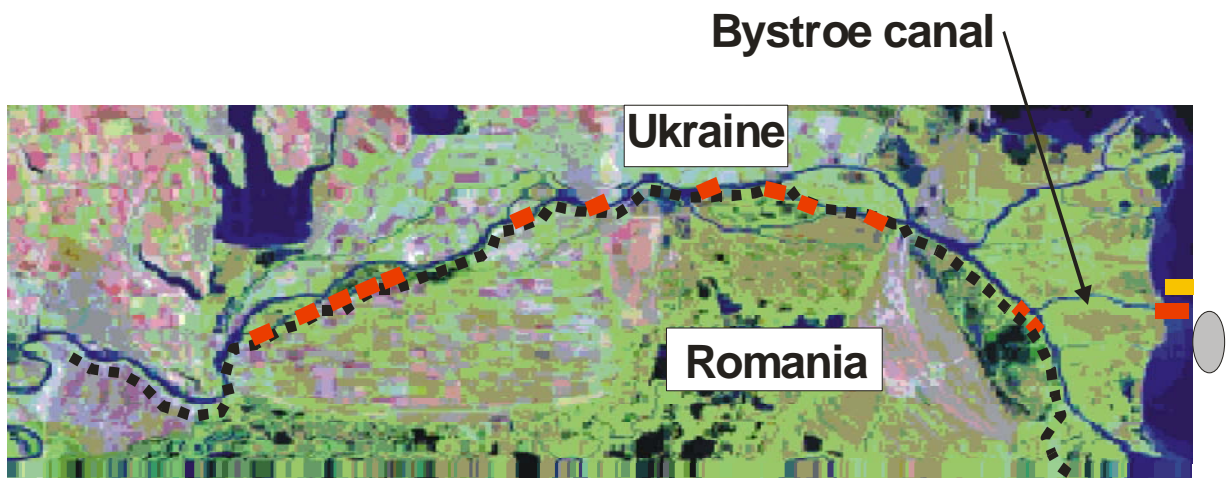




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**DOCUMENTATION
ON THE LIKELY SIGNIFICANT TRANSBOUNDARY IMPACT
OF THE UKRAINIAN DEEP-WATER NAVIGATION CANAL
DANUBE-BLACK SEA
IN THE CONTEXT OF ESPOO CONVENTION, 1991**

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DOCUMENTATION
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AS A RESULT OF THE UKRAINIAN DEEP-WATER NAVIGATION CANAL DANUBE-
BLACK SEA, IN THE CONTEXT OF ESPOO CONVENTION, 1991
by Dr. Mircea Staras, Danube Delta National Institute, Tulcea, Romania

Part I

Considerations

Aim: To support Romanian expert's opinion within the Inquiry Commission of the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991).

The role of the Inquiry Commission is to advise on whether the project „Danube-Black Sea Deep Water Navigation Canal in the Ukrainian sector of the Danube Delta” is likely to have a significant adverse transboundary impact.

Provisions of the ESPOO Convention

Convention's text:

Impact: "Impact" means any effect caused by a proposed activity on the environment including human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; it also includes effects on cultural heritage or socio-economic conditions resulting from alterations to those factors”.

"Transboundary impact" means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party;

- **Appendix I of ESPOO Convention**

(List of activities that are likely to cause significant adverse transboundary impact).

„9) Trading ports and also inland waterways and ports for inland-waterway traffic ...for vessels of over 1,350 metric tons”.

- **Appendix III of ESPOO Convention**

(General criteria to assist in the determination of the environmental significance of activities not listed in Appendix I)

(b) Location: activities which are located in or close to an area of special environmental sensitivity or importance (such as wetlands designated under the Ramsar Convention, national parks, nature reserves, ...)”

(c) Effects: activities with particularly complex and potentially adverse effects, including those giving rise to serious effects on humans or on valued species or organisms...”

The Guidance of practical application of ESPOO Convention mentions that “*activities that can make long-range impacts in transboundary context include activities potentially affecting migratory species*”.

This documentation was performed focused on factors and elements defined by the convention and the Guidance of its practical application as having significant transboundary impact.

Statements and argumentation

Statement 1: Unlikely significant transboundary hydrological impact caused by phase I of the project, but likely significant transboundary impact by phase II

The statement is based on the results from four scenarios for predicting the changes in hydrology using Sobek hydraulic model with hydrologic data from 2001-2002 and data indirectly deduced from received Ukrainian reports (annex 1).

-Result no.1

There is no significant increase of water discharge upstream Bystroe and consequently of the Chilia branch (and border) caused by phase I (annex 1).

-Result no.2

There is a small decrease (1-2 cm) of the water level at the fork of Bystroe-Starostambulsky (annex 1).

-Result no. 3

Significant decrease of water discharge of Starostambulsky canal downstream Bystroe, mainly at high water levels (annex 1).

-Result no. 4

Significant increase of water discharge of Bystroe canal after phase I (annex 1).

The dredging works in phase II would result in increasing hydraulic section of the Chilia branch with 240 m² on the average and an increase of water discharge outside normal fluctuations, by 6% at maximum levels and 7% at minimum levels. It is difficult to predict the effects of the likely changes of water distribution between Chilia, St. George, Sulina branches and inside the delta system.

Statement 2: Likely significant transboundary impact by effects of the loss of habitat in the Ukraine to the Romanian coastal area and littoral fauna by dumping dredged material into the sea.

According to the information we have from the Ukrainian team, the dredged material will be discharged into the sea, 5 km away the coast (Raport on scientific work, 2003, Inst. Env. Problems; Raport Univ. Harkov, 2004) or 8-10 km away the coast. (the 18th session – UNESCO, Paris 2004)

The received information about the dredged material into the sea: 2,331 mil mc (Raport Min. of Ecology, 2002), 2,155 mil mc (Raport Univ. Harkov, 2004 and Raport Inst. Env. Problems, 2003).

Likely impact on littoral area fauna through sediments transport to the Sulina mouth and coastal Romanian area by the North-South natural marine currents (Panin, 1996) and loss of habitat in the Ukraine to the Romanian part of the delta. The sediments transport direction is obvious seen on satellite map (Annex 1).

Existing experience in the world proved that „dredging and filling disturbs benthic fauna, eliminates deep holes and alters rock substrates, all important for sturgeon” (Smith et al., 1997).

According to an Impact study made by Ukrainian Academy of Science (Romanenko ,2004, cited from Kotenko 2005, in press), „ *According to calculations based on field analysis 5.14 million m³ of dredged river sediments will contain 7548.5 tons of oil products, 8.2 tons of polycyclic aromatic carbohydrates (PAC have high carcinogenic activity), 263.8 kg of DDT and its metabolites, as well as heavy metals (including 23.1 tons of very toxic cadmium), radioactive caesium etc. 2.33 million m³ of sediments dredged in the bar part and 1.17 million m³ of sediments of annual maintenance dredging will additionally contribute to this pollution*”.

Statement 3: Very likely significant impact on fish migratory species, which in the ESPOO Convention context is a transboundary impact.

There are not comparative observations of this impact, because the migration start in spring and however this kind of impact generates long term effects. The existing

experience world wide provide sufficient support for this statement. The Ukrainian experts proved to have good knowledge in this respect and their impact assessment did not neglect or negate the impact of the projected navigation canal on sturgeons. The only question would be whether this undoubted impact has a transboundary character. The Guidance of practical application of the ESPOO Convention, UN/ECE clearly states „Activities that can make long-range impacts in transboundary context include activities potentially affecting migrating species.”

By the same reason, the Bern Convention (1979) has taken into consideration the transboundary context referring to protected species : „The contracting parties are committed to coordinate their efforts for protection on natural habitats of the species listed in annexes 1 and 2 in the transboundary area” (art 4/4).

The following available information have been used for supporting the above statement:

- **Report** on scientific research work (environment assessment) of Ukraine Research Institute for Environment Problems, 2003:

„the rare species reophilic as sturgeons are more frequent here (Bystroe) than in other part..” „ and „ a significant migration down the river of young sturgeons occurs” and „the captures of shad represent 16,7-51% from the total of shad captures”. (p.127), and:

„penetration of salt water will adversely effect living conditions for freshwater and other hydrobionts (p.193), and: „A certain damage during the DNC (canal) creation may be inflicted on the fauna in connection with changing of hydromorphological parameters in the area of Bystry sand bar, which may result in disrupting fish migration routes..”

- **Scientific paper:** Nature conservation and shipping in the Danube Delta and Biosphere Reserve (Ukraine): weighing ecological values against economic interests (Kotenko, 2005, in press): „ A significant portion of juvenile sturgeons descends by this branch” and „ Many habitats of threatened and endemic species of animals and plants are expected to be completely destroyed or essentially modified” (Romanenko, 2002, cited from Kotenko, 2005, in press).

- **Existing experience** in the world proved that „dredging and filling disturbs benthic fauna, eliminates deep holes and alters rock substrates, all important for sturgeon” (Smith et al., 1997). In Vistula River the disappearance of sturgeon coincided with canalization of the lower course (Backiel et. al., 1985) whereas in US „in canalized riches many of large fishes such as sturgeon, paddlefish..have been almost eliminated” (Welcomme, 1985).

Bystroe canal is one of the two remained migration ways (Annex 1), and perhaps the most important, because sturgeons and Danube herring migrating into the Danube spend most of their life on the North-Western shelf of the Black Sea (Bacalbasa, 1990;1997). The protection dam of 1040 m length could act as a barrier for adult sturgeons and Danube herring coming from the main feeding area located in N-W of the Sea, for spawning migration in the Danube River through Bystroe canal.

Sturgeon is an „urgent issue” for the whole Danube River Basin as stated by Bloesch (2003) and is one of the three most important topics which need transboundary cooperation (Bloesch et al., 2003).

The adverse transboundary impact of the project consists in habitat loss for young specimens, disruption of migration route and changes in migration pattern for adults.

Statement 4: Likely to very likely significant transboundary socio-economic impact

The impact on migratory fish and the social-economic impact on transboundary fishery are strong arguments in the position of Romanian side.

According to Bacalbasa (1990), the regulation and intense navigation of the Sulina branch reduced the importance of its fishery based on anadromous sturgeons and Danube herring, but Chilia and St. George branch remains important.

The Ukrainian reports mention the impact on fishery and the fact that the project anticipate compensatory measures but ignore Romanian fishermen.

Similar to Sulina canal, Pontic shad (*Alosa pontica*) and 3 sturgeon species will lose one of their migration ways in short term. The migration will be possible only on Sf. Gheorge branch. The Romanian fishermen who use to fish on Chilia branch and upstream will be affected.

Statement 5: Very likely significant transboundary impact on Biodiversity by habitat loss of strictly protected migratory birds

Natural values are transboundary ones and any local impact has a transboundary significance. The most species are present in both-parts of the Transboundary Biosphere Reserve designated by UNESCO in 1998.

A total of 1689 plant species and 3460 animal species have been recorded in the Romanian territory of the Danube Delta, 2 plant species and 37 animal species are new for science.

The most of the species are present also in the Ukrainian part of the Danube Delta.

According to the „*Assessment with respect to the Environmental Impact...*” issued by the Ministry of Ecology and Natural Resources of Ukraine out of 257 species, 245 species affected by the new Bystroe canal and up to 5600 couples of birds nest in Bystroe canal area. Valued and strictly protected migratory birds nests on the island located in the area of dredging.

Gull-billed Tern (*Gelochelidon nilotica*)- strictly protected by Berna Convention) nested in the last years on the small islands at the mouth of the Bystroe canal only, Sandwich tern (*Sterna sandvicensis*) nested in the last years in two places, one at Bystroe mouth (Platteew et al., 2004). Pied avocet (*Recurvirostra avosetta*)-strictly protected by Berna Convention) population nests in both part of the Danube Delta but the main feeding area of Pied Avocet are located at the mouth of Bystroe canal (Platteew et al., 2004). The Ukrainian reports clearly stated the impact of dredging on benthic fauna- the basic food for Avocet.

Rare species of birds recorded only in Ukrainian Delta, contribute to the biodiversity richness of the whole Transboundary Danube Delta Biosphere Reserve. A complete List of migratory birds passing Bystroe area and their international protection status is presented in Annex II.

There are reasons to state that these colonies of very sensitive species of birds were damaged by noise disturbance but the existing information are contradictory: the Ukrainian NGO's protested and asked reactions from international organizations whereas during the meetings held in 2004 in Geneva and in Paris the official Ukrainian explanation was that a colony of ducks was washed off the island by waves. Moreover, the German captain of a dredge declared in a film that birds never nested on the island at the Bystroe mouth, whereas one of the best Ukrainian scientist from the Biosphere Reserve Authority declared the tern colony was destroyed by dredging activities. The author of the documentation trust scientists in this matter instead of politicians or crew staff.

