



Water Contingency Management in the Sava River Basin

Sava STEER Implementation manual

Output O.T4.2

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| Version | Draft |
| Date | 29.12.2022 |

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**ANNEX 1:
Transnational best management practices catalogue**

**ANNEX 2:
Sava STEER Tools for flood response and accidental pollution response cooperation
and interoperability**

1 Introduction

At the end of the WACOM project, we can look back on many achievements:

- ✓ the development of WACOM Tools for a better, more organized and faster response to incidents and in case of transboundary incidents such as floods and accidental pollution;
- ✓ successfully conducted table top exercises;
- ✓ three sequences of national stakeholder workshops and three regional workshops held during the project period, attended by a total of 207 institutions;
- ✓ successful cooperation and active participation of project partners, who are experts in water management and civil protection, as well as cooperation of stakeholders from all four participating countries (Slovenia, Croatia, Bosnia and Herzegovina, and Serbia);
- ✓ catalogue of measures with 94 identified measures in 14 different key intervention areas (education, finance, governance, human resources, information and communication technologies, monitoring, information, infrastructure, knowledge, logistics, organization, planning, navigation, and others).

This resulted in a very successful project with 94 proposed measures to improve flood and accidental pollution response, contained in two strategies:

- (1) Strategy for flood response cooperation and interoperability and
- (2) Strategy for accidental pollution response cooperation and interoperability.

Both strategies define in elaborative way all necessary arguments relative to the implementation of proposed toolbox and, in particular, the procedures for coordination, modelling, and situational awareness. The strategies developed were presented at the final conference of the WACOM project, with signature procedures confirming a firm commitment by the partners to their implementation.

With the strategies developed, it is important to prepare a tool enabling the follow up of the strategy implementation – a guidance tool enabling efficient tracking on the strategy implementation process itself. The tool is especially targeting the decision makers, stressing the importance of the improved transnational cooperation and interoperability in the field of emergency response for the authorities in charge for the full implementation of the strategies and check list of priority/necessary steps that are on the pathway leading to its actual implementation.

2 The proposed WACOM measures

The proposed measures were collected through a multi-stage process with multiple stakeholders. The measures were compiled by project partners who are experts in water management and civil protection. In this way, all partners from different working areas and countries contributed to a thorough analysis of emergency measures for floods and accidental pollution, as well as to situational awareness. A comprehensive list of measures was developed, harmonized and prioritized for all participating countries: Slovenia, Croatia, Bosnia and Herzegovina, and Serbia. This transnational catalogue of best management practices serves to improve preparedness, cross-border coordination, and interoperability of emergency response to flooding and accidental pollution, as well as situational awareness.

Transnational best management practice catalogue includes 94 measures divided into 14 Key intervention areas. The intervention areas were recognised as priority areas for emergency response

and planning in the Sava River Basin. we aggregated the listed measures to key selected areas of measures, which are grouped in order to address key groups of measures.

Key intervention areas are:

1. Education
2. Finance
3. Governance
4. Human resources
5. Information and communication technologies
6. Supervision
7. Information
8. Infrastructure
9. Knowledge
10. Logistics
11. Organizational
12. Planning,
13. Navigation
14. Other

The complete Transnational best management practice catalogue with all 94 measures divided into 14 Key intervention areas for emergency response and planning in the Sava River Basin is presented in Annex 1, attached to this document.

3 Status of implementation of WACOM measures and strategies

In order to develop a tool that allows a methodical and systematic follow up of the Sava STEER (Strategies for emergency response in the Sava River Basin), a well-structured list of necessary steps need to be taken prior to the implementation stage. With this regard to the Strategies for emergency response in the Sava River Basin, the first step was to identify the deficiencies in the area of Contingency management.

Within the WACOM project, partners have made a thorough analysis of the status of key measures for the reduction of flood risks and accidental pollution risk reduction measures in all countries of the Sava River Basin was developed. A catalogue of measures was developed in a harmonized and thus comparable way in order to identify common experiences with these measures, but also to identify differences between countries with respect to the same measure. The WACOM catalogue of measures was developed through a multi-stage, process involving multiple stakeholders. A comprehensive list of measures was developed, for all countries involved: Slovenia, Croatia, Bosnia and Hercegovina and Serbia.

The evaluation of the Transnational best management practice catalogue was done in October and November 2022.

