

## 6. MITIGATION MEASURES DESIGNED TO MINIMISE THE LIKELY ADVERSE TRANSBOUNDARY ENVIRONMENTAL IMPACT OF THE PROJECT

Table 6.1 presents a suite of environmental mitigation measures included in the detailed design for the full-scale development of the Navigation Route Project. All relevant details and description of these measures can be found in the EIA Report [1].

**Table 6.1. A Suite of Planned Environmental Protection and Mitigation Measures**

Category	Description
<b>Resource-Saving</b>	<ul style="list-style-type: none"> <li>• The siting of riparian dumpsites in the scarcely used, bush and reed overgrown areas of low ecological that are waterlogged and/or periodically flooded.</li> <li>• The restoration of dumpsites, including improvements in soil fertility and water regime (in order to restore original agricultural uses).</li> <li>• The environmentally reasonable siting of marine dumpsite in a manner that facilitates the minimization of damage to bottom communities, safe disposal of dredging spoils, and prevention/avoidance of re-contamination of estuarine and coastal waters.</li> <li>• The provision of floating navigation signs in order to avoid the use of riparian land for the installation of these signs.</li> </ul>
<b>Protective</b>	<ul style="list-style-type: none"> <li>• The provision of engineered structures combining both navigation and environmental protection functions: <ul style="list-style-type: none"> <li>➢ Flow guide dam at the bifurcation of the Bystre and Starostambulske Branches, designed to regulate the distribution of river flow between the branches and compensate any potential transboundary impact on the hydrological regime of the Starostambulske Branch;</li> <li>➢ Riverbank strengthening measures designed to prevent/avoid bank erosion along the navigation route;</li> <li>➢ Retaining dam along the seaward access channel, designed to minimize siltation processes caused by sea storms;</li> <li>➢ Settling basins and on-site dikes established at the riparian dumpsites in order to clarify generated drainage flow and minimize water contamination in the Danube River.</li> </ul> </li> <li>• Technology measures: <ul style="list-style-type: none"> <li>➢ Restricting/reducing, as much as possible, the amount of project-related construction and maintenance activities in the period of fish spawning and downstream migration of young fish;</li> <li>➢ Restricting/reducing, as much as possible, the amount of project-related construction and maintenance activities in the area of the seaward access channel in the bird nesting period;</li> <li>➢ Restricting ship traffic speeds in order to minimize/prevent the destructive impact of waves on the riparian levees, and meet the established noise limits;</li> <li>➢ Careful planning, distribution and regulation of mobile plant and machinery; adjusting the number of mechanisms operated simultaneously (a suite of air quality management measures designed to ensure compliance with existing air quality standards);</li> <li>➢ Introducing the ban on honking and loud music relaying to the ship deck while a ship moves through the protected area; scheduling ship traffic properly so that to ensure that the major proportion is handled in day-time (a suite of measures designed to minimize disturbance to local fauna and reduce damage to fisheries caused by losses in fish catches).</li> </ul> </li> </ul>
<b>Restorative</b>	<ul style="list-style-type: none"> <li>• River channel deepening along the navigation route as a measure designed to promote the partial restoration of water regime in the Delta, disturbed/alterd by past human activities (river channel straightening and flow guide dam construction by the Romanian party).</li> </ul>
<b>Compensatory</b>	<ul style="list-style-type: none"> <li>• The provision of financial compensation for unmitigable damage and utilization of compensation funds for financing appropriate and comparable environmental improvements (for example, compensation of damage to fish stocks through the construction of fish breeding farm; compensation of damage arising from disturbance to bird communities through the implementation of bird habitat improvements in the adjacent areas).</li> </ul>
<b>Protective</b>	<ul style="list-style-type: none"> <li>• Implementing a comprehensive environmental monitoring programme in order to enable the prompt and early detection of any potential adverse trends associated with the proposed activities.</li> </ul>

All these measures should be considered in the transboundary context since they aim to ensure the conservation and normal functioning of the entire Danube Delta by preventing/minimizing any adverse impact on the biodiversity of the bilateral Danube Biosphere Reserve.

## **7. OVERVIEW OF ENVIRONMENTAL MONITORING PROGRAMME AND PLANS FOR POST-PROJECT ANALYSIS**

The objective of this specially designed and comprehensive environmental monitoring programme (hereinafter referred to as the Monitoring Programme), planned to be implemented during the restoration and operation of the navigation route is the provision of reliable information on changes and trends in the ecosystem status relative to the initially defined baseline condition, to be based on actual observations, assessments and forecasts.

General monitoring goals are to:

- Maintain control over status, dynamics and trends in the components of the natural environment during the restoration and operation of the Danube-Black Sea navigation route;
- Enable the assessment of water quality and ecosystem status on the basis of chemical and biological indicators and criteria in line with the modern assessment techniques and classification systems, including integrated ecological and group indices etc.;
- Facilitate the assessment of adverse impacts caused to the natural environment and its components as a result of restoration of navigation route;
- Predict changes in the state of natural environment due to the effects of anthropogenic factors;
- Develop recommendations designed to mitigate and minimize potential adverse impacts.

The Comprehensive Environmental Monitoring Programme presented in the Annex C is an integral element of the Danube-Black Sea Navigation Route Project implemented in the Ukrainian part of the Danube Delta. It anticipates that sampling and monitoring activities will be carried out throughout the entire project lifecycle, or from 2004 onwards, to encompass all the seasons of the year (winter, spring, summer, autumn) in order to take account of seasonal specifics of delta development processes.

The Table 7.1 below illustrates how the existing Comprehensive Environmental Monitoring Programme addresses those impacts that have been identified by the Inquiry Commission as the likely significant adverse transboundary impacts of the Navigation Route Project. The monitoring results collected to-date only suggest some localized impacts in the immediate vicinity of dredging/construction works that are not able to give rise to any significant adverse consequences in the transboundary context.

The implementation of the Comprehensive Environmental Monitoring Programme presented in the Annex C will continue after the completion of restoration works in order to provide required information inputs for the post-project analysis. The results of environmental monitoring, reflecting current status and future trends in the delta's ecosystem, along with the results of engineering monitoring looking into the silting rates within the navigation route and changes in the coastal morphometry, will be used to revise and update the requirement for restoration dredging, location of marine dumpsite, layout of hydraulic structures, environmental restrictions and required scope of maintenance dredging.

**Table 7.1. The Organisational Arrangement in Place to Address Potential Adverse Transboundary Impacts**

Likely Significant Adverse Transboundary Impact	Relevant Environmental Monitoring Programme Component/Responsible Agency
<ul style="list-style-type: none"> <li>▪ Impact of dredging or deepening of the rifts on the distribution of the flow discharge between the Bystre and Starostambulske Branches and on the water level dynamics along the Bystre Branch, resulting in loss of floodplain habitats</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hydrological monitoring (Danube Hydrometeorological Observatory);</li> <li>▪ Ichthyologic monitoring (Odessa Centre – The Southern Scientific Research Institute of Marine Fisheries and Oceanography);</li> <li>▪ Protected area monitoring (Danube Biosphere Reserve)</li> </ul>
<ul style="list-style-type: none"> <li>▪ 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</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ichthyologic monitoring (Odessa Centre – The Southern Scientific Research Institute of Marine Fisheries and Oceanography);</li> <li>▪ Hydrobiological monitoring (Institute of Hydrobiology);</li> <li>▪ Protected area monitoring (Danube Biosphere Reserve)</li> </ul>
<ul style="list-style-type: none"> <li>▪ Impact on the increase of suspended sediment concentration, downstream of the dredging site on fish</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ichthyologic monitoring (Odessa Centre – The Southern Scientific Research Institute of Marine Fisheries and Oceanography)</li> </ul>
<ul style="list-style-type: none"> <li>▪ Impact on the turbidity of marine waters as a result of dumping of spoil at the dump-site at sea</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sampling/testing for control purposes during dredging operation (State Centre “Noosphere”);</li> <li>▪ Comprehensive field survey programme (Odessa Branch – The Institute of South Marine Biology)</li> </ul>
<ul style="list-style-type: none"> <li>▪ Impact of repeated maintenance dredging hampering the recovery processes of disturbed areas and affecting the structure bottom invertebrate communities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Long-term monitoring results;</li> <li>▪ Ichthyologic monitoring (Odessa Centre – The Southern Scientific Research Institute of Marine Fisheries and Oceanography);</li> <li>▪ Hydrobiological monitoring/state of food stocks (Institute of Hydrobiology, USRIEP);</li> <li>▪ Long-term monitoring and predictive modelling results</li> </ul>
<ul style="list-style-type: none"> <li>▪ 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</li> </ul>	<ul style="list-style-type: none"> <li>▪ Long-term monitoring results;</li> <li>▪ Long-term monitoring and predictive modelling results.</li> </ul>

## 8. SUMMARY AND FINDINGS

The Environmental Impact Assessment study for the Danube-Black Sea Navigation Route (NR) in the Ukrainian part of the Danube Delta represented a stepwise exercise where various specific steps were undertaken at various stages of the design development process, and reports produced in the course of the EIA process were duly and properly taken through the state environmental review procedure. The results of the EIA process completed for the Navigation Route Project showed no indication that any significant transboundary impacts might be likely to arise as a result of the proposed activity.

The EIA materials produced as part of the Detailed Design documentation package for the Phase 1 and Full-Scale Project were reviewed by the Inquiry Commission established under the Espoo Convention, and the Commission concluded that the development and operation of the navigation route as proposed might give rise to some significant transboundary impacts and the proposed project should be therefore subject to procedures defined in the Espoo Convention.

The EIA Report produced as part of the Detailed Design package for the full-scale project development phase and submitted to the Romanian party had incorporated only preliminary findings of the Inquiry Commission because that report was produced and issued before the publication of the Final Report by the Inquiry Commission.

The present Summary Report is an integral element of the above mentioned EIA Report and comprises factual information and findings from previous EIA reports produced as part of the Navigation Route Project and considered in the transboundary context herein, and also recent data and materials collected through additional surveys undertaken since 2005 in order to facilitate a deeper insight into the potential transboundary effects of the navigation route that have been recognized as likely significant by the Inquiry Commission.

In line with the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, the Statements of Environmental Consequences were published through mass media at each stage of the design development process; full texts of the EIA Reports produced for both phases of the Danube-Black Sea Navigation Route Project (Phase 1 and Full-Scale Project) were made available in the Russian and English languages on the official website of the project sponsor (the Delta Pilot State Company). Between 2003 to 2006, a series of four public hearing events was organized and held in various towns within the Lower Danube Basin.

In 2007, public consultation meetings were held in Vylkove and Tulcea for the representatives of the Ukrainian and Romanian public to discuss potential environmental impacts of the Danube-Black Sea Navigation Route Restoration Project in the Ukrainian part of the Danube Delta.

International consultations and meetings convened at various stages of the project lifecycle were used to provide forum for reviewing, among other matters, the information and data collected as part of the monitoring programme. The official resolutions adopted at these meetings do not mention any project-related violations and/or non-compliances with respect to both national and international environmental laws.

The Chilia sub-delta and its branches have been traditionally used for navigation. This can be illustrated by the fact that the maritime ports of Ismail, Reni and Kilia, located along the Chilia Arm, were established 180, 160 and 120 years ago, respectively.

Since 1958, the Bystre mouth had been closed for commercial shipping, remaining open only to military ships. Between 1950 to 1957, the proportion of ship traffic routed via the Bystre mouth was about 40% of total traffic accounted for by the Sulina Canal.

Starting from the late 1800s, various attempts had been made to improve the northern arms of the Danube's Chilia Delta and make them suitable for navigation. For example, the sandbars in the Pivnichny, Potapiv, Ochakiv and Prirva mouths were cleared and deepened.

In 1957, a pilot navigable passageway was cleared in the Prirva mouth to provide access to the Ochakiv and Chilia Arms for the combined fluvial/naval ships with the 3.5–4.0 m draught. The Prirva route represented a very heavy and continuously growing burden in terms of maintenance dredging requirement, which was at 150–200 thousand m<sup>3</sup> of soil per year in the early years of operation and swelled 20-fold by mid-1980s, when dredging had to be carried out on a continuous basis.

Since its independence in 1991, the restoration of its own navigation route on the Danube has been among the top geopolitical and economic priorities for Ukraine. The importance of this task can be illustrated by the fact that Ukraine would inevitably lose control over one of the branches of the transport corridor unless it is able to provide a direct and reliable route linking the Danube and the Black Sea, Romania would thereby gain a complete monopoly on sea-going ship traffic in the region. This scenario is fraught with serious economic implications, not only for Ukraine but also for many European countries, especially those located in the Danube Basin.

The abandonment of a traditional navigation activity in the Chilia Arm of the Danube Delta would have a devastating impact on the regional economy and people's livelihoods. Clearly, this option cannot be considered as a 'zero' scenario representing an alternative to the restoration of shipping route in the Ukrainian part of the Danube Basin.

The selection of the most appropriate option for the Danube-Black Sea Navigation Route involved the analysis of over 10 options examined/developed with a proper level of detail, sufficient for the feasibility study and/or project preparation stages. The examined alternatives comprised a broad range of navigation means that might be practicable and workable in the conditions of the Ukrainian part of the Danube Delta, and featured both routing via existing branches and construction of artificial navigation canals. The main common feature of all existing alternatives is that all of them comprise the following elements: a section of the Danube and its Chilia Arm between the ports of Reni and Kilia; and, fully or partially, the section lying between the ports of Kilia and Vylkove.

**The restoration of navigation through the Ochakiv and Prirva Arms is considered as a 'zero' (or baseline) scenario which refers to the previous shipping arrangement that was in place in the Ukrainian part of the Danube Delta to link the Danube and the Black Sea. The operation and maintenance of that shipping route were severely impeded by a continuously increasing dredging requirement (up to 4 million m<sup>3</sup> of soil per year).**

The multi-criteria comparison of various navigation route options was undertaken using a combined (verbal and formal) decision-making technique that employs the analytical hierarchy process (AHP) developed by Thomas L. Saaty. The essence of the AHP method is that a complex decision problem is first decomposed into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. Once the hierarchy is built, the decision makers systematically evaluate its various elements, comparing them to one another in pairs.

The suite of factors taken into account and considered in the analysis is graphically illustrated in Figure 4.1 and described in Tables 4.1 to 4.5 (Section 4 of the present Transboundary EIA Report).

The problem decomposition process is illustrated in Figure 4.8, and results of evaluation process are presented in Figure 4.14.

**Integral values and global priorities produced through a comprehensive comparative assessment of various alternative options have demonstrated that the Option A1 (Bystre Branch) is significantly more advantageous than other options, the choice made at the previous stages of the design development process has been thereby confirmed.**

From the list of potential transboundary environmental impacts of proposed navigation route as identified by the Inquiry Commission, the following six issues considered to represent likely significant transboundary impacts have been selected for further research and analysis:

- (1) Impact of dredging or deepening of the rifts on the distribution of the flow discharge between the Bystre and Starostambulske 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 dump-site 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 list was used as a basis to focus and steer further research and analysis carried out within the framework of the present assignment. The main findings and conclusions ensuing from this assignment are summarized below:

- 1) A special modelling exercise was carried out to assess and predict **the impact of construction and operation of seaward access channel on the distribution of flow between the Bystre and Starostambulske Branches** using one- and two-dimensional mathematical modelling tools. Three modelling scenarios were formulated to take into account and reflect typical flow conditions and discharge rates (minimum, average and maximum) defined on the basis of systematic hydrological data series.

The results of one-dimensional modelling exercise suggest that the restoration of the navigation route would cause a decrease in water levels in the Starostambulske Branch, the margin of decrease to range between 3.0 to 3.6% under different flow conditions. Maximum margins of decrease in water levels in the Starostambulske Branch were estimated as follows: 0.2 cm at the 1,500 m<sup>3</sup>/s flow discharge rate; 1.5 cm at the 3,300 m<sup>3</sup>/s flow discharge rate; and 4 cm at the 7,000 m<sup>3</sup>/s flow discharge rate.

According to the results of two-dimensional modelling exercise, the restoration of the navigation route would cause a minor decrease in flow discharges in the Starostambulske Branch, estimated to be within 1.0-1.1%, while a maximum estimated decrease in water levels is expected to be not higher than 1 cm.

These estimates, even at their upper range, are significantly lower than those assumed in the Final Report of the Inquiry Commission.

The mathematical modelling tools have been used to examine the **impact of various flow guide dam design scenarios on the flow discharges and water levels in the Bystre and Starostambulske Branches**. The predictive modelling results suggest that the construction of a flow-guide dam as part of the full-scale development of the navigation route would minimize the margin of change in flow distribution pattern between the Bystre Branch and Starostambulske Branch, caused by the construction of the seaward access channel, by about 48% at high-water discharges and 43% at average to low-water discharges relative to the project development scenario without the flow-guide dam, and this would account for approximately 0.6% of the total flow received by the Starostambulske Branch under all modelling scenarios. Furthermore, the margin of change in water levels in the Starostambulske Branch would decrease by about 42% at high-water discharges and by 50% at average discharges. As regards the minimum discharges typical of low-water periods, the estimated change in water level is too small in itself, lying within the error margins.

The modelling exercise was also used to look into the possibility of increasing the proportion of river flow discharged via the Starostambulske Branch by **clearing bottom sediments concentrated along the left bank of this branch downstream of the Bystre Branch outflow**. Modelling results indicate that the implementation of this measure may facilitate **almost a 4% increase in river flow discharged via the Starostambulske Branch**.

- 2) The present study comprises the refined/updated assessment of potential adverse impacts of the Navigation Route Project on the benthic fauna present in the Danube River branches. The results of the comprehensive environmental monitoring programme have demonstrated that those river sections where **dredging and riverbank strengthening operations are concentrated** (shallow sections, riverbank slopes prone to erosion) are in the process of continuous change under the natural conditions, their benthic communities are therefore scarce and not significant in terms of providing feeding/dwelling habitats for fish and birds. **Consequently, their disturbance/modification, both natural and man-caused, is not considered to be able to produce any significant adverse effect on fish and bird communities – all the more so in the transboundary context.**

The decision has been made to terminate the use of in-stream spoil islands and dredging dumpsites at the Yermakiv Island, because the common expert view is that these features may affect the bird and fish fauna. This is an important contribution to the minimization of potential adverse impacts of dredging/dumping on the Delta's environment. **Remaining riparian dumpsites located along the Chilia Branch lie outside the boundaries of protected area and are not able to cause any significant impact in the transboundary context.**

- 3) In order to enable a comprehensive and credible assessment of transboundary impacts associated with increased water turbidity in the Danube due to dredging operations in the fluvial part of the navigation route, the present assignment has involved the predictive modelling component looking into the distribution of fin suspended solids in the cross-border sections of the Chilia Branch upstream of the Babyna Branch outflow, and Starostambulske Branch downstream of the Bystre Branch outflow, i.e. the sections where this impact is likely to be most significant. The methodology employed for this exercise evolves around the turbulent diffusion equation and analytical/numerical methods used to resolve it.

**Modelling results indicate that the part of flow diverted from the Chilia Branch to the Babyna Branch would show a very minor increase in the levels of suspended solids, expected to be below 0.1 mg/l under the pessimistic scenario assuming that a dredge**

**operates in the maximum design-specified proximity to the bifurcation point. This transboundary impact is considered to be very minor.**

In the **Starostambulske Branch**, the projected increase in concentrations of fine suspended solids at the distance of 1 km downstream of the dredging site would be at or below 4 mg/l along the navigable section of the river channel, and would be below 3 mg/l at the distance of 8 km downstream of the dredging site (i.e. where the Musura Branch splits off the main branch). Similar to the previous modelling scenario, the turbid plume would be aligned along the central section of the river channel and would not approach the riverbanks closer than 100 m, the Romanian territory would therefore remain unaffected. **In this situation, the transboundary impact of project-related dredging activities is also considered to be minor.**

Field measurements of suspended solid levels in the Chilia Branch upstream and downstream of dredging sites, carried out within the framework of the Comprehensive Environmental Monitoring Programme, have demonstrated that **the project-related increment to the background concentrations of suspended solids is very minor, especially in the context of turbidity pattern prevailing in the Danube Basin, and is definitely below the detection limits of existing direct measurement techniques.**

- 4) The results of predictive modelling carried out with the use of the three-dimensional SELFE model in order to examine and predict the behaviour of the turbidity plume generated by marine dumping operations located in the area of the Bystre Branch have demonstrated that estimated maximum concentrations of suspended solids along the state border with Romania would be twice lower than the levels indicated in the Final Report of the Inquiry Commission. Further analysis and clarification of modelling parameters describing/characterizing the dumping processes would be required.

The two-dimensional COASTOX-MORPHO model was used to examine and predict the **impact of the seaward access channel and its retaining dam on the alongshore transport of sediments** between the Bystre Branch and Starostambulske Branch **in order to refine/clarify the transboundary dimension of this impact.** The following two modelling scenarios were considered: (1) in the absence of the retaining dam and access channel; and (2) with the retaining dam and access channel completed and operational. The results of this modelling exercise demonstrate that **any impact of project-related structures on the morphodynamic processes would fade out completely at the distance of 6 km from the Bystre Branch**, while the distance between the Bystre Branch and Starostambulske Branch (marine border with Romania) is about 16 km. There is a plan to continue the morphodynamic process modelling exercise by looking into various flow discharge, sediment transport, storm intensity and dam design scenarios.

- 5) The results of the benthic community survey carried out within the framework of the Comprehensive Environmental Monitoring Programme indicate that these communities are distributed over the project area in a mosaic manner, which is shaped by a variety of factors. The monitoring and surveys undertaken to-date did not provide any evidence suggesting that dredging operations could have affected the state and development of benthic communities. This aspect will continue to be monitored in the future, though the pattern emerging from the analysis of available information is one of a general decrease in quantities of benthic organisms in the river water as one moves from the near-bank section towards the centre of the main channel. This means that the benthic fauna is generally scarce within the navigable section of the river, **therefore the implementation of maintenance dredging operations is not likely to have any significant effect on the food resources available to local fish fauna.**



- 6) It is recommended to employ and apply various systemic analysis techniques for the assessment of likelihood and severity of **cumulative effects produced by a mix factors associated with the operation of the navigation route**, since these techniques would enable the identification of those combinations of factors whose cumulative effects could be particularly detrimental, and development of effective and appropriate preventative measures. The Comprehensive Environmental Monitoring Programme involves the implementation of a suite of field surveys to examine the dynamics and trends in the species diversity and populations of fish and bird fauna in the project area, to enable the prompt and timely identification and response to any potential cumulative effects on these communities.

The Comprehensive Environmental Monitoring Programme presented in the Annex C is an integral element of the Danube-Black Sea Navigation Route Project implemented in the Ukrainian part of the Danube Delta. It is anticipated that sampling and monitoring activities will be carried out throughout the entire project lifecycle, or from 2004 onwards, to encompass all the seasons of the year (winter, spring, summer, autumn) in order to take account of seasonal specifics of delta development processes.

The monitoring results collected to-date only suggest some localized impacts in the immediate vicinity of dredging/construction works that are not able to give rise to any significant adverse consequences in the transboundary context.

The implementation of the Comprehensive Environmental Monitoring Programme presented in the Annex C will continue after the completion of restoration works in order to provide required information inputs for the post-project analysis. The results of environmental monitoring, reflecting current status and future trends in the delta's ecosystem, along with the results of engineering monitoring looking into the silting rates within the navigation route and changes in the coastal morphometry, will be used to revise and update the requirement for restoration dredging, location of marine dumpsite, layout of hydraulic structures, environmental restrictions and required scope of maintenance dredging.

**Overall, the results of this research assignment, intended to provide a more detailed and complete picture on the basis of the mathematical modelling of sediment transport in the Chilia sub-delta of the Danube and field surveys carried out within the framework of the Comprehensive Environmental Monitoring Programme to examine the status and trends in the biotic and abiotic ecosystem elements in the project area, indicate that the scale and magnitude of transboundary impacts associated with the Phase 1 of the Navigation Route Project appear to be considerably smaller than the estimates referred to in the conclusions of the Inquiry Commission where these impacts were classified as likely significant.**

**The modelling results illustrating the full-scale project development scenario and expected trends in the pattern of hydrological processes in the Bystre and Starostambulske Branches and coastal processes in the maritime delta and adjacent areas of the sea indicate that there expected to be no significant change in how these processes manifest itself as compared to the Project Phase 1, and any associated impacts can be further minimized and mitigated through the implementation of protective measures planned in the full-scale project design.**

**From the foregoing, it can be concluded that the full-scale development and implementation of the Navigation Route Project in general is not likely to give rise to any significant adverse transboundary effects.**

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## Annex A

### OVERVIEW OF COMPLIANCE WITH THE INTERNATIONAL ENVIRONMENTAL CONVENTIONS AND TREATIES RATIFIED BY UKRAINE

#### 1. The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 1971)

The Ramsar Convention was initially ratified by the former Soviet Union on 26 December 1975, and the Council of Ministers of the then Ukrainian Soviet Socialist Republic adopted the Resolution No. 106 of 26 February 1976 “On Measures Designed to Enhance the Protection Regime for Wetlands of International Importance Especially as Waterfowl Habitat”<sup>1</sup>. Pursuant to that Resolution, the Chilia Branch of the Danube within the Odessa Oblast was included into the List of Wetlands.

On 23 November, 1995, the Cabinet of Ministers of Ukraine adopted the Resolution “On Measures Designed to Ensure the Protection and Conservation of Wetlands of International Importance” to approve the List of Wetlands of International Importance Especially as Waterfowl Habitats. This List includes the Chilia sub-delta of the Danube located in Odessa Oblast and occupying the area of 32,800 ha.

On 29 October, 1996, the Verkhovna Rada of Ukraine passed the Law of Ukraine “On the Participation in the Convention on Wetlands of International Importance Especially as Waterfowl Habitats”. By passing this Law, Ukraine confirmed the commitment to this Convention assumed by the former Soviet Union.

Pursuant to the Article 2 of the Convention, each Contracting Party should designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance which is maintained by the Bureau established under Article 8, which stipulates that International Union for Conservation of Nature and Natural Resources shall perform the continuing Bureau duties under this Convention until such time as another organization or government is appointed by a majority of two-thirds of all Contracting Parties. At the present time, the Bureau of the International Coordinating Council of UNESCO’s Man and Biosphere Programme manages the Bureau duties under this convention (the “Man and Biosphere Programme Bureau”).

In its Article 2 (Clause 5), the Convention enables each Contracting Party that acts in its urgent national interests to delete or restrict the boundaries of a wetland included in the List. In doing so, a Contracting Party should, at the earliest possible time, inform the organization or government responsible for the continuing bureau duties of any such changes.

It should be noted that of the main outcomes of the 8<sup>th</sup> Conference of the Contracting Parties to the Ramsar Convention (Valencia, 18-26 November 2002) was the adoption of the Resolution VIII.20 to provide general guidance for interpreting "urgent national interests" under Article 2.5 and 4.2 of the Convention.

Pursuant to the Resolution VIII.20 (Clause 3 of the Annex to the Resolution), when invoking its right under Article 2.5 to delete from or restrict the boundaries of wetlands included in the List of Wetlands of International Importance in the case of urgent national interests, a Contracting Party may take into account, inter alia, whether, over the long term, the proposed action offers greater benefits and the alternative that will best minimize harm to the site in question. According to the

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<sup>1</sup> Please see the Collection of the Resolutions Adopted by the Ukrainian SSR in 1976, No. 3., page 7.

Clause 1 of the Annex to the Resolution VIII.20), the determination of "urgent national interests" lies solely with the Contracting Party.

Just to reiterate, nine navigation route options were analysed over 2002 to 2004 (Bystre, Z'ednuvalny, Polunychny, Potapiv, Prirva, Sasyk, Solomoniv, Starostmbulske, Tsyhanka). This analysis was carried out by major sectoral and academic institutions from various countries, including Ukraine, and involved the use of up-to-date methods and techniques. Based on the results of this analysis, the Bystre (Novostambulske) Branch was recognized as the most optimal option in environmental, social and economic terms<sup>1</sup>. This illustrates the fact that the alternative options for proposed navigation route have been examined and reviewed at various stages of design development.

This project would yield obvious and significant economic benefits for Ukraine as a transit country. It is anticipated that this navigation route, once fully developed, would be used by 3045 ships per year on the average, which is almost four times the annual average for the Sulina Canal in Romania. Only over the first five months since the completion of the Project Phase 1, this navigation route was used by ships from 21 various countries of the world, and its freight turnover for the period was 0.7 million tonnes. The project's social advantages are no less significant, illustrated by the fact that in 2004, the Project Phase 1 created 280 new jobs in Vylkove, and 160 of these jobs were occupied by Vylkove residents. Additionally, about 500 persons were hired to work at various service ships.

**All the foregoing graphically illustrates the fact that the project, once completed, would bring significant economic and social benefits for the regional population and economy, and this fully fits the meaning and interpretation of the term 'urgent national interests' as defined in the Resolution VIII.20 of the 8<sup>th</sup> Conference of the Contracting Parties.**

**Furthermore, Ukraine completed the procedure defined by the Convention to inform the Ramsar Convention Bureau about the change in the territory of the Danube Biosphere Reserve. This is illustrated by the fact that the Decree of the President of Ukraine No. 717/2004 comprises a specific provision concerning the notification of the UNESCO's Man and Biosphere Programme Bureau on the alteration of boundaries of the Danube Biosphere Reserve. All the above demonstrates that Ukraine as a Contracting Party has fulfilled an obligation defined in the Article 2, Clause 5, of the Convention.**

**Based on these facts, it can be concluded that Ukraine has met the obligations ensuing from the 1971 Ramsar Convention in the course of implementation of the Danube-Black Sea Navigation Route Project in the Bystre (Novostambulske) Branch.**

## **2. The Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)**

This Paris Convention was ratified by the then Ukrainian Soviet Socialist Republic on October 4, 1988<sup>1</sup>. In Article 6 of the Law of Ukraine "On the Legal Succession", Ukraine confirms its commitment to the international treaties joined/ratified by the Ukrainian SSR before the independence. In line with this provisions, Ukraine is a party to the Convention.

Article 11 of the Paris Convention defines the procedure for formulating the World Heritage List. Under this procedure, each State Party to the Convention should submit to the World Heritage Committee an inventory of assets constituting the world's natural and cultural heritage situated in

<sup>1</sup> Please see the Ukrainian State Review Conclusion No. 121/03 of 20.04.2004

<sup>1</sup> Please see the Decree by the Ukrainian SSR Presidium No. 6673-XI "On the Ratification of the Convention Concerning the Protection of the World Cultural and Natural Heritage" of 4 December 1988.

its territory and suitable for inclusion in the list. Based on the country inventories, the Committee should establish, update and maintain the World Heritage List. This List includes the following cultural assets of outstanding value located in Ukraine:

- Saint Sofia Cathedral and Related Monastic Buildings (Kyiv);
- Kyiv-Pechersk Lavra (Kyiv);
- The Ensemble of the Historic Centre (Lviv);
- Struve Geodetic Arc.

The Struve Geodetic Arc is a chain of survey structures extending from Norway to the Black Sea, through 10 countries and over 2,820 kilometres. One of these structures (Serial ID Number 1131-084) is located in Stara Nekrasivka village, Odessa Oblast (N 45°19'54'' E28°55'41'').

These coordinates can be compared with those of the Chilia Branch (defined in the List of Wetlands of International Importance as N 45°23' and E 29°36') to demonstrate that the Struve Geodetic Arc is located within the administrative boundaries of the Kilia District in Odessa Oblast.

It should be however emphasized that the Struve Geodetic Arc is not located within the countries of the project area, therefore the restoration and operation of the Danube-Black Sea Navigation Route is unlikely to cause any damage to this asset that enjoys protection under the Paris Convention.

**From the foregoing, there appears to be no grounds to allege that Ukraine might have failed to comply with the provisions of the Paris Convention during the development and implementation of the Danube-Black Sea Navigation Route Project.**

### **3. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979)**

Ukraine as a party to 1979 Bern Convention joined it with reservations set forth in the Law of Ukraine “On the Participation of Ukraine to the 1979 Convention on the Conservation of European Wildlife and Natural Habitats” of 29 October 1996.

The objective of the Convention as defined in the Article 1 is to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation. The Convention and its provisions do not provide any explanation whatsoever for the notion of natural habitat.

In its Article 21, the Convention stipulates that any State may, at the time of signature or when depositing its instrument of ratification, acceptance, approval or accession, specify the territory or territories to which this Convention shall apply. In other words, in the situation where a Contracting Party has not specified such territory or territories, this provision can be considered as applicable to entire territory of a Contracting Party.

The Law on the Participation of Ukraine to the Convention does not specify any territory or territories to which the Convention applies (or does not apply). This can be construed to provide grounds for the application of the Convention to entire territory of Ukraine, including the area of the Danube Biosphere Reserve.

Under this Convention, the Contracting Parties are obliged, inter alia, to take appropriate and necessary legislative and administrative measures to ensure the conservation of the habitats of the wild flora and fauna species, especially those specified in Appendices I and II, and the conservation of endangered natural habitats. Furthermore, each Contracting Party is required to encourage the

reintroduction of native species of wild flora and fauna when this would contribute to the conservation of an endangered species.

It should be noted that the Decree by the President of Ukraine No. 717/2004 “On the Extension of the territory of the Danube Biosphere Reserve” specifies that the extension includes 1,296 ha of land lying within the Kilia District, and 3,850 ha of land within the Tatarbunary District. In addition, this Decree introduces a temporary zoning arrangement for the Danube Biosphere Reserve, adjusted to take account of development needs in the water transport sector. According to the Preamble to this Decree, these measures are designed to enhance the conservation of unique environmental features in the Danube Delta in their natural state.

Special emphasis should be placed upon the Article 2 of the Convention, which stipulates that the Contracting Parties should take requisite measures to maintain the population of wild flora and fauna while taking account of their economic requirements.

**In the light of the above, the restoration of shipping activity in the Bystre (Novostambulske) Branch cannot be considered as a failure to meet the international obligations assumed by Ukraine under the 1979 Bern Convention.**

#### **4. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979) and Related Agreements and Memoranda**

The Convention on the Conservation of Migratory Species of Wild Animals, also known as the CMS Convention<sup>1</sup>, was signed in Bonn (Germany) on June 23, 1979. Similar to many other environmental conventions, it seeks to ensure and promote the conservation of natural heritage by preventing the extinction of wild animal species migrating across the state borders. Ukraine joined the Bonn Convention by having adopted the Law of Ukraine “On the Participation of Ukraine to the Convention on the Conservation of Migratory Species of Wild Animals” of 19 March 1999. The Law does not include any reservations or restrictions limiting the application and effect of the Bonn Convention within the territory of Ukraine.

The Bonn Convention consists of the main text comprising twenty articles, and two appendices. Appendix I lists the migratory species threatened with extinction, and Appendix II lists vulnerable species that need or would significantly benefit from international cooperation.

Those Parties to the Bonn Convention that are the Range States for the migratory species included in the Appendix II are encouraged to enter into the international agreements aiming to ensure the conservation of one or more migratory species. The following six Agreements have been concluded to date under the Convention:

- Agreement on the Conservation of African-Eurasian Migratory Waterbirds;
- Agreement on the Conservation of Populations of European Bats;
- Agreement on the Conservation of Small Cetaceans of the Baltic, North-East Atlantic, Irish and North Seas;
- Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area;
- Agreement on the Conservation of Seals in the Wadden Sea;
- Agreement on the Conservation of Albatrosses and Petrels;

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<sup>1</sup> Convention on Migratory Species (CMS)



Ukraine is party to three international agreements adopted under the Convention (Afro-Eurasian Waterbirds, European Bats, and Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area).

In addition, a number of Memoranda of Understanding (MoU) have been concluded under the auspices of the Convention. Ukraine is party to the following three Memoranda:

- Memorandum of Understanding concerning Conservation Measures for the Slender-billed Curlew (*Numenius tenuirostris*);
- Memorandum of Understanding on the Conservation and Management of the Middle-European Population of the Great Bustard (*Otis tarda*);
- Memorandum of Understanding concerning Conservation Measures for the Aquatic Warbler (*Acrocephalus paludicola*).

These documents seek to ensure the restoration and/or conservation of migratory species. The geographic scope of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds this Agreement is the area of the migration systems of African-Eurasian waterbirds, as defined in Annex 1 to this Agreement.

The Agreement area includes the territory of the Danube Biosphere Reserve within Ukraine. General conservation measures required to be taken by the Parties to the Agreement are listed in the Article 3, to include the same strict protection for endangered migratory waterbird species in the Agreement Area as is provided for under the Convention on the Conservation of Migratory Species of Wild Animals; coordination of country's efforts to ensure that a network of suitable habitats is maintained for migratory waterbird species; implementation of remedial measures, including habitat rehabilitation and restoration, and compensatory measures for loss of habitat, etc.

At the same time, nothing in this Agreement can be read or construed as a ban for a Contracting Party on any forms of human activities, including construction works. **Therefore there appear to be no reasonable grounds to allege that the restoration of the Danube-Black Sea Navigation Route would constitute a violation of international obligations assumed by Ukraine under the Agreement on the Conservation of African-Eurasian Migratory Waterbirds.**

The Agreement on the Conservation of Populations of European Bats was signed in London on December 4, 1991, and the Government of the United Kingdom is the Depositary thereof. Pursuant to the Agreement (Article 1, Clause "b"), the term "Bats" means European populations of CHIROPTEA (Rhinolophidae and Vespertilionidae) occurring in Europe and non-European Range States.

One of the fundamental obligations of the Parties to the Agreement is to prohibit the deliberate capture, keeping or killing of bats except under permit from its competent authority. At the same time, the Agreement in its Article 3, Clause 2 stipulates that in protecting the bat habitats, the Parties should take into account all necessary economic and social considerations. **Nothing in this Agreement can be read or construed as a restriction on right to use its territory by a Party, or a ban/restriction on the implementation of any projects in the transport sector, including the Danube-Black Sea Navigation Route Project in the Bystre Branch.**

**As appears from the review of available information and documents, including the Scientifically Justified Environmental Assessment of the Detailed Design for the Full-Scale Development of the Danube-Black Sea Navigation Route in Project the Ukrainian Part of the Danube Delta, produced by the specialists of the Geo-Ecology and Applied Geography Department of Kharkiv National Karasin's University, there are no reasonable grounds to**

**allege that the implementation of the Danube-Black Sea Navigation Route Project might constitute a non-compliance with respect to the Agreement on European Bats.**

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area was signed in Monaco on November 24, 1996. The geographic scope of the Agreement is defined in its Article 1 (Clause “a”) as all the maritime waters of the Black Sea and the Mediterranean and their gulfs and seas, and the internal waters connected to or interconnecting these maritime waters, and of the Atlantic area contiguous to the Mediterranean Sea west of the Straits of Gibraltar. According to Article 2 of the Agreement, the Parties should take coordinated measures to achieve and maintain a favourable conservation status for cetaceans. To this end, Parties should prohibit and take all necessary measures to eliminate, where this is not already done, any deliberate taking of cetaceans and shall co-operate to create and maintain a network of specially protected areas to conserve cetaceans.

**Nothing in the available information and documents, including the Scientifically Justified Environmental Assessment of the Detailed Design for the Full-Scale Development of the Danube-Black Sea Navigation Route in Project the Ukrainian Part of the Danube Delta, can be considered as an indication suggesting that the Bystre (Novostambulske) Branch is a habitat for the Cetacean species enjoying special protection under the Agreement. Moreover, in the context of Article 1 of the Agreement, the area of the Bystre (Novostambulske) Branch is outside the geographic scope of the Agreement**

The Memorandum of Understanding concerning Conservation Measures for the Slender-billed Curlew was signed on September 10, 1994, to cover 30 Range States, including Ukraine – since June 12, 1995. As can be seen from the Preamble to the Memorandum, the Parties thereto have agreed to work closely together to improve the conservation status of the Slender-billed Curlew throughout its potential breeding, migrating and wintering range. One of the major obligation of the Parties is to Provide strict protection for the Slender-billed Curlew and identify and conserve the wetlands and other habitats essential for its survival.

The Action Plan for the Conservation of the Slender-billed Curlew, adopted in July 1994, forms an integral element and major tool for the conservation of this bird species. Each participating country has formulated a country-specific suite of measures. Under this Action Plan, Ukraine has committed itself to implement the following measures:

1. More rigorously control the hunting of waterbirds, including the activities of foreign hunters; impose a ban on hunting in protected wetlands;
2. Promote the *Red Data Book of Endangered Species*;
3. Continue to monitor migratory waterbirds with a view to establishing protected areas in the most important resting sites of the Slender-billed Curlew (Limans of the Azov Sea, Sivash Bay, Black Sea coastal areas, Danube Delta) and protect big waders that could easily be confused with the Slender-billed Curlew;
4. Investigate those anthropogenic factors which might have a straight effect on the decline of migratory populations of the Slender-billed Curlew, such as straight hunting or harassment, grazing, use of pesticides, human settlement in coastal areas;
5. Expand the network of protected wetlands, especially in the south of the country.

It should be noted that Ukraine as a Party to the Memorandum has achieved significant progress in improving its national legal framework for the conservation of the Slender-billed Curlew. More specifically, the Law of Ukraine “On the Animal Life” was adopted on December 13, 2001, to provide the essential legal framework for the protection and conservation of wild animal species (including mammal, bird, reptile, amphibian and fish species, etc.). This Law has defined the notion

of hunting as a special use of wildlife resources that involves pursuing/chasing wild animals and birds that live in the natural or semi-natural conditions and are hunted for food or sport. Pursuant to the Law on the Animal Life, each and every Ukrainian citizen has the right to hunt on the basis of the hunting license, and the minimum hunting age is 18 years. In its Article 16 (Part 4), the Law on the Animal Life stipulates that the general (other than hunting) uses of wildlife resources must not involve the destruction of animals and/or their dwelling places (burrows, holes, retreats, nests, ant hills, beaver dams etc.), or any disturbance/deterioration of their dwelling and reproduction habitats.

The Law of Ukraine “On the Red Data Book of Ukraine” was adopted on February 7, 2002 to define the legal status and procedure for the Red Data Book of Ukraine. In its Article 13, the Law on the Red Data Book of Ukraine introduces several categories of plant and animal species that are eligible for inclusion in the Red Data Book of Ukraine. One of these categories refers to the endangered species, i.e. the species that are at risk of extinction in the natural environment and that are unlikely to survive if they continue to be affected by adverse factors undermining the status of their populations. The responsibility for the provision of scientific support for the Red Data Book activities; preparation of proposals on the inclusion or exclusion of plant and animal species to/from the Red Data Book of Ukraine; organization of research and survey activities; development and supervision of conservation measures; and coordination of related activities of governmental bodies and non-governmental organizations rests with the National Commission on the Red Data Book of Ukraine, established by the Resolution of the Cabinet of Ministers of Ukraine No. 1176 “On the National Commission on the Red Data Book of Ukraine”. According to the Clause 3 of the Procedural Regulation adopted to provide the legal and procedural framework for the Commission, the Commission is responsible for the review and assessment of status and populations of species included in the Red Data Book of Ukraine.

Pursuant to the Decree of the President of Ukraine No. 717/2004 “On the Extension of the territory of the Danube Biosphere Reserve”, 1,296 ha of land lying within the Kilia District, and 3,850 ha of land within the Tatarbunary District have been converted to the Danube Biosphere Reserve. In total, the extension granted to the Danube Biosphere Reserve sums up to 5,145 ha.

**All these legislative steps taken by Ukraine over the entire period of its participation to the Memorandum of Understanding concerning Conservation Measures for the Slender-billed Curlew obviously demonstrate the country’s continuing commitment to the obligations assumed under this Memorandum.**

The Memorandum of Understanding on the Conservation and Management of the Middle-European Population of the Great Bustard was one of the main outcomes of the 2<sup>nd</sup> Conference of Contracting Parties held in Geneva from 11 to 14 October, 1998. In the light of Article 4 of the Convention on the Conservation of Migratory Species of Wild Animals, the Memorandum is an intergovernmental treaty. For and on behalf of Ukraine, this Memorandum was signed by the Head of the Ministry of Environment and Natural Resources. This Memorandum aims to protect the population of the Great Bustard (*Otis tarda*) in the Central Europe, including the territories of Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Former Yugoslav Republic of Macedonia, Germany, Greece, Hungary, Moldova, Poland, Romania, Slovakia, Slovenia and Ukraine.

The Action Plan forms an integral part of the Memorandum and lists the following key measures appropriate for each Range State:

- (1) Habitat protection;
- (2) Prevention of hunting, disturbance and other threats;
- (3) Strict prohibition of possession and trade in the birds and their eggs, and control of restrictions;

- (4) Recovery measures (including captive breeding, to be carried out only by the trained professionals in line with the IUCN criteria for reintroduction);
- (5) Cross-border conservation measures (Signatories should harmonise their legal instruments in order to more efficiently conserve and manage Great Bustards);
- (6) Monitoring and research;
- (7) Training of staff (agronomists, biologists) working in the conservation bodies;
- (8) Increasing awareness of the need to protect Great Bustards and their habitat;
- (9) Economic measures.

**Given that the Bystre (Novostambulske) Branch is not the only habitat for the Great Bustards, and taking into account the recent extension of the Biosphere Reserve, there considered to be no grounds for any allegations suggesting that the implementation of the Navigation Route Project might constitute a non-compliance with the provisions of the Memorandum.**

On April 30, 2003, the Memorandum of Understanding Concerning Conservation Measures for the Aquatic Warbler (*Acrocephalus paludicola*) was signed in Minsk by the representatives of fifteen countries. By signing this Memorandum, the Parties agreed to take all steps required to ensure the conservation of the aquatic warbler populations and their habitats.

**Given that Ukraine has taken concrete legislative steps to expand the area of the Danube Biosphere Reserve and adopt a number of environmental laws, there considered to be no grounds for any allegations suggesting that the implementation of the Navigation Route Project might constitute a non-compliance with the provisions of the Memorandum, especially taking into account the fact that, pursuant to its Clause 7, the Memorandum, is not a legally binding agreement though it is considered as an agreement under the CMS Article 4.**

## **5. The Convention on Biological Diversity (Rio de Janeiro, 1994)**

Ukraine ratified the Convention on Biological Diversity by adopting the Law of Ukraine “On the Ratification of the Convention on Biological Diversity” on November 29, 1994.

Pursuant to the Convention’s Article 4, the provisions of this Convention apply in relation to each Contracting party within the limits of its national jurisdiction in the case of components of biological diversity and, in the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction. Given the Danube Biosphere Reserve occupies part of the Ukrainian territory, the provisions of the Convention apply in relation to the Navigation Route Project located in that area.

For the purposes of the Convention, the term “biological diversity” means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. In line with the Article 6, Clause “a”, each Contracting Party should develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

In line with the Article 8, Clause “k”, each Contracting Party should, as far as possible and as appropriate, develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations.

It is worth to mention that Ukraine as a Contracting Party has made a number of legislative steps aiming to ensure the conservation and protection of biological diversity within the area of its jurisdiction. These include the Law of Ukraine “On the Environmental Review”, adopted on February 9, 1995. The Law defines the state environmental review as a special procedure to be carried out by the relevant governmental bodies, environmental consultancies and non-governmental organisations, and to be underpinned by inter-sectoral environmental review, analysis and assessment of projects and activities that cause or may cause adverse impact to the environment. The main objective of this review process is to produce the scientifically justified conclusion concerning compliance of a proposed or implemented activity with the provisions of current environmental legislation, sustainability requirements and environmental safety standards. The Law sets out specific requirements concerning the organization and implementation of the state environmental review process. The state environmental review conclusion should comprise the assessment of environmental acceptability and relevance of a proposed activity, and take account of its socio-economic implications. Having a positive conclusion of the state environmental review is pre-requisite for a project/activity to go ahead. In line with the provisions of the Law on the Environmental Review, the Ministry of Environmental Protection of Ukraine launched the state environmental review process for the Navigation Route Project, which culminated in the State Environmental Review Conclusion No. 290 for the Detailed Design Documentation for the full-scale development of the Danube-Black Sea Navigation Route in the Ukrainian part of the Danube Delta.

The Law of Ukraine “On the Protected Areas and Nature Reserve Sites in Ukraine” was amended in order to ensure consistency with the relevant national and international legislation (please see, for example, the Law of Ukraine “On Amending the Law of Ukraine on the Protected Areas and Nature Reserve Sites in Ukraine” of 14 December 1999, and the Law of Ukraine “On Amending Various Pieces of Legislation of Ukraine” of 11 December 2003).

The Law of Ukraine “On the Plant Life” was adopted on April 9, 1999 to provide the legal framework for the management of plant resources. Pursuant to the Article 26 of the Law, the plant life should be protected and conserved by various means, including prohibition and restriction on uses of plant resources. Any construction activities, processes and technologies that may cause deterioration and/or disturbance to plant species and their habitats are not allowed.

The Law of Ukraine “On the Animal Life” was adopted on December 13, 2001. According to the Article 39 (Part 3) of the Law, adequate and appropriate measures should be implemented as part of existing and planned infrastructure projects (railway lines, motorways, pipelines, electricity lines, waterways, dams and other water management structures) to ensure the conservation and protection of migration routes used by animal species. The assessment of potential impact on animal life and habitats is a compulsory element of any environmental impact assessment and environmental review process.

The issue of compliance by Ukraine with its international obligations ensuing from the Convention should be considered in the context of the Convention’s Article 11, which reads as follows: “ Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity”. This provision is construed as an indirect requirement to take into account and consider, among other factors, economic interests.

It should be noted that the Convention does not impose any bans or restrictions with respect to the development projects planned/implemented by the Contracting Parties within their respective jurisdictions, nor does it require a consent from any of the adjacent countries or international organizations for these projects.

From the foregoing, nothing in the Biodiversity Convention is considered to constitute a legal barrier or restriction on the implementation of the proposed Danube-Black Sea Navigation Route Project in the Bystre (Novostambulske) Branch located in the Ukrainian part of the Danube Delta.

## **6. The Convention on Co-operation for the Protection and Sustainable Use of the River Danube (Sofia, 1994)**

The Danube River Protection Convention was signed on June 29, 1994 in Sofia. Ukraine ratified the Convention by adopting the Law of Ukraine “On the Ratification of the Convention on Co-operation for the Protection and Sustainable Use of the River Danube” of January 17, 2002. Pursuant to Article 3, Clause 2, the Convention applies to those activities that might cause transboundary impact, including, inter alia:

- (a) the discharge of waste waters, the input of nutrients and hazardous substances both from point and non-point sources as well as heat discharge;
- (b) planned activities and measures in the field of water construction works, in particular regulation as well as run-off and storage level control of water courses, flood control and ice-hazards abatement, as well as the effect of facilities situated in or aside the watercourse on its hydraulic regime;
- (c) other planned activities and measures for the purposes of water use, such as water power utilization, water transfer and withdrawal;
- (d) the operation of the existing hydrotechnical constructions e. g. reservoirs, water power plants: measures to prevent environmental impact including: deterioration in the hydrological conditions, erosion, abrasion, inundation and sediment flow; measures to protect the ecosystems;
- (e) the handling of substances hazardous to water and the precautionary prevention of accidents.

For the purposes of the Convention, the term "transboundary impact" means any significant adverse effect on the riverine environment resulting from a change in the conditions of waters caused by human activity and stretching out beyond an area under the jurisdiction of a Contracting Party. Clearly, the Convention applies to the dredging and water management works carried out in the cross-border sections of the Chilia and Starostambulske Branches.

The Contracting Parties shall ensure that their competent authorities are required to make available information concerning the state or the quality of riverine environment in the Danube Basin to any natural or legal person, with payment of reasonable charges, in response to any reasonable request, without that person having to prove an interest, as soon as possible. We are not aware of any facts of the refusal of any relevant Ukrainian authority, including, among other, the Ministry of Environmental Protection, to provide any available information concerning the state of environment in the Danube Basin. Quite the contrary, the Danube-Black Sea Navigation Route Project has been in the focus of continuous and close public attention, and received detailed coverage in the media. The *Holos Ukrainy* (Voice of Ukraine)<sup>1</sup> National Newspaper published the Statement of Environmental Consequences of the Project, and this publication is only one of many examples demonstrating our continuing commitment to maintaining openness and transparency at various stages of the Navigation Route Restoration Project. It should be noted that the State Environmental

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<sup>1</sup> Please see the *Holos Ukrainy* Newspaper No. 155 (3405) of 20 August 2004.

Review Conclusion quoted in this publication was supported by the team of international experts from various countries (Vietnam, Greece, Georgia, Lithuania, Poland, Russia and Ukraine).

It is worth emphasizing that none of the expert opinions, messages and communications received from various non-governmental organizations have contained any indication or allegation suggesting that any discharge of waste waters, or input of nutrients, or release of thermal waters may be attributed to the Project. Recognizing and appreciating the fact that the Bystre (Novostambulske) Branch lies within the boundaries of the Danube Biosphere Reserve, Ukraine has implemented a suite of measures designed to compensate any potential damage that may be caused to the plant and animal life in the project area, including, inter alia, an over 5,000 ha extension granted to the Danube Biosphere Reserve<sup>2</sup>.

According to the Article 7 of the Convention, the Contracting Parties are required to set emission limits applicable to individual industrial sectors or industries in terms of pollution loads, and concentrations and based in the best possible way on low- and non-waste technologies at source. Just to reiterate, the restoration of the navigation route in the Bystre Branch does not involve any wastewater discharges or hazardous emission/waste sources.

**In the light of the above, the restoration of the Danube-Black Sea Navigation Route in the Ukrainian part of the Danube Delta does not constitute non-compliance against the provisions of the Danube River Protection Convention.**

## **7. The European Landscape Convention (Florence, 2000)**

The European Landscape Convention was signed by the member countries of the Council of Europe on 20 October, 2000 in Florence. In line with the recommendations set forth in the Resolution by the Verkhovna Rada of Ukraine No. 140-IV of 12 September, 2002, the Cabinet of Ministers took all organizational steps required to facilitate the ratification of the Convention by Ukraine. All these steps culminated in the adoption of the Law of Ukraine “On the Ratification of the European Landscape Convention” on October 4, 2005.

Pursuant to its Article 2, the Convention applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes. Any Contracting Party may specify the territory or territories to which the Convention shall apply. At the time of ratification, Ukraine did not specify any reservations or limitations with regard to the territorial coverage of the Convention within its jurisdiction. It can be therefore assumed that the Convention applies to the entire territory of Ukraine and concerns all its landscapes.

For the purposes of the Convention, the term “landscape” means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors; and the landscape policy refers to an expression by the competent public authorities of general principles, strategies and guidelines that permit the taking of specific measures aimed at the protection, management and planning of landscapes.

It is worth to mention that the team of the Ukrainian scientists and specialists of the Ministry of Environmental Protection of Ukraine has developed the Regulation on the Preparation of the Proposed Site Layout and Plan for the Organisation and Management of a Regional Landscape Park to Ensure Protection, Conservation and Sustainable Recreational Use of Natural Complexes and

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<sup>2</sup> Please see the Decree of the President of Ukraine No. 717/2004 ““On the Extension of the territory of the Danube Biosphere Reserve” of 2 February 2004.

Environmental Features<sup>1</sup>. There is a special Annex to this Regulation, which defines the recommended content and structure of the Proposed Site Layout and Plan for the Organisation and Management of a Regional Landscape Park to Ensure Protection, Conservation and Sustainable Recreational Use of Natural Complexes and Environmental Features.

The adoption of this Regulation is one of general measures stipulated by the European Landscape Convention in its Article 5, Clause “b”, which requires each Contracting Party to establish and implement landscape policies aimed at landscape protection, management and planning.

**The proposed Navigation Route Project does not involve any change in the existing landscape pattern, and does not therefore constitute any non-compliance against the provisions of the European Landscape Convention.**

#### **8. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, 1998)**

The Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters was signed on June 25, 1998, in Aarhus, Denmark. Ukraine ratified the Convention by adopting the Law of Ukraine “On the Ratification of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters” of July 6, 1999.

Pursuant to Article 1 of the Convention, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters. Each Party shall take necessary measures to ensure and promote public participation and access to environmental information.

According to the provisions set forth in Article 5, Clause 7, each Party should publish the facts and analyses of facts which it considers relevant and important in framing major environmental policy proposals; publish, or otherwise make accessible, available explanatory material on its dealings with the public in matters falling within the scope of this Convention; provide in an appropriate form information on the performance of public functions or the provision of public services relating to the environment by government at all levels..

Article 7 of the Convention stipulates that Each Party shall make appropriate practical and/or other provisions for the public to participate during the preparation of plans and programmes relating to the environment, within a transparent and fair framework, having provided the necessary information to the public.

It is worth reiterating that a large number of meetings, roundtable discussions, and workshops were held in 2004-2005 to discuss potential environmental implications of the proposed Navigation Route Project. Some of these meetings, just to mention a few examples, are summarised below.

On December, 17, 2004, the public hearing was held in Ismail to present and discuss the Detailed Design for the Full-Scale Development of the Danube-Black Sea Navigation Route Project. This event was attended by over 200 people from Ismail, Vylkove, Kilia, Kyiv, Mykolaiv, Odesa, Reni, Uzhhorod and Kharkiv, including the journalists representing the *Reporter* News Agency (Odesa), the *Vseukrainska Tekhnichna Hazeta* Technical Newspaper (Kyiv), the *Odesskie Izvestia* Newspaper (Odesa), the *Sudokhodstvo* International Shipping Journal (Odesa), the *Vecherniya Odessa* Evening Newspaper (Odesa) etc. One of the main resolutions ensuing from the public hearing was that the “proposed design for the full-scale development of the Danube-Black Sea

<sup>1</sup> Please see the Order by the Ministry of Environmental Protection of Ukraine No. 245 of 6 July 2005.



Navigation Route meets all relevant standards and represents a reasonable and scientifically sound ‘win-win’ solution that promotes economically viable shipping services while keeping all related environmental impacts at minimum”. This public hearing event was covered in the *Moya Zemlia* (My Land) Ismail Municipality Newspaper<sup>1</sup>.

According to information distributed through the Aarhus Information and Training Centre as of April 4, 2005, the following environmental NGOs were able to review the Environmental Impact Assessment Report for the Full-Scale Development of the Danube-Black Sea Navigation Route Project in the Ukrainian Part of the Danube Delta: EcoPravo Lviv, Mama-1986, National Environmental Centre of Ukraine, All-Ukrainian Environmental League, Environmental Education and Information Centre, and EcoPravo Kyiv.

On June 7-8, 2005, the public hearing for the Danube-Black Sea Navigation Route Project was held in Odesa with the support and assistance from the Regional Environmental Centre for Central and Eastern Europe, Regional Black Sea NGO Network, EUROCOAST-Ukraine (European Coastal Association for Science and Technology), etc. One of the main resolutions ensuing from this public hearing was that the Project team should ensure that the public is informed about all aspects of the project and decisions made on a continuous basis and in a very detailed manner. This public hearing received extensive media coverage from the journalists representing the *Zdorovia* (Health) TV Broadcasting Company, the *Sreda Obitania* (Human Environment) Journal, the *Plus* Broadcasting Company, the *Prosto Radio* (Simply Radio) and *Europa Plus* Broadcasting Stations, and the *Reporter* News Agency.

On July 6-7, 2005, the roundtable meeting was held in Kyiv to discuss the Navigation Route Project in the Ukrainian part of the Danube Delta, and its environmental, economic and social implications in the international context.

**All the foregoing facts illustrate that Ukrainian has met the requirements set forth in the Articles 6, 7, and 8 of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.**

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<sup>1</sup> Please see the *Moya Zemlia* Newspaper No. 75 (234) of 21 December 2004 (Page 2)

**Annex B****UKRAINIAN PARTY RESPONSE TO THE COMMENTS INCLUDED IN THE LETTER  
OF 13.11.2007 NO. 4537/AK BY MR. ATTILA KORODI, MINISTER OF  
ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT OF  
ROMANIA**

This response comprises Annex B1 prepared by the Ministry of Transport and Communications of Ukraine, and Annexes B2 and B3 prepared by the specialists of the Ukrainian Scientific Research Institute of Ecological Problems of the Ministry of Environmental Protection of Ukraine

## Annex B1

### GENERAL COMMENTS

#### *Comments to Annex 1*

The paragraph 3 of Annex 1 (page 2) includes the following statement, quote: “*Within the frame of the foreseen protection measures, respectively the monitoring of the water way impact on the coastal zone, the measures for the effects assessment are not defined clearly enough*”. The Romanian party did not provide any explanation or justification with regard to the basis for such conclusion, criteria employed to assess the clarity of impact definitions provided in our EIA report, and a regulatory source of these criteria.

Sub-clause a) in the Section II of Annex 1 includes an allegation that “*...the analysis of those alternatives was not carried out together with Romania prior to the decision on the navigation route. On the other hand, alternatives to the project were not considered, meaning that other activities for the development of that region have not been evaluated. For example, eco-tourism could be one possibility for that region - to convert natural values into economic ones.*” However, the Article 5 of the Espoo Convention says that consultations may relate to possible alternatives to the proposed activity, including the non-action alternative – **in other words, there is a suggestive meaning in provision – they may or may not.**

As regards the alternative proposed by the Romanian party, i.e. the development of eco-tourism in the region, it should be pointed out that, first, Romania’s interference in Ukraine’s domestic affairs by instructing how it should manage its own natural resources and shape/pursue its economic and social development course is considered to represent a non-compliance with the generally accepted principles of international law. The principle of sovereign equality and self-determination of people as defined by the Declaration on the Principles of International Law (1970) means that all peoples have the right freely to determine, without external interference, their political status and to pursue their economic, social and cultural development, and every State has the duty to respect this right in accordance with the provisions of the UN Charter. Second, the EIA results provide the basis for the conclusion that the implementation of the Danube-Black Sea Navigation Route Restoration Project is not likely to cause significant impact to the environment, the eco-tourism option therefore remains a possibility that can be pursued in parallel with the restoration of shipping activity in the region.

Romania’s comment presented in the Section III of Annex 1 and alleging that “*the EIA documentation does not include an analysis of reasonable alternatives, including the no action one*”, can be answered/addressed by using the reference to the Espoo Convention provisions provided by the Romanian party further in the text: “*Article 4(1) corroborated with appendix II let. b) mentions that the EIA documentation should include "a description, **where appropriate**, of reasonable alternatives ( ) to the proposed activity and also the no-action alternative". Art.5 let a) specifies that the consultation (on the basis of the EIA documentation) between the Party of origin and affected Party **may** relate to "possible alternatives to the proposed activity, including the no-action alternative.*

Regarding a remark that the “*EIA documentation does not provide information regarding the compliance with international Conventions signed by Ukraine in the environment protection field, especially regarding the transboundary impact*”, it can be mentioned that the Appendix II to the Espoo Convention “Content of the Environmental Impact Assessment Documentation” does not include a mandatory requirement for this information to be presented in the EIA documentation.

**General Remarks/Response to Comments Included in the Annex 3**

**WWF**

1. *What is the rationale of having a second deep sea channel in the same area (one of the most sensitive in Europe), there is no similar situation in Europe (with two deep sea channels in one area)?*

We appreciate and understand the concern of the Romanian public over potential impact that may be associated with the restoration and operation of shipping activity along the Danube-Black Sea Navigation Route in the Ukrainian part of the Danube Delta, and caused by changes in vessel traffic intensity and redistribution of traffic flows.

At the same time, pursuant to the Article 4 of the Helsinki Rules on the Uses of the Waters of International Rivers, adopted in 1966 by the International Law Association, each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin, where the relevant factors to be considered in determining a reasonable and equitable share include, inter alia, the past utilization of the waters in the basin, economic and social needs of each basin state, etc.

Considering the fact that Bystre Branch used to be one of historic navigation routes in the Danube Basin before the construction of the Sulina Canal had caused a major redistribution of river flow from the Chilia Branch to the Tulcea Branch (to provide required navigable flow for the Sulina Canal) and triggered the progressive siltation and loss of navigable depths in the Ukrainian part of the Danube Delta, Ukraine considers itself entitled to restore the navigation within its territory.

Furthermore, Article 1 of the International Covenant on Economic, Social and Cultural Rights, adopted by the General Assembly Resolution 2200A (XXI) of 16 December 1966 stipulates that all peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development. All peoples may, for their own ends, freely dispose of their natural wealth and resources. In no case may a people be deprived of its own means of subsistence.

Romania owns and operates four canals in this region (please see Table 1), rather than two as claimed in the comment/question by WWF. In addition, Romania now plans to undertake the construction of new canals and reconstruction of existing navigation lines (the Law of Romania No. 363 of 21.09.2006 on the approval of the National Territory Development Plan).

**Table 1**

No.	Canal Name and Brief Description	Year of Construction	Length/width/depth (km/m/m)
1.	<p><b>Sulina Canal</b> – runs along the Sulina Branch <b>in the territory of the biosphere reserve</b> managed by the Danube Commission – artificial international navigation canal operated to handle naval (river/sea) ships. The construction commenced in 1857, and was largely completed within 24 years. Maintenance dredging activities have continued throughout the canal life to the present time, with the total amount of dredging completed to date being at 25,243,000 m<sup>3</sup> of soil. The total length of canals constructed is over 31 km, with 10 sections of river channel straightened and 27 meanders cut. As a result, the length of this river channel has decreased from 84.9 to 63 km, i.e. by quarter, and the channel itself now represents an almost straight line. In 1902, a stone flow dam was built near the Ismail Chatal, and the length of this dam reached 430 m by 430 m. It extends over more than a third of the Danube width in this area and diverts additional flow to the Romanian water system.</p>	1858	<b>63/60/7.3</b>

2.	<b>Cernavoda - Constanta South</b> – artificial canal with two sluices	1984	<b>64.2/80/7.0</b>
3.	<b>Medgidia-Navodari</b> – artificial canal connecting the Novodari port with the Cernavoda-Constanta Canal near the Medgidia port	1988	<b>26</b>
4.	<b>St. George</b> – runs along the St. George Branch in the territory of the <b>biosphere reserve</b> , the natural channel has been significantly modified by straightening. Reportedly, the construction is expected to complete soon, the total investment is over 7 billion Leu	Construction is underway	<b>121.6</b>

The restoration of shipping activity in the Ukrainian part of the Danube Delta is vital to the region's economy since this would involve the revival and development of Ukrainian ports, ship-building plants and dockyards, land and marine transport infrastructure that are important tax-payers and employers in the entire Danube Region.

### **WWF**

*2. Why going for 8m depth instead of 4,5 which does not involve that much dredging? This depth could ensure the ships traffic from Odessa to Reni/Giurgiulesti, therefore could provide economic benefits with less costs for maintaining the channel!*

The design characteristics of the navigation route were defined on the basis of a number of factors, including the projected eligible ship sizes, type and class of waterways, both national and international (the so-called Category E waterways), and with reference to the List of Key Technical Characteristics of the Category E Waterway Network (UNECE Blue Book, Waterway No. E 80-09).

The Ukrainian Danube-Black Sea Deep Navigation Route Project (hereinafter referred to as the DNR) was classified under the Category E (Class VII) as an inland waterway of international significance. Moreover, the river-bound section (Ismail Chatal - Reni) of the route has been in this highest category (Category E, Class VII waterway) since 1993 (please see the UNECE Map of the European Inland Waterways, circa 1 January 1993, published in New York/Geneva, 1994).

### ***General Remarks/Response to Comments Included in the Annex 4***

In their comments, the Sulina City Hall claim that “*The attempt to build a navigable waterway on the Bystre arm by USSR failed, after lots of money has been spent during more than a decade. At that time, the USSR ships tried to navigate on Bystre Channel, but they have failed and so the traffic on Sulina channel has been resumed*”.

USSR never attempted nor undertook any large-scale construction activity in the Bystre Branch. Since 1830 to 1958, all shipping activities in the Bystre (Novostambulske) Branch were operated on the basis of natural depths, and this is confirmed by historic evidence (e.g. archival map produced by the Lieutenant Commander Egor Manganari and other navigation maps and pilot charts inherited from the past century).

The Bystre Branch was most intensively utilized as a freight transport artery in the 1950s, when the Soviet State Danube Shipping Company (PДДП) organized a special line connecting the Danube ports with the Black Sea ports. This can be illustrated by the fact that freight movements over the Bystre Branch were comparable in scale with those handled by the Sulina Canal. For example, the Bystre Branch carried over 4 million tonnes of ore materials between 1950 and 1957.

In order to increase the river/sea traffic handling capacity, the construction of an artificial canal was launched in 1957 in the area of the marine sandbar in the Chilia Delta. The choice of the Pirva

Branch option was steered by political reasons exclusively – the optimality of the Bystre Branch option was obvious, but it was closed for commercial navigation by 1958. In the context of then existing political circumstances, it was reserved as a passageway for the Soviet military fleet from the Black Sea to Budapest, Prague and Vienna.

Paragraph 6 of Annex 4 (page 2) says: “*Regarding the "Danube River corridor 7" (established at the Creta meeting and at the Pan-European Conference in Helsinki 22-25 June 1997), the Ukraine's goods transport by fluvial and maritime ships is not affected. The Corridor keeps its transport configuration having as final point Sulina adding the Danube-Black Sea channel in order to enhance the value of Constanta port. In conclusion, Ukraine cannot use as reason the obstruction of the access to the fluvial-maritime transportation*”.

The above statement forms an impression that the Romanian party, as soon as it has joined the European Union, has immediately taken over the authority to judge and rule on the issues relating to the development of the international transport corridors. Caring about its own economic interests exclusively, Romania tries to put barriers that would impede the Ukrainian involvement in the cooperative effort aiming to develop and enhance the transport network that brings together the EU countries and the North-Eastern/Asian countries.

The dramatic and continuous increase in demand for the movement of freights and goods poses an urgent and important need for greater and better integration of national transport system, and appropriate decisions are required to be taken at the international level. This was the rationale for the first steps taken at the Crete Meeting dedicated to the development of the international transport corridors.

One of the priority areas of the Ukrainian national transport policy is the implementation of decisions adopted at the series of Pan-European transport conferences with regard to the development of transport links and connections between Ukraine and the Trans-European Network by developing international transport corridors. The development and improvement of the international transport corridors is one of the ways towards achieving integration with the European Union, to which Ukraine has committed itself.

The Danube waterway (International Transport Corridor VII) is part the main European water transport network, linking the Danube countries and providing a connection to the Black Sea. The development of the Danube-Black Sea Navigation Route in the Ukrainian part of the Danube Delta will help intensify the transport activities along the International Transport Corridor 7 (Crete Corridor) running along the Danube River. The longer-term perspective that would require cooperation and interaction with the Russian Federation is to develop the Danube-Black Sea-Don-Volga transportation route as a passageway to the Caspian Sea – the International Transport Corridor 7 would be thereby connected with the TPACEKA (Transport Corridor Europe-Caucasus-Asia).

***In the light of the above, any acts aiming to impede the restoration of shipping activity in the Ukrainian part of the Danube Delta not only represent an infringement of Ukraine's right to develop and operate the fluvial and naval navigation within its territory but do come in contradiction with the interests of the international community, especially those that relate to the development and enhancement of the international transport networks.***

Paragraphs 7-8 of Annex 4 (page 2) say: “*The works at the Bystroe Channel started without bilateral consultation, without impact study developed by specialists from both involved countries and by neutral international experts, without the accept of Romanian party related to the dredging on Chilia arms, and the construction of contracting dykes on the Romanian bank. It implies Ukraine to*

*sign agreements accords with Romania of EU and NATO Member State, respective with the Romanian Ministry of Transportation, Ministry of Environment regarding the navigation approval, heavy naval traffic on Chilia arm...”*

It is very obvious that the Romanian party is proud of its membership in the European Union, but it opts not to mention that it joined the EU only in 2007, whereas the notification procedure with regard to the proposed Danube-Black Sea Navigation Route in the Ukrainian part of the Danube Delta was launched by Ukraine back in 2002. When making all sorts of vocal statements at the international level like “it implies Ukraine has to”, “Ukraine should”, the Romanian party would be kindly recommended to provide explicit references to relevant international documents or at least those pieces of customary practice that Romania uses as the basis for defining the scope of obligations other states are deemed to have toward itself – this would be seen as a demonstration of respect toward the international ethics and Ukraine as a sovereign state. Furthermore, given that Ukraine holds neither EU nor NATO membership, the mere fact that Romania is a member to these international organizations does not give rise to any obligation of Ukraine towards Romania.

As a further point to note, the sources used by Romania to underpin its conclusions are simply striking, please see the following quote from the Sulina City Hall Comments: *“The conclusions from this paper resulted by consulting experts from the hydrotechnical offices, harbourmaster’s offices, research institutions that run at Sulina, fluvial pilots of different piloting companies fishermen and fish engineers, other professional categories.”*

The way used to present information by referring to a source while not providing the information, and the sources themselves employed to reject/debate the findings presented to the Romanian party in the EIA Report and environmental monitoring reports produced by reputable research organizations (including research institutions working in the system of the National Academy of Sciences of Ukraine, State Hydrometeorological Service of Ukraine, other leading research organizations in the field) are considered as a demonstration of utmost disrespect to the Ukrainian scientists, recognized at the international level, and to the country as a whole.

To finalize, one general response to the repeated allegation that the EIA documentation provided by the Ukrainian party does not examine/take account of the project impact on the Romanian territory: until this time, no solid scientific basis nor comprehensive research data have been provided/gathered to assess the impacts caused to the Danube ecosystem as a result of construction and operation of the Sulina Canal, let alone the on-going construction of St. George Canal. Therefore an **objective assessment of environmental impacts of the Danube-Black Sea Navigation Route Project in the Ukrainian part of the Danube Delta, on both Ukrainian and Romanian parts of the Delta can only be possible if proper consideration has been given to all past, current and future impacts caused to the Danube by human activities exercised by both affected parties.**

The second part of this document package comprises scientific explanations/responses to the Romanian comments on the results and findings of the environmental impact assessment study completed as part of the design documentation for the Danube-Black Sea Navigation Route Project (Full-Scale Development). These explanations/comments have been prepared by the Ukrainian Scientific Research Institute of Ecological Problems of the Ministry of Environmental Protection of Ukraine.

## Annex B2

### RESPONSE TO THE COMMENTS PROVIDED BY THE ROMANIAN PARTY ON THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY UNDERTAKEN FOR THE FULL-SCALE DEVELOPMENT OF THE DANUBE-BLACK SEA NAVIGATION ROUTE PROJECT (FINAL EIA REPORT, KHARKIV, 2004)

These comments were included in the ATTACHMENT I to the Letter of 13.11.2007 No. 4537/AK by Mr. Attila Korodi, Minister of Environmental Protection and Sustainable Development of Romania

Many of the comments provided by the Romanian party seem to refer to or describe data and materials included in the EIA report itself and therefore do not require any explanations/clarifications from the Ukrainian party. It should be however noted that the language and wording themselves as used by the Romanian party represent a certain bias against these materials.

This can be illustrated by the following examples:

A quote from the Romania's comments:

#### ***“A. Surface and Ground Waters***

- *As shown by para. 2 of the Introduction, thy report was carried out only for the Ukrainian part of the Danube Delta, not taking into account the impact on the Romanian territory.*
- *As is highlighted within the chapter 2.4 "Hydro physical conditions of delta formation" of the document transmitted by Ukraine, the Report does not refer either to the water flow issues in Danube Delta or to the hydrological relations between Chilia arm and the Danube Delta, and consequently the effect of the deep navigation waterway on the hydrological regime and hydrological processes of the Danube is not analyzed",*

End quote.

In truth, the second paragraph of the Introduction Section of the EIA reads as follows: "...the environmental impact assessment (EIA) was carried out for the Deep Navigation Route Project (DNR Project hereinafter) ...planned to be implemented in the Ukrainian part of the Danube Delta". In other words, this statement specifies the source of impact is specified without making any mention of, or reference to the area or extent of impact. The EIA Section 2.4 indeed describes and considers the hydrological characteristics of the Chilia Arm (i.e. the entire Ukrainian part of the Danube Delta) because this is a section of the Danube that physically accommodates the navigation route. At the same time, the EIA Section 4.1.2 "Analysis of Impact of Planned Activity on Local Geology and Topography" examines the impact of navigation route development on the distribution of flow among all arms of the Danube River, including those located within the Romanian territory.

One more quote from the Romania's comments:

#### ***“B. Marine Coastal Zone***

*The Report is not clear as to which is the place to store the excavated sediments during the maintenance of the navigable water way”,*

End quote.

It is our view that the EIA Section 3.2 "The Choice Substantiation of the Ship Navigation Passage"



(with subsections "Sea Dumpsite", "Riparian Dumpsites", "Spoil Islands"), Section 4.4. "Soil", and maps included in the Annexes E "Layout and Location of the Vilkove-Ismail Chatal Navigation Route Section" and J "Layout and Location of the Seaward Access Canal" provide both clear and sufficient information in this respect.

A remark reiterated by the Romanian party concerning perceived incompleteness of EIA documentation seems to stem from the fact this EIA Report finalizes and summarizes a suite of comprehensive and specialized studies/surveys carried out at earlier stages of the project development process, and these studies/surveys are referred to and reflected in the text of the EIA Report, with some of them published, and some transmitted to the Romanian party. Furthermore, some of these materials were included in the "Additional Set of EIA Materials", prepared in 2005 in line with the State Environmental Review Conclusion No. 290 (NO. 8270/21-10 of 30.08.05) – the English translation of these materials will be provided to the Romanian party in the nearest future. The overwhelming majority of all additional materials relating to the assessment of potential transboundary impacts of the navigation route were also included in the submission package delivered by the Ukrainian party to the Inquiry Commission and formed 47 annexes to the Final Report produced by this Commission.

An assertion made by the Romanian party that the EIA Report is lacking a non-technical summary is not fair in our view. Such non-technical summary is provided in the report as the 'Conclusion' Section. The Espoo Convention does not define any specific requirements with regard to the length and size of non-technical summary, it only emphasizes that this document should be non-technical in language and that it may include "a visual presentation" as appropriate. Given that this summary is part of the EIA Report, any additional presentation is considered to be not necessary.

We also cannot agree with negative comments on the proposed environmental mitigation measures identified in the EIA. Even these comments themselves appear to be very contradictory.

Quote:

*"Romania considers that the mitigation measures presented in the documentation are not sufficient and effective in order to reduce at minimum the transboundary environmental impact. Most of them are local measures which address local environmental effects. The mitigation measures proposed by the Inquiry Commission were not completely taken into account by the Ukrainian party "*, end quote (Romania's Comments, Section II, paragraph d).

*"Regarding the content of chapters 3.2, 4.1 2, 4 3.4, 4.3.5 and 4.4 we think that the measures envisaged are not clear and they do not ensure the affected Party against any likely adverse effect. The EIA documentation should have been elaborated and based on the precautionary principle and that is why it should have proposed mitigation measures for both the predicted impact and for the impact detected during the implementation of the monitoring programme, as well. Chapter 7 lists a suite of measures in order to mitigate the environmental impact of the project, but these measures are not explicitly connected to certain areas of impact and they are treated in a very general manner"*, end quote (Romania's Comments, Section III, paragraph A).

While the first quote stresses that the proposed mitigation measures are predominantly local, the last sentence of the second statement contains criticism about the lack of explicit connection between the proposed mitigation measures and specific areas of impact.

A key question emerging in the light of the above is how one should understand and apply the preventative approach that seeks to address and prevent any project impacts as they are detected during the implementation of the environmental monitoring programme (i.e. after the commencement of the project implementation)? It is quite obvious and logical that the design documentation for the full-scale project should take account of environmental and operational performance data characterizing the first phase of the navigation route. But so far, the monitoring

has shown no indication of any significant adverse transboundary impact of navigation route on the environment! Moreover, the Romania's comments do not include any specific example illustrating the alleged insufficiency and/or inadequacy of proposed mitigation measures, nor they contain any meaningful suggestion for enhancing/amending them.

We cannot disagree with Romania's repeated assertion that the existing EIA takes no account of findings and conclusions made by the Inquiry Commission – how this could be done back in 2004, when the Commission was not even established yet? It was however quite surprising to learn from the statement quoted below that the Inquiry Commission's findings and conclusions were not taken into account in the Romania's comments dated 2007.

Quote from the Romania's comments:

***“B) Specific***

*Conclusions on surface and ground water:*

- *The Chilia arm dredging works combined with the Bystroe canal development works and also with the transport capacity in low flow conditions could lead to the increasing of the water velocity on the Chilia arm, with a negative effect on the Delta ecosystems.*
- *Significant decreasing of the hydrostatic level of the groundwater along the dredged sector will cause deterioration of the equilibrium between the brackish and fresh waters, within the Romanian shore areas of the Danube Delta.*
- *Low surface and groundwater levels will cause deterioration of the aquatic environment related to water.*
- *The EIA documentation should take also into consideration the World Meteorological Organization forecast of global warming issues for the next years and accordingly the impact of climate change on the hydrology and ecosystems within the Danube Delta”,*

End quote.

Only the third point of this list appears to be consistent with the final opinion of the Inquiry Commission, with the remaining points either disregard it completely, or represent an ultimate novelty (like the last point) that has never been raised by the Romanian party before.

To summarize our review and response to the scientific comments presented by the Romanian party, the following general remarks can be made:

All hydraulic engineering facilities and water management systems interact with the natural features and systems (e.g. the river, the sea) that are highly vibrant and variable. Considering the complexity of all natural processes occurring in these systems, it seems unrealistic to expect that a single EIA process undertaken for a specific project would be sufficient to fill all existing gaps in scientific knowledge. This concerns, inter alia, the global warming issue raised in the Romania's comments.

In order to improve scientific knowledge on these processes and promote sustainable economic development, the international research community adopted appropriate monitoring and post-project analysis procedures, and these have been incorporated in the Espoo Convention and taken into account by the Inquiry Commission. Therefore in its Final Report, the Inquiry Commission, instead of suggesting to stop the project, has formulated recommendations on the organization and implementation of additional surveys designed to support the selection/identification of design improvements.

In order to further promote and employ the preventative approach during the post-project period, it

is considered that the best way forward would be to commence the full-scale development of the navigation route while remaining committed to the environmental protection and monitoring priorities identified in the project documentation – this would help prevent any potential adverse environmental effects that may be caused by the operation of the navigation route, the preventative principle would be thereby fully met.

### Annex B3

## ANSWERS TO QUESTIONS AND COMMENTS INCLUDED IN THE ANNEXES 2, 3, 4 TO THE LETTER (13.11.2007, No. 4537/AK) BY MR. ATTILA KORODI, MINISTER OF ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT OF ROMANIA

### I. Answers to questions and comments expressed during the public consultation meeting held to discuss the EIA Report for the Danube-Black Sea Navigation Route Project in the Ukrainian part of the Danube Delta (Minutes of Meeting done in Tulcea on 18 July 2007)

#### *Mr. Nisioiu Doru- NGO Ecomondia:*

*Question: How is it possible that a canal be dredged/dug and the level of water to remain constant, as you state about Bystroe?*

During the meeting, the Ukrainian party provided the following short answer to this question: “The navigation route design includes a provision for a flow guide dam designed to maintain the natural flow pattern in the Bystre Arm. By operating this dam, we’ll be able to minimize the potential for sediment accumulation within the canal entry zone whilst maintaining water discharge rates”.

More detailed information on this issue can be found in the Annex 47Ukr., which forms an integral part of the Final Report of the Espoo Convention’s Inquiry Commission. This Annex presents the results of modelling exercise undertaken by the team of specialists from the Moscow State University in order to examine and forecast the impact of proposed navigation route on the existing flow distribution pattern in the Danube Delta. These modelling results show that the dredging and deepening of the Bystre Branch sandbar would cause a very minor effect on the flow pattern in the Chilia Delta. Under low-flow conditions, the flow discharged through the Bystre branch would increase only by 1-2 m<sup>3</sup>/s and this would have no implications for other branches of the river. The dredging and deepening of 12 shallows in the Chilia Branch is expected to cause an increase in flow discharged through this branch only by 24 m<sup>3</sup>/s under the low-flow conditions, and this is only 0.8 % of the total Danube flow in the low-water period.

Such a minor magnitude of project impact on the flow distribution pattern in the Delta can be explained by the fact that the project’s dredging effort is planned to be limited to relatively small sections and not expected to have any significant impact on the cross-sectional geometry and hydraulic characteristics of water streams and, consequently, on water levels. One should also keep in mind that the water levels in the downstream sections of the Danube Delta are significantly affected by the upwelling/downwelling cycles in the sea.

External experts engaged by the Inquiry Commission carried out their own modelling exercise and produced somewhat higher estimates with regard to potential changes in flow discharges and water levels due to the project implementation, especially in the Starostambulske Branch. The programme of actions, developed by the Ukrainian party in order to facilitate the implementation of the Inquiry Commission’s recommendations, includes a provision for additional and more detailed flow modelling work and, if appropriate, adjustment of design characteristics of flow guide dam proposed to be constructed at the bifurcation of the Bystre and Starostambulske Branches.

*Question: Which is the social impact on the Ukrainian side and on the Romanian side if the transport traffic is modified and the traffic on the Romanian side is reduced?*

During the public consultation meeting, the Ukrainian party provided an exhaustive answer to this

question: “We fully understand the concern of the Romanian party about the social implications of the project. We all very well know the concept of social rights, both in Romania and Ukraine. Navigation has always been and still is one of key economic activities in the Lower Danube Basin. The Ukrainian Navigation Company accounts for about 24% of the total freight transport in the Danube Basin and provides jobs for thousands people. There are 4 seaports in the Ukrainian part of the Basin – it is just worth mention that the Ismail Seaport will celebrate its 100-year anniversary. To our view, the restoration of navigation is the act of restoring the social right”.

***Mr. Stelian Gavrus - Counsellor of the President of the Tulcea County:***

*Question: Is it true that by realization of the Bystroe Canal, among other financial advantages for Ukraine will bring as well a loss of 5600 ha from the Ukrainian delta surface?*

The answer provided by the Ukrainian party during the public consultation meeting appears to be adequate and complete: “The Bystre Canal is a non-existent feature – this refers to the natural river channel where the river flow has increased by 2.5 times within a span of the past 50 years. We just can’t comprehend where the information about the alleged loss of 5600 ha of land comes from – this didn’t happen and would never happen. The Ukrainian Government adopted a special decision emphasizing and confirming the outstanding environmental value of the northern part of the Danube Delta, and this decision was based on the opinion of the UNESCO experts. In line with that decision, the area of the Danube Biosphere Reserve has been extended to include additional 5600 ha in its northern section, and this is obviously a gain, not a loss”.

*Question: Is it true that on this natural branch have navigated only ships with draught of 1.5 m?*

Again, the answer provided by the Ukrainian party during the meeting seems to be complete and exhaustive: “Between 1951- 1956, the Bystre Branch accounted for about 40-45% of the total freight transport, and this route was used to navigate ships with draughts of up to 5.6 m, including fishing, river, marine and military vessels”.

***Mr. Romulus Stiuca, INCDD Tulcea:***

*Question: Which is the current depth of the canal?*

An exhaustive answer provided by the Ukrainian party is quoted as follows: “The current works have established the depths for a draught of 5.5 m. Ukraine, as well as Romania, have the right to optimise its traffic on the Danube. While Romania works to improve the operational performance of the Sulina Canal, Ukraine has designed its navigation route to handle ships with the 7.2 m draught”.

***Mr. Bologa Alexandru, Professor from Constanta:***

*It is obvious that this project has an environmental impact, both ecological and hydrological. From this point of view I appreciate that the technical aspects were presented at least in an inadequate and insufficient manner, the presentation made was purely informative. Due to the importance of the problem and due to Romania's intervention there have been some international studies and expertise provided. But the bibliographic references attached to the environmental impact assessment report for this canal are exclusively Ukrainian and Russian, and there is only one Romanian reference from 1992, unfortunately not the most representative one, there is no international reference at all.*

*Question: Is this environmental impact study relevant or credible, if it ignores the international expertise?*

The following answers were provided by the Ukrainian experts during the public consultation

meeting:

“We have always presented the results that are based on factual data collected by the Ukrainian specialists through the monitoring, but we’ve never succeeded in obtaining any information, to be similarly based on factual data or forecasts, from our partner in discussion”.

“We’ve used the scientific works by Bondar, Visota, Gastescu, there is a also a scientific work published in English about the palaeography of the Black Sea”.

“In its activities, Ukraine has been and is governed by the provisions of the following three conventions: Espoo Convention, Bern Convention, and Convention on the Protection of the Danube River”.

It is worth to add that the EIA Report has drawn on a wealth of various information sources that incorporate data and information from foreign publications, and these are referred to appropriately.

***Ms. Veronica Anghel, representative of MFA***

*She has been involved in the project matters since 2003. The international studies and the Ukrainian ones showed that the Bystroe alternative is the worst one. This statement is cited from the Ramsar Convention Report elaborated together with UNESCO Committee, Man and Biosphere Programme. The decision of the Ukrainian Government by which the Bystroe arm is taken out of the strict protected area has raised concern within UNESCO. This can be verified on the Man and Biosphere web site. The recommendation for the Ukrainian authorities was that in case they wish to change the zones within the delta to follow the same procedure that was for the initial designation of the delta UNESCO should have done a favourable agreement. The ICPDR resolution letter says that the Parties to the Convention ask Ukraine not to develop new project until it is fully in compliance with the recommendations of the Inquiry Commission. That means implicitly that the ICPDR members considered that until the resolution was adopted, the Inquiry Commissions conclusions have not been observed.*

The Ukrainian party commented on this speech as follows: “In 2003, the UNESCO’s international expert work group reviewed the project and issued a resolution. In 2004, in line with the European Council resolution, 12 international experts were commissioned to examine the project and they did not identify any major aspects in the project. So far, no approval has been given to any new zoning arrangement for the Danube Biosphere Reserve”.

This comment is considered to be adequate.

***Mr. George Rosca***

*Question: If your predictions will not be confirmed in the next years, will there be any bad consequences on the local communities? The ecological factors taken into account are in compliance with the international requirements on wetland or only with national Ukrainian provisions?*

Mr. Victor Bezdolny from the Delta-Pilot Company answered: “A number of the international expert conclusions produced between 2003 to 2006 have confirmed that the project design is compliant with the international law. Two Ukrainian NGOs filed a claim to the court on the grounds of alleged non-compliance of the project with the national and international law. The final court ruling is that the project is fully compliant with current international law”.

*Question: Taking account of the answer and of the fact that you declared that there are no negative effects of this canal, we ask now if you have the existing situation before the works have started, and if it is available to the public, if it was taken into account the whole ecosystem together with the Romanian Delta, to have a starting point for the future?*

Mr. Vasyl Prokopenko from the Vylkove Local Council answered: “None of the projects in Ukraine has been or is undertaken without prior consultations with the public. Starting from 2003, a series of public consultations and international conferences were held in Vylkove and Ismail to discuss the project. Also, we had an international conference in Odessa, where we met with the Romanian Consul and Romanian Ambassador to Ukraine, and with a large number of Romanian mass media representatives. We’ve been keeping close eye on coverage and publicity the project has received in the Romanian mass media, and are quite surprised by the tremendous scale of imagination and improvisation involved. Just to mention one example, the Romania Libera newspaper published an article alleging that the project caused the accumulation of sediments in the coastal zone of the sea and migration of this sediment mass towards the Sulina Estuary. We would recommend the Romanian authorities to take necessary steps in order to ensure that information on the project is presented in a more correct and careful manner”.

It is worth to add that the ecological status of the Ukrainian part of the Danube Delta as existed before the commencement of the project was described with a great amount of detail in the EIA Report on the basis information and materials provided by the leading research institutes of the Ukrainian Academy of Sciences and the Danube Biosphere Reserve itself. The integrated environmental monitoring programme was launched with the start of the Project Phase 1, and environmental baseline was therefore established and defined.

*Question: Do you recognize that Romania has the right to reecologysse the delta? How much do you think that Ukraine contributes to the flow and volume of water in the Danube river?*

The following answer was provided by the Ukrainian party: “All environmental issues and problems facing the Danube Delta should be examined/addressed in their complexity and entirety, rather than on a purely sectoral level. We have to design a unique strategy in order to prevent and mitigate the adverse environmental effects. As regards the project, in the event that any significant adverse impact will arise as a result of the project, its can be addressed/handled using appropriate mechanisms and procedures, including compensation arrangements”.

This answer is considered to be adequate and sufficient, especially considering a much broader nature of the question itself, which seems to be above and beyond the scope of EIA study undertaken for a specific single project.

***Mr. Ciprian Fantana, the Romanian Ornithological Society***

*Questions:*

- *Why there is no proposal on measures for ecological reconstruction for the ecological requirements of the affected birds?*
- *Are there any action plans for the recover of the affected birds population?*
- *Why this environmental impact study does not provide for reconstruction measures based on the species requirements?*
- *There are provided compensations for the bird fauna in the amount of 100000 USD, is this money sufficient by comparison with a similar project in Romania for improving the living conditions of the curled pelican of around 600000 Euro?*

The following answers were provided by the Ukrainian party:

“After the publication of the final opinion of the Inquiry Commission in July, the situation has been closely examined in line with the recommendations of ornithologists. We plan to increase the involvement and contribution of specialists in order to develop proper and effective protection measures for bird communities”.

“Our forecasts and estimates, made on the basis of numerous surveys and specialised studies carried out in the project area, show no indication that any significant adverse effects on bird colonies are likely to arise as a result of the project”.

“Compensation measures are not limited to financial allocations. They may include additional specific arrangements like appropriate warning signs, vessel speed and noise level limitations set for the protected area. Specific data and information are required regarding the type of damage incurred and list of species affected by the project, as well as the timing of damage, both incurred and forecasted”.

These answers are sufficient and consistent with the EIA findings.

*Mr. Ciprian Fantana said that in the study on Bystroe produced by INCDDD there is considered that the construction of the canal will implicitly affect the water level in the area Rosca-Buhaliova and so the biggest common pelican and curled pelican colony will disappear. This study was commissioned by the Romanian Ministry of Environment and Sustainable Development to the National Institute for Research and Development Danube Delta in Tulcea.*

In order to be able to provide a meaningful answer to this comment, the Ukrainian experts should be provided with all relevant study materials and reports, therefore the request for the copies of these materials to be made available to the Ukrainian party, expressed during the meeting, remains valid.

**Mr. Dima Ionel, NGO "Fiii Deltei":**

*Question: The documentation does not present clear technical details. Is there an impact assessment for the bottom dyke near Chilia and for the downstream ecosystem?*

In retrospect, the question concerning the dyke or dam was unclear, so was the answer. It looks like the question referred to the flow guide dam proposed to be constructed at the bifurcation of the Bystre and Starostambulske Branches. This structure is intended to prevent/minimize any potential adverse effect of the navigation route project on the flow distribution pattern in the Danube Delta. No adverse impact on the downstream ecosystems is expected to arise as a result of construction and operation of this dam. Local and small-scale disturbance to bottom communities during the dam construction was properly examined and reflected in the EIA Report, whose Section 3.2 provides key technical characteristics of the proposed dam (Page 57). Furthermore, there is a provision that these characteristics can be modified/adjusted as appropriate based on the results of comprehensive post-project monitoring.

*Question: The paragraph 4.2 from the environmental impact study mentions that the distribution of the flow of the hydrological regime is positive but not precisely estimated. How can it be positive if it is not possible to be foreseen?*

The following answer was provided by the Ukrainian party: “The focus of any technical document/study is on the analysis and characterization of potential adverse impacts, will all other aspects of a proposed activity addressed/examined at later stages of the project cycle. There appears to be a misinterpretation/mistranslation, because the original statement refers to the acceptability of this impact rather than the lack of assessment thereof.



This answer can be expanded by adding that the assessment of potential impact of the navigation route on the redistribution of flow in the Danube Delta is presented in the Section 4.1.2 of the EIA Report and is based on the results of the flow modelling exercise carried out at the Faculty of Geography of the Moscow State University. The EIA Report is considered to be quite clear in its definition and quantification of this impact: “the dredging and deepening of shallows in the Chilia arm will cause a **minor** (within the range of 1-2% of the total Danube flow as recorded in the upstream section of the Danube delta) change in the flow distribution pattern in favour of the Chilia Branch”. The Inquiry Commission concluded that it is **unlikely** that the dredging operations would represent a significant transboundary impact on the flow distribution pattern and water levels in the Chilia and Tulcea Branches. In other words, this confirms the estimate made by the Ukrainian party.

Indeed, the Ukrainian party considers that this minor impact is positive in the context of progressive deterioration of hydrological regime of the Chilia Branch due to the canal construction/flow regulation in the Sulina Branch and river channel straightening in the St. George Branch.

*Question: There has not been analysed the initial state, nor the development of the state of environment without this project. Paragraph 3.2 and Table 3.3 mention that in the first phase of the project the Bystroe branch will be 7 m deep and afterwards it will be 8 m deep You said the depth will not be modified.*

The following answer was provided to this question: “The EIA Report refers to the potential increase in flow received by the Bystre Branch that is estimated to be within 1-2%. As regards the depths, the report mentions two figures – the first one relates to the vessel draught, while the second figure describes the scale of dredging effort required. Speaking about the volume of water expected to be carried via the Bystre Branch, we consider that it would be required to examine and assess the effect of tectonic processes because the water levels in the Bystre Branch are greatly affected by the sea level. Being the 4<sup>th</sup> order tributary, the Bystre Branch itself has little or no direct impact on the distribution of water volume”.

To take the answer a bit further, it should be stressed that the natural depths in the Bystre Branch are sufficient to accommodate vessels with the draughts specified for the full-scale phase of the project, and no dredging/deepening activities are planned to be undertaken within the Branch itself. Coming back to the first part of the question, it should be reiterated that the EIA study did involve the assessment of current status of environmental components in the project area. This is true that the option of rejecting/cancelling the project (which would mean a withdrawal from the Danube shipping that traditionally has been among the key economic activities in the region) has not been considered by Ukraine because this option is detrimental to the country’s interests. The only question that was open to discussion was the review of various potential route options considered at the initial stage of project development and EIA process.

***Ms. Camelia Ionescu, WWF***

*Questions:*

- *How the sturgeon population will be affected taking into account the morphology change on the Bystroe branch?*
- *What is the effect of the increased quantity of sediments on the Bystroe branch, on the coastal zone?*
- *These contaminated sediments will be deposited on the bottom of the Black Sea. What will be the effect?*

The following answers were provided to these questions:

The first option considered by the Academy of Sciences of Ukraine featured the route running to the

Jimliansky (Zhebriansky) Bay. This option was rejected on the grounds that this Bay is one of the few major habitats for sturgeon species. Ichthyologic data collected by the Odessa scientists indicate an upward trend in the sturgeon population numbers, and this trend can be further confirmed by statistics on fish catches.

The major proportion of sediments is deposited in the estuary zone where a river branch empties into the sea, including the sandbar section. The experts are very well aware of this fact, which in itself would not cause any effect on the marine zone of the sandbar section. Chemical contaminants and effluents come to the river from many various sources, both in Romania and Ukraine. What we have to do is to examine this situation and ensure that contaminants are not introduced to the bottom sediments, or at least their levels are kept at minimum. The behavioural patterns of these sediments depend upon their physical state, and this issue is among the key research priorities of the monitoring programme. We have collected a wealth of information about the chemical composition of bottom sediments, and we continue our in-depth research by employing toxicity testing techniques for dissolved sediment samples. More details on this issue can be found in the monitoring programme.

Just to add a few words, it should be pointed out that one of the findings of the Inquiry Commission is that the impact of dredging operations in the sandbar section and retaining dam construction in the seaward access canal on the migratory behaviour of sturgeon and shad are hardly likely.

***Mr. Tudor Marian, NGO ProDelta Tulcea***

*Question: Is there a local impact due to the works of the project?*

The answer provided by Mr. Olexander Vasenko from the USRIEP Institute is considered to be sufficient in the light of the fact that the question itself is hardly relevant to the subject of the public consultation meeting: “Some local impacts at the dredging locations have arisen, there is a special report that describes and examines the effects on local zooplankton communities and potential consequences. This issue has always been among the priority concerns for NGOs, therefore the Ukrainian party has kept it in focus. But it is worth to remind that this meeting is dedicated to the review and analysis of transboundary impacts”.

***Mr. Nicolae Dumitru, resident of Tulcea town***

*Question: What is the opinion of the local population in Ukraine regarding this project?*

The answer of the local community representative from Ukraine speaks for itself: “In March 2003, the public consultation meeting was convened in Vylkove. It was attended by the local residents from Kilia, Ismail, and Reni, and they were absolutely unanimous in their support for the project to go ahead. All participants to that meeting were very supportive and positive in respect of the project, because they are very well aware of the fact that greater depths along the route would mean larger numbers of herrings. They also understand that the project would create new jobs, and this is an important social benefit”.

## II. Answers to additional comments and questions received from the public concerned

### WWF

- 1) *What is the rationale of having a second deep sea channel in the same area (one of the most sensitive in Europe), there is no similar situation in Europe (with two deep sea channels in one area)?*
- 2) *Why going for 8m depth instead of 4,5 which does not involve that much dredging? This depth could ensure the ships traffic from Odessa to Reni/Giurgiulesti, therefore could provide economic benefits with less costs for maintaining the channel!*

For answers to questions 1 and 2 please see the General Comments to Annex 2.

- 3) *How comes that the EIA on DWNR made by the participation of twelve institutes and different researchers from Ukraine specify just an possible local impact starting from some presumptions instead a using detailed current situation as reference for the impact It is allowed in the Ukrainian environmental laws to establish an impact of a project without having known the initial detailed situation?*

**Answer:** Over 40% of the whole body of the Final EIA Report represents the review and analysis of existing environmental situation in the Danube Delta, including, inter alia, a broad range of geographic, hydrological, biological and socio-economic aspects (and this report in itself is a summary that draws on heavily on several detailed/specific research reports and numerous literature sources).

[Part 2: “Physiographic and Climatic Characteristics of the Ukrainian Section of the Danube Delta and Area of Deep Water Navigable Pass” - 33 p.;

Part 3.1: “Necessity of Creation of Deep Water Navigable Pass in the Territory of the Ukrainian Part of the Danube Delta” – 6 p.;

Part 4.1.1: “Description of Geological environment and Engineering Ecological Conditions” – 4 p.;

Part 4.1.3: “Hydrogeologic Conditions” - 3 p.;

Part 4.3.1: “Hydrologic Conditions of DWNP Route” – 1 p.;

Part 4.3.2: “Description of Water Quality of Danube River in the Mouth” – 6 p.;

Part 4.3.3: “Description of Bottom Sediments” – 2 p.;

Part 4.4: “Soil” – 4 p.

Part 4.5.1: “Description of DBNR (the Danube Biosphere Nature Reserve) – 4 p.;

Part 4.5.2: “Description of Vegetation and Analysis of Impact of the Project Activities” – 5 p.;

Part 4.5.3: “Characteristic of Fauna and Analysis of Impact of the Project Activity” – 11 p.;

Part 5: “Description of Social Environment and Assessment of Social Impacts” – 8 p.;

Part 6: “Assessment of Planned Activity Impact on the Existing Structures and Facilities” – 1 p.]

We do not agree with the claim concerning the lack of initial review/analysis of existing situation. All our conclusions on the selection of the navigation route option and assessment of its potential environmental impacts are based on the results of analysis of existing situation. Most our arguments were taken into consideration by the Inquiry Commission. Our argumentation was further unfolded over 47 Information Annexes submitted to the Inquiry Commission and attached to its Final Report.

- 4) *Should the EIA foresee a conformation plan to be followed by the authorities, as the works started without establishing the precise impact of the project? Monitoring plan is just a way to establish the impact and not a measure for diminishing the impact as you stated during the meeting on 18 July.*

**Answer:** The State Construction Standard of Ukraine “The Contents and Scope of the Environmental Impact Assessment (EIA) Documentation to be Produced to Justify the Design and Construction of Industries, Buildings and Facilities” (A.2.2-1-2003) defines that the legally binding document that describes key environmental consequences of a proposed activity and guarantees/responsibilities pertaining to the implementation of mitigation measures designed to ensure the environmental safety throughout the entire project lifecycle is the Statement of Environmental Consequences summarizing key EIA findings and related comments, including, inter alia:

- data on the proposed activity, its objective and implementation approach;
- essential factors that affect or may affect the state of environment, taking into account the potential for extreme events and emergencies;
- results of quantification and evaluation of potential levels of environmental risk and safety of proposed activity to human life, and measures designed to ensure that the operation of a proposed activity will meet relevant environmental standards and requirements;
- responsibilities and obligations assumed by the project sponsor with regard to ensuring continued compliance with all relevant environmental protection and safety standards at all stages of development and operation of proposed activity.

The Statement of Environmental Consequences is signed by the Project Sponsor (Client) and General Designer, and made public through mass media. Copies of this document, both printed and electronic, are submitted to the local authorities to facilitate the control of compliance. All these requirements were met during the navigation route project in accordance with the national procedures.

The Delta Pilot State Company as the Project Sponsor (Client) and navigation route operator has developed and adopted the continuous monitoring/prompt response mechanism designed to identify and address all potential indications of impact in a prompt and timely manner, which includes the following components:

- The continuous and comprehensive monitoring of environmental status in the project impact area,
- The post-project analysis of impacts and regular review/update of EIA findings,
- The review and amendment, as appropriate and based on refined EIA findings, of proposed mitigative/protective/control/compensatory measures and navigation route operation rules.

As can be seen from the above, the monitoring has been and is an important element of an integrated environmental mitigation mechanism incorporated and employed in the navigation route project.

5) *Why it is not assessed the impact of the alteration of the basic processes which forms the delta (degradation, aggradations and water circulation) at the scale of entire Danube Delta system? In the current EIA, only general remarks on the potential effects are given. What is the long-term impact of:*

- *Alteration of sediment balance (dumping the sediments into the sea, effects on coastal areas);*
- *Alteration of the sea currents;*
- *Habitat loss (e.g. sand bars, wetlands)?*

**Answer:** Expected changes in the hydrological characteristics of Delta’s watercourses and estuary in relation to the project are very minor and cannot produce any significant (perceivable) impact on the delta development processes – this is one of the key findings of the EIA study. For example, the

sediment balance can only be affected/changed only in some very limited areas of the Bystre Branch mouth, and this will not have any implications for the delta's seaward advancement because the total outflow of solids to the sea will remain the same. The proposed protective dam, to be located within the sandbar section of the Bystre Branch, is not able to cause any significant change in the pattern of sea currents.

The Inquiry Commission also concluded that any large-scale and long-term impact of dredging on the hydromorphologic processes would be unlikely.

6) *How do the “,slowing extension of delta margins, the increasing water circulation through Bystroe, increasing quantity of sediments transported into the sea,, have a positive environmental effect”, as stated on pg 38 (point 10)? These are rather improved conditions for navigation without taking into account the river dynamic processes.*

**Answer:** The quoted statement indeed refers to the favourable character of the Bystre Branch hydrology for ship navigation. The Russian text of the EIA is very clear about that.

7) *What criteria have been used to calculate the compensations (values) for „irreparable / irreversible,, damages to natural environment?*

- *E g habitat loss is usually compensated by recreation of similar habitats necessary for feeding, breeding, staging; the quality of the new proposed habitats (those 5600ha of reserve) enables populations to recover.*
- *E. g. how was the value for the reduction of the population of flora and fauna species calculated? Who is going to be compensated from these losses (especially the calculation for the bird losses)?*

**Answer:** The damage evaluation mechanism as proposed in the EIA for the quantification of damage caused by the loss of habitats and/or reduction in population numbers is described in the EIA with a great detail (Section 7.4.2). It evolves around the mandatory fine levied for the loss of protected species caused as a result of gross negligence/non-compliance. All figures provided in the EIA in this respect, both data inputs and derived estimates, represent a theoretical exercise since the EIA findings show no indication that there is likely to be any irreversible loss of habitats and/or decrease in species population numbers due to the construction and operation of the navigation route. In any case, it is very important to establish and define a mechanism for quantifying any damage and specifying relevant compensatory measures that can be used should the need arise. According to the Ukrainian procedure, compensation payments are channelled to the state environmental protection departments in the oblasts concerned, to be further used to finance required mitigation measures.

8) *What is the impact of biodiversity losses at the scale of entire Danube Delta? (E g birds are nesting in the RO DD but feeding in the UA DD).*

**Answer:** The EIA study has come to a conclusion that any potential loss of biodiversity, both within the DBR and in the entire Danube Delta due to the navigation route construction and operation is unlikely.

9) *What reference values were considered for the assessment of pollution impact (for nutrients, heavy metals in water, sediments and suspended solids)? (Maximum admissible concentration, standard EU values should be considered, compliance with WFD)*

- *How the long-term effects of the implementation works and maintenance will be monitored within the delta and along the Black sea coast?*

**Answer:** The national water quality standards and MAC limits set in Ukraine for water bodies designated for fishery were used as reference values for the assessment of pollution impact. Our fishery water quality standards and limits are more stringent than those set for other water uses. The comprehensive environmental monitoring programme being undertaken in the Ukrainian part of the Danube Delta refers to both national and international water quality standards.

10) *What is the effect of contaminated sediments dumped on the shores and into the sea?*

- *What reference values have been used to assess the impact?*
- *Impact on the shore plant and animal communities?*
- *Impact of the sediment re-suspension in the river (on bottom fauna, fish fauna, etc.)*
- *Impact on the zoobenthic communities by dumping sediments into the sea*
- *Overall impact on the food chains (e.g. reduction of macroinvertebrates population (by dredging pollution, etc.) will impact species whose main food source are fish, birds) - in this case, the calculation of compensations (e.g. to ichthyofauna) do not take into consideration the whole damage.*

**Answers:**

- The national water quality standards and MAC limits set in Ukraine for water bodies designated for fishery were used to assess the effect of shore and offshore dumping, as well as current national soil quality standards (given that the riparian areas in question were in agricultural use and would be restored/made suitable for agriculture in the future).
- In their overwhelming majority, those plant communities that used to be present in the areas converted to dumpsites were heavily modified and degraded due to past human activities, and represented little or no biological value.
- Overall, the natural sediment re-suspension pattern in the river would not be affected, since the shallow areas where required depths would need to be maintained by dredging are relatively small.
- According to the EIA, the impact of marine dumping on the zoobenthic communities was identified as locally significant though minor in the transboundary context; the monitoring results also confirmed that the area of disturbance would not extend beyond the boundaries of marine dump site.
- According to the Ukrainian procedure, overall impact on food chains is taken into consideration and compensated for separately as the loss of food stock.

11) *Compensations - there is an evidence of a bank guarantee to ensure the amount for the promised compensations?*

**Answer:** The payment of compensation is governed by the existing national legislation of Ukraine, and the control of compliance with all requirements relating to the size and timeliness of payments is the responsibility of specialized state inspectorates, including the environmental inspectorate. So far, the compensation requirements specified for the project have been complied with.

12) *Compensations - why compensations are not included for the damages on the RO side?*

**Answer:** The EIA conclusion is that the direct impacts of navigation route project on the environment are expected to be of local scale. Those transboundary impacts that were examined by the Inquiry Commission might take shape as indirect effects caused by changes in the state of environment within the territory of Ukraine. In this context, it would be feasible to concentrate all environmental measures (including compensations) on the prevention and avoidance of route causes that may give rise to adverse effects.

13) *What elements are considered when stating that the reproduction conditions of fish are not*

*affected?*

**Answer:** When it comes to the assessment of any proposed activity that involves the use of surface water resources, it is simply inappropriate to expect that there will be no impact on the aquatic life. Therefore the criteria employed in this assessment primarily refer to the scale/severity of this impact, rather than presence of absence thereof. This assessment largely and predominantly uses narrative characteristics, like significant or insignificant, acceptable or unacceptable, likely or unlikely, local or large-scale, etc. The same approach was used by the Inquiry Commission.

In the EIA, the impact of the navigation route on fish reproduction in the Danube Delta as a whole, including its Ukrainian part, was considered as insignificant based on the criterion that the scale of expected change in the fish habitats should not exceed 5%. In the case of the Danube-Black Sea Navigation Route Project, the area of the bottom to be disturbed by dredging and/or share of water flow to be affected by increased turbidity levels due to the project are estimated to be well below 5%.

*14) How the sturgeon population will be affected by the alteration of the river bed morphology? What arguments are considered when stating that “The analysis of the possible impacts of the DWNR construction and operation on the adjoining territories of Romania and on bilateral Ukrainian-Romanian biosphere reserve in the Danube delta demonstrated that the DWNR implementation in accordance with the development project for the full development will not make a significant transboundary impact on the natural environment and nature resources of Romania and will not result in negative ecological consequences for the reserve biota” (pg. 183)*

**Answer:** Ukraine’s argumentation on these issues are similar to the one used to answer the previous question.

*15) What is the meaning of the following sentence? The fact that the species are rare, means that they are already threatened and vulnerable, therefore any intervention would definitely generate a negative impact! „ Biotic groupings of the Bystre branch area, including rare species and associations, are not unique for the DBR; they are widely spread within the boundaries of its territory. That is why certain local successions of vegetative aggregations and partial migration of animals from the branch itself and its riverside, possible in connection with the DWNR creation, do not pose a threat to preservation of the reserve biodiversity, to the existence of rare and especially valuable species of plant and animal kingdoms on its territory, in particular”.*

**Answer:** This means that the construction and operation of the navigation route are expected to affect very limited riparian areas that lie along the route. Biotic communities present in these areas comprise some protected species that are relatively abundant and occupy quite significant habitats within the territory of the biosphere reserve. The areas expected to be affected by the project account for less than 1% of the total area of these habitats within the reserve, therefore any potential reduction in the populations of these species within the project impact area would not have any significant effect of their total population number present within the territory of the reserve, especially considering the fact that the delta habitats have no fixed boundaries due to the natural geomorphologic variability of the delta itself. The forecasts suggest that consequences of these impacts to biotic communities are expected to be within the margins of natural fluctuations in population numbers.

That said, the project includes a provision for the mitigation of this impact. Proposed mitigation/compensation measures include the extension of the DRB area, release of funds to finance wetland habitat improvements in the northern part of the DBR, establishing limitations for vessel speed and acoustic signal use in the Bystre Branch, strengthening the riparian levees that

degrade naturally as the Bystre Branch develops and transforms, by planting trees and shrubs to consolidate soil and provide additional protection against noise.

*16) Why the cumulative impact of external activities (agriculture, industrial fishing, pollution, infrastructure developments) is not considered? For an already fragile system as Danube Delta, each intervention is added to an already existing pressure.*

**Answer:** Navigation has been and is part of historical pattern of human activities exercised in the Chilia Delta whose ecosystems have therefore adapted/adjusted themselves to its effects. In essence, the navigation project in question only seeks to restore the navigation in the Ukrainian part of the Danube Delta, where it has seen a dramatic decline over the past decade, the region's economy thereby hit hard.

*17) Navigable routes or port development should be kept outside the DD! One channel is enough; financial mechanisms and agreements could be a better solution.*

**Answer:** It is not clear what channel is referred to – if we look at Romania, it owns as many as four, with the total length of over 275 km (please see our answers to the General Comments Presented in Annex 2). Speaking about the seaward access channel in the Bystre Branch in the Ukrainian territory, whose length is only 3.432 km, any ideas concerning further development of transport infrastructure in the region will be considered if the need arises or as the funds become available in the future.



### III. Answers to the Comments from the Sulina City Hall

Comments provided by the Sulina City Hall largely comprise general information on the local geography, hydrology and history, and this information is very well known and familiar to the Ukrainian party – we do not think that any comment or response is required apart from a somewhat biased interpretation by the Sulina authorities of causes that led to the termination of navigation activity in the Bystre Branch and certain exaggeration of technical and legal constraints involved in the future operation of navigation route.

The route design as proposed has taken account of local hydrology that has shaped technical solutions incorporated in the design of seaward access channel with its protective dam lying to the north and flow guide dam proposed to be located at the bifurcation of the Starostambulske and Bystre Branches. At the same time, the analysis of comments provided by the Sulina City Hall suggests that their authors had a very superficial acquaintance with the navigation route design or otherwise they would have known that:

- The design as proposed only involves the dredging/deepening of several shallows rather than canalization of the Chilia Branch;
- The design as proposed does not involve any shift of the thalweg towards the central line similar to other internationally homologated – the navigation route will run along the existing navigable channel as much as possible;
- The design as proposed does not involve the construction of submerged dykes to direct the flow through the navigation channel – exactly the opposite, the plan is to construct a flow guide dam to direct the excessive flow to the Starostambulske Branch before it enters the Bystre Branch (Annex 3);
- The design as proposed does not anticipate any significant change in the hydrological regime and existing international navigation pattern in the Chilia Branch, therefore no additional strengthening will be required for the Romanian bank to provide protection against erosion induced by naval traffic.

Environmental issues articulated in the Comments from the Sulina City Hall are not a novelty. Potential adverse environmental impacts of navigation route mentioned in these comments were examined in the EIA and later addressed by the Inquiry Commission. Findings and estimates presented in our EIA and in the Final Report of the Inquiry Commission are similar in some occasions, though specific figures and quantifications differ in the others.

The provisions of the Espoo Convention itself and findings/conclusions of the Inquiry Commission pose a requirement for the Ukrainian party to establish and maintain the post-project review and monitoring process to enable the in-depth study of impacts identified by the Commission as relatively highly likely and potentially significant.

The integrated environmental monitoring has been maintained by the Ukrainian party since 2004, and so far no indication of significant adverse impact has been found to be present. The Ukrainian party has also launched the post-project analysis process in order to clarify/refine information on 6 potential transboundary impacts identified by the Inquiry Commission, and this provision is reflected in the Programme of Actions to be Taken by the Ukrainian Party to Implement the Scientific Conclusions and Recommendations Made by the UNECE Espoo Convention Inquiry Commission.

The navigation route design as proposed seeks to minimize and avoid any potential adverse environmental impacts as much as possible. The results of post-project analysis will provide a valuable basis for the adjustment/refinement of proposed technical solutions and, if appropriate, mitigation measures, in order to prevent and avoid any significant adverse environmental impacts on the entire Delta, both in Ukraine and Romania.

## Annex C

### **INTEGRATED ENVIRONMENTAL MONITORING PROGRAMME FOR THE DANUBE-BLACK SEA NAVIGATION ROUTE RESTORATION PROJECT (ECOLOGICAL COMPONENT)**

#### **1. The Programme's Rationale and Objectives**

The increasing anthropogenic pressure on the ecosystem of the Ukrainian part of the Danube Delta, attributed to the implementation of construction activities aiming to clean up the sandbar section of the Bystre Branch and increase depths along the route, as well as increased water transport traffic, is an objective factor posing certain threat to the unique natural environment of the Danube Delta, which is significant and valuable to the entire Europe. Moreover, the Danube-Black Sea navigation route runs across the territory of the Danube Biosphere Reserve, which is an important biodiversity conservation centre in Europe.

The environmental impacts of the deep navigation route (DNR) via the Chilia Delta of the Danube River are associated with:

- Dredging operations;
- Construction of hydroengineering facilities;
- Maintenance dredging during the route operation;
- Increased intensity of vessel traffic.

The international aspect is no less important due to growing attention paid by the neighbour nations and international environmental organizations to actions taken by Ukraine in restoring its own navigation route to connect the Danube and the Black Sea. In this respect, of particular importance is the implementation of comprehensive environmental monitoring system in the Ukrainian part of the Danube Delta, to be fully consistent with the relevant international standards and capable of providing an objective picture of the ecosystem status in this part of the Danube Basin.

**The objective of implementing the integrated environmental monitoring on the basis of a specially designed programme (hereinafter referred to as the Monitoring Programme) during the restoration and operation of the navigation route is the provision of reliable information on changes and trends in the ecosystem status in comparison to the previously determined baseline condition, to be based on actual observations, assessments and forecasts.**

General tasks of environmental monitoring include:

- The control of status, dynamics and trends in the components of the natural environment during the restoration and operation of the Danube-Black Sea navigation channel;
- The assessment of water quality and ecosystem status on the basis of chemical and biological indicators and criteria in line with the modern assessment techniques and classification systems, including integrated ecological and group indices etc.;
- The assessment of damage caused to the natural environment and its components as a result of restoration of navigation route;
- The forecasting of changes in the state of natural environment due to the effects of anthropogenic factors;
- The development of recommendations designed to mitigate and minimize potential adverse impacts.

## **2. The Monitoring Programme Duration**

The Monitoring Programme has been designed to cover the whole period of restoration and operation of navigation route. It covers all seasons (winter, spring, summer, autumn), since each of them features a specific pattern of various factors, including natural delta formation process.

## **3. Reporting Arrangements for the Monitoring Programme**

The processing of monitoring results is carried out on a quarterly and annual basis. Summarized results are submitted to the Client in the form of quarterly and annual summary reports.

Quarterly reports are prepared to reflect the results produced in the 1-2 and 3 Quarters and include the following information:

- Annotated report presenting the monitoring results;
- Aggregated suite of monitoring data produced over a reporting period;
- Estimates of compensation fees for damage caused by the contamination of aquatic environment;
- Assessment of damage caused to fish fauna and compensation estimates.

A quarterly report is submitted to the Client before the end of a month following after a respective reporting quarter.

The compensation estimates for the 4<sup>th</sup> Quarter are submitted to the Client before 15 February of a subsequent year.

An annual report is submitted to the Client before 15 March of a subsequent year. A consolidated annual report includes the following information:

- Description of works actually completed under the Programme;
- Brief review of results produced under each activity area;
- Selected summary statistics in tabular form;
- Produced estimates of damage incurred and compensation fees due;
- Recommendations on potential changes in the monitoring schedule;
- Forecast estimates.

The Ukrainian language is the main language for reporting purposes.

The following information is provided in the annexes to the Consolidated Annual Report:

- The full set of actual monitoring data collected under the Programme in tabular form;
- Annual reports produced by co-executing organizations involved in the implementation programme.

The final version of an annual report is reviewed during a special working meeting. The findings and conclusions of an annual report are reviewed and endorsed by the representatives of co-executing organizations.

## **4. Executing Organisations**

The main executing organization responsible for the implementation of works under the Monitoring Programme (Ecological Component) is the Ukrainian Scientific Research Institute of Ecological

Problems of the Ministry of Environmental Protection of Ukraine (USRIEP, Kharkiv). The list of other executing agencies and their key tasks are presented in Table 1.

**Table 1. List of Executing Agencies Involved in the Implementation of the Integrated Environmental Monitoring Programme**

No.	Organisation/Address	Sub-Contract/Assignment Title and Responsibilities
<b>ECOLOGICAL COMPONENT</b>		
1	Ukrainian Scientific Research Institute of Ecological Problems of the Ministry of Environment of Ukraine (USRIEP, Kharkiv)	<p><i>General Contractor, Main Executing Organisation</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Planning, organization and coordination of work;</li> <li>- Participating in field surveys, including those designed to examine (toxic) pollution levels in the Danube Delta (fresh-water part);</li> <li>- Hydrobiological studies;</li> <li>- Information management (information processing/summarizing, development of GIS-based data base for the Monitoring Programme);</li> <li>- Integrated ecological quality assessment of aquatic environment;</li> <li>- Forecasting potential changes in the status of natural environment;</li> <li>- Recommendations designed to prevent/mitigate environmental impacts;</li> <li>• Preparation of consolidated reports.</li> </ul>
2	Danube Hydrometeorological Observatory (DHMO, Ismail)	<p><i>Assignment: Hydrological and Hydrochemical Monitoring in the Ukrainian Part of the Danube Delta during the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Hydrological monitoring as part of the routine monitoring programme;</li> <li>- Hydrochemical monitoring as part of the routine monitoring programme at the stationary monitoring locations;</li> <li>- Study into the marine water invasion processes in the Bystre Branch;</li> <li>- Study into the marine delta dynamics;</li> <li>- Forecasting potential changes in the status of natural environment;</li> <li>- Provision of transport for seasonal field surveys (fresh-water delta).</li> </ul> <p><i>Technical support in undertaking water quality measurements in the dredging locations (fresh-water part)</i></p>
3	<b>Odessa Oblast State Department of Environment and Natural Resources of the Ministry of Environment of Ukraine, Odessa</b>	<p><i>Assignment: Water Quality Measurements for Control Purposes in the Dredging Locations</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Collection and summarization of available sectoral data on water quality in the Danube River in the area of the navigation route;</li> <li>- Water quality measurements for control purposes in the dredging locations.</li> </ul>
4	Odessa Branch – The Institute of South Marine Biology (OB ISMB, Odessa)	<p><i>Assignment: The Monitoring of Environmental Impacts Associated with Restoration and Operation of the Danube –Black Sea Navigation Route: Marine Part</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Comprehensive field surveys (the marine part of the field survey programme) to examine/assess species diversity, population and biomass of aquatic organisms; food base for fish stocks (as part of damage evaluation/compensation);</li> <li>- Assessment of ecosystem status on the basis of biological indicators;</li> <li>- Development and delivery of data base;</li> <li>- Forecasting potential changes in the status of natural environment</li> </ul>

No.	Organisation/Address	Sub-Contract/Assignment Title and Responsibilities
5	The Institute of Hydrobiology of the National Academy of Sciences of Ukraine ( <b>IHB NASU</b> , Kyiv)	<p><i>Assignment: Hydrobiological Studies into the State of Fresh-Water Ecosystems during the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Participation in comprehensive field surveys (fresh-water part); examination/assessment species diversity, population and biomass of aquatic organisms; food base for fish stocks, ecosystem status in terms of biological indicators;</li> <li>- Development and delivery of data base;</li> <li>- Forecasting potential changes in the status of natural environment</li> </ul>
6	Odessa Centre – The Southern Scientific Research Institute of Marine Fisheries and Oceanography ( <b>State Company OdCPivdenNIRO</b> , Odessa)	<p><i>Assignment: Ichthyologic Monitoring during the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Analysis of impacts caused to fish fauna by the restoration and operation of the navigation route;</li> <li>- Evaluation of damage caused to fish stocks and compensation payments</li> </ul>
7	Danube Biosphere Reserve of the National Academy of Sciences of Ukraine ( <b>DBR</b> ), Vylkove	<p><i>Assignment: The Monitoring of Plant and Animal Communities Inhabiting the Coastal and Wetland Areas of the Danube Biosphere Reserve during the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p> <ul style="list-style-type: none"> <li>- The impact assessment for all human activities in the area of the DBR, ranking of anthropogenic factors and forecasting of potential changes in the ecosystem status</li> </ul>
8	<b>State Centre “Noosphere”</b> , Odessa	<p><i>Assignment: Compliance Monitoring during the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Implementation of measurements during the construction and maintenance activities;</li> <li>- Analysis of grain size distribution in soil samples during field surveys;</li> <li>- Monitoring of riparian dredge-spoil sites;</li> <li>- Development and delivery of data base;</li> <li>- Forecasting potential changes in the status of natural environment</li> </ul>
9	<b>Research and Design Institute ChornomorNDIProject</b> , Odessa	<p><i>Assignment: Evaluation of Compensation Payments for Water Pollution due to the Restoration and Operation of the Danube-Black Sea Navigation Route</i></p>
10	International Association – Ukrainian Centre for Land and Resource Management ( <b>CLRM</b> , Kyiv)	<p><i>Assignment: The Satellite-Based Monitoring of Algal Growth (Chlorophyll A Concentrations), Levels and Spatial Distribution of Suspended Solids and Dissolved Organics in the Danube Delta and Coastal Zone of the Black Sea.</i></p> <p>Tasks:</p> <ul style="list-style-type: none"> <li>- Examining the algal growth processes (chlorophyll A concentrations), levels and spatial distribution of suspended solids and dissolved organics in the Danube Delta and coastal zone of the Black Sea;</li> <li>- Long-term observations on the marine delta dynamics;</li> <li>- Analysis of delta dynamics;</li> <li>- Forecasting potential changes in the status of natural environment.</li> </ul>

The technical/engineering design component of the project is implemented on the basis of separate contract signed between the Delta-Pilot State Company and the RichTransProject Research and Design Institute, which is the main contractor for this component. The Technical Component involves the morphological monitoring of the navigation route, including depth measurements in the sandbar section of the estuary, in the dredging locations and in the area of offshore dump site; examining the sandbar deformation dynamics in the Bystre Branch and siltation rates in the navigable channel, etc. The USRIEP and RichTransProject Institutes are in charge of providing work access to information collected under both components of the Monitoring Programme.

## 5. Scope of Work

The Ecological Component of the Monitoring Programme involves the following main activities:

- 1) Regular hydrological observations and regular water quality observations on the basis of special programme;
- 2) Quality control measurements for water and bottom sediments during the dredging operations in the sandbar section and in the shallow-water sections of the Danube River; ecological monitoring in the locations of riparian dredge-spoil sites and offshore dump site;
- 3) Comprehensive field surveys in the Ukrainian part of the Danube Delta and adjacent areas of the Black Sea coastal zone;
- 4) The monitoring of fish fauna, evaluation of damages caused to fish stocks due to the restoration and operation of the navigation route, calculation of appropriate compensation payments;
- 5) Evaluation of damage caused to the aquatic environment due to the restoration of the Danube-Black Sea navigation route;
- 6) The monitoring of plant and animal communities inhabiting the DBR areas subject to potential impacts of the navigation route;
- 7) Analysis of ecological processes in the Danube Delta and coastal zone on the basis of satellite imagery;
- 8) Forecasting changes in the state of natural environment (based on contributions by each executing agency);
- 9) Development of recommendations designed to prevent and mitigate environmental impacts associated with the restoration and operation of the navigation route.

## 6. Regular Hydrological and Hydrochemical Observations

The work on this sub-component is implemented by the Danube Hydrometeorological Observatory (Ismail) on the basis of sub-contract. Some water chemistry analyses (e.g. determinations on heavy metals and oil products) are carried out by the USRIEP staff as part of the field survey programme.

**The main objective** of regular observations is to collect accurate and statistically verified information on the hydrological and hydrochemical status and trends in the aquatic environment in the project area in order to assess the impacts associated with natural and anthropogenic factors.

### 6.1. Regular Hydrological Observations

The hydrological monitoring programme is carried out on the basis of monitoring and flow measurement network operated by the Danube Hydrometeorological Observatory, which covers the Danube Delta area and includes additional downstream gauging stations established in the Bystre and Tsyganske Branches since 2004 in order to monitor the navigation route project impacts.

Key work tasks include:

- The monitoring of changes in hydrological characteristics of the Danube Delta during the restoration and operation of the Danube – Black Sea navigation route;
- The identification and assessment of trends in the hydrological regime of the Ukrainian part of the Danube Delta, caused by natural and anthropogenic factors;
- The forecasting of changes in the flow pattern and hydrological processes in the Ukrainian part of the Danube Delta;

The hydrological monitoring programme involves the following activities:

- Implementation of regular observations in the existing hydrological monitoring network and additional monitoring locations in the Danube Delta on the basis of standard monitoring programmes;
- Organisation and implementation of specialized field surveys designed to track changes in the hydrological processes in the Danube Delta due to natural and anthropogenic factors.

The monitoring schedule specified in the hydrological monitoring programme is described below:

- Daily observations on water levels and temperatures (and ice conditions when relevant) in the following monitoring locations: Reni, Ismail, Kislytsia, Kilia, Lyski, Vylkove, Prirva, Ust-Dunaisk and Prymorske;
- Daily observations on water levels at the Bystre and Tsyganske monitoring locations;
- Daily observations on water turbidity levels at the monitoring locations Reni, Ismail, Vylkove and Prirva;
- Flow discharge and suspended solid measurements at the gauging stations in the Chilia Branch (54 mile, 115 and 20 km), Ochakiv Branch (15.5 km), Ankudyniv Branch (head), Bystre Branch (head) and Starostambulske Branch (10 km);
- Flow discharge and suspended solid measurements at 14 gauging stations: 8 times per year (5 annual measurements are financed as part of the Ecological Component and further 3 annual measurements are carried out as part of the Technical/Engineering Component);
- Observations on the marine delta dynamics in the Chilia Branch: between the Poludenny Branch mouth and the Tsyganske Branch mouth (10 monitoring locations, monitored once per year during low-flow period).

The list of hydrological monitoring locations in the Danube Delta and parameters monitored are presented in Table 2. In addition to the directly measured parameters, the Table 2 also includes estimated values.

**Table 2. Regular Hydrological Monitoring Locations, Parameters and Frequencies**

No.	Water Body / Location	Distance from the Seaward Line, km	Monitoring Parameters and Frequencies						
			H	T	S	$\rho$	Q	Q <sub>H</sub>	R <sub><math>\rho^*O</math></sub>
1	Danube – Reni	163,3	730	730	-	365	-	365	365
2	Danube – Mile 54	136,4	-	-	-	8	8		8
3	Chilia Branch – 115 km	115,2	-	-	-	8	8		8
4	Chilia Branch – Ismail	93,6	730	730	-	365	-	365	365
5	Chilia Branch – 70 km	70,4	-	-	-	5	5		8 (5)
6	Ivanesh Branch – 12.5 km	72,5	-	-	-	5	5		8 (5)
7	Kislytsky Branch – 27.8 km	74,0	-	-	-	5	5		8 (5)
8	Kislytsky Branch – Kislytsia	68,0	730	730	-	-	-		-
9	Chilia Branch – Chilia	47,0	730	730	-	-	-		-
10	Priamy Branch – 30 km	30,0	-	-	-	5	5		8 (5)
11	Solomoniv Branch – 10 km	32,0	-	-	-	5	5		8 (5)
12	Solomoniv Branch – Lyski	27,5	730	730	-	-	-		-
13	Chilia Branch – 20 km	20,0	-	-	-	8	8		8 (5)
14	Chilia Branch – Vylkove	18,0	8760	730	-	365	-	365	365
15	Ochakiv Branch – 15.5 km	15,5	-	-	-	8	8		8
16	Ankudyniv Branch – head	12,0	-	-	-	8	8		8
17	Poludenny Branch – head	6,0	-	-	-	5	5		8 (5)
18	Prirva Branch – 3.6 km	3,6	8760	730	-	365	5		365
19	Hneushiv Branch – head	3,0	-	-	-	5	5		8 (5)
20	Potapivsky Branch – head	3,8	-	-	-	5	5		8 (5)
21	Bystre Branch – head	9,5	730	-	-	8	8	365	8/365
22	Starostambulske Branch – 10 km	15,0	-	-	-	8	8		8
23	Skhidny Branch – head	7,0	-	-	-	5	5		8 (5)
24	Lymba Branch – head	7,7	-	-	-	5	5		8 (5)
25	Starostambulske Branch – mouth	7,0	-	-	-	5	5		8 (5)

No.	Water Body / Location	Distance from the Seaward Line, km	Monitoring Parameters and Frequencies						
			H	T	S	$\rho$	Q	$Q_H$	$R_{\rho \cdot Q}$
26	Kurylsky Branch – head	5,0	-	-	-	5	5		8 (5)
27	Tsygansky Branch – head	2,0	730	-	-	5	5		8 (5)
28	Black Sea, Zhebriansky Bay, Ust-Dunaisk	-	730	730	365	-	-		-
29	Black Sea, Zhebriansky Bay, Prymorske	-	730	730	365	-	-		-

Notes: H – water level, cm; T – water temperature, °C (surface); S – water salinity, ‰ (surface);  $\rho$  – water turbidity, g/m<sup>3</sup>; Q – flow discharge, m<sup>3</sup>/s;  $Q_H$  – flow discharge (estimated on the basis of H values), m<sup>3</sup>/s;  $R_{\rho \cdot Q}$  – suspended solid flow, kg/s.

## 6.2. Regular Hydrochemical Observations

The hydrochemical monitoring programme under the Environmental Monitoring Programme for the Danube-Black Sea Navigation Route Project is carried out on the basis of monitoring network and programme maintained by the Danube Hydrometeorological Observatory. The list of monitoring locations included in the regular water quality monitoring programme is presented in Table 3.

The monitoring locations for regular water quality monitoring programme have been selected taking into account the need for assessing specific water quality impacts associated with the restoration and operation of the navigation route in a manner that disentangles them from other impacts, including those caused by transboundary, anthropogenic and natural factors.

Key work tasks include:

- The monitoring of changes in hydrochemical characteristics of the Danube Delta during the restoration and operation of the Danube – Black Sea navigation route;
- The identification and assessment of trends in water chemistry in the Ukrainian part of the Danube Delta, caused by natural and anthropogenic factors.

The hydrochemical monitoring programme involves the following activities:

- Regular water quality monitoring, based on the standard monitoring programmes, at the existing (11) and additional (5) monitoring stations in the Ukrainian part of the Danube Delta: 12 times per year;
- Undertaking additional observations on certain hydrochemical regime characteristics along the Danube – Black Sea navigation route, including observations on the saline water invasion in the Bystre Branch (5 monitoring locations, 12 times per year);
- Review and summarization of historical monitoring data available for the Ukrainian part of the Danube Delta.

The list of monitored parameters and sampling frequencies are presented in Table 4.

**Table 3. Monitoring Locations Included in the Regular Monitoring Programme**

Code	Sampling Locations (Based on the State Monitoring Programme)	Additional Sampling Locations along the Navigation Route	Station	Distance from the Seaward Delta Line, km	Sampling Location
R01	X		Danube, 2 km upstream of Reni	71 mile	RML <sup>1</sup>
R02	X		Danube, 1 km downstream of Reni	68 mile	M
R03		X	Danube – upstream of Tulcea Branch	116 km	M
R04	X		Chilia Branch – 10 km upstream of Ismail	103 km	M

<sup>1</sup> RML – “right bank”, “middle section”, “left bank”.



Code	Sampling Locations (Based on the State Monitoring Programme)	Additional Sampling Locations along the Navigation Route	Station	Distance from the Seaward Delta Line, km	Sampling Location
R05	X		Chilia Branch – Ismail	96 km	M
R06	X		Chilia Branch – 1 km downstream of Ismail	89,9 km	M
R07	X		Chilia Branch – 4 km upstream of Kilia	49 km	M
R08	X		Chilia Branch – 6 km downstream of Kilia	39 km	M
R09	X		Chilia Branch – 13 km downstream of Kilia	32 km	M
R10	X		Chilia Branch – 1 km upstream of Vylkove	21 km	RML
R11	X		Chilia Branch – 1 km downstream of Vylkove	17 km	M
R12		X	Starostambulske Branch – upstream of the Bystre Branch	11 km	M
R13-1	X		Bystre Branch	11 km	M
R13		X	Bystre Branch	0 km	M
R14		X	Ochakivsky Branch	6 km	M
R15		X	Starostambulsky Branch	0 km	M

**Table 4. List of Monitored Parameters and Sampling Frequencies**

No	Parameters	Measuring Units	Sampling Location	Sampling Frequency, times per year	Water Layer <sup>2</sup>
	<b>Physical Parameters:</b>				
1	Water temperature	°C	R01-R15	12	S, B
2	pH	-	R01-R15	12	S
4	Transparency	m	R01-R15	12	S
5	Suspended substances	mg/l	R01-R15	12	S, B
	<b>Chemical Parameters:</b>				
6	Dissolved oxygen	mg O/l	R01-R15	12	S, B
7	Carbon dioxide	mg/l	R01-R15	12	S, B
8	BOD <sub>5</sub>	mg O/l	R01-R15	12	S, B
9	Permanganate oxidability	mg O/l	R01-R15	12	S, B
10	COD	mg O/l	R01-R15	12	S, B
11	Ammonium nitrogen	mg N/l	R01-R15	12	S, B
12	Nitrite nitrogen	mg N/l	R01-R15	12	S, B
13	Nitrate nitrogen	mg N/l	R01-R15	12	S, B
14	Phosphorus (orthophosphates)	mg P/l	R01-R15	12	S, B
15	Organic phosphorus	mg P/l	R01-R15	12	S, B
16	Total phosphorus	mg P/l	R01-R15	12	S, B
17	Silicon	mg/l	R01-R15	12	S, B
18	Dry residue	mg/l	R01-R15	12	S, B
19	Total hardness	mg-equiv./l	R01-R15	12	S, B
20	Alkalinity	mg-equiv./l	R01-R15	12	S, B
21	Chlorides	mg/l	R01-R15	12	S, B
22	Sulphates	mg/l	R01-R15	12	S, B
24	Hydrocarbonates	mg/l	R01-R15	12	S, B
25	Calcium	mg/l	R01-R15	12	S, B
26	Magnesium	mg/l	R01-R15	12	S, B
27	Sum of sodium and potassium	mg/l	R01-R15	12	S, B
28	Oil products	mg/l	R01-R15	12	S, B
29	Surfactants	mg/l	R01-R15	12	S, B

<sup>2</sup> S – surface, B – bottom

No	Parameters	Measuring Units	Sampling Location	Sampling Frequency, times per year	Water Layer <sup>2</sup>
30	Phenols	mg/l	R01-R15	12	S, B
32	Total iron (dissolved)	mg/l	R01	12 + 3 <sup>**</sup> )	S, B
33	Manganese (dissolved)	mg/l	R02	12	
34	Zinc (dissolved)	µg/l	R10-R11	4 <sup>*</sup> ) + 3 <sup>**</sup> )	S, B
35	Copper (dissolved)	µg/l	R12-R13, R15	4 <sup>*</sup> ) + 3 <sup>**</sup> )	
36	Total iron	mg/l	R01	3 <sup>**</sup> )	S, B
37	Total manganese	mg/l	(R,M,L),	3 <sup>**</sup> )	S, B
38	Total zinc	µg/l	R3, R6,	3 <sup>**</sup> )	S, B
39	Nickel (dissolved)	µg/l	R7, R9- 13,	3 <sup>**</sup> )	S, B
40	Total nickel	µg/l	R13-1	3 <sup>**</sup> )	S, B
41	Total copper	µg/l	(R,M,L) R15	3 <sup>**</sup> )	S, B
42 43 44 45	α-HCCH	µg/l	R01,	6	S, B
46 47	β-HCCH	µg/l	R04-R10		
	γ-HCCH	µg/l			
	DDT	µg/l			
	DDD	µg/l			
	DDE	µg/l			

Notes: \*) 4 samples per year taken by DHMO, 3 samples per year taken by USRIEP as part of the field survey programme

\*\*\*) 3 samples per year taken by USRIEP as of the field survey programme. Changes and amendments to the monitoring programme in terms of monitoring locations and monitored parameters can be made on the basis of actual monitoring results.

## 7. Water Quality Control Measurements during the Dredging Operations in the Sandbar Section and Shallow-Water Sections of the Danube River, Monitoring of Riparian Dredge-Spoil Sites and Offshore Dump Site

This work component is implemented by the following organizations:

1) Odessa Oblast State Department of Environment and Natural Resources (7.1):

- Hydrochemical monitoring in the river section of the navigation route;

2) State Centre “Noosphere” (Odessa):

- Monitoring of riparian dredge-spoil sites and their impacts on adjacent areas (7.2);
- Water quality control measurements, including water contained in bottom sediment pores, and bottom sediment quality measurements during dredging operations in the sandbar section of the Bystre Branch (7.3).

The technical support required to take control samples in the river section of the Danube navigation route is provided by the Danube Hydrometeorological Observatory on the basis of separate subcontract.

Samples taken as part of the comprehensive field survey programme can be treated as control samples provided that they have been taken in accordance with the appropriate control sampling procedure.

The objective of determinations made on the basis of control samples is to facilitate the direct assessment of technogenic impacts on water quality caused by excavation/dredging activities, control of water quality in the locations of dredge-spoil islands (along the river channel), control of

ecological status of riparian dredge-spoil sites and offshore dump site during the restoration and operation of the navigation channel (including maintenance dredging operations).

### 7.1. Sampling Locations and Monitored Parameters for Control Purposes – Water

The sampling locations and timing of water quality measurements for control purposes are decided upon taking into account the design requirements, and the progress of restoration and operational dredging operations (Phase II – Full-Scale Development):

- 1) Shallow section 11 km;
- 2) Shallow sections 20.5–26 km;
- 3) Shallow section 26-31 km;
- 4) Shallow section 31-33 km;
- 5) Shallow section 33-39 km;
- 6) Shallow section 46.5–53 km;
- 7) Shallow section 60-64 km,
- 8) Shallow section 64-68.5 km,
- 9) Shallow section 68.5-71 km,
- 10) Shallow section 71–75.5 km,
- 11) Shallow section 75.5–78 km;
- 12) Shallow section 112.5–115 km;
- 13) Shallow section 139.7–142.4 km;
- 14) Shallow section 152.3–153.4 km;
- 15) Dredge spoil island 58 km.

The following sampling locations are used for water samples taken in order to control the impacts of dredging operations on water quality:

- 0.5 km upstream of dredging activity;
- 0.5 km downstream of dredging activity;
- 1 km downstream of dredging activity.

Water samples in these locations are taken at three points across the river channel and at three depth levels (0.5 m; middle layer and bottom layer), i.e. the total of 9 samples for each control location;

Additionally, control samples are taken 2 km downstream of dredging activity at three depth levels within the navigable channel.

During each control survey, carried out on a quarterly basis, the suite of control measurements for each location includes repeated measurements carried out during 2-3 days using the same procedure.

According to the provisions of the monitoring programme, each dredging location should be sampled/monitored at least once per quarter. The list of control parameters is presented in Table 5.

**Table 5. List of Control Parameters (Water)**

No.	Parameter	Measuring Unit
1	Water temperature	°C
2	pH	pH
3	Dissolved oxygen	mg O <sub>2</sub> /l
4	Electric conductivity	μS/cm

No.	Parameter	Measuring Unit
5	BOD5	mg O <sub>2</sub> /l
6	Permanganate oxidability	mg O/l
7	COD	mg O/l
8	Total quantity of suspended substances	mg/l
9	Total phosphorus	mg P/l
10	Phosphorus of orthophosphates	mg P/l
11	Ammonium nitrogen	mg N/l
12	Nitrite nitrogen	mg N/l
13	Nitrate nitrogen	mg N/l
14	Total dissolved iron	mg/l
15	Total iron	mg/l
16	Oil products	mg/l

## 7.2. Monitoring of Riparian Dredge-Spoil Sites

The monitoring of riparian dredge-spoil sites is undertaken by the State Centre “Noosphere” (Odessa). It comprises the following survey and laboratory activities:

- 1) Synchronized water level measurements in the following areas:
  1. Soil storage sites;
  2. Danube and its branches: in the locations of dredge-spoil sites,
  3. Interception channels.
- 2) Analysis of soil quality in the areas adjacent to the dredge-spoil sites (including heavy metals (Cu, Cd, Zn, Pb, Hg) and oil products); agro-ecological assessment of soil at the dredge-spoil sites.
- 3) Analysis of grain size distribution and chemical composition (water extract) of soil at each dredge-spoil site, including the following parameters:
  - Heavy metals: Cu, Cd, Zn, Pb, Hg;
  - Nutrients: K<sub>org.</sub>, nitrogen group, phosphorus group;
  - Oil products.

The soil quality is assessed against relevant standards set for agricultural use. The soil quality analyses at the riparian dredge-spoil sites are carried out on a quarterly basis.

## 7.3. Monitoring of Offshore Dump Site

The monitoring of offshore dump site is carried out by the State Centre “Noosphere” as part of the water/soil quality control programme, and by the Odessa Branch of the South Marine Biology Institute as part of the comprehensive field surveys undertaken 3 times per year.

## 8. Comprehensive Field Survey Programme

The following organizations are involved in the implementation of the Comprehensive Field Survey Programme:

- 1) USRIEP:
  - Coordination of work;
  - Chemical analyses in the fresh-water section of the study area, assessment of pollution levels in water, soil and aquatic organisms;
  - Hydrobiological surveys in the fresh-water section of the study area.
- 2) Odessa Branch – Institute of South Marine Biology:

- Hydrological, hydrochemical and hydrobiological surveys in the coastal zone of the Black Sea, including the offshore dump site.

### 3) Institute of Hydrobiology:

- Hydrobiological surveys in the fresh-water section of the study area.

### 4) Danube Biosphere Reserve:

- Monitoring of plant and animal communities inhabiting the coastal areas in the territory of the Danube Biosphere Reserve where the potential impacts of the navigation route may be likely, on the basis of an agreed upon monitoring schedule.

USRIEP is responsible for organizing and supervising field surveys, including regular survey site inspections.

The comprehensive field survey component of the Monitoring Programme is designed to provide in-depth knowledge and information on anthropogenic factors and natural processes affecting the state of natural environment. The field survey programme aims to:

- Provide an integrated ecological status assessment of the Ukrainian part of the Danube Delta and coastal zone of the Black Sea;
- Provide an integrated assessment of environmental impacts associated with the restoration and operation of the Danube-Black Sea navigation route;
- Collect hydrobiological and hydrochemical data required to evaluate damage incurred to the aquatic environment and biological resources due to the restoration and operation of the Danube-Black Sea navigation route;
- Carry out specific studies, which are considered not practicable nor feasible as part of the regular monitoring programme;
- Update and amend the regular monitoring programme;
- Assess the scale of potential adverse impacts associated with the restoration and operation of the navigation route (reduction or loss of habitats and species diversity due to the route construction and full-scale resumption of navigation) and identify proposed mitigation measures.

The comprehensive field survey programme involves the detailed assessment of ecosystem status in the Ukrainian part of the Danube Delta along the navigation route, surveys covering the main branches within the DBR boundaries (Ochakiv, Prirva, Bystre, Skhidne, Starostambulske), surveys in the sandbar section of the Bystre Branch and in the cross-border section of the Danube Delta (between Prirva and Ukrainian/Romanian marine border).

The comprehensive field surveys are carried out according to the following schedule:

- 1) Spring (April-May), to match the spring flood peak;
- 2) Summer (July-August), to cover the period of maximum temperatures;
- 3) Autumn (October-November), to match the period of minimum flow levels.

## **The Comprehensive Field Survey Programme**

### *a) Fresh-Water Section*

#### Hydrochemical Surveys:

- At the stationary stations which are part of the regular monitoring network:  
Studies complementing the regular monitoring programme (e.g. on heavy metals);
- At the dredging locations:

At least three dredging locations where samples are taken in the following manner: 0.5 km upstream, at the dredging location, 0.5 km downstream, 1 km downstream. In each sampling location water and bottom sediment samples are taken in the navigable section and near the river bank. The list of determinations includes:

- Nutrients,
- Oxygen group parameters (dissolved oxygen, permanganate oxidability, BOD<sub>5</sub>, COD),
- Heavy metals (water: Fe, Mn, Zn, Ni, Cu (dissolved form and total content); bottom sediments: Mn, Zn, Ni, Cu,),
- Oil products (water and bottom sediments).

Overall, each field survey in the fresh-water involves chemical sampling and analyses in at least 18 sampling locations.

As regards the bioaccumulation of heavy metals and chlorinated organic pesticides, at least 6 samples are taken once per year for this purpose.

The hydrobiological samples are taken:

- At the stationary monitoring stations (microbiology, phytoplankton, zooplankton, zoobenthos);
- In the locations of dredging activities: 3 samples taken in each location in the navigable channel (microbiology, phytoplankton, zooplankton, zoobenthos).

The focus of hydrobiological studies undertaken as part of the field survey programme is to assess the dynamics and trends in populations, communities, aquatic biocoenoses and ecosystems; collect data required for evaluating damages incurred to biological stocks; maintain control of species invasions; collect evidence of new invasions; assess impacts caused by invading species to the native flora and fauna. Key issues to be addressed through the hydrobiological study component of the field survey programme are summarized in the Table 6.

#### *6) Marine Section*

The marine component of the field survey programme involves chemical sampling and analyses in at least 16 locations. The same locations are used for biological sampling purposes (microbiology, phytoplankton, zooplankton, macrozoobenthos, meiobenthos, chlorophyll content).

The sampling locations are selected to take account of water and suspended solid flow directions. Related hydrological measurements include salinity and temperature measurements in the water column, as well as flow direction and velocity measurements.

**Table 6. Key Areas and Tasks of Hydrobiological Component of Field Survey Programme**

Study Target	Study Area	Indicators
Microbiology	Fresh-water	Seasonal variation of microbiological indicators: total number of bacteria and number of saprophyte bacteria, water/ecosystem quality assessment in terms of microbiological indicators
	Marine	
Algal communities (phytoplankton)	Fresh-water	Species composition, total quantity, total biomass, number of key groups, biomass of key groups, number of species within a group, species present in large quantities, saprobe index, chlorophylls; status assessment of food base for fish species; water/ecosystem quality assessment in terms of phytoplankton indices.
	Marine	Species composition, total population, total biomass, number of key groups, biomass of key groups, number of species within a group, species present in large quantities, chlorophylls; status assessment of food base for fish species; water/ecosystem quality assessment in terms of phytoplankton indices.

Study Target	Study Area	Indicators
Zooplankton	Fresh-water	Species composition, total population, total biomass, number of key groups, biomass of key groups, number of species within a group, species present in large quantities; ecosystem status assessment in terms of zooplankton indices; saprobe level; status assessment of food base for fish species.
	Marine	Species composition, total population, total biomass, number of key groups, biomass of key groups, number of species within a group, species present in large quantities; quantification of meroplankton (pelagic larvae of bottom invertebrates); quantification of edible and non-edible zooplankton; water/ecosystem quality assessment in terms of zooplankton indices.
Macrozoobenthos	Fresh-water	Species composition, total population, total biomass, number of groups, species number within a group, population and biomass of key groups. Ecosystem status assessment based on indices describing the invertebrate macrofauna, saprobe index and integral assessment of aquatic ecosystem status using biotic indices; status assessment of food base for fish species.
	Marine	Status assessment of bottom macrofauna, population and biomass, group pattern; status assessment of bivalve mollusc species present in large quantities; status assessment of food base for fish species; water/ecosystem status assessment based on zoobenthic indices.
Meiobenthos	Marine	Assessment of biological diversity, species quantities and spatial distribution; status assessment of food base for fish and young fish, and seasonal variations.

## 9. Monitoring of Fish Fauna

This work component is the responsibility of the State Company “OdCPivdenNIRO” (Odessa).

The objective of this component is to examine the impacts of hydroengineering construction and navigation activities on the migratory and native fish species, and develop recommendations concerning the organization and regulation of fishing activities in the Danube River.

Specific tasks include:

- To assess the state of populations of migratory and native fish species;
- To examine the impacts associated with the restoration and operation of navigation route in the Ukrainian part of the Danube Basin on the migratory and native fish species and commercial fisheries;
- To develop appropriate recommendations on the organization of commercial fishing activities and fishery management in the Ukrainian part of the Danube Basin.

The scope of activities under this component includes:

- The implementation of ichthyologic field surveys in the locations of hydroengineering activities and in the areas affected by intensive silting;
- The status monitoring of natural spawning areas and breeding areas for young fish;
- The implementation of a suite of field observations in the areas used for dredge-spoil storage;
- The assessment of impacts of dredging activities on the migration of transitory fish species;
- The collection and summarization of data on the status of commercial fish species on the basis of information collected during the field surveys;
- The collection and summarization of statistical data on commercial fisheries;
- The assessment of magnitude and scale of human activities on the intensity of commercial fishing activities;
- The development of proposals on the prevention and minimization of impacts of navigation route restoration and operation on fish fauna;

- The evaluation of damages caused to fisheries by hydroengineering activities over the reporting period, to be based on the actual data from field surveys and monitoring activities.

## **10. Evaluation of Damages and Compensation Fees**

Based on the monitoring results, the damages and relevant compensation fees are evaluated, including:

- The evaluation of damages caused to fisheries by hydroengineering activities is the responsibility of the State Company “OdPivdenNIRO” (Odessa);
- The calculation of compensation fees for water pollution as a result of restoration activities for the navigation route is the responsibility of the ChornomorNDIProject Research and Design Institute (Odessa).

The evaluation of damages and compensation fees is carried out on a quarterly basis and with the use of officially approved techniques. For the damage evaluation exercise, responsible organizations use the results of their own studies and studies conducted by other co-executing agencies, to be supplied via the Main Contractor.

## **11. The Monitoring of Plant and Animal Communities Inhabiting the Coastal and Wetland Areas of the Danube Biosphere Reserve During the Construction and Operation of the Navigation Route**

This work component is the responsibility of the Danube Biosphere Reserve of the National Academy of Sciences of Ukraine. The objective of this work is to assess the impacts associated with the navigation route restoration and operation on changes in the coastal ecosystems within the territory of the DBR, to be singled out from other impacts caused by natural and anthropogenic factors.

Specific work tasks:

- Analysis of changes in flora communities at the DBR site caused by natural and anthropogenic factors, including the ranking of these factors;
- Analysis of changes in species composition and population of herpetofauna, bird fauna, rare species and benthic communities at the DBR site, caused by natural and anthropogenic factors, including the ranking of these factors;
- Assessment of scale and magnitude of potential adverse impacts associated with the restoration and operation of the navigation route.

Specific activities under this component include:

- The monitoring of wetland and shallow-water habitats at the DBR site in order to track potential changes in water levels in the Bystre Branch;
- The inventory of riparian dredge spoil sites and bank strengthening sites, and assessment of their impacts on the state of terrestrial ecosystems (including bird fauna) at the DBR site, both current status and future trends;
- The preparation of recommendations on optimization of channel operation activities in order to prevent and minimize adverse impacts caused to the natural environment;
- The provision of operational recommendations on the basis of actual data collected as part of the monitoring activities in order to prevent damages to the environment.



## **12. The Analysis of Ecological Processes in the Danube Delta and Coastal Zone of the Sea with the Use of Remote Sensing Tools**

This work component is the responsibility of the Ukrainian Land and Resource Management Centre (Kyiv). It includes:

- The monitoring of algal growth (concentrations of Chlorophyll A), levels and spatial distribution of suspended solids and dissolved organics in the Danube Delta and coastal areas using the satellite imagery.
- The long-term observations on the dynamics of the seaward delta edge.

## **13. Quality Assurance**

The following provisions are designed to assure the adequate quality of monitoring data collected under the Programme:

- Reliance on accredited laboratories and their services;
- Use of unified sampling techniques;
- Use of officially approved list of measuring techniques;
- Use of standard quality control procedures for chemical analyses;
- Involvement of specialized and reputable laboratories in the implementation of hydrobiological and other specialized studies, especially leading sectoral research organizations and academic institutions.

## **14. Information Management**

The information management under the Programme includes the integration of all data provided by co-executing organizations in a common data base, data logic control, data analysis and processing.

The USRIEP Institute as the Main Contractor is responsible for the data integration, analysis, processing and preparation of consolidated reports at each stage of the Programme implementation.

The results of regular monitoring, control measurements and field surveys are presented in the quarterly and annual reports by subcontractors. The Main Contractor (USRIEP) is responsible for the preparation of consolidated reports.

## **15. Mitigation against Extreme Events**

If an accidental pollution release or extreme event is recorded in the course of the monitoring programme, the factual evidence is submitted to the relevant authorities of the Ministry of Environment of Ukraine, which act in accordance with the relevant international procedures adopted under the international emergency warning system established in the Danube Basin (AEWS).

## **16. Changes and Amendments to the Programme**

Changes and amendments in the Programme are possible on the basis of regular monitoring data, control measurements, field surveys, and in line with course of implementation of the navigation route project. Any changes in the Programme are to be agreed with the Client (the Delta Pilot State Company).

O. Vasenko, Scientific Coordinator, Deputy Director, USRIEP