EUSAIR Transport MasterPlan

Volume 3

Inland Waterway Transport

Contents

This Volume is part of the *Transport Masterplan of the Adriatic-Ionian Region*, elaborated by the *EUSAIR Facility Point* with the technical assistance of *PTSCLAS*, *TPS Pro* and *Systematica*, with the collaboration of *Tplan Consulting*, under the supervision of *Prof. Pierluigi Coppola* (Politecnico di Milano). Credits for reviewing and editing goes to *Dr. Francesco de Fabiis* (Politecnico di Milano).

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1 Inland waterway transport in the Adriatic-Ionian region: general description and key issues

1.1 Inland waterways: description and key issues

The Adriatic-Ionian macro region is served by various important rivers and canals that create a relevant and widespread network of Inland Waterways along which there are several inland ports. In this chapter a brief description of the IWW network that serves the Adrion region will be presented[1].

1.1.1 Danube river

Geographical Location

The Danube is one of the most important waterways within the European navigation network. This waterway that links the North with the Black Sea is more than 3.500 kilometers long and runs across fifteen European countries[2]. The Danube River is divided into three sections:

- Upper Danube (624 Km), running through Germany, Austria, Slovakia and Hungary.
- Middle Danube (860 Km), flowing through Slovakia, Hungary, Croatia, Serbia and Romania.
- Lower Danube (931 Km), running through Serbia, Romania, Bulgaria, Moldova and Ukraine

Geographical Location in the ADRION Region

The Danube river flows across the Adrion region from the border between Hungary, Croatia and Serbia, river Kilometer (rKm)[3] 1433 (near the port village of Batina – HRV) to the border with Romania and Bulgaria ("Iron Gates") at rKm 845.5, near the Timok River confluence, just after the inland port of Prahovo (SRB).

The "ADRION section" of the Danube river is partly consistent with the Middle basin (part of the Danube from Bratislava to the Iron Gates, at the border between Serbia and Romania); in this section the Danube is joined by the waters of three major tributaries - the Drava, the Tisza and the Sava - which nearly triples its flow[4].

Main type of goods transported and modal share per country

As regards the type of goods transported along the Danube middle basin, the steel industry (iron ore, metals, and a part of coal) accounts for 45-55% of the total cargo, that together with the agricultural sector reach approx. the 70% of cargo transport on the Middle Danube[5]. Other main cargo transported along this section of the Danube river are: Chemicals (16%); Mineral oil products (13%). A particular case is represented by sands, stones and gravel that is a cargo segment which is present on the Upper and Lower Danube, but not

[1] Only the river sections that are commercially exploitable are going to be analyzed.

[2] *The Danube river and its importance on the Danube countries in cargo transport*, A. Dávida, E. Madudováb, 13th International Scientific Conference on Sustainable, Modern and Safe Transport (TRANSCOM 2019), Slovak Republic, May 29-31, 2019

[3] Distance, in kilometers, from the mouth of the indicated river

[4] https://www.icpdr.org/main/danube-basin/river-basin

[5] MARKET REPORT 2014-2019, Main features and trends of the European Inland Waterway Transport sector, Central Commission for the navigation of the Rhine, 2019

on the Middle Danube. Finally, container transport is not present on the Danube at all (in the Rhine it has a share of 8.7%)[6].

As regards the transport modal share per country, in Croatia, the IWW transport modal share decreased from 7% in 2014 to 5% in 2018. At the same time IWW transport in Croatia increased by 17% from 2014 to 2019[7].

IWW transport in the last 5 years (2014-2019) increased more in the Danube countries if comparted to the Rhine ones due to various reasons:

a) Higher annual growth rates of GDP of eastern European countries than western ones;

b) Energy transition and decline of steel production in western Europe caused a fall in the coal and iron transport in the Rhine countries. On the contrary in the Danube eastern European countries the steel production has increased, especially the Serbian one (+231%);

c) Evolution of cargo transport on the Rhine between 2014 and 2019. As regards dry cargo (with the exception of sands, stones and building materials) the trend was negative due to the shift away from coal (determined by the energy transition towards carbon-neutral economies) and to the weakening of the economic conditions in the steel industry in 2018 and 2019 (determined by trade barriers, such as extra tariffs on cars and on steel, and by a general slowdown of world trade). Liquid cargo performed better than dry cargo: for chemicals and containers, the volumes in 2019 were still lower than in 2017 due to the weaker macroeconomic conditions (slowdown in industry production growth, slowdown in world trade) but it is important to underline that during the low water periods occurred in 2015, 2017 and 2018 the Rhine lost market shares to rail transport.

So, thanks to the role of the rising industrial activity in the Lower and Middle Danube, waterside traffic has grown strongly in the Danube and most Danube countries experienced a growth in overall waterway transport between 2014 and 2019. For example, Serbian inland ports (Smederovo, Pancevo, Novi Sad, Prahovo) have increased their activity in a clear way thanks to the growth of the Serbian steel industry driven by Chinese direct investment (e.g. port traffic in Smederovo has grown of the 167%, passing from 1.5 Mtons in 2014 to 4.0 Mtons in 2019).

Fleet

The type of fleet in use along the Danube waterway (about 2,700 vessels) the 77% of the whole fleet operates in the dry cargo segment (2017) and push & tug shipping[8] is still a predominant market in the Danube region, in particular for iron ore transport, even if it is decreasing. As regards the age of the fleet, in Danube Countries the percentage of the oldest vessels (those which were built before 1940) represents only 2% of the total fleet, in particular as regards ADRION Danube countries:

[6] MARKET REPORT 2014-2019, Main features and trends of the European Inland Waterway Transport sector, Central Commission for the navigation of the Rhine, 2019

[7] Ibid.

[8] Two types of cargo vessels are used on the Danube and its navigable tributaries depending on the combination of their propulsion systems: a) Motor cargo vessels (or "self-propelled vessels") are equipped with an engine and a cargo hold; b) Pushed convoys consist of a pusher (motorised vessel used for pushing) and one or more non-motorised pushed lighters that are attached to the pushing unit.

Table 1: Age of IWW fleet of Croatia and Serbia (2017)

Fleet	Before 1941	1941-1960	1961-1980	1981-1990	1991-today
Croatia	4%	25%	60%	8%	3%
Serbia	3%	5%	45%	14%	33%

Source: Central Commission for the navigation of the Rhine

Classification of the IWW

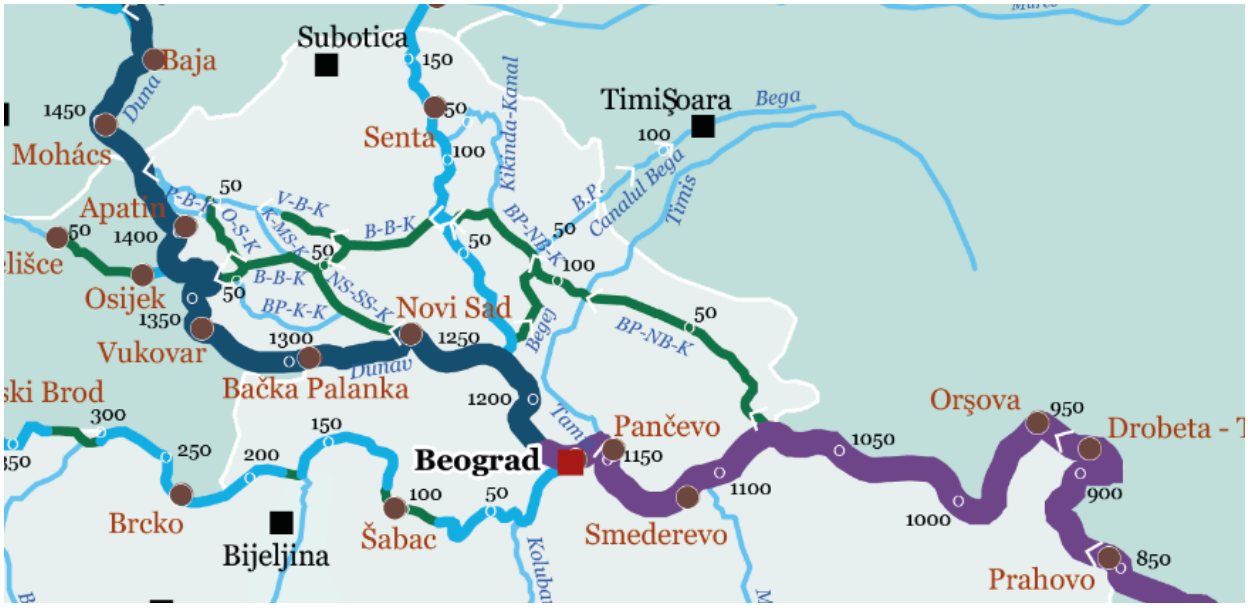
As regards the classification of the Danube river IWW stretches it is possible to identify two stretches: between Budapest and Belgrade and between Belgrade and the Danube delta. In the first stretch the Danube is classified as class VIc. It means that, as regards motor cargo vessels, are allowed vessels that have the following characteristics: Length (L): 140 m, d: 3.9 m, Tonnage (T): 1.5 K – 3 K ton, and as regards pushed convoy, are allowed convoys that consists of a pusher and max. six pushed barges. Instead, between Belgrade and the Danube delta, the river is classified as class VII. It means that, as regards motor cargo vessels, vessels are allowed that have the following characteristics: L: 140 m, d: 3.9 m, T: 1.5 K – 3 K ton, and as regards pushed convoy, are allowed convoys that consists of a pusher and max. nine pushed barges.

Table 2: Classification of the Danube IWW stretches (between Budapest and the river delta)

rkm	rkm	Length (km)	Waterway Class
1650.0 Budapest (HRU)	1168.0 Belgrade (SRB)	482.0	VIc
1168.0 Belgrade (SRB)	0.0 Danube delta	1168.0	VII

Source: Central Commission for the navigation of the Rhine

Figure 1: Danube river IWW section in the A-I region (in dark blue/purple)



Source: Viadonau.org

Key issues

Although its potential, the volume of goods transported along the Danube is lower than on the Rhine due to different factors such as transformation processes in the Danube countries in the 1990s, the civil war in the former Yugoslavia that stopped the navigation or insufficient support from some countries to upgrade fleet and infrastructure in the Danube ports[9].

The most critical part of the Danube river IWW, as regards inland navigation, is represented by the common Croatian and Serbian part of the river. In particular the stretch from 1433.1 rKm (border between Hungary, Croatia and Serbia) to 1295.5 rkm (near the port of Bačka Palanka) is considered critical in terms of navigation conditions and dissemination of sediment and ice. On the partly regulated reaches of the Danube river between 1433.1 – 1295.5 rkm, ships can operate a minimal draft of 2.5 m at low water during the majority of a year. As water levels are very difficult to predict, vessels have to wait for higher water levels or partly unload during some low water periods. In order to ensure an adequate water regime for transport and the protection of banks from further erosion and morphological changes in the riverbed of the Danube, it is necessary to propose adequate measures, due to the fact that at this stretch there were almost no activities performed in last 25 – 30 years (mainly due to the war and bilaterally non-agreed border line)[10].

- Insufficient maintenance of the Danube River in some Danube countries
- High costs for modernization of fleet and infrastructure in the Danube ports
- Political issues between Danube countries

1.1.2 Sava river

Geographical location

The Sava river flows in Central and Southeast Europe and it represents the longest tributary of the Danube. The length of the Sava River from its main source in western Slovenian mountains to its confluence with the Danube in Belgrade (Serbia) is approximately 944 km. The total basin area of 97,713 km2 covers major parts of territories of Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and minor territory of Albania.[11]

Geographical Location in the ADRION Region

The Sava river flows in the Adrion Region for approx. 600 Km, through Slovenia (the Slovenian section of Sava river is currently not commercially exploitable), Croatia (the Croatian section of Sava river that is currently commercially exploitable starts in Sisak, Km 600), Bosnia and Herzegovina (all along the border with Croatia) and Serbia where, in the city of Belgrad (SRB), the Sava river flows into the Danube river.

The Sava River waterway is divided into three sectors[12]:

[9] *Ibid.*

[10] https://navigation.danube-region.eu/improving-navigation-conditions-on-the-danube-river-from-1295-5-1433-1-river-km-eliminating-bottlenecks-on-the-croatian-serbian-part-of-danube-river/

[11] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[12] *Ibid.*

- Upper Sava from the rkm 594 to the rkm 467;
- Middle Sava from the rkm 467 to the rkm 139;
- Lower Sava from the rkm 139 to the rkm 0.

Classification of the IWW

Table 3: Classification of the Sava River Waterway

rkm	rkm	Length (km)	Waterway Class
0.0 Sava mouth (SRB)	81.0 Kamičak (SRB)	81.0	Va[13]
81.0 Kamičak (SRB)	176.0 Rača (border SRB-BiH)	95.0	IV
176.0 Rača (border with SRB-BiH)	196.0 Domuskela (SRB)	20.0	III
196.0 Domuskela (SRB)	313.7 Šamac (BiH)	117.7	IV
313.7 Šamac (BiH)	338.2 Oprisavci / Rit kanal (HRV)	24.5	III
338.2 Oprisavci / Rit kanal (HRV)	371.2 Slavonski Brod/Bosanski Brod	33.0	IV
371.2 Slavonski Brod/Bosanski Brod	594.0 Sisak (HRV)	222.8	III

Source: International Sava River Basin Commission

Figure 2: Sava river IWW section in the A-I region (in green and bold azure)

Source: Viadonau.org

[13] Class Va standard: motor cargo vessels (L: 95-110 m; d: 2.5 - 2.8 m; T: 1.5 K – 3 K ton); pushed convoy (pusher + max. one pushed barges).

Key issues

Prior to the break-up of the former Yugoslavia, navigation on the Sava was possible from the river mouth on the Danube up to Rugvica (HRV) for a length of 683 rkm, and the river played an important role in the freight transport network: in 1990 the tons of bulk cargo transported along the river were 5.2 millions and the river was navigable nearly 300 days per year[14]. The conflict was particularly hard on the Sava river and its ports, as in many areas the river represented the front line and the infrastructure was devastated and the area heavily mined[15]. After the conflict, the navigation conditions along the Sava river were progressively deteriorated due to various reason, including lack of maintenance of the river bed, lack of cross-border collaboration on the development of the waterway, presence of land mines, strongly fluctuating discharge and heavy sedimentation in certain areas[16]. Thus has led to a reduction in the width and depth of the navigable channel that make the navigation difficult[17] (in particular in some key bottleneck section were the navigability is costrained to only 160 days per year) and to a reduction of the freight transport (only 500K tons in 2008): today the Sava River is navigable for larger vessels from Sisak (it is navigable from Rugvica to Sisak for smaller sport or pleasure crafts)[18].

Although freight volumes are partially recovering (877,000 tons in 2018)[19], the main issues still prevent the full development of inland waterway transport along the Sava river are:

- Risk of flooting: it is necessary to upgrade the flood protection infrastructures to address the increasing risk of flooding due to climate change;
- Mines: demining the Sava's right bank within Bosnia-Herzegovina (BiH) is a prerequisite for the improvement of the Sava waterway;
- Waterway class: Sava meets a "continuous" Class IV standard[20] only through the last 100 rKm of its fairway (between Šabac and Belgrade); upstream from Šabac, the river is operationally considered Class III standard[21] due to the presence of bottlenecks that limits corridor navigability even if the major part of the river sections comply with Class IV provisions (at least until Slavonski/Bosanksi Brod, approx. rKm 370).

[14] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[15] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[16] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[17] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[18] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[19] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[20] Class IV standard: motor cargo vessels (L: 80-85 m; d: 2.5 m; T: 1 K – 1.5 K ton); pushed convoy (pusher + max. one pushed barges).

[21] Class III standard: motor cargo vessels (L: 67-80 m; d: 2.5 m; T: 650 – 1 K ton); no pushed convoy.

- Inland ports: the river ports serving the Sava IWW freight transportation (Sremska Mitrovica, Brčko Port and Slavonski Brod) needs modernization, an improvement in the multimodal connections and environmentally friendly facilities;
- Type of commodities moved: the freight transport along Sava river is dominated by bulk cargo, with no incidence of container transportation.

The Sava River's waterway is not completely marked, while the activities on a marked part are carried out in accordance with valid international regulations. Winter shelters are proclaimed on the waterway, but there are no officially proclaimed anchorages[22].

In this context is important to mention the "Sava and Drina Rivers Corridors Integrated Development Program" (SDIP) promoted by the World Bank (International Bank for Reconstruction and Development - IBRD) in July 2020. The SDIP foresees an integrated development of the Sava and Drina Corridors through a multiphase programmatic approach; the total estimated program cost is US $ 332.4 million, including a program-level IBRD financing envelope of US $ 302.8 million. The first phase (2020-2026), for which a total cost of US $ 139.3 million is foreseen, is composed by 4 component:

1) Integrated Management and Development of the Sava River Corridor (€94 million, of which IBRD is €86 million and grant financing €8 million) that includes Flood Protection and environmental management (Sub. 1.1), Waterway improvements (Sub. 1.2) in the terms of demining the right bank of the Sava river, Enhancement of ports facilities (Sub. 1.3) at the port of Sremska Mitrovica (SRB);

2) Integrated Management and Development of the Drina River Corridor (€21 million, all IBRD);

3) Project Preparation and Management (€16 million, all IBRD) that includes Phase II preparation (Sub. 3.1) in the terms of financing the preparation of the project documentation (e.g. design of a docking facility at the Port of Gradiska and improvement of the section Racinovci–Vrsani) for Phase II of the program and Institutional strengthening and project management (Sub. 3.2).

4) Regional Activities (€8 million, all grant financing) that includes Regional dialogue, project management, and coordination (Sub 4.1) that promotes joint action and decision-making in river basin management and flood risk management among riparian countries and Regional plans, studies, and strategies of basin-wide importance (Sub 4.2) that will support consultations, preparation of basin plans and studies.

The start of Phase II will depend upon the implementation readiness of the sub-projects that will comprise the program's second phase (for example, the completion of feasibility studies, environmental and social impact assessments, and related documents).

1.1.3 Drava river

Geographical Location

[22] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

The Drava River is one of the major right-bank tributary of the Danube River, located in south-central Europe. It rises in the Carnic Alps near Dobbiaco (Toblach), Italy, and flows eastward through the Austrian Bundesländer (federal states) of Tirol and Kärnten. From there it flows southeastward through Slovenia. Near Legrad, Croatia, it is joined by the Mura (Mur) River and forms part of the Croatian-Hungarian border.

Geographical Location in the ADRION Region

The Drava river IWW flows in the Adrion region from the port of Belišce (HRV), approx. Km 55, to the point where the Drava joins the Danube. The Drava river flows inside the Adrion region (excluding the Italian section) for approx. 445 Km through Slovenia and Croatia, but only a smaller part of the Croatian section is commercially exploitable, in particular the one that goes from mouth of Danube to Osijek port that complies with class IV CEMT.

Figure 3: Drava river IWW section in the A-I region (between Belisce and the confluence with Danube)

Source: Agency for Inland Waterways (HRV)

Classification of the IWW

Table 4: Classification of the Drina River Waterway

rkm	rkm	Length (km)	Waterway Class
0.0 Drava mouth	14.0 Osijek port	14	IV
14.0 Osijek port	55.45 Belišće	41.45	III
55.45 Belišće	70.0 Hungarian border	14.55	II
70.0	198.6	128.60	II

Source: Transport Development Strategy of the Republic of Croatia (2017 – 2030)

Key issues

One of the main issues concerning the Drava waterway is represented by the necessity to ensure the navigability in line with the required navigability level according to the European Agreement on Main Inland Waterways of International Importance (AGN). In order to achieve that navigability requirements, the dimensions of the waterway has to be increased and the bottlenecks eliminated (trough among others dredging and/or construction of new waterways structures)[23].

1.1.4 Tisza river

Geographical Location

The Tisza River is a major tributary of the middle Danube River, rising in the Bukovina segment of the Carpathian Mountains. Its two headstreams, the Black and White Tisza, unite east of Sighet on the Ukraine-Romania border. From Sighet, Romania, the Tisza flows northwest through a small portion of Ukraine and then into Hungary. It then flows in a great northward loop to where the Slovak, Ukrainian, and Hungarian frontiers converge near Chop, Ukraine. The Tisza continues southwest through Hungary then it cuts southward, paralleling the Danube, which it joins 45 km north of Belgrade, Serbia, after a course (largely canalized) of 966 km.

Geographical Location in the ADRION Region

The Tisza river IWW flows in the Adrion Region from the border between Hungary and Serbia (near the village of Đala) at rKm 164.0 to the village of Stari Slankamen (SRB) where the Tisza river flows into the Danube.

Figure 4: Tisza river IWW section in the A-I region (in bold azure)

Source: Viadonau.org

[23] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

Classification of the IWW

Table 5: Classification of the Tisza River Waterway

rkm	rkm	Length (km)	Waterway Class
0.0 Tisza mouth (SRB)	254.0 Csongrád (HU)	254	IV
254.0 Csongrád (HU)	403.0 Kisköre (HU)	149	II
403.0 Kisköre (HU)	612.0 Tuzsér (HU)	209	III
612.0 Tuzsér (HU)	685.0 Vásárosnamény (HU)	73	I

Source: Tisza River Basin Characterization. Report on Surface Water

Key Issues

The Tisza River's waterway is completely marked in accordance with the applicable international regulations, but there are no officially proclaimed safety objects of navigation: winter ports, shelters and anchorages[24].

Among the main issues of all inland ports in the region, it is worth underlining:

- The lack of alternative fuels facilities
- The need to upgrade several sections to Class IV or V
- The lack of safety conditions capable to ensure all year long free stream navigation

1.1.5 Hydro system Danube-Tisza-Danube (HS DTD)

Geographical location

The Hydro system Danube-Tisza-Danube is a single waterway canal network integrated in waterways of the rivers Danube and Tisza in the region of Vojvodina, Serbia.

Classification of the IWW

[24] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

The DTD hydro system is navigable for 600 Km, out of which 13,1 km belongs to the category Va, and 289,8 km to the category III[25].

Figure 5: Hydro system Danube-Tisza-Danube (in green)

Source: Viadonau.org

Key issues

- designs of new types of vessels suitable for navigation in the category III of waterway;
- revitalization of affected sections contaminated by mud (Vrbas, Zrenjanin);
- rehabilitation of the Bezdan ship lock as an entry point from the river Danube into the DTD canal system (Great Backa Canal/Veliki Backi kanal)[26].

1.1.6 Northern Italy Inland Waterway System (NIIWS)

Geographical location

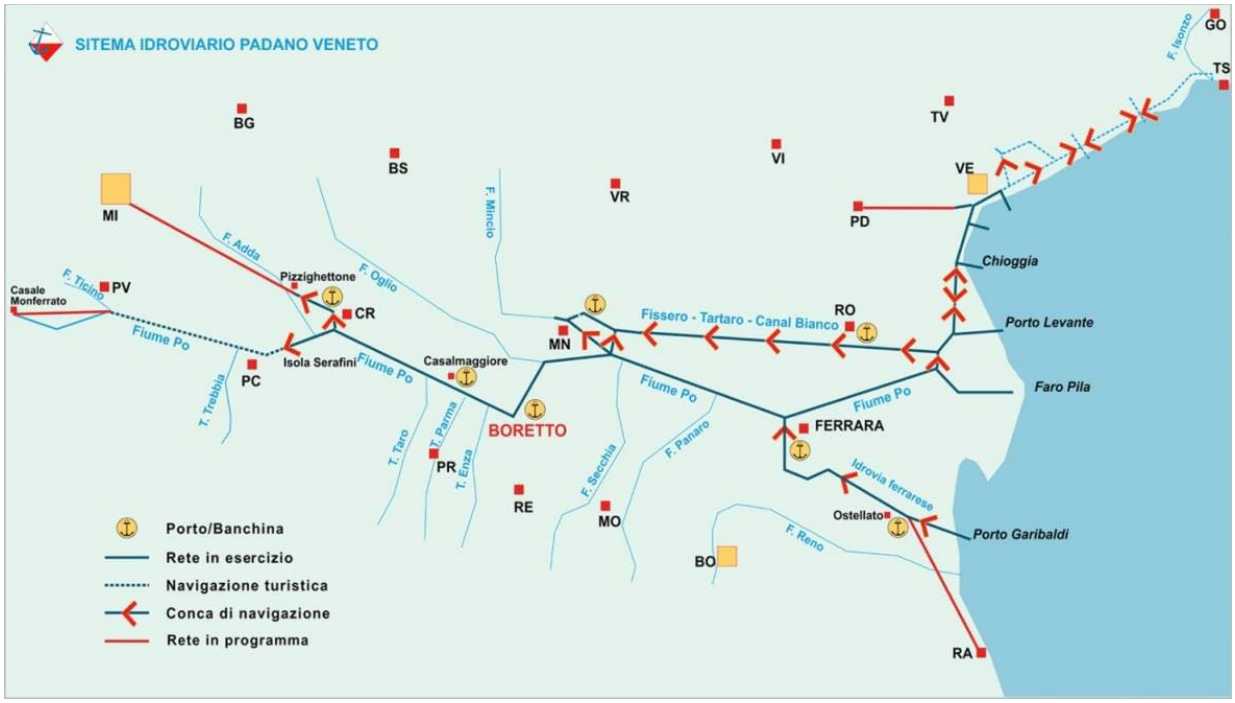
The Northern Italy Inland Waterway System (NIIWS), or "Sistema Idroviario Padano-Veneto", is located entirely in Italy, from Casal Monferrato (in the Piemonte Region) to the Po river delta and Ravenna on one side and the borders with Slovenia near Trieste on the other. The NIIWS is built around the Po River, that is the natural waterway that extends along the Po Valley, from West to East; following the main axis represented by the Po river (approx. 440 Km formally navigable, 280 Km currently navigable), the Northern Italy IWW, just before the Po delta, split its path in two different directions: towards South, from Ferrara to Ravenna through the Idrovia Ferrarese section (approx. 70 Km long) and towards North passing through the Po - Brondolo canal (approx. 19 Km long), the canals of the Venice Lagoon and then the Litoranea Veneta waterway up to Trieste (Venice Lagoon – Grado Lagoon; from Pontegrandi to Isonzo river mouth) (approx. 135 Km long). Another three important sections of the NIWS are the Fissero Tartaro-C.Bianco-Po di Levante

[25] *Ibid.*

[26] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

waterway (approx. 135 Km long), the Idrovia Milano – Cremona (approx. 66.5 km long, only 13 Km actually completed) and the the river Mincio from Mantua to the confluence with the Po (approx. 21 km long).

