

European Commission

**Regional Balkans
Infrastructure Study -
Transport**

Appendix 15 - Final Report

Sava River

July 2003

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Report no. 2
Issue no. Final
Date of issue 23 July 2003

Prepared SSH/AGK
Checked PCH
Approved ELH

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1 Introduction

1.1 Background

The Sava River does not form a part of the Core Network. In the REBIS Interim Report it was concluded that it would not be of sufficient regional importance from a transport point of view to warrant its inclusion in the Core Network.

An international agreement on the management and development of the Sava river basin has been developed. The restoration of navigation through clearing of the waterway and improving ports and other infrastructure may lead to increased waterway traffic on the river.

It was therefore decided - within the REBIS study - to undertake a brief study to assess the status of the river, including historic traffic data and the scope and costs of proposed improvements.

1.2 Objective

The objective of the study is to factually document the status of the river and its ports as they are today and to summarise historical data in order to provide an initial indication on the future traffic potential of Sava. It is beyond the scope of the present study to carry out analyses of individual projects or make detailed projections on future transport potential.

On the basis of available information, the past role of the river, prior to 1990 will be described. The present status of the river will be presented and ongoing initiatives and existing plans will be summarised.

In addition, this paper presents some key issues and recommendations regarding the approach to be taken on future work on Sava.

Data and information have been gathered through interviews with local authorities, universities and other involved parties. Valuable documentation has been provided by the parties involved in the Sava Basin Initiative.

1.3 Structure of the document

The report provides a profile of the river, including its past and present navigability. The main ports are introduced, and an overview of past and present transport patterns is presented.

The legal and institutional situation regarding the Sava as an international waterway is important for its future role in navigation, and this will be dealt with before the future transport prospects on Sava are addressed.

In a separate section, transport-related projects regarding the restoration and development of Sava are introduced, and finally some preliminary conclusions are drawn regarding issues that should be addressed in the future Sava process.

2 Transport on Sava

While the most important inland waterway in the region is obviously the Danube, which is an established international waterway, the Sava River was once an important inland waterway in the region.

Navigation on the Sava River, and its tributaries, was well developed in the region up to 1990. The commercial waterway had a length of 586 kilometers, and reached from Belgrade to Sisak (Croatia) around 50 km from Zagreb. The links between the ports on the Sava River, by rail and road, facilitated low-cost transportation of goods between the Sava basin and a range of locations.

2.1 History and status

2.1.1 Navigability: History and status

Prior to the war, Sava was navigable from the mouth of Sava near Belgrade to Sisak in Croatia. The commercial waterway was 586 kilometers long. Navigation on the Sava River was an important connection between the Adriatic Sea (Rijeka and Ploce ports) and the Danube River-Black Sea and Western Europe.

From the mouth of Sava at Danube up to Brcko at km 225, navigability was Class IV, whereas from Brcko to Sisak, it was Class III. Class III implies that the river was navigable for ships with a tonnage of up to 1,000 tons, while the figure for Class IV is 1,500 tons with a draught of 2.5 meters. The classification is according to the European Agreement on Main Inland Waterways of International Importance, AGN.

Historically, there has been very limited possibility of navigating from Sisak to Zagreb, and there are no plans to restore or upgrade this section.

The navigability of Sava has a seasonal aspect as well. At Brcko, for example, the river was considered navigable for around 275 days per year, the main problem being low water levels during July-August. Navigability higher up on the river was below 200 days/year. During foggy weather, limits were introduced on navigation speed.



Figure 2.1 Map of Sava river.

Sava's navigability was seriously affected due to several acts of war during the 90's.

During the war in the early 90's, several harbors were mined.

During the NATO campaign in 1999, several incidents contributed to the reduction of present navigability of the river:

- the destruction of a railway bridge at Ostruznica (km. 16), where a 2,000 ton steel structure blocks the navigation channel
- the destruction of a road bridge (km. 14.7) at Jasenovac, where a damaged concrete structure is in the way
- the destruction of a power plant, leading to a transmission cable falling into the Sava
- unexploded ordnance on the river bed
- sunken vessels



Figure 2.2 Destroyed road bridge on the Sava.



Figure 2.3 Destroyed railway bridge on the Sava.

