



Water Contingency Management in the Sava River Basin

Strategy for implementation of protocols to the FASRB - river navigation response

Output Number T1.1

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Version	
Date	29.3.2022.

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1 List of abbreviations

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
BiH	Bosnia and Herzegovina
CEVNI	European Code for Inland Waterways
ECDIS	Electronic chart display and information system
ENC	Electronic navigational chart
FASRB	Framework Agreement on the Sava River Basin
HPP	hydropower plant
IoT	Internet of Things
ISRBC	Sava River Basin Commission
LLC	Limited Liability Company
PEG NAV	Permanent Expert Group for Navigation
RIS	River Information Services
VHF	Very high frequency
WACOM	Water Contingency Management in the Sava River Basin

2 Introduction

To facilitate effective implementation of protocols to the *Framework Agreement on the Sava River Basin* (FASRB), it is necessary to develop the strategy, which will take into account its key goals and provide an overview and understanding of relevant stakeholder's responsibilities and roles in the implementation process. This strategy refers to the efforts to establish a unified regulatory system in the Sava river basin in terms of navigation safety, which should be applied in all International Sava River Basin Commission (ISRBC) countries.

Taking into account existing invested efforts and realized achievements that are made so far (and which are also gathered through WACOM project in format of National Response Practices Analysis), the aim of this strategy is to get an insight on the national processes in regards to ISRBC binding decisions, motivate transfer of best practice and in that way achieve more complete implementation of FASRB protocols. The strategy encompasses the existing practices and procedures (also taking into account EU and regional mechanisms), furthermore elaborating the process of establishment of an international regime of navigation on the Sava River and its navigable tributaries in special emphasis on undertaking of measures to prevent or limit hazards and hazard related consequences from accidents involving hazardous substances.

The structure of the *Strategy for implementation of protocols to the FASRB - river navigation response*, consists of five segments. First, the framework of legal background that encompasses the transboundary cooperation and establishes the basics of legal and institutional framework for the cooperation; second is related to strategic objective of FASRB in terms of navigation response; third, the implementation potential of the existing, transnationally signed FASRB protocols – through state of implementation with ISRBC coordination and stakeholder's involvement – which actors are involved in the implementation of the protocol, their operational procedures and; fourth, the suggestions of further improvement under mutual (and multinational) cooperation framework.

3 Legal background

3.1 International level

Recognizing the vital importance of transboundary cooperation, the Parties of the Framework Agreement on the Sava River Basin (FASRB) (Slovenia, Croatia, Bosnia and Herzegovina and Serbia) should undertake measures to prevent or limit hazards and reduce and eliminate adverse consequences of incidents involving substances to water among other objectives of the FASRB. They are also obliged to establish a coordinated or joint system of measures, activities, warnings, and alarms in the Sava River Basin for extraordinary impacts on the water regime, such as sudden and accidental pollution, discharge of artificial accumulations and retentions caused by collapsing or inappropriate handling, flood, ice, drought, water shortage, and obstruction of navigation. The FASRB was signed on December 3, 2002, at Kranjska Gora (Slovenia) and entered into force on December 29, 2004, after the ratification by all Parties. The International Sava River Basin Commission (ISRBC) which is the international partner of the WACOM project is a responsible body for the implementation of the FASRB. It coordinates the activities of the Parties in establishment of an international regime of navigation, establishment of sustainable water management and undertaking of measures to prevent and limit hazards.

Considering that the Recommendations on technical requirements applicable to inland navigation vessels agreed at the European level, *European Code for Inland Waterways* (CEVNI), and the *European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways* (ADN) represent a set of guiding regulations with important role in controlling water pollution by inland navigation vessels, the Parties to the FASRB concluded the Protocol on Prevention of Water Pollution Caused by Navigation. The protocol was signed in Gradiška (BA) on June 1, 2010, and entered into force on November 27, 2015.

3.1.1 Protocol on Prevention of Water Pollution Caused by Navigation to the FASRB

Protocol on prevention of the water pollution caused by navigation to the FASRB is the sound legal basis for the ship waste management system on the whole Sava River Basin and aims at prevention, control and reduction of pollution originating from vessels, establishment of technical requirements for the equipment of port facilities and other reception stations, development of the best available techniques, informing, development of spill response measures and monitoring of water quality.

As stated in the Protocol, the Parties to the FASRB shall undertake the measures to implement the Protocol in particular:

- establish, rationally locate and maintain the reception facilities network;
- ensure immediate notification of pollution, especially transboundary, by means of effective communication networks, and take effective emergency response measures;
- develop a program of joint action to prevent water pollution from shipping, and establish a mutual information system.

The most important factors for the implementation of the mentioned Protocol are certainly the notification of transboundary pollution and effective emergency response measures as well as establishment of a network of receiving stations for waste from vessels in ports on the Sava River, which would enable boatmasters to dispose waste and thus respect the ban on dumping waste into Sava River waters.

