garmin device was used to help locate the position accurately. At each maritime station, the survey ship was anchored before conducting tests. All overside operations were conducted using two Neva-type crab winches (for hydrological and hydrobiological samples) installed in the central part of the ship. Water samples were collected using Molchanov's GR-18 bathometer. Wind velocities were measured using the API-49 induction anemometer and the ship's compass was used to determine the direction. The transparency and colour of water at the maritime stations were measured using the white disk (Secchi dick).
- Two special field surveys (on 22.09.2014 and 18.11.2014) were conducted to assess the structure and functions of phyto-periphyton communities in the Bystre Branch and in the area of the Ust-Dunaisk Port. Those periphyton communities that live attached to surfaces were surveyed and sampled using a boat powered by outboard motor and diving equipment (including a scuba equipment package and diving suit).

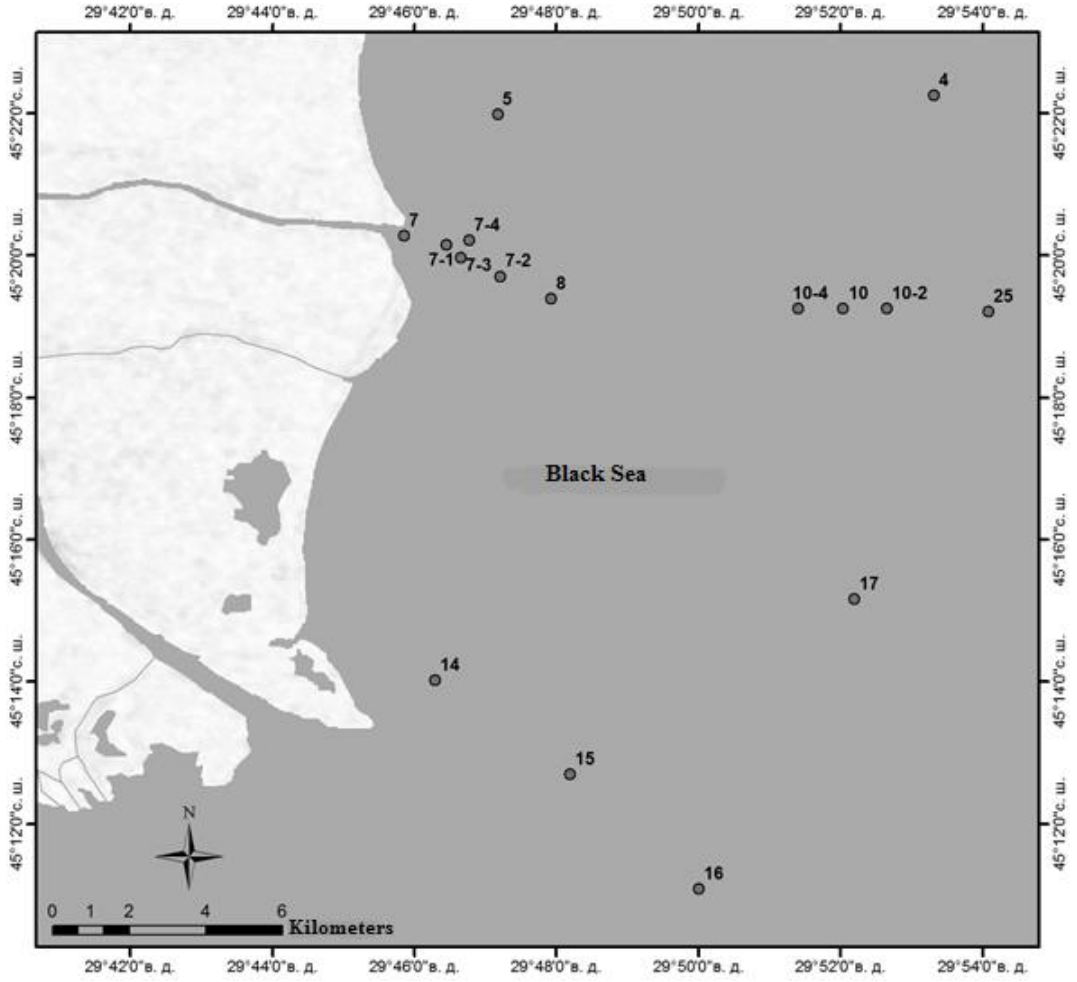

Figure 3.1. *Locations of Stations Surveyed in September and November 2014*

- The biotests were conducted to assess the quality of bottom sediments and over 100 hydrobiological samples (phytoplankton, zooplankton, meio- and macro-zoobenthos) were collected and processed. The results of hydrobiological tests were used to estimate the food resources for fish.
- The food resources for fish were quantified using the sample processing results for phyto- and zooplankton, meio- and macro-zoobenthos) where only organisms consumed by fish were considered. For example, the phytoplankton and zooplankton resource estimates do not take into

account the blue green algae and sea sparkle (*Noctiluca scintillans*) biomass, respectively. The zoobenthos resource biomass was estimated based on those macro-zoobenthos species that represent a food resource and total biomass of meio-benthos excluding Foraminifera species. Taking into account the spatial distribution of plankton organisms in various sections of the maritime delta that are subject to different levels of anthropogenic pressure (dredging area, dredging spoils dumping area and baseline sections), the arithmetical mean values were estimated (and the geometrical mean values for the benthic organisms).

- A number of conclusions can be drawn based on the results of the 2014 comprehensive environmental monitoring survey in the maritime section of the Danube Delta.
- In mid-September 2014, the hydrological situation in the maritime section of the Danube Delta was one that was considered to be typical of the late summer period. The warm water layer was 24–25 m so that the surface and bottom water temperatures were virtually the same and ranged from 22.5 to 24.2 °C. The homothermy was observed in all monitoring locations.

The homothermy of water masses was also observed in the maritime section of the Danube Delta in November 2014, when the water temperature in the surface layer was only 1–2 °C higher than in the bottom layer. There was no thermocline in that section where the significant part of the water area was occupied by the transformed river water of low salinity that dominated the surface layer to a depth of 2–3 m. Below that layer, the water masses had a salinity of 16.3-17.7 ‰.

The ranges of variation and average concentrations of nitrogen and phosphorus compounds in both mineral and organic forms, silicon, and dissolved organic substances observed in the maritime section of the Delta remained similar to their average historical levels.

The suspended solids (SS) distribution pattern in the maritime section of the Delta in September was shaped by the SS transport with river flow and their deposition in the form of bottom sediments in the mouth section of the Bystre Branch. A significant increase in the SS concentrations in water layer was recorded in November in the dredging area. No exceedances of the baseline SS concentrations were recorded in the area of the offshore dump site; this is attributed to a highly dynamic nature of local water regime and significant density of material (sand) disposed of at the site, which is quickly deposited at the bottom.

The elevated levels of phosphates and organic nitrogen were recorded in the surface and bottom water layer in the dredging area, and only in the surface layer in the area of the offshore dump site. Dredging activities undertaken in the channel and the subsequent dumping of dredging spoils affect the water chemistry in the maritime section only to a limited extent and at a local scale; this impact manifests itself in increased concentrations of suspended solids in the dredging locations and within the maritime access channel.

The bottom sediment samples collected at the monitoring stations Nos. 4, 8, 14, and 15 demonstrated a moderately toxic effect on test organisms. The extracts of bottom sediment samples collected at the monitoring stations Nos. 7-2, 7-4 and 17 were found to be slightly toxic. No toxic effects were detected in the bottom sediment samples from the monitoring stations Nos. 2, 7, 7-1, 7-3, 10, 10-2, and 10-4.

The floristic composition of phyto-periphyton appears to be similar among all monitoring sites; the only difference is that the Bystre Branch seems to have 12% more blue-green algae and 21% less green algae as compared to the monitoring site in Ust-Dunaisk.

The highest value of phytoplankton biomass was recorded in the dredging area. The contribution of blue-green algae to the total phytoplankton biomass was not significant (up to 4.6% of the average biomass value). This means that all phytoplankton resources can be used as a source of food for invertebrates and fish.

The monitoring results demonstrate a continuing adverse impact of freshwater discharged via the Danube – Black Sea channel on the development of zooplankton communities. The lowest zooplankton values are recorded in the dredging area whereas the highest values of zooplankton that is not suitable for consumption by fish and those of zooplankton suitable for consumption by fish were observed in the dumping area and in the baseline locations, respectively.

The 2014 values of indices based on meio-benthos suitable for consumption by fish were higher than in the previous year. It can be assumed that the climatic conditions in 2014 were conducive to the development of Harpacticoida species, bivalve molluscs and young Polychaeta organisms as the most important component of meio-benthos as a food resource.

The representatives of only four taxa were found to be presented in the dredging area and none of meio-benthos representatives were recorded at the monitoring station 7/2. As compared to these sites, the dumping area demonstrated a greater diversity of meio-benthos.

In September, the lowest number of taxa (6), along with the average abundance (333.3 cells per m^2) and biomass (0.940 g/m^2) of benthos, were recorded in the dredging area. In the dumping area, 27 taxa were recorded with the abundance and biomass being at 2340 cells per m^2 and 10.257 g/m^2, respectively; the baseline stations showed the following values: 33 taxa, 3818.6 cells per m^2 and 31.300 g/m^2. In November, virtually all indices characterizing the macro-zoobenthos development were lowest in the dredging area while the highest values were recorded in the dumping area and at the baseline stations.

In 2014, the condition of bivalve mollusc colonies changed significantly in terms of both the frequency of occurrence and the biomass and number of molluscs in these colonies. One of the main causes of reduced abundance and biomass of bivalve molluscs in the north-western shelf of the Black Sea is hypoxia (of natural origin), resulting in reduced growth rates and increased mortality rates. The hypoxia phenomenon varies in magnitude from year to year, resulting in variations in the population number and biomass of molluscs.

Generally, the extent of the anthropogenic impact, assessed from the perspective of all indices describing the condition of food resources for fish, was greatest in the dredging area on the navigation route in the summer and autumn period. The dumping area and baseline stations demonstrated similar levels of development of food resources for fish.

4. ICHTHYOLOGIC MONITORING AND DEVELOPMENT OF FISH PROTECTION MEASURES INCLUDING THE INITIAL ESTIMATE OF DAMAGE CAUSED TO BIOLOGICAL RESOURCES BY MAINTENANCE DREDGING ACTIVITIES IN THE MARITIME ACCESS CHANNEL OF THE DANUBE-BLACK SEA DEEP NAVIGATION ROUTE

The 2014 ichthyologic survey was undertaken as part of the comprehensive monitoring programme for the operation of the Danube-Black Sea Navigation Route in the Bystre Branch and in line with the Terms of Reference to the Contract between USRIEP and the Odessa Centre of the Southern Scientific Research Institute of Marine Fisheries and Oceanography (SSRIMFO).

The survey activities were carried out in line with the standard hydrobiological and ichthyologic survey techniques adopted by the State Agency for Fisheries and NAS of Ukraine.

Zooplankton samples were collected in accordance with the Plankton Sample Collection and Processing Instruction (1971) and the Ichthyologic and Hydrobiological Sample Collection and Processing Technique (1998).

The survey activities were undertaken on the basis of the joint monitoring station established by the Odessa Centre of the SSRIMFO and the Danube Biosphere Reserve, either with the involvement of regional fishing companies or using the in-house capabilities of the Centre and DBR.

The ichthyologic samples were collected using officially permitted fishing gear (stationary nets, floating nets, and hoop nets).

Other fishing equipment (minnow seine, trammel net, ichthyoplankton net, and narrow-meshed drift net) were used to count young fish individuals and assess spawning success.

Floating nets were used to collect biological samples in the river in order to assess, among other things, the intensity of spawning migration of herring. Passive fishing gear (stationary net and hoop net) were used to collect biological samples required to assess the key characteristics of fish populations, identify migration routes used by the commercial fish species and, where the use of active fishing gear was not possible, assess and record the condition of fish stocks.

Individuals representing the Red Data Book species are returned back into the river after measurements. A certain number of individuals (up to 25 for each species) that have not reached a legal length limit (except sturgeon individuals) can be taken for further laboratory tests; the relevant details are reflected in the sampling protocol.

The following key parameters of the commercial fish species populations were examined:

- Fish age, sex, size and weight;
- Growth rates in different age groups;
- Gonadal development, productivity and spawning efficiency;
- Population dynamics of commercial fish species.

Fish protection measures developed for mitigating the impact of maintenance dredging works in the maritime access channel on fish resources aim to assess the level of impact and damage incurred to fisheries in the Danube Basin as a result of dredging activities. This work component was carried out by the UkrRybProject Institute.

The results of this work indicate that the total yield of herring in the Ukrainian part of the Danube Basin was 98.5 t by the end of 2014, which is almost 220 t less than in the previous year; this is the lowest yield over the previous 13-year period. In 2014, the spawning migration of herring in the Danube River was weak, or more precisely put, it was the lowest in the past few years. The first 10 days of April was the peak migration time for herring.

The herring larvae migration intensity in 2014 was very low, being well below the average historical levels. Quite traditionally, the peak migration time was late May to early June.

The study into the Danube sturgeon larvae migration patterns continued in 2014. The preliminary results indicate that sterlet and great sturgeon currently have relatively larger populations than other sturgeon species occurring in the Lower Danube Basin.