Other factors contribute to limiting present navigability of the river, resulting in a virtual disappearance of traffic on the river.

Heavy sedimentation in certain areas together with a lack of maintenance of the river bed has meant that a considerable amount of dredging would be required in order to restore the river depth to its past levels of navigability. Most of the tributary rivers Una, Vrbas, Ukrina, Bosna and Drina carry considerable amounts of silt material, which is collected at the river mouths.

Ongoing maintenance would also be required. Restoration of traffic would contribute to maintenance of the fairway itself by limiting sedimentation. According to the Transport Master Plan for Bosnia and Herzegovina, 16.5 km of the river bed that runs along the border of Bosnia and Herzegovina would require dredging, with a total volume of 990,000 m³.

Existing riverbank constructions, such as signals, have also been neglected or destroyed and would need rehabilitation. The same is true for the marking signals and navigational safety objects in the river itself.

As a consequence, the navigability of the river has been virtually non-existent, apart from a few local stretches. However, recently some transport has resumed, at the shipping companies' own risk, and has overcome even the major bottlenecks during favorable water flow and tidal conditions.

Initiatives to restore navigability are being planned and executed at both regional and national levels. A number of rehabilitation activities have already taken place:

- Croatia is planning the restoration of the stretch Sisak-Slavonski Brod and has allocated EUR 2 million for dredging of the river bed for each of the years 2002 and 2003. Croatia has also carried out bathymetric surveys and reconstructed signs on part of the river.
- Bosnia and Herzegovina has invested EUR 600,000 in the de-mining of riverbanks and has commissioned bathymetric surveys and plans to clean the riverbed.
- Serbia and Montenegro have spent around EUR 1 million in removing unexploded ordinance from the riverbed.

2.1.2 Main ports: History and status

The present level of services provided by the ports for vessels and associated road and rail transport is, for obvious reasons, very limited as a consequence of the minimal amount of cargo throughput due to the poor navigability and obsolete facilities and equipment.

In addition to the main ports described in the following, there are a number of smaller ports and piers as well as places where sand and gravel is loaded.

The main ports on Sava river in Serbia and Montenegro are **Sabac** and **Mitrov-ice**. From the FRY perspective, both are minor ports with limited strategic importance when compared to ports on the Danube. This is reflected by the fact that no projects have been proposed as priority investments for the Interim Action Plan of the Sava Basin Initiative for either of the ports.

The main ports in Bosnia and Herzegovina are **Brcko**, **Samac** and **Brod**.

Of the three main ports in Bosnia and Herzegovina, the one in Brcko at km. 225 was the largest in terms of cargo turnover.

Pre-war capacity was around 750,000 tons per year. A marked decrease in turnover took place during the late 80's. While the port was still operating near full capacity in 1984, by 1990 traffic had decreased to 77,000 tons of cargo. The port had direct connections to the rail and road networks. However, while there was significant capacity, operational efficiency was relatively low.

With funding from the Italian government, repair work has recently been carried out on the two cranes, and the port is now operational. The further reconstruction of the port would require initiatives in terms of dredging, quay reconstruction, repairing of warehouses. A feasibility study on port restoration has been carried out.

The port at Samac at km. 304 is currently not in operation.

Rehabilitation needed to put the port back into operation would include dredging of port access, quay reconstruction, repair to warehouses, repair of cranes and restoration of road and rail infrastructure..

The port was originally designed for 1 million tons per year with plans to expand to 3 and 5 million tons in subsequent phases as well as the addition of a customs-free zone. The maximum capacity was never reached, and turnover during 1985-1990 was 3-500,000 tons of goods. The port was connected to road and railway systems. It is usable for approximately 220 days per year.

The port in **Bosanski Brod** is a dedicated port for liquid cargo connected to the refinery in Brod. On the Croatian side, the port at **Slavonski Brod** is second in size to **Sisak**, Croatia's biggest river port and centre of river shipping industry.

2.2 Historical transport data

The collection of data regarding historic transport and the underlying economic activity is made difficult by the breakup in the region. Furthermore, considerable variations and inconsistencies appear among available data sources. Systematic information on origin and destination is generally not available. Distinctions between national and international traffic have obviously changed since 1990, and it is often not possible to derive what proportion of what used

to be "national" transport would now be "international" among the Sava River countries.