Figure 6: Northern Italy Waterway System



Source: AIPo (Agenzia Interregionale per il fiume Po)

Classification of the IWW

Table 6: Classification of Northern Italy Waterway System

Waterway	Length (km)	Waterway Class
Po river (Cremona – faro Pila)	280	n.a.
Po river (Foce Ticino – Cremona)	97	n.a.
Po river (Casal Monferrato – Foce Ticino)	65	n.a.
Idrovia Milano – Cremona (stretch Cremona – Pizzighettone)	66.5[27]	V
Mincio river – Po river	21	IV
Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante	135	IV - V
Idrovia Po-Brondolo	19	IV
Idrovia Padova - Venezia	27.5[28]	n.a.
Litoranea Veneta (Venice Lagoon – Grado Lagoon)	135 approx.	II
Idrovia Ferrarese	70	IV

[27] Idrovia Milano - Cremona: only 13 Km actually completed

[28] Idrovia Padova - Venezia: only 10% actually completed

Key issues

Since the improvement of the Northern Italy IWW was included in the Mediterranean Corridor's Priority Project List and the Italian IWW as a core section of the Med corridor (Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility), one of the main national and regional transport policy is addressed to upgrade the capacity of various section of the NIIWS to class V CEMT and to remove existing bottlenecks in order to ensure a seamless navigability for commercial and touristic purposes all along the "Sistema Idroviario Padano-Veneto" at least 340 days per year with the aim to increase the attractiveness of this mode of transport, relieving one of the most heavily congested (road) transport corridor. The infrastructural gaps need to be solved in order to relaunch the potentials of a waterway system that is situated along one of the biggest European economic area (the northern regions of Italy represents about the 50% of the Italian GDP) characterized by one of the higher level of road saturation in Europe, in part determined by the fact that the Waterway system is incomplete with missing link and therefore it cannot fully contribute to a more balanced modal split to relieve congestion on west-east road axis.

- Upgrade the capacity of the various section of the NIIWS to class V CEMT;
- Remove existing bottlenecks in order to ensure a seamless navigability along the "Sistema Idroviario Padano-Veneto" at least 340 days per year.

Table 7: Inland waterways in the Adriatic-Ionian region (main characteristics)

IWW	Length (inside A-I)	A-I Country crossed	Main inland ports
Danube river	580 rKm (approx.)	Croatia, Serbia	Vukovar (HRV); Bogojevo (SRB); Bačka Palanka (SRB); Beočin (SRB); Novi Sad (SRB); Belgrad (SRB); Pančevo (SRB); Smederevo (SRB); Prahovo (SRB).
Sava river	600 rKm (approx.)	Slovenia, Bosnia and Herzegovina, Croatia, Serbia	Sisak (HRV); Slavonski Brod (HRV); Bosanski Brod (BIH); Bosanski Šamac (BIH); Brčko (BIH); Sremska Mitrovica (SRB); Šabac (SRB); Belgrade (SRB).
Drava river	445 rKm	Croatia, Slovenia	Belišce (HRV); Osijek (HRV)
Tisza river	164 rKm	Serbia	Senta
NIIWS	920 rKm (approx.)	Italy	Boretto, Cremona, Mantua, Rovigo, Porto Levante, Ferrara, Chioggia, Venice, Porto Nogaro, Monfalcone and Trieste.

1.2 Inland port characteristics in EUSAIR countries

1.2.1 Albania

There is no IWW-related content to report for this Country.

1.2.2 Bosnia and Herzegovina

1.2.2.1 IWW network overview

The Bosnian Inland Waterway network is composed by one main axis that is represented by the Sava river, that runs in BIH for a length of 332.4 river kilometers (rKm)[29]: from the border with Croatia, (confluence of the Una river into the Sava one) at rKm 507, to the border with Serbia (confluence of the Drina river into the Sava one), at rKm 175. The Bosnian section of the river runs through the Federation of Bosnia and Herzegovina (32%), Republika Srpska (61%), and Brčko Administrative District (7%)[30].

Table 8: Classification of the Bosnian IWW (Sava river)

rkm	rkm	Length (km)	Waterway Class
176.0 Rača (border with SRB)	196.0 Domuskela (SRB)	20.0	III
196.0 Domuskela (SRB)	313.7 Šamac	117.7	IV
313.7 Šamac	338.2 Oprisavci / Rit kanal (HRV)	24.5	III
338.2 Oprisavci / Rit kanal (HRV)	371.2 Bosanski Brod	33.0	IV
371.2 Bosanski Brod	507.0 Una river (border with HRV)	135.8	III

Source: International Sava River Basin Commission

[29] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[30] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

As mentioned before, the current navigation conditions along the Sava River are difficult due to strongly fluctuating discharge, heavy sedimentation in certain areas and lack of maintenance of the river bed; thus has led to a reduction in the width and depth of the navigable channel that make the navigation difficult[31].

It is important to underline that the rehabilitation and development of the Sava River waterway in Bosnia needs two different level of cooperation: one between the Ministry of Transport and Communications of Republic of Srpska, the Federal Ministry of Transport and Communications and the competent authority from the Brčko District of Bosnia and Herzegovina; and the other one, as regards the Sava river sections shared with Croatia and Serbia, with the competent authorities of this countries.

1.2.2.2 Main inland ports

The Bosnian IWW network includes 3 main inland ports: Bosanski Brod (rKm 374), Bosanski Šamac (rKm 313) and Brčko (rKm 228).

Table 9: Bosnian main inland ports

Port		rKm/bank	Area (m²)	Type	Class
Bosanski Brod	Harbour of the Refinery	374.5/right		oil derivatives	IV
Bosanski Šamac	RTC Šamac Port	313.0/right	580.000	general	IV
Brčko	Oil Port of Brčko	226.4/right	140.000	Oil derivatives	IV
	Port of Brčko	228.4/right		General cargo	
	Passenger terminal	228.4/right		Passenger	

Source: International Sava River Basin Commission

Figure 7: Map of Bosnian main inland ports

[31] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

Source: Own elaboration based on "Manual on the Sava river navigation" by International Sava River Basin Commission

- Bosanski Brod:

The inland port of Bosanski Brod is intended exclusively as a crude oil and petroleum products handling facility[32].

- Bosanski Šamac:

The inland port of Bosanski Šamac is located at the rkm 313 of the Sava River's right bank, at the eastern entrance to Šamac. Thanks to its proximity to corridors Vc and X, along with a good connection to the hinterland, it is recognised as very importand port for BiH and it provides a good basis for further development of port services. The port of Šamac, being owned by a private company, is characterised by large fluctuations in the quantities of transhipped goods and its transhipment depends on the company's actual production. The port is mostly used for delivering cold-rolled strips and shipping steel pipes[33]

Gross area: 58.8 hectares

Facilities: It has 311 metres of a vertical quay, the basin with 150 m of unfinished quay wall, 30,000 m2 of open storage space, 3,600 m2 of closed warehouse, road and railway infrastructure, as well as mobile handling machinery. Anchoring and turning of vessels and convoys is possible a bit downstream from the port.[34]

Port of Bosanski Šamac (BiH)	
	
Location	rkm 313 of the Sava River's right bank
Port area (m^2)	588.888 (gross area)
Terminals (n.)	n.a.
Quays (n.)	1 vertical quay (311 mt)

[32] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[33] "Inland navigation in Europe - Market Observation", Annual Report, Central Commission for the Navigation of the Rhine (CCNR), 2020

[34] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

CEMT Class	n.a.
Facilities	mobile handling machinery
Rail connection	Yes
Warehouses	30,000 m2 of open storage space; 3,600 m2 of closed warehouse
Type of goods handled	cold-rolled strips; steel pipes

Source: Study on Rhine - Danube TEN-T Core Network Corridor; 2nd Phase; Western Balkans Final Report (2017)

- Port of Brčko:

The port of Brčko covers the Sava River's right bank from rKm 226 to 228 and it is located in the city centre of Brčko; it has an important tradition of port services and it is a resource with a relevant potential that should be taken into consideration, in fact it has a good connection to other modes of transport (rail and road). The location at the center of the city of Brčko brings some disadvantages, mainly reflected in limited opportunities for further development and problems of transport access. In the last ten years, transhipment mostly involved coal, soybean meal, coke, steel sheets and cold rolled steel strips[35].

Gross area: 14 hectares

Facilities: Three anchoring points, setup in accordance with technological operations and types of goods, are located in the immediate vicinity of the operational quay. The length of the operational quay built along the inclined quay is 104 m, with additional 76 m along the vertical quay. Four classification tracks are located near the operational quay, with total length of 2,586 m. A single-track railway section connects the port with the main Brčko Railway Station. It has 61,000 m2 of open and 11,000 m2 of closed storage space[36]. The equipment allows for transport of grain and bulk cargo.

Port of Brčko (BiH)	
	
Location	rkm 226-228 of the Sava River's right bank
Port area (m^2)	140.000 (gross area)
Terminals (n.)	n.a.

[35] "Inland navigation in Europe - Market Observation", Annual Report, Central Commission for the Navigation of the Rhine (CCNR), 2020

[36] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

Quays (n.)	1 vertical quay (76 mt); 1 operational quay (104 mt)
CEMT Class	IV
Facilities	n.a.
Rail connection	Yes (single track)
Warehouses	61,000 m2 of open storage space; 11,000 m2 of closed warehouse
Type of goods handled	Bulk cargo (coal, soybean meal, coke, steel sheets and cold rolled steel strips); grain

Source: Study on Rhine - Danube TEN-T Core Network Corridor; 2nd Phase; Western Balkans Final Report (2017)

1.2.2.3 IWW traffic volumes (passengers and freight) and characteristics

Before 1990, the Sava fulfilled an important role in the regional waterway transport network; this importance is demonstrated by the fact that the total amount of freight carried on the Sava river in 1990 amounted to 5.2 million tons of primarily bulk freight. Since the end of the conflict, the Sava river has been neglected and, as a consequence, annual traffic volumes have been modest, amounting to less than 400,000 tons on the entire waterway.[37]

The following table shows the amount of waterside traffic in the major BiH ports in the years 2017,2018 and 2019:

Table 10: Waterside freight traffic in major Sava ports (in thousand tonnes)

	2017	2018	2019	2019/2018
Bosanski Brod	9.7	29	8.1	- 72%
Bosanski Šamac	n.a.	n.a.	n.a.	
Brčko	136	98	125	+ 27%

Source: Central Commission for the navigation of the Rhine

1.2.2.4 Objectives of national IWW policies

The main objectives of the Bosnian IWW policies are[38]:

- Demining of the Sava River right bank;
- Improvement of the navigability of Sava river;
- Reconstruction and upgrade of the port capacities and purchasing of related equipment.

[37] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[38] Action Plan for Waterborne Transport and Multimodality, Transport Community, 2021

1.2.3 Croatia

1.2.3.1 IWW network overview

Croatia has in total 1.016 km of navigable inland waterways. Only 287.4 km of total 534.7 km of existing inland waterways that are included in the European inland waterways network, comply with the requirements of international navigation standards, minimum class IV of navigability[39].

The Croatian Inland Waterway network is composed by three main rivers: Sava, Danube and Drava.

Table 11: Classification of the Croatian Sava IWW stretches (Sisak – Border with BiH)

rkm	rkm	Length (km)	Waterway Class
212.7 Border with BiH	313.7 Slavonski Šamac	101	IV
313.7 Slavonski Šamac	338.2 Oprisavci / Rit kanal	24.5	III
338.2 Oprisavci / Rit kanal	371.2 Slavonski Brod	33.0	IV
371.2 Slavonski Brod	594.0 Sisak	135.8	III

Table 12: Classification of the Croatian Danube IWW stretches (Batina - Ilok)

rkm	rkm	Length (km)	Waterway Class
1433.1 Batina	1295.0 Ilok	138.1	VIc

[39] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

Table 13: Classification of the Croatian Drava IWW stretches (Belišce - Drava confluence into Danube river)

rkm	rkm	Length (km)	Waterway Class
50.0 Belišce	0.0 Confluence into Danube river	50.0	III - IV

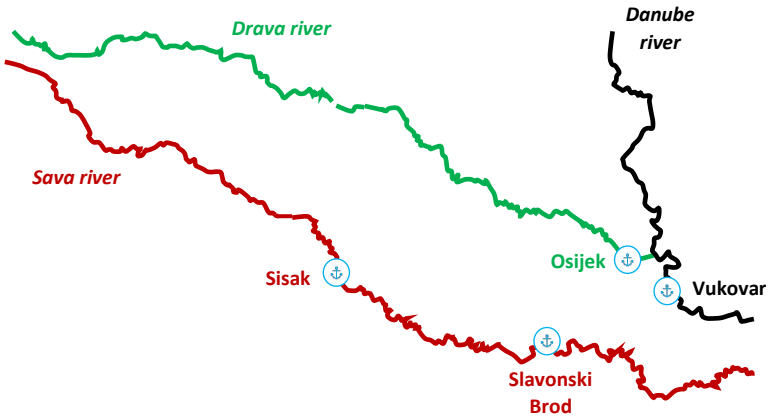
1.2.3.2 Main inland ports

The Croatian IWW network includes 4 main inland ports[40]:

- Danube river: Vukovar (rKm 1335)
- Sava river: Sisak (rKm 590); Slavonski Brod (rKm 363)
- Drava river: Osijek (rKm 14)

Ports Vukovar and Slavonski Brod are classified as a TEN-T core port. Ports Osijek and Sisak are classified as a TEN-T comprehensive ports[41].

Figure 8: Map of Croatian main inland ports



[40] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

[41] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

Source: Own elaboration based on Danube Waterway Map by Viadonau.org

Table 14: Croatian main inland ports

Port		River	rKm/bank	Area (m2)	Type	Class
Sisak	Sisak Harbour and Warehouses	Kupa (confluence with Sava)	4.8/left	n.a.	General cargo	III
	Passenger Terminal		4.0/left	n.a.	Passenger	III
	Galdovo Basin	Sava	593.7/left	12.000	Ship overhaul	III
	Crnac Oil Port		587.0/right	n.a.	Oil and oil derivatives	IV
Slavonski Brod	Port of Slavonski Brod	Sava	363.4/left	n.a.	General cargo, Bulk cargo	IV
	Ruščica Oil Port		363.0/left		Crude oil	
Vukovar	Luka Vukovar	Danube	1335.0/right	385.000	General and bulk cargo	VI
	Nautica Vukovar				Liquid cargo + bunkering station	
	Vupik				Grain	
	Terminal Dunav				Liquid cargo	
Osijek	LUKA TRANZIT OSIJEK d.o.o.	Drava	14.0/right	1.600.000	General cargo, bulk cargo, containers, palletized cargo;	III

					project cargo	

Source: International Sava River Basin Commission; danube-logistics.info; lukatranzit.hr; Transport Development Strategy of the Republic of Croatia (2017 – 2030)

- Sisak:

The Port of Sisak is divided in two parts: one public, owned and managed by the Sisak Port Authority, located along the Sava river (between rKm 586 and rKm 593) and one private, owned and managed by the company "Pristanište i skladišta d.o.o", located along the Kupa river near its confluence into the Sava one.

Public port of Sisak (Sava river)

The public port of Sisak is divided in two basins:

1) "Crnac" basin (right bank; rkm. 586.75 - rkm 587.30): open to public traffic, it is located on the right bank of the Sava River, in the village of Crnac and it is dedicated to the handling of oil and petroleum products since it is connected through pipelines to the INA Sisak Oil Refinery. The port has two piers (P-30 and PO-36) for tank barges (or self-propelled ships) for loading and unloading crude oil and oil derivatives, including pumping stations for cargo handling, an arranged water area for anchoring cargo and empty ships, and a suitable turning point for ships. Piers P-30 and PO-36 are managed by the company Pristaništa i služdo d.o.o[42].

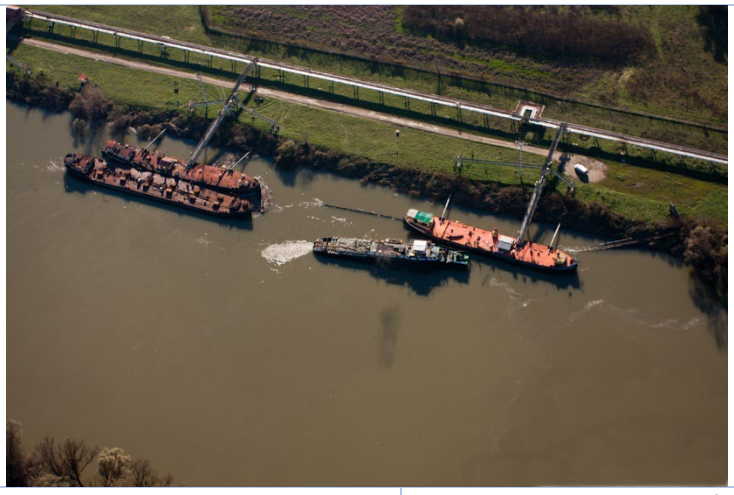
2) "Galdovo" basin (left bank; rkm. 593.10 - rkm 593.40): It is a shipyard with overhaul facilities extending over an area of 11.719 m^2 [43]. The basin contains a steep sloping ramp with a slope of 13° for the lateral extraction and launching of inland navigation ships with a net weight of up to 400 tons and a length of up to 80 m. The capacity of the slipway is to work on 3 ships at the same time[44].

Public port of Sisak - Crnac basin (HR)

[42] https://www.luckaupravasisak.hr/bazen/bazen-crnac/

[43] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[44] https://www.luckaupravasisak.hr/bazen/bazen-galdovo/



Location	rkm 586.75 – 587.30 of the Sava River's right bank
Port area (m²)	n.a.
Terminals (n.)	n.a.
Quays/piers (n.)	2
CEMT Class	IV
Facilities	pumping stations; area for anchoring cargo and empty ships
Rail connection	No
Warehouses	n.a.
Type of goods handled	Oil and petroleum products

Public port of Sisak - Galdovo basin (HR)

Location	rkm 593.10 - rkm 593.40 of the Sava River's left bank
Port area (m²)	11.719
Terminals (n.)	n.a.

Quays/piers (n.)	1
CEMT Class	III
Facilities	steep sloping ramp; overhaul facilities
Rail connection	No
Warehouses	n.a.
Type of goods handled	vessels

Private port of Sisak (Kupa river)

The Sisak private port for transhipment of bulk cargo "Pristanište i sklada d.o.o." it is located on the left bank of the Kupa River (rkm 4.47 – rkm 5.64) and it is not administratively included in the port area of the public port of Sisak.

The private port has 250 m of semi-vertical quay, 170 metres of vertical operational quay with capacity to moor 4 vessels, open and closed warehouses, two gantry cranes and a silo, and other port machinery. The land area of the port it is linked to all major railways and roads having a terminal for road vehicles and an own marshalling yard[45] that allows direct transhipment from vessels to road and rail vehicles. Moreover, the port contains open storage areas for transhipment and storage of medium and large containers, but there is no transhipment machinery for containers[46].

The water area of the port on the upstream part of the Kupa River has an anchorage area for empty and cargo ships, but the turning point of the ships at low water level is not satisfactory[47].

The annual handling capacity of the port is of about 1.5 million tons[48].

A new port of Sisak is planned south of the Crnac settlement[49].

Private port of Sisak - Pristanište i sklada d.o.o. (HR)

[45] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[46] https://www.luckaupravasisak.hr/bazen/privatna-luka-pristaniste-i-skladista-d-o-o/

[47] *Ibid.*

[48] luckaupravasisak.hr

[49] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

Location	rkm 4.47 – rkm 5.64 of the Kupa River's right bank
Port area (m^2)	n.a.
Terminals (n.)	n.a.
Quays/piers (n.)	2
CEMT Class	III
Facilities	two gantry cranes; silo; other port machinery
Rail connection	Yes
Warehouses	open and closed warehouses
Type of goods handled	Bulk cargo

- Slavonski Brod:

The port of Slavonski Brod is located along the Sava river (rKm 363) at the crossroads of roads and railways that connect eastern part of Europe and the Mediterranean and the Central Europe with the southern part of European continent. The port area covers approximately 900.000 m^2, with capacity of 1.5 million tons of cargo, composed by an oil terminal for transshipment of crude oil with two loading racks and a bulk cargo terminal for transshipment of rocks, sand, gravel and other bulk cargo[50]. The port is connected by road and railway infrastructure with international infrastructure corridors[51]

The construction of basic infrastructure[52] is underway and around 80% of the port infrastructure has been completed, in particular: a 120 m long terminal for general cargo (quay No. 3) with a handling area of 3,910

[50] investcroatia.gov.hr

[51] Transport development strategy of the Republic of Croatia (2014 – 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, June 2014

[52] CEF project "Slavonski Brod Port infrastructure construction and upgrade" (2017)

m2 has already been built; the construction of two piers for transshipment and manipulation of bulk cargo (berth No. 4 and No. 5) for a total lenght of 230 m, with a handling and logistics area and related infrastructure of 1.545 m2, is currently in progress[53]. The project includes, among other things, the construction of the Ro-La terminal for transshipment of trucks to rail wagons, a parking space for trucks, a container terminal for container cargo and the upgrade of the road network[54]

Moreover the following additional capacities are planned: construction of a container terminal with the capacity of 200,000 tons of cargo and auxiliary facilities; Ro-La terminal for transshipment of trucks to low-speed wagons with a capacity for receiving/shipping 20 low floor wagons[55].Upon the completion of the planned capacities, reloading and handling of up to 1,500,000 tons of cargo per year will be possible.

The port of Slavonski Brod has a total share of 6% of overall trans-shipped cargo and it is of particular importance for Bosnia and Hercegovina but currently operations are oriented on the transport of crude oil from port Slavonski Brod to port Sisak which primarily serves the oil refinery in Sisak[56].

Slavonski Brod (HR)	
	
Location	rkm 363.0 – rkm 363.4 of the Sava River's left bank
Port area (m^2)	900.000
Terminals (n.)	2 (oil terminal; bulk cargo terminal)
Quays/piers (n.)	n.a.
CEMT Class	IV
Facilities	n.a.
Rail connection	Yes
Warehouses	n.a.
Type of goods handled	Bulk cargo; General cargo; Oil

[53] investcroatia.gov.hr

[54] https://povezanahrvatska.eu/en/projekti/izgradnja-i-unapredenje-infrastrukture-u-luci-slavonski-brod/

[55] investcroatia.gov.hr

[56] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

- Vukovar:

The port of Vukovar is the largest and most important port for the Republic of Croatia and it is located on the right coast of the Danube river (rKm 1335) and it is 850m long and 45m wide. The port is very well situated to the main current of the river Danube, which makes it possible for the port to be navigable during the whole year regardless of water level, so even during the period of the lowest water levels of the Danube, the port is operational and active. The port area covers approximately 385.000 m^2, while the length of the operational coast, which includes four berths, is 450m[57].

The port area contains three operational railway tracks for ship-to-shore handling and loading/unloading of general and scattered cargo. Current capacities allow for an annual transhipment of goods of about 1,200,000 – 1,500,000 t, depending on the type of cargo. Finally, the port of Vukovar offers 10000 m^2 of arranged open storage space and 3000 m^2 of closed storage space[58]

The port of Vukovar is the biggest inland port of Croatia with yearly transport of 30,000 passengers and half of million tons of cargo; it is the biggest port in handling cargo with the share of 2/3 of overall trans-shipped cargo in the Republic of Croatia (mostly bulk cargo, fertilizers and cereals)[59].

The port of Vukovar contains the following facilities[60]:

- DHC 400 and DHC 600 HP locomotives
- C hook for coilse sheet metal with a load capacity of 25 t
- Grapples for bulk cargo from V = 5m3 to V = 13m3
- Device for handling (spreader) 20“ and 40“ containers
- Vehicle handling device:
  - load capacity 3.6 t, L=4m H= 3.4m
  - load capacity 2.5 t, L=3m, H= 2.7m
- Tugboat PRILJEVO of 480 hp
- 10000 m2 of arranged open storage space
- 3000 m2 of closed storage space
- 1 x forklift capacity 20 t
- 7 x forklifts with a capacity of 2 to 5 tons (Linde)
- x ULT loaders
- 1 x port mobile crane 63t load capacity (Gottwald HMK 170)
- x port gantry cranes 5/6t load capacity (Ganz))
- 1 x port gantry crane 16/25t load capacity (Ganz))

[57] luka-vukovar.hr

[58] *ibidem*

[59] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

[60] luka-vukovar.hr

Vukovar (HR)	
	
Location	rkm 1335.0 of the Danube River's right bank
Port area (m^2)	385.000
Terminals (n.)	n.a.
Quays/piers (n.)	4
CEMT Class	VI
Facilities	DHC 400 and DHC 600 HP locomotives; C hook for coils (load capacity of 25 t); Grapples for bulk cargo from V = 5m3 to V = 13m3; Device for handling (spreader) 20" and 40" containers; Vehicle handling device (load capacity 3.6 t, L=4m H= 3.4m) (load capacity 2.5 t, L=3m, H= 2.7m); Tugboat PRILJEVO of 480 hp; 1 x forklift capacity 20 t; 7 x forklifts with a capacity of 2 to 5 tons; 1 x port mobile crane 63t load capacity; port gantry cranes 5/6t load capacity; 1 x port gantry crane 16/25t load capacity
Rail connection	Yes
Warehouses	10000 m^2 of open storage space; 3000 m^2 of closed storage space
Type of goods handled	Bulk cargo; General cargo; Containers; Vehicles

- Osijek:

The Osijek international river port is located on the right bank of the Drava river only 22 km away from the confluence of the Drava river into the Danube.

Port Osijek is the second largest port of Croatia, with the share of ¼ of overall trans-shipped cargo, of which 60% is bulk cargo and 10% are agricultural products (wheat, sunflower, and rapeseed)[61].