Statement 6: Very likely significant transboundary impact of phase II of the project on water quality outside normal fluctuation range, biota and fishery

As mentioned in the Report on scientific research work, Ukrainian Research Institute for Environmental Problems (2003), the dredging works on Chilia arm would affect water quality, biota and fishery but would not have a transboundary impact. Having in view the dredging works during phase II will be carried out on the border line the above statement does not need argumentation.

References

a). Literature

- Alimazov, A.A., Bondar C., Ghederim Veturia, Mihailov V.N., Mita P., Nichiforov I.D., Rai I.A., Rodionov N.A., Stanescu S., Voghin N.F., 1963. Zona de varsare a Dunarii, Monografie hidrologica, Ed. Tehn., Bucuresti (in Romanian).
- Baboianu G., Munteanu I., Voloshkevich O., Zhmud M., Fedorenko V., Nebunu A., Munteanu A., 2004. Transboundary cooperation in the nature protected areas in the Danube River and Lower Prut/ management objectives for biodiversity conservation and sustainable development, ISBN: 973-8044-34-0, Ed. Dobrogea, 161 p.
- Bacalbasa-Dobrovici N, 1990. The Danube River and its Fisheries, In: W.L.T. Densen, B. Steinmetz & R.H. Hughes (Eds). Management of freshwater fisheries-Proceedings of symp. Org. by EIFAC/FAO, Goteborg, Sweden, pp.447-461.
- Bacalbasa-Dobrovici N, 1995. The effects on fisheries on non-biotic modifications of the environment in the east-Danube river area, In: Alabaster J. (Ed), Habitat modification and Freshwater Fisheries, EIFAC/FAO, London, 13-27.
- Bacalbasa-Dobrovici N, 1997. Endangered migratory sturgeons of the Lower Danube River and its Delta, In: Birstein V., Waldman J., Bemis W., (Eds.). Sturgeon biodiversity and conservation, Kluwer Academic Publisher, 201-219.
- Backiel T., Huisman E.A., Leynaud G.H., Linfield R.S.J., and Loyd R., 1985. Summary of Session Proceedings. In: Alabaster (Ed), Habitat modification and Freshwater Fisheries, EIFAC/FAO, London, 259-265.
- Bloesch J., 2003. Flood plain conservation in the Danube River Basin, the link between hydrology and limnology. In: Large Rivers Vol.14, No.3-4, Arch. Hydrobiol. Suppl.147/3-4, p.347-362.
- Bloesch J., Sieber U., 2003. The morphological destruction and subsequent restoration programmes of large rivers in Europe. In: Large Rivers Vol.14, No. 3-4, Arch. Hydrobiol. Suppl.147/3-4, p.363-385.
- Gastesu P., Oltean M., Nichersu I., Constantinescu A, 1999. Ecosystems of the Romanian Danube Delta, RIZA work document 99.032, Lelystat, the Netherlands, 33 p.
- Kotenko T., 2005. Nature conservation and shipping in the Danube Delta and Biosphere Reserve (Ukraine): weighing ecological values against economic interests, In: Proceedings of the Symposium Lowland River Rehabilitation, Wageningen, the Netherlands, (in press).
- Kynard B., 1997. Life history, latitudinal pattern and status of the shortnose sturgeon. In: Sturgeon biodiversity and conservation (Birstein V., Waldman J., Bemis W., Eds.), Kluwer Academic Publisher, 319-334.
- Panin N., 1996. Danube Delta. Genesis, evolution, geological settings and sedimentology, Geo-Eco-Marina 1, RCGGM Constantza, 7-23.
- Platteew M., Kiss J.B., Zhmud M., Sadoul N., 2003. Colonial water birds and their habitat use in the Danube Delta, RIZA raport 2004.002, ISBN 90.369.5658.7, Lelystat, the Netherlands, 157 p.
- ROMANENKO, V. D. (2002): Ecological assessment of project variants (at the stage of TEG of investments) of creating a deep shipping lane from the Danube to the Black Sea in the Ukrainian part of the delta. Report. – NASU, Kyiv, 212 pp. (in Ukrainian).
- Smith T., & Clugston J., 1997. Status and management of Atlantic sturgeon (*Acipenser oxyrinchus*) in North America, In: Sturgeon biodiversity and conservation (Birstein V., Waldman J., Bemis W., Eds.), Kluwer Academic Publisher, 335-346.
- Sommer A., 2002. Assessment of the significance of environmental effects. Screening approach and criteria applied in strategic environmental assessment, Guidance of the Ministry of Agric. and Forestry, Environ. and Water Management, Austria, 32 p.
- Zajcev J., Mamaev V., 1997. Marine biological diversity in the Black Sea. A study of change and decline. UN Publications, New York.
- Welcomme R., 1985. River fisheries. FAO Fish. Tech. Pap.,(262), 246-247.

b). Conventions and Reports

***Convention on Environmental Impact assessment in a transboundary context, Economic Commission for Europe, United Nations, New York and Geneva, 13 p.

***. Guidance on practical application of the ESPOO Convention, UNECE.

***Report: Assessment with respect to the environmental impacts of the choices envisaged for construction of the Black sea-Danube Canals, 2002, Ministry of Ecology and Natural resources of Ukraine.

***Report: Scientific evaluation of ecological expertise of the project „Deep water navigation canal Danube-Black Sea in Ukrainian territory, Phase I, Kharkov Univ., 2004 (Romanian translation).

*** Report: Report on scientific research work,, Environmental Assessment (EA) within the framework of the project „Creation of the Danube-Black Sea deep-water navigable passage.... Stage I, Ukrainian Research Institute of Environmental Problems, Kharkov, 2003.

*** Study on environmental and social-economic consequences caused by building Bystroe navigation canal from Ukrainian Danube Delta Biosphere Reserve, Danube Delta National Institute, 2004 (in Romanian).

Technical data according to study of Harkov Univ., 2004

Phase I

- Seaward canal and removal of both Bystroe mouth bars
 - Length: 3 km
 - Wide: 100 m
 - Depth: 8,4 m
 - Dredging volume: 2155600 cubic meters, dumping at 5 km from the shoreline
 - Protection dam, 1040 m length

Phase II

- Removal of 11 shallow bars from Chilia arm
 - Dredging volume: 2192200 cubic meters, transfer on river bank and deeper areas

Technical data according to the Report of Ministry of Ecology, Ukrainian Research Institute of Environmental problems, Kharkov, 2003

- Less quantity of soil excavated than stated in 2002, but the same data as from Harkov University

Technical data according to Ukrainian position document, 23 July 2004

- Seaward canal and removal of both Bystroe mouth bar
 - Length: 3 km
 - Wide: 100 m
 - Depth: 7,65 m
 - Dredging volume: 1683000 cubic meters
 - A protection dam
- Removal of 11 shallow bars from Chilia arm
 - Dredging volume: 1726000 cubic meters, transfer on river bank

Technical data according to presentation of Ukrainian Delegation in Geneva / 21 Sept.2004 and UNESCO 18th session, Paris, Oct.2004

- Dredging works at Bystroe bar (Phase I) and Chilia arm (Phase II)
 - Total amount of soil excavated at both phases: 2,4 mil. cubic meters
 - Protection dam, length 1050 meters

Data from Ministry of Transport and Communication of Ukraine / Delta-Pilot company, 2004 (CD)

- The length of the protective dam would be 2830 meters

Data from Harkov Univ. and Institute for Environmental Problems has been used for deduction of cross sections before and after dredging of Bystroe bar (phase I), necessary for hydrologic scenarios and for deduction of the increase the hydraulic section of Chilia branch by phase II of the project.

River hydrology

-Water levels

The dynamic of multi-annual monthly water level of the Danube at Tulcea (calculated on a period of 50 years), indicate an adverse Danube water level during last years. The ecological problems were recorded both in Romanian territory and Ukrainian territory.

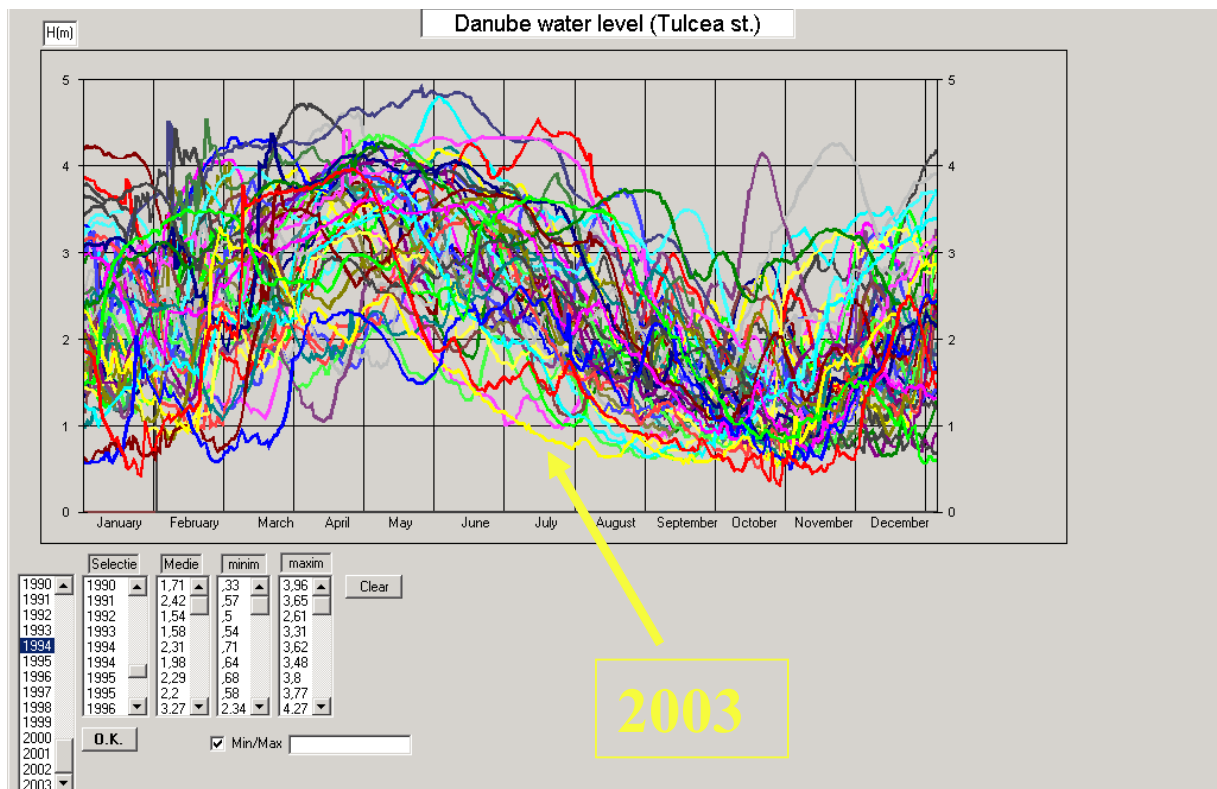


Fig.1. The dynamic of multi-annual monthly water level of the Danube at Tulcea

-Discharge

The medium flow of Danube River, calculated for the period 1921-1990 is 6570 mc/s. The maximum flow discharge absorbed by Chilia transboundary branch from Danube was 70% in 1895 (Alimazov et al., 1963).

During 1921-1990, the balance of the flow absorbed by Chilia decreased from 64% to 58% (Gastescu et al., 1999) and 52-53% in last years, according to the hydrological data, Romanian Waters.

Transboundary impact assessment

1. Hydrological impact assessment

Schematization for Bastroe (Phase I)

The General hydraulic model of Danube delta (Sobek/Delf Hydraulics, Holland) was updated by adding Chilia delta (Fig. 2).