3.2 Compliance with EU strategic documents and legislative frameworks in the region

Having in mind the importance of compliance with the international strategic documents (as it is stipulated in many strategic documents related to Sava River Basin, and in the *Framework Agreement on the Sava River Basin*), the *Protocol on Prevention of Water Pollution Caused by Navigation to the FASRB* strongly relies on the recommendations on technical requirements applicable to inland navigation vessels agreed at the European level and within all other relevant European agreements, recommendations and regulations, previously mentioned.

Furthermore, observing the regional level, based on the analysis which WACOM project conducted in Bosnia and Herzegovina, Croatia, Slovenia and Serbia, on normative documents in relation with river navigation response – some countries have developed adequate normative framework (i.e. strategies, laws and bylaws), and some have not established their framework. The Constitution of BiH defines that the institutions of Bosnia and Herzegovina are responsible for, inter alia, foreign policy, the establishment and functioning of common and international means of communication and the regulation of inter-entity transport. According to the Law on Ministries and Other Administrative Bodies of BiH, the Ministry of Communications and Transport of BiH is responsible for: policy and regulation of joint and international communication devices, international and inter-entity traffic and infrastructure, preparation of contracts, agreements and other acts in the field of international and inter-entity communications and traffic, relations with international organizations in the field of international and inter-entity communications and transport, preparation and drafting of strategic and planning documents in the field of international and inter-entity communications, transport, infrastructure and information technologies, control of uninterrupted transport in international transport, civil aviation and air traffic control.

In 2003, Bosnia and Herzegovina ratified the Framework Agreement on the Sava River Basin and the Protocol on the Navigation Regime ("Official Gazette of BiH", No. 8/03), amendments ratified in 2004, "Official Gazette of BiH", No. 10/04). In 2006, the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Croatia signed the Agreement on Navigation of Inland Waterways and Their Marking and Maintenance ("Official Gazette of BiH", No. 13/06), and the Council of Ministers of Bosnia and Herzegovina appointed representatives Bosnia and Herzegovina - members of the interstate commission for monitoring the implementation and application of the Agreement on Navigation of Inland Waterways and their Marking and Maintenance ("Official Gazette of BiH", No. 2/06 and 40/06). On the other hand, regulations in the field of inland navigation are adopted at the level of entities in Bosnia and Herzegovina - in the Republic of Srpska, the Federation of BiH and Brčko District and relate to the laws on inland and maritime navigation, as well as their bylaws. Other countries on strategic levels have: Resolutions on the National Environmental Protection Programs; Strategies for the development of water transport; National Plans of measures in the events of accidental and sudden water pollution. Some of laws (acts) and bylaws that are common for ISRBC countries are: Inland Waterways Navigation Laws; Water Laws; Environmental Protection Laws; Laws on nationality and registration of vessels; Laws on the transport of dangerous goods.

Also, countries have alongside with international agreement, that are common to all ISRBC countries, developed inter-agency (bilateral) protocols and international agreements addressing flood protection and accidental pollution. Some of the examples are: the *Framework Agreement on the Sava River Basin*; *Agreement between the Government of the Republic of Croatia and the Council of Ministers of Bosnia and Herzegovina on the navigation on inland waterways and their marking and maintenance*; *Protocol between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Serbia on Navigation on Inland Waterways and Their Technical Maintenance*; *Protocol on Prevention of the Water Pollution caused by Navigation to the Framework Agreement on the Sava River Basin*; *Navigation rules for the Sava river basin*; *Rules for the transport of dangerous goods in the Sava River Basin*.

4 Establishment of an international regime of navigation on the Sava River and its navigable tributaries as general strategic objective of FASRB

The key purpose of FASRB is to ensure transboundary cooperation in prescribed objectives: Establishment of an international regime of navigation on the Sava River and its navigable tributaries; Establishment of a sustainable water management in the Sava River Basin, and undertaking of measures to prevent or limit hazards, and reduce and eliminate adverse consequences, including those from floods, ice hazards, droughts and incidents involving substances hazardous to water (ISRBC, 2002a:4). Under the establishment of an international regime of navigation on the Sava River and its navigable tributaries, most emphasis is put on the provision of conditions for safe navigation in terms of all actions that are prescribed by FASRB, which include development of plans, establishment of integrated systems for monitoring, forecasting and early warning, harmonization of legislation, developing protocols, cooperation, etc.