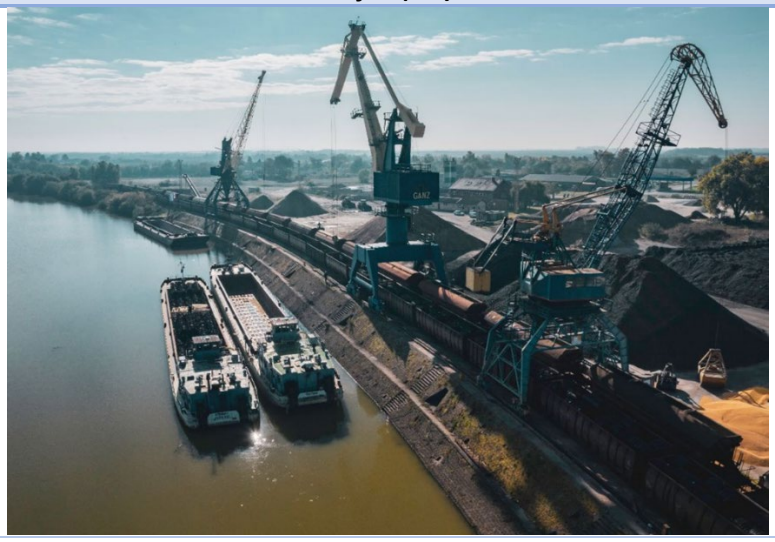
[61] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

The port Osijek was divided in two parts: the old one (rKm 18) and the new one (rKm 13). The "old port", containing only the bulk cargo terminal, was built in 1974 in the centre of the city and it has been decommissioned in 2015. As a consequence, the Bulk cargo terminal need to be relocated in the "new port" area [62]. To this purpose the project "*Construction of bulk cargo terminal in the Port of Osijek*", leaded by Port Authority Osijek and co-financed by the EU's Cohesion Fund to 78,45%, envisages the construction in the "new port" area of a new Bulk cargo terminal, containing: 240 m coastal structure with 2 berths; loading/unloading units and transporting equipment (transhipment facility with incoming hopper); access road (approx. 300mt long); extension of rail tracks (approx. 610 m long) and crane tracks (approx. 285 m long); electrical substation as well as necessary infrastructure and devices for electrical power supply[63]. The project wants to ensure an integrated transhipment service in the "new port" of Osijek, developing an efficient and quality intermodal freight transport, in order to increase the share of inland waterways in comparison to railway and road freight transport in the Republic of Croatia[64]. The estimated completion date is envisaged for December 2023.

Currently Luka Tranzit Osijek d.o.o., property of *Našicecement d.d. Našiceis* (NEXE dd group), is the only port operator in Osjiek and it manages the Port Tranzit Osijek that reload bulk cargo (slag, coal, gravel, fertilizers, stone, wheat), palletized cargo, metals and special cargo. Port Tranzit Osijek contains also 20.000 m^2 of open storage and 5.000 m^2 of closed storage[65].

The Osijek port area covers a total surface of approximately 160 ha and it has a great opportunity to become an intermodal logistic centre due to the large port area and excellent potential from the point of view of the road and rail connections with the hinterland[66].

Osijek (HR)



[62] https://navigation.danube-region.eu/construction-of-bulk-cargo-terminal-in-the-port-of-osijek/

[63] https://povezanahrvatska.eu/en/projekti/novi-lucki-terminal-u-osijeku/

[64] https://povezanahrvatska.eu/en/projekti/novi-lucki-terminal-u-osijeku/

[65] https://www.nexe.hr/en/reloading-and-storage/6159

[66] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

Location	rkm 13 of the Drava River's right bank
Port area (m^2)	1.600.000
Terminals (n.)	n.a.
Quays/piers (n.)	2
CEMT Class	III
Facilities	240 m coastal structure; loading/unloading units and transporting equipment (transhipment facility with incoming hopper); access road (approx. 300mt long); extension of rail tracks (approx. 610 m long) and crane tracks (approx. 285 m long);
Rail connection	Yes
Warehouses	20000 m^2 of open storage space; 5000 m^2 of closed storage space
Type of goods handled	Bulk cargo; Agricultural products; palletized cargo; special cargo

1.2.3.3 IWW traffic volumes (passengers and freight) and characteristics

Table 15: IWW freight traffic volumes in Croatia 2011 – 2020 (in thousand tonnes)

Year	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Traffic volumes	5 184	5 934	5 823	5 377	6 642	6 409	6 221	5 182	6 491	7 077

Source: Eurostat

Table 16: Waterside freight traffic in major Croatian ports (in thousand tonnes)

Port	**2015**	**2016**	**2017**	**2018**	**2019**
Slavonski Brod	n.a.	n.a.	117	131	199
Sisak	n.a.	n.a.	60	66	70
Vukovar	303.9	213.7	249.7	341.4	29.1
Osijek	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Central Commission for the navigation of the Rhine; Port of Vukovar

1.2.3.4 Objectives of national IWW policies

According to the "Transport Development Strategy of the Republic of Croatia (2017 - 2030)", the main objectives of the Croatian IWW policies are[67]:

- Improvement of the competitiveness of Vukovar and Osijek as the main inland freight ports;
- Cooperating with BiH in relation to the development of Slavonski Brod freight port;
- Addressing the potential of inland navigation for tourism and local PT;

[67] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

- Adjusting the navigability requirements to the traffic needs and to safeguard the necessary level of navigability;
- Improving the operational and organizational conditions of the inland transport sector (economic sustainability).

1.2.4 Greece

There is no IWW-related content to report for this Country.

1.2.5 Italy

1.2.5.1 IWW network overview

The Italian Inland Waterway network is composed by different waterways that form a unique system: the Northern Italy Waterway System (NIIWS), from Casal Monferrato (in the Piemonte Region) to the Po river delta and Ravenna on one side and the borders with Slovenia near Trieste on the other.

The NIIWS is built around the Po River, that is the natural waterway that extends along the Po Valley, from West to East; following the main axis represented by the Po river (approx. 440 Km formally navigable, 280 Km currently navigable), the Northern Italy IWW, just before the Po delta, split its path in two different directions: towards South, from Ferrara to Porto Garibaldi through the Idrovia Ferrarese section (approx. 70 Km long) and towards North passing through the Po - Brondolo canal (approx. 19 Km long), the canals of the Venice Lagoon and then the Litoranea Veneta waterway up to Trieste (from Pontegrandi to Isonzo river mouth) (approx. 135 Km long). Another three important sections of the NIWS are the Fissero Tartaro-C.Bianco-Po di Levante waterway (approx. 135 Km long), the Idrovia Milano – Cremona (approx. 66.5 km long, only 13 Km actually completed) and the the river Mincio from Mantua to the confluence with the Po (approx. 21 km long).

Table 17: Classification of Northern Italy Waterway System

Waterway	Length (km)	Waterway Class
Po river (Cremona – faro Pila)	280	n.a.
Po river (Foce Ticino – Cremona)	97	n.a.
Po river (Casal Monferrato – Foce Ticino)	65	n.a.
Idrovia Milano – Cremona (stretch Cremona – Pizzighettone)	66.5[68]	V
Mincio river – Po river	21	IV
Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante	135	IV - V
Idrovia Po-Brondolo	19	IV
Idrovia Padova - Venezia	27.5[69]	n.a.
Litoranea Veneta (Venice Lagoon – Grado Lagoon)	135 approx.	II
Idrovia Ferrarese	70	IV

[68] Idrovia Milano - Cremona: only 13 Km actually completed

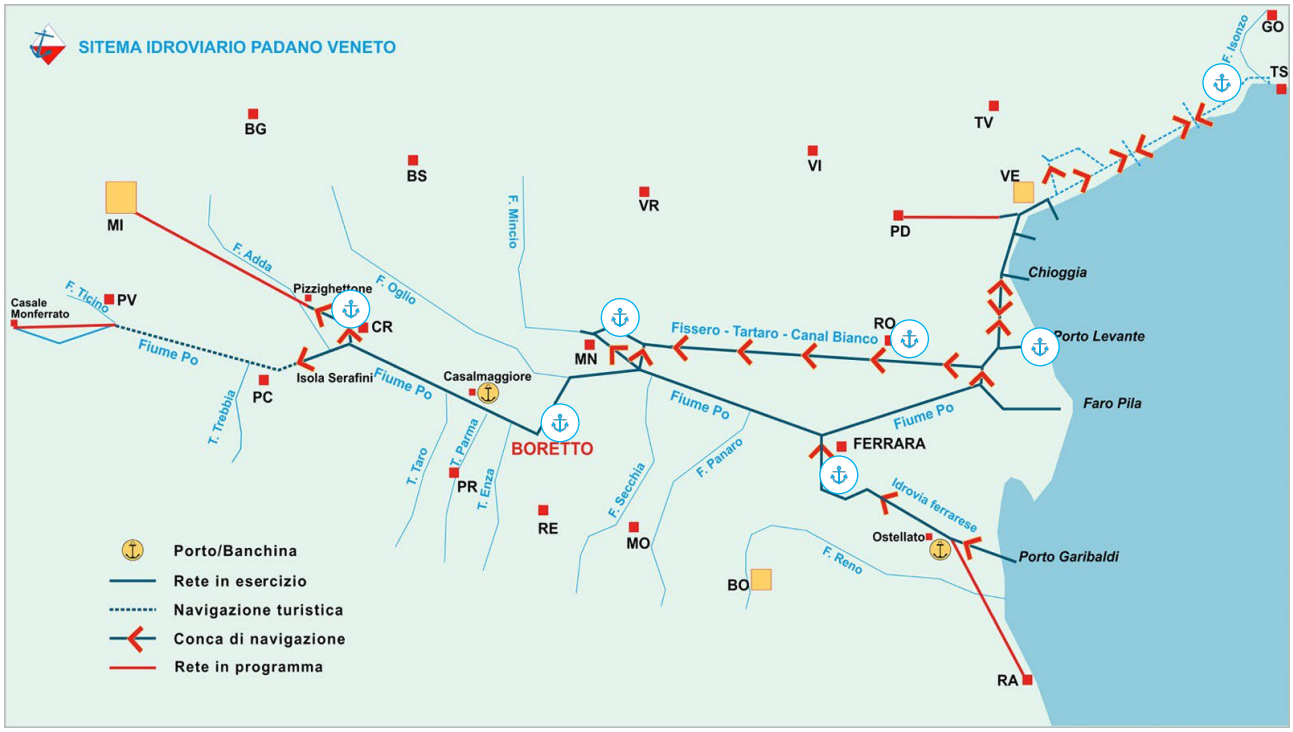
[69] Idrovia Padova - Venezia: only 10% actually completed

Source: Piano generale del Sistema Idroviario dell'Italia del Nord; AIPo; Infrastrutture Venete Srl

1.2.5.2 Main inland ports

The Northern Italy Waterway System includes 5 main inland ports[70][71]:

Figure 9: Map of Northern Italy main inland ports



Source: Interporto Rovigo

Table 18: Italian main inland ports

Port	Waterway	Area (m2)	Type	Class
Cremona	Idrovia Milano - Cremona	3.000.000	n.a.	V
Mantua (Valdaro)	Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante	2.850.000	n.a.	IV - V
Rovigo	Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante	35.000	n.a.	IV - V

[70] Master Plan of the Northern Italy Waterway System, Province of Mantua and Coordination for the functional development of the Northern Italy and Northern Adriatic inland waterway system, 2011

[71] In this classification sea ports that manage also IWW traffic are not included (e.g., Trieste, Venice, Chioggia, Monfalcone); moorings are not considered too (e.g. Boretto, Valdaro, Ostiglia, S.Benedetto, Viadana, Revere, Governolo, etc.)

Porto Levante	Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante	130.000 + 290.000	n.a.	IV
Porto Nogaro **(Porto Vecchio + Porto Margreth)**	Litoranea Veneta	365.000	General cargo; container; dry bulk cargo;	n.a.

- **Cremona**

The inland port of Cremona is developed on a total surface of 3.000.000 mq; it is equipped of fixed and mobile structures apt to guarantee the handling of every type of goods; moreover it offers large yards, warehouses for the storage of different types of goods, including exceptional and/or dangerous loads, and for the loading and unloading of covered vessels, public docks and efficient lifting equipment.

The port of Cremona have two docks: 1) Consorzio Agrario Provinciale one(grain, feed, fertilizers, etc.); 2) Acciaieria Tubificio Arvedi one (semi-finished products, ferrous scrap coils, etc.) with a total development of 200 m and one owned by ABIBES s.p.a., with a development of 100 m, for the docking of liquid propane gas.

The port of Cremona has docks for a total quay length of 900 meters and additional quays with inclined section equal to 1000 m. The port also has numerous facilities including 75000 m^2 of uncovered and paved storage areas, a double warehouse on the water with storage area of 900 m^2 for each compartment, a warehouse usable by trucks and railway wagons of 750 m.

The harbour services offered from the port of Cremona previews a crane to portal of 50 t suitable to handling of containers, goods in necks crane to easel from the company Beans of the capacity of 400 t that can move exceptional cargos from the water to iron and the rubber; 20 t self-propelled crane; 5 t overhead travelling crane.

The port of Cremona is connected by road and by rail to the core infrastructure network of TEN-T corridors.

Cremona (IT)

Location	Idrovia Milano - Cremona
Port area (m^2)	3.000.000
Terminals (n.)	n.a.
Quays/piers (n.)	2
CEMT Class	IV-V
Facilities	fixed and mobile structures apt to guarantee the handling of every type of good; a crane to portal of 50 t suitable to handling of containers; crane of the capacity of 400 t that can move exceptional cargos from the water; 20 t self-propelled crane; 5 t overhead travelling crane.
Rail connection	Yes
Warehouses	75000 m^2 of uncovered and paved storage areas, a double warehouse on the water with storage area of 900 m^2 for each compartment, a warehouse usable by trucks and railway wagons of 750 m.
Type of goods handled	Every type of goods

- **Mantua (Valdaro)**

The Valdaro Port is inserted in the Harbour System Mantovano, constituted from public and private Ports positioned along the Idrovia Mantova-Adriatico and along the rivers Po and Mincio, and therefore it is connected with Cremona, Rovigo, Porto Levante, Chioggia, Venice and Marghera.

The river port of Mantua-Valdaro covers a total area of approx. 199.300 m^2 (+ 313.000 m^2 of future expansion) and it serves an industrial area of 2.850.000 m^2.

The port has two operating docks (+ 1 dock recently built) and a total of 1450 ml of quays. The port is equipped with the following facilities: large squares of cargo and drainage, warehouse, services buildings for the functions of the port, warehouses on water, weighs for trucks, cranes, shipyards, project cargo facilities,

dangerous goods depot. The yards of the port are equipped for the movement of grains, coils, container and bulk.

The port of Mantua is connected by road and by rail to the core infrastructure network of TEN-T corridors.

Mantua - Valdaro (IT)	
	
Location	Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante
Port area (m^2)	2.850.000
Terminals (n.)	n.a.
Quays/piers (n.)	2
CEMT Class	IV-V
Facilities	Open and close warehouses, weighs for trucks, cranes, shipyards, project cargo facilities, dangerous goods depot.
Rail connection	Yes
Warehouses	Open and close warehouses
Type of goods handled	Grains, Coils, Container and bulk cargo

- **<u>Rovigo</u>**

The Interporto of Rovigo covers an area of 1.900.000 m^2, occupying a strategic position as it faces the navigable channel Fissero-Tartaro Canalbianco that through the Po of Levante or the Po of Brondolo flows on the Adriatic Sea. The canal is accessible by European fifth-class sea-going vessels. Barges used for river transport have a loading capacity of up to 1,800 tonnes.

The company Interporto di Rovigo Spa owns an area of 350,000 m^2, of which 41,000 m^2 are warehouses.

The Interporto of Rovigo has 60.000 m^2 of railway-connected yards where container handling activities can be carried out.

The area is characterized by the presence of an automated silos warehouse able to contain 81,000 m^3 of agri-food bulk. This warehouse allows different type of transport modal shift: barge to truck and train to truck.

The Interporto of Rovigo is specialized in project and special cargo towards the port of Venice and towards the port of Mantua-Valdaro.

Rovigo (IT)	
	
Location	Idrovia Fissero-Tartaro-Canalbianco-Po Di Levante
Port area (m^2)	1.900.000
Terminals (n.)	n.a.
Quays/piers (n.)	n.a.
CEMT Class	V
Facilities	Automated silos warehouse able to contain 81,000 m^3 of agri-food bulk; 60.000 m^2 of railway-connected yards for container handling activities;
Rail connection	Yes
Warehouses	41.000 m^2 + 6.000 m^2 (temperature-controlled)
Type of goods handled	Containers; special cargo;

- **<u>Porto Levante</u>**

Porto Levante is one of main accesses to/from the Adriatic Sea of the Northern Italy Waterway system, located in the municipality of Porto Viro (RO).

The port endowed with a private terminal "Porto Levante Terminal" with an industrial expansion area located 5 km from the mouth of the Po di Levante into the Adriatic Sea, a section of the Fissero-Tartaro-Canal Bianco waterway. Porto Levante Terminal's strategic location at the intersection of the Adriatic Sea and the Po River makes it an ideal hub for river-maritime transportation. This strategic position facilitates the efficient movement of cargo using European-sized barges, enabling seamless connections between inland and coastal destinations. All major ports and river docks along the Po River are easily accessible from Porto Levante Terminal, further enhancing its role as a key transportation node.

The total land area of 420,000 square meters is divided into two parts: a terminal area that is already operational, and an industrial area that is still under development.

The existing terminal area of Porto Levante Terminal is approximately 130,000 square meters and includes the following: a 450-meter quay; two warehouses, Warehouse A (4,500 square meters) and Warehouse B

(1,500 square meters); paved areas for storage and handling (60,000 square meters); an heliport (15,000 square meters); parking (10,000 square meters); two houses for employee accommodation; a third renovated property for office use (500 square meters); urbanization works, including a lamination basin, green areas, and roads (40,000 square meters). Warehouse A is currently used by an off-shore gas terminal company.

Porto Levante (IT)	
	
Location	Idrovia Fissero Tartaro Canalbianco Po di Levante
Port area (m^2)	450,000
Terminals (n.)	1
Quays/piers (n.)	2
CEMT Class	IV-V
Facilities	Paved areas for storage and handling; warehouses; heliport
Rail connection	-
Warehouses	Two, totalling 6,000 square meters
Type of goods handled	Gas; multipurpose

- **Porto Nogaro**[72]

The port system known as 'Porto Nogaro' (extension: 365.000 m^2), located at the mouth of the rivers Corno and Aussa in front of the Marano and Grado Lagoons, is divided into the two public structures of Porto Nogaro 'Vecchio' (located near the built-up area of Porto Nogaro), the Porto Margreth structure and the private quay of the former Industrie Chimiche Caffaro, which is reached through the Banduzzi artificial canal.

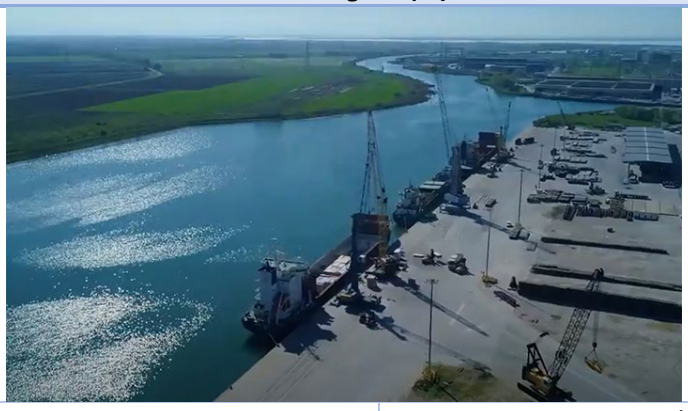
[72] https://www.cosef.fvg.it/zona-industriale-aussa-corno/porto-nogaro.html

Port Margreth, located at a distance of 10.9 km from the Adriatic Sea and connected to it by the Corno sea channel, has an evolution basin with a useful width of 250 m and a quay development of 860 ml. Following the recent dredging carried out by the Region of Friuli Venezia Giulia, the Corno maritime canal has a bottom level of -7.50 mt. It can host vessels with a maximum length of 180 m, a maximum width of 22 m and a tonnage up to 15,000 tons. The Margreth port railway junction is approximately 4,300 ml long.

The Margreth port area benefits from 25 hectares aprons equipped with a rail connection, covered warehouses (3.500 m^2), covered canopies, uncovered storage areas, areas outside the customs barrier, road-rail weighbridges, fire-fighting system, ferrous scrap treatment plant, video surveillance system, management building and green areas.

The commercial quay 'Porto Vecchio' is about 400 ml long and has a water draught of -3.5 metres.

The port of Porto Nogaro provides handling services for steel products such as coils, semi-finished steel, sheet metal, pipes, bars, billets, rods, etc.

Porto Nogaro (IT)	
	
Location	Litoranea Veneta – Grado Lagoon
Port area (m^2)	365.000
Terminals (n.)	2
Quays/piers (n.)	2
CEMT Class	n.a.
Facilities	Covered warehouses, covered canopies, uncovered storage areas, road-rail weighbridges, fire-fighting system, ferrous scrap treatment plant, video surveillance system, management building
Rail connection	Yes
Warehouses	41.000 m^2 + 6.000 m^2 (temperature-controlled)
Type of goods handled	General cargo; container; dry bulk cargo; steel products

1.2.5.3 IWW traffic volumes (passengers and freight) and characteristics

Table 19: IWW freight traffic volumes in Italy 2011 – 2020 (in thousand tonnes)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Traffic volumes	1 224	655	762	481	379	407	434	355	288	n.a.

Source: Eurostat

Table 20: Waterside freight traffic in major Italian inland ports (in thousand tonnes)

Port	**2015**	**2016**	**2017**	**2018**	**2019**
Mantua – Valdaro					
Cremona					
Rovigo					
Porto Nogaro[73]	1027	1012	1106	1343	1385

1.2.5.4 Objectives of national IWW policies

The main objectives of Regional IWW policies (Piedmont, Lombardy, Veneto and Emilia Romagna) foresee the development of projects that go in the direction of increase the navigation on the river Po and inland waterways of northern Italy (such as Idrovia Fissero-Tartaro-Canalbianco or Litoranea Veneta), with the aim of moving goods from road and rail to water, trying to reduce traffic saturation on the road and pollution. The specific project actions proposed so far, such as those aimed at making the Po navigable for 340 days a year to craft Va CEMT class and improve the waterway Fissero-Tartaro-Canalbianco, which connects Mantova to the Adriatic, have proved in being harmony with the guidelines carried out at European level.

1.2.6 Montenegro

There is no IWW-related content to report for this Country.

[73] https://www.cosef.fvg.it/zona-industriale-aussa-corno/porto-nogaro.html

1.2.7 North Macedonia

There is no IWW-related content to report for this Country

1.2.8 Serbia

1.2.8.1 IWW network overview

The Serbian Inland Waterway network is composed by one main axis, the Danube river, and two other minor ones: Sava and Tisza rivers.

Other important rivers that flows in Serbia are: Drina (forms the border with Bosnia) and Morava.

Besides these rivers, there is a dense network of navigable canals in Serbia (the Danube-Tisza-Danube canal), as well as other national inland waterways.

The Danube runs in Serbia for a length of approx. 588 rKm, from the border with Hungary and Croatia (near the village of Bezdan) at rKm 1.433 to the border with Romania and Bulgaria ("Iron Gates") at rKm 845.5, near the Timok River confluence. Of 588 rKm, 137 rKm are shared with Croatia (between km 1.433,1 and km 1.295,5) and 229 km with Romania[74] (from the mouth of the Nera River at km 1.075 to the mouth of the Timok River at km 845,5).

[74] "National plan for IWW maintenance in the Republic of Serbia for the period 2011-2020", South-East European Transnational Cooperation Programme, 2010

Figure 10: Map of Serbian IWW network (Danube in black; Sava in red; Tisza in green)

Regulation of the Government of Republic of Serbia on determination of international and interstate waterways ("RS Official Gazette" No. 109/16) defines the Danube River as international waterway on the entire length of the flow through Republic of Serbia[75].

Serbian stretch of the Danube River can be divided into three different stretches (based on navigation conditions):

Table 21: Division of Danube's Serbian section (based on navigation conditions)

Hungarian border (km 1,433) - Belgrade (km 1,170.0)	Free flowing stretch	All 24 critical sectors for navigation in Serbia are located at this stretch of the river. Frequent realignments of the fairway, depending on hydrological conditions and available water depths, don't allow the fulfillment of the necessary navigation parameters (depth and width) during low water periods. These 24 critical sectors are: Bezdan (rKm 1429.0 - rKm 1425.0); Siga-Kazuk (rKm 1424.2 - rKm 1414.4); Apatin (rKm 1408.2 - rKm 1400.0); Čivutski rukavac (rKm 1397.2 - rKm 1389.0); Ušće Drave (rKm 1388.8 - rKm 1382.0); Aljmaš (rKm 1381.4 - rKm 1378.2);

[75] http://www.plovput.rs/international-waterways

		Staklar (rKm 1376.8 - rKm 1373.4); Erdut (rKm 1371.4 - rKm 1366.4); Bogojevo (rKm 1366.2 - rKm 1361.4); Dalj (rKm 1357.0 - rKm 1351.0); Borovo (rKm 1 1348.6 - rKm 1343.6); Borovo (rKm 2 1340.6 - rKm 1338.0); Vukovar (rKm 1332.0 - rKm 1325.0); Sotin (rKm 1324.0 - rKm 1320.0); Opatovac (rKm 1315.4 - rKm 1314.6); Mohovo (rKm 1311.4 - rKm 1307.6); Bačka Palanka (rKm 1302.0 - rKm 1300.0); Susek (rKm 1287.0 - rKm 1281.0); Futog (rKm 1267.4 - rKm 1261.6); Novi Sad (rKm 1255.4 - rKm 1254.2); Arankina Ada (rKm 1247.0 - rKm 1244.8); Čortanovci (rKm 1241.6 - rKm 1235.0); Beška (rKm 1232.0 - rKm 1226.6); Preliv (rKm 1207.0 - rKm 1195.0).
Belgrade (km 1,170.0) - Iron Gate II dam (km 863.0)	Backwater stretch	Good navigation conditions throughout the whole year in terms of available depth and width of the fairway.
Iron Gate II dam (km 863.0) - Timok River (km 845.5)	Free flowing stretch	Fairly good navigational conditions.

Source: Plovput – Directorate for Inland Waterways – Ministry of Construction, Transport and Infrastructure (SRB) - 2020

Sava river runs in Serbia for a length of 211 river kilometers (rKm)[76]: from the border with Bosnia, (nearby Jamena) at rKm 211, to the confluence with Danube (in Belgrade). The Serbian section of the Sava river forms for approx. 33 rKm the border with Bosnia (until the confluence of the Drina river into the Sava one) and it flows entirely in the Republic of Serbia.

Regulation of the Government of Republic of Serbia on determination of international and interstate waterways ("RS Official Gazette" No. 109/16) defines the Sava River as international waterway on the entire length of the flow through Republic of Serbia[77].