Inland waterway transport in the region was strongly affected by the conflict in the early 90's and NATO bombing in 1999. At the same time, it is important to point out that even in the former Yugoslavia, waterborne transport played a modest role when compared to other modes of transport. Modal share was low. The modal share of river transport was around 3% of total tonnage in 1990.

The economic downturn that took place in the second half of the 90's in the region was associated with a decline in transport of around 25%. Figure 2.4 illustrates the development in transport levels during the 1980's.

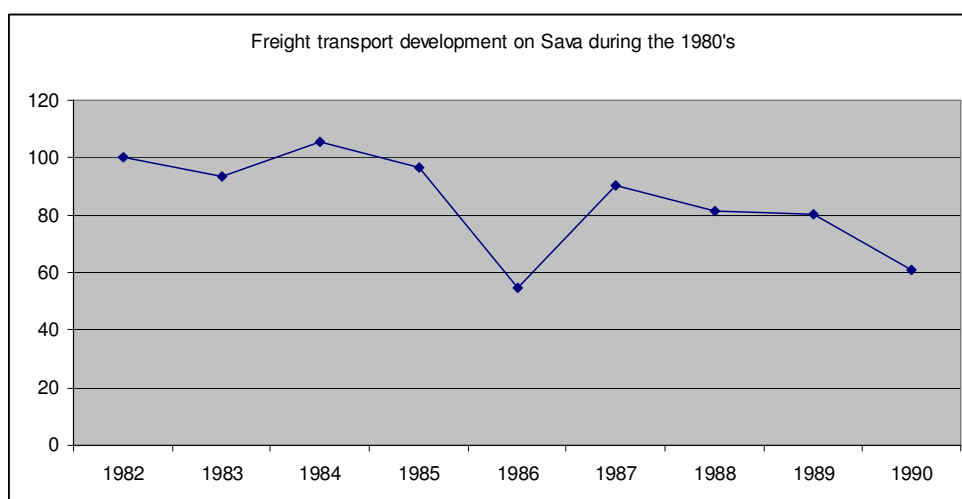


Figure 2.4 Transport development on Sava 1982-1990. 1982 = 100.

According to data from the Federal Bureau of Statistics in Serbia and Montenegro, aggregated traffic on Sava in 1990 was 9.5 million tons of cargo, mainly dry bulk and liquid cargo. For comparison, the figure for international traffic only on the Danube in the late 1980s was around 25 millions tons per year.

More than 90 % of this traffic was "national", i.e. transport within and between the Sava countries. Furthermore, some figures indicate that more than 50% and perhaps up to 80% of the traffic took place outside of the main ports. The main cargo for this traffic was raw material for construction - sand and gravel - transported on barges and often unloaded at facilities outside the main ports.

According to data on international transport (i.e. transport beyond the Sava countries), from the Federal Bureau of Statistics of Serbia and Montenegro, more than two thirds were imported goods, mainly solid fuels and metals.

Brcko, Samac, Brod and Sisak were the key Sava ports in the region. The port of **Belgrade**, at the mouth of the Sava, serves both the Danube and Sava and is not specifically analyzed in this study. Brod was the most important facility in terms of volume, handling, around 50%.

Table 2.1 shows the relative share of transport volume in ton-kilometres for main sections of the Sava in 1983 and 1990:

Table 2.1 Ton-kilometres transported on different sections of Sava.

Section	Share of ton-kilometres in 1983	Share of ton-kilometres in 1990
Mouth of Sava - Sabac	46%	59%
Sabac - Brcko	12%	11%
Brcko - Brod	22%	16%
Brod - Sisak	19%	14%

In Brcko, throughput was 744,000 tons in 1984. The main purpose of the port was transport of bulk goods. The port's primary activity was trans-shipment of imported coal for the coke factory in Lukavac with associated export of coke via Brcko. Tuzla was the most important hinterland with coal and iron as the major cargoes. Turnover declined steadily to 200,000 tons in 1989 and 77,000 tons in 1990.