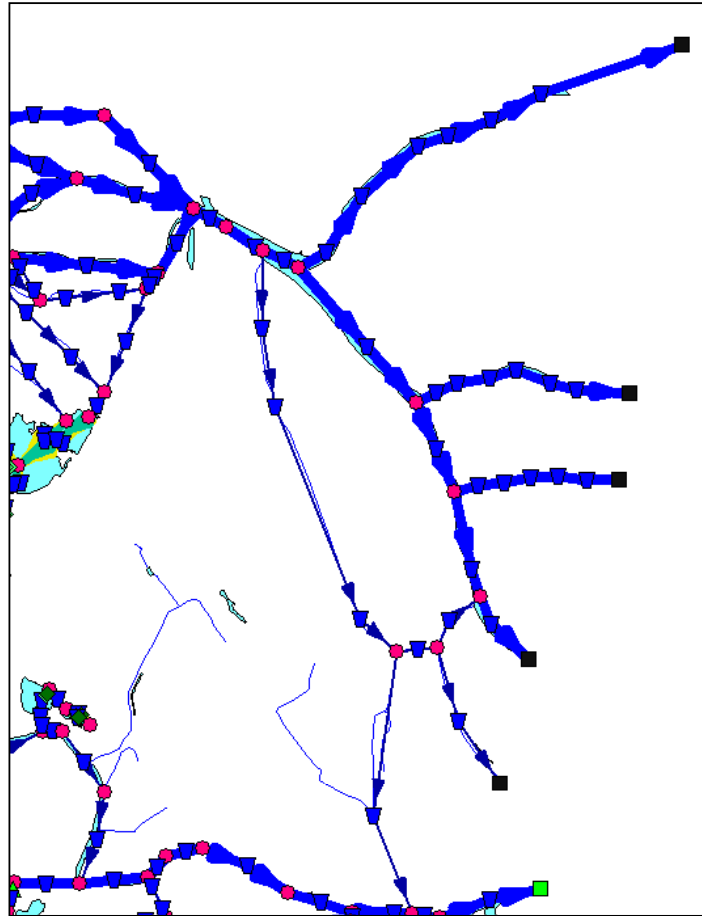
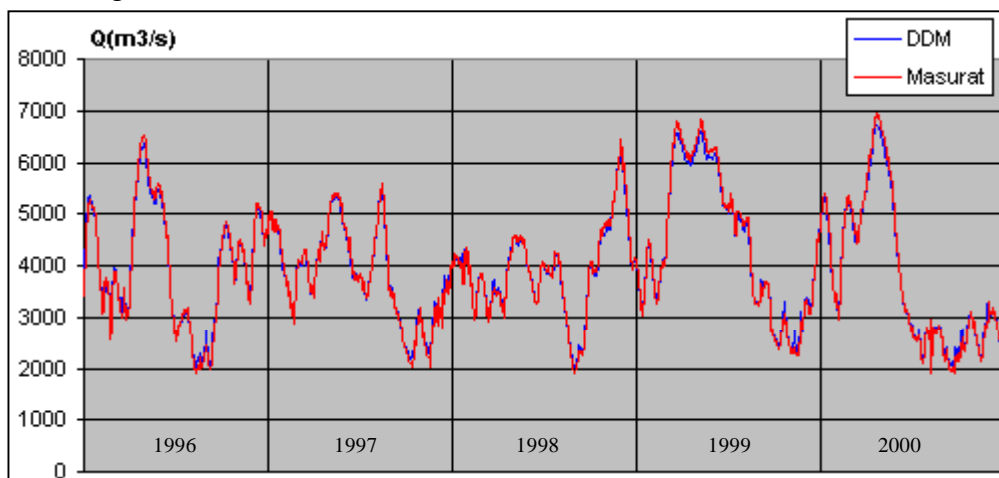


Figura 1

Fig. 2. Schematization of Chilia Delta hydrological system

The calibration for the Periprava-Vilkovo station model was satisfactory (Fig.3).

-Discharge calibration



Graficul 1

-Water level calibration

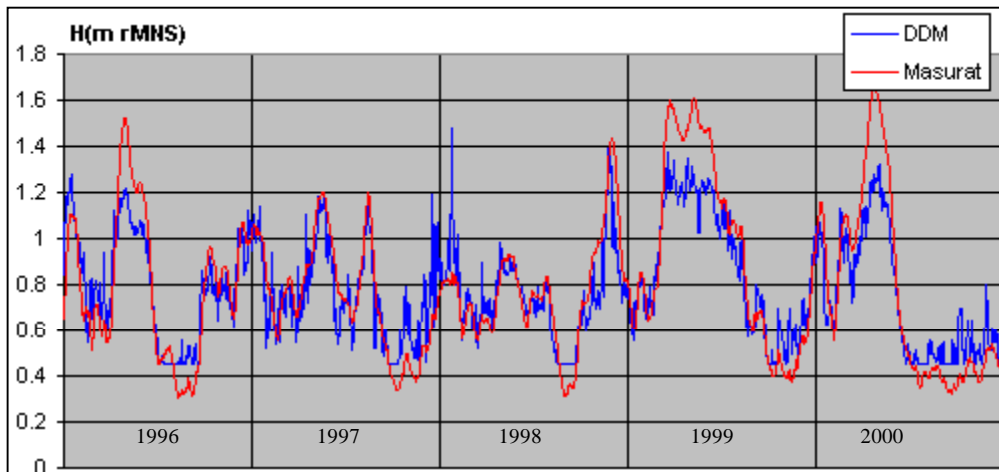


Fig. 3. Hydrological model calibration, Periprava station

After calibration, the model was run in order to evaluate the effects of works made during phase I, respectively the excavation of Bystroe bar canal from 4 to 8 meters, data from years 2001-2002.

-Result no.1

There are not significant changes of water discharge upstream Bystroe and consequently of the Chilia branch (and border) caused by phase I (Fig. 4).

Unlikely significant transboundary impact by phase 1.

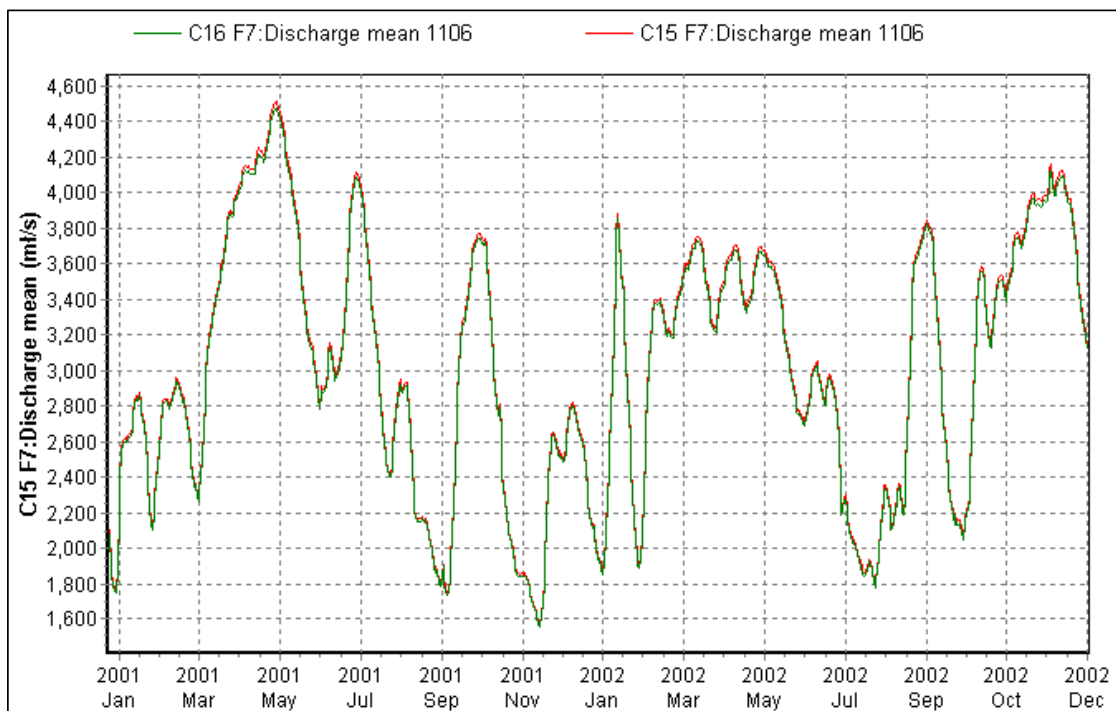


Fig. 4. Modeling of water discharge upstream Bystroe before and after phase I.

-Result no.2

There is a small decrease (1-2 cm) of the water level at the fork of Bystroe-Starostambulsky (Fig.5), but unlikely significant transboundary impact by phase I.

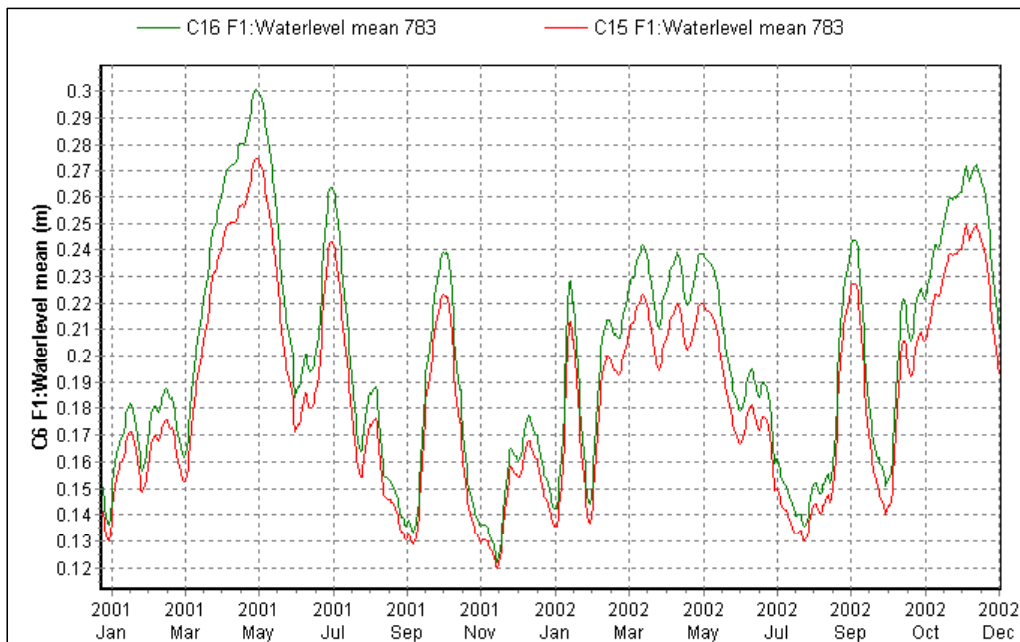


Fig. 5. Levels at the fork of Starostambulsky- Bystroe before and after phase I

-Result no. 3

Significant decrease of water discharge of Starostambulsky canal downstream Bystroe, mainly at high water levels (Fig. 6), but unlikely significant transboundary impact by phase I.

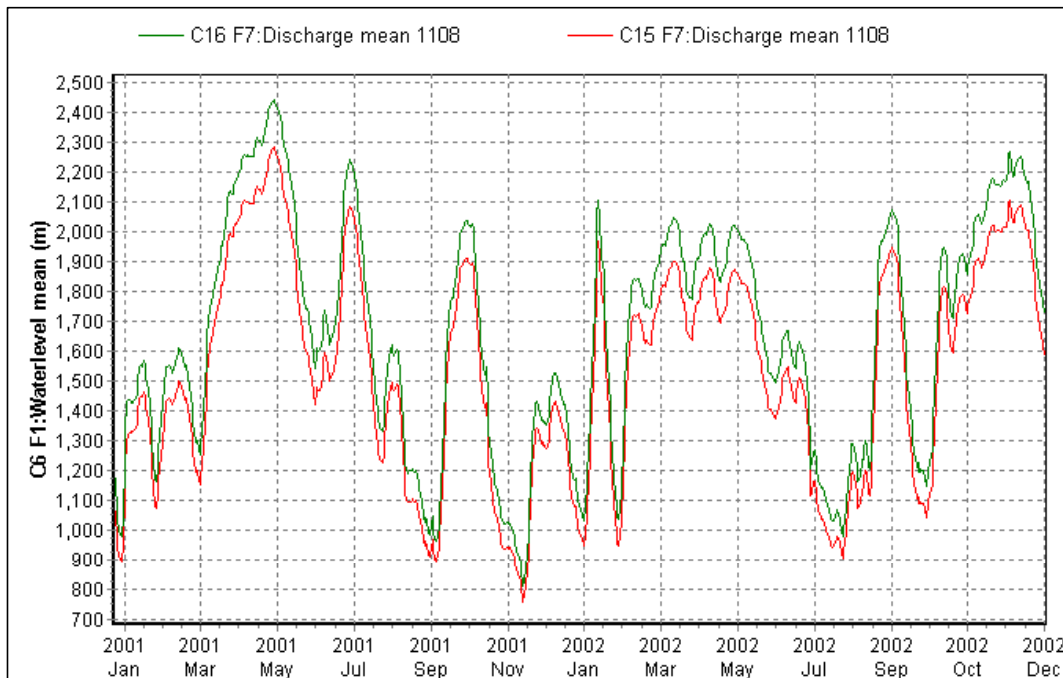


Fig. 6. Discharge modeling of Starostambulsky downstream Bastroe, before and after phase I

-Result no. 4

Significant increase of water discharge of Bystroe canal after phase I (Fig. 7), but unlikely significant transboundary impact by phase I.