Serbian stretch of the Sava River can be divided into three different stretches (based on navigation conditions):

Table 22: Division of Sava's Serbian section (based on navigation conditions)

"Sava confluence" (km 11) - Belgrade (km 0.0)	Special navigation regime	A "special navigation regime"is applied on this river stretch due to the density of traffic, the number and characteristics of bridges

[76] "National plan for IWW maintenance in the Republic of Serbia for the period 2011-2020", South-East European Transnational Cooperation Programme, 2010

[77] http://www.plovput.rs/international-waterways

		that enforce one-way navigation on part of this sector.
Km 82 - "Sava confluence" (km 11)	Backwater stretch	This stretch is characterized by good navigation conditions all year around, in terms of available depth and width of the fairway. There are no critical sectors for navigation on this stretch of the river.
Entrance in Serbia (Km 211) – Km 82	Free flowing stretch	This stretch is characterized by changeable navigation conditions which are under the strong influence of hydrological conditions. There are 5 critical sectors for navigation on this stretch where required fairway parameters (depth and width), for safe navigation during low water periods, are not fulfilled. These 5 critical sectors are: Ušće Drine (rKm 184.0 - rKm 177.0); Sremska Mitrovica (rKm 134.0 - rKm 126.8); Klenak (rKm 112.6 - rKm 106.0); Šabac (rKm 104.0 - rKm 90.0); Kamičak (rKm 88.2 - rKm 82.2).

Source: Plovput – Directorate for Inland Waterways – Ministry of Construction, Transport and Infrastructure (SRB) - 2020

Tisza river runs in Serbia for a length of 164 river kilometers (rKm)[78]: from the border with Hungary, (near the village of Đala) at rKm 164, to the confluence with Danube. The Serbian section of the Tisza river flows entirely in the Republic of Serbia and is classified as IV Class standard. In terms of navigation conditions, the Tisza's Serbian section is characterized by stable navigation conditions through the whole stretch. The Tisza's Serbian section is divided in two main stretches by a dam located at the rKm 63.425, near the city of Novi Bečej.

Regulation of the Government of Republic of Serbia on determination of international and interstate waterways ("RS Official Gazette" No. 109/16) defines the Tisza River as international waterway on the entire length of the flow through Republic of Serbia[79].

Table 23: Classification of the Serbian Danube IWW stretches (Bezdan - Timok river confluence)

rkm	rkm	Length (km)	Waterway Class
1433.1 Bezdan	1168.0 Belgrade	265.1	VIc
1168.0 Belgrade	845.5 Timok river confluence	322.5	VII

[78] "National plan for IWW maintenance in the Republic of Serbia for the period 2011-2020", South-East European Transnational Cooperation Programme, 2010

[79] http://www.plovput.rs/international-waterways

Source: Plovput – Directorate for Inland Waterways – Ministry of Construction, Transport and Infrastructure (SRB) - 2020

Table 24: Classification of the Serbian Sava IWW stretches (Jamena – Danube river confluence)

rkm	rkm	Length (km)	Waterway Class
0.0 Sava mouth	81.0 Kamičak	81.0	Va
81.0 Kamičak	176.0 Rača	95.0	IV
176.0 Rača (border with SRB-BiH)	196.0 Domuskela	20.0	III
196.0 Domuskela	210.8 Jamena	14.8	IV

Source: International Sava River Basin Commission

Table 25: Classification of the Serbian Tsiza IWW stretches (Đala - Danube river confluence)

rkm	rkm	Length (km)	Waterway Class
164.0 Đala	63.4 Novi Bečej dam	100.6	IV
63.4 Novi Bečej dam	0.0 Danube river confluence	63.4	IV

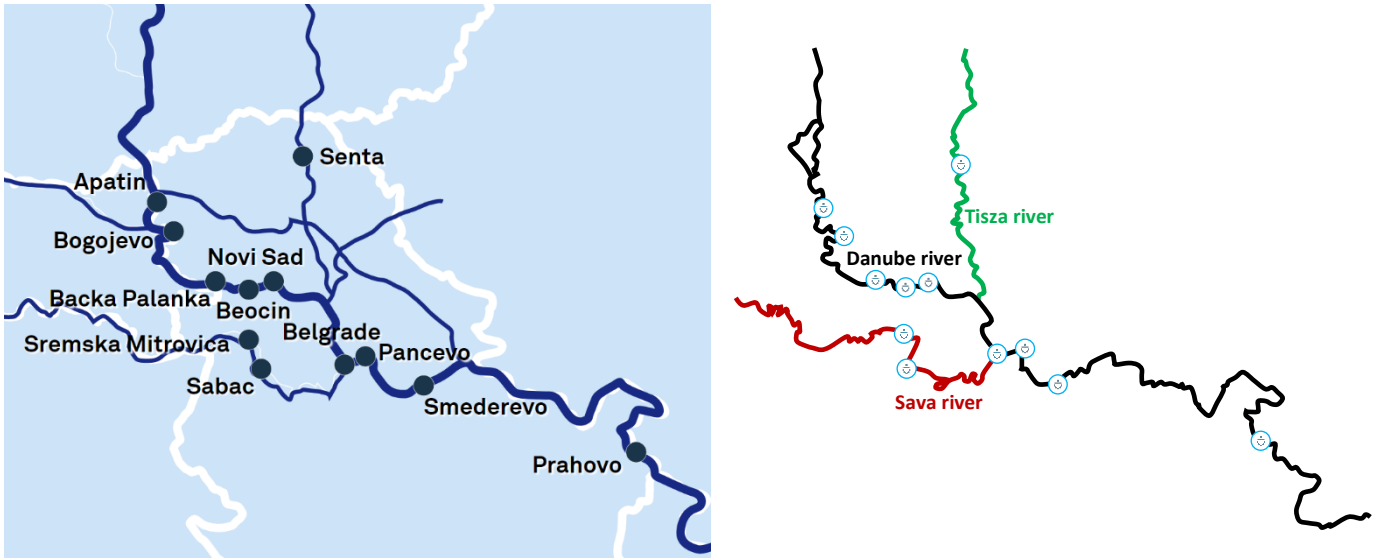
Source: Plovput – Directorate for Inland Waterways – Ministry of Construction, Transport and Infrastructure (SRB) - 2020

1.2.8.2 Main inland ports

The Serbian IWW network includes 13* main inland ports:

- Danube river: Apatin (rKm 1401); Bogojevo (rKm 1366); Bačka Palanka (rKm 1295); Beočin (rKm 1268); Novi Sad (rKm 1254); Belgrad (rKm 1168); Pančevo (rKm 1153); Smederevo (rKm 1111); Prahovo (rKm 861).
- Sava river: Sremska Mitrovica (rKm 133); Šabac (≈ rKm 103); Belgrade (rKm 0.7).
- Tisza river: Senta (rKm 122)

Figure 11: Map of Serbian main inland ports



Source: Viadonau.org

Table 26: Serbian main inland ports

Port		River	rKm/bank	Area (m²)	Type	Class
Apatin		Danube	1401/left	30.000	Dry bulk; Break bulk[80]	VIc
Bogojevo		Danube	1366/left	160.000	Dry bulk; Break bulk	VIc
Bačka Palanka		Danube	1295/left	640.000	Dry bulk; Break bulk	VIc
Beočin		Danube	1268/right	n.a.	Dry bulk	VIc
Novi Sad		Danube	1254/left	24.000	Dry bulk; Container; Break bulk; Petroleum products; refined Liquid bulk; Crude oil	VIc
Belgrad		Danube	1168/right	1.000.000	Dry bulk; Break bulk; Container; High & heavy cargo	VII
Pančevo		Danube	1153/left	1.270.296	Dry bulk; Break bulk; Container; High & heavy cargo; Petroleum products; refined Liquid bulk; Crude oil	VII
Smederevo		Danube	1111/right	433.384	Dry bulk; Break bulk; Petroleum products; refined Liquid bulk; Crude oil	VII
Prahovo		Danube	861/right	70.473	Dry bulk; Break bulk; Container; Petroleum products; refined Liquid bulk; Crude oil	VII
Sremska Mitrovica	Port of Leget	Sava	133/left	500.000[81]	Dry bulk; Break bulk	IV
Šabac	Oil terminal	Sava	104.6/right	5.600[82]	Oil derivatives	IV

[80] Dry bulk: dry cargoes (such as Iron ore, Grain, Coal, Alumina and Phosphate) are carried in loose form (i.e. the cargo is not packed); Break bulk: cargoes are carried in unitized form such as palletised, bagged, strapped, bundled, drummed

[81] According to the *International Sava River Basin Commission* are 80 hectares (800.000 m²)

[82] According to the *International Sava River Basin Commission* are 4.5 hectares (45.000 m²)

	Free zone		101.0/right		Dry bulk; Break bulk	
Belgrad	Oil terminal Baric	Sava	26.3/right		Oil derivatives	Vb
	Oil terminal Ostružnica		18.0/right		Oil derivatives	
	Oil terminal Electricity Plants		5.0/left		Oil derivatives	
	Passenger terminal		0.7/right		Passenger	
Senta		Tisza	122/right	179.000	Dry bulk; Break bulk; Petroleum products refined	IV

Source: International Sava River Basin Commission; Viadonau.org

- Apatin[83]:

The port of Apatin is located along river Danube, at rKm 1401, left bank. It covers a surface of about 30.000 m^2 (including an open storage area) and the main type of cargo handled are represented by dry and break bulk.

Apatin (SRB)	
	
Location	rkm 1410 of the Danube River's left bank
Port area (m^2)	30.000
Terminals (n.)	n.a.
Quays/piers (n.)	n.a.
CEMT Class	VIc
Facilities	Open warehouses
Rail connection	n.a.
Warehouses	Open warehouses
Type of goods handled	Break bulk cargo; dry bulk cargo.

[83] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/55/pfc/Profile/

- Bogojevo:

Danube-Bogojevo Port is located at 1.366 rKm of Danube waterway (left bank) on the border with Croatia, 4 km away from the village Bogojevo, 34 km downstream from the town Apatin[84].

The port covers an area of 160.000 m^2 and it is managed by "Danube-Bogojevo" d.o.o., a company that provides port services, reloading, unloading, warehousing and storage of, primarily, grains, then oilseeds and mineral fertilizers. Bogojevo port is defined in the Masterplan Ports of Serbia as a reloading terminal for, primarily, grains and synthetic fertilizers with the purpose of exploiting Serbian agrarian potentials in export[85].

Main infrastructure: quay (98 m length); 4 roofed facilities with storage space of 10,000 m^2 (adjusted for grains, oilseeds, mineral fertilizers in bulk)[86].

The port of Bogojevo offers the following services: Reloading and unloading of goods; Warehousing and storage of goods; Warehouse rental; Packaging mineral fertilizers

According to the Serbian Ministry of Infrastructure, Serbia plans to invest a total of 52 million euro ($56.8 million) in the expansion of the Danubian port of Bogojevo: construction of grain and oilseed silos, additional storage for agricultural space, a smaller container terminal, as well as an oil terminal[87]. The project foreseen also the construction of industrial rail tracks to be connected with the public rail infrastructure, as well as internal transport routes, handling areas and parking lot; the area covered by the plan amounts to around 548.700 m^2 [88].

Bogojevo (SRB)	
	
Location	rkm 1366 of the Danube River's left bank
Port area (m^2)	160.000
Terminals (n.)	n.a.
Quays/piers (n.)	1

[84] Luka Dunav-Bogojevo

[85] *ibidem*

[86] Luka Dunav-Bogojevo

[87] https://seenews.com/news/serbia-to-invest-52-mln-euro-in-bogojevo-river-port-expansion-699843

[88] https://www.ekapija.com/en/infrastructure/3163889/capacities-of-bogojevo-port-to-expand-new-silos-warehouses-container-and-liquid

CEMT Class	VIc
Facilities	4 roofed facilities with storage space of 10,000 m2
Rail connection	No
Warehouses	Open warehouses
Type of goods handled	Grains, oilseeds, mineral fertilizers

- Bačka Palanka:

The port Bačka Palanka is located on the left bank of the river Danube, on the 1295th km of its course[89] and it has a handling capacity of 500,000 tons per year (various types of cargo). With a water depth of 3.93m - 8.86m, it can host vessels with an average size of 90m length, 11m width, capacity of 1500t and freeboard of 2.5m[90]. The port Bačka Palanka provides reloading services for all kinds of bulk and general cargo, bulk commodities (cereals, oilseeds, soy and sunflower meal, mineral fertilizer, gravel, industrial plants etc.), ferrous metallurgy products packaged, heavy goods (machinery and machine parts), wood and wood products[91]. The port Bačka Palanka has 322 m of quay, various type of cranes (gantry; mobile port; floating) and port pusher. As regards the storage areas, the port Bačka Palanka has an open warehouse of 8,261m² and a covered storage area of 659m². It is important to underline that in the port are carried out additional activities such as the production and sale of construction materials (sand; natural gravel; concrete).

Five kilometers from the port the AgroPort logistics centre is located; it is used for warehousing, packaging and port services for commercial goods and chemical fertiliser. With a storage capacity of 55.000 tonnes for mercantile goods and a daily capacity grain storage of 1,500 tonnes, it offers grain treatment services such as cleaning, drying, separation of grain by quality, ensuring the quantitative and qualitative safety of grains, monitoring the temperature of grain 24/7. The daily capacity of grain shipping is 2,000 tonnes[92].

Bačka Palanka (SRB)	
	
Location	rkm 1295 of the Danube River's left bank
Port area (m²)	640.000
Terminals (n.)	n.a.
Quays/piers (n.)	1

[89] https://www.lukabp.rs/en

[90] https://www.lukabp.rs/en

[91] https://www.lukabp.rs/en

[92] https://www.lukabp.rs/en/news/agroport-logistics-centre-backa-palanka

CEMT Class	VIc
Facilities	various type of cranes (gantry; mobile port; floating) and port pusher. open and close warehouses.
Rail connection	n.a.
Warehouses	Close warehouse (659m²) and Open warehouse (8.261m²)
Type of goods handled	bulk and general cargo, bulk commodities, ferrous metallurgy products packaged, heavy goods , wood and wood products

- Beočin[93]:

The port of Beočin is located along river Danube, at rKm 1268 (right bank). It includes an open storage area and the main type of cargo handled are represented by dry bulk. Between the main facilities there is a gantry crane with a max. lifting capacity of 10 tons.

In mid-October 2015, the Port Management Agency issued a Decision and a Certificate of Entry into the Register of Port and Port Operators to the company "Lafarge BFC". In the same year, the company started building a silo with a river port in Beocin with a capacity of 30,000 cubic meters with complete equipment that includes receiving, storing, transshipment and drying of grain crops (wheat, soybeans, barley, sunflower, oilseed rape, etc.)[94].

Beočin (SRB)	
	
Location	rkm 1268 of the Danube River's right bank
Port area (m²)	n.a.
Terminals (n.)	n.a.
Quays/piers (n.)	1
CEMT Class	VIc
Facilities	1 gantry crane; Open storage area.
Rail connection	n.a.
Warehouses	Open warehouse
Type of goods handled	Dry bulk

[93] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/81/pfc/Profile/

[94] https://www.turistickiklub.com/sadrzaj/luka-beocin

- Novi Sad (DP World Novi Sad):

The Port of Novi Sad (DP World Novi Sad) is located on the 1,254 rKm of the Danube, on the left bank.

At the end of 2018, the Serbian Government started the privatization process of the Port of Novi Sad. The procedure was completed in May 2019, with the successful bidder being a consortium of P&O Ports FZE managed by DP World from the United Arab Emirates, a specialist company which manages small, multi-purpose ports including container terminals, bulk cargo and general cargo[95].

DP World Novi Sad operates on a water surface area of 6 hectares, with quayside depths of from 4 to 10 metres. The 800-metre quay can accommodate up to 5 vessels in one row of berths. The port of Novi Sad hosts 39,220 m2 of closed warehouses and 100,000 m2 of open storage area, consisting of public and bonded warehouses[96]. DP World Novi Sad owns and operates the port[97].

Novi Sad (SRB)	
	
Location	rkm 1254 of the Danube River's left bank
Port area (m^2)	24.000
Terminals (n.)	n.a.
Quays/piers (n.)	1
CEMT Class	VIc
Facilities	Covered water transshipment; Conveyor belt; Pneumatic equipment; Ro/Ro-ramp; 4 gantry crane (max. lifting capacity of 27.5 tons); 1 mobile crane (max. lifting capacity: 42 tons); Open and close warehouses; Storage of dangerous cargo; Waste

[95] https://www.dpworld.com/en/novi-sad/about-us/who-we-are

[96] https://www.dpworld.com/en/novi-sad/about-us/who-we-are

[97] https://www.dpworld.com/en/novi-sad/about-us/who-we-are

	disposal; Bunkering facilities; Fresh water supply; Onshore power supply.
Rail connection	n.a.
Warehouses	Closed warehouses (39.220 m^2); Open warehouses (100,000 m^2).
Type of goods handled	Dry bulk; Container; Break bulk; Petroleum products refined; Liquid bulk; Crude oil

- Belgrade:

The Port of Belgrade is located on the 1.168 rKm of the Danube, on the right bank. Projected technical and technological capacities provide basis for the annual handling of 3.000.000 t of different goods and 10.000 TEU (twenty - foot containers)[98]. The main type of cargo handled are represented by dry bulk, Container, Break bulk, High & heavy cargo and Moisture[99].

The main infrastructure includes[100]:

- Storage space: 117.000 m^2 (indoor) + 526.000m^2 (outdoor)
- Water area: 110.000 m^2 (minimum depth of 4m)
- operative quay: 940 m (possibility of handling 8 vessels at the same time)
- roads: 9.612 m
- railway track: 12.507 m
- parking facilities: 7.347 m^2 for cargo vehicles and 3.848 m^2 for passenger vehicles
- heavy freight terminal: of 16.500 m^2
- bulk freight terminal: of 5.519 m^2
- container terminal: of 12.430 m^2
- Docking facilities for international vessels: total capacity of 12 vessels

The main equipment includes:

- 3 bridge cranes with load capacities of 3t, 20t and 50t respectively
- Manipulator for 27t containers
- 9 portal cranes with the capacity of 3 to 6 t
- motorcar hoists handling 16 - 40 t
- 31 forklift trucks with load capacity of 1,2 - 3 t
- 12 forklift trucks with load capacity of 4,0 – 14,0 t
- tugboat
- several trucks, tractors, trailers, semi-trailers and other machinery

[98] http://www.lukabeograd.com/en.html

[99] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/30/pfc/Profile/

[100] *ibidem*

Belgrade (SRB)	
	
Location	rkm 1.168 of the Danube River's right bank
Port area (m^2)	1.000.000
Terminals (n.)	3 (heavy freight; bulk freight; container)
Quays/piers (n.)	1
CEMT Class	VII
Facilities	Outdoor and indoor storage space; railway tracks; parking facilities; Docking facilities; 3 bridge cranes (load capacities: 3t, 20t and 50t); Manipulator for 27t containers; 9 portal cranes (capacity: 3 to 6 t); motorcar hoists handling (16 - 40 t); 31 forklift trucks (load capacity: 1,2 - 3 t); 12 forklift trucks (load capacity: 4,0 – 14,0 t); tugboat; several trucks, tractors, trailers, semi-trailers and other machinery.
Rail connection	Yes
Warehouses	117.000 m^2 (indoor) + 526.000 m^2 (outdoor)
Type of goods handled	Dry bulk, Container, Break bulk, High & heavy cargo and Moisture

- Pančevo[101]:

The port of Pančevo is located along river Danube, at rKm 1153, left bank. It covers a surface of 1.270.296 m^2 (including open storage area, covered storage area, storage of dangerous cargo and customs warehouse) and the main type of cargo handled are represented by dry bulk, container, break bulk, high & heavy cargo, refined petroleum products, liquid bulk and crude oil.

[101] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/82/pfc/Profile/

The port of offers the following services[102]:

- Fleet maintenance services
- Ship transshipment services
- Rail transshipment and handling services
- Warehousing and cargo handling services
- Special cargo handling services from ships

The main equipment includes[103]:

- Covered water transshipment;
- Conveyor belt;
- Pneumatic equipment;
- Ro/Ro-ramp
- 3 Gantry cranes
- 3 Mobile cranes

Pančevo (SRB)	
	
Location	rkm 1.153 of the Danube River's left bank
Port area (m^2)	1.270.296
Terminals (n.)	n.a.
Quays/piers (n.)	n.a.
CEMT Class	VII
Facilities	open storage area, covered storage area, storage of dangerous cargo and customs warehouse; Covered water transshipment; Conveyor belt; Pneumatic equipment; Ro/Ro-ramp; 3 Gantry cranes; 3 Mobile cranes.

[102] https://www.specijalnaluka.rs/

[103] danube-logistics.info

Rail connection	Yes
Warehouses	Open and covered storage area
Type of goods handled	dry bulk, container, break bulk, high & heavy cargo, refined petroleum products, liquid bulk and crude oil

- Smederevo[104]:

The port of Smederevo is located along river Danube, at rKm 1111, right bank. It covers a surface of 433.384 m^2 (including open storage area, covered storage area, storage of dangerous cargo and customs warehouse) and the main type of cargo handled are represented by dry bulk, break bulk, refined petroleum products, liquid bulk and crude oil.

The main equipment includes[105]:

- Covered water transshipment;
- Conveyor belt;
- Pneumatic equipment;
- Ro/Ro-ramp
- 3 Gantry cranes (with a max. lifting capacity of 27 tons)
- 1 Mobile cranes (with a max. lifting capacity of 40 tons)

Smederevo (SRB)	
	
Location	rkm 1.111 of the Danube River's right bank
Port area (m^2)	433.384
Terminals (n.)	n.a.
Quays/piers (n.)	n.a.
CEMT Class	VII
Facilities	open storage area, covered storage area, storage of dangerous cargo and customs

[104] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/58/pfc/Profile/

[105] *ibidem*

	warehouse; Covered water transshipment; Conveyor belt; Pneumatic equipment; Ro/Ro-ramp; 3 Gantry cranes (with a max. lifting capacity of 27 tons); 1 Mobile cranes (with a max. lifting capacity of 40 tons).
Rail connection	n.a.
Warehouses	Open and covered storage area
Type of goods handled	Dry bulk; Break bulk; Petroleum products refined; Liquid bulk; Crude oil

- Prahovo[106]:

The port of Prahovo is located along river Danube, at rKm 861, right bank. It covers a surface of 70.473 m2 (including open storage area, covered storage area and customs warehouse) and the main type of cargo handled are represented by dry bulk, break bulk, refined petroleum products, liquid bulk and crude oil.

Elixir Group is the operator of the Port of Prahovo, which has 700 metres of operational coast, 7 berths for river vessels and facilities for receiving and handling all types of cargo from river barges, rail trains and transport trucks[107]. The current transshipment capacity is about 2 million tonnes per year.

The main equipment/facilities includes[108]:

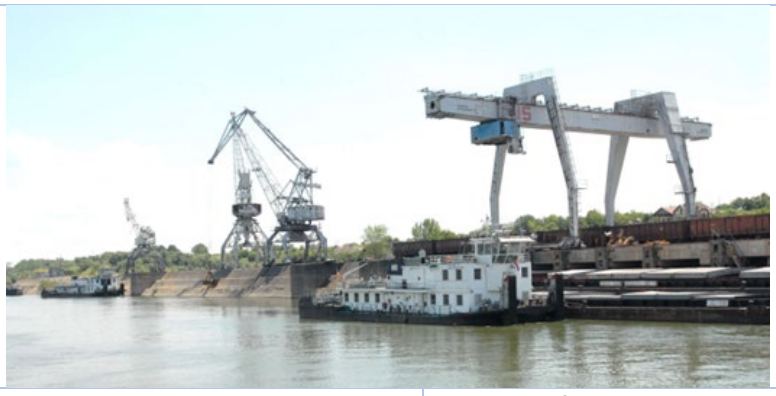
- Covered water transshipment;
- Conveyor belt;
- Pneumatic equipment;
- Ro/Ro-ramp
- 6 Gantry cranes (with a max. lifting capacity of 40 tons)
- Bunkering facilities
- Fresh water supply
- Onshore power supply

Prahovo (SRB)

[106] https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/32/pfc/Profile/

[107] https://icpp.rs/

[108] *ibidem*



Location	rkm 861 of the Danube River's right bank
Port area (m^2)	70.473
Terminals (n.)	n.a.
Quays/piers (n.)	1
CEMT Class	VII
Facilities	open storage area, covered storage area, storage of dangerous cargo and customs warehouse; Covered water transshipment; Conveyor belt; Pneumatic equipment; Ro/Ro-ramp; 6 Gantry cranes (with a max. lifting capacity of 40 tons); Bunkering facilities; Fresh water supply; Onshore power supply.
Rail connection	n.a.
Warehouses	Open and covered storage area
Type of goods handled	Dry bulk; Break bulk; Petroleum products refined; Liquid bulk; Crude oil

- Sremska Mitrovica (Port of Leget)[109]:

The port of Leget is positioned in the eastern industrial zone of Sremska Mitrovica, and it includes an open storage area of 25.000 m^2 and a covered warehouse of 20.000 m^2. The port has various facilities such as vertical quay (100 m) for mooring and handling all types of vessels, 1 portal crane (lifting capacity: 6,5 tons) capable of handling of all types of general and bulk cargo, 1 car crane (bearing capacity: 25 tons) and several forklifts. The port of Leget has various infrastructural connection such as the one with the railway Belgrade - Zagreb via industrial railway track and a direct connection to the Belgrade – Zagreb highway.

The fleet operating in the port of Leget consists of 4 pullers, 5 self-propelled vehicles, a total load capacity of 3.000 tons and 17 load-bearing facilities with a total capacity of 8.000 tons[110].

Sremska Mitrovica - Port of Leget (SRB)

[109] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[110] https://www.leget.rs/ENG/index.html

	
Location	rkm 133 of the Sava River's left bank
Port area (m^2)	500.000 – 800.000
Terminals (n.)	n.a.
Quays/piers (n.)	1
CEMT Class	IV
Facilities	open storage area, covered storage area; Covered water transshipment; Conveyor belt; Pneumatic equipment; 1 gantry crane (lifting capacity: 12 tons); 1 portal crane (lifting capacity: 6,5 tons); 1 car crane (bearing capacity: 25 tons); several forklifts.
Rail connection	Yes
Warehouses	Open storage area (25.000 m^2) and covered storage area (20.000 m^2)
Type of goods handled	Dry bulk; Break bulk

- Šabac:

The port of Šabac (5.600 m^2) is located into the Free Zone Šabac (470.000 m^2) and it has a potential harbour water area of 45.000 m^2 [111] . The port includes an open storage area of 12.000 m^2, a closed storage area of 22.000 m^2, a container storage area of 10,000 m^2 and a dangerous goods storage area of 5,000 m^2. The port has various facilities such as a terminal of 10,000 m^2, mobile handling machinery, passenger terminal and various vertical quays (l: 400 m + 160 m). The port of Šabac has infrastructural connection with road and railway. Among the services offered by the port there are handling services[112] (4 vessels simultaneously + railway cars), customs office, weighing scale and all other auxiliary services.