The dominant cargo types for Brcko were thus:

- Construction materials (iron, gravel, cement, lime etc)
- Coal / Coke
- Iron / Ore
- Steel
- Agricultural products
- Wood
- Fertilizer

Samac was linked via road and rail to industrial locations in Zenica, Doboj, Tuzla, and Sarajevo. Before the war, Samac port was oriented towards production of furniture, refinery and mining, food-processing, and sand/gravel. The dominant products handled in the port were coke, coal, iron, ore, raw materials, foodstuff, and heavy industrial materials for the mining and energy sectors. The key players in the hinterland of Samac were Energoinvest (producing good for i.a. the Russian market) and the steel plant in Zenica. Traffic in 1985 was 500,000 tons.

At the time, two steel facilities and two oil refineries were directly (Sisak and Brod) or indirectly by rail (Zenica) connected with ports on the Sava River. At Brod, the main source of demand for port services is the oil refinery and related terminal. At Sisak, a pipeline has now replaced most of the demand for river transport.

2.3 Present traffic

Following the conflicts in the early 90's and the NATO bombing in 1999, transport on the Sava virtually disappeared. Most of the transport has either disappeared or has been transferred to road.

Even against a background of very restricted navigability and slow economic recovery, there are however recent signs of transport resuming entirely under the responsibility of the navigation companies. Most of the transport is local, but also transport over larger distances is taking place.

Only smaller, local ships are being utilized for this kind of transportation, which takes place at the risk of the operators. Generally, the fleet is old and has deteriorated due to idleness and age.

Recent transport undertakings include:

- Oil and coal between Raca and Sisak.
- In Brcko, 10,000 tons of feedstock was pulled on barges from Belgrade. Similarly, coal has been shipped to Belgrade, crossing the bridge debris during high waters.
- Goods shipped to Slavonski Brod. According to the port authorities in Slavonski Brod, 8 ships have passed from Danube to Slavonski Brod within two months in early 2003.
- According to the Croatian Ministry of Maritime Connections (MPPV), an annual 220,000 tons of crude oil is being shipped from Brod to Sisak. There are plans to transport steel from Ukraine via Danube-Sava (to Zenica) at a level of app. 450,000 tons.
- Gravel is being excavated and dredged and transported over smaller distances.

3 Legal and institutional issues

3.1 Sava River Initiative

Before the splitting up of the region, the Sava River, was used by the four parties as a domestic network. Following the break-up in the region, the Sava covers four countries, Serbia and Montenegro, Bosnia and Herzegovina, Croatia and Slovenia. This entails a range of institutional and management challenges for the countries involved, which have to be dealt with as part of post-conflict regional cooperation efforts.

With the support of the Stability Pact for South Eastern Europe, the four riparian states have entered into a process of cooperation for the sustainable management of the water resources of the basin. Negotiations began with the signing of a Letter of Intent by the Parties, on November 29, 2001 in Sarajevo. The Letter of Intent provided the political basis for the International Sava Basin Initiative. In the Letter of Intent, the Parties decided to cooperate regarding:

- Establishing the status of the Sava River as an international river and putting in place an international navigation regime on the Sava river and its main tributaries, the Una and the Drina
- Promoting sustainable management of the Sava Basin waters and related resources
- Fostering integrated economic development while preserving the environment and the well being of population and
- Creating the proper institutional framework to fulfil these objectives

Cooperation developed toward the formulation of the "Framework Agreement on the Sava River Basin", which has been signed by the four countries and is pending ratification. A key feature of the agreement is the establishment of the International Sava River Basin Commission, which will be responsible for implementation of the Agreement. Two annex protocols are related to transport, one on regulation of the regime of navigation and a second one addressing prevention of water pollution caused by navigation.

The Framework Agreement defines three objectives of the process of cooperation:

1. Establishment of an international regime of navigation on the Sava River and its navigable tributaries
2. Establishment of sustainable water management and
3. Undertaking of measures to prevent or limit hazards, and reduce and eliminate adverse consequences, including those from floods, ice hazards, droughts and incidents involving substances hazardous to water

According to the Agreement the Sava Basin Commission has the following functions:

- Support the provision of safe navigation
- Decide on the financing of the construction of navigable waterways and their maintenance
- Decisions on its own work, budget and procedures
- Recommendations on all other issues regarding realisation of the agreement

A key element of the Sava Initiative is the development of an Action Plan that provides a framework for identifying, prioritizing, scheduling and managing activities and projects for executing the Framework Agreement. The Action Plan is intended to be the “road map” for the Commission in elaborating priority activities and projects. In early 2002, the Sava countries established a Rehabilitation and Development (RD) Working Group to assume the task of designing an interim Action Plan, comprising a number of high priority projects. The first task of the group has been to define objectives and actions in the area of rehabilitation and development of navigation, to be followed up by design of priority programs. More than 50 experts have been involved in the work of a sub-group that was assigned the task of defining the Interim Action Plan.