Unless conducted immediately in the spawning areas during the spawning period, dredging and dumping activities have a relatively minor impact on fish fauna.

The following mitigation measures are recommended for reducing adverse impact on fish reproduction:

- During the fishing ban for flounder and turbot (May) and Azov Sea/Black Sea mullet (late August – early September), dredging activities in the maritime access channel should be limited to the section immediately adjacent to the Bystre Branch (i.e. the section with the lowest salinity levels);
- The dumping site should be operated in line with the design provisions promoting the even distribution of dredging spoils over the dump site area based on a recommended sequence of cells;
- The scale of dredging activities should be limited for the entire duration of spawning periods agreed and specified in the Feasibility Study for each individual affected species and kept at a minimum that is necessary to ensure the safe movement of ships.

The Fish Protection Action Plan has been developed including an initial estimate of damage caused to the aquatic biological resources by maintenance dredging operations in the maritime access channel of the Danube – Black Sea Navigation Route. The Plan is based on the navigation route design provisions and takes account of existing requirements to the protection of fish resources during construction works undertaken in water bodies.

The scientific and biological justification required to understand whether the maintenance dredging works including the use of the offshore dredge spoils dump can be carried out in the maritime access channel of the navigation route during the spawning ban was prepared (Annex E).

Maintenance dredging activities undertaken in the reporting period have had a limited impact on fish fauna within the boundaries of the dredging area and have not caused any transboundary effects.

It is considered that the most appropriate way of using compensation payments for damages caused to fisheries by dredging activities to date would be to finance the purchase and installation of a fish breeding plant to breed valuable fish species (e.g. sturgeon, carp). Examples and experiences of these plants demonstrate that they have proved both feasible and efficient in restoring the populations of rare fish species.

5. TERRESTRIAL & RIPARIAN ECOSYSTEM MONITORING IN THE DANUBE BIOSPHERE RESERVE (DBR)

In 2014, the plant and animal communities inhabiting the riparian and wetland areas of the Danube Biosphere Reserve (DBR) were monitored during the operation of the Danube-Black Sea Navigation Route in line with the Terms of Reference.

The monitoring undertaken by the DBR staff comprises a monitoring component focused on those species that are protected under various international conventions and included in the Red Data Book of Ukraine. With the approval of a new edition of the Red Data Book of Ukraine in 2009, these species received special attention during the monitoring activities.

Significant attention was also paid to the introduced species because they are mainly spreading with existing transportation flows and pose threat to the aboriginal species.

The monitoring activities were planned and undertaken with a focus on those key issues that were raised in the findings and recommendations of the Espoo Convention Inquiry Commission. At the same time, it should be taken into account that the construction works conducted in 2014 were associated only with the Phase 1 and their environmental impact is not likely to be significant.

Survey Materials and Methods

Flora and vegetation cover were surveyed in line with the commonly recognized geo-botanical survey techniques (fixed-route surveying, stationary and semi-stationary geo-botanical surveying methods, and the eco-coenotic characterization of key areas).

The vegetation dynamics was assessed using the direct methods at the stationary sites (studying the primary successions on the new coastal landforms and secondary successions at the hydraulic fill sites and in other areas where the vegetation cover was destroyed as a result of human activity; studying the endogenesis and anthropogenic changes etc.) and indirect methods which included establishing succession links and spatial phytocoenotic groups.

The structural comparative method was used to assess the specifics of the plant life in the area of the nature reserve. Issues associated with the protection and optimization of reserve's phytosystems were examined using a suite of methods including the environmental management tools, relict method and indicator species.

The zoobenthos samples were collected using the Petersen grab sampler (a 0.025 m² model) by taking 2-4 grabs for each sample. The riparian areas and splash zones were also visually inspected in order to gather additional information about the status of aquatic ecosystems and changes in the invertebrate species composition.

The ichthyologic surveys focused on the rare fish fauna present in the DBR and changes in it due to natural and anthropogenic factors including the operation of the Danube-Black Sea Navigation Route. In the reporting period, the ichthyologic surveys were conducted using the commonly recognized methods.

The taxonomic identification of fish in the study area was undertaken using both adult individuals (Movchan, 2011) and young individuals (Koblitskaya, 1981) as determinants.

The migration of young sturgeon and other rare rheophilic fish species was studied using a special minnow seine with 10 mm mesh. Similar to the previous years, the seine net was deployed from a boat with seine hauls equally spaced in order to ensure the comparability of data received in different years. For this same purpose, 20-mm drift nets were used from a boat moving downstream along with the nets. Fish samples were collected periodically in the specified river sections (fishing grounds).

In order to assess the impact of the navigation route operation on the fish fauna populations, fish samples were collected during the reporting period using the fishing gear (floating nets and stationary nets with 20-80 mm mesh).

The amphibian and reptile communities in the riparian and wetland areas of the DBR were monitored during the operation of the Navigation Route using traditional field survey methods in the daytime hours. The species composition and distribution of amphibian and reptile species were surveyed through a series of daily walking tours. Special attention was paid to the field survey activities during the reproduction period in spring and early summer when the animals demonstrated the highest level of activity in the daytime hours. The number and population of reptile and amphibian species were assessed using a fixed-route method featuring 10 m and 100 m long strips with a width of 1-2 m (depending upon a species, population density and nature of biotope); the aquatic amphibians were surveyed along the 10 m and 20 m sections of the shoreline or per 1 m^2 of water surface.

The ornithological survey was conducted to study the bird fauna of the DBR and changes in it due to natural and anthropogenic factors including the operation of the Navigation Route. The 2014 survey outcomes include data on wintering birds, seasonal migrants and nesting birds present in the DBR including the navigation route lying along the Bystre Branch. The analysis and assessment of the navigation route construction impacts on the ornithological communities in the DBR were undertaken on the basis of the DBR's 2004-2014 ornithological monitoring data for the navigation route and the maritime delta of the Chilia Branch in general and 1977-2013 Nature Records maintained by DBR.

Major attention was concentrated upon assessing the impact of the navigation route on the bird fauna of the DBR during the nesting period because this impact may lead to the most significant adverse consequences for bird populations.

Similar to the previous years (Monitoring…, 2011-2013), the monitoring of nesting bird colonies was undertaken in the maritime delta in three areas occupying 1000-1500 ha each (Taranova Spit, Ptashyna Spit and Nova Zemlia Spit) where large nesting colonies of Charadriiformes species have been observed over the past 10 years.

The nest census method was used in 2014 (except the Pallas's gull nests). To ensure the efficiency of this method, all nests in the colony were photographed and counted using the Adobe Photoshop CS5 software and its counting tool. This approach enhances the counting accuracy and minimizes time spent by a surveyor in the colony.

The systemic counting survey for the riparian and waterfowl species ('August count') was undertaken on 13.08.2014 in the coastal area of the DBR including a section of the Ptashyna Spit adjacent to the sandbar area of the Bystre Branch. The count of the riparian and waterfowl species was also conducted on 12.08.2014 on the Yermakiv Island including the area used for sand dumping in 2004, during the construction of the navigation route in the Bystre Branch.

The bird population dynamics in the DBR often depends upon the water levels in the Danube River. In the survey report, the overview of certain factors that have affected the bird fauna in the study area refers to data on water levels in the Chilia Arm over the period of 1991-2014, collected by the Danube Hydrometeorological Observatory (Nature Records, 1991-2013).

Conclusions Drawn from the 2014 Monitoring Results for the DBR Area are Summarised Below:

In 2014, the main factors affecting the flora and vegetation cover in the DBR were high water levels recorded in the Danube River throughout the spring and summer period and intensive storms observed in spring and autumn (starting from September).

Major storms that occurred in 2014 affected the development of vegetation cover in the coastal areas and along the shoreline where they triggered abrasive processes, especially in the north eastern and eastern parts of the coastal area within DBR. Intensive storms resumed again in September-October, resulting in an early termination of the vegetative cycle of plant communities concentrated in the coastal areas of the DBR.

In 2014, the DBR flora remained unchanged as compared to the previous years, comprising 1562 species with higher vascular plants being the most numerous group (967 species, or 19.19% of plant

species occurring in Ukraine). The DBR area is home to 26 rare plant species included in the Red Data Book of Ukraine and 10 species included in the European Red List.

The protective dam built of granite fragments at the outlet of the Bystre Branch causes the development of granite and sand surf zone and changes in the composition of sandy littoral vegetation in the maritime section of the Starostambulsky Island. There appears to be an increase in the proportion accounted for by the meadow species and common reed, along with the initial signs indicating the development of dunes and depressions with associated plant communities comprising a large proportion of ruderal plant species.

After the completion of land reclamation activities and demolition of some sections of dam structures, the natural wetland ecosystems and biodiversity on the Yermakiv Island continued to restore themselves. The establishment of populations of rare plants included in the Red Data Book of Ukraine (water chestnut *Trapa natans* and summer snowflake *Leucojum aestivum*), as well as the intensive spreading of a species included in the Green Data Book of Ukraine (white water lily *Nymphaea alba)* has continued for the third year in a row.

The macro-zoobenthos abundance and biomass values in the Bystre Branch were 634 cells/m² and 19.11 g/m², respectively (as compared to the historical average values of 777 cells/m² and 17.854 g/m²). The fact that these values have not changed significantly relative to the previous years can be first and foremost attributed to a relatively stable flow regime in this Branch.

The sandbar section of the Bystre Branch contains unstable soil materials of varying composition and this adversely affects the state of all macro-zoobenthos taxa associated with them. The size of the macro-zoobenthos communities varied significantly from site to site. The total abundance and biomass values of macro-zoobenthos were 932 cells/m² and 8.800 g/m², respectively.

Processes that emerged in the previous years in the Bystre Bay continued this year. Its northern 2-km long section remained virtually unchanged. In its central part, the Ptashyna Island continues merging with the Kubansky Island. As a result of severe storms and winds, a complex system of passages, small shallow water areas (up to 0.7 m deep), and clean sand beaches has developed. A new spit has started to emerge near the Eastern Branch at a distance of 150-200 m and parallel to the Ptashyna Island. It is too small in size and changes its shape continuously.

In the first 6-month period of 2014, the total abundance of macro-zoobenthos in the Bystre Bay was 2760 cells/m², or 3.2 times more than in the same period of 2013; the biomass was at 19.581 g/m², or 2.2 times more than in the previous year. The shallow water areas containing very warm water provided the ideal habitats for the reproduction of small crustacean species representing the Pontic-Caspian fauna and freshwater species brought with the Bystre Branch flow and settled in the Bay.

The survey results indicate that this-year young population of sturgeon migrating along the Danube from their spawning habitats in June and early July 2014 was overwhelmingly dominated by young 10-14 cm long great sturgeon individuals whose number ranged from 2 to 9 per each haul. Young sterlet specimens occurred individually while no other sturgeon species were observed among this year's young fish population.

An important specific feature observed in 2014 is that, unlike the previous years, no large-scale marine water penetration into the Bystre Branch occurred except in a small section where the Branch flows into the Black Sea (0-1 km) due to the elevated water levels in the Branch that remained relatively high for a larger part of the year.

In 2014, dredging was not conducted during the state ban on the commercial fishing of common freshwater fish species in May-June because this was a spawning and larvae migration period for many baseline and rare fish species; the suspension of dredging obviously had a beneficial impact on the populations of these fish species.

The elevated water levels observed in the Danube River starting from late spring and throughout the rest of the year facilitated the filling of internal water bodies on the Yermakiv Island that was almost completely (i.e. for about 90%) flooded to provide favourable spawning and feeding habitats

for many fish species including those that used to inhabit the island before and those brought with the Danube flow.

The 2014 survey of the coastal areas of the Kubansky and Stambulsky Islands, Ptashyna Spit and Bystre Bay demonstrated that the operation of the Danube-Black Sea Navigation Route had no direct impact on the amphibian and reptile populations inhabiting the DBR.

Similarly, the navigation route operation had no direct impact on the amphibian and reptile species occurring on the Yermakiv Island.

The complete restoration of the natural habitats on the Yermakiv Island undertaken in 2010 proved to be the best compensation measure. With the natural hydrological regime of the island getting back to normal, the major part of the island was also restored to its natural state. Valuable habitat areas for amphibian and reptile species, including spawning water bodies for amphibian species, have expanded significantly.

In 2014, six new species were included in the total list of the DBR's bird fauna (golden eagle, black-legged kittiwake, green warbler, pied wheatear, and mistle thrush). Overall, as of the end 2014, the DBR bird fauna comprised 292 species (70% of the national bird fauna species composition). Some of these species were encountered at distances ranging from 1 km to 25 km from the navigation route along the Bystre Branch (golden eagle, black-legged kittiwake, green warbler, and mistle thrush). Thus, the bird fauna occurring along the navigation route in the Bystre Branch comprises 239 species (57% of the national bird fauna species composition).

In 2014, the dynamics of the bird species composition and populations in the coastal areas of the DBR including the navigation route along the Bystre Branch was mainly shaped by the natural factors such as the elevated water levels in the Danube and storm events.