Šabac *(SRB)*

[111] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[112] Cargo handling in the basin is currently not possible due to the insufficient depth at the entrance.

Location	rkm 104,6 - 101 of the Sava River's right bank
Port area (m^2)	5.600
Terminals (n.)	2
Quays/piers (n.)	2
CEMT Class	IV
Facilities	open storage area, covered storage area; Covered water transshipment; 1 gantry crane (lifting capacity: 6 tons); 1 mobile crane (lifting capacity: 10 tons).
Rail connection	Yes
Warehouses	Open storage area (12.000 m^2) and covered storage area (22.000 m^2); container storage area (10.000 m^2); dangerous goods storage area (5.000 m^2).
Type of goods handled	Dry bulk; Break bulk

- Senta[113]:

The port of Senta is located at rKm 122 of the Tisza River (right bank). It has a bulk cargo terminal and a container terminal. The first one has an unloading place for waste construction material (gravel - crushed stone and coal) with a capacity of 120 tonnes per hour.

Closed and open warehouses with a capacity of more than 38,000 m² are located in the port as well as a petrol station with a capacity of 300.000 litres for river, rail and road vehicles refueling.

The transhipment capacity of the port is 1,500,000 tonnes of different goods.

Main equipment:

- loading bays for ships of up to 1.800 tonnes
- Crane with a capacity of 25 tons
- 25 t carrying arc loading bridge
- 2 to 6 ton forklifts

[113] https://www.luka-senta.rs/

- ULT - 220
- excavator
- 9 to 30 tons trucks with a 50 tons digital road scale
- gravel separator with international certificate (capacity 30m3/h)
- rail connection (1.050 mt of railway tracks)
- road connection (1.170 mt of roads)
- equipment for loading grain and other bulk goods (capacity: 3.000 tons per day)
- construction material unloading point, capacity 120 t/h
- port machinery

Senta *(SRB)*	
	
Location	rkm 122 the Tisza River's right bank
Port area (m^2)	179.000
Terminals (n.)	2
Quays/piers (n.)	n.a.
CEMT Class	IV
Facilities	open storage area, covered storage area; Covered water transshipment; Conveyor belt; Pneumatic equipment; 1 gantry crane (lifting capacity: 25 tons); 2 to 6 ton forklifts; ULT – 220; excavator; 9 to 30 tons trucks with a 50 tons digital road scale; gravel separator
Rail connection	Yes
Warehouses	Open (20.000 m^2) storage area; covered storage area (18.260 m^2); LPG storage area (1.000 m^3); Customs warehouse
Type of goods handled	Dry bulk; Break bulk; Petroleum products refined; Container

1.2.8.3 IWW traffic volumes (passengers and freight) and characteristics

Table 27: IWW freight traffic volumes in Serbia 2010 – 2019 (in Tonne - km)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Traffic volumes	875	726	604.6	701.1	758.8	858.6	926.3	724.8	579.7	726.8

Source: Statistical Office of the Republic of Serbia

Table 28: Waterside freight traffic in major Serbian ports (in thousand tonnes)

Port	**2017**	**2018**	**2019**
Smederevo	3 200	3 600	4 000
Pancevo	1 100	1 400	1 500
Novi Sad	1 200	1 000	1 400
Prahovo	900	1 000	1 100
Sremska Mitrovica	189	234	560
Sabac	170	149	149
Other transhipment places	n.a.	682	949

Source: Central Commission for the navigation of the Rhine

1.2.8.4 Objectives of national IWW policies

The main objectives of the Serbian IWW policies are[114]:

- Renewal and modernization of the national fleet: Increase the Serbian IWW traffic by 35% by 2025; renewal and modernization of the national fleet; development of domestic shipping industry and domestic shipping companies; development of container transportation; Harmonized regulations and administrative procedures, simplified customs and border procedures according to the model of the neighbouring EU Member States in the Danube region.
- Developing economic potentials of Serbian ports: Sustainable development of local ports; High quality port infrastructure and superstructure; Integration of ports in a multimodal logistic chain; Higher employment of port hinterland residents.

[114] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

- Improve Serbian IWW: Improving the quality level of waterways; achievement of European standards of safe navigation on the entire network; Widespread development of RIS management system in order to raise the level of safety and efficiency of IWW traffic; Improvement, preservation and full protection of the ecological network.
- Professional training and employment in the field of water traffic: Training and hiring of professional personnel in shipping, harbour and administration in charge of water traffic.
- Development of maritime economy of the Republic of Serbia: Harmonization of the national legislation with the maritime regulations; Strengthening the Maritime Cluster; implementation of international and European standards in the field of maritime navigation; Development of the entire maritime business infrastructure required for encouraging the ship-owners to shift a portion of their fleet under the Serbian flag

1.2.9 Slovenia

There is no inland port-related content to report for this Country.

2 Planned IWW projects

The Adriatic-Ionian macro region is served by various important rivers and canals that create a relevant and widespread network of Inland Waterways along which there are several inland ports.

The present chapter describes the main infrastructural projects that concern the development of the IWW network of the Adriatic-Ionian region, and it is divided as follows:

- Sub-chapter 2.1 “International projects in the macro region”: it analyses projects that can be defined as “international” since they are related to works to be carried out directly on the waterway itself and whose benefits are therefore spread among various riparian countries. The projects analysed in this chapter concerns only the Danube and the Sava river waterways.

- Sub-chapter 2.2 “National IWW projects in the macro region”: describes the main inland waterway projects being carried out at a national level.

2.1 International projects in the macro region

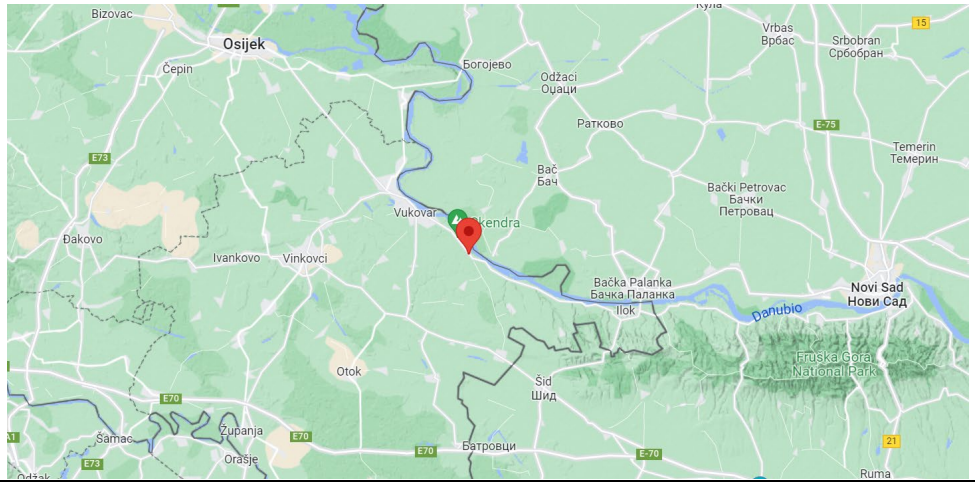
The main international waterways that are part of the Adriatic-Ionian region and that crosses more than one country are represented by the Danube and the Sava rivers. The first one, in fact, flows through Croatia and Serbia and the second one through Croatia, Bosnia and Herzegovina and Serbia. The analysis of the main international waterway projects included in this sub-chapter is divided in the following two paragraphs:

- 2.1.1 “Danube river infrastructure investment projects”
- 2.1.2 “Sava river infrastructure investment projects”

2.1.1 Danube river infrastructure investment projects

In the present paragraph the main international projects concerning the Danube waterway section that flows in the Adriatic-Ionian region will be analyzed. The interventions analysed cover different areas including both “heavy” infrastructural interventions, such as those necessary to improve or restore navigation conditions (e.g. dredging, rehabilitation of the waterway, construction of new canals, etc.) and “lighter” ones such as the implementation of a transnational waterway management system.

Rehabilitation of the right bank of the Danube river at km 1,322 (Sotin)[115,116]

Description and objectives	Near the village of Sotin (at rkm 1322) the Danube River has eroded the right coastline where the village and the local church are located and there is a risk of undermining and collapse of the bank. The erosion of the right side has the effect of increasing the width and decreasing the depth of the river profile with a considerable expansion of the flowing profile, affecting the conditions of navigation, especially at lower water levels. The aim of this project is to present a solution for safeguarding the coastline by implementing control facilities that would effectively restrict the flow profile resulting in accelerated currents and decreased sediment buildup. This approach will effectively hinder the formation of sandbars and maintain ideal depths for smooth navigation [117]. The Project goal is the regulation of the Danube River Waterway at Sotin from 1321 rkm to 1325 rkm. <u>Planned activities:</u> This project will construct the following control facilities: • transverse groyne 21-D/1, • transverse groyne 22-D/1, • longitudinal structure 22-23-D/1 The projected regulatory line will be established and maintained by the longitudinal structure and the transverse groynes. Their purpose is to narrow down the flow profile downstream, thereby reshaping the coastline. This approach will yield beneficial outcomes for the watercourse, as it will result in reduced width and the attainment of more favorable depths suitable for navigation. Additionally, relocating the coastline will serve as a protective measure for the high bank at risk of erosion. **Figure 12: Location of the Action (Sotin, HR)** 

[115] https://navigation.danube-region.eu/rehabilitation-of-the-right-bank-of-the-danube-river-at-km-1322-sotin/

[116] https://povezanahrvatska.eu/en/projekti/regulation-of-the-danube-river-waterway-at-sotin/

[117] https://www.viadonau.org/fileadmin/content/viadonau/Projektdatenbank/Preparing_FAIRway_2_works_in_the_Rhine_Danube_Corridor/2021-06-09_PPT-3_Overview-Project-Sotin_MMPI_ZrinkoZvocak.pdf

	Source: Google Maps
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Danube IWW
Costs	Total budget: 5.813.060,67 EUR EU grant: 4.941.101,57 EUR
Timeline	Start date: Oct 2020 End date: Dec 2023

Improving navigation conditions on the Danube River from 1295.5 -1433.1 river km – Eliminating bottlenecks on the Croatian/Serbian part of Danube River[118]

Description and objectives	The most critical part of the Danube river IWW, as regards inland navigation, is represented by the common Croatian and Serbian part of the river. In particular the stretch from 1433.1 rKm (border between Hungary, Croatia and Serbia) to 1295.5 rkm (near the port of Bačka Palanka) is considered critical in terms of navigation conditions and dissemination of sediment and ice. Therefore, the main objective of the project is to define the present situation through monitoring (ecological, hydro-morphological, water quality,…), propose measures which would ensure smooth and safe river navigation while preserving and protecting existing natural habitats and protected sites . <u>Planned activities</u> 1. Data collection and analysis – existing situation 2. Identification of main elements: transport needs, environmental needs and constrains, conditions from other planning activities, transboundary elements, integrated project objectives and benefits, definition on project objectives and benefits, communication and involvement of stakeholders and the public 3. Mathematical modelling of the river 4. Initial planning and establishment of a forum 5. Monitoring of major elements Preparation of necessary project documentation and assessments
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Danube IWW
Costs	Total budget: 1.000.000 EUR
Timeline[119]	Start date: tbd End date: tbd

[118] https://navigation.danube-region.eu/improving-navigation-conditions-on-the-danube-river-from-1295-5-1433-1-river-km-eliminating-bottlenecks-on-the-croatian-serbian-part-of-danube-river/

[119] The project is under definition and exact dates cannot be determined until national border issues are resolved.

Danube Ship Wreck Removal[120]

Description and objectives	This project aims at removing the shipwreck /abandoned vessels along the riverbed of Danube River in Serbia, Romania and Bulgaria (from Apatin to Constanta, km 1,433 - km 0) in order to ensure a sustainable improvement of the waterway. Planned activities: The removal project is divided into four different phases: • Phase I – Preparation: Getting an overview of the current situation and quantify the amount of workload along the Danube, preparing a closer study for each section that will be carried out in phase II. • Phase II – Classification of vessels: every vessel would be assessed individually regarding its cost of removal due to location and features (mostly explosive material) and marketable steel. • Phase III – Contracting: After classification of the respective objects and funding for each section, appropriate companies have to be contracted to execute the works. • Phase IV – Implementation
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Danube IWW
Costs	Most expenses regarding the removal cannot yet be defined due to the uncertainty of the characteristics of shipwrecks. Serbia: According to the Serbian Danube Master Plan Study, the cost of all WWII Shipwrecks in Serbia will sum up to 20.000,00 EUR. The initial project for the removal of 48 shipwrecks in the Smederevo region needs to be financially supported with approx. 5.000,00 EUR. (1.5 years, 50 skilled workers full time, including services from divers and heavy machinery). Romania and Bulgaria: The available data record on obstructing shipwrecks in Bulgaria and Romania is so far mainly based on non-scientific reports. Hence the implementation of a specific study in Romania and Bulgaria is necessary and will be part of the overall removal project. The cost of such study will be approx. 300.000,00 EUR.
Timeline[121]	Start date: tbd End date: tbd Project not yet realized

Construction of multi-purpose Danube-Sava Canal[122]

[120] https://navigation.danube-region.eu/dswr-danube-ship-wreck-removal/

[121] The project is under definition and exact dates cannot be determined until national border issues are resolved.

[122] https://navigation.danube-region.eu/construction-of-multi-purpose-danube-sava-canal/

Description and objectives	Currently, there is no connection between the Sava and the Danube river, except through the mouth of the Sava river near Belgrade. Connecting the Danube and the Sava, the fairway will be shortened for more than 400 km upstream and about 90 km downstream. The Canal was initially designed as a transport link, but eventually gets a multifunctional role. The canal would start in Vukovar on the Danube River and end at Šamac on the Sava River. Length of the canal route is 61.4 km.
Expected impact	Improved transport conditions irrigation, navigation and drainage.
Costs	Total budget: 850.000.000 EUR (indicative)
Timeline[123]	Start date: n.a. End date: n.a. Project not yet realized

RIS COMEX – RIS Corridor Management Execution[124]

Description and objectives	Previous RIS implementation projects mainly focused on the realisation of national RIS infrastructure with some pilot activities related to the international exchange of RIS data. RIS COMEX now focuses on the seamless availability and easy-to-access relevant information for fairway users and other logistics stakeholders as well as relevant authorities in order to increase efficiency of inland navigation based on existing infrastructure. In June 2022, the RIS COMEX project reached its successful conclusion following over six years of extensive collaboration among partners from 13 European countries. The development of EuRIS and CEERIS systems finally fulfilled the long-awaited need for a centralized European RIS platform and an intelligent electronic reporting platform[125].
Expected impact	Increase efficiency of inland navigation
Costs	Total budget: 26.501.194 EUR EU funds: 15.605.340 EUR (Connecting Europe Facility); National funds: 10.895.854 EUR
Timeline	Start date: Feb 2016 End date: June 2022

COMPETING – Competence Based Education and Training for Inland Navigation[126]

[123] The project is under definition and exact dates cannot be determined until national border issues are resolved.

[124] https://navigation.danube-region.eu/ris-comex-ris-corridor-management-execution/

[125] https://www.riscomex.eu/

[126] https://navigation.danube-region.eu/competence-based-education-and-training-for-inland-navigation/

Description and objectives	Within COMPETING fifteen partners from eight different EU member states developed curricula and lesson materials, as well as a Quality Assurance and Quality Control (QA/QC) system, to ensure the highest level of quality concerning the implementation of future proof IWT education and training throughout the EU. The duration of COMPETING was from the 1st of January 2019 until the 30st June 2022[127]. The advancements made in this project have facilitated the adoption of EU legislation (EU Directive 2017/2397), leading to the establishment of a standardized system for recognizing educational programs and ensuring that qualified crew members possess a Union certificate.
Expected impact	Increase quality and safety of inland navigation
Costs	Total budget: 938.570 EUR EU funds: 938.570 EUR are funded by ERASMUS + Programm
Timeline	Start date: Jan 2019 End date: Jun 2022

FAIRway works! in the Rhine-Danube Corridor (2019-EU-TM-0187-W)[128]

Description and objectives	"FAIRway works! in the Rhine-Danube Corridor" is a collaborative project between Austria and Serbia, dedicated to resolving navigational bottlenecks in the Danube River within their respective territories. Serving as a successor to the CEF flagship initiative "FAIRway Danube," this project focuses on implementing the most advanced and developed initiatives within the corridor[129]. The interventions included in the present project regards some of the most critical bottlenecks located along the Danube waterway in Serbia and Austria. As regard Serbia, the interventions included in this project are: • Upgrade of the Iron Gate 2 locks will increase the reliability of lock operation and reduce waiting times of vessels for the entire corridor. The reconstruction and upgrade of the Iron Gate II navigational lock will improve functional performance of the lock and reduce the duration of its lock cycles. Moreover, reliability, predictability and stability of operations will be increased, resulting in a decrease of waiting times for vessels, the elimination of unscheduled downtime risks, improved safety of navigation and improved overall Good Navigation Status parameters on the Danube waterway.

[127] https://www.iwt-competencies.eu/

[128] https://navigation.danube-region.eu/fairway-works-in-the-rhine-danube-corridor/

[129] https://www.viadonau.org/en/company/project-database/fairway-works-in-the-rhine-danube-corridor/fairway-works-in-the-rhine-danube-corridor

	• The procurement of equipment for ensuring year-round navigability (1 multifunctional marking vessel in Serbia and Austria respectively, 1 surveying vessel and Aids to Navigation in Serbia) will enhance the Good Navigation Status and the capacity of the waterway. Improved data on the riverbed, combined with the reduced reaction time for marking, enables more efficient measures especially after extreme weather events.
Expected impact	Increase quality and safety of inland navigation
Costs	Total budget: 42.576.144 EUR EU funds: 17.030.458 EUR (Connecting Europe Facility);
Timeline	Start date: March 2020 End date: Oct 2024

Preparing FAIRway 2 works in the Rhine-Danube Corridor (2019-EU-TM-0262-S and 2019-HR-TM-0263-S)[130,131]

Description and objectives	The proposed action will prepare the foundation for "FAIRway Danube 2" giving a significant impetus to the further acceleration of inland waterway works in the Rhine-Danube Corridor. The Global Project includes two twinned Actions: 2019-EU-TM-0262-S and 2019-HR-TM-0263-S. Both Actions will be carried out following-up the results of the CEF funded Actions FAIRway Danube (2014-EU-TM-0219-S and 2019-EU-TMC-0231-S) and will aim at accelerating the future works along the Danube and the Sava. 3 partners from 3 countries (Austria, Croatia and Serbia) participate in the implementation of the project The proposed actions (2019-EU-TM-0262-S and 2019-HR-TM-0263-S) consists of following activities: • An inventory of navigational and environmental characteristics of the Croatian/Serbian common section of the Danube. The data collected will be used for navigation purposes and as well as to define conservation objectives for the River Basin Management Plans in Croatia. • Delivery of a study including the results of the 1D hydraulic modelling for the entire Croatian and Serbian Danube common section. • Delivery of the terms of references for the functional upgrades of the transnational waterway monitoring system (WAMOS 2.0). • Definition of a concept for the stakeholders' cooperation and coordination along the Austrian, Croatian and Serbian sections of the Danube. • Delivery of a study for Austria, Croatia and Serbia to assess the needs to upgrade/construct mooring places along the sections of the Danube and the Sava
Expected impact	Increase quality and safety of inland navigation
Costs	Total budget:1.908.000 EUR (2019-EU-TM-0262-S) + 1.384.000 EUR (2019-HR-TM-0263-S) EU funds: 954.000 EUR (2019-EU-TM-0262-S) + 1.176.400 EUR (2019-HR-TM-0263-S)

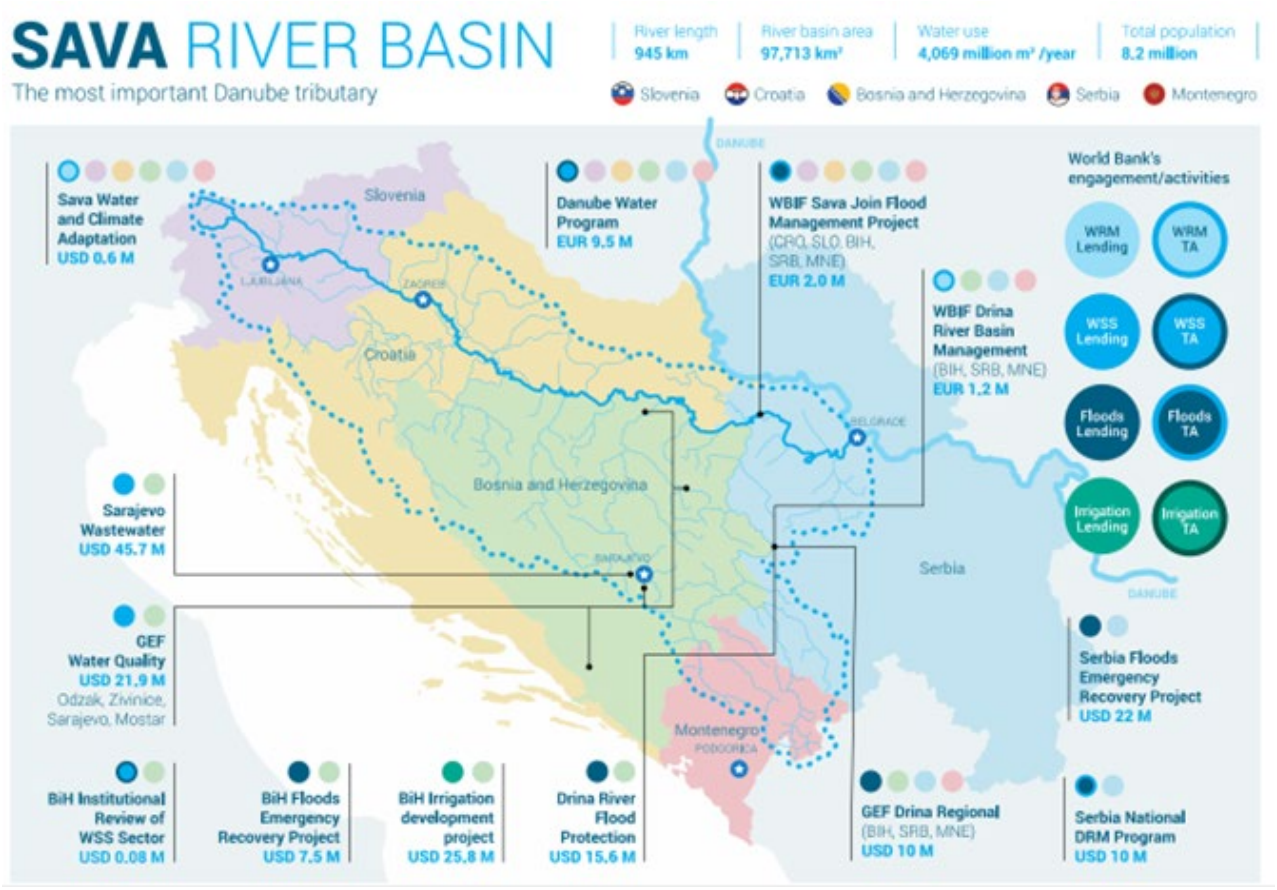
[130] https://navigation.danube-region.eu/preparing-fairway-2-works-in-the-rhine-danube-corridor/

[131] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2019-eu-tm-0262-s

Timeline[132]	Start date: July 2020 End date: Apr 2024

2.1.2 Sava river infrastructure investment projects

Figure 13: Sava river basin



Sava - Drina River Corridor Integrated Development Project (SDIP) (World Bank Project ID: P168862)

Description and objectives	The objective of the SDIP project is to strength the transboundary water cooperation and to improve navigability and flood protection in the Sava and Drina Rivers Corridors[133]

[132] The project is under definition and exact dates cannot be determined until national border issues are resolved.

[133] https://documents1.worldbank.org/curated/en/782831582048365750/pdf/Project-Information-Document-Sava-and-Drina-Rivers-Corridors-Integrated-Development-Program-P168862.pdf

	The SDIP is divided in two partially overlapping phases (Phase I 2020 – 2026; Phase II 2024-2030) and it foresees an integrated development of the Sava and Drina Corridors through a multiphase programmatic approach. EUSAIR Countries involved: Serbia, BiH, Montenegro, Croatia, and Slovenia. **Phase 1 (2021 – 2026):** Aims at improving flood protection and enhance transboundary water cooperation in the Sava and Drina Rivers Corridors. It is composed by four components: 1. Integrated Management and Development of the Sava River Corridor (IBRD + WBIF[134]) • Flood Protection and environmental management; • Waterway improvements in the terms of demining the right bank of the Sava river; • Enhancement of ports facilities (ports of Sremska Mitrovica (SRB); Brcko (BiH); Gradiska (BiH); part of Phase II) 2. Integrated Management and Development of the Drina River Corridor (IBRD) • Flood protection and environmental management; • Integrated development of Drina watershed. 3. Project Preparation and Management (IBRD) • Phase II preparation; • Institutional strengthening and project management. 4. Regional Activities (GEF[135]) • Regional dialogue, project management and coordination • Regional plans, studies and strategies of basin –wide importance Total costs: USD 151,50 million[136] **Phase 2 (2024 – 2030):** Aims at strengthening trans-boundary water cooperation and improve navigability and flood protection in the Sava and Drina Rivers Corridors. This Phase will partially overlap with Phase I and is envisaged to implement subprojects that will be prepared during Phase I, with a stronger emphasis on multi-purpose, integrated and transboundary investments where relevant.