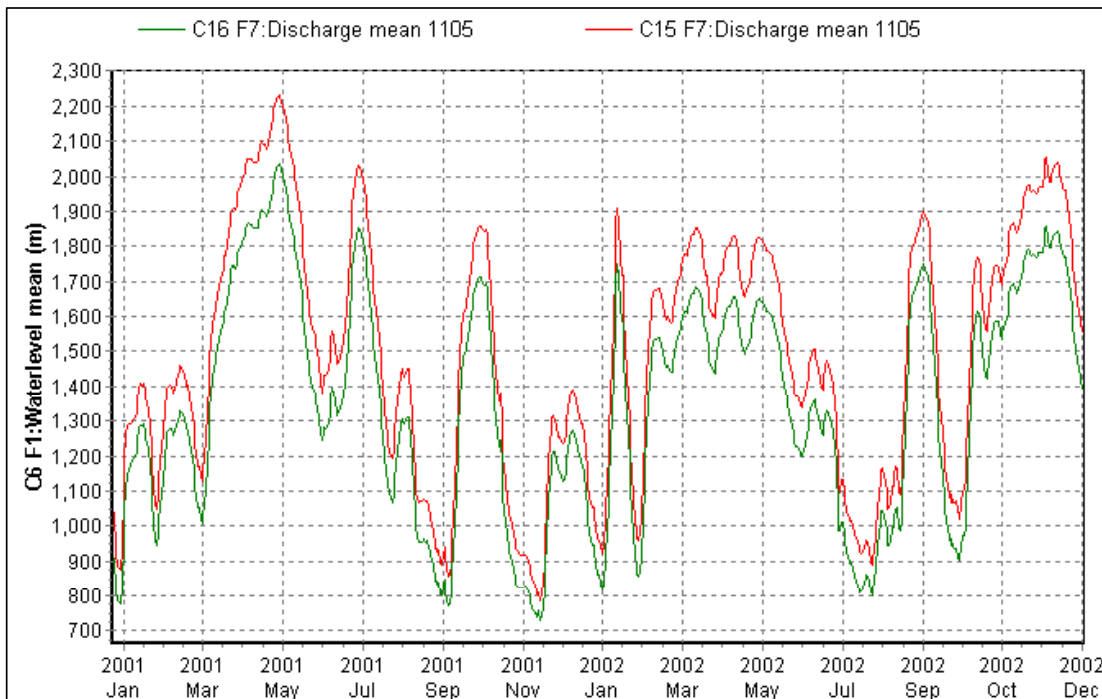


Fig. 7. Discharge of Bystroe canal before and after Phase I

According to Ukrainian information, dredging of 11 segments of the Danube River in phase II would result in 2, 19 million m³ of sediments and would affect a bottom area of 1,129 million m². By deduction, the average dredging stratum depth would be 2 metres. As the projected wide of the navigation canal is 120 m, the hydraulic section of the Chilia branch will increase with 240 m². As water velocity at low water level is 0,5 m/s and 1,0-1,35 at high water level, the water discharge of Chilia branch will increase by 120 m³/s at low levels and 324 m³/s at high levels. Comparing to the values of 1723 m³/s and 5605 m³ /s minimum and maximum discharges of Chilia (1996-2003 period), the water flow of Chilia branch would increase by 7% at minimum water levels and 5,8% at maximum levels. This effect will change the hydrology and water distribution between Danube branches outside normal fluctuations and has a potential significant impact on water circulation inside Romanian delta.

Conclusion: Unlikely significant transboundary hydrological impact caused by

phase I, but likely significant transboundary impact caused by phase II of the project

2. Assessment of the impact of sediments discharge/dumping

According to the information from the Ukrainian part, over 2 million cubic metres of dredged material will be (have been) discharged into the sea, 5 km away the coast (or 8-10 km away the coast, other report).

There are not available information on changes in water quality or enrichment in sediments in the Romanian territory, but there is the risk and probability for a significant impact on littoral area fauna through sediments transport to the Sulina mouth and

coastal Romanian area by the normal conditions of the natural North- South marine currents. The sediments transport direction is obvious seen on satellite map (Fig. 8).

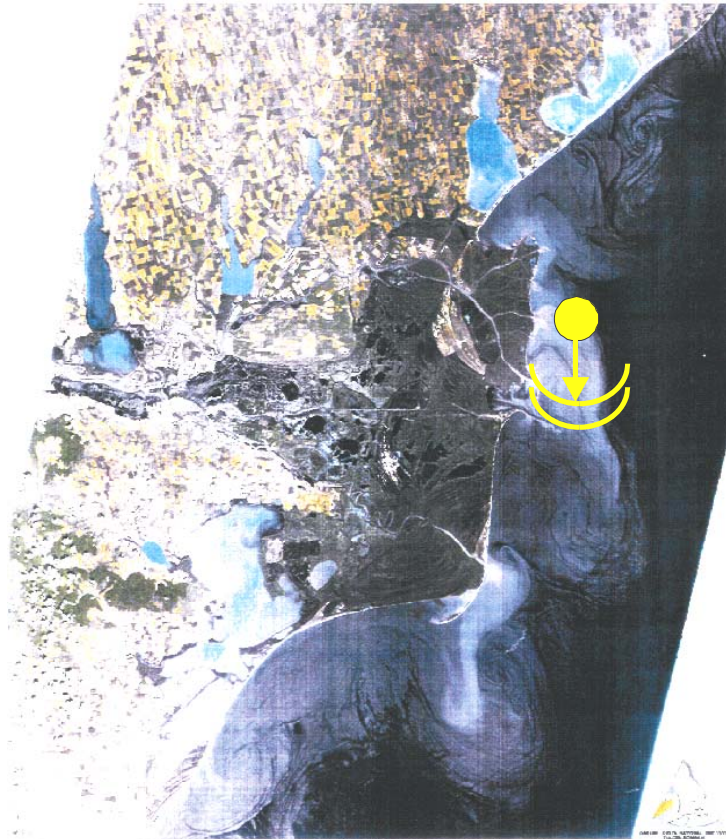


Fig. 8. Movement of sediments by natural N-S marine currents

Conclusion: Likely significant transboundary impact on Romanian coastal area and littoral fauna by movement of sediments and pollutants

3. Impact on fish migratory fish species

The adverse transboundary impact of dredging consists in changes in migration pattern of sturgeon species and Danube herring, disrupting fish migration routes, decrease in biodiversity, impact on threatened species and changes in species composition. The effects were stressed out and correctly argued by the Ukrainian reports, mainly the Report on Scientific Research work „Environmental Assessment within the framework of the project „Creation of the Danube –the Black Sea deep water navigable passage in the Ukrainian part of the delta”, Institute for Environmental Problems, ,pag. 127-130. The adverse effects of penetration of the salt water on living conditions of freshwater biota are mentioned in the same report, pag. 193. The adverse impact will not be obvious immediately. Some sturgeon specie became mature and migrate in the river at 7-8 years old, other at 14 years old. The migration season is long, almost all over the year, whereas fingerlings migrate downstream in summer. The existing experience world wide proved that „*dredging and filling disturbs bethic fauna, eliminate deep holes and alters substrate, all important for sturgeon. Anecdotal evidence indicates that old river bottom not subject to maintenace dredging is preffered.*” (Smith et al., 1997), The foreseen compensatory measures by stocking are considered,, a short term

solutions unless they are coupled to plans for protecting and increasing levels of natural reproduction” (Birstein et. al., 1997).

Conclusion: Very likely significant impact on migratory fish species, which in the context of ESPOO Convention according to the Guidance of practical application (pag. 27) have transboundary long range implications.

4. Social-economic impact

The impact on migratory fish and the social-economic impact on transboundary fishery have raised a big concern inside the Romanian fishermen community.

According to Bacalbasa (1990), the regulation and intense navigation of the Sulina branch reduced the importance of its fishery based on anadromous sturgeons and Danube herring, but Chilia and St. George branch remains important.

The Ukrainian reports mention the impact on fishery and the fact that the project anticipate compensatory measures but ignore Romanian fishermen.

Similar to Sulina canal, Pontic shad or (Danube herring) (*Alosa pontica*) and 3 sturgeon species will loose one of their migration ways in short term. The migration will be possible only on Sf. Gheorge branch.

The Romanian fishermen who use to fish on Chilia branch and upstream will be affected.

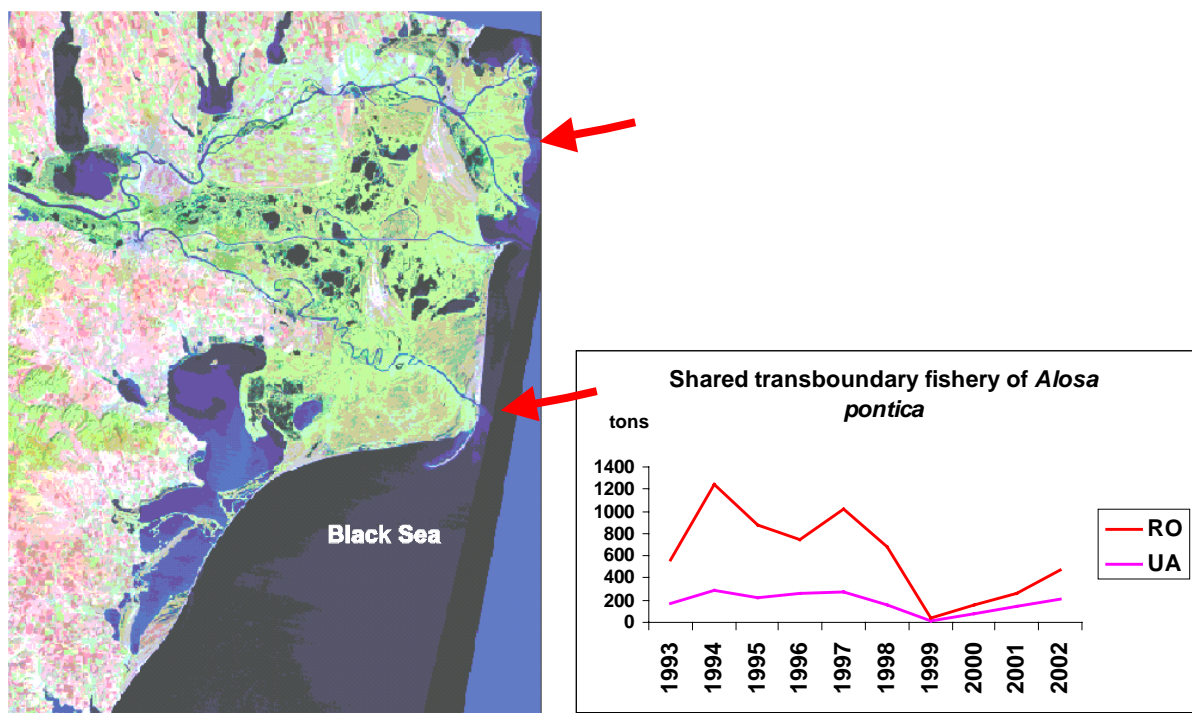


Fig. 9. The main migration ways of Pontic shad and sturgeon species

Conclusion: Likely / very likely significant transboundary social-economis impact

5. Impact on Biodiversity

Natural values are transboundary ones and any local impact has a transboundary significance. The most species are present in both-parts of the Transboundary Biosphere Reserve designated by UNESCO in 1998.

