

THE TRANSBOUNDARY IMPACT GENERATED BY WORKS OF IMPROVING THE NAVIGATION CONDITIONS ON THE ROMANIAN-BULGARIAN COMMON SECTOR OF THE DANUBE

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Abstract:

Improving navigation conditions on the Romanian-Bulgarian sector of the Lower Danube over a distance of 450 km will contribute to the implementation of the agreed European standards of the inland waterways between the Black Sea and the countries in Central and Western Europe, during periods with low river flow. As a result of implementation of dredging and technical solutions proposed by this project for the Romanian – Bulgarian common sector, and solutions developed for other river sectors (Tulcea branch, Calarasi – Braila sector), the Danube waterway will also meet the navigation conditions stipulated by the Danube commission in Budapest. The functionality of the Pan-European Transport Corridor number VII will be improved, resulting in benefits for the European Union member states, but also for other countries in the north – western Balkans (Serbia, Croatia) and in eastern Europe (Ukraine, Republic of Moldova). This Danube sector is also in line with the priority axes of the Trans-European Transport Network (TEN-T) of which the Rhine/Meuse-Main-Danube inland waterway axis is part. This waterway axis crosses Europe from the North Sea to the Black Sea, and has a great number of connections to road transport and railways. The transboundary impact will be analyzed considering the benefits and the negative effects over two major aspects: the impact on upstream countries and the impact on downstream countries.

Key words: *Pan-European Transport Corridor no. VII, navigation improvement works, the transboundary impact*

JEL classification: *R4*

Introduction

The Danube River in Romania and Bulgaria is an important section of the Pan-European Transport Corridor number VII. The river connects the Black Sea with the hinterland from Romania and Bulgaria to Hungary, Austria, Germany, etc. However, in the periods of summer–autumn, the water flows are decreasing considerably on this river section, resulting in difficult navigation conditions.

In the main branch of the Danube, the minimum depth for navigation is not met everywhere, resulting in dangerous navigational conditions and economic uncertainty about this transport route. The reasons for this very unfavourable situation for navigation are mainly related to morphological and hydrological phenomena.

The project for improvement of navigation conditions on the Romanian – Bulgarian common sector of the Danube is part of the more global Danube navigability project in order to improve the Pan-European Corridor no. VII as it aims to improve the navigability of the Danube River in such a way that it will answer to the needs of the national transport policy of Romania as well as the countries' international commitments.

The transboundary impact will be analyzed considering the benefits and the negative effects over two major aspects: the impact on upstream countries and the impact on downstream countries.

1. Impact on upstream countries

Potential impacts on upstream countries are not expected for (sub) soil, noise, landscape and cultural heritage, since the works only induce very local and temporary impacts on these factors, as described in the previous chapters. Air pollution may have a transboundary effect. The impact on biodiversity also acts on a very local level.

However, negative impacts in Natura 2000 sites may affect the entire European network and survival of protected species of European importance. It is therefore very important to prevent any negative impact on a local level, by applying all mitigation measures proposed.

The only impact on the water system expected on upstream countries is related to water levels, due to the damming effect of the technical structures. As regards direct impact on water levels, the calculations that were performed for setting up the solutions showed that the modifications of the water levels caused by the works of the project on some stretches do not practically change water levels upstream of the Romanian-Bulgarian common sector in any of the proposed alternatives.

Therefore the impact of the project on water levels on the Romanian-Serbian sector is practically inexistent. No effects are induced on the Serbian sector of Danube, simply because the project's upstream limit is limited by the Iron Gates-II hydro-electrical development, which separates Danube's Section 1 from the Serbian sector. An important positive impact of the project is related to improvement of the socioeconomic environment.

Improving navigation conditions on the Romanian-Bulgarian sector of the Lower Danube over a distance of 450 km will contribute to the implementation of the agreed European standards of the inland waterways between the Black Sea and the countries in Central and Western Europe, during periods with low river flow.

As a result of implementation of dredging and technical solutions proposed by the project for the Romanian – Bulgarian common sector, and solutions developed for other river sectors (Tulcea branch, Calarasi – Braila sector), the Danube waterway will also meet the navigation conditions stipulated by the Danube commission in Budapest.

The functionality of the Pan-european Transport Corridor number VII will be improved, resulting in benefits for the European Union member states, but also for other countries in the north – western Balkans (Serbia, Croatia) and in eastern Europe (Ukraine, Republic of Moldova).

This Danube sector is also in line with the priority axes of the Trans-European Transport Network (TEN-T) of which the Rhine/Meuse-Main-Danube inland waterway axis is part (Figure 1). This waterway axis crosses Europe from the North Sea to the Black Sea, and has a great number of connections to road transport and railways.