More specifically, as FASRB prescribes, there are several tasks and competencies of ISRBC in the field of navigation in order to provide conditions for safe navigation in the Sava River Basin, as follows:

- adoption of plans on marking, maintenance and development of navigable waterways;
- adoption of unified rules of navigation, taking into account specific conditions of certain parts of the navigable waterways;
- adoption of technical rules concerning inland navigation vessels and rules on obtaining the boatmasters certificates;
- establishment of the River Information Service (ISRBC, 2002:16)

Supporting the ISRBC with their expertise in navigation safety, the Permanent Expert Group for Navigation (PEG NAV) provides assistance and guidance which facilitate the achievement of FASRB objectives. Under this cooperation, there are several adopted decisions:

- *Decision 30/07 on adoption of the Navigation Rules on the Sava River Basin;*
- *Decision 31/07 on adoption of the Rules for Waterway Marking on the Sava River Basin;*
- *Decision 32/07 on adoption of the Rules on Minimum Requirements for the Issuance of Boatmasters Licenses on the Sava River Basin;*
- *Decision 33/07 on adoption of the Rules on Minimum Manning Requirements for the Vessels on the Sava River Basin;*
- *Decision 03/09 on adoption of the Vessel Tracking and Tracing Standard;*
- *Decision 04/09 on adoption of the Inland ECDIS Standard.*

All listed decisions can be used as the background to meet the prerequisites of the *Protocol on prevention of the water pollution caused by navigation to the FASRB*. Alongside with listed normative documents, there are several activities, which are also undertaken and will be emphasized in the continuation.

5 Implementation potential of FASRB protocols

As part of FASRB implementation, backgrounding FASRB protocols, various activities by the ISRBC were undertaken. From adoption of navigation rules decisions (which were mentioned in previous chapter), provision of basic sets of regulation for transport of dangerous goods, to the implementation of River Information Services (RIS) for enhancing safety and efficiency of inland waterway transport.

In 2007, ISRBC has adopted *Navigation Rules on the Sava River Basin* in accordance with FASRB and the *Protocol on the Navigation Regime to the Framework Agreement of the Sava River Basin* which was updated in 2013 as the *Navigation Rules on the Sava River Basin - consolidated text based on Decision 30/07 and Decision 19/10*. The efforts were additionally realized through various Rules and Manuals, concluding with the *Manual on the Sava river navigation* from 2018, which was developed on basis that before this manual there was no comprehensive navigation manual that would cover various inland navigation issues.

Also, ISRBC has provided some other tools to support relevant stakeholders, such as web application for the preparation of the Sava River Waterway Marking Plan and web application for support to national bodies responsible for the navigation safety inspection, as web services used by the relevant national authorities (ISRBC 2021).

Although International Sava River Basin Commission is responsible for the adoption of strategic documents and coordination between Parties and international community (e.g. European Union), main investments in human and financial resources for the implementation of the *Protocol on prevention of the water pollution caused by navigation to the FASRB* still lays on ISRBC member states, as well as the responsibilities which will be further elaborated.

5.1 Stakeholders – competent authorities and resources

As stipulated in the *Framework Agreement on the Sava River Basin*, the national institutions (competent authorities) which are nominated by the Parties (i.e. ISRBC member countries) are responsible for FASRB implementation, under the coordination of the ISRBC which is also obliged for developing of common policy. As part of FASRB, competent national authorities are responsible for the implementation of *Protocol on prevention of the water pollution caused by navigation to the FASRB*.

Under ISRBC there is a relevant number of bodies which are responsible in their respective countries for the implementation of the FASRB (a total of 20 institutions in four countries, according to the data on ISRBC Web Page). Without the need of deeper analysis of the contribution of each institution in FASRB implementation, which is not the focus of this Strategy, we will just point out the stakeholders that are competent authorities and therefore, most responsible for area of river navigation. As introduce, they are listed in Figure 1, and will be afterward elaborated in details.