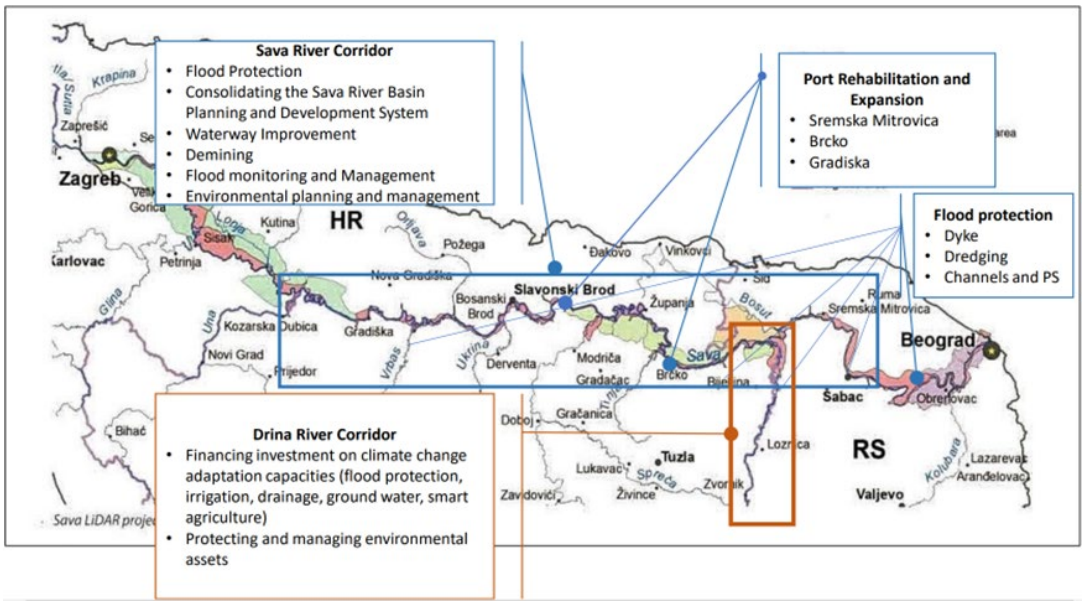
[134] The grant from Western Balkans Investment Framework (WBIF) is going to finance the demining of left Bank of Sava River within BiH.

[135] Global Environmental Facility

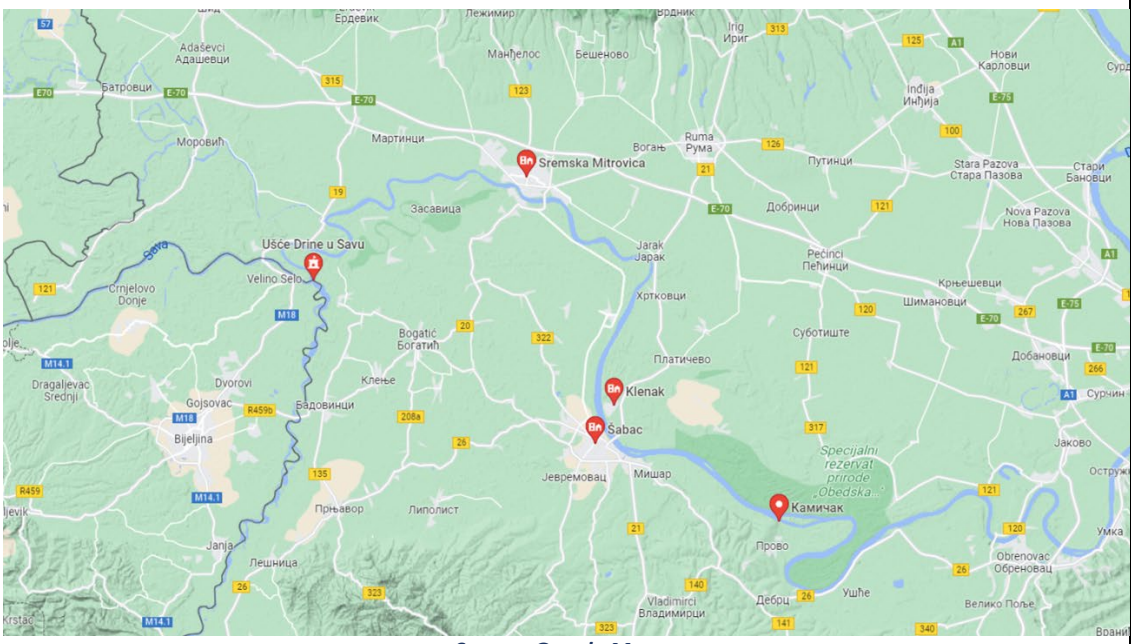
[136] International Bank for Reconstruction and Development (IBRD): USD 134 million

Western Balkans Investment Framework (WBIF): EUR 9,5 million

Global Environmental Framework (GEF): USD 8 million

	1. <u>Integrated Management and Development of the Sava River Corridor</u> • Flood protection and environmental management. • Waterway Improvements in the terms of demining the right bank of the Sava river. • Enhancements of ports, services and logistics. 2. <u>Integrated Management and Development of the Sava River Corridor</u> • Flood protection and environmental management • Integrated development of Drina watershed 3. <u>Project Preparation and Management</u> • Project Management 4. <u>Project Preparation and Management</u> • Regional dialogue, project management and coordination • Regional plans, studies and strategies of basin –wide importance Total costs: USD 180,9 million **Figure 14: Sava - Drina River Corridor Integrated Development Project (Figure)**  ***Source: World Bank***
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Sava IWW
Costs	US$ 332,4 million (2021 – 2030)
Timeline	Start date: Aug 2020 End date: 2030

Rehabilitation of the critical sectors (5) on the Sava River[137]

Description and objectives	Currently, the Sava river waterway does not meet the required navigation parameters of international waterway class IV and does not allow for smooth navigation on 300 days/year for vessels with a maximum draft of 2.5 metres. One of the main objective to develop the Sava river waterway is its upgrading to navigability Class IV along the entire route. The main objective of the project is to provide the prescribed fairway parameters on the Sava river between Belgrade and the border with Croatia (Serbian Sava stretch). On this river stretch there are 5 critical bottlenecks, from rKm 184 to rKm 82.2, that will be removed • Kamičak (rKm 88.2 - 82.2) • Šabac (rKm 104.0 - 90.0) • Klenak (rKm 112.6 - 106.0) • Sremska Mitrovica (rKm 134.0 - 126.8) • Estuary of the Drina River (rKm 184.0 - 177.0) – Border with BiH **Figure 15: 5 critical sectors of the Serbian Sava IWW** 

Source: Google Maps

Planned activities:

In 2017 rehabilitation works were already conducted on the first critical sector "Kamičak" (rkm 87-83). The three locations "Šabac", "Klenak" and "Sremska Mitrovica" will be removed over the next two years. The works comprise of dredging of the riverbed.

The fifth critical sector "Estuary of the Drina and Sava Rivers" requires the construction of hydrotechnical structures as well as dredging works.

Expected impact	Improved navigation conditions Strengthen the competitiveness of the Sava IWW
Costs	Total estimated costs: 7.000.000 EUR

[137] https://navigation.danube-region.eu/rehabilitation-of-the-critical-sectors-on-the-sava-river/

	Budget for rehabilitation of four critical locations (Kamičak, Šabac, Klenak and Sremska Mitrovica): 2.000.000 EUR financed from budget of the Serbian Ministry of Construction, Transport and Infrastructure – Directorate for Inland Waterways Budget for rehabilitation of sector Estuary of the Drina and Sava Rivers: 5.000.000 EUR
Timeline	Start date: 2017 End date: n.a.

Preparation of EIA Study and Design Documentation for the river Sava IW section between rkm329 to 315 and 312+200 to 300 (2016-HR-TMC-0122-S)[138]

Description and objectives	Within this Action it is proposed to prepare Environmental Impact Assessment Study, Conceptual Solution, Preliminary and Main Designs for rehabilitation of the Sava river inland waterway to class IV in the section from rkm 329 to rkm 315 and rkm 312.2 to rkm 300. The Conceptual Solution would encompass the section from rkm 268 (city of Zupanja) to rkm 371 (city of Slavonski Brod), but the EIA Study and Design documentation would be prepared for the critical part of the route (from rkm 329 to rkm 315 and rkm 312.2 to rkm 300), where the most critical sub-section is the onw between Jaruge (rkm 320) and Novi Grad (rkm 329). **Planned activities:** The scope of the Action is to: • Deliver a Main Design covering works priority measures to be implemented along a critical section of the Sava from rkm 268 (Županja) to rkm 371 (Slavonski Brod) to reinstate good navigation status throughout the year; • Issue construction Permits by the Ministry of Construction and Physical Planning on the basis of results of the Final Designs; • Complete the EIA and Appropriate Assessments for the sections where the priority works will be carried out **Figure 16: Location of the Action n. 2016-HR-TMC-0122-S**

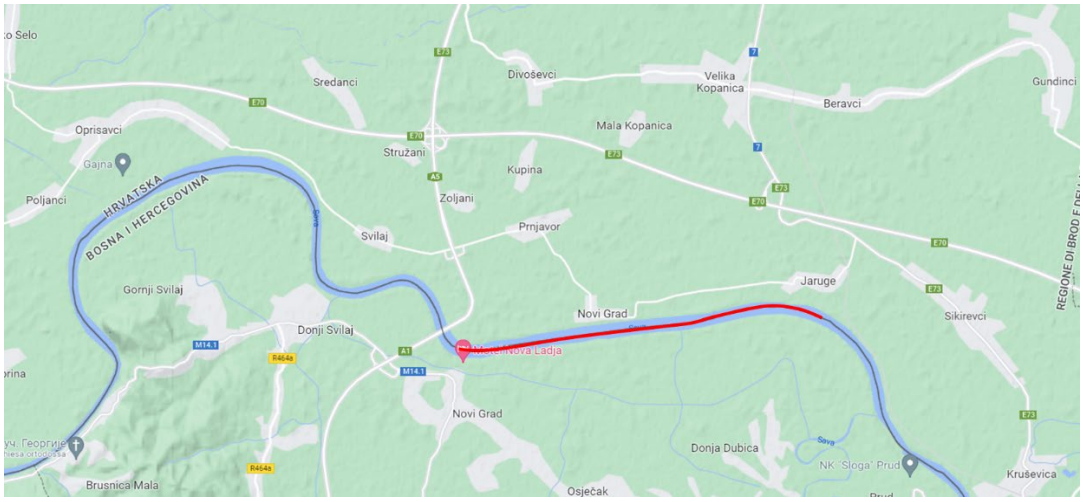
[138] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2016-hr-tmc-0122-s

	 ***Source: INEA***
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Sava IWW
Costs	Total estimated costs: 489.430 EUR EU Funds: 416.016 EUR (*Connecting Europe Facility*) National funds: 73.414
Timeline	Start date: Jan 2018 End date: Dec 2022

Reconstruction of the critical part of the Sava River waterway in the section Jaruge – Novi Grad[139]

Description and objectives	Part of the Design of the Action n. 2016-HR-TMC-0122-S regards the critical section between Jaruge and Novi Grad that represents the largest obstacle for navigation on the whole river Sava from Sisak to Belgrade. Namely, this sub-section is under all criteria for navigability class II, while the need for the whole river is to be upgraded to class IV. The present project regards the work phase of reconstruction of the critical part of the Sava river waterway between Jaruge and Novi Grad. **Planned activities:** • Renewal of existing groynes and construction of new T-groynes, which will reduce the width of the waterway and increase the depth of the river. • Construction of bottom sills on the riverbed, which would increase the water level.

[139] https://navigation.danube-region.eu/reconstruction-of-the-critical-part-of-the-sava-river-waterway-in-the-section-jaruge-novi-grad/

	• Excavation of river material at places of smaller depth due to increased sedimentation. • Renewal of existing and construction of new revetments that will prevent bank erosion **Figure 17: Location of the Action (Jaruge – Novi Grad) in red**  ***Source: Own elaboration on Google Maps***
Expected impact	Improved navigation conditions Strengthen the competitiveness of the Sava IWW
Costs	Total estimated costs: 13.400.000 EUR (indicative) 6.700.000 EUR (HR budget) 6.700.000 EUR (BIH budget)
Timeline	Start date: tbd End date: tbd

2.2 National IWW projects in the macro region

2.2.1 Bosnia and Herzegovina

"Port of Brčko" (project n° 47546)

Description and objectives	The present project, leaded by Government of Brcko District + European Bank for Reconstruction and Development (EBRD) + Western Balkan Investment Framework (WBIF), aims at upgrading road and railway access to the Port of Brcko and modernizing of facilities within Port of Brcko. **Planned activities:** • Direct connection of the quayside railway tracks with the railway station Brčko Novo

	Extension of the existing railway tracks within the Port of 263 m in order to directly connect the quay to the railway. Construction of this direct railway track would enable the port of Brčko to have direct railway link between the quayside tracks and the reception railway track number 2 in the railway station Brčko Novo. This connection would enable quicker maneuvering of the incoming/outgoing wagons to/from the quayside tracks in the port. • Reconstruction of industrial railway track on the line from the Port of Brcko to the Train station Brcko Novo and reconstruction of connections to industrial zone Removal of 400 m of double track and construction/ reconstruction of 4,500 m of railway tracks that connect the Port with the Railway Station Brcko Novo. • Construction of the asphalt plateau with drainage of rainfall in the harbour crane area. • Reconstruction of the access road from the Bijeljina road to the Port of Brčko Reconstruction of the existing connecting road which is 900 m long and connects the Brcko Port with the network of public roads of BiH. • Supply and installation of portal (harbour) crane Procurement of a new crane with a carrying capacity of up to 16 tons (three times larger than the current one), which will contribute to increasing the handling capacity of goods to 150 to 200 tons per hour.
Expected impact	Improving port infrastructures, facilities and rail-road connections
Costs	Total budget: 10.270.000 EUR EBRD: 7.000.000 EUR (loan) External grant: 250.000 EUR WBIF: 3.020.000 EUR (grant)
Timeline	Start date: June 2021 End date: n.a.

Other projects

Description and objectives	Other projects regarding the port of Brčko (Project promoter: "JP Luka Brčko (Port Authority of Brčko)" • Construction of the operational yard in the Port of Brčko Construction of the new operational yard for cargo handling in the port 225x40m Total investment costs: EUR 1.15 mln • Construction of the container terminal in the Port of Brčko Construction of the container terminal for the distribution of containerized cargoes to/from neighbouring container hub terminals Total investment costs: EUR 14.45 mln • Capital dredging of the port area in the Port of Brčko: Due to the lack of regular maintenance dredging and issues with hindrances to navigation mostly related to extended low water periods, the port aquatic territory needs to be

	dredged significantly. The dredging will enable at least 2,5 meters oof water depth throughout the entire year. Prior to the dredging, a thorough bathymetric survey will be performed in order to provide inputs for more precise estimation of quantity of sediments to be dredged and their critical accumulation points. Project promoter: "JP Luka Brčko (Port Authority of Brčko)" Total investment costs: EUR 1.05 mln • Construction of the liquid cargo terminal in the Port of Brčko Construction of the isolated liquid cargo terminal for direct transhipment of cargoes to road and rail vehicles Total investment costs: EUR 0.29 mln
Expected impact	Improving port infrastructures and facilities
Costs	Total budget: 16.940.000 EUR
Timeline	Start date: n.a. End date: n.a.

2.2.2 Serbia

Implementation of VTS and voice VHF system on the Danube and Sava rivers[140]

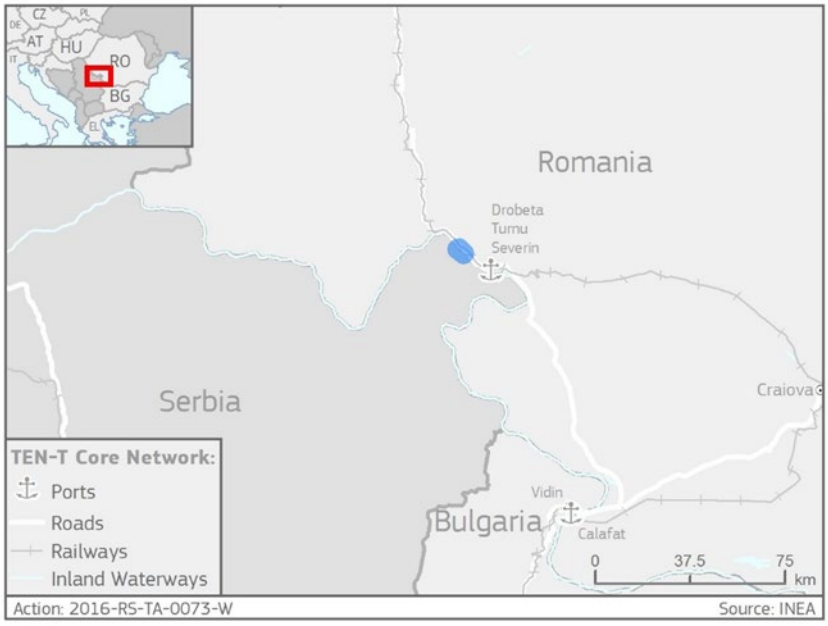
Description and objectives	The project, leaded by the Directorate for Inland Waterway (Plovput), foresees the implementation of a VTS (Vessel Traffic Service) and voice VHF (Very High Frequency) communication systems along the Danube and Sava rivers in the Republic of Serbia including coastal base-stations (rehabilitation and installation of new equipment), IT for the data center and backup location and one VTS command and control center. **Planned activities:** Detailed design and preparation of technical documents (design, software specifications, test plan, etc.), supply, installation and commissioning of equipment, software development, installation and integration, pilot operation, training and support of administration and operating personnel.
Expected impact	Improving safety of navigation
Costs	Total budget: 5,0 million EUR[141]

[140] https://ted.europa.eu/udl?uri=TED:NOTICE:68038-2021:TEXT:EN:HTML

[141] Serbian Inland Waterway Infrastructure Finance Contract between the Republic of Serbia and European Investment Bank (Official Gazette of the Republic of Serbia – International Contracts, No 02/2019) – 40 % EIB and 60 % state budget of the Republic of Serbia

Timeline	Start date: 2021 End date: 2023

Upgrade of the Iron Gate I navigational lock (2016-RS-TA-0073-W)[142]

Description and objectives	The hydroelectric dams Đerdap 1 (Iron Gates I) and Đerdap 2 (Iron Gates II) on the Danube River in Serbia are identified as critical sections. The Đerdap 1 navigation lock (river-km 943) has been in operation for about 40 years and the Đerdap 2 lock (river-km 863) for about 25 years. The project, leaded by the Ministry of Construction, Transport and Infrastructure of Serbia, is focused on renovating and upgrading the Đerdap I navigation lock, contributing to the modernization of the infrastructure, as well as to enable uninterrupted navigation on the Danube (Corridor VII) in full compliance with the requirements of the EU, the Danube Commission, and the standards of the Republic of Serbia. **Figure 18: Location of the Action (n. 2016-RS-TA-0073-W)**  ***Source: INEA*** **<u>Planned activities:</u>** The main works will include: • The upgrade of the electro-hydraulic drives and its components; • The upgrade and the reconstruction of the hydro-mechanical drive in the segment gates and the two wing doors;

[142] https://navigation.danube-region.eu/rehabilitation-and-upgrade-of-the-iron-gate-i-navigational-lock/

	• Ancillary works in the locks concerning the traffic lights and navigation locks signalisation, the heating and cooling system of the operating rooms and of the lock control tower, the electrical installation for the outdoor and indoor lighting system, the fire protection system and its equipment, the outdoor crane and its equipment and the electrical and hydraulic pressure pliers; • The civil engineering upgrades and reconstruction works.
Expected impact	Improving IWW Improving safety of navigation Improving operational reliability, performance, and safety of the lock.
Costs	Total budget: EUR 28.510.000 (potentially EUR 33.510.000) EU funds: EUR 11.404.000 funded by *Connecting Europe Facility (CEF) 2014 – 2020* National funds: EUR 17.106.000
Timeline	Start date: 01/07/2017 End date: 31/03/2022

Upgrade of the Iron Gate II navigational lock[143][144]

Description and objectives	This project consists on upgrading the single stage lock on the Danube at HPP Djerdap 2 at rkm 853, (the single stage existing lock is 310 m long and 34 m wide) in order to make the infrastructure compliant with applicable EU requirements for inland waterway transport. The main works will include: civil and architectural works, electro-hydraulic drive upgrade works, hydro-mechanical equipment upgrade works and upgrade works to the ancillary systems of the lock **Planned activities:** The Works Contractor has to perform, inter alia, the following activities and tasks: • Detailed design • Timely procurement of all items of materials and equipment • Execution of the Works in full compliance with FIDIC Yellow Book 1999 and national and international legislation, particularly Law on Planning and Construction, OGRS 9/2020 and Safety and Health legislation • Closure of Lock for the allowed period complied with in full • Application of all safety measures, all environmental protection and social mitigation measures, provision of all specified manuals and execution of specified trainings, in full, during the period of the contract • Completed all Works to Employers Requirements and to budget. Taking over Certificate issued at the end of month 22 of the contract

[143] https://www.mgsi.gov.rs/sites/default/files/PIN%20Works%20Contract%20Iron%20Gate%202.pdf

[144] Cfr. *FAIRway works! in the Rhine-Danube Corridor* (2019-EU-TM-0187-W)

Expected impact	Improving IWW Improving safety of navigation Improving operational reliability, performance, and safety of the lock.
Costs	Total budget: n.a.
Timeline	Start date: March 2022 End date: n.a. (46 months)

Removal of sunken vessels in sector Prahovo (rkm 845.5)[145]

Description and objectives	Downstream of the Đerdap II dam at Prahovo a large graveyard of German Second World War shipwrecks is present along the border between Serbia and Romania. The exact number of vessels which are located on this stretch is unknown, but 23 sunken vessels have an influence on the safety of navigation, since their presence narrows the minimum fairway width of 180m to 100m during low water seasons. Moreover there are unexploded ordnance (UXO) and Explosive Ordnance Disposals (EODs) on board of them. The project's objective is to improve the conditions for safe navigation on the Danube (sector Prahovo), in particular during the low water level periods by removal of the German sunken vessels from WW II, by lifting sunken vessels from the riverbed, storing and shipping and scrapping them. **Planned activites:** • Phase I: Removal of unexploded ordnance (UXO). Concluded • Phase II: Removal of sunken vessels
Expected impact	Improving IWW Improving safety of navigation
Costs	Total budget: EUR 22 million (estimation) EUR 2 million for the removal of UXO EUR 20 million for the removal of sunken ships
Timeline	Start date: 2017 End date: 2022

Reconstruction and expansion of the Port of Bogojevo[146]

Description and objectives	The Port of Bogojevo is located in Serbia, on left river bank of the Danube, at km 1366. It is envisaged the reconstruction of the existing port area and quay of approx. 16 ha and 167 m respectively, and construction of a new part of the port terminal for bulk and general cargo of an area of approx. 30 ha and a quay length of approx. 230 m, as upstream extension of the existing port area. The Works to be supervised also include the access

[145] https://navigation.danube-region.eu/removal-of-the-sunken-german-fleet-from-the-world-war-ii-in-sector-prahovo/

[146] https://www.mgsi.gov.rs/en/dokuments/documents-port-bogojevo

	road and port infrastructure and utilities (e.g. internal roads and railways, sewerage, water, power supply). **Figure 19: Draft detailed regulation plan of the Port of Bogojevo**  ***Source: Ehting Beograd***
Expected impact	Improving port infrastructures, facilities and rail-road connections
Costs	Total budget: 2.500.000 EUR
Timeline	Start date: Dec 2022 End date: n.a. (42 months)

Rehabilitation and construction of the Bulk and General Cargo Terminal of the Port of Smederevo[147]

Description and objectives	The general objective of the Project is to rehabilitate the existing Smederevo port area and quay of approximately 3.8 ha and 170 m respectively; construction of new part of the port terminal for bulk and general cargo of an area of approximately 21 ha and a quay in length of approximately 670 m. The works include the access road and port infrastructure and utilities (internal roads and railways, water supply, power supply).
Expected impact	Improving port infrastructures, facilities and rail-road connections
Costs	Total budget: 2.500.000 EUR
Timeline	Start date: Oct 2020 End date: n.a.

[147] https://ted.europa.eu/udl?uri=TED:NOTICE:249597-2020:TEXT:EN:HTML

Expansion of capacities of the port of Prahovo[148]

Description and objectives	The aim of the project is the reconstruction and extension of existing facilities and construction of new port capacities of the Port of Prahovo. Works to be supervised include construction of vertical quay and vertical bank protection at terminal, gabion bank protection, road works, construction of railways in terminal, installation of utility networks at terminal, construction of buildings and other civil engineering/architectural buildings, etc.
Expected impact	Improving port infrastructures, facilities and rail-road connections
Costs	Total budget: 1.500.000 EUR
Timeline	Start date: Nov 2022 End date: n.a. (30 months)

Reconstruction and development of the Port of Novi Sad[149]

Description and objectives	In May 2022 DP World has started the construction of a new container terminal, a vertical quay, and a silo for storing cereals in the port of Novi Sad. The project is part of the continued €30 million investment DP World has committed to its Novi Sad terminal.
Expected impact	Improving port infrastructures and facilities
Costs	Total budget: € 30 million (estimated)
Timeline	Start date: May 2022 End date: n.a.

Expansion of port capacity in Sremska Mitrovica[150][151]

Description and objectives	The project consists in the construction of a bulk cargo terminal, an agriculture products terminal, including silos with 18,900 m^3 of capacity, and a smaller capacity oil terminal. The expansion of the port in Sremska Mitrovica will contribute to increase the volume of transhipment to 1.5 million tons of cargo per year.

[148] https://ted.europa.eu/udl?uri=TED:NOTICE:390794-2022:TEXT:EN:HTML

[149] https://www.porttechnology.org/news/dp-world-breaks-ground-on-new-serbia-container-terminal/

[150] *ibidem*

[151] https://cpmconsulting.rs/preliminary-design-for-expansion-and-construction-of-the-port-of-sremska-mitrovica/

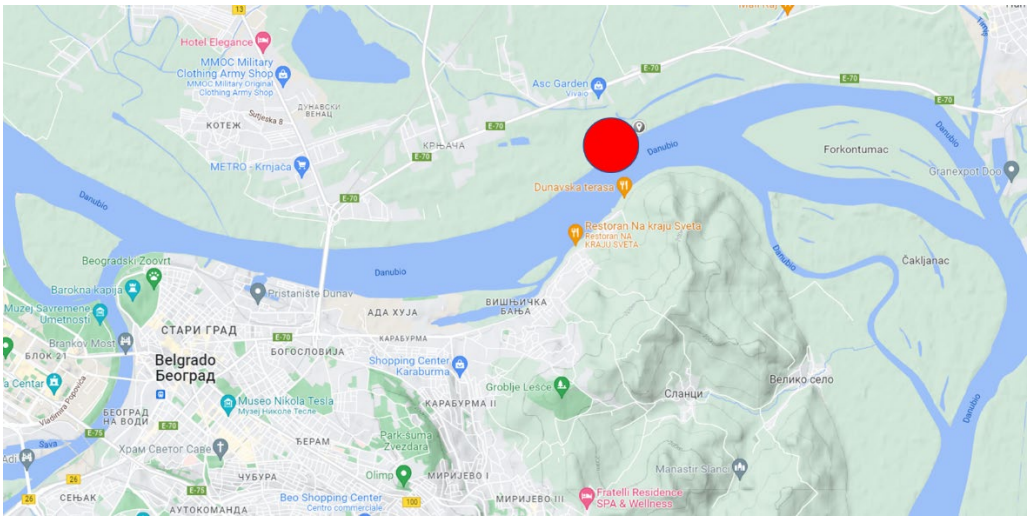
	Figure 20: Preliminary design for Expansion and Construction of the Port of Sremska Mitrovica  ***Source: CPM Consulting***
Expected impact	Improving port infrastructures and facilities. Improving handling capacity
Costs	Total budget: 52.000.000 EUR (33 million for works on construction of port infrastructure)
Timeline	Start date: n.a. End date: n.a.