After the restoration to its natural state, the Yermakiv Island has become a valuable nesting and feeding area for many birds including waterfowl species. The central part of the Yermakiv Island, where the waterlogged mouth section of the Lypovanka River is covered with willow thickets, has become a valuable nesting habitat. In 2014, the following bird species nested successfully in this area: little egret, black-crowned night heron, glossy ibis, squacco heron, pygmy cormorant and great cormorant. The white-tailed eagle, a species included in the Red Data Book of Ukraine and other international bird conservation lists, also nested successfully.

No indication of direct impact of the navigation route in the Bystre Branch on the species composition and populations of birds in the coastal areas of the DBR was observed during the 2014 seasonal migrations and wintering periods.

Similarly, no indication of direct adverse impact on the DBR's flora and fauna in general was observed in 2014 during the operation of the Danube-Black Sea Navigation Route.

6. THE REVIEW OF THE CHANNEL AND SUSPENDED SOLIDS DYNAMICS IN THE DANUBE DELTA AND LITTORAL AREA OF THE BLACK SEA BASED ON THE SATELLITE IMAGES

The Satellite Images Used in the Monitoring Survey

During the 2014 survey, the Landsat 7 and Landsat 8 satellite images were used to analyse the dynamics of suspended solids and coastline changes. The choice of the KA Landsat images is justified by the fact that they can be easily accessed and that the entire suite of spectral channels can be used to facilitate the reliable visual identification of water bodies and automatic processing of images with the use of specialized software. Also, these images are characterized by the optimal spatial resolution that ensures the required level of detail in the process of analysis. The KA Landsat 7 images have defects in the form of faulty strips that impede the quantitative assessment but are sufficient to meet the requirements of the qualitative assessment. During the survey, the image availability was checked and the existing image base was updated.

The Coastline Dynamics

The areas with the most altered coastlines were identified through the comparative visual analysis of satellite images. These areas are described below.

A new spit has developed in the Perebiyna Bay along the existing spit separating the Bay from the sea in the northern section. In this area, the accumulation of sediments outweighs the erosion by the sea ().

The size and shape of spits separating the Taraniv Bay from the Black Sea and extending between the Ochakivske Branch and Prirva Branch and between the Shabash Bay and Taraniv Bay have altered significantly. In May 2013, the erosion processes generally outweighed the accumulation processes in this section of the Danube Delta. In September 2013, the spit had a more coherent structure due to the accumulation of sediments.

The analysis of satellite images of the Taraniv Bay area taken in March, June and September of 2014 indicates that the erosion processes generally dominated the sediment accumulation processes. In December, the sediment accumulation processes caused changes in sizes and alignment of spits separating the Taraniv Bay from the Black Sea and extending between the Ochakivske Branch and Prirva Branch and between the Shabash Bay and Taraniv Bay. The Taraniv Bay is almost completely isolated from the Black Sea by a spit formed by longshore drift. An arc-shaped spit created by sediment deposition to the west of the Prirva Branch mouth impedes the direct discharge of river water to the sea. Sediments accumulating to the north of the Bystre Branch shape a new coastline in that area.

The analysis of satellite images of the Ptashyny Island taken in March, June and September of 2014 indicates that erosion generally dominated sediment accumulation. In December, the area of the Island increased to form virtually continuous land with a spur aligned eastward (Figure 6.2).

Significant coastline changes have also occurred on the Nova Zemlia Island (located between the Sulina and Starostambulske Branches) (Figure 6.3). The 2013 images are provided for comparison.

The southern section of the island is not discerned on the images taken in May 2013. The image dated 16 September 2013 shows a new virtually continuous island. A new tip of mainland was also created by sedimentation to the north of the Starostambulske Branch; sediment has also been deposited in the southern part of the Branch mouth.

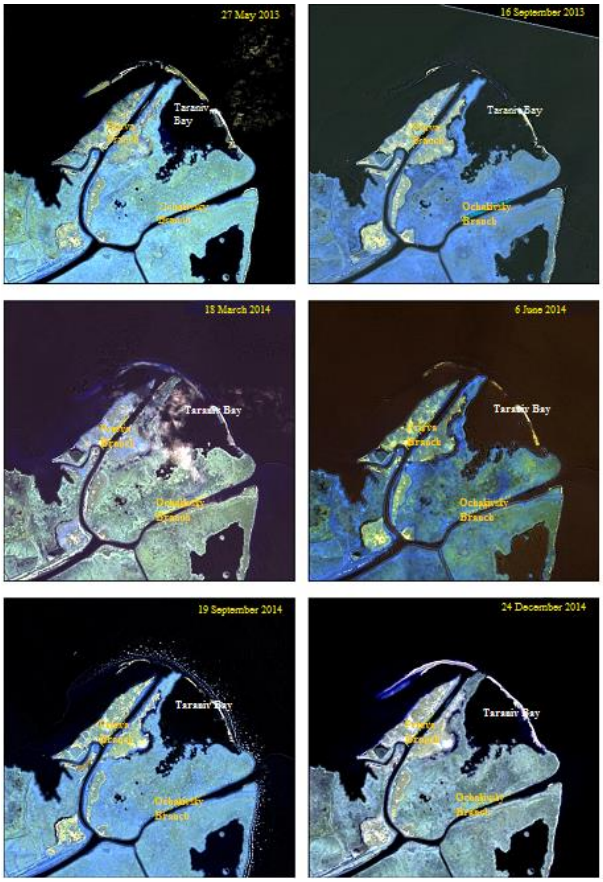

Figure 6.1. *Coastline and Spit Changes in the Taraniv Bay Area*

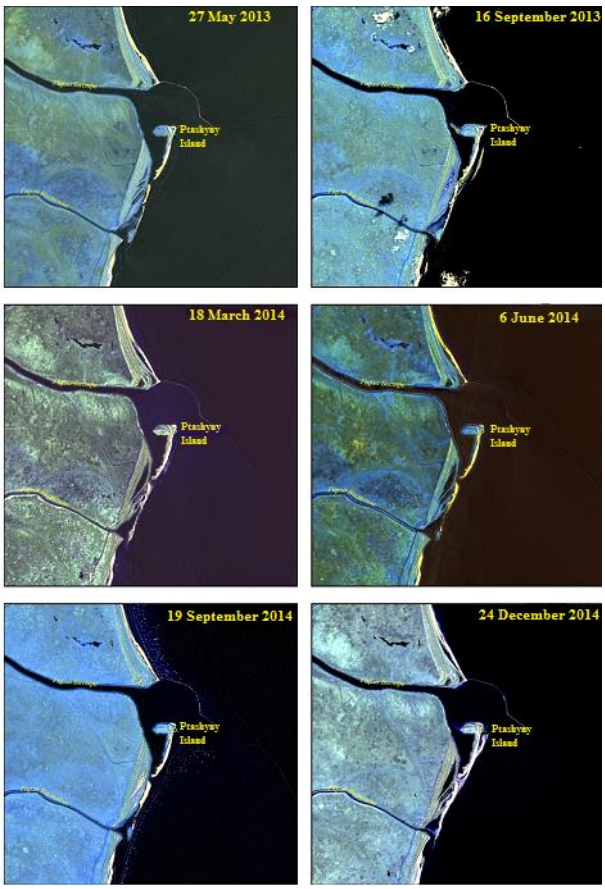

Figure 6.2. *Changes in the Ptashyny Island Shape*

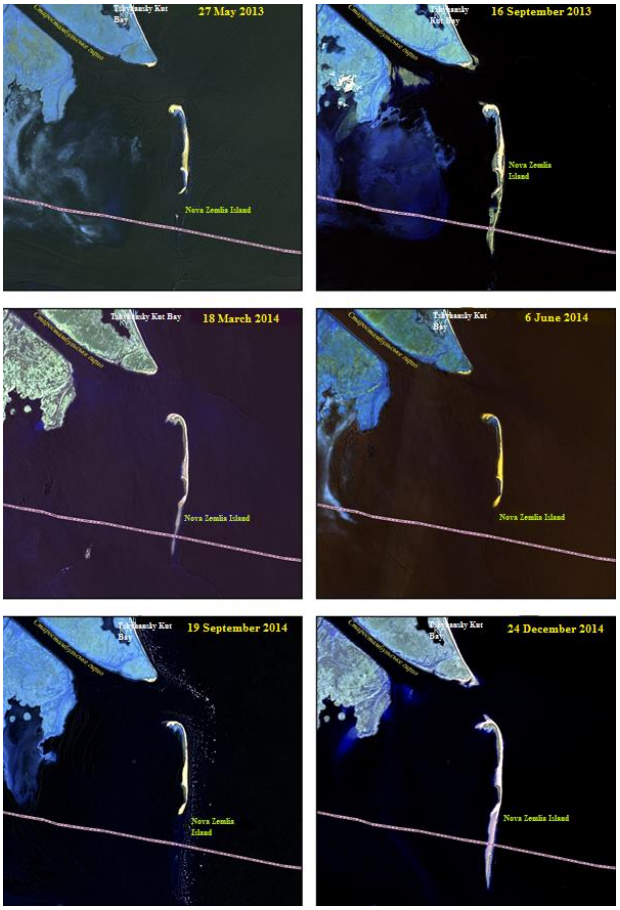

Figure 6.3. *Changes in the Nova Zemlia Island Shape and Coastline*

In 2014, the coastline of the Nova Zemlia Island was unstable and changed its size mainly laterally. An extension of the island in its southern part started to emerge in March. The images taken in June and September show a blurred structure with a large number of very small islands. On the images taken in December, the shape becomes broader and extends to the south by about 2 times. A new mainland tip also emerged to the north of the Starostambulske Branch.

As compared to the period of 2010 - 2013 when the islands were scattered separately, these islands formed a coherent structure by 2014, and this structure is becoming more and more consolidated due to sediment accumulation. The spit development has a more or less cyclic pattern; any conclusions regarding their dynamics and periodic nature can be made only after several years of observations.

The Dynamics of the Suspended Solids Distribution

The analysis of satellite images taken in 2014 provided a basis for characterizing the dynamics of the suspended solids (SS) in the western part of the Black Sea in the area of the Danube Delta (Figures 6.4-6.9). These figures show the satellite images synthesized consecutively over several months. To enable the quantitative assessment, the suspended solids concentrations were estimated and presented for the coastal section of the Black Sea in the area of the Danube Delta (Figures 6.7 – 6.9).

The maximum turbidity zones can be observed within the main stream of each Danube branch. The turbidity field has a vortex structure with lighter shaded edges facing the sea. The transport of suspended solids is generally southbound but may have the northbound direction in some periods of the year. No photo anomalies were observed on the satellite images of the dumping area.

On 11 March 2014, a plume of suspended solids carried with river flow via the northern branches of the Delta had a tail-shaped southbound alignment and was transported further southeast along a significant distance. The elevated turbidity levels were observed in the bays and along the coastline. The image taken on 18 March 2014 shows that the colour of the coastal zone of the sea was a few shades lighter and the suspended solids plume was smaller and aligned southward. The turbidity levels remained generally high in the bays and along the coast. On the image dated 19 April 2014, the plume was aligned northward, the average SS concentration was about 200 mg/l, decreasing to minimum levels further out in the sea and propagating in the eastern direction. It can be concluded that the situation with the spatial distribution of suspended solids at different concentrations remained unstable in spring. The shape of the plume and SS concentrations varied considerably.

The image dated 6 June 2014 shows a very large plume and SS concentrations above 250 mg/l, extending in the southward direction. On 8 July 2014, SS were transported in the south eastern direction and had relatively low concentrations. The image taken on 17 July 2014 shows that the SS concentrations increased and the SS plume of each branch was so large that they formed a continuous range extending alongshore in the southern direction. Images taken in later summer (18 and 25 August 2014) reflect a relatively stable SS plume that has a smaller size and lower SS concentrations and is aligned south. It can be concluded that in summer 2014, the highest SS concentrations and the largest SS distribution zone were observed on 6 June.

On 10 September 2014, the SS releases were not significant with fan-shaped plumes localized in the mouth sections of the branches. The SS transport was aligned in the southern direction. On 19 September and 5 October 2014, the SS concentrations increased to 200-250 mg/l and the SS plumes of the Danube branches merged to form a continuous strip extending along the coast in the southern direction. On 24 December 2014, the SS transport was westbound; the plume extended over a significant distance; and the SS concentrations were relatively small (up to 150 mg/l).