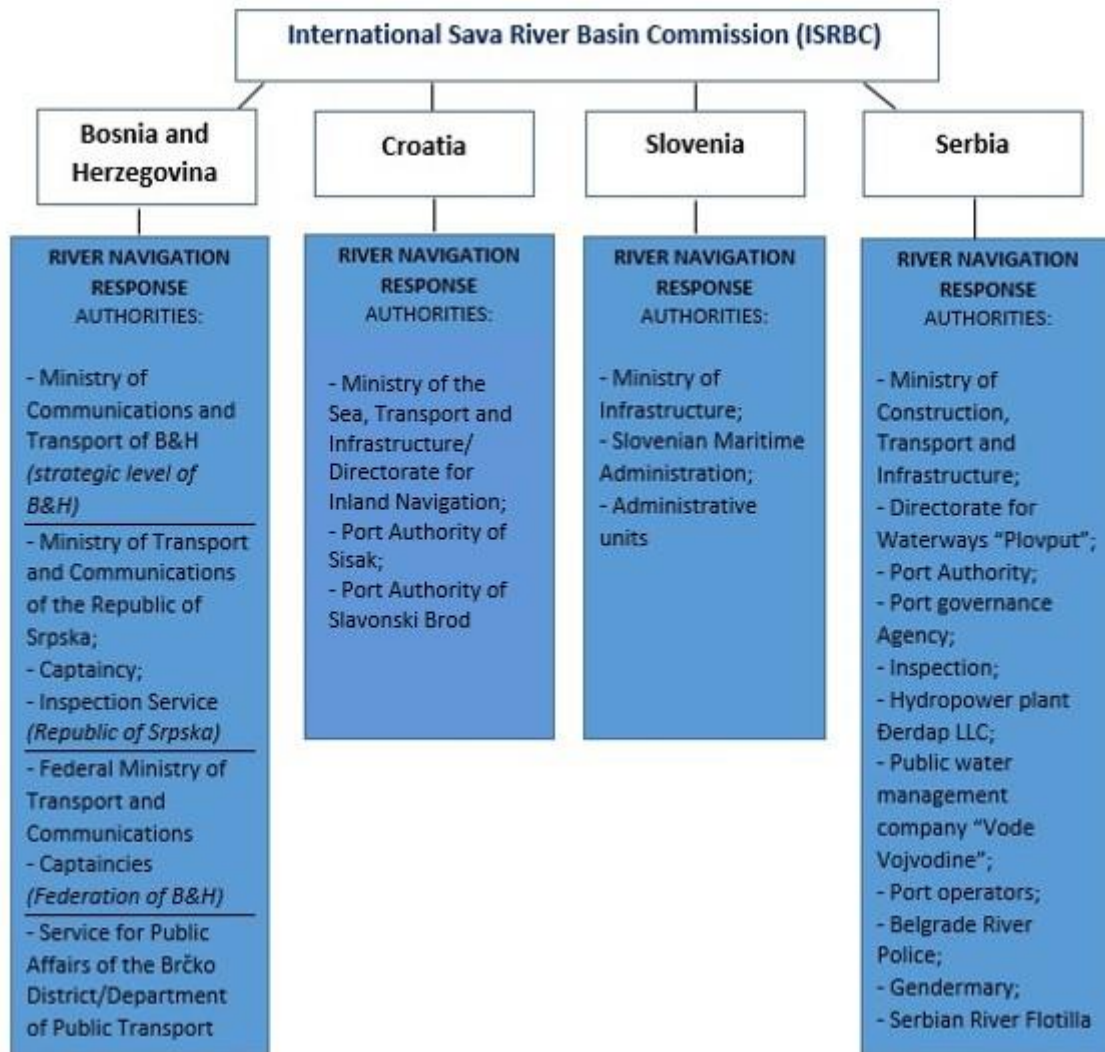


Figure 1. Schematic overview of institutions responsible for the river navigation field (FSRB)

In **Slovenia**, in the field of river navigation strategic level is represented by a Ministry of Infrastructure, at tactical level responsible administration is Slovenian Maritime Administration, and on the operational level, competent are the administrative units – Porth Authorities, which deals with river navigation response and all of its segments. Supervision over the implementation of the provisions of the Inland Waterways Navigation Act and regulations issued on the basis thereof are performed by the Inland Navigation Inspector at the Ministry responsible for inland navigation and the police, and over military vessels by the inspection body responsible for defense.

In Croatia, in the field of river navigation, the most important body at strategic level is the Ministry of the Sea, Transport and Infrastructure – Directorate for Inland Navigation. Tactical level does not exist, and on the operational level are Port Authority Sisak and Port Authority Slavonski Brod. In case of pollution incident in relation with river navigation response, equally engaged are two competent bodies – Civil Protection Directorate and Croatian Waters. To be more precise, it is necessary to point out that in accordance with the *Water Act*, water protection in this case is carried out by the provisions of the regulations governing navigation and inland ports. Croatian Waters can be included as a supervisor in order to monitor the state of watercourses, all by

decision of the State Inspectorate. In this part, the cooperation of competent inspectors (water law and inland navigation safety inspector) is important.

For **Bosnia and Herzegovina**, it should be taken into account that the Civil Protection System and Water Management System is structured in accordance with the political system, and competencies are divided on the basis of established administrative-territorial units. There are several levels of government: level of Bosnia and Herzegovina; entity level – Republic of Srpska and the Federation of Bosnia and Herzegovina which is divided into cantons, each of which has its own competencies in the field of water management; and district level - Brčko District of Bosnia and Herzegovina.

In the field of river navigation, on the level of Bosnia and Herzegovina, the competence lies on Ministry of Communications and Transport of BiH, and additionally, entity governments and administrative bodies – ministries. In Republic of Srpska, for the river navigation competent is the Ministry of Transport and Communications of the Republic of Srpska, Captaincy and Inspection Service and with certain consents of the Ministry of Agriculture, Forestry and Water Management in some articles of the Law on River Navigation For the Federation of BiH, competence is under the Federal Ministry of Transport and Communications and at the operational level, river navigation is the responsibility of the Captaincies representing the organizational units of the entities ministries of transport. In Brčko District, river navigation authority is Service for Public Affairs of the Brčko District of BiH (Department of Public Transport and Vehicle Maintenance) with Brčko Port Authority.