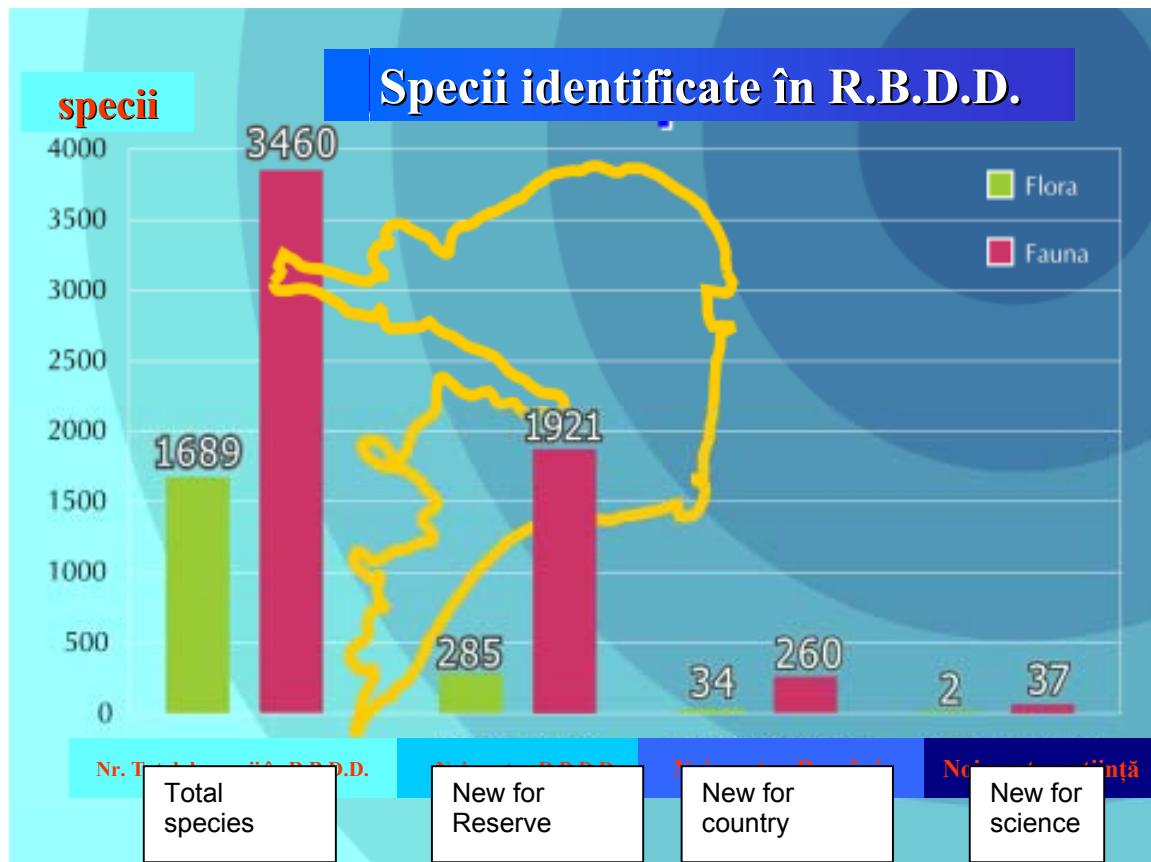


Fig. 10. Number of plant and animal species recorded in Romanian Danube Delta

A total of 1689 plant species and 3460 animal species have been recorded in the Romanian territory of the Danube Delta, 2 plant species and 37 animal species are new for science. The most of the species are present also in the Ukrainian part of the Danube Delta.

The most significant for the biodiversity of the Transboundary Biosphere Reserve are the birds.

According to the Reports for Impact Assessment issued by the Ministry of Ecology and Natural resources in 2002 and 2003, out of 257 species of birds, 245 species are affected by the new Bystroe canal and up to 5600 couples of birds nest in Bystroe canal area.

The same reports mentions „the probability of violations ecosystem character” is „very high” and „the practical possibility of compensating the predicted losses” is „very low”.

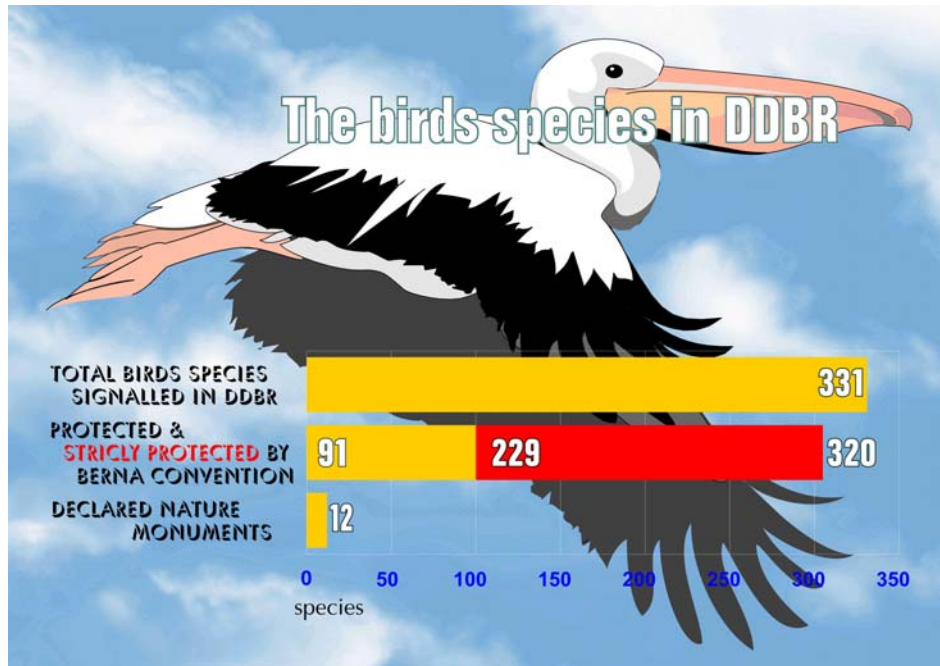


Fig. 11. Protected and strictly protected bird species by Berna Convention from the common transboundary Biosphere Reserve



Fig. 12. Transboundary distribution of bird colonies for gulls, terns, waders, Charadriiformes (strictly protected by Berna Convention), in 2001 and 2002 (Platteeuw et al., 2004)

Great White pelican nests in Romanian delta only, close to the border (8-9 km).

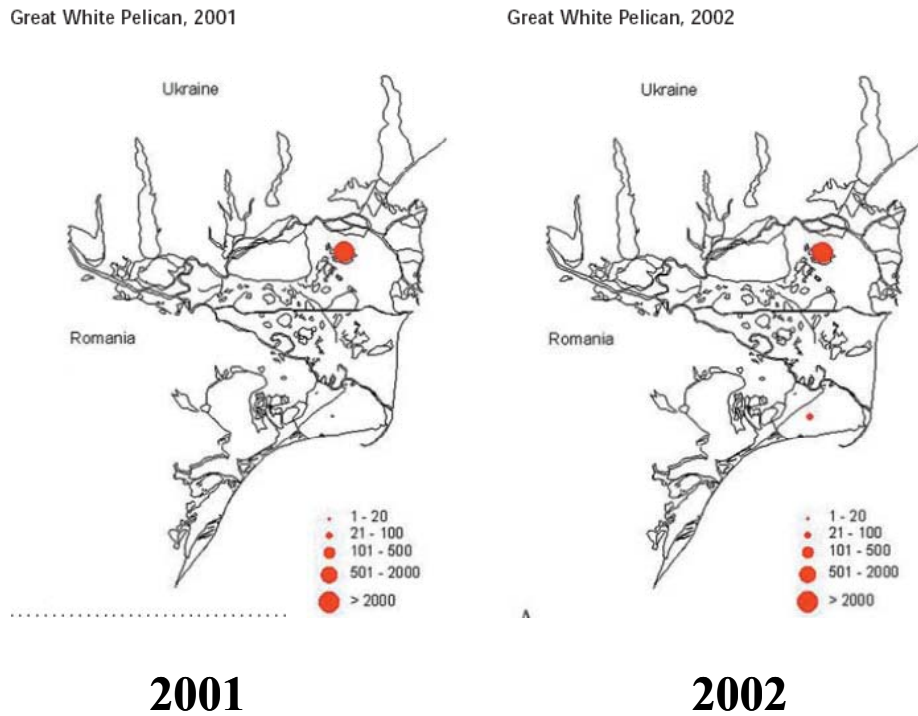


Fig. 13.. Rosca-Hrecisca-the largest Great White pelicans colony in Europe

But feeding area covers the whole Transboundary Danube Delta Biosphere Reserve, including the Ukrainian territory (Platteew et al., 2004)

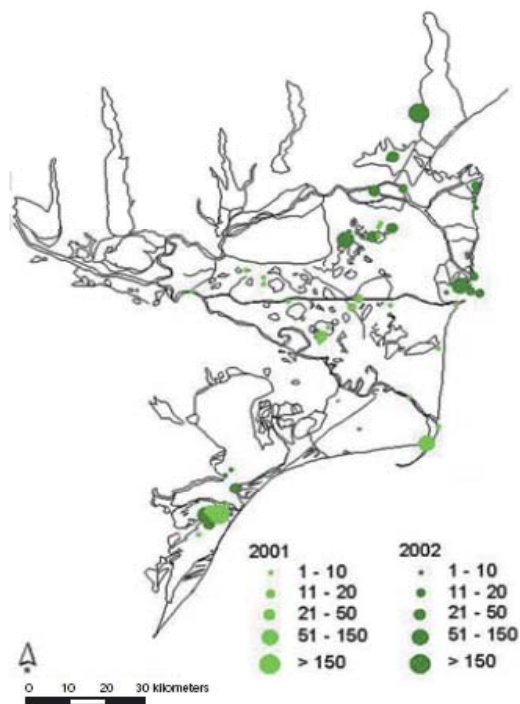


Fig. 14. Great White Pelican, feeding distribution

Pied avocet (*Recurvirostra avosetta*-strictly protected by Berna Convention) population nests in both part of the Danube Delta (Platteew et al., 2004).

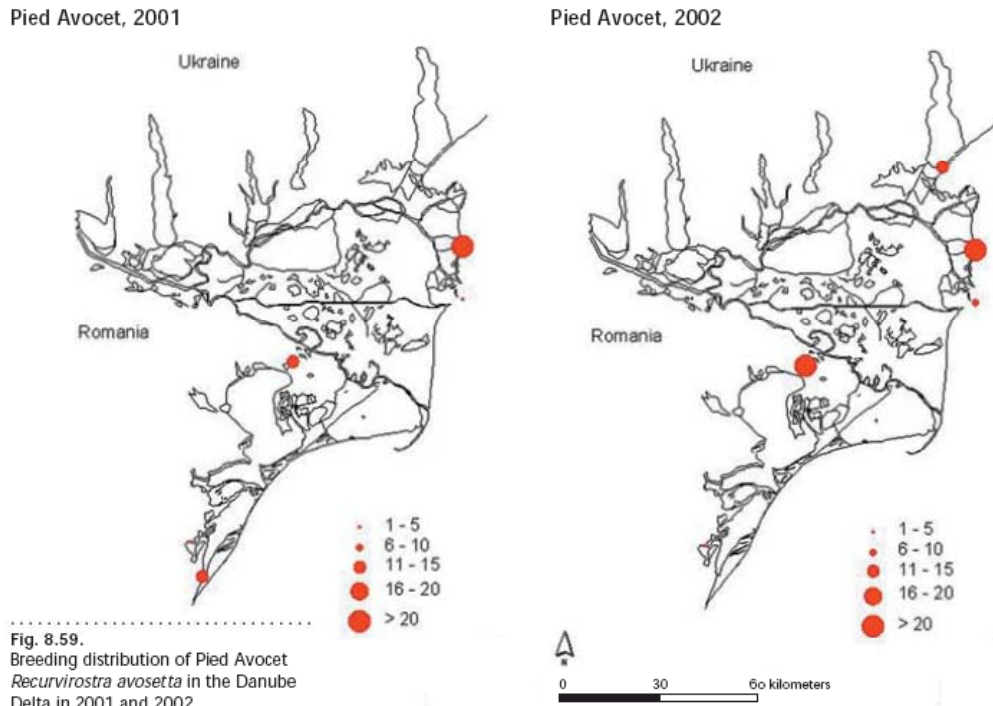


Fig. 15. Pied avocet (*Recurvirostra avosetta*) nesting places

Feeding distribution

Pied Avocet, feeding distribution

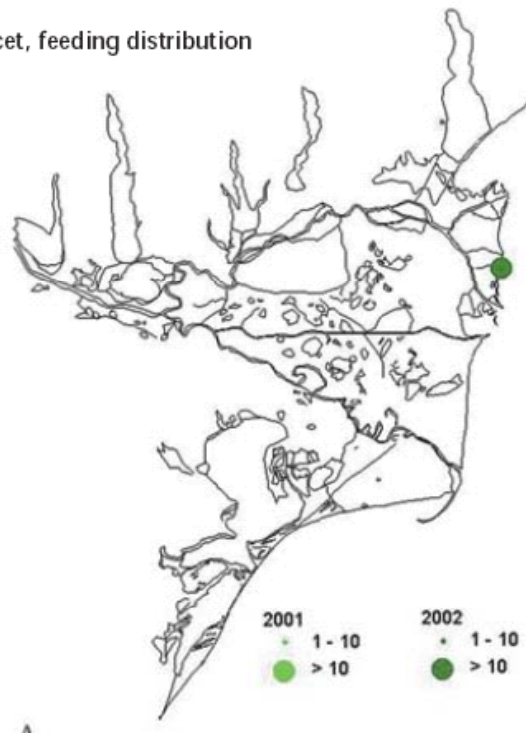


Fig. 16. Main feeding area of Pied Avocet at the mouth of Bystroe canal (Platteew et al., 2004)

The main food of Avocet -aquatic invertebrates, will be (have been) affected by dredging as stated in the Ukrainian reports and resulted from modeling sediment movement along to Ptichya island- the feeding area.