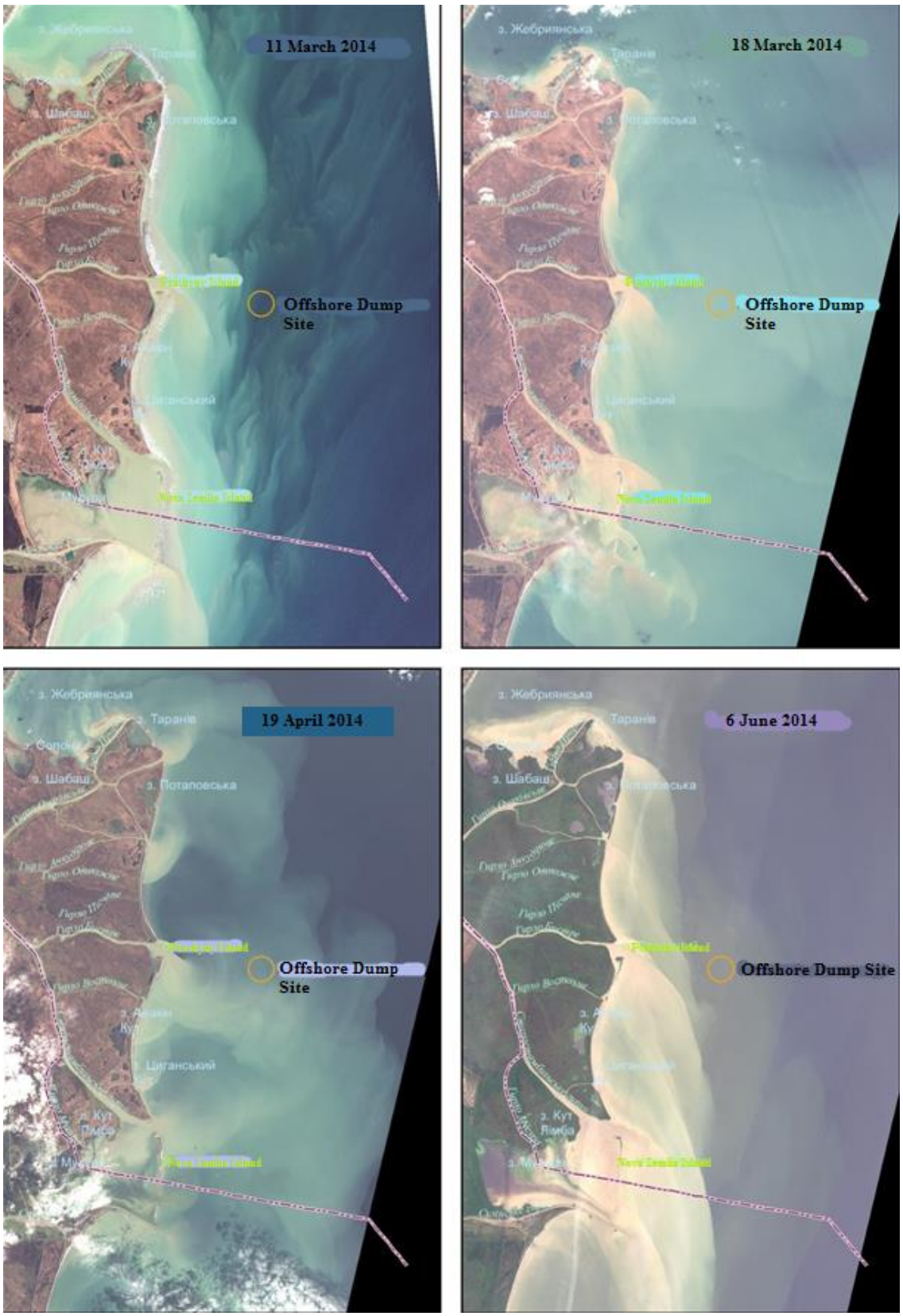

Figure 6.4. *Sediment Solids Plume in the Danube Delta and Coastal Section of the Black Sea (KA Landsat 8, red, green and blue channels), March-June 2014*

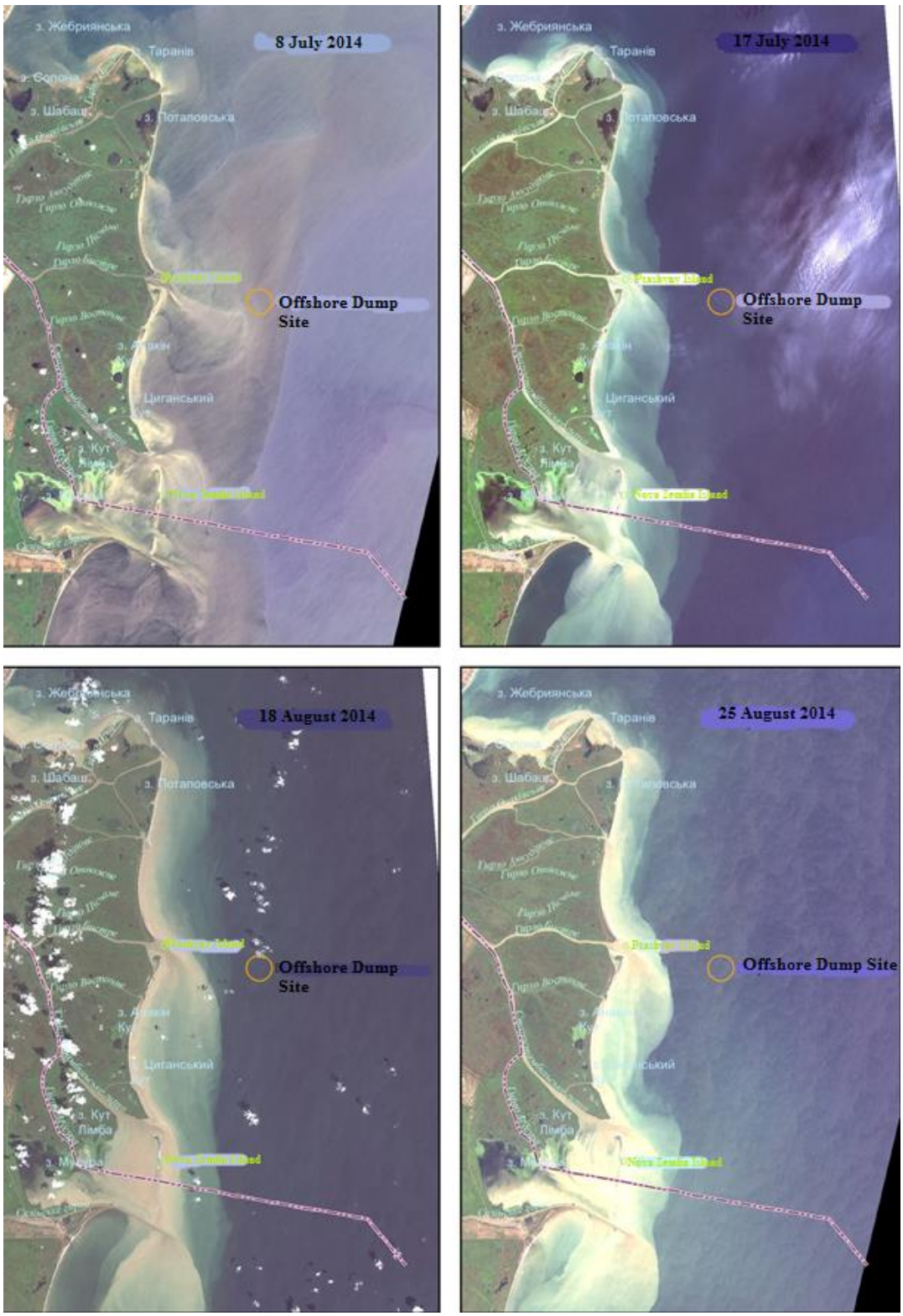

Figure 6.5. *Sediment Solids Plume in the Danube Delta and Coastal Section of the Black Sea (KA Landsat 8, red, green and blue channels), July – August 2014*

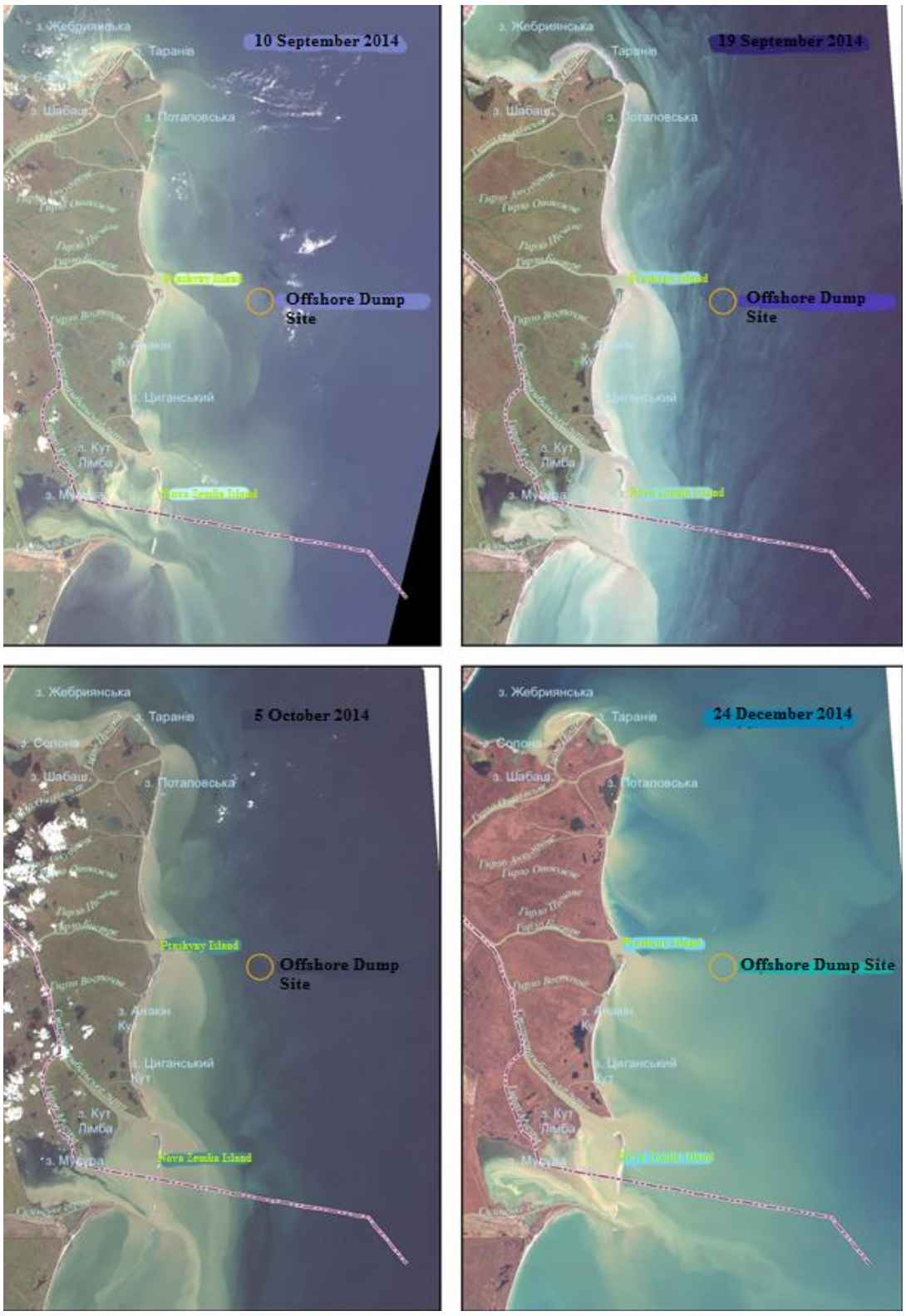

Figure 6.6. *Sediment Solids Plume in the Danube Delta and Coastal Section of the Black Sea (KA Landsat 8, red, green and blue channels), September – December 2014*

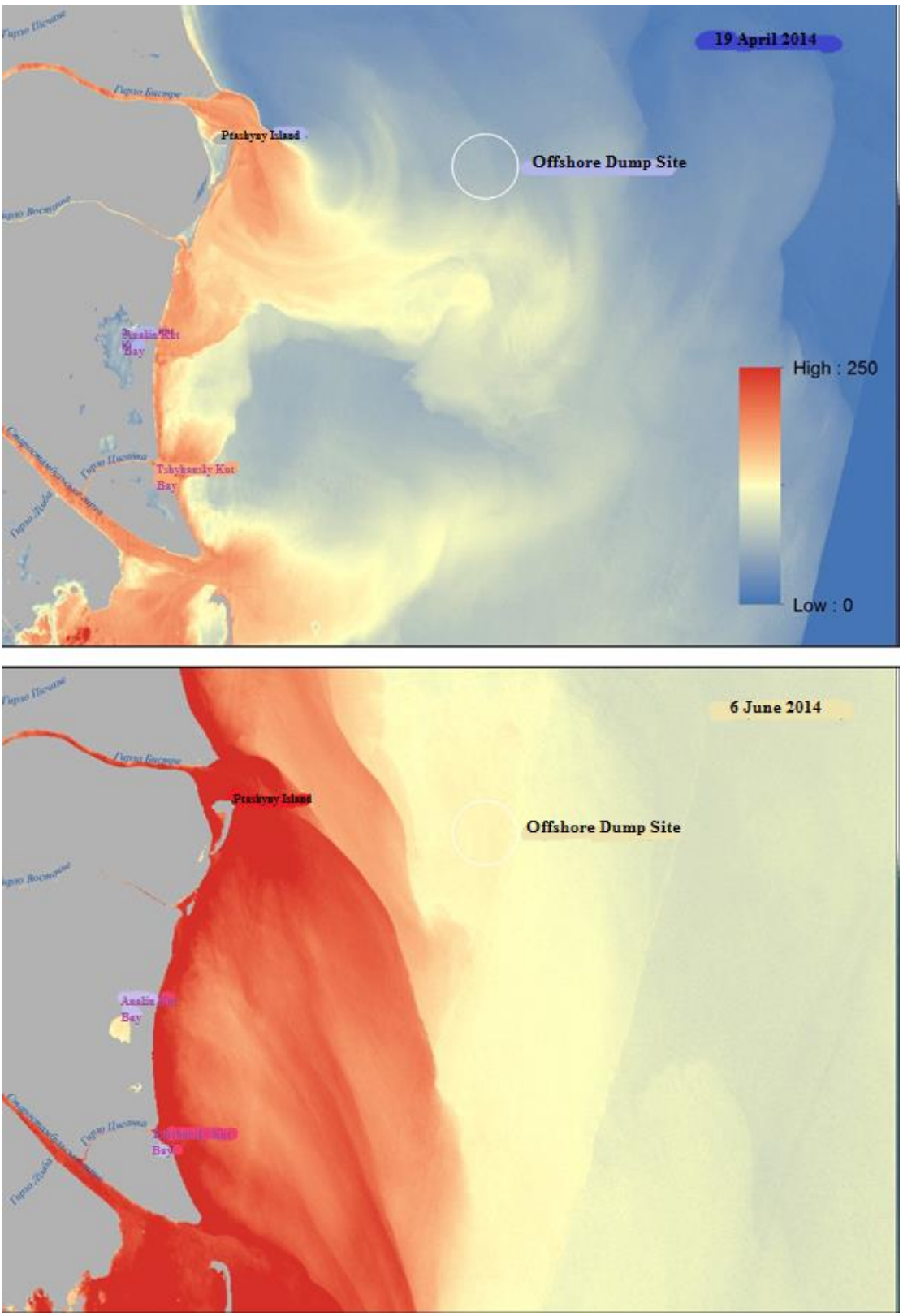

Figure 6.7. *SS Concentrations in the Coastal Section of the Black Sea near the Bystre and Starostambulske Branches (April – June 2014)*