In analysis of Republic of Srpska it is emphasized how in relation to navigation, *the Law on Inland Navigation of the Republic of Srpska* stipulates that there are coastal radio stations that perform radio service for the purpose of ensuring safety of navigation, as well as for communication with the competent captaincies, ports and shipowners. A river information system (RIS) is operating on the waterway on which the international navigation regime has been established, in order to provide information services in navigation planning and management, which is available to all system users. The Captaincy is an organizational unit of the Ministry, which performs administrative, technical and other professional tasks that enable safe navigation on the inland waters of the Republic of Srpska. This shows good approach in the national establishment of river navigation system on the trace of adequate implementation practice of FASRB.

In **Serbia**, strategic competence for the field of river navigation is in the Ministry of Construction, Transport and Infrastructure. At the tactical level, several authorities share competencies in river navigation: The Directorate for Waterways “Plovput” (an administrative body within the Ministry of Construction, Transport and Infrastructure) is responsible for the maintenance and development of inland waterways in the Republic of Serbia where international and interstate navigation regimes apply (Danube, Sava and Tisza rivers); Port Authority (regional unit of the Ministry that performs administrative, technical and other expert tasks that ensure the safety of navigation); and Port governance Agency. At the operational level, covering different aspects of river navigation, competent are: Inspection; Hydropower plant Đerdap LLC; Public water management company “Vode Vojvodine”; Port operators; Belgrade River Police; Gendarmery; the Serbian River Flotilla (part of Serbian Armed Forces).

As we can conclude from this overview of competent authorities that are responsible for the navigation response, on the national levels there is evident clear distribution of tasks regarding different aspects of river navigation. In most countries this is evident as a fact, while for Bosnia and Herzegovina, due to the complexity of the state system, there are certain challenges in assessing the full integrity of the national system. Also, some differences can be found in competence when comparing four countries, e.g. in Croatia there is no tactical level, but still, all legal obligations of national system are fulfilled. In the event of emergencies such as an accidental

pollution, all countries have the preconditions to have an adequate response on national, as well as international level (as needed).

5.1.1 Operational procedures and tools used in river navigation accidents response

In **Slovenia**, regarding river navigation, the Inland Waterways Navigation Act determines that the navigation should be regulated by general acts at the community level. These acts should consider general provisions of the law including environmental protection and general conditions for the navigation prohibition. Since in Slovenia water traffic is mostly limited to touristic, sport, recreational activities, extreme accidental pollution from this perspective are not considered. The operational procedures during accidental pollution and floods are mostly not included in the navigation acts, therefore these are part of contingency plans at the regional level. In order to support the safety in the navigation, several agreements on mutual information exchange exist among administration of the RS for civil protection and disaster relief and major stakeholders manipulating the river flow (e.g. hydropower plant) to harmonize the activities at the river to prevent accidents at the river.

Regarding the tools and procedures related to the emergencies in inland navigation, different kind of monitoring and communication tools are in use. Online DSS tool for oil spill forecast can be used at the same time for different locations. In the area of river navigation, the treatment at the regional/local level is described where all necessary activities are coordinated by the regional notification centre. The support is also offered from the local municipalities and their voluntary and professional organizations according to the disaster response plan. Specific contingency plans for inland navigation are not prepared in Slovenia, mainly due to the limited navigation potential of the rivers.

In **Croatia**, as legal entity for water management Croatian Waters have adopted the *Operational Plan of Measures of Croatian Waters in case of accidental and sudden water pollution*, which is aligned with *Water Law* under the jurisdiction of the Ministry in charge of water management. It determines the measures of water protection in case of Accidental pollution; Accidental pollution that does not require the declaration of the degree of endangerment of water; Accidental pollution for which the endangerment of waters is of I and II degree. Regarding operational procedures in terms of navigation security from the viewpoint of river navigation, the captains of the vessels are obliged to report to the competent Harbor Master's Office, which acts according to the *National Plan of Measures in case of accidental and sudden water pollution* in compliance with regulations in force. The tools in the implementation of communication are VHF radio connection and River Information Services (RIS). In order to protect water, Croatian Waters may perform expert supervision. According to the National Plan of Measures, in case of pollution with transboundary impact, PIAC-HR is obliged to send a warning message to downstream countries, ICPDR and ISRBC.

In **Bosnia and Herzegovina**, the institutions are responsible for, among other things, foreign policy, the establishment and functioning of common and international means of communication and the regulation of inter-entity transport, according to the BiH Constitution. Regarding river navigation in accordance with the Law on Ministries and Other Administrative Bodies of BiH, the Ministry of Communications and Transport of BiH is responsible for: policy and regulation of joint and international communication devices, international and inter-entity traffic and infrastructure, preparation of EU agreements, agreements and other acts in the field of international and inter-entity communications and transport, relations with international organizations in the field of international and inter-entity communications, transport, infrastructure and information technologies, control of uninterrupted transport in international transport, civil aviation and air traffic control.