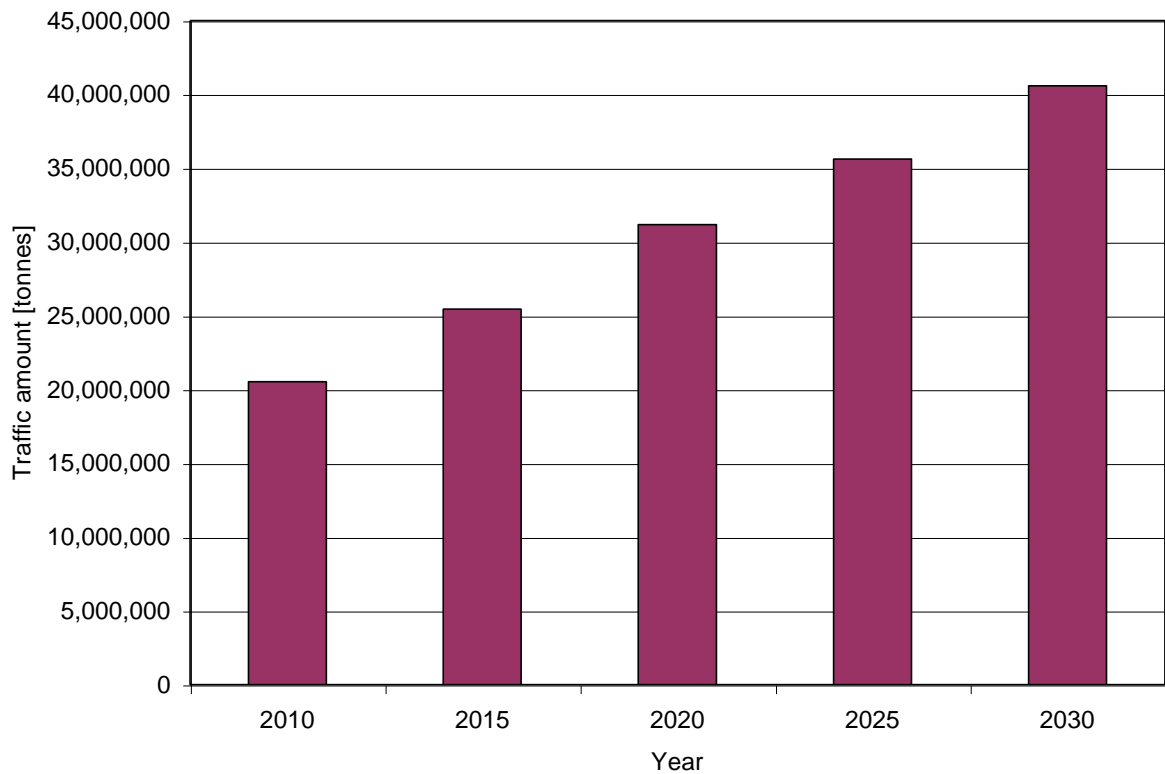
The cargo traffic forecast along the Lower Danube (Figure 2) indicates a potential increase with 100%, within the next 20 years. This project will certainly create real incentives - for fluvial operators and other economic agents, in Danube's riparian countries - increasing and diversifying their waterborne transportation activities, along the entire length of Danube.



Figure 1: Rhine/Meuse-Main-Danube inland waterway axis (TEN-T)

Source: ec.europa.eu

Figure 2: Forecast of yearly cargo traffic, along the Romanian-Bulgarian sector of the Lower Danube



Source: E.I.A., Technical assistance for the improvement of navigation conditions on the Romanian - Bulgarian common sector of the Danube and accompanying studies, Ministry of Transports of Romania, dec. 2009

Due to this project, shipping of goods and passengers along the Lower Danube will be safer during low water levels, while preventing risks of accidents and unexpected stops caused by insufficient water depth. The implementation of the project-

proposed technical solutions for the improvement of navigation conditions will allow for various direct and indirect positive effects for population in other countries, such as:

- increased waterborne and intermodal transportation possibilities for trade purposes;
- mitigation of the need to increase road traffic;
- increased tourism along the Danube and safer ship access to valuable natural areas (including the Danube Delta) resulting in better knowledge of the existing natural protected areas near the river.

2. Impact on downstream countries

As for (sub) soil, noise, landscape, cultural heritage, biodiversity, and socio-economic environment, the same assumptions as for the impact on upstream countries are valid. The only other impact expected on downstream countries is related to water quality changes. In order to put into evidence the potential trans-boundary impacts generated by river works and dredging activities along the Romanian – Bulgarian common sector of the Danube, the following evidences were analysed:

(i) the physico-chemical and biochemical processes for the decaying concentration of inorganic and organic pollutants at the level of water column / suspended matter / sediments;

(ii) recent data and information based on the International Commission for the Protection of the Danube River (ICPDR) – Trans National Monitoring Network (TNMN) monitoring activity (concentration and loads parameters);

(iii) the remarks based on available Ukrainian reports.