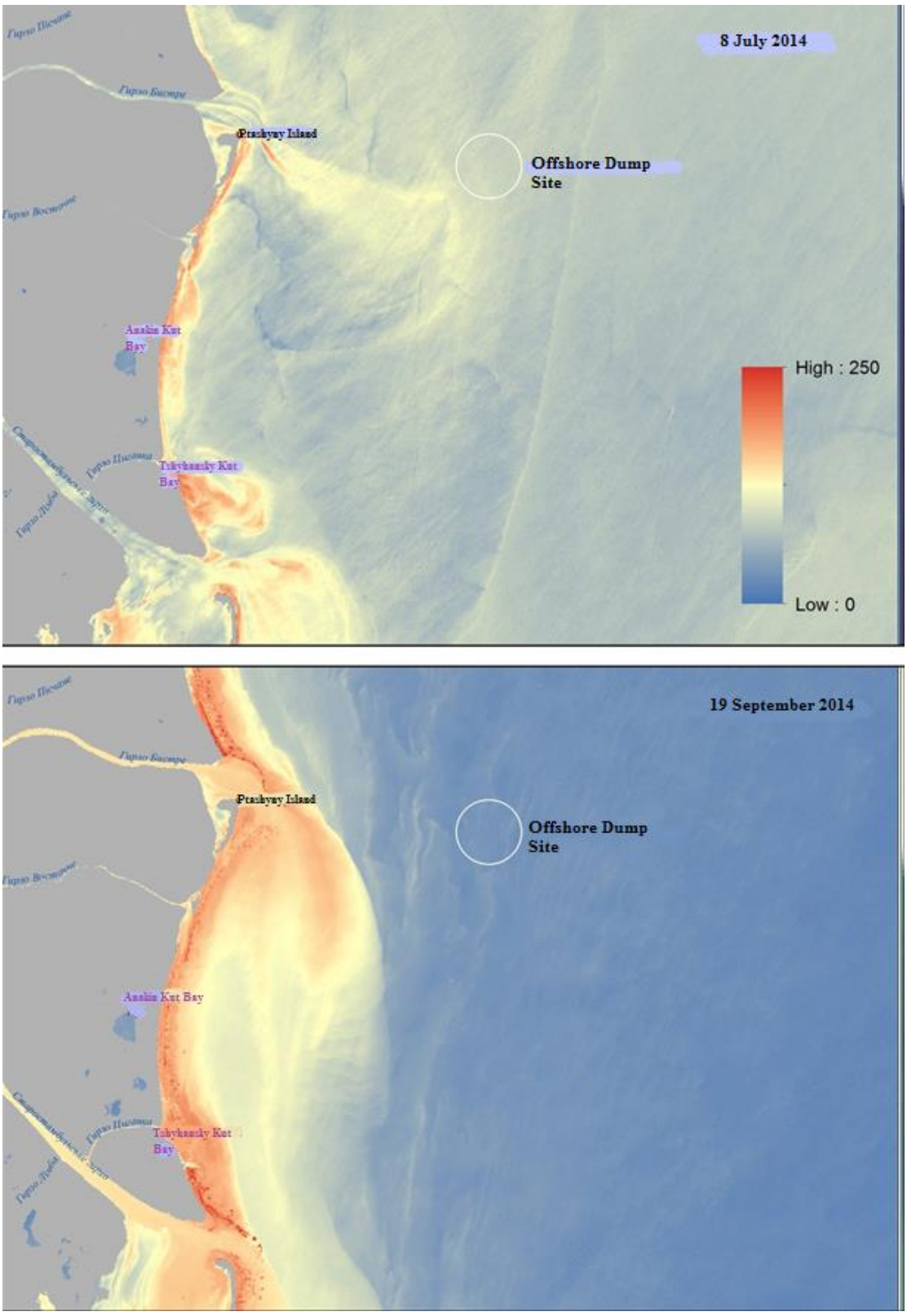

Figure 6.8. *SS Concentrations in the Coastal Section of the Black Sea near the Bystre and Starostambulske Branches (July – September 2014)*

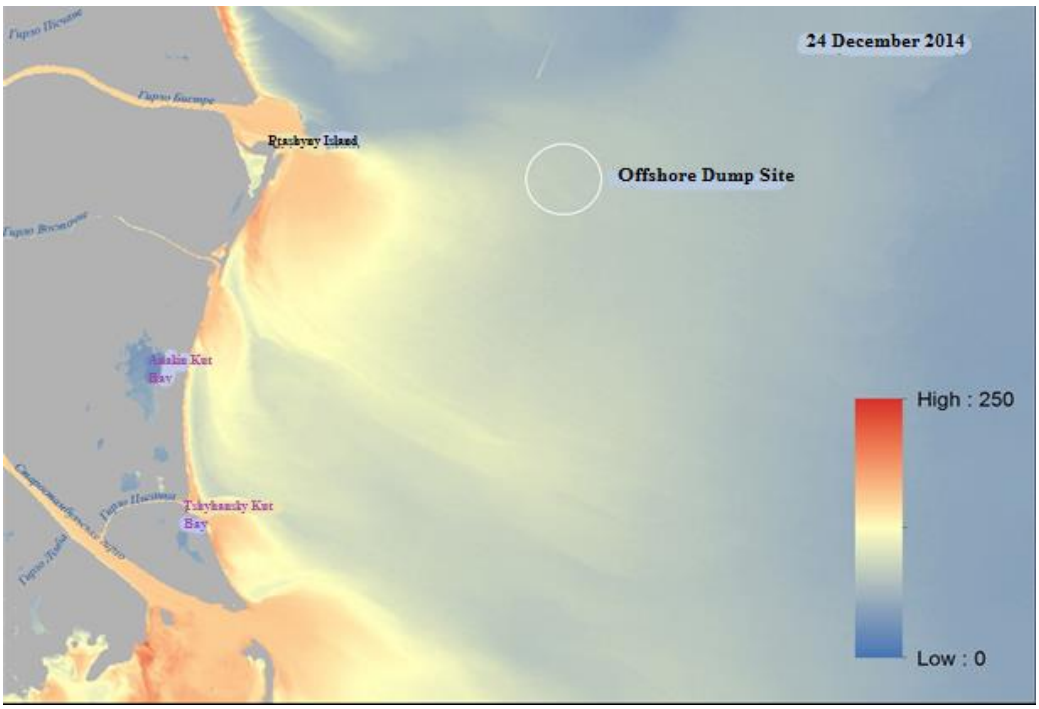

Figure 6.9. *SS Concentrations in the Coastal Section of the Black Sea near the Bystre and Starostambulske Branches (December 2014)*

Overall, the picture emerging from the analysis of the 2014 satellite images shows that there have been changes in the Danube Delta formation processes. The most significant changes have occurred in the following areas:

- The Taraniv Bay that has been virtually isolated from the sea by a spit created by sediment deposition;
- To the west of the Prirva Branch mouth where the sediments accumulated to form the arc-shaped spit that impedes the direct discharge of the river water to the sea;
- The Ptashyny Island located between the Bystre and Vostochne (Eastern) Branches: the island increased in size toward the end of the year and an eastward spur emerged in the northern part of the island;
- The Nova Zemlia Island located between the Starostambulske and Sulina Branches: the island's surface, size and layout have altered; the island has become broader and extended to the south by about 2-fold.

The suspended solids distribution pattern in the western part of the Black Sea and in the Danube Delta area in 2014 is described below:

- The maximum turbidity zones could be observed within the main stream of each Danube branch. The turbidity field had a vortex structure with its lighter shaded edges facing the sea;
- The transport of suspended solids was generally southbound but could take the eastbound and northbound directions in some periods of the year;
- In spring, the SS plume had variable shape and concentrations;
- In summer, the maximum plume distribution zone and SS concentrations were recorded in early June, with a direction being predominantly southbound.
- In autumn, the maximum plume distribution zone and highest SS concentrations were recorded in early October, with a direction being predominantly southbound.

No photo anomalies were observed on the satellite images of the dumping area.

7. ENVIRONMENTAL MONITORING AT THE OFFSHORE DREDGE SPOIL DUMP SITE DURING THE OPERATION OF THE DANUBE – BLACK SEA DEEP NAVIGATION ROUTE

The main focus of the 2014 survey activities was on reviewing the current state of the offshore dump site area, assessing the likely scale of pollutant dispersion during the disposal of dredge spoils at the site; and assessing the remaining disposal capacity of the offshore dump and potential for extending its operational life in a manner that ensures that all potential adverse effects to the environment are minimised.

The current filling levels and evenness of distribution of stored materials over the dump site surface and the potential for extending its operational life were assessed on the basis of the available historical depth measurement data for the offshore dump site area and results of depth measurements conducted on 08.04. 2014 and 28.11. 2014, as well as the hydrological modelling results produced using the Dumping geo-information system.

The analysis of morphological conditions at the dump site demonstrated that the soil material was unevenly distributed over the site. The maximum and minimum depths at the dump site are 24.2 m and 17.2 m, respectively. This means that the difference between maximum and minimum depths at all filling cells of the dump site is 7.0 m.

The total remaining storage capacity for soil materials (W_{res}, m^3) was 6192692 m^3 as of November 2014.

The results of the previous year surveys have shown no indication of any regional-scale impact of the dump site operation in terms of the offsite transport of stored materials. In order to quantify and provide a credible assessment of the dump site impact on the bottom morphology of the adjacent areas of the sea, it is recommended to monitor the distribution and movements of soil materials disposed of at the dump site by conducting the detailed depth measurements in the adjacent areas of the sea and assessing the extent of the offsite transport of soil materials stored at the dump site.

The comprehensive technical and environmental monitoring should continue to ensure that the dump site is operated in an environmentally safe manner.

Actual Status of Implementation of the Comprehensive Environmental Monitoring Programme during the Operation of the Danube – Black Sea Deep Navigation Route in 2014. Conclusions and Recommendations

In 2014, the monitoring activities were carried out in line with the Terms of Reference for the Contract No. 1320/1.1 of 16.04.2014 and the 2014 Comprehensive Environmental Monitoring Programme for the Operational Phase of the Danube – Black Sea Navigation Route: the Maritime Access Channel".

USRIEP (the Ministry of Ecology of Ukraine) as the Main Contractor subcontracted the following organizations to undertake various components of the assignment: the Danube Hydrometeorological Observatory, Odessa Centre of the Southern Scientific Research Institute of Marine Fisheries and Oceanography, ChornomorNDIProject State Enterprise, Danube Biosphere Reserve of the NASU, Institute of Marine Biology of the NAS of Ukraine (IMB NASU), and Ukrainian State Design Institute for Fish Industry ("UkrRybProject").

In the course of monitoring activities, the main emphasis was placed upon tracking impacts, both direct and indirect, associated with the maintenance dredging works in the maritime access channel, on the ecological status of the seashore, and other natural and anthropogenic factors that shape the situation in the study area (hydrological regime, river water and sediment flows, water chemistry, maritime delta dynamics, condition of food resources supporting fish fauna etc.). A number of other issues also required serious attention. These include the status of aquatic and riparian ecosystems of the DBR adjacent to the work site and collection of required information regarding transboundary impacts in line with the provisions of the Espoo Convention with a focus on those impacts that have been identified by the Inquiry Commission as the 'likely significant adverse transboundary impacts.