The Ministry of Communications and Transport of BiH cooperates with the entity ministries in charge of navigation and the competent department in the Government of the Brčko District of BiH. If the need arises, a special interdisciplinary team (commission) may be formed for each specific situation involving police and civil protection bodies. In events of strategic importance, ministries may, as assessed, mobilize their operational forces for specific situations and for certain parts of the waterway.

In the Republika Srpska, the competence of the Ministry of Transport and Communications is determined by the Law on Republic Administration (Official Gazette of the Republika Srpska No. 115/18 and 111/21), and the Law on Inland Navigation of the Republika Srpska (Official Gazette of the Republika Srpska No. 54/19) regulates "conditions and manner of use of inland waters and coasts of Republika Srpska for navigation, safety of navigation on inland waters of Republika Srpska, facilities for safety of navigation, vessels, ship documents, procedure of entry in the register and deletion of vessels from the register, ability of vessels, shipowners, transport goods and passengers, shipping accidents, river information system, technical maintenance of waterways."

In the Republika Srpska, the Captaincy performs activities that enable safe navigation on inland waters in accordance with the Law on Inland Navigation of the Republika Srpska. The Harbor Master's Office performs control and inspection of vessels in inland waters and vessels entering or leaving the inland waters of the Republika Srpska. During the inspection of the vessel, the correctness and technical documentation of the vessel, cargo on the vessel, documents and books of the vessel as well as the method of waste management on the vessel are checked. In case the vessel is transporting dangerous goods, in addition to the above, the documentation and equipment are checked in accordance with AND as well as the Law on Transport of Dangerous Goods and the Ordinance on the manner of transport of dangerous goods on inland waterways. In case of incidental pollution from the vessel, which occurred in the part under the jurisdiction of the Republika Srpska, the Captaincy will inform the Civil Protection of the Republika Srpska as soon as possible, as well as other competencies of the captaincy on the Sava River.

In the Transport Strategy of the Republic of Srpska 2015-2030 it stands that the medium-term plans for 2022 are: Alignment of inland navigation regulations with EU standards; Harmonization of regulations with EU standards on harmful emissions of vehicles (vehicles on rivers); Modernization of the inland waterway of the Sava River; Active participation of the Port of Šamac in the transport system; Development and use an intermodal system with a focus on the Sava River; Development of traffic safety on the Sava River in parallel with the development of infrastructure; Introduction of RIS.

The competence of Federal Ministry of transport and communications in Federation of Bosnia and Herzegovina is based on Law on inland and maritime navigation of Federation of Bosnia and Herzegovina (Official Gazette of Federation of Bosnia and Herzegovina No. 73/05). Harbors captaincy are the organizational part of Federal Ministry of transport and communications, and they provide all technical, professional and administrative services and tasks that will ensure the safety of navigation on internal and marine waters. All tasks that captaincy provides are based on Law on inland and maritime navigation of Federation of Bosnia and Herzegovina. During the inspection of the vessel, they check the correctness and technical documentations on the vessel. To insure the RIS is in function completely, the National legislation in this area needs to be harmonized with international directives.

Competence of Federal Ministry of transport and communications is regulated by the Law of Federal ministries and the other federal government bodies. Federal Ministry of transport and communications is in charge for implementation of the Law of inland and maritime navigation only on the part of Sava river that belongs to Federation of Bosnia and Herzegovina territorially. The obligations include maintenance and financing, and also marking and deepening waterways.

In **Serbia**, the navigation procedures and tools are under development. Although, there are some procedures on reducing risk of navigation accidents where for example, the Harbor Master's Office may, for the safety of navigation, prohibit or restrict navigation and determine special navigation conditions to protect human lives, property, the environment, safety of waterworks on the waterway, etc. In the event of a navigation accident, at the national level, the search and rescue operations are managed by the Ministry of the Interior in cooperation with the Port Authorities and the Ministry of Transport. PWMC "Srbija Vode" is responsible to remedy water pollution originating from vessels (oil derivatives). The tools used in the river navigation field regarding monitoring situational awareness systems are River Information Services (RIS) is in use. It includes systems for locating and tracking ships, displaying electronic navigational charts, providing waterway information, as well as other services. In Directorate for Inland Navigation - Plovput, electronic navigation maps (ENC) have been developed for the entire course of the Danube (590 km) and Tisza (160 km) rivers through Serbia, in accordance with the Inland Electronic Chart Display and Information System (ECDIS) standard. Many of existing procedures are hard to be applied due to deficiencies in port infra and superstructure, overlapping jurisdictions and lack of human and technical capacities.

In the segment of operational procedures and tools used in river navigation response, there are much deeper differences than in previous section, that gave the insight on national competences. For Bosnia and Herzegovina, as well as for Serbia, there is a clear need to further development of navigation procedures. The countries that have achieved somewhat higher level of developed procedures (Slovenia, Croatia) can still find room for improvement in terms of faster and better national response procedures and adjustment of nationally used monitoring and communication tools which should be unified for international cooperation in river navigation response.