Construction of a bulk cargo terminal in Belgrade (Krnjača)[152,153]

Description and objectives	The present project foresees the construction of a bulk cargo terminal on the left bank of the Danube, at the river kilometer km 1161+800, downstream from the existing Port of Belgrade and the Pancevacki bridge, in Krnjaca. It will cover approximately 37.6 hectares of land, with a water area width of 230 meters. The terminal will consist of several components, including an operational shoreline, a raw material dumping area, sub-terminals for separating sand and gravel, sub-terminals for aggregate used in concrete and concrete-asphalt bases, traffic areas, a railway track corridor, and green spaces amounting to at least 20% of the total area. Additionally, there will be various facilities within the terminal, such as an administrative building, a control and access facility, and 12 facilities for port operators. The terminal will also provide parking space for 88 passenger cars and 41 trucks.

[152] Port Governance Agency, Annual Bullettin, THE DEVELOPMENT OF PORTS AND TERMINALS FOR BETTER CONNECTIONS, No. 6, April 2022

[153] https://serbia-business.eu/the-new-port-of-belgrade-will-be-built-in-krnjaca/?pdf=29898

	Furthermore, besides its primary purpose as a port facility, the port terminal area can be utilized for compatible purposes such as public services (e.g., customs, tax administration branches), economic zones (e.g., warehouses), commercial establishments, and other accompanying facilities. However, before the construction of the planned structures and compatible purposes can take place, the ground must be filled in to protect against potential flooding. The terminal area will be connected with the Pancevacki road and to the Belgrade-Pančevo railroad (located at a distance of 3Km) with an industrial track.[154] **Figure 21: Location of the new bulk cargo terminal in Belgrade (Krnjača)**  ***Source: Own elaboration on Google Maps***
Expected impact	Improving port infrastructures and facilities.
Costs	Total budget: n.a.
Timeline	Start date: n.a. End date: n.a.

Construction of the new Port of Belgrade[155]

Description and objectives	This project is under preparation. The main idea is the construction of a new modern port outside Belgrade city centre and near the main transport corridors. One of main goals of the New Port of Belgrade project is to develop this port as one of the most important multimodal hubs in South-East Europe. In the near hinterland of the port, a new free trade zone has been planned. As the location for the new port is in the vicinity of Pupin Bridge, this will enable connection of the port area with several main roads through Serbia (E-70,

[154] https://www.ekapija.com/en/news/3783451/the-new-belgrade-port-will-be-built-in-krnjaca-the-bulk-cargo

[155] https://wbif.eu/project/PRJ-SRB-TRA-031

	E-75, the Belgrade-Zrenjanin regional road and Belgrade-Vršac) as well as a rail connection to the Belgrade-Kelebija line. The new Port of Belgrade will improve and facilitate complete transport connectivity of this region. Construction of the New Port of Belgrade will enable the gradual phasing out of operations at the present port. The port is currently located in the urban area, thus causing a bottleneck that prevents development of this part of the city, as well as of the port itself. The new port will also facilitate phasing out transport of dangerous goods carriage through the Belgrade City Centre. Part of the project for construction of the new port envisages a general and bulk terminal, container terminal, ro-ro terminal and Oil&LNG terminal. The feasibility study will confirm whether all of the proposed terminals can be approved for construction[156]. **Planned activities:** Construction of port facilities, vertical quay, road, railway and communal infrastructure
Expected impact	Improving port infrastructures and facilities.
Costs	Total budget: 180 million EUR (estimation)[157]
Timeline	Start date: 2023 (estimation) End date: n.a.

2.2.3 Croatia

Development of the waterway marking system of the Republic of Croatia[158]

Description and objectives	The project, led by the Ministry of Maritime Affairs, Transport and Infrastructure of Croatia, foresees investment in the improvement of the waterway marking and monitoring system by taking into consideration its current state and available modern solutions. The marking is performed on the following waterways: 1. On the Danube River from km 1295.5 to km 1433.0 2. On the River Drava from km 0.00 to km 198.6 3. On the River Sava from km 210.8 to km 594.0 4. On the River Kupa from km 0.00 to km 5.0 5. On the River Una from km 0.00 to km 15.00

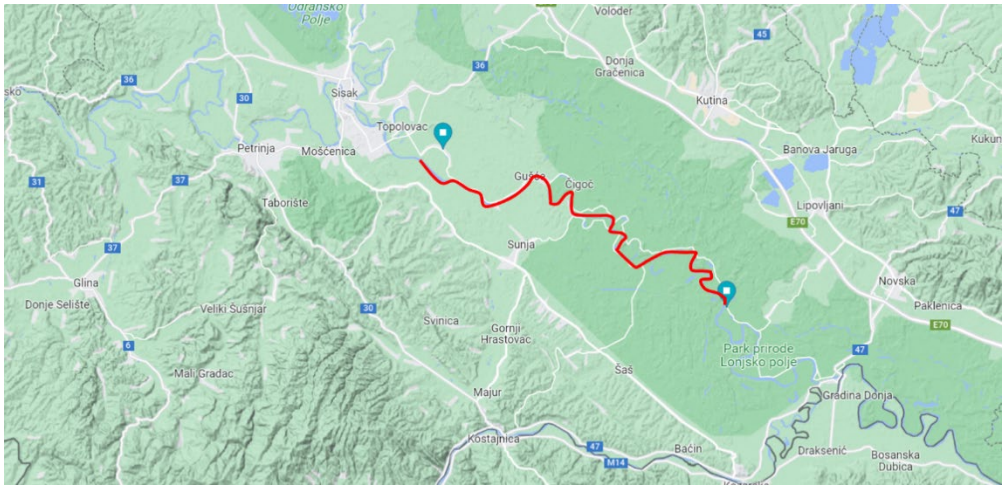
[156] Five-year Rolling Work Plan for Development of the Indicative TEN-T Extension of the Comprehensive and Core Network in Western Balkans, Permanent Secretariat of Transport Community, April 2022

[157] *ibidem*

[158] https://povezanahrvatska.eu/en/projekti/razvoj-sustava-obiljezavanja-vodnih-putova-republike-hrvatske/

	Figure 22: Section of the Croatian IWW where the marking is performed  ***Source: Ministry of Maritime Affairs, Transport and Infrastructure of Croatia*** **<u>Planned activities:</u>** The waterway marking activities include: • installation of watermarks (marking, signaling) to regulate navigation and its safety; • replacement, renovation and maintenance of the existing safety equipment; • monitoring of waterways and controlling of marking systems (e.g. control of functionality of watermarks, locating watermarks in case of movement, placing additional watermarks, etc.); • removing watermarks before the appearance of ice and high water. As a part of this investment, the existing software will be upgraded with the ability to monitor AtoN and purchase new navigable markers (buoys) with built-in navigation system and solar lamps (so-called AIS AtoN – Aids to Navigation), some of which are also equipped with depth sensors. Moreover the existing two marking ships older than 30 and 50 years, respectively, need to be replaced not only because of the fact that they have almost reached their expiration date, but also because their capacities and operational performance do not meet the growing needs for waterway tours and safe navigation.
Expected impact	Improvement of navigability conditions and safety
Costs	Total budget: 3.626.024,21 EUR EU grant: 3.082.120,58 EUR
Timeline	Start date: March 2020 End date: Dec 2023

Reconstruction of the critical part of the Sava River waterway in the section Puska – Preloščica[159]

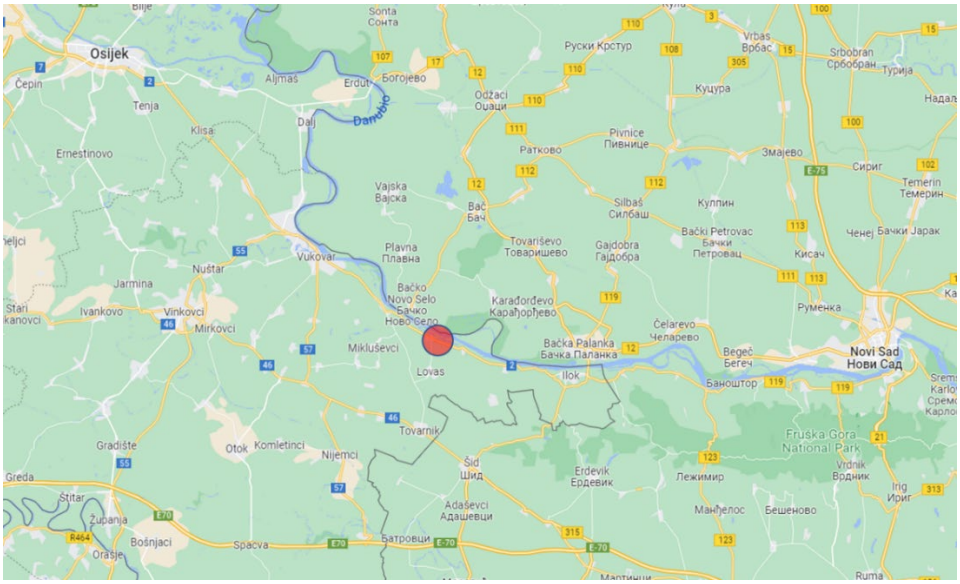
Description and objectives	The critical section between Puska and Preloščica is the second largest obstacle for navigation (after section Jaruge-Novi Grad) on the whole river Sava from Sisak to Belgrade. The critical section between Puska and Preloščica is under all criteria for navigability class III, while the need for the whole river is to be upgraded to class IV. The project is led by the Ministry of Maritime Affairs, Transport and Infrastructure of Croatia. **Planned activities** In January 2014 the feasibility study and the preliminary design for rehabilitation of the two critical sections of the Sava River waterway "Jaruge – Novi Grad" and "Puska – Preloščica" have been completed. The technical measures will include: • Renewal of existing groynes and construction of new T-groynes, which will reduce the width of the waterway and increase the depth of the river. • Construction of bottom sills on the riverbed, which would increase the water level. • Excavation of river material at places of smaller depth due to increased sedimentation. • Renewal of existing and construction of new revetments that will prevent bank erosion. **Figure 23: Location of the Action (Puska – Preloščica) in red**  ***Source: Own Elaboration on Google Maps***
Expected impact	Improvement of this stretch of Sava river to CEMT class IV
Costs	Total budget: 16.000.000 EUR (indicative)
Timeline	Start date: 2020 (planned) End date: 2022 (planned)

159 https://navigation.danube-region.eu/reconstruction-of-the-critical-part-of-the-sava-river-waterway-in-the-section-puska-preloscica-2/

International ship winter shelter on the Danube in Croatia (Opatovac)[160]

Description and objectives	The project, led by the Ministry of Maritime Affairs, Transport and Infrastructure of Croatia, envisages the construction of a winter shelter to accommodate vessels in fast ice / pack ice conditions, in the Danube distributary between Opatovac islet and the settlement of Opatovac, on the VIc class international waterway, at approximately 1,314 rkm. The project implementation would result in the formation of a wintering area with a min. depth of 2.5 m, 40m wide waterway (outside the mooring area) and a 150 m turning basin, as well as the winter shelter with space for 23 vessels of standard dimensions 76.5×11.4 m, and a revetment in the length of 700 m. **Planned activities:** The project comprises the following investment measures • initial site cleanup: excavation of approx. 175.000 m^3 of material (sand, granulation 0-4 mm). • construction of revetment and anchor blocks: sloping shore type, slope ratio 1:2, made up of blocks and quarried stone coating. Contiguous with the revetment structure, development of an earthwork shore plateau at an elevation of 84,00 m above sea level. • mooring elements: bollards and spacer slots (30 blocks) • guardhouse: guardhouse structure (single-storey, "L" shaped floor plan) total net surface area 67 m2 • supporting winter shelter infrastructure: internal access road, water supply and sewerage network, power supply.

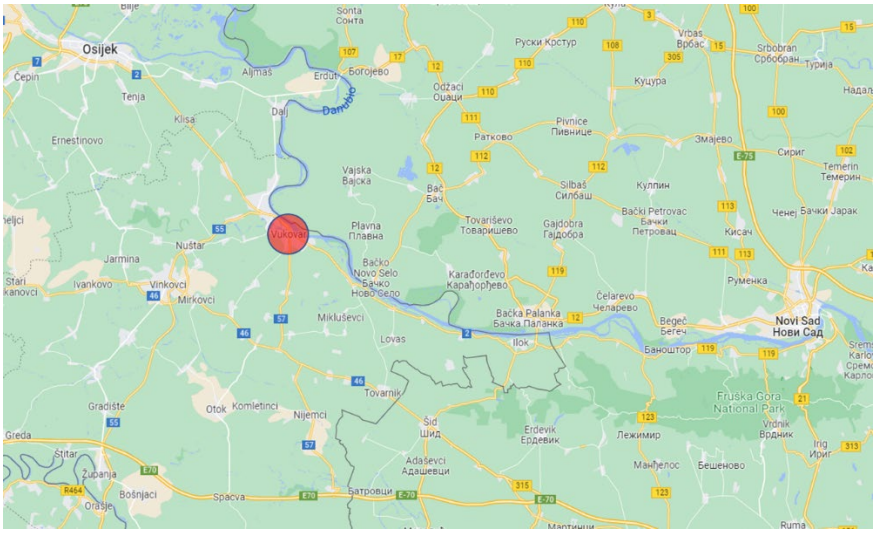
[160] https://povezanahrvatska.eu/en/projekti/international-ship-winter-shelter-on-the-danube-in-opatovac/

	Figure 24: Location of the International ship winter shelter on the Danube – Opatovac (HR)  ***Source: Own Elaboration on Google Maps***
Expected impact	Improvement of safety in navigability conditions
Costs	Total budget: 6.428.962,29 EUR EU grant: 5.464.617,95 EUR
Timeline	Start date: Nov 2020 End date: Dec 2023

Preparation of project documentation for the construction of the vertical quay in the Port of Vukovar[161]

Description and objectives	The Action is part of the global project, which aims at developing the capacity and competitiveness of the Croatia's core inland port of Vukovar, the only Croatian port on the Danube River, located on the Rhine-Danube Corridor. The waterside infrastructure of the port, and its connections with the rail and road TEN-T core networks will be upgraded. The main objective of this Action is to prepare technical documentations, including location and building permits, the full EIA and final design for construction of the of the 300 m long vertical quay in the Vukovar port and its connection to existing railway infrastructure.

[161] Action 2019-HR-TMC-0233-S

	Figure 25: Location of the port of Vukovar (HR)  *Source: Own Elaboration on Google Maps*
Expected impact	Improvement of port infrastructures and connection to rail network
Costs	Total budget: €1.677.851 EU funds: €1.426.173
Timeline	Start date: Aug 2020 End date: March 2024

New Port East – Reconstruction of the port of Vukovar[162]

Description and objectives	The main objective of this project to reconstruct basic port facilities to develop the Vukovar port in a sustainable way and thereby make the port more competitive in the international market. **<u>Planned activities</u>** The new port of Vukovar project encompasses the construction of infrastructural port facilities (banks, road and rail as well as communal infrastructure), port loading and unloading equipment, and the construction and acquisition of terminal-related equipment for: • Bulk cargo terminal • Multi-purpose terminal • Vessel waste disposal station (ship supply management and collection of waste liquids from the vessels) In addition, it is envisaged to construct an office building, a car park, an administrative port control centre and a new port entrance.

[162] https://navigation.danube-region.eu/new-port-east-reconstruction-of-the-port-of-vukovar/

Expected impact	Improvement of port infrastructures and connection to rail network
Costs	Total budget: 24.200.000 EUR (estimation)
Timeline	Start date: 2013 End date: not defined

Preparing documentation for dangerous cargo terminal in Port Slavonski Brod[163]

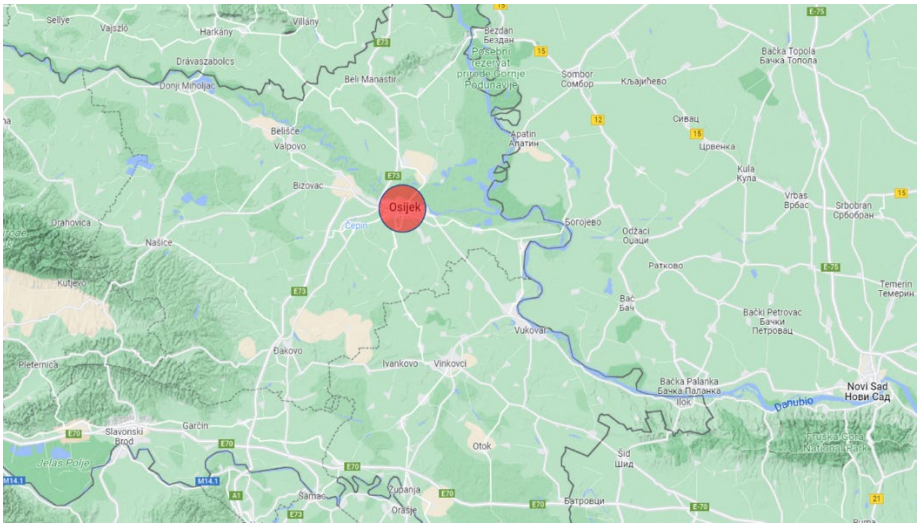
Description and objectives	The project aims at preparing the necessary documentation for the realization of a Waste Reception and Bunkering terminal in the port of Slavonski Brod, in order to provide bunker for ships and removal of waste from the ships in an environmentally friendly way. The idea consists in the construction of a dock with a length of 90 meters with two fuel tank capacity of 1000m^3 and other equipment for waste disposal. **Planned activities** The project envisages the preparation of environmental documentation (i.e. Environmental Impact Assessment, technical documentation, conceptual, main and detailed designs, tender documentation and a cost-benefit analysis) for the construction of a dangerous cargo terminal in the Port of Slavonski Brod.
Expected impact	Improvement of port infrastructures and waste management along Sava IWW
Costs	Total eligible costs: 1.032.200,00 EUR EU grant: 877.370,00 EUR
Timeline	Start date: Aug 2021 End date: Jul 2024

New port terminal in Osijek[164]

Description and objectives	With the construction of the bulk cargo terminal, the port of Osijek will become the first Croatian basin-type inland port and the first to have adopted European business standards, thereby providing strong logistical support to the economy of Eastern Croatia. **Planned activities** Construction works include the following: • approx. 240 m of coastal structure with 2 berths • loading units for unloading/loading and transport of equipment (transhipment facility with incoming hopper) • access road approx. 300 m long • rail tracks approx. 610 m long (extension) • crane tracks and roads approx. 285 m long (extension) • incoming hopper in the dimensions 14,8 x 8,6 x 7,8 m • electrical substation – 1 unit

[163] https://povezanahrvatska.eu/en/projekti/izrada-dokumentacije-za-terminal-za-opasne-terete-u-luci-slavonski-brod/

[164] https://povezanahrvatska.eu/en/projekti/novi-lucki-terminal-u-osijeku/

	• construction of the necessary infrastructure (water supply and drainage – water supply system will consist of three water supply branches approx. 363 m long in total – electricity supply and lighting, open storage). **Figure 26: Location of the port of Osikek (HR)**  ***Source: Own Elaboration on Google Maps***
Expected impact	Raise environmental protection level Raise safety of ships in port Increase accessibility of port infrastructure Increase efficiency of intermodal freight transport Reduce operating costs
Costs	Total eligible costs: 32.577.462,00 EUR EU grant: 25.557.918,49 EUR
Timeline	Start date: May 2017 End date: Dec 2023

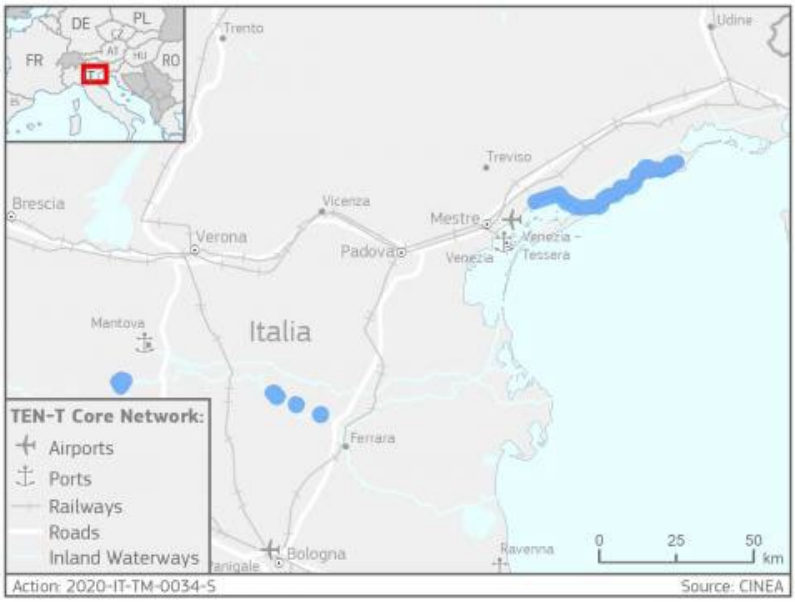
2.2.4 Italy (NIIWS[165])

WIN-IT: Works for Implementing the Navigation in Northern Italy[166](2020-IT-TM-0034-S)

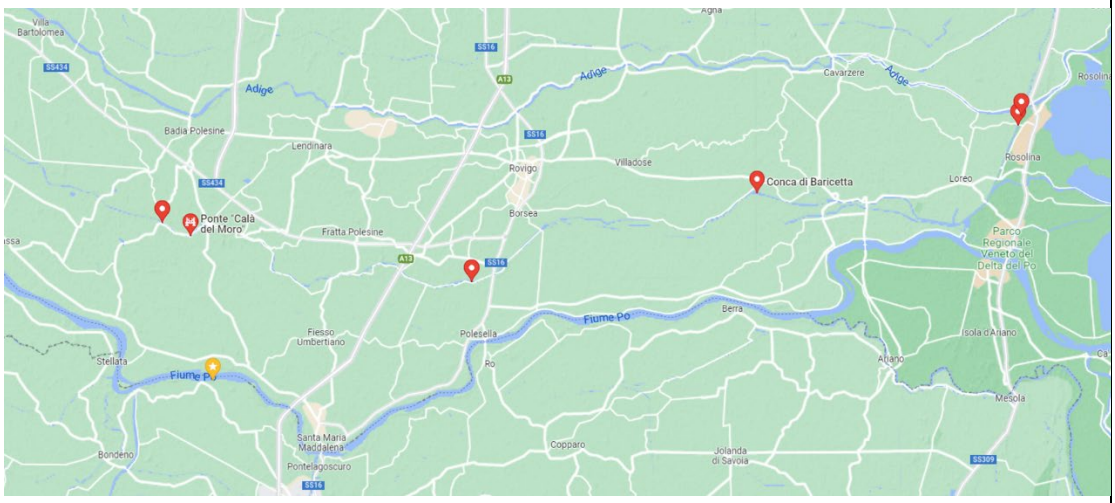
Description and objectives	The Action will carry out the Final Designs and Detail Designs (including the approval of two Environmental Impact Assessments and technical surveys) in three sections of the waterway system: the Po Central section (from Mincio to the Po Delta), the Po Western

[165] Northern Italy Inland Waterway System

[166] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2020-it-tm-0034-s

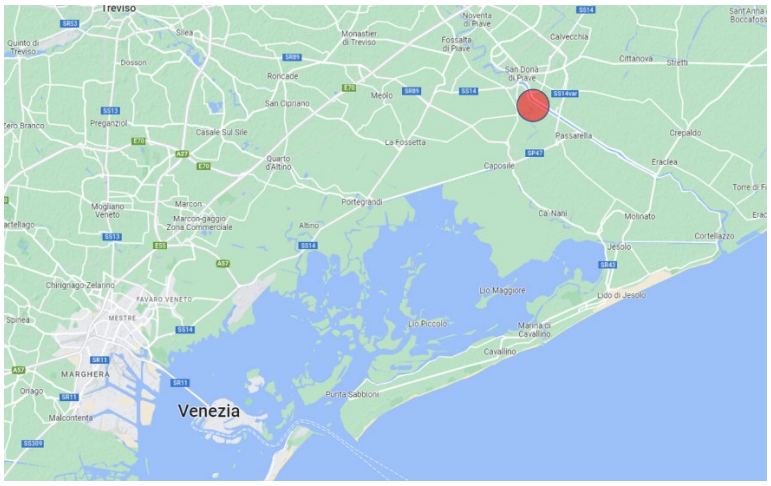
	section (from Cremona to Mincio) and the Litoranea Veneta IWW (from Venice to the Tagliamento River). The objective is to guarantee the free-stream water condition and sufficient water draught for navigation during the whole year. **Planned activities** • Final Design, detailed design and award of the works contract for 4 sites located on the Central section of the Northern Italy IWW, the one that goes from Mincio river mouth to Po delta (namely Castelmassa, Caposotto, Ficarolo, Ravalle). • Final Design, Detailed Design and award of the works contract for the construction and restoring of 6 groynes located in the Western Section of the Northern Italy IWW, at Oglio river mouth (curves 12 and 13), improving their technical, structural and functional features. • Final Design, Detailed Design and award of the works contract to upgrade to Class IV Standards the Litoranea Veneta waterway from Venezia to Tagliamento river. **Figure 27: Locations of the intervention foresees by the WIN-IT project**  ***Source: CINEA***
Expected impact	Improving navigability conditions in order to reach the standards of the inland waterways class IV
Costs	Total budget: 2.730.000 EUR EU contribution: 1.365.000 EUR (50%)
Timeline	Start date: March 2021 End date: Dec 2024

VIEWWS[167]

Description and objectives	The VIEWWS project aims at unlocking navigation potentialities of the Veneto's Inland Waterway (IWW) system through the upgrade of various infrastructures along two of its most important stretches, the Fissero-Tartaro-Canalbianco-Po di Levante and Po Brondolo to Class V CEMT standards. **Planned activities** • realize works aimed at increasing the under-bridge clearance of two road bridges (Trecenta and Calà del Moro) and of one railway bridge (Rosolina); • realize works aimed at increasing the capacity and ensuring good navigation conditions of a section of the waterway in correspondence to the Rantin road bridge; • realize works aimed at upgrading the hydraulic and electro mechanic components of the Baricetta locks in order to restore its usability; • Design phase of the new railway bridge of Arquà Polesine in order to ensure proper under-bridge clearance. **Figure 28: Location of the interventions of the VIEWWS Project (in red)**  *Source: Own elaboration on Google Maps*
Expected impact	Achieving Class V CEMT along the the Fissero-Tartaro-Canalbianco-Po di Levante and Po Brondolo IWWs
Costs	Total budget: 22.000.000 EUR EU contribution: 11.000.000 EUR (50%)
Timeline	Start date: Jan 2021 End date: Feb 2026

[167] Regione Veneto

Rehabilitation of the navigation lock named Intestadura[168,169]

Description and objectives	The project aims to rehabilitate the functionality of the Intestadura Lock located along the Piave river. The project includes the replacement of all 4 pairs of vincian doors to ensure their structural stability. The new doors will be 'open structure', following the same structure as the existing ones. With regard to the systems (aqueducts) that allow for the balancing of the hydraulic level for the manoeuvring of the doors, frontal aqueducts will be installed, all the same for the 4 heads. The current functionality of the lateral aqueducts on the south-east side on the Piave Vecchia side will be discontinued, maintaining their manual operation. The work also envisages equipping the basin with new electrical and lighting systems, video surveillance, traffic lights upstream and downstream, level sensors and local manoeuvring. **Figure 29: Location of the Intestadura lock**  ***Source: Own elaboration on Google Maps***
Expected impact	Rehabilitation of navigability conditions
Costs	Total budget: 1.900.000 EUR
Timeline	Start date: Jan 2019 End date: Dec 2022

Po river: free stream works[170]

Description and objectives	This planning provides a short-term solution for Po River secure Navigation and implementation of river standards from Cremona to River Mincio intersection (Step 1) and from Foce Mincio to Volta Grimana lock (Step 2), identifying the most urgent sections to

[168] *ibidem*

[169] https://www.regione.veneto.it/article-detail?articleId=13734620

[170] AIPO

	set in with free stream works. The project (Studies) is completed for the Step 1 and is ongoing for the Step 2 (Studies and works), to assure a safe standard navigation. **Planned activities** • Lot 1: Connecting Mantova. (Jan 2019 – Dec 2019) It aims at contructing a new groyne to remove the existing bottlenecks on the last mile connections from the Po river to the Core inland port of Mantova. The action is going to ensure the navigability and the access to the port of Mantova from the Po river during all the year. Total budget: 1.250.000 EUR • Lot 2: Upgrading of the navigation system from Revere to Ferrara (Jan 2019 – Dec 2024) The present project aims at removing the existing bottlenecks from Revere to Ferrara to reach the standards of the EC class V of navigation. Total budget: 15.000.000 EUR
Expected impact	Removing bottlenecks Improve navigation standard to V CEMT class
Costs	Total budget: 16.250.000 EUR
Timeline	Start date: Jan 2019 End date: Dec 2024

Adaptation of the Ferrarese waterway to traffic class V waterway - Section between the Pontelagoscuro navigation lock and the access to the sea at Porto Garibaldi[171]

Description and objectives

Between the main relevant interventions for the upgrading of the NIIWS to the CEMT V class there are those related to the upgrading of the Ferrarese waterway to class V from Pontelagoscuro navigational lock to Porto Garibaldi (70 Km). The interventions were divided in the following lots[172]:

Table 29: List of the interventions planned for the upgrade of the Ferrarese waterway to class V

Lot	Intervention	Works	Amount (€)
1.1	Dredging Po di Volano from the Bocelli canal to the San Paolo dock	To be started	36.500.000,00
1.2	San Giorgio and Caldirolo roundabouts construction	Completed	41.685.414,49
	Canal Bianco and Canale Cittadino siphon barrels reconstruction	Completed	

[171] Three-year public works programme 2023 – 2025. Emilia-Romagna Region Regional Council. Resolution No. 461 of 27/03/2023.