Actual Status of the Monitoring Programme Implementation and Scope of Work

- During the reporting period, the surveying expedition was undertaken in the Ukrainian Part of the Danube River according to the Monitoring Programme. The hydrological characteristics of the Delta watercourses were measured during the expedition and at the stationary hydrological stations. The 2014 regular hydrological monitoring programme in the Ukrainian part of the Danube River was fully completed.
- Throughout 2014, the Danube Hydrometeorological Observatory conducted the systematic monthly measurements of chemical parameters of water quality in the Ukrainian part of the Danube River in 17 monitoring locations. Overall, 218 water samples and 9 bottom sediment samples were collected and tested, and over 6100 chemical parameter determinations were made.
- The hydrobiological survey in the Danube River in 2014 was conducted by the USRIEP specialists. The survey included the sampling and testing of phyto- and zooplankton, water and bottom sediments in order to examine the seasonal variations in the biological communities, content of photosynthetic pigments in phytoplankton microalgae and bottom sediments (BS). About 70 hydrobiological samples were collected over the reporting period and 27 additional water and bottom sediment samples for determining the concentrations of algal pigments.
- The environmental monitoring of the hydraulic engineering works conducted in the maritime section included the expeditionary observations (IMB). The hydrological and water chemistry data was collected at 16 stations located in the sandbar section and adjacent areas. A suite of hydrological, hydrochemical and hydrobiological measurements and meteorological observations were conducted at each of these stations. Overall, 64 hydrological and meteorological observations were undertaken including the measurement of temperature, salinity and oxygen content.
- Fifty four water samples were collected for determining 12 chemical parameters and 23 soil samples for assessing the grain size composition and levels of contaminants. Water and bottom sediment tests were conducted in the accredited laboratories.
- The hydrobiological survey in the maritime section included the analysis of seasonal variations in the phytoplankton, zooplankton, meiobenthos, macrozoobenthos and phytoperiphyton communities. In 2014, 148 hydrobiological samples were collected and processed (56 phytoplankton samples, 21 zooplankton samples, 26 benthic samples, and 45 phytoperiphyton samples). The condition of the food resources for fish was assessed.
- The ichthyologic monitoring was conducted according to the Monitoring Programme and included the analysis of fish catch statistics for migratory and non-migratory fish species inhabiting the Danube and delta front areas, as well as the analysis and processing of information pertaining to the state of their populations (Odessa Centre of SSRIMFO).
- The comprehensive environmental monitoring undertaken in the DBR included observations on the condition of plant communities in the coastal and wetland areas, macrozoobenthic communities inhabiting freshwater and brackish water bays within the DBR boundaries, herpetofauna and rare fish fauna, as well as ornithological surveys along the navigation route and on the Yermakiv Island.
- The remote monitoring instruments were used to monitor the environmental processes in the Danube Delta and coastal area of the sea. Data on the dynamics of channel processes and suspended solids transport in the Danube Delta and coastal area of the Black Sea was produced through the analysis of satellite imaging materials.
- The 2014 assessment of dredging impacts on the aquatic environment and fish fauna was undertaken and quarterly compensation estimates produced (ChornomorNDIProject and Odessa Centre of SSRIMFO).
- The actual quantities of soil materials generated during the maintenance dredging operations and disposed of at the dump site were reviewed; the remaining dump site capacity and potential for extending its operational life in order to provide storage capacity required for soil materials to be

generated during dredging operations in the maritime section of the Danube-Black Sea Navigation Route were assessed (ChornomorNDIProject).

- The 2014 Comprehensive Environmental Monitoring Programme for the Operational Phase of the Danube-Black Sea Navigation Route Project was fully completed.

Findings and Conclusions

Fluvial Section of the Navigation Route

- In the mouth section of the Danube, the winter of 2013-2014 was mild and relatively dry, the spring and summer of 2014 were warm and wet, and the autumn that year was moderately warm and wet. The average annual air temperature was 11.7^0C, or 1.1^0C higher than normal. The total annual precipitation in 2014 was 634 mm (130% of the norm).
- A catastrophic rainfall and flooding occurred in the Middle Danube Basin in mid-May. As a result of the natural subsidence of flood wave and regulation of flood flow by the Iron Gate dam, maximum annual water levels in the Ukrainian part of the Danube River were pretty close to being dangerously high and were recorded in the end of May.
- Abnormal variations of water levels were recorded in autumn 2014 when several flooding events occurred after heavy rainfalls instead of low flows typically observed during the autumn low-water period. The highest water level (415 cm above the station datum) was recorded in Reni on 30.09.2014.
- The redistribution of river flow in the Danube Delta is governed by both natural processes and anthropogenic factors. The current pattern is characterized by an increase in flow discharged via the Tuclea system of branches and a decrease in flow received by the Chilia system. In 2012-2014, the average flow discharged via the Chilia Arm accounted for 49% of the total flow received in the upper section of the Danube Delta.
- It is expected that all major branches of the Chilia part of the Danube Delta will receive reduced flows. The only exception will be the Bystre Branch whose flows will remain relatively stable. Maintaining navigable depths in the Ukrainian part of the Danube Delta will slow down the redistribution of river flow in favour of the Tulcea part of the Danube Delta. Without large-scale hydraulic engineering operations, the Chilia Arm will receive about 47% of the Danube flow by 2020.
- During the spring high-flow period, the highest flow discharge rate in the upper section of the Danube Delta was 13700 m^3/s at a 10% probability, which means an average recurrence interval of 10 years. With an average annual total flow discharged through the Danube River being 205 cubic kilometres per year, the 2014 total flow reached 237.6 km^3 and 119 km^3 (50%) of that was discharged through the Chilia Arm.
- Predictions and estimates show that the development of the St. George Branch will be a decisive factor shaping changes in water regime of other major branches of the Danube during any construction activities. A 30% reduction in the length of the St. George from 109 to 76 km in 1981-1992 as a result of constructing a system of loose-bed channels continues to promote a gradual increase in the cross-sections of the straightening channels and intensive development of the St. George and Tulcea Branches.
- Maintaining navigable depths in the mouth section of the Bystre Branch at 5-7 m is not able to change the dynamics of the major branches of the Delta whilst deepening the rifts and sandbar sections in the Chilia Arm will help slow down the redistribution of flow in favour of the Tulcea Arm.
- Overall, 33.2 million tonnes of suspended solids was discharged to the Black Sea with the Danube River flow. Of that, 7.93 million tonnes (23.9%) was discharged via the Bystre Branch. Part of these sediments accumulated in the maritime access channel of the Danube-Black Sea Navigation Route.
- The review of data on the dynamics of the maritime delta front over 2012-2013.

- Changes in water chemistry in the Danube Delta largely depended upon the hydrological regime including flow abundance and water temperature, as well as on the transport of suspended solids with surface runoff.
- The following water quality guidelines were found to be exceeded in the Ukrainian part of the Danube Delta:
  - MAC Limits set for waters designated for domestic use were exceeded for the following parameters: COD (in the sections where river water could be used for drinking water supply purposes); phenols; and total iron;
  - MAC Limits set for waters designated for fishery were exceeded for the following parameters: BOD; nitrites; phenols; total iron; manganese, zinc, surfactants, and suspended solids;
- The exceedances of the MAC Limits were observed starting from the transboundary section (the R01 monitoring site, Danube River, Mile 71, upstream of Reni). This is the section where the highest pollution levels and MAC Limit exceedances are recorded most frequently.
- The levels of dissolved oxygen remained relatively high throughout the year, reduced levels were observed during the summer; the levels of oxygen in water were in inverse dependence on water temperature. No exceedances of guideline levels were observed.
- The BOD_5 levels in the reporting period also look better than those observed in the previous year; this year's average level of BOD_5 is lowest in eight years. No exceedances of guideline levels were observed during the year even in the locations where the actual levels were assessed against guidelines set for drinking water supply sources (R01, R06, R07, and R10).
- The MAC Limit set for COD and for waters designated for domestic use was found to be exceeded only in the locations where the actual water quality is assessed against the criteria set for drinking water supply sources (R01, R06, R07, and R10). The measured levels of COD and the ratio of permanganate oxidability to dichromate oxidability (0.27) indicate that the poorly oxidized compounds prevail over those that are easily oxidized, but this picture has been typical of the Danube River for many years.
- The concentrations of nitrogen in mineral forms were not significant, the exceedances of the MAC Limit set for waters designated for fishery were only observed for nitrite nitrogen, becoming more pronounced during the warm period; the highest nitrite concentrations were recorded in August and September though the MAC Limit set for waters designated for domestic water supply were not exceeded. The concentrations of mineral phosphorus remained within the guidelines (MAC Limits for domestic uses and fishery) throughout the year.
- The concentrations of suspended solids in water varied considerably throughout the year and tended to increase during flooding and rainfall events, being an indication of intensive washout and transport of soil particles with surface runoff. The exceedances of the MAC Limit (fishery) were observed throughout the year in all monitoring locations starting from the R01 location (Danube River, Mile 71) in the transboundary section.
- The Danube River water can be characterized by the domination of hydrocarbonate and calcium ions. Total mineralization in the study area varied throughout the year within a range from 307 to 414 mg/l, the highest levels were observed in January; the 2014 levels were slightly lower (-15 mg/l) than the average level recorded in the previous year.
- The levels of surfactants remained minor throughout the year, being below the detection limit in the majority of samples, though occasional exceedances also occurred – mainly in December.
- A picture of metal contamination in the Danube River can be described as follows:
  - The concentrations of iron exceeded the MAC Limits for domestic water supply and fishery throughout the year in all monitoring locations, showing the largest margin of exceedance among all other monitored metals;
  - The concentrations of manganese and zinc also exceeded the MAC Limit for fishery in all monitoring locations but remained within the MAC Limit for domestic water supply;
  - The levels of nickel in the majority of samples were within the MAC Limits though occasional

exceedances (up to 1.9 times the MAC Limit for fishery) were observed.

- The elevated levels of metals in the bottom sediments were observed in the entire Ukrainian part of the Danube Basin and the highest concentrations were recorded in the transboundary section near the R01 monitoring location (Danube River, Mile 71). The review of the 2014 monitoring results in the context of the international guidelines on metals indicates that the guideline values were exceeded for copper in water and nickel and bottom sediments. But these exceedances were only occasional and relatively minor (up to 1.1 times the MAC Limit for copper in water and 1.4 times the MAC Limit for nickel in bottom sediments).
- The chlorinated organic pesticides (DDT and derivatives) were found to be occasionally present in water samples collected in the mouth section of the Danube at concentrations below the MAC Limit for fishery (<0.1 MAC Limit); the highest concentrations were recorded in April and May. Relatively significant concentrations of DDT and derivatives were periodically observed in various times and in different places, including the transboundary monitoring locations R01 and R02. Other monitored chlorinated organic pesticides such as HCCH and HCB were not present in the Danube River water at detectable concentrations in the reporting year.
- Based on the review of the monitoring results, it can be concluded that river water in the Danube Delta is contaminated by organic compounds, nitrites and metals at levels exceeding the applicable guidelines. The elevated levels of chemical contaminants in the river water and metals in the bottom sediments are observed recorded starting from the transboundary section (the R01 monitoring location, Danube River, Mile 71).
- To assess the transboundary impact of the Cernavoda NPP on the tritium levels in the Danube River within Ukraine, the concentrations of tritium were monitored in 2011-2014 near Reni, Izmail, and Vylkove. The operation of the Cernavoda NPP causes an increase in the tritium activity concentration in the Danube River within Ukraine by 3-5-fold as compared to the background levels.
- In 2014, 227 taxonomic units representing 8 freshwater phytoplankton groups were identified in the algological communities in the Ukrainian part of the Danube River. Throughout the year, diatomic algae dominated the algological communities in all surveyed sections of the River in terms of the species number, followed by the green Chlorococcales algae. Thus, the total phytoplankton diversity is represented by the Diatoma and Chlorococcales algal communities.
- A decrease in the total number of algal species was observed in November as compared to September and June, mainly due to a reduced number of green algae species. The majority of the identified phytoplankton species represented the freshwater/brackish water communities. *Synedra gaillonii*, a typically marine species, occurred individually and was encountered in the sandbar area near the dam in September.
- The dynamics of the total phytoplankton abundance was mainly attributed to the small-cell representatives of the blue-green algae group; other groups, e.g. diatomic and green algae, were less abundant. In the tested samples, the major contributors to the phytoplankton biomass were the large-cell representatives of the diatomic algae and, to a less extent, blue green and green algae.
- The phytoplankton biomass values in some sections and in different periods of the year varied in the range from very low to moderate, and from below moderate to moderate based on the averaged values of indices. Based on this, the surveyed sections of the Danube River can be classified by their trophic state as ‘mesotrophic’ (varying from being ‘oligotrophic’ to being ‘eutrophic’ in various seasons and locations). Generally, the values of quantitative indicators characterizing the phytoplankton development were within their historical range.
- The Pantle-Buck saprobe index values ranged from 1.56 to 1.69. According to the Methodology of Surface Water Quality Assessment by the Saprobe Index, all surveyed locations during the survey were within the β'-mesosaprobe zone and corresponded to Water Quality Class II, Category 3 (‘good’ ecological status and ‘fairly clean’ level of quality).