The process of institutionalizing the cooperation around the Framework Agreement currently centers around four issues:

- **Ratification:** The Framework Agreement will enter into force 30 days after the date of deposit of the fourth instrument of ratification by the Parties. According to the most recent information, the process of ratification has started in all Parties. In Bosnia and Herzegovina, the parliamentary procedure has been completed, and Croatia expects to finish the ratification process by July 2003. After completion of the ratification process, the countries will have to adopt national legislation, in order to meet all requirements of the Agreement.
- **Appointment of representatives of the Commission:** Two representatives will be appointed by each party.
- **Selection of the Commission Seat:** Selection of the Seat of the Commission has been deferred and is still under negotiation by the parties. The issue appears to be a matter of conflicting interest as all parties have nominated themselves as host of the Secretariat.

- **Interim Secretariat:** An Interim Secretariat is serving the Sava Initiative with support from international donors. Recently, the Secretariat has been transferred from the Stability Pact to SECI, which has expertise in trans-boundary water management and infrastructure development.

Whereas the ratification process is ongoing, issues regarding the seat and funding of the Sava Commission appear to be matters of some difference of opinion among the parties. Of more fundamental importance in the longer term might be the fact that Serbia and Montenegro appears to put less emphasis on Sava's role for transportation purposes than Bosnia and Herzegovina and Croatia, while the environmental and water management issues have a higher priority from the perspective of Serbia and Montenegro.

The prospect of committing to major investments in establishing and maintaining navigability with limited national benefits to Serbia and Montenegro may be a cause for some reservation. The Danube is more important from a Serbian and Montenegrin transport perspective, while it is recognized that Danube development may provide spin-offs to Sava.

The desirability of setting up a new institutional structure that will have to deal with issues which overlap with the work of the Danube Commission has also been raised. Once operational, the Sava Commission is expected to take on a role similar to that of the Danube Commission in terms of harmonizing laws, implementing EU directives (most importantly the EC Water Framework Directive), and coordinating major development projects.

A separate, ongoing, Sava-related initiative is the Working Group on the Sava River Basin Management Plan which has been established by the International Commission for the protection of the Danube River (ICPDR) within the framework of a UNDP/GEF project. The working group guides a pilot project for the implementation of the Water Framework Directive for the Sava River.

It should be noted that from the perspective of Bosnia and Herzegovina, the Sava Commission and its secretariat is seen as a facilitator that will not just promote international cooperation but will also be a vehicle for the complex coordination between the three main institutional parties involved from the side of Bosnia and Herzegovina, i.e. the federal level, the District of Brcko, and Republika Srpska.

The ratification of the Framework Agreement will establish the Sava River as an international waterway with the resulting obligations that this entails. At the same time, the signing by the parties of the "European Agreement on Main Inland Waterways of International Importance (AGN) may be regarded as a commitment by the parties.

3.2 Management and private sector participation

It is not just the technical status and the transport potential of the river ports that is important to the future infrastructure development along the Sava. The or-

ganizational and institutional issues are equally significant. The process of moving toward increased market orientation and commercialization is taking place in the countries in question, but at different speeds. Separation of the functions of port management/planning/supervision (to reside with the port authority) and commercial operations are on the agenda in all countries but progressing at different speeds. Presently, Croatia has advanced the most along the path toward privatization and concessioning of port activities. This is reflected most strongly in the case of Slavonski Brod, where a large multi-modal transport project is under development in cooperation with the private sector.

4 Outlook and prospects

The validity of historic data for projections of present and future transport demand is obviously questionable given the significant changes in levels of economic activity as well as production and trading patterns that have taken place and will take place in the coming years.