For the assessment of impacts generated by river works, the associated sediment-related pollution is the most relevant factor. Other pollutants dissolved in the river water will not be relevant in the assessment of the transboundary potential impact.

a. *Nutrients*

For the water quality monitoring station at Reni (upstream of the Danube Delta), based on the ICPDR Annual Report, the following data / information are relevant):

- water flow (Danube River m³/s) – 8428
- ammonium (N-NH₄ mg/l) - 0.31
- nitrite (N-NO₂ mg/l) - 0.04
- nitrate (N-NO₃ mg/l) - 1.33
- total nitrogen (NT mg/l) - 2.13

The nitrogen compounds (inorganic and / or organic) are more than 80% dissolved in the water column so the potential impact generated by project proposed river works being not relevant.

b. *Phosphorous*

The phosphorous compounds are more than 65% in the sediment phase. Based on the above mentioned reference material (2009 ICPDR Report) the following information are relevant for the present note:

- suspended matter (k 106 Tones) - 13.994/year
- orthophosphate (k 103 Tones) - 8.044/year
- total phosphorous (k 103 Tones) - 35.722/year

The associated sediment pollution with phosphorus compounds is characterized by the following properties:

- (i) sediments are not toxic;
- (ii) the remobilization probability is very low.

Consequently, for the phosphorous chemicals no local / transboundary impact is anticipated, as caused by the dredging activities along Romanian – Bulgarian common sector of the Danube.

c. Heavy metals

For 2009, the Annual Report (ICPDR – TNMN) shows the following relevant values:

- Cooper (Cu) > 4.65 µg/l
- Lead (Pb) > 1.97 µg/l
- Cadmium (Cd) > 0.93 µg/l

The heavy metals components are in the 80-95% retained on the sediments and organic particles in suspension. As in the case of phosphate, the heavy metals from the sediments are not easily brought into the flow, as a result of dredging works, nor are they an eventual local or transboundary impact.

d. Other pollutants

In the Ukrainian reports, the problem of phenols is mentioned. In this regard it should be underlined that the phenolic compounds are soluble and biodegradable and are thus not being retained on the sediment phase. As a conclusion, the dredging works do not have any relation with phenols and thus could not generate a potential impact. With regard to sediment transport, deposition in the Danube channel of both dumped dredged materials and sediments stirred by capital dredging works will practically maintain the same sediment budget in the Danube's river bed, along the river sector addressed by the project. Induced morphological effects are local, and the project does not modify practically sediment transport towards downstream.

Therefore, the effects of the works proposed by the project on sediment transport will only occur on short stretches of the Romanian – Bulgarian common sector of the Danube and a short distance downstream of Siliistra, without any relevant impact on downstream sectors or downstream riparian countries.

The envisaged river works of the project will be implemented so that the impact on fish migration and reproduction is as low as possible and will not affect the respective fish populations, within the Lower Danube.

The suspended sediment load generated by maintenance dredging envisaged in the Project is significantly lower than the suspended sediment loads brought by high flows in the Lower Danube. In conclusion, the project has no effects on the Ukrainian sector of the Danube.

Conclusions on potential transboundary impact

Benefits for upstream and downstream countries

Improving navigation conditions on the Romanian-Bulgarian sector of the Danube will contribute to re-establish the necessary state of the waterway between the Black Sea and the countries in Central Europe, during periods with low river flow. The Danube waterway will have the necessary conditions regarding the navigation regime according the Danube Convention and the functionality of the Pan-european Transport Corridor number VII will be improved with clear benefits for the European Union member states as well as for other countries in Eastern Europe and the Northwestern Balkans.

The execution of the project will not only improve the navigation conditions, but will also result in direct and indirect positive effects for population in other countries: increased transportation possibilities, reduction in the need for road traffic, increased tourism along the Danube.

Impacts on upstream countries

There are no negative effects expected on upstream countries. Calculations indicated that the water levels upstream of the works will change only over a few kilometers. On the Serbian side of the Danube, the water level increase will already have disappeared.

Impacts on downstream countries

In regard with the potential impact generated by the water works, the physicochemical and biochemical processes were evaluated based on recent ICPDR monitoring data and Ukrainian material analyses. The impact from sediment pollution seems to be the most relevant, since sediment pollutants may be remobilised due to the works.

The only pollutants detected in the sediment are phosphorous (which is not toxic and has a very low remobilization probability) and heavy metals (low remobilization probability). Therefore the impact from polluted sediment is negligible. Impact from pollutants dissolved into the water column is not expected.

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