- In various seasons of the year, the zooplankton community comprised 25 species (June), 35 species (September), and 34 species (November); overall, 39 taxa were recorded in 2014 (accompanying species were not taken into account).
- The zooplankton abundance levels were low and were similar to their mean historical levels. As regards the trophic state, the zooplankton development level ranged from the extremely low to very low, corresponding to the 'oligotrophic' category.
- The results of the saprobe state assessment based on zooplankton indices indicate that the saprobe state has changed little in the recent years and generally remained within the beta-mesosaprobic zone, corresponding to the 'sufficiently clean' and 'good' water quality categories.
- Based on the measured concentrations of chlorophyll 'a' and according to the Classification of the Ukrainian Water Bodies by their Trophic State, the survey locations sampled in 2014 can be generally classified as 'oligo-mesotrophic', corresponding to Category 1 as described in the Ecological Status Assessment Methodology for Surface Waters (which means an 'excellent' ecological status and 'very clean' level of quality). Under the ICPDR classification, the measured concentrations of chlorophyll also correspond to Class I. Generally, the 2014 survey results correlated well with the results received in the previous years.
- To summarize the 2014 survey results, it can be concluded that no noticeable changes in the Danube River ecosystem condition were identified based on the biological assessment.
- The results of water quality assessment based on the ecological indices for the Ukrainian part of the Danube Delta indicate that:
  - Based on the average estimated values of indices, the river water in the Ukrainian part of the Danube Delta corresponded to Class II, Categories 2 to 3 ('very good to good' ecological status, 'clean to relatively clean' level of quality); based on the worst-case average values, it is classified as Class III, Categories 4 to 5 ('satisfactory to moderate' ecological status and 'slightly to moderately polluted' level of quality).
  - The results of the ecological status assessment of the Ukrainian part of the Danube Delta remained virtually unchanged as compared to the previous years.
- Generally, the hydrochemical and hydrobiological regimes were mainly shaped by a traditional suite of natural and anthropogenic factors.

Maritime Section

- The water chemistry of the maritime section is shaped by the discharge and transformation of the Danube River water, hydrological conditions in the area and intensity production and destruction processes.
- In mid-September 2014, the hydrological situation in the maritime section of the Danube Delta was one that was considered to be typical of the late summer period. The warm water layer was 24–25 m so that the surface and bottom water temperatures were virtually the same and ranged from 22.5 to 24.2 °C. The homothermy was observed in all monitoring locations.
- The homothermy of water masses was also observed in the maritime section of the Danube Delta in November 2014, when the water temperature in the surface layer was only 1–2 °C higher than in the bottom layer. There was no thermocline in that section where the significant part of the water area was occupied by the transformed river water of low salinity that dominated the surface layer to a depth of 2–3 m. Below that layer, the water masses had a salinity of 16.3-17.7 ‰.
- The ranges of variation and average concentrations of nitrogen and phosphorus compounds in both mineral and organic forms, silicon, and dissolved organic substances observed in the maritime section of the Delta remained similar to their average historical levels.
- The suspended solids (SS) distribution pattern in the maritime section of the Delta in September was shaped by the SS transport with river flow and their deposition in the form of bottom sediments in the mouth section of the Bystre Branch. A significant increase in the SS

concentrations in water layer was recorded in November in the dredging area. No exceedances of the baseline SS concentrations were recorded in the area of the offshore dump site; this is attributed to a highly dynamic nature of local water regime and significant density of material (sand) disposed of at the site, which is quickly deposited at the bottom.

- The elevated levels of phosphates and organic nitrogen were recorded in the surface and bottom water layer in the dredging area, and only in the surface layer in the area of the offshore dump site. Dredging activities undertaken in the channel and the subsequent dumping of dredging spoils affect the water chemistry in the maritime section only to a limited extent and at a local scale; this impact manifests itself in increased concentrations of suspended solids in the dredging locations and within the maritime access channel.
- The bottom sediment sample tests did not detect any acute lethal toxicity effects, which means that these samples can be classified as Toxicity Class 1 (no toxicity).
- Based on the structural and functional indices of phytoperiphyton whose values were estimated in September-November 2014, the maritime front of the Danube Delta can be described as having 'good' ecological status with relevant values of the Ecological Quality Ratio (EQR).
- The highest value of phytoplankton biomass was recorded in the dredging area. The contribution of blue-green algae to the total phytoplankton biomass was not significant (up to 4.6% of the average biomass value). This means that all phytoplankton resources can be used as a source of food for invertebrates and fish.
- The lowest zooplankton values were recorded in the dredging area whereas the highest values of zooplankton that is not suitable for consumption by fish and those of zooplankton suitable for consumption by fish were observed in the dumping area and in the baseline locations, respectively.
- The 2014 values of indices based on meio-benthos suitable for consumption by fish were higher than in the previous year. It can be assumed that the climatic conditions in 2014 were conducive to the development of Harpacticoida species, bivalve molluscs and young Polychaeta organisms as the most important component of meio-benthos as a food resource.
- The lowest macrozoobenthos biomass values over the entire period of observations in the maritime part of the Danube Delta, i.e. since 2004 till the present time, were observed in September 2014 when young individuals overwhelmingly dominated the population structure of macrozoobenthos. This situation can be apparently attributed to the massive death of bottom fauna. In September 2014, the macrozoobenthos quantity increased by 3-fold but its contribution to the biomass food resource was only 19% if estimated through the arithmetical mean and 35% if estimated through the geometric mean.
- In September, the lowest number of taxa (6), along with the average abundance (333.3 individuals per m^2) and biomass (0.940 g/m^2) of benthos, were recorded in the dredging area. In November, virtually all indices characterizing the macro-zoobenthos development were lowest in the dredging area while the highest values were recorded in the dumping area and at the baseline stations.
- In 2014, the condition of bivalve mollusc colonies changed significantly in terms of both the frequency of occurrence and the biomass and number of molluscs in these colonies. One of the main causes of reduced abundance and biomass of bivalve molluscs in the north-western shelf of the Black Sea is hypoxia, resulting in reduced growth rates and increased mortality rates. The hypoxia phenomenon varies in magnitude from year to year, resulting in variations in the population number and biomass of molluscs.
- The results of the hydrobiological surveys were used to assess the fish food resources available in different seasons and in various areas of the maritime section of the Danube Delta as a basis for estimating damage caused to fish stocks during the operation of the navigation route in 2014.

Ichthyologic Monitoring

- The total yield of herring in the Ukrainian part of the Danube Basin was 98.5 t by the end of 2014, which was almost 220 t less than in the previous year; this is the lowest yield over the previous 13-year period. In 2014, the spawning migration of herring in the Danube River was weak, or more precisely put, it was the lowest in the past few years. The first 10 days of April was the peak migration time for herring.
- The herring larvae migration intensity in 2014 was very low, being well below the average historical levels. Quite traditionally, the peak migration time was late May to early June.
- The study into the Danube sturgeon larvae migration patterns continued in 2014. The preliminary results indicate that sterlet and great sturgeon currently have relatively larger populations than other sturgeon species occurring in the Lower Danube Basin.
- Dredging and soil dumping operations associated with the development of the navigation route mainly affect the food resources for fish and, to a less extent, on young fish populations. At the same time, surveys undertaken within the framework of the environmental monitoring of the Navigation Route Project indicate that this impact is mainly limited to a number of local areas and periods during which dredging works are conducted. Dredging operations result in the short-term elevation of suspended solids concentrations in water.
- Unless conducted immediately in the spawning areas during the spawning period, dredging and dumping activities have a relatively minor impact on fish fauna.
- The following measures are recommended to reduce adverse impact on fish reproduction:
  - During the fishing ban for flounder and turbot (May) and Azov Sea/Black Sea mullet (late August – early September), dredging activities in the maritime access channel should be limited to the section immediately adjacent to the Bystre Branch (i.e. the section with the lowest salinity levels);
  - The dumping site should be operated in line with the design provisions promoting the even distribution of dredging spoils over the dump site area based on a recommended sequence of cells;
  - The scale of dredging activities should be limited for the entire duration of spawning periods agreed and specified in the Feasibility Study for each individual affected species and kept at a minimum that is necessary to ensure the safe movement of ships.
- The Fish Protection Action Plan has been developed including an initial estimate of damage caused to the aquatic biological resources by maintenance dredging operations in the maritime access channel of the Danube – Black Sea Navigation Route. The Plan is based on the navigation route design provisions and takes account of existing requirements to the protection of fish resources during construction works undertaken in water bodies.
- The scientific and biological justification required to understand whether the maintenance dredging works including the use of the offshore dredge spoils dump can be carried out in the maritime access channel of the navigation route during the spawning ban was prepared.
- The results of surveys conducted during the operational phase of the navigation route indicate that the spawning conditions for both freshwater and marine fish species generally have not deteriorated significantly in the areas of dredging operations in the maritime section of the Bystre Branch and offshore dump site.
- Maintenance dredging activities undertaken in the reporting period have had a limited impact on fish fauna within the boundaries of the dredging area and have not caused any transboundary effects.

Results of Monitoring Activities Undertaken in the Danube Biosphere Reserve

- In 2014, the main factors affecting the flora and vegetation cover in the DBR were high water levels recorded in the Danube River throughout the spring and summer period and intensive storms observed in spring and autumn (starting from September).

- Major storms that occurred in 2014 affected the development of vegetation cover in the coastal areas and along the shoreline where they triggered abrasive processes, especially in the north eastern and eastern parts of the coastal area within DBR.
- In 2014, the DBR flora remained unchanged as compared to the previous years, comprising 1562 species with higher vascular plants being the most numerous groups (967 species, or 19.19% of plant species occurring in Ukraine). The DBR area is home to 26 rare plant species included in the Red Data Book of Ukraine and 10 species included in the European Red List.
- The plant life, first and foremost including its aquatic communities, are characterized by a continuing simplification of phytocoenoses structure, caused by abrupt variations in water levels, turbidity and salinity during the vegetative period. This process is accompanied with an intensive build-up of silt in the coastal water bodies, affecting the development of vegetation cover and changes in it.
- After the completion of land reclamation activities and demolition of some sections of dam structures, the natural wetland ecosystems and biodiversity on the Yermakiv Island continued to restore themselves. The establishment of populations of rare plants included in the Red Data Book of Ukraine (water chestnut *Trapa natans* and summer snowflake *Leucojum aestivum*), as well as the intensive spreading of a species included in the Green Data Book of Ukraine (white water lily *Nymphaea alba)* has continued for the third year in a row.
- The macro-zoobenthos abundance and biomass values in the Bystre Branch were 634 cells/m² and 19.11 g/m², respectively (as compared to the historical average values of 777 cells/m² and 17.854 g/m²). The fact that these values have not changed significantly relative to the previous years can be first and foremost attributed to a relatively stable flow regime in this Branch.
- The sandbar section of the Bystre Branch contains unstable soil materials of varying composition and this adversely affects the state of all macro-zoobenthos taxa associated with them. The size of the macro-zoobenthos communities varied significantly from site to site.
- In the first 6-month period of 2014, the total abundance of macro-zoobenthos in the Bystre Bay was 2760 cells/m², or 3.2 times more than in the same period of 2013; the biomass was at 19.581 g/m², or 2.2 times more than in the previous year. The shallow water areas containing very warm water provided the ideal habitats for the reproduction of small crustacean species representing the Pontic-Caspian fauna and freshwater species brought with the Bystre Branch flow and settled in the Bay.
- The survey results indicate that this-year young population of sturgeon migrating along the Danube from their spawning habitats in June and early July 2014 was overwhelmingly dominated by young 10-14 cm long great sturgeon individuals whose number ranged from 2 to 9 per each haul. Young sterlet specimens occurred individually while no other sturgeon species were observed among this year's young fish population.
- An important specific feature observed in 2014 is that, unlike the previous years, no large-scale marine water penetration into the Bystre Branch occurred except in a small section where the Branch flows into the Black Sea (0-1 km) due to the elevated water levels in the Branch that remained relatively high for a larger part of the year.
- In 2014, dredging was not conducted during the state ban on the commercial fishing of common freshwater fish species in May-June because this was a spawning and larvae migration period for many baseline and rare fish species; the suspension of dredging obviously had a beneficial impact on the populations of these fish species.
- The elevated water levels observed in the Danube River starting from late spring and throughout the rest of the year facilitated the filling of internal water bodies on the Yermakiv Island to provide favourable spawning and feeding habitats for many fish species including those that used to inhabit the island before and those brought with the Danube flow.