Rare species of birds as Gull-billed Tern have been recorded only in Ukrainian Delta, contributing to the biodiversity richness of the whole Transboundary Danube Delta Biosphere Reserve.

Gull-billed Tern (*Gelochelidon nilotica*- strictly protected by Berna Convention) nested in the last years on the small islands at the mouth of the Bystroe canal only (Platteew et al., 2004).

Gull-billed Tern, 2002



Fig. 17. Gull-billed Tern (*Gelochelidon nilotica*) nesting at the mouth of Bystroe canal

Other migratory bird colonies strictly protected, located in the area:
Sandwich tern (*Sterna sandvicensis*)

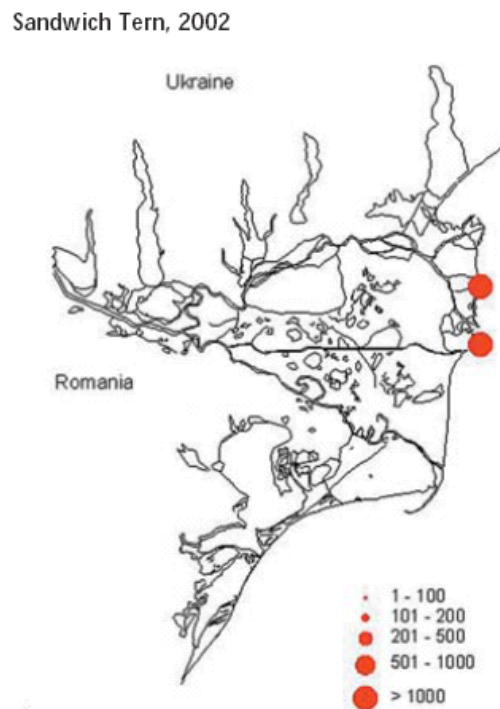


Fig. 18. Location of *Sterna sandvicensis* colonies

A complete list of migratory birds and the international protection status is presented in Annex II of the documentation



Fig. 19. Dredging works and bird's reaction as a result of noise disturbance close to the Ptichya colony at Bystroe mouth, 2.07.2004



Fig. 20. View from tern colony at Ptichya on 16.07.2004

Official Ukrainian explanation: *it was a colony of ducks and due to a very severe storm everything were washed off the island by waves.* Ducks do not nest on Ptichia island but species of tern, strictly protected by Bern Convention, some of them unique in the transboundary Biosphere Reserve.

Question: why the egg shells were not washed out by waves?.

According to Ukrainian NGO's and the Ukrainian scientists from Danube Biosphere Reserve-Vilkovo, Ptichya colony was destroyed by noise disturbance from dredging activities (WWF film), even the dredge crew stated that birds never nested on island.

Beside valuable birds, Bystroe area is an important habitat for other migratory animals. The last record of the Black Sea seal (*Monachus monachus*)-strictly protected by Bonn Convention on migratory species, was on Bystroe canal (Zajcev et. al. , 1997).

Conclusion: Very likely significant transboundary impact on migratory strictly protected birds and other strictly protected animals.

Summary

- 1 Unlikely significant transboundary hidrologic impact by phase I, but likely significant by Phase II**
- 2. Likely significant transboundary impact because of the sand/mud dumping;**
- 3. Likely/very likely transboundary social-economic impact on the Romanian fishery**
- 4. Very likely significant transboundary impact on migratory fish and birds;**

Annex 2
MIGRATORY BIRD SPECIES RECORDED ON NORTH – EASTERN PART
OF the DANUBE DELTA

The bird species what have been observed in Romanian territory, and their route (migration way) between breeding places and wintering places pass on North - Eastern part of Danube Delta, transiting Bystroe area.

The data are from quoted references and the maps from Rudescu's book: "Migratia pasarilor" (The Birds Migration) respectively from Academy publications - Aves volume.

"Ex.?" (extinct?) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Anthropoides virgo</i>	Br.II /Bn.II	Ac	Mo
2	<i>Falco cherrug</i>	Br.II /Bn.II/W	MP	Mo
3	<i>Neophron percnopterus</i>	Br.II/Bi.I	OV, ?C	M

"E" (endangered) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Aquila heliaca</i>	Br.II /Bn.II/Bi.I/W	MP	E
2	<i>Eudromias morinellus</i>	Br.II /Bn.II/Bi.I	P, OV	A
3	<i>Oxyura leucocephala</i>	Br.II /Bn.I/Bi.I	OI, ?C	M
4	<i>Pelecanus crispus</i>	Br.II /Bn.I,II/Bi.I/W	OV	Mo

"V" (vulnerable) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Accipiter nisus</i>	Br.II	S, Oi	Tp
2	<i>Alauda arvensis</i>	Br.III	MP	Mo
3	<i>Alcedo atthis</i>	Br.II /Bi.I	MP	E
4	<i>Anas penelope</i>	Br.III /Bi.II	P, OI	S
5	<i>Anas querquedula</i>	Br.III /Bn.II/Bi.II	OV, P	Tp
6	<i>Anas strepera</i>	Br.III /Bn.II/Bi.II	OV	Tp
7	<i>Anthus campestris</i>	Br.II /Bi.I	OV	Mo
8	<i>Anthus cervinus</i>	Br.II	P	A
9	<i>Anthus pratensis</i>	Br.II	P, OV	E
10	<i>Anthus trivialis</i>	Br.II	OV	E
11	<i>Apus apus</i>	Br.III /Bn.II	OV	E
12	<i>Ardea cinerea</i>	Br.III /Bn.II	OV, RI	Tp
13	<i>Ardea purpurea</i>	Br.II /Bn.II/Bi.I	OV	M
14	<i>Ardeola ralloides</i>	Br.II /Bi.I	OV	M
15	<i>Asio otus</i>	Br.II/W	S	Tp
16	<i>Athene noctua</i>	Br.II/W	S	Mo
17	<i>Aythya nyroca</i>	Br.III /Bn.II/Bi.I	OV, RI	E
18	<i>Branta ruficollis</i>	Br.II /Bn.II/Bi.I/W	OI	A
19	<i>Burhinus oedichnemus</i>	Br.II /Bn.II/Bi.I	OV	M
20	<i>Buteo buteo</i>	Br.II /Bn.II	MP	Tp
21	<i>Buteo lagopus</i>	Br.II	OI	A

22	<i>Calandrella brachydactyla</i>	Br.II /Bi.I	OV	Mo
23	<i>Calidris alpina</i>	Br.II /Bn.II	P	A
24	<i>Capella media</i>	Br.II /Bn.II/Bi.I	P	E
25	<i>Caprimulgus europaeus</i>	Br.II /Bi.I	OV	E
26	<i>Charadrius alexandrinus</i>	Br.II /Bn.II	OV	Mo
27	<i>Charadrius dubius</i>	Br.II /Bn.II	OV	Mo
28	<i>Charadrius hiaticula</i>	Br.II /Bn.II	P	A
29	<i>Chlidonias hybridus</i>	Br.II /Bi.I	OV	M
30	<i>Chlidonias leucopterus</i>	Br.II /Bn.II	OV	E
31	<i>Chlidonias niger</i>	Br.II /Bn.II/Bi.I	OV	E
32	<i>Ciconia ciconia</i>	Br.II /Bn.II/Bi.I	OV	E
33	<i>Circus aeruginosus</i>	Br.II /Bi.I	OV, RI	Mo
34	<i>Circus cyaneus</i>	Br.II /Bn.II/Bi.I	OI	E
35	<i>Coccothraustes coccothraustes</i>	Br.II	S	E
36	<i>Columba oenas</i>	Br.III /Bn.II	OV	E
37	<i>Coracias garrulus</i>	Br.II /Bn.II/Bi.I	OV	E
38	<i>Corvus corax</i>	Br.II	S	Tp
39	<i>Coturnix coturnix</i>	Br.III /Bn.II	OV	E
40	<i>Cuculus canorus</i>	Br.III	OV	Tp
41	<i>Delichon urbica</i>	Br.II	OV	Tp
42	<i>Dendrocopos major</i>	Br.II	S	Tp
43	<i>Dendrocopos minor</i>	Br.II	S	Tp
44	<i>Dendrocopos syriacus</i>	Br.II /Bi.I	S	M
45	<i>Dryocopus martius</i>	Br.II /Bi.I	S	S
46	<i>Egretta alba</i>	Br.II /Bn.II/Bi.I	OV, RI	Ch
47	<i>Egretta garzetta</i>	Br.II /Bi.I	OV	M
48	<i>Emberiza hortulana</i>	Br.III /Bi.I	OV	E
49	<i>Erithacus rubecula</i>	Br.II	OV, RI	E
50	<i>Falco columbarius</i>	Br.II /Bi.I/W	OI	S
51	<i>Falco naumanni</i>	Br.II /Bn.II/Bi.I/W	OV	Mo
52	<i>Falco peregrinus</i>	Br.II /Bn.II/Bi.I/W	S, OI	Tp
53	<i>Falco subbuteo</i>	Br.II /Bn.II/W	OV	Tp
54	<i>Falco tinnunculus</i>	Br.II /Bn.II/W	MP	Tp
55	<i>Falco vespertinus</i>	Br.II /Bn.II/W	OV	Mo
56	<i>Ficedula parva</i>	Br.II /Bn.II/Bi.I	OV	S
57	<i>Gavia stellata</i>	Br.II /Bn.II/Bi.I	OI	A
58	<i>Gelochelidon nilotica</i>	Br.II /Bn.II/Bi.I	OV	M
59	<i>Glareola prantincola</i>	Br.II /Bn.II/Bi.I	OV	M
60	<i>Grus grus</i>	Br.II /Bn.II	P, ?C	E
61	<i>Haematopus ostralegus</i>	Br.III	OV	Tp
62	<i>Himantopus himantopus</i>	Br.II /Bn.II/Bi.I	OV	Mo
63	<i>Hippolais pallida</i>	Br.II	OV	M
64	<i>Hirundo daurica</i>	Br.II	OV	?/I-A
65	<i>Ixobrychus minutus</i>	Br.II /Bn.II/Bi.I	OV	E
66	<i>Lanius collurio</i>	Br.II /Bi.I	OV	E
67	<i>Lanius excubitor</i>	Br.II	MP, OI	Tp
68	<i>Lanius minor</i>	Br.II /Bi.I	OV	E
69	<i>Lanius senator</i>	Br.II	Ac	M
70	<i>Larus canus</i>	Br.III /Bn.II	OI	S
71	<i>Larus genei</i>	Br.II /Bn.II/Bi.I	Ac, ?OV	M
72	<i>Larus melanocephalus</i>	Br.II /Bn.II/Bi.I	OV	M
73	<i>Larus minutus</i>	Br.II	P, ?C	S
74	<i>Limicola falcinellus</i>	Br.II /Bn.II	P	S