The future development of transport on Sava River and the need for port investment will depend on the economic development of the region. Future volumes of commercial traffic will be determined by industrial and commercial demand. Beyond the restoration of basic navigability, future investments will be conditioned by underlying economic development in the hinterland of the Sava and its ports. Factors such as differences in industrial development and geographical location of industrial centers will shape the future potential for river transport.

It is beyond the scope of this study to provide an in-depth analysis of the prospects of Sava as a major regional inland transport waterway in the coming years. The data is not readily available and the issue has not been analyzed in depth so far. In fact, several national authorities have emphasized the lack of and need for an integrated regional analysis of likely economic development scenarios and related transport issues along the Sava River.

At the national level, Bosnia and Herzegovina has developed a Transport Master Plan which also addresses the inland waterways, whereas in Croatia and Serbia and Montenegro, a comprehensive regional assessment of the transport potential on the Sava has not been carried out, providing the basis for the preparation of individual ports projects. Consequently, the information is not presently available that would provide the basis for an integrated planning and prioritization of investments in Sava transport infrastructure, in particular when it comes to the demand and potential for intermodal transport solutions.

This fact is also reflected in the output of the design of the Interim Action Plan. When it comes to investments beyond the basic restoration of navigability, the investment proposals put forward regarding the port facilities are projects that have mainly been designed and developed at the national level rather than as the result of a regional planning process.

Assuming a level of continued political and economic stability in the region, the volume of national and international cargo can be expected to grow with

economic development and once navigation on Sava is fully restored. At the same time, considerable uncertainty remains regarding future production and trade patterns with the European Union and Central and Eastern Europe (CEE). Therefore, historic traffic statistics available from the region cannot be extrapolated to forecast future traffic.

It appears to be a reasonable assumption that the volume of bulk and liquid cargo (such as minerals, building materials, and petroleum products) will increase, although the data available does not provide a clear indication of the likely level. EUDET projections of traffic on the Danube range from a modal share for inland water traffic ranging from 1% to 6% (freight transport by inland waterways in the European Union accounts for 7% of total inland transport). Transport projections for Sava should take into account the fact that there is modal competition, as the River runs parallel to Corridor X, for which both road and rail projects have been defined.

Experience from other CEE countries does not suggest that any dramatic increase in the modal share of river transport is likely. The share of ton-kilometers of rivers has been between 2 and 3% since the 70's, with a slight increase in share during the late 90's. However, this has taken place against a backdrop of substantial decline in absolute traffic volume. The modal shares in CEE countries correspond to that of Western European countries with a modest level of waterway infrastructure development.

In the REBIS project, the growth rate of inland waterway traffic is roughly assumed to follow GDP, which is higher than rail and less than the projected growth in road traffic.

The Transport Master Plan for Bosnia and Herzegovina has developed a number of scenarios for transport development on the Bosnia and Herzegovina section of the river. According to this, the most probable development scenario will lead to an increase in river transport to around 3 million tons per year by 2020, which is similar to pre-war figures (including 600,000 tons of oil and derivatives from the refinery in Brod).

An important issue in Sava transport development will be the link to pan-European corridors. Improved road and rail connections along Corridor Vc offer a potential for integrated and intermodal transport systems. In Western Europe, river transport is increasingly associated with ro/ro traffic and container transport.

Specific observations

In Serbia and Montenegro, the main industries in the *hinterland* of the two main ports is a wood for cellulose plant and a shipbuilding yard near Mitrovica and a steel factory and chemical company at Sabac. The steel factory has been taken over by US Steel and is shipping to i.a. the Czech republic.

Transport of oil and derivatives to and from refineries near the ports in Serbia and Montenegro is now taking place via pipeline, eliminating the major source of demand for river transport.