[172] Annual monitoring report on mobility and transport in Emilia Romagna, December 2022

	Bardella bridge reconstruction	Ongoing	
2.1	Final di Rero/Tresigallo	Ongoing	18.600.000,00
2.2	Migliarino bridge construction	Completed	3.800.000,00
2.3	Madonna bridge construction	Ongoing	3.000.000,00
3.1	Porto Garibaldi upgrade	Completed	21.000.000,00
3.2	Valle Lepri bridge construction	Completed	6.000.000,00
Arni	Intervention on the canal bends	Completed	6.500.000,00
Ostellato	Ostellato bridge construction	Completed	8.000.000,00

Source: Annual monitoring report on mobility and transport in Emilia Romagna, December 2022

Figure 30: Location of the interventions

Source: Emiia-Romagna Region; Province of Ferrara

Part of the works included in the previous table were co-financed by the European Union through the project *INIWAS - Improvement of the Northern Italy Waterway System*[173], in particular: demolition and reconstruction of two siphon barrel, the one located on the Canal Bianco and the one located along the Canale Cittadino, and reconstruction of the Bardella bridge.

[173] 2014-IT-TM-0543-W

	It is important to underline that, as regards the works to upgrade the Ferrarese waterway to class V from Pontelagoscuro navigational lock to Porto Garibaldi, the overall project approved at the EIA commission in December 2008 foreseen a total investment of € 242 million, but the availability of resources deriving from L. 413/98 was equal to € 145 million[174].
Expected impact	Improving accessibility and traffic capacity of the Ferrarese waterway.
Costs	Total budget: 145.085.414,49 EUR
Timeline	Start date: n.a. End date: 2027

Upgrading Cremona Lock and entrance from Po River[175]

Description and objectives	Consolidation and strengthening of the Cremona lock functionality, with respect to infrastructure and to the set of installations. The Interregional Agency for the Po River (AIPo) will replace the manoeuvring ropes of the downstream gate of the Cremona navigation lock. The intervention, financed by the Lombardy Region with 1.5 million euro, will modernize a structure that is 60 years old. The current ropes will be replaced with an oleodynamic piston system to make the lifting of the two coupled gates, which form the lock closure system of the lock on the Po river side, safer. The works started in February 2023[176].
Expected impact	improving accessibility and traffic capacity of the port of Cremona.
Costs	Total budget: 1.950.000 EUR
Timeline	Start date: Feb 2023 End date: n.a.

Upgrading of the Valdaro Port[177]

Description and objectives	The project is included in the Lombardy *Regional programme for mobility and transport*[178] and it aims at strengthening the capacity of the port of Valdaro as trimodal logistic platform through new multimodal infrastructure inside the port, for growth of using rail, road and inland water and logistics docks. Three main interventions are foreseen for the upgrade of the Mantua-Valdaro port, in particular: creation of the dry dock for development of river shipbuilding; completion of the docks in the East and South side of the port; extension of the railway tracks serving part of the port[179]. In March 2023 the

[174] Annual monitoring report on mobility and transport in Emilia Romagna, December 2022

[175] AIPO + Lombardy Region

[176] https://www.agenziapo.it/content/conca-di-cremona-importante-intervento-di-ammodernamento-previsto-dal-1-febbraio-un-periodo

[177] Lombardy Region

[178] *Regional mobility and transportation program*, Lombardy Region, September 2016

[179] Territorial coordination plan, annex no. 3.1, Province of Mantua, March 2022 (version n. 04)

	Province of Mantua has approved the final design regarding the works for the extension of the rail tracks of the Valdaro port[180]. In particular, the project foresees the extension of the railway track on the east side of the Valdaro port to a length of 750 meters (European standard) and the construction of a railway ditch for grain unloading on the south side of the port.
Expected impact	Improvement of port capacity
Costs	Total budget: 6.900.000 EUR
Timeline	Start date: Jan 2020 End date: Dec 2023

Upgrading of the Cremona Port[181]

Description and objectives	According to the *Regional mobility and transportation program* published by the Lombardy Region in 2016, the projects financed by the region in the port area regarding the upgrade of the port - rail connection have led to an increase of the rail traffic handled by the port area and the adjacent industrial sector (from 17,000 wagons/year in 2008 to 35,000 in 2013), consolidating the vocation of the port as the main site in the province dedicated to freight intermodality. The Region aims at developing the construction of an intermodal interport for the exchange of goods in the water-rail-road system.
Expected impact	Improvement of port capacity
Costs	Total budget: 4.000.000 EUR
Timeline	Start date: Jan 2020 End date: Dec 2023

[180] https://www.provincia.mantova.it/cs_context.jsp?ID_LINK=41&area=37&id_context=21808&COL0003=1&COL0003=2

[181] *ibidem*

3 Conclusions and policy recommendations for the Inland Waterway transport sector

In this chapter, a recap of the findings of the previous chapters is proposed, in order to highlight the main issues of the sector in the macro-region and its outlook. Moreover, suggestions for development guidelines are being proposed.

3.1 Key issues

3.1.1 Danube river

Although its potential, the volume of goods transported along the Danube is lower than on the Rhine due to different factors such as transformation processes in the Danube countries in the 1990s, the civil war in the former Yugoslavia that stopped the navigation or insufficient support from some countries to upgrade fleet and infrastructure in the Danube ports[182].

The most critical part of the Danube river IWW, as regards inland navigation, is represented by the common Croatian and Serbian part of the river. In particular the stretch from 1433.1 rKm (border between Hungary, Croatia and Serbia) to 1295.5 rkm (near the port of Bačka Palanka) is considered critical in terms of navigation conditions and dissemination of sediment and ice. On the partly regulated reaches of the Danube river between 1433.1 – 1295.5 rkm, ships can operate a minimal draft of 2.5 m at low water during the majority of a year. As water levels are very difficult to predict, vessels have to wait for higher water levels or partly unload during some low water periods. In order to ensure an adequate water regime for transport and the protection of banks from further erosion and morphological changes in the riverbed of the Danube, it is necessary to propose adequate measures, due to the fact that at this stretch there were almost no activities performed in last 25 – 30 years (mainly due to the war and bilaterally non-agreed border line)[183]. Therefore, the main issues of this IWW system can be listed as follows:

- Insufficient maintenance of the Danube River in some Danube countries
- High costs for modernization of fleet and infrastructure in the Danube ports
- Political issues between Danube countries

3.1.2 Sava river

Prior to the break-up of the former Yugoslavia, navigation on the Sava was possible from the river mouth on the Danube up to Rugvica (HRV) for a length of 683 rkm, and the river played an important role in the freight transport network: in 1990 the tons of bulk cargo transported along the river were 5.2 millions and the river

[182] *Ibid.*

[183] https://navigation.danube-region.eu/improving-navigation-conditions-on-the-danube-river-from-1295-5-1433-1-river-km-eliminating-bottlenecks-on-the-croatian-serbian-part-of-danube-river/

was navigable nearly 300 days per year[184]. The conflict was particularly hard on the Sava river and its ports, as in many areas the river represented the front line and the infrastructure was devastated and the area heavily mined[185]. After the conflict, the navigation conditions along the Sava river were progressively deteriorated due to various reason, including lack of maintenance of the river bed, lack of cross-border collaboration on the development of the waterway, presence of land mines, strongly fluctuating discharge and heavy sedimentation in certain areas[186]. Thus has led to a reduction in the width and depth of the navigable channel that make the navigation difficult[187] (in particular in some key bottleneck section were the navigability is costrained to only 160 days per year) and to a reduction of the freight transport (only 500K tons in 2008): today the Sava River is navigable for larger vessels from Sisak (it is navigable from Rugvica to Sisak for smaller sport or pleasure crafts)[188].

Although freight volumes are partially recovering (877,000 tons in 2018)[189], the main issues still prevent the full development of inland waterway transport along the Sava river are:

- Risk of flooding: the effectiveness of flood protection infrastructures is currently inadequate in order to address the increasing risk of flooding due to climate change;
- Mines: demining the Sava's right bank within Bosnia-Herzegovina (BiH) is a prerequisite for the improvement of the Sava waterway;
- Waterway class: Sava meets a "continuous" Class IV standard[190] only through the last 100 rKm of its fairway (between Šabac and Belgrade); upstream from Šabac, the river is operationally considered Class III standard[191] due to the presence of bottlenecks that limits corridor navigability even if the major part of the river sections comply with Class IV provisions (at least until Slavonski/Bosanksi Brod, approx. rKm 370).
- Inland ports: the river ports serving the Sava IWW freight transportation (Sremska Mitrovica, Brčko Port and Slavonski Brod) needs modernization, an improvement in the multimodal connections and environmentally friendly facilities;
- Type of commodities moved: the freight transport along Sava river is dominated by bulk cargo, with no incidence of container transportation.

[184] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[185] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[186] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[187] "Transport Sector Review: Bosnia and Herzegovina - the road to Europe" - Annex 5 ("Inland waterways transport - realizing the potential"), World Bank Transport Unit, Sustainable Development Department Europe and Central Asia Region, May 2010

[188] "Manual on the Sava river navigation", The International Sava River Basin Commission, Zagreb 2018

[189] "First phase of the Sava and Drina rivers corridors integrated development program", International Bank for Reconstruction and Development, July 2020

[190] Class IV standard: motor cargo vessels (L: 80-85 m; d: 2.5 m; T: 1 K – 1.5 K ton); pushed convoy (pusher + max. one pushed barges).

[191] Class III standard: motor cargo vessels (L: 67-80 m; d: 2.5 m; T: 650 – 1 K ton); no pushed convoy.

The Sava River's waterway is not completely marked, while the activities on a marked part are carried out in accordance with valid international regulations. Winter shelters are proclaimed on the waterway, but there are no officially proclaimed anchorages[192].

3.1.3 Drava river

One of the main issues concerning the Drava waterway is represented by the necessity to ensure the navigability in line with the required navigability level according to the European Agreement on Main Inland Waterways of International Importance (AGN). In order to achieve that navigability requirements, the dimensions of the waterway has to be increased and the bottlenecks eliminated (trough among others dredging and/or construction of new waterways structures)[193].

3.1.4 Tisza river and Hydro system Danube-Tisza-Danube (HS DTD)

The Tisza River's waterway is completely marked in accordance with the applicable international regulations, but there are no officially proclaimed safety objects of navigation: winter ports, shelters and anchorages[194].

Among the main issues of all inland ports in the region, it is worth underlining:

- The lack of alternative fuels facilities
- The need to upgrade several sections to Class IV or V
- The lack of safety conditions capable to ensure all year long free stream navigation

In the HS DTD, the following necessities have been collected:

- Designs of new types of vessels suitable for navigation in the category III of waterway; Revitalization of affected sections contaminated by mud (Vrbas, Zrenjanin);
- Rehabilitation of the Bezdan ship lock as an entry point from the river Danube into the DTD canal system (Great Backa Canal/Veliki Backi kanal)[195].
-

3.1.5 Northern Italy inland Waterwat System

The improvement of the Northern Italy IWW was included as a core section of the Med corridor (Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility); as such the international and regional transport policy addresses the main issue to upgrade the capacity of various section of the NIIWS to class V CEMT and to remove existing bottlenecks in order to ensure a seamless navigability for commercial and touristic purposes all along the "Sistema Idroviario Padano-Veneto" at least 340 days per year with the aim to increase the attractiveness of this mode of transport, relieving one of the most heavily congested (road) transport corridor. The infrastructural gaps need to be solved in order to relaunch the potentials of a waterway system that is situated along one of the biggest European economic area (the northern regions of Italy represents about the 50% of the Italian GDP)

[192] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

[193] Transport Development Strategy of the Republic of Croatia (2017 - 2030), MINISTRY OF THE SEA, TRANSPORT AND INFRASTRUCTURE, May 2017

[194] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

[195] STRATEGY ON WATERBORNE TRANSPORT DEVELOPMENT OF THE REPUBLIC OF SERBIA 2015 – 2025, 2015

characterized by one of the higher level of road saturation in Europe, in part determined by the fact that the Waterway system is incomplete with missing link and therefore it cannot fully contribute to a more balanced modal split to relieve congestion on west-east road axis. Therefore, the main issues of this IWW system can be listed as follows:

- Various section of the NIIWS not being in line with Class V CEMT;
- Existing bottlenecks along the waterway do not allow to ensure a seamless navigability along the system at least 340 days per year.

3.2 Outlook

Along with rail, IWW transport is considered the least impacting transport mode in terms of carbon footprint, and it is therefore central to the international policies for the decarbonization of the transport system.

As mentioned in the NAIADES III Action Plan of the European Commission[196], the European Green Deal[197] called for decisive action to shift a substantial part of the freight transported by road to inland navigation and rail, namely through measures to increase the capacity of inland waterways from 2021. Similarly, the Sustainable and Smart Mobility Strategy[198] lays the foundation for how the EU transport system can achieve its green and digital transformation and become more resilient to future crises, underlined the need to increase the use of more sustainable transport modes, and indicated that inland waterway transport and short-sea shipping should increase by 25% by 2030 and by 50% by 2050. However, despite its environmental edge, and efforts by the sector to modernise operations, the overall modal share of the EU inland waterway transport sector has not seen the desired growth levels in recent years, remaining stable at around 6%.

The European Commission has been establishing an 'Inland Waterway Transport Action Plan 2021-2027', in line with the new multiannual financial framework and focusing on two core objectives:

1) shifting more freight transport to inland waterways
2) setting the sector on an irreversible path to zero-emissions

These objectives are underpinned by a paradigm shift towards further digitalisation, as well as accompanying measures to support the current and future workforce.

Accordingly, in the following paragraphs the most important – in terms of economic size – investments in the IWW systems (identified in chapter 2) will be presented and associated to themes which are considered as strategic objectives throughout the macroregion's transport system, namely:

[196] EC, "NAIADES III: Boosting future-proof European inland waterway transport", COM(2021) 324 final

[197] The European Green Deal, COM(2019)640 final

[198] Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM(2020)789 final

- Improvement of safety and navigability conditions
- Sustainability
- Innovation and digitalisation

Only the projects that are ongoing or that have to start and that have a clear implementation strategy will be mentioned. Therefore, actions that lack of information, for example about the timing or the financing, will be omitted from the analysis carried out in the present chapter. This theme is particularly relevant as regard the improvement of river transport, and its infrastructure, as it often finds progress difficulties determined by the lack of funding or cross-border issues between countries.

It is to be noted, however, that no ongoing/planned project has been recorded which is exclusively dedicated to sustainability goals in the IWW system; therefore two paragraphs are populated out of the three strategic themes mentioned.

3.2.1 Main projects for the Improvement of safety and traffic development conditions

The main investments ongoing in the region are dedicated to improving the quality and safety of navigation in the concerned rivers. This is the case of the following projects:

- **FAIRway works! in the Rhine-Danube Corridor (2019-EU-TM-0187-W)**[199]. (2020-2024) The action clusters mature works on the critical waterway infrastructure bottlenecks in the Rhine Danube Corridor (global project) in Serbia and Austria. In Serbia, the upgrade of the Iron Gate 2 locks will increase the reliability of lock operation and reduce waiting times of vessels for the entire corridor. The reconstruction and upgrade of the Iron Gate II navigational lock will improve functional performance of the lock and reduce the duration of its lock cycles. Moreover, reliability, predictability and stability of operations will be increased, resulting in a decrease of waiting times for vessels, the elimination of unscheduled downtime risks, improved safety of navigation and improved overall Good Navigation Status parameters on the Danube waterway. The procurement of equipment for ensuring year-round navigability (1 multifunctional marking vessel in Serbia and Austria respectively, 1 surveying vessel and Aids to Navigation in Serbia) will enhance the Good Navigation Status and the capacity of the waterway. Improved data on the riverbed, combined with the reduced reaction time for marking, enables more efficient measures especially after extreme weather events.
- **SDIP: Sava - Drina River Corridor Integrated Development Project** (World Bank Project ID: P168862) (2020-2030). The project involves Serbia, Bosnia Hercegovina, Montenegro, Croatia, and Slovenia. The objective of the SDIP project is to strength the transboundary water cooperation and to improve navigability and flood protection in the Sava and Drina Rivers Corridors. The SDIP is divided in two partially overlapping phases (Phase I 2020 - 2026; Phase II 2024- 2030) with the aims to improve flood protection and enhance transboundary water cooperation in the Sava and Drina Rivers Corridors, including demining the right bank of the Sava river and the enhancement of ports facilities (ports of Sremska Mitrovica (SRB); Brcko (BiH); Gradiska (BiH)); integrated development of Drina watershed; Enhancements of ports, services and logistics; and development of regional dialogue, project management and coordination.

[199] https://navigation.danube-region.eu/fairway-works-in-the-rhine-danube-corridor/

- **Upgrading road and railway access to the Port of Brcko and modernizing of facilities within Port of Brcko (Bosnia Hercegovina)** (started in 2021). The project, led by Government of Brcko District with the European Bank for Reconstruction and Development (EBRD) and the Western Balkan Investment Framework (WBIF), aims at upgrading road and railway access to the Port of Brcko and modernizing of facilities within Port of Brcko.
- **New port terminal in Osijek** (Croatia) (2017-2023). With the construction of the bulk cargo terminal, the port of Osijek will become the first Croatian basin-type inland port and the first to have adopted European business standards, thereby providing strong logistical support to the economy of Eastern Croatia.
- **Development of the waterway marking system of the Republic of Croatia**. (2020-2023) The project foresees investment in the improvement of the waterway marking and monitoring system; moreover the existing two marking ships older than 30 and 50 years, respectively, need to be replaced not only because of the fact that they have almost reached their expiration date, but also because their capacities and operational performance do not meet the growing needs for waterway tours and safe navigation.
- **International ship winter shelter on the Danube in Croatia (Opatovac)**. (2020-2023) The project envisages the construction of a winter shelter to accommodate vessels in fast ice / pack ice conditions, in the Danube distributary between Opatovac islet and the settlement of Opatovac, on the VIc class international waterway; the project implementation would result in the formation of a wintering area with a min. depth of 2.5 m, 40m wide waterway (outside the mooring area) and a 150 m turning basin, as well as the winter shelter with space for 23 vessels of standard dimensions 76.5×11.4 m, and a revetment in the length of 700 m.

3.2.2 Main projects for Innovation and Digitalization

For the goal of improving the degree of digitalization and modernizing the IWW systems, the following main investments are being implemented:

- **RIS COMEX – RIS Corridor Management Execution (2016-2022)**. This project invloves the Danube river, including - within EUSAIR countries - the sections in Serbia and Croatia. Previous RIS implementation projects mainly focused on the realisation of national RIS infrastructure with some pilot activities related to the international exchange of RIS data. RIS COMEX now focuses on the seamless availability and easy-to-access relevant information for fairway users and other logistics stakeholders as well as relevant authorities in order to increase efficiency of inland navigation based on existing infrastructure.
- **Implementation of VTS and voice VHF system on the Danube and Sava rivers**. (2021-2023). The project envisaged the implementation of a VTS (Vessel Traffic Service) and voice VHF (Very High Frequency) communication systems along the Danube and Sava rivers in the Republic of Serbia including coastal base-stations (rehabilitation and installation of new equipment), IT for the data center and backup location and one VTS command and control center.

3.3 Guidelines for development

As noted, the most relevant gap in the recollection of projects is the lack of major projects aimed at **improving the environmental sustainability of IWW operations in rivers and inland ports**. This is a widespread need to be addressed in the IWW systems of the macro-region. Many vessels currently operating on the European waterways, including the Western Balkans, were built more than 30 years ago. Almost the entire fleet is equipped with diesel combustion engines and diesel-powered electrical generators to provide electrical power on board. Environmental performance can be improved by using alternative propulsion systems and alternative fuels. As underlined by UNECE[200], The readiness of the sector to proactively invest in new and enhanced power supply systems is rather low, since most owners will not replace an engine that is still functional. Alternative propulsion systems are still a widely discussed topic in the Inland Waterways sector. The most common alternatives for diesel are Liquified Natural Gas (LNG) and hydrogen. Considering the current diesel fleet, it is highly likely, that we will see a combination of different systems coexisting, each fit for a designated purpose.

Further projects are needed to improve the navigability conditions and, in general, the competitivess of IWW transport throughout various sections of the macro-regions main rivers (Danube, Sava, Drina, as well as the river Po and related canals). The reasons of the low competitiveness are mostly related to issues that represent the urgent needs whose satisfaction should guide the future projects in the system, such as:

- **lack of reliability of the waterway infrastructure**
- **insufficient fairway depths and widths**
- **outdated infrastructure in mooring places or at locks**
- **insufficient road/rail access to inland ports and connection to logistics platforms**
- **limited application of RIS and VTS**
- **unattractiveness of jobs in the IWW sector**

in addition to the previously mentioned need to **improve the sustainability of IWW operations**. For this latter ambitious goal, as outlined in the NAIADES III Action Plan, the following steps can give relevant contributions:

- ➔ **promoting research in zero-emission vessels technology**, **innovative propulsion systems and sustainable fuels**, which is the goal of the Zero-Emissions Waterborne Partnership, also in close collaboration with the Battery Alliance, the European Clean Hydrogen Alliance and the Renewable and Low-Carbon Fuels Value Chain Alliance.
- ➔ **extend to the whole macro-region the EC's adoption of a technical guidance on climate-proofing** to help promoters take into account climate and environmental objectives when investing in transport infrastructure.
- ➔ **Developing inland ports as multimodal alternative fuels infrastructure hubs,** extending to the whole macro-region the indications of the Alternative Fuel Infrastructure Directive, with the aim of ensuring that the necessary recharging and refuelling infrastructure for zero-emission vessels is deployed in inland ports by 2030, including the provision on-shore power supply available so that vessels are able to turn off their engines while at berth.

[200] UNECE, "White Paper on the Progress, Accomplishments and Future of Sustainable Inland Water Transport", 2020

Taking into account the above-mentioned objectives and the status of EUSAIR IWW transport system, the following development guidelines are recommended, grouped into three main policy areas, as for the other transport modes.

SAFETY, SECURITY AND RESILIENCE	ENVIRONMENTAL AND SOCIAL SUSTAINABILITY	CONNECTIVITY AND TRAFFIC DEVELOPMENT
• Increase the resilience of IWW infrastructure to extreme weather events • Exploit existing digital solutions for monitoring the status of infrastructure • Expand the use of vessel traffic monitoring and information system (VTMIS) and of existing digital solutions for security within ports	• Boost the uptake of alternative fuels and low carbon vessels in ports and rivers • Develop cold ironing solutions • Monitor GHG, pollutant emissions and water quality in ports and rivers • Greening ports (green spaces, energy efficiency, circular economy)	• Improve port infrastructures for specific traffic types such as containerized goods • Improve the integration of inland ports with land transport modes • Expand the use of Port Community Systems • Implement solutions for overcoming paper-based procedures and long waiting times of border crossing procedures • Expand year round navigability of IWWs

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