75	<i>Limosa limosa</i>	Br.III /Bn.II	P, ?OV	Mo
76	<i>Lullula arborea</i>	Br.III/Bi.I	OV	E
77	<i>Luscinia megarhynchos</i>	Br.II	OV	E
78	<i>Lymnocyptes minimus</i>	Br.III/Bn.II/Bi.II	P	S
79	<i>Melanocorypha calandra</i>	Br.II /Bi.I	MP	M
80	<i>Mergus albellus</i>	Br.II /Bn.II/Bi.I	OI	S
81	<i>Mergus merganser</i>	Br.III/Bn.II	OI	Tp
82	<i>Mergus serrator</i>	Br.III/Bn.II	OI	S
83	<i>Merops apiaster</i>	Br.II /Bn.II	OV	M
84	<i>Milvus migrans</i>	Br.II /Bn.II/Bi.I	OV	E
85	<i>Motacilla flava</i>	Br.II	OV	Tp
86	<i>Muscicapa striata</i>	Br.II	OV	E
87	<i>Netta rufina</i>	Br.III /Bn.II	OV, RI	M
88	<i>Numenius arquata</i>	Br.III /Bn.II	OV	E
89	<i>Nycticorax nycticorax</i>	Br.II /Bi.I	OV	M
90	<i>Oenanthe oenanthe</i>	Br.II	OV	Tp
91	<i>Oriolus oriolus</i>	Br.II	OV	E
92	<i>Passer hispaniolensis</i>	Br.III	OV	E
93	<i>Pelecanus onocrotalus</i>	Br.II /Bn.I,II/Bi.I	OV	Mo
94	<i>Perdix perdix</i>	Br.III/Bn.II/Bi.II	S	E
95	<i>Pernis apivorus</i>	Br.II /Bn.II/Bi.I	OV	E
96	<i>Phalacrocorax pygmeus</i>	Br.II /Bn.II/Bi.I	OV, RI	M
97	<i>Phoenicurus ochruros</i>	Br.II	OV	Mo
98	<i>Phoenicurus phoenicurus</i>	Br.II	OV	E
99	<i>Picus canus</i>	Br.II /Bi.I	S	E
100	<i>Platalea leucorodia</i>	Br.II/Bn.II/Bi./W	OV	E
101	<i>Plegadis falcinellus</i>	Br.II /Bn.II/Bi.I	OV	M
102	<i>Pluvialis squatarola</i>	Br.III	P	A
103	<i>Podiceps auritus</i>	Br.II /Bn.II/Bi.I	Ac	S
104	<i>Podiceps cristatus</i>	Br.III	OV, RI	Tp
105	<i>Podiceps nigricollis</i>	Br.II /Bn.II	OV, RI	E
106	<i>Porzana porzana</i>	Br.II /Bn.II/Bi.I	OV	E
107	<i>Recurvirostra avosetta</i>	Br.II /Bn.II/Bi.I	OV	Mo
108	<i>Remiz pendulinus</i>	Br.II	MP	Mo
109	<i>Riparia riparia</i>	Br.II	OV	Tp
110	<i>Saxicola torquata</i>	Br.II	OV	Mo
111	<i>Scolopax rusticola</i>	Br.III/Bn.II/Bi.II	P, OV	E
112	<i>Sterna albifrons</i>	Br.II /Bn.II/Bi.I	OV	E
113	<i>Sterna caspia</i>	Br.II /Bn.II/Bi.I	P	Tp
114	<i>Sterna sandvicensis</i>	Br.II /Bn.II/Bi.I	OV	M
115	<i>Streptopelia turtur</i>	Br.III /Bn.II	OV	E
116	<i>Strix aluco</i>	Br.II/W	S	E
117	<i>Sylvia borin</i>	Br.II	OV	E
118	<i>Tachybaptus ruficollis</i>	Br.II	OV, RI	E
119	<i>Tadorna tadorna</i>	Br.II /Bn.II	OV, RI	Mo
120	<i>Tringa glareola</i>	Br.II /Bn.II/Bi.I	P	S
121	<i>Tringa totanus</i>	Br.III /Bn.II	P, OV	Mo
122	<i>Turdus merula</i>	Br.III	MP	E
123	<i>Upupa epops</i>	Br.II	OV	E
124	<i>Vanellus vanellus</i>	Br.III	OV	Mo

"R" (rare) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Accipiter gentilis</i>	Br.II	S	Tp
2	<i>Acrocephalus dumetorum</i>	Br.II	Ac, ?C	?/T
3	<i>Anser erythropus</i>	Br.II /Bn.II	Ac	A
4	<i>Apus melba</i>	Br.II	OV	M
5	<i>Aquila clanga</i>	Br.II /Bn.II/Bi.I	P, ?C	E
6	<i>Aquila pomarina</i>	Br.II /Bn.II/Bi.I	OV	E
7	<i>Arenaria interpres</i>	Br.II /Bn.II	P	E
8	<i>Asio flammeus</i>	Br.II/Bi.I/W	OI, ?C	Tp
9	<i>Ciconia nigra</i>	Br.II/Bn.II/Bi.I/W	OV	E
10	<i>Circaetus gallicus</i>	Br.II /Bn.II/Bi.I	OV	E
11	<i>Crex crex</i>	Br.II /Bi.I	OV	E
12	<i>Gavia arctica</i>	Br.II /Bn.II/Bi.I	OI	S
13	<i>Gavia immer</i>	Br.II /Bn.II/Bi.I	OI	A
14	<i>Glareola nordmanni</i>	Br.II /Bn.II	Ac	Mo
15	<i>Haliaeetus albicilla</i>	Br.II /Bn.I/Bi.I	MP	Tp
16	<i>Hieraaetus pennatus</i>	Br.II /Bn.II/Bi.I	P, OV	E
17	<i>Pandion haliaetus</i>	Br.II /Bn.II	P	Tp
18	<i>Phalaropus fulicarius</i>	Br.II /Bn.II	Ac	A
19	<i>Phalaropus lobatus</i>	Br.II /Bn.II/Bi.I	P	A
20	<i>Pluvialis apricaria</i>	Br.III/Bn.II/Bi.I	P, RI	A
21	<i>Porzana parva</i>	Br.II /Bn.II	OV	E
22	<i>Porzana pusilla</i>	Br.II /Bn.II	OV	E
23	<i>Puffinus yelkouan</i>	Br.III	Ac	A
24	<i>Rallus aquaticus</i>	Br.III	MP	E
25	<i>Stercorarius parasiticus</i>	Br.III	Ac	A
26	<i>Stercorarius pomarinus</i>	Br.III	P	A
27	<i>Tadorna ferruginea</i>	Br.II /Bn.II/Bi.I	OV	Mo

"I" (indeterminate) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Anser brachyrhynchus</i>	Br.III/Bn.II	OI	A
2	<i>Anser fabalis</i>	Br.III/Bi.II	OI	A
3	<i>Circus macrourus</i>	Br.II /Bn.II/Bi.I	P, ?OV	Mo

"K" (insufficiently known) -
Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Accipiter brevipes</i>	Br.II/Bi.I	OV	M
2	<i>Acrocephalus agricola</i>	Br.II	OV	E
3	<i>Acrocephalus melanopogon</i>	Br.II/Bi.I	OV	M
4	<i>Acrocephalus paludicola</i>	Br.II	Ac, ?C	E
5	<i>Acrocephalus palustris</i>	Br.II	OV	E
6	<i>Acrocephalus scirpaceus</i>	Br.II	OV	E
7	<i>Anser caerulescens</i>	Br.III	Ac	A

8	<i>Aythya marila</i>	Br.III/Bn.II/Bi.II	OI	A
9	<i>Bombycilla garrulus</i>	Br.II	OI, Ac	S
10	<i>Botaurus stellaris</i>	Br.II /Bn.II/Bi.I	OV, RI	Mo
11	<i>Branta bernicla</i>	Br.III	Ac	A
12	<i>Bubo bubo</i>	Br.II/Bi.I/W	S	Tp
13	<i>Bubulcus ibis</i>	Br.II	OV	I/Af
14	<i>Calidris alba</i>	Br.II /Bn.II	P	A
15	<i>Calidris canutus</i>	Br.III/Bn.II	Ac	A
16	<i>Calidris temminckii</i>	Br.II /Bn.II	P	A
17	<i>Carduelis cannabina</i>	Br.II	MP	E
18	<i>Carduelis flammea</i>	Br.II	OI	E
19	<i>Carpodacus erythrinus</i>	Br.II	OV	Tp
20	<i>Certhia brachydactyla</i>	Br.II	S	E
21	<i>Certhia familiaris</i>	Br.II	S	E
22	<i>Cettia cetti</i>	Br.II	S	M
23	<i>Charadrius asiaticus</i>	Br.III	Ac	Mo
24	<i>Charadrius lescheaulti</i>	Br.III	Ac	Mo
25	<i>Charadrius vociferus</i>	Br.III	Ac	Mo
26	<i>Chettusia gregaria</i>	Br.III	Ac	Tp
27	<i>Circus pygargus</i>	Br.II /Bn.II/Bi.I	OV	E
28	<i>Clangula hyemalis</i>	Br.III	OI	A
29	<i>Cygnus columbianus</i>	Br.II/Bi.I	Ac	A
30	<i>Dendrocopus medius</i>	Br.II/Bi.I	S	E
31	<i>Emberiza melanocephala</i>	Br.II	OV	M
32	<i>Eremophila alpestris</i>	Br.II	OI, OV	A
33	<i>Ficedula albicollis</i>	Br.II /Bn.II/Bi.I	OV	E
34	<i>Ficedula hypoleuca</i>	Br.II /Bn.II	OV	E
35	<i>Hippolais icterina</i>	Br.II	OV	E
36	<i>Hoplopterus spinosus</i>	Br.III	Ac	Mo
37	<i>Jynx torquilla</i>	Br.II	OV	Tp
38	<i>Larus hyperboreus</i>	Br.III	Ac	A
39	<i>Larus ichthyaetus</i>	Br.III /Bn.II	Ac	Mo
40	<i>Larus sabini</i>	Br.III	Ac	A
41	<i>Limnodromus griseus</i>	Br.III	Ac	S
42	<i>Limosa lapponica</i>	Br.III /Bn.II/Bi.I	Ac	A
43	<i>Locustella fluviatilis</i>	Br.II	OV	E
44	<i>Locustella naevia</i>	Br.II	OV	E
45	<i>Loxia curvirostra</i>	Br.II	S	S
46	<i>Luscinia luscinia</i>	Br.II	OV	E
47	<i>Luscinia svecica</i>	Br.II/Bi.I	P, OV	M
48	<i>Marmaronetta angustirostris</i>	Br.III/Bi.I	Ac	E
49	<i>Melanitta fusca</i>	Br.III	Ac	S
50	<i>Melanitta nigra</i>	Br.III/Bi.II	Ac	S
51	<i>Miliaria calandra</i>	Br.III	MP	E
52	<i>Milvus milvus</i>	Br.II/Bi.I	P	E
53	<i>Montifringilla nivalis</i>	Br.III	Ac	A
54	<i>Motacilla citreola</i>	Br.II	Ac	S
55	<i>Nucifraga caryocatactes</i>	Br.II	S	S
56	<i>Numenius phaeopus</i>	Br.III /Bn.II	P	S
57	<i>Numenius tenuirostris</i>	Br.II/Bn.I/Bi.I/W	Ac	S
58	<i>Oenanthe hispanica</i>	Br.II	OV	M
59	<i>Oenanthe pleschanka</i>	Br.II	OV	Mo
60	<i>Otis tarda</i>	Br.II/Bn.II/Bi.I/W	S	Mo

61	<i>Parus lugubris</i>	Br.II	S	M
62	<i>Parus palustris</i>	Br.II	S	E
63	<i>Phalacrocorax aristotelis</i>	Br.III	Ac	A
64	<i>Phoenicopterus ruber</i>	Br.III/Bi.I	Ac	Mo
65	<i>Phylloscopus bonelli</i>	Br.II	Ac	S
66	<i>Phylloscopus collybita</i>	Br.II	OV	Tp
67	<i>Phylloscopus sibilatrix</i>	Br.II	OV	E
68	<i>Phylloscopus trochilus</i>	Br.II	P, OV	E
69	<i>Plectrophenax nivalis</i>	Br.II	OI	A
70	<i>Prunella modularis</i>	Br.II	OV, RI	E
71	<i>Regulus ignicapillus</i>	Br.II	MP	E
72	<i>Regulus regulus</i>	Br.II	MP, OI	E
73	<i>Rissa tridactyla</i>	Br.III	Ac	A
74	<i>Saxicola rubetra</i>	Br.II	OV	E
75	<i>Serinus serinus</i>	Br.II	OV	M
76	<i>Somateria mollissima</i>	Br.III/Bi.II	Ac	A
77	<i>Stercorarius longicaudus</i>	Br.III	Ac	A
78	<i>Stercorarius skua</i>	Br.III	Ac	A
79	<i>Sterna paradisea</i>	Br.II/Bi.I	Ac	A
80	<i>Sturnus roseus</i>	Br.II	OV	M
81	<i>Sylvia atricapilla</i>	Br.II	OV	E
82	<i>Sylvia communis</i>	Br.II	OV	E
83	<i>Sylvia curruca</i>	Br.II	OV	E
84	<i>Sylvia nisoria</i>	Br.II/Bi.I	OV	E
85	<i>Sylvia rueppelli</i>	Br.II/Bi.I	Ac	M
86	<i>Tetrax tetrax</i>	Br.II/Bi.I	Ac	M
87	<i>Tringa hypoleucos</i>	Br.II /Bn.II	OV	Tp
88	<i>Tringa ochropus</i>	Br.II /Bn.II	P	S
89	<i>Tringa stagnatilis</i>	Br.II /Bn.II	P, OV	Mo
90	<i>Turdus philomelos</i>	Br.III	OV	E
91	<i>Turdus torquatus</i>	Br.II	OV	E
92	<i>Turdus viscivorus</i>	Br.III	MP	E
93	<i>Tyto alba</i>	Br.II/W	S	E
94	<i>Vanellorchettusia leucura</i>	Br.III	OV	Mo
95	<i>Xenus cinereus</i>	Br.III/Bi.I	Ac	S