Further industrial centers connected to the Danube by Sava include Sabac, Valjevo, Loznica and Obrenovac. These centers also have chemical, metal processing and food processing industries

In Bosnia and Herzegovina, the industrial analysis carried out for the Transport Master Plan identified the following cargo types and industrial centers as being of particular relevance to the future traffic on the Sava River:

- steel and metal production, mainly in Banja Luka, Zenica, Trebinje and Gorazde
- coke and coal in Zenica and Lukavac
- thermal coal in central Bosnia mines
- sand and gravel in Gradiska and regional construction
- forest and wood from Pale, Travnik, Mostar, Banja Luka
- fertilizers and agricultural products from Banja Luka, Travnik and Orasje
- oil and oil derivatives in Brod

The role of Brcko is primarily to serve its natural hinterland in the larger Tuzla region. According to the Feasibility Study for Rehabilitation of Brcko Port (Parsons Brinckerhoff Intl., 2000), future cargo throughput will consist mainly of import of steel, grain, vegetable seeds, sand & gravel, whereas exports will primarily be iron ore. According to projections, annual cargo throughput is expected to increase to 727,000 tons/year in 2011 in the baseline scenario. The "rehabilitation only" scenario predicts a tonnage of 375,000. Key industries such as steel in Zenica, coke in Lukavac and sand and gravel for construction will be critical to the future of the port in Brcko.

Samac will have its natural hinterland oriented towards the Republika Srpska and in addition benefit from its location on Corridor Vc. In the longer term, this can be expected to have a favorable impact on the growth of transport through Samac.

Limited information is available on Samac. According to the project fiche developed for the Interim Action Plan, predicted cargo level in 2015 is 400,000, 80% of which is international.

According to the scenarios in the Bosnia and Herzegovina Master Plan study, the traffic of oil and derivatives to and from the refinery in Bosanski Brod is likely to increase from initially 200,000 tons to 1.3 million tons out of a capacity of 5 million tons.

A major intermodal investment project is being designed in Slavonski Brod in cooperation with the private sector. According to the port development concept, the volume of cargo is expected to be an initial 400,000 tons/year, reaching 2 million tons after 5 years and 3.5 million tons after 10 years.

A new major study on Waterways in Serbia is underway, financed by the European Agency for Reconstruction. This study, which has a budget of EUR 2.1 million, is likely to provide some of the analysis of transport potential that is still lacking.

5 Identified projects on Sava

A large number of different projects have been identified on Sava as to bring the river back to same navigable, environmental and embankment standards as before the war.

Several projects, with different characteristics, have been identified by the process of elaborating an Interim Action Plan as part of the Sava Initiative. The projects are briefly listed in this chapter. In addition REBIS has in an earlier stage in close co-operation with the local authorities screened and identified 8 projects on Sava. These projects are described briefly in the following chapter.

5.1 Projects identified by REBIS

REBIS has identified:

- 3 projects on Sava in Croatia
- 3 projects on Sava in Bosnia and Herzegovina
- 1 project on Sava in Serbia and Montenegro

Restoration and regulation of Sava River, Croatia

The scope is to restore and regulate Sava between Sisak and the FRY border (376 km). The project includes dredging of Sava to upgrade the navigability to high Class IV standard (2.5 m) from 2.2 m; and the construction of regulation facilities.

Construction of Sava-Danube Canal, Croatia

The project comprises construction of a new canal linking the Danube to the Sava, together with approach roads and bridges. 62 km long with 2 locks (possibility of tolling at these locks). The project aims are to improve transportation, irrigate and drain parts of the region (flood protection) where the canal will be located. An EIA has been carried out and the project is high on the govt. list of prioritised projects. The size of the investment is however such that part of the justification is to support development in the East Slavonia region.

Construction of an inter-modal container terminal with logistic centre in Slavonski Brod, Croatia

The scope is to construct an inter-modal container terminal and a logistic centre with storage, packing and parking facilities. This is a port renewal project because Slavonski port was damaged during the recent war. It is the first phase of

a longer term project, and the subsequent phases are dependent on the construction of the Sava-Danube canal and future through navigability to Belgrade. The project is being developed as a public-private partnership. The Croatian authorities are to finance project development, land and connecting infrastructure, whereas the private partner will invest in installations, equipment, buildings and employ local staff.

Reconstruction of Port of Brčko, Bosnia and Herzegovina

Port of Brcko needs reconstruction after the damages of the war. Feasibility studies are already implemented. Dredging port access, quay reconstruction, repair of warehouses, upgrading of road and rail infrastructures are now awaited. Crane restoration has been carried out with support from the Italian government, and the port is now operational.