6 Recommendations to FASRB protocol implementation

When drafting strategies and protocols, as well as all other documents, the main focus should be placed on the potential of implementation of tools, plans and other segments of the documents that are being developed. In order to achieve the expected level of implementation, there should be some structured ways of engaging the competent national authorities in charge of achieving the objectives set by the common frameworks for cooperation.

This Strategy is based on several basic assumptions (theses) in the analysis of the current situation:

- I. The existing systems in Slovenia, Croatia, Bosnia and Herzegovina and Serbia are based on sovereignty in defining the conditions of river navigation, and shaping the concept of navigation safety, which are among relevant areas covered by the *Sava River Basin Framework Agreement*. It is noticeable that the legislative framework has not been established in all countries, although on the strategical level through the relevant national documents (i.e. strategies) the importance of the subject areas is emphasized. These are presented in more detail in the introductory part of this document.

The states of the Sava River Basin, through plans and other documents, prescribe the procedures and necessary measures related to the competencies of individual institutions, adjusted to the established systems in their countries. This is also evident in this Strategy and in the analysis conducted for the areas of water management and civil protection that is presented in the Strategy which covers those areas. In the field of river navigation and river navigation safety it is noticeable that plans dedicated to this area are insufficiently developed, so the additional challenge is if the incident occurs, how the *chain of command* (which defines the responsibilities) will be defined and implemented in practice. Adherence to the hierarchy defined by the chain of command and clearly defined tasks ensure better organization of response/reaction to the incident, characterized by coordinated action. The full functionality of such a chain is a challenge because solutions must be made at several levels and information must be adequately exchanged among all stakeholders.

The sovereignty allows states to invest in equipment, technical improvement, maintenance and modernization of waterways; strengthening the response capacity in case of an incident, etc. - within their own needs, but also on the basis of their responsibility for achieving safety of navigation and safety of the environment. What is the practice in most countries, is greater investment in operational capacity and activities, while less is invested in prevention - from early warning systems, database development (which enables *situational awareness*) to navigation planning (*navigation planning*). On those issues, WACOM project also aims to raise awareness of the needs of the development and prevention segment among stakeholders, and transnational cooperation during incidents, as well as the preparation of protocols, which strengthen the entire disaster management cycle.

- II. Considering multinational perspective, bilateral and multilateral agreements (primarily the *Framework Agreement for the Sava River Basin*, but also relevant documents prescribed, such as the *Protocol on the Prevention of Water Pollution Caused by Navigation to The Framework Agreement on the Sava River Basin*), they represent connective tissue which enables harmonization of instructions, rules and actions for the establishment of a quality water management system (which includes both navigation and safety of navigation) between the countries in the Sava and the Danube Basins.

Legally binding norms provide a general framework, but what the WACOM project recognizes as a challenge, it is necessary to provide an *implementation framework*. Agreement implementation can often be insufficiently successful, despite the fact that implementation monitoring mechanisms are prescribed, as is the case in the analyzed protocol. Practice shows that there is a greater possibility of implementation in countries that have adequate capacities (financial, human, etc.), while in other countries, despite the will and desire to implement the provisions of bilateral and multilateral agreements, this is not feasible due to lack of capacity.

One of the good examples/results of international cooperation at several levels, is the *Joint Declaration on Inland Navigation and Environmental Sustainability in the Danube River Basin* adopted in 2007 by the International Commission for the Protection of the Danube River (ICPDR), the Sava Commission and the Danube Commission, with aim to harmonize the principles of planning and implementation of projects in the field of inland navigation development – to avoid or mitigate conflicts of different interests during the development of inland navigation. From this document we can draw several conclusions/recommendations, such as: full compliance with the existing legal framework, including all relevant transport and environment regulations (national legislation, EU directives and international requirements) is a precondition for any navigation development activity; it is necessary to carry out a priority ranking of possible measures, in order to ensure the best possible impact on the environment, the development of navigation and the use of financial resources; measures should not only be monitored but also adapted to the changing risk environment.

It is worth mentioning the document named PLATINA - Handbook of good practice in sustainable waterway planning. It was developed as an extension of the aforementioned Joint Declaration. This document is based on a review of available European references and sources (publications, workshops of other organizations, other manuals, etc.) and the General Guidelines for Planning the *Joint Declaration on Rules for the Development of Inland Navigation and Environmental Protection in the Danube River Basin* (2007).