- The 2014 survey of the coastal areas of the Kubansky and Stambulsky Islands, Ptashyna Spit and Bystre Bay demonstrated that the operation of the Danube-Black Sea Navigation Route had no direct impact on the amphibian and reptile populations inhabiting the DBR.
- In the reporting year, the Yermakiv Island had favourable conditions for the development of the amphibian and semi-aquatic reptile species inhabiting the DBR. Similar conditions existed in some parts of the maritime front of the Danube Delta adjacent to the navigation route where the shallow water areas remained after the spring flooding. The navigation route operation had no direct impact on the amphibian and reptile species populations inhabiting the Yermakiv Island.
- The inflow of water to the island has resulted in a fairly significant decrease in the area of dry sections whose status and value as habitats for the terrestrial fauna species including amphibians and reptiles have increased considerably.
- In 2014, six new species were included in the total list of the DBR's bird fauna (golden eagle, black-legged kittiwake, green warbler, pied wheatear, and mistle thrush). Overall, as of the end 2014, the DBR bird fauna comprised 292 species (70% of the national bird fauna species composition).
- In 2014, the dynamics of the bird species composition and populations in the coastal areas of the DBR including the navigation route along the Bystre Branch was mainly shaped by the natural factors such as the elevated water levels in the Danube and storm events. As a result of winter storms, the Taranova and Nova Zemlia spits altered their shape and size. Storms that hit the Taranova spit during the reproductive period almost completely ruined the Caspian gull and pied avocet colonies. Only the Pallas's gull nested successfully because the colony was located in the upland section of the spit. Like in the previous years, sandwich tern and common tern did not use this area for nesting.
- In 2014, no nesting colonies of Charadriiformes species were observed on the Ptashyna Spit and granite dam located in the immediate vicinity of the sandbar section of the Bystre Branch.
- After the restoration to its natural state, the Yermakiv Island has become a valuable nesting and feeding area for many birds including waterfowl species. The central part of the Yermakiv Island, where the waterlogged mouth section of the Lypovanka River is covered willow thicket, has become a valuable nesting habitat. In 2014, the following bird species nested successfully in this area: little egret, black-crowned night heron, glossy ibis, squacco heron, pygmy cormorant and great cormorant. The white-tailed eagle, a specie included in the Red Data Book of Ukraine and other international bird conservation lists, also nested successfully.
- No indication of direct impact of the navigation route in the Bystre Branch on the species composition and populations of birds in the coastal areas of the DBR was observed during the 2014 seasonal migrations and wintering periods.
- Overall, no indication of direct adverse impact on the DBR's flora and fauna in general was observed in 2014 during the operation of the Danube-Black Sea Navigation Route.

The IT-Assisted Monitoring of Processes Occurring in the Danube Delta and in the Coastal Area of the Black Sea

- In 2014, the Landsat 7 and Landsat 8 satellite images were used to analyse the coastline dynamics, concentrations and distribution of suspended solids in the Danube Delta; the satellite images were collected, interpreted and integrated into the satellite imagery data base.
- Overall, the picture emerging from the analysis of the 2014 satellite images shows that there have been changes in the Danube Delta formation processes. The domination of accumulation or erosion resulted in the coastline changes in various sections of the Delta.
- The most significant changes have occurred in the following areas:
  - The Taraniv Bay that has been virtually isolated from the sea by a spit created by sediment deposition;

  - To the west of the Prirva Branch mouth where the sediments accumulated to form the arc-shaped spit that impedes the direct discharge of the river water to the sea;
  - The Ptashyny Island located between the Bystre and Vostochne (Eastern) Branches: the island increased in size toward the end of the year and an eastward spur emerged in the northern part of the island;
  - The Nova Zemlia Island located between the Starostambulske and Sulina Branches: the island's surface, size and layout have altered; the island has become broader and extended to the south by about 2-fold. A new tip of mainland was also created by sedimentation to the north of the Starostambulske Branch.

- The spit development has a more or less cyclic pattern; any conclusions regarding their dynamics and periodic nature can be made only after several years of observations.

- The analysis of the suspended solids distribution in the western part of the Black Sea in the Danube Delta area has demonstrated that:

  - The maximum turbidity zones could be observed within the main stream of each Danube branch. The turbidity field had a vortex structure with its lighter shaded edges facing the sea;
  - The transport of suspended solids was generally southbound but could take the eastbound and northbound directions in some periods of the year;
  - In spring, the SS plume had variable shape and concentrations;
  - In summer, the maximum plume distribution zone and SS concentrations were recorded in early June, with a direction being predominantly southbound.
  - In autumn, the maximum plume distribution zone and highest SS concentrations were recorded in early October, with a direction being predominantly southbound.

- No photo anomalies were observed on the satellite images of the dumping area No photo anomalies were observed on the satellite images of the dumping area.

Environmental Monitoring in the Dumping Areas Used to Store Dredging Materials Generated during the Construction and Operation of the Danube-Black Sea Navigation Route

- The current filling levels and evenness of distribution of stored materials over the dump site surface and the potential for extending its operational life were assessed on the basis of the available historical depth measurement data for the offshore dump site area and results of depth measurements conducted on 08.04. 2014 and 28.11. 2014, as well as the hydrological modelling results produced using the Dumping geo-information system.

- The analysis of morphological conditions at the dump site demonstrated that the soil material was unevenly distributed over the site. The maximum and minimum depths at the dump site are 24.2 m and 17.2 m, respectively. This means that the difference between maximum and minimum depths at all filling cells of the dump site is 7.0 m.

- The total remaining storage capacity for soil materials (W_{res}, m^3) was 6192692 m^3 as of November 2014.

- The review of the dynamics of previous dumping operations at the dump site and results of depth measurements has provided a basis for a conclusion that the dumping technology employed at the site is feasible.

- The comprehensive analysis of the current state of the offshore dump site underpinned a conclusion regarding whether dumping operations can be continued in the storage cells Nos. I, II, III, and IV. At this stage, it would be feasible to suspend dumping operations at the central section of Cell V, north eastern section of Cell VI, and southern section of Cell VII. The comprehensive technical and environmental monitoring should continue to ensure that the dump site is operated in an environmentally safe manner.

- The results of surveys conducted in the previous years have shown no indication of any regional-scale impact of the dump site operation in terms of the offsite transport of stored materials. In order to quantify and provide a credible assessment of the dump site impact on the bottom morphology of the adjacent areas of the sea, it is recommended to monitor the distribution and

movements of soil materials disposed of at the dump site by conducting the detailed depth measurements in the adjacent areas of the sea and assessing the extent of the offsite transport of soil materials stored at the dump site through the use of dyed (coloured) soil material, observations over changes in physical and mechanical properties of bottom sediments at the offshore dump site and adjacent areas in order to determine if there is any correlation between them etc.

The review of information, predictions and estimates produced for key components of the Comprehensive Environmental Monitoring Programme in 2014 have provided a basis for assessing the scale of environmental impacts associated with the operation of the navigation route as being close to the design projections and confirmed a conclusion that there was no indication of any transboundary impact that may be attributed to the operation of the Danube- Black Sea Navigation Route. Changes occurring in the Danube Delta ecosystem are mainly due to a suite of traditional natural and technogenic factors.

RECOMMENDATIONS

Continue implementing the Comprehensive Environmental Monitoring Programme in 2015 with a focus on key issues identified in the conclusions made by the Inquiry Commission set up under the UNECE Espoo Convention as likely transboundary impacts.

The collection of information on hydrometeorological conditions and water chemistry is an important component of the comprehensive environmental monitoring of the Danube Delta that helps optimize the natural resource uses in the Ukrainian part of the Danube Delta and monitor anthropogenic impacts on the natural evolution processes. It is therefore required to maintain and upgrade the existing hydrometeorological and hydrochemical observation network.

It is required to maintain and upgrade the existing hydrological and hydrochemical monitoring system in the Ukrainian part of the Danube Delta. The Delta as a dynamic system requires increasing the monitoring frequencies and establishing additional stationary monitoring sites including, first and foremost, a marine hydrometeorological station in the Bystre Branch mouth.

The environmental monitoring of aquatic environment should be undertaken using an up-to-date methodological framework based on the approach adopted in the EU Water Framework Directive.

Surveys undertaken to date have confirmed the dependence of the abundance and biomass of bivalve molluscs *Mytilus galloprovincialis, Mya arenaria,* and *Anadara inaequivalvis* upon the flow volume in the Danube River. The regression equations developed as part of these surveys can be used for predictive assessments of mollusc populations that do not require conducting a specialized field survey in the study area. This information about zoobenthos species with large population sizes may be part of the monitoring programme focusing on the ecological status of the coastal ecosystems of the Black Sea and food resources of commercially valuable fish species.

The following mitigation measures are recommended for reducing adverse impact on fish reproduction:

- During the fishing ban for flounder and turbot (May) and Azov Sea/Black Sea mullet (late August – early September), dredging activities in the maritime access channel should be limited to the section immediately adjacent to the Bystre Branch (i.e. the section with the lowest salinity levels);
- The dumping site should be operated in line with the design provisions promoting the even distribution of dredging spoils over the dump site area based on a recommended sequence of cells;
- The scale of dredging activities should be limited for the entire duration of spawning periods agreed and specified in the Feasibility Study for each individual affected species and kept at a minimum that is necessary to ensure the safe movement of ships.

General Recommendations Designed to Optimise the Work Methods Employed and Reduce Environmental Damage from the Operation of the Danube-Black Sea Navigation Route and Options to Offset It:

It is required to expedite the process of establishing the joint Ukrainian-Romanian monitoring of the entire Danube Delta and finalizing the organizational arrangements for the joint Ukrainian-Romanian Working Group for dealing with all issues associated with the transboundary impacts of economic activities on the ecological status of the Danube Delta.

During the implementation of the Phase 2 of the Danube-Black Sea Navigation Route Project that involves large-scale dredging operations within the river channel, the issue of providing sufficient storage space for excavated soil material will become a priority requiring urgent action. To ensure that any environmental damage is reduced effectively and promptly, the excavated soil should be stored at the upland dump sites rather than in the in-stream storage areas.

New plant and animal species appear in the DBR, many of them are new in Ukraine (for example, about 60% new flora species have appeared over the past 20 years); the arrival of new species is largely attributed to significant transport flows. It is therefore recommended to establish a regional new species monitoring centre and take actions required to control/limit the distribution of dangerous species.

In order to prevent the invasion of adventitious plant species in the natural associations present in the DBR, the previously destroyed sites near the Ust-Dunaisk Port should be re-established to provide conditions for the restoration of natural fauna. It is also required to ensure that all environmental guidelines are complied with during the operation of the navigation route.

In order to offset the Bystroe Branch navigation route impacts on the nesting colonies of ground-nesting birds, it is recommended to build artificial floating islands – for example, in the Anankin Kut and Potapivsky Kut creeks. These islands are expected to attract nesting tern species and some sandpiper species. To provide adequate protection against jackal that has recently appeared in the DBR and is known to eat birds and eggs and also is a good swimmer, the floating islands should be equipped with small fencing.

A five-year compensation programme for compensating damage caused to the DBR ecosystems should be developed and approved as part of the state environmental monitoring programme for the Danube-Black Sea Navigation Route Project, to be financed through the environmental funds at the regional and national levels. As a first step toward implementing this programme, it is recommended to complete the restoration of the Yermakiv Island and clear up the Anankin Kut and Rybachy Zholobok creeks of the Vostochne (Eastern) Branch.

The disposal of soil material at the offshore dump site should be monitored by conducting regular (every six months) depth measurements in the following manner: 100 m spacing between vertical sounding profiles and 10 m spacing between the depth points along the sounding line. The results of these measurements will be used to develop a short-term dumping plan for the next six-month period.

In order to quantify and provide a credible assessment of the dump site impact on the bottom morphology of the adjacent areas of the sea, it is recommended to monitor the distribution and movements of soil materials disposed of at the dump site by conducting the detailed depth measurements in the adjacent areas of the sea and assessing the extent of the offsite transport of soil materials stored at the dump site.

The evenness of distribution, accuracy of disposal operations and movements of sediments at the offshore dump site should be monitored on the basis of a special programme.

- Received on 6th March 2015 -

MINISTRY OF ECOLOGY AND NATURAL RESOURCES OF UKRAINE

DEPARTMENT OF PROTECTED AREAS

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05.03.2015 No 9-01.2015

To: Ms Ivana D'Alessandro
Head of the Biodiversity Unit
Democratic Governance Directorate
Council of Europe

Subject: Case-file open on "Ukraine: Proposed navigable waterway in the Bystroe Estuary (Danube delta)"

Dear Ms D'Alessandro,

The Ministry of Ecology and Natural Resources of Ukraine confirms its compliments to the Secretariat of the Bern Convention and has the honor to inform on the following.

The Ukrainian Ministry sent a letter to the Ministry of Environment and Climate Change of Romania and the Ministry of the Environment of the Republic of Moldova with a proposal to hold the third meeting of the Joint Commission in trilateral agreement on cooperation in the zone of Danube Delta and Lower River Prut nature protected areas in the Danube Biosphere Reserve (town Vylkove, Odeska Oblast, Ukraine) on the May 27-28, 2015.

The Joint Commission will consider implementation of the Recommendation No. 111 (2 004) of the Standing Committee of the Bern Convention on the Bystre Estuary Deep Navigation Channel Project (Danube Delta, Ukraine). It is expected that Ukrainian and Romanian parties will exchange by information data before the meeting to present their comments at the meeting.

The Ukrainian Ministry also invited the parties to estimate the state of conservation of key species that are listed in the annexes of the Bern Convention for the Danube Delta, and to inform each other about this during the meeting and to elaborate recommendations for improving the conservation of individual species.

The Ministry of Ecology and Natural Resources of Ukraine takes this opportunity to once again express its sincere respect and hopes for further cooperation.

Sincerely yours,

Igor Ivanenko,
National Focal Point - Director of the Department of Protected Areas
Ministry of Ecology and Natural Resources of Ukraine