Reconstruction of Port of Šamac, Bosnia and Herzegovina

Port of Šamac needs reconstruction after the damages of the war. There are two 5-tonne cranes which are out of order as well as a burned warehouse. Dredging port access, quay reconstruction, repair of the warehouse, upgrading of road and rail infrastructures and repair of cranes are expected.

Rehabilitation of the navigation channel for Sava River, Bosnia and Herzegovina

A big part of the 333 km of Sava needs cleaning, dredging and clearance of all debris and missiles still laying in the bed after the war. The project comprise finalisation of demining, clearance of the river in order to upgrade it, in a second step to Category 4 from its mouth to Brcko and to Category 3 up to Sisak.

Clearance of the Sava, Serbia and Montenegro

The objectives of the project are to restore safe navigation on the river in clearing the river bed, carrying out priority maintenance and installing adequate marking system. The immediate needs are:

- Clearing unexploded ordinance from riverbed in Ostruznica area; Removing debris of collapsed bridges
- Bathymetric survey and rehabilitation plan for existing waterway
- Execution of rehabilitation plan (selective dredging, marking, debris clearing, restoring navigation devices) to bring the waterway up to minimal navigation standards.

The Sava in FRY was seriously affected by the destruction of a railway and road bridge at Ostruznica, the destruction of a power plant, which transmission cable fell into the Sava, and unexploded bombs on the river bed. Traffic has disappeared completely due to existing obstacles and deficiencies.

5.2 Projects identified by Stability Pact

Stability Pact has identified some of the same projects with the aim to reopening navigation on Sava and to rehabilitating main ports and multimodal transport.

Identified Projects - Reopening Navigation

- Clearance of bridges debris in area of Ostruznica and Jasenovac
- Bathymetric survey and rehabilitation plan for existing waterway
- Rehabilitation of fairway for minimum navigation category
- Marking of waterway
- Demining of river banks

Identified Projects - Rehabilitation of Ports and Multimodal Transport

- Demining related to ports
- Reconstruction of Brcko Port
- Reconstruction of Samac Port
- Reconstruction of Slavonski Brod Port
- Improvement of Belgrade Port

These projects are important element in the Interim Action Plan for Execution of the Framework Agreement on the Sava River Basin.

6 Conclusion

There is considerable regional and national commitment to the Sava process, and in this process, Sava's potential as a transport corridor is high on the agenda among the interested parties. Transport on Sava is playing a prominent role both in the Sava Basin Initiative and in the transport planning at the national level in the countries concerned.

Four main issues can be identified that will be essential in order to make the ambitious visions for Sava's role in the regional transport system come true:

1. The status of the Sava as an international waterway must be clearly established, as it is likely to happen through the ratification of the Framework Agreement.
2. The Sava Commission and other regional processes and institutions must become operational vehicles for regional cooperation, analysis, planning, and project development. The parties interviewed for this study have expressed a common need for regional transport and economic analyses that can provide the necessary basis for development and financing of future projects. In particular, there is insufficient knowledge about the potential for linkages with rail/road transport modes and opportunities for combined transport solutions. Both national and local governments, port authorities and potential private sector investors would benefit from additional knowledge, and it can be expected that the Sava Commission will address these issues.
3. Financial resources for upgrading of Sava and its ports and transport facilities will be scarce, which means on the one hand that public funding will have to be prioritized and allocated based on accepted economic rationales, while at the same time public-private partnerships will be required to reach the desired level of investment. Legal and institutional issues will have to be resolved with regard to port management, restructuring and privatization. International Technical Assistance may be able to provide support for this process.
4. Finally, economic development patterns in the region must provide the underlying demand for transportation services that match the special characteristics of river transport.

In light of the findings of the present study and the uncertainties associated with the four issues mentioned above, a prudent approach would probably be to apply a phased approach to the restoration and further development of Sava as an international waterway:

During the first phase, navigability would be restored and basic rehabilitation carried out to make selected ports operational. Initiatives to restore navigation and do basic rehabilitation of ports are already underway in all of the countries.

In a second phase, more comprehensive development plans and investments may take place, depending on the development in the above parameters with due consideration of the overall scheme of transport in the region including linkages with Trans European Corridors. These investments would to a large extent depend on public-private-partnerships for their development and financing.