- III. The conducted analysis of existing Agreements and Guidelines, as a particularly relevant segment, the exchange of information is highlighted in order to enable a better response to incidents. An additional challenge in the event of an incident, can be badly structured and incomplete data or poorly managed databases and insufficient data exchange, so software solutions to support the system of traffic management in inland navigation, increasing its efficiency, and also safety, should be systematically developed and implemented. The same applies to the use of data which contributes to situational awareness and include the sharing of information internationally - from its acquisition to its exchange. One of the solutions is the River Information Services (RIS), which have already been implemented in the Sava River Basin countries, and the RIS AIS information system is particularly useful. RIS AIS has the functionality of viewing ship data (but only if ships are equipped with an AIS device) in real time for traffic monitoring purposes, as well as a historical repository of those data in raw format. It enables the identification of other vessels in the vicinity, improves the exchange of identification data, data on position and other relevant data, and thus improves the level of security, protection of waters and the aquatic environment and monitoring of water traffic. *Protocol on Prevention of Water Pollution Caused by Navigation to the FASRB* defines that regular monitoring of water quality is performed by national monitoring bodies. The Sava Commission will establish and maintain a water quality information system, as part of the Sava River Information System (ISRBC, 2002b: 6), which contributes to the general water management plan in the Sava River Basin and is important information for ISRBC countries.

It is also important that each country maintains a system of marking waterways and navigation safety objects and carries out those activities in accordance with the prescribed annual reports on the availability and maintenance of navigation safety objects. This is also important in order to be able to work on improving the navigability class on defined sections of international waterways. From the strategic level, the Sava River Waterway Development Programs in all countries within the Sava Commission should be coordinated and harmonized.

From these basic assumptions (thesis) of the analyzed situation, the recommendations of this Strategy will be emphasized, which relate to the identification of priorities and directions of development, in order to improve the functionality of the river navigation system.

Once again, it is necessary to emphasize the value and the need for stronger use of RIS, which in addition to the part of water navigation and waterway management can be integrated with elements of water protection and flood response, thus contributing to a safer and more efficient water management system. Therefore, it is important to maintain, upgrade and systematically develop information and communication equipment (hardware and software) in order to ensure 24/7 functionality of the information system and exchange of the information on waterways. Harmonization should be established by regulating the use of RIS in all countries of the Sava River Basin according to the prescribed exchange of information. The additional importance of RIS can be highlighted through several segments:

1. contains data on waste, its quantity and discharge, which enables monitoring of the level of pollution and at the same time facilitate the monitoring and management of data on significant events on board which are kept in the ship's books prescribed by legal regulations on inland navigation;
2. as stated in *Technical Guidelines for the Planning, Implementation and Operational Use of River Information Services (RIS)*, adopted by the European Commission - urgent and dynamic information which are provided, may also be the information on navigation restrictions due to floods and ice; and strategic traffic information that must be established when constant monitoring of the state of navigation in the RIS area is needed in order to make medium-term and long-term decisions (eg to manage flood and ice emergencies). The strategic traffic picture contributes to the possibilities of deciding on the planning of safe and efficient navigation (European Commission, 2007). It is important to note that the RIS is fully functional on the entire section of the Sava River where the international navigation regime applies (from Belgrade to Sisak, ie from rkm 0 to rkm 594);
3. Electronic navigation charts integrated in RIS contain all waterway information, where Inland ECDIS is used as a standard for displaying electronic navigational charts in inland navigation and contributes to the safety and efficiency of inland waterway transport and environmental protection. The Inland ECDIS Navigation Module is supported with traffic information obtained via radar or the aforementioned Automatic Identification System (AIS);
4. it should be considered to create preconditions to implement underwater mapping technology in the future in ISRBC countries, which will enable better data quality, such as echo sounders and tools for collecting / processing hydrographic data with single-beam echo sounders (depth gauges);
5. better integration of river information services (RIS) and protocols related to navigation with water management information systems, in order to achieve synergy effects in the direction of smart navigation and smart water management, with elements of IoT.

In consideration of other recommendations for improving the functioning of the river navigation system, all national authorities should ensure a sufficient number of persons with the appropriate expertise, basic equipment to operate and the necessary permits to deal with pollution consequences and other incidents consequences in the navigation area. In some countries, Captaincies are not required to have equipment for remediation of polluted sites, and inland navigation inspection bodies are not constantly on duty in case of sudden pollution, which should be changed by investing in equipment that can be financed from various financial instruments such as EU funds (The European Structural and Investment Funds, e.g. Interreg) and better work organization.

In addition, regarding the use of resources, it is necessary to establish mechanisms for inter-ministerial cooperation both within countries and on the basis of inter-state cooperation. The inconsistency of regulations and communication systems among stakeholders creates difficulties in the efficiency of the entire water management system in the Sava River Basin, so it is necessary to conduct a joint analysis of measures, procedures, available and necessary resources for prevention, as well as the response in case of incident. The analysis has already been conducted within the WACOM project, and some parts of it are presented in this Strategy. From this, WACOM can further develop and provide a fundamental approach to upgrading national systems that will ensure effective protection, by transferring knowledge and good practice from existing, already established systems.

In conclusion, a holistic approach is mandatory, given the needs of all countries and stakeholders and the necessity to overcome economic and institutional barriers that often hamper the changes needed to establish an appropriate river navigation and incident management system.

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