The evaluation of the Transnational best management practice catalogue was performed in three steps:

First step was review and evaluation by the project partners of the Transnational best management practice catalogue. The purpose of evaluation was to define the level of implementation in the country involved (partners were evaluating the measures for their country only). Since the partners are experts from the field of civil protection and water management, they made an overview if the catalogue identifies all deficiencies in the area of Contingency management and few additional measures were added to the catalogue.

The second step was to review and evaluate the additional measures for their country. within this step assessment of priority of the measure – is it short term and should be implemented in the next 6 years or is the assessment of priority of the measure long term and should be implemented within the next 20 years. The measures were evaluated by project partners and associated partners for each of the involved country: Slovenia, Croatia, Bosnia and Hercegovina and Serbia.

The third step was the evaluation by the target groups. This was done during the third national workshop at which we presented a set of measures and strategies, which would contribute to an approach for improved response and cooperation in case of such disasters at the national or transnational level. We conducted the evaluation of the measures at the project workshops via Polls to gather a broader picture of the proposed measures. The measures were presented one by one in two rounds as a starting point for setting priorities in relation to:

- Status of implementation of the measure in each country (SLO, HRV, BiH, SRB): measure already implemented - partly implemented - measure not implemented;
- Priority to introduce the measure in the short term or long term: the measure is urgent short-term in the next 6 years - urgent long-term in the next 20 years - immediate and long-term application is necessary - application of the measure is not necessary.

The involvement of target groups in the WACOM project is crucial due to their specific knowledge in the field, mostly practical knowledge from their daily work. Through the project workshops stakeholders contributed to the analysis of the pilot measures quality and to the overall quality of the project and project outcomes. Target groups gathered several times during the whole lifetime of the

project and were actively involved in all steps, as well as at the above mentioned third national workshops in all countries (SI, HR, BA and RS).

After completing all three steps of the evaluation the analysis of the results took place. The results were collected, analysed, and interpreted for each country separately. The analysed results were aggregated into a traffic light according to the rating from 1 to 5, which largely corresponds to the third evaluation step performed by stakeholders at the national workshops, accordingly:

| Rating 1. And 2. Step | Rating 3. Step (Polls voting) | Final Rating |
|-----------------------|-------------------------------|----------------------|
| 1 - 2 | 0 – 20 % | ■ not implemented |
| 2 - 4 | 20 – 70 % | ■ partly implemented |
| 4 -5 | 70- 100 % | ■ implemented |
| ? | ? | □ undefined |

The final result of the analysis in the Table 1 presents the level of individual measure implementation for each country.

Table 1: Overview of measures with level of implementation in the countries

| ID | Key intervention area | Measure <small>■ implemented; ■ partly implemented, ■ not implemented; □ undefined</small> | | | | |
|----|----------------------------|--|-----|-----|-----|-----|
| | | | SLO | HRT | BiH | SRB |
| 1 | EDUCATIONAL | Education on all levels | ■ | ■ | ■ | ■ |
| 2 | | Social, educational and awareness work with the youth | ■ | ■ | ■ | ■ |
| 3 | | Education of general public and promotion activities | ■ | ■ | ■ | ■ |
| 4 | | ICS 100 - incident command system standardized framework protocols | ■ | ■ | ■ | ■ |
| 5 | | Microcredentials and continuous education | ■ | ■ | ■ | □ |
| 6 | | Education of special ICS functions (IC, Safety officer, PR, Operations, Planning, Logistics, Administration/finance) | ■ | ■ | ■ | ■ |
| 7 | | Other education, research oriented | ■ | ■ | ■ | ■ |
| 8 | | Supporting Flood and Accidental pollution emergencies | ■ | ■ | ■ | ■ |
| 9 | FINANCIAL | Enforcing the polluter pays principle (compensations for the floods) | ■ | ■ | ■ | ■ |
| 10 | | Securing public financial resources | ■ | ■ | ■ | ■ |
| 11 | | Improved insurance practices and stimulations for wider penetration of insurance for floods and accidental pollution | ■ | ■ | ■ | □ |
| 12 | | Individual understanding of financial responsibilities in the case of floods and accidental pollution (education) | ■ | ■ | ■ | ■ |
| 13 | | Education of water users (abstractions) on emergency procedures (floods, accidental pollution) | ■ | ■ | ■ | ■ |
| 14 | GOVERNANCE | Elective representatives for long-term challenges after the accident | ■ | ■ | ■ | ■ |
| 15 | | Participatory decision-making process - water democracy | ■ | ■ | ■ | ■ |
| 16 | HUMAN RESOURCES MANAGEMENT | Individual communication and indirect education | ■