“nt” (not threatened) - Annex 1 -

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Acrocephalus arundinaceus</i>	Br.II	OV	E
2	<i>Acrocephalus schoenobaenus</i>	Br.II	OV	E
3	<i>Aegithalos caudatus</i>	Br.II	S	Tp
4	<i>Anas acuta</i>	Br.III/Bn.II/Bi.II	P, OI	S
5	<i>Anas clypeata</i>	Br.III/Bi.II	P, OV	Tp
6	<i>Anas crecca</i>	Br.III/Bi.II	P, OI, OV	Tp
7	<i>Anas platyrhynchos</i>	Br.III/Bi.II	MP, OI	Tp
8	<i>Anser albifrons</i>	Br.III/Bi.II	OI	A
9	<i>Anser anser</i>	Br.III/Bi.II	MP	Mo
10	<i>Aythya ferina</i>	Br.III/Bi.II	MP	E
11	<i>Aythya fuligula</i>	Br.III/Bi.II	OI, OV	S
12	<i>Bucephala clangula</i>	Br.III	OI	S
13	<i>Calidris ferruginea</i>	Br.II /Bn.II	P	A

14	<i>Calidris minuta</i>	Br.II /Bn.II	P	A
15	<i>Carduelis carduelis</i>	Br.II	S, OI	E
16	<i>Carduelis chloris</i>	Br.II	S	E
17	<i>Carduelis spinus</i>	Br.II	MP, OI	E
18	<i>Columba palumbus</i>	Bi.II	OV, RI	E
19	<i>Cygnus cygnus</i>	Br.II/Bi.I	OI	S
20	<i>Cygnus olor</i>	Br.III	MP	E
21	<i>Emberiza citrinella</i>	Br.II	S	E
22	<i>Emberiza schoeniculus</i>	Br.II	MP	Tp
23	<i>Fringilla coelebs</i>	Br.III	MP	E
24	<i>Fringilla montifringilla</i>	Br.III	OI	S
25	<i>Fulica atra</i>	Br.III/Bi.II	MP	Tp
26	<i>Galerida cristata</i>	Br.III	S	Mo
27	<i>Gallinago gallinago</i>	Br.III/Bi.II	P, ?C	E
28	<i>Gallinula chloropus</i>	Br.III	OV	E
29	<i>Hirundo rustica</i>	Br.II	OV	Tp
30	<i>Larus ridibundus</i>	Br.III	MP	Tp
31	<i>Motacilla alba</i>	Br.II	OV	E
32	<i>Panurus biarmicus</i>	Br.II	S	Mo
33	<i>Parus caeruleus</i>	Br.II	S	E
34	<i>Parus major</i>	Br.II	S	E
35	<i>Passer montanus</i>	Br.III	S	Tp
36	<i>Phalacrocorax carbo</i>	Br.III	OV, RI	Tp
37	<i>Phasianus colchicus</i>	Br.III/Bi.II	S	Ch
38	<i>Philomachus pugnax</i>	Br.III/Bi.I	P	S
39	<i>Pyrhula pyrrhula</i>	Br.III	S	S
40	<i>Podiceps griseigena</i>	Br.II /Bn.II	OV	E
41	<i>Sterna hirundo</i>	Br.II /Bn.II/Bi.I	OV	E
42	<i>Streptopelia decaocto</i>	Br.III	S	M
43	<i>Tringa erythropus</i>	Br.III	P	S
44	<i>Tringa nebularia</i>	Br.III	P	S
45	<i>Troglodytes troglodytes</i>	Br.II	OV, RI	E
46	<i>Turdus pilaris</i>	Br.III	MP, OI	S

Out of DDBR Red List

Nr. crt.	Species	International Conventions (Annex 2)	Phenology in Romania (Annex 3)	Geographical Origin (Annex 4)
1	<i>Aquila chrysaetos</i>		S	Tp
2	<i>Aquila nipalensis</i>		Ac	Mo
3	<i>Branta leucopsis</i>			A
4	<i>Buteo rufinus</i>		P, OV	Mo
5	<i>Corvus c. cornix</i>		S	E
6	<i>Corvus frugilegus</i>		S, OI	E
7	<i>Corvus monedula</i>		S	E
8	<i>Garrulus glandarius</i>		S	E
9	<i>Falco eleonora</i>			M
10	<i>Lanius isabellinus</i>			Mo
11	<i>Larus cachinnans</i>		S	Tp
12	<i>Larus fuscus</i>		P, OI	A
13	<i>Larus marinus</i>		Ac	A
14	<i>Passer domesticus</i>		S	Tp
15	<i>Pica pica</i>		S	E

16	<i>Sturnus vulgaris</i>		MP	E
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Abbreviations which represent the inclusion of the species in the respective conventions have been annexed, if need was, besides the actual extinction range of each species in the territory:

Br.I = species included in the Annex 1 of the Bern Convention (European strictly protected plants)

Br.II = species included in the Annex II of the Bern Convention (European strictly protected animals)

Br.III = species included in the Annex III of the Bern Convention (European protected animals)

Bn.I = species included in the Annex I of the Bonn Convention (migratory birds, worldwide threatened)

Bn.II = species included in the Annex I of the Bonn Convention (migratory species worldwide having an unfavorable conservation status, need agreements for conservation)

H = species included in the European Council Directive no.92/43/1992, referring natural habitats and wild flora and fauna conservation (species considered to need special conservation areas)

W = species included in the Convention of trading endangered wild flora and fauna species (Washington – 1973), which enforces special practices for commerce.

Bi.I = bird species included in the European Council Directive no.79/409 from 1979, referring the wild birds conservation (endangered and vulnerable, which need special conservation measures, forbidden to be hunted and captured).

Bi.II = bird species included in the European Council Directive no.79/409 from 1979, referring the wild birds conservation (allowed to be legal hunted).

REFERENCES for Annex 2

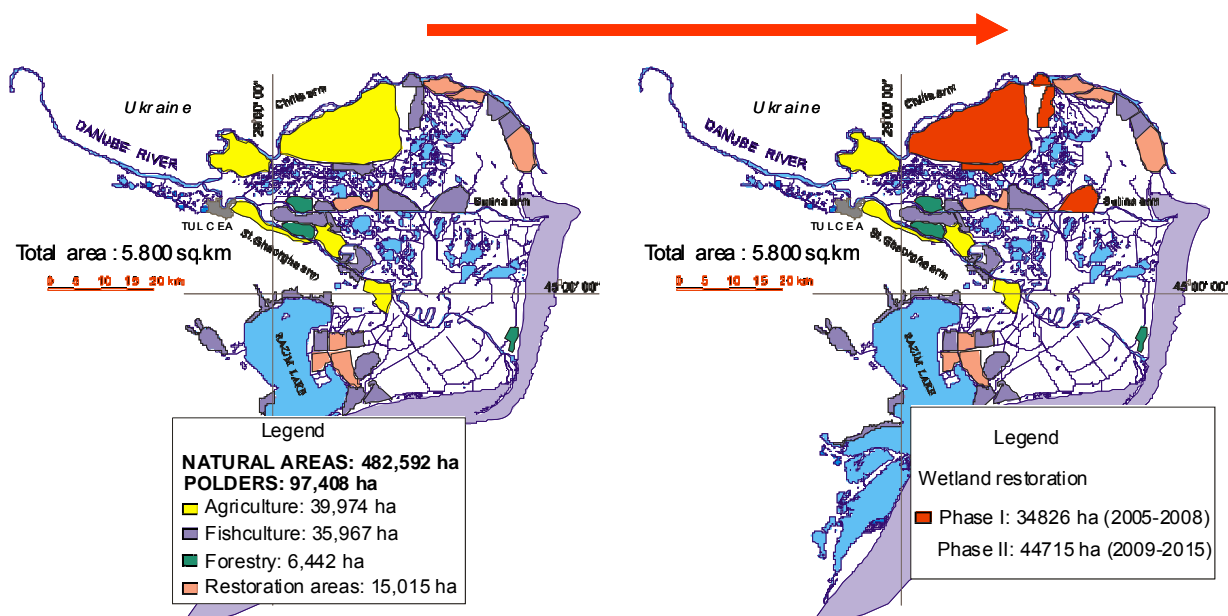
- Ciochia, V. - 1984 - Dinamica și migrația păsărilor. Ed. Stiințifică și Enciclopedică. București.
- Ciochia, V. (coord.) – 2001 - *Aves Danubii*. Păsările Dunării de la izvoare la vărsare. Ed. *Pelecenus*. Brașov.
- Dombrowsky, von R. - 1946 - Păsările României. Fund. Reg. pt. Lit. și Arta.
- Hagemeyer, W.J.M., Blair M. – 1997 - The EBCC Atlas of European breeding birds: their distribution and abundance. T&A.D. Poyser. London.
- Kiss, J.B. - 1973 - Date preliminare asupra ornitofaunei insulei Sacalin și rolul ei în migrație. Peuce. 1 : 479 - 492.
- Kiss, J.B. - 1973 - Date preliminare asupra ornitofaunei insulei Sacalin și rolul ei în migrație. II. Peuce. 3 : 539 - 567.
- Kiss, J.B., Măteș, M. - 1973 - Pescărița-mare - *Hydroprogne caspia* (Pall.) și intensificarea migrațiilor transcontinentale. Peuce. 3 : 595 - 624.
- Kiss, J.B. - 1976 - Insula Sacalin - loc important în cercetarea cuibăritului și migrației păsărilor. Peuce. 5 : 489 - 507.
- Kiss, J.B. - 1976 - Contribuții privind migrația sitarilor (*Scolopax rusticola* L.) în Delta Dunării. Peuce. 5 : 509 - 518.
- Linția, D. - Păsările din R.P.R. Ed. Academiei R.P.R. București. 2..
- Linția, D. - Păsările din R.P.R. Ed. Academiei R.P.R. București. 3.
- Munteanu, D. - 1998 - The status of birds in Romania”. Publicațiile SOR.
- Munteanu, D. - 2002 - Atlasul păsărilor clocitoare din România. Publicațiile SOR. Cluj.
- Oțel, V., Ciocîrlan V., Fedorchenko, A., Kiss, J.B., Murariu, D., Nițu, E., Rákósy, L., Ruicănescu, A., Sárkány, A., Sârbu, I., Szabó, L., Török, Zs. – 2000 - Lista Roșie a speciilor de plante și animale din Rezervația Biosferei Delta Dunării, România. Editura Aves. Odorheiu Secuiesc. 4 – 132.
- Radu, D. - 1979 - Păsările din Delta Dunării. Ed. Academiei R.S.R. București.
- Rudescu, L. – 1958 – Migrația păsărilor. Editura Stiințifică. București.
- Vasiliu, G.D., Sova, C. – *Fauna Vertebratica României*. Muzeul Județean Bacău. Studii și Comunicări. 2 : 108 – 213.
- Weber, P. – 2000 – *Aves Histriae*. Editura Aves. Odorheiu Secuiesc.
- *** - 1990 – IUCN Red List of threatened animals. IUCN. Gland and Cambridge. 32.
- *** - 1993 - Lege privind aderarea României la Convenția privind conservarea vieții sălbatice și a habitatelor naturale, adoptată la Berna la 19 septembrie 1979. Monitorul Oficial al României. Partea I. Nr. 62.

- *** - 1998 - Lege privind aderarea României la Convenția privind conservarea speciilor migratoare de animale sălbatice, adoptată la Bonn la 23 iunie 1979. Monitorul Oficial al României. Partea I. Nr. 24.
- *** - 2000 - Legea nr. 89 pentru ratificarea Acordului privind conservarea păsărilor de apă migratoare african-urasiatice, adoptat la Haga la 16 iunie 1995. Monitorul Oficial al României. Nr. 236 din 30 mai 2000.
- *** - 2001 - Legea nr. 462 din 18.06.2001 pentru aprobarea Ordonanței de urgență a Guvernului nr. 236/2000 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei și a faunei sălbatice. Monitorul Oficial al României. Nr. 433/04.08.2001.

Possible mitigation measures in Romania

- Extension of aquatic habitat areas for birds and fish by wetland restoration

The areas marked with red in the following scheme represent the areas which could be reconnected at hydrological regime of the Danube River and reverted to wetlands (DDNI



Study, 2004).

Fig. 22. Possible wetland restoration measures in the Romanian Danube Delta

-New brackish water habitats-key habitat for sturgeon feeding, could be created between Sulina and Sf. Gheorghe arms by restoration of the former water outlet from Rosu lakes to the Black Sea.

(More technical and financial details in „Study on environmental and social-economic consequences caused by building Bystroe navigation canal from Ukrainian Danube Delta Biosphere Reserve, Danube Delta National Institute, 2004.)

-Stocking measures with sturgeon fingerlings are still under debate, having in view the costs and risks. Enhancement stocking may temporarily increase adult abundance, but it may alter the genetic bases (Kynard, 1997).

However, „very best stocking programs can only provide short term solutions unless they are coupled to plans for protecting and increasing level of natural reproduction” (Birstein, 1997).

Another viable and sustainable alternative would be the protection of adult sturgeons during spawning migration by increasing of prohibition period, but this measure should be agreed by all riverine countries of the Lower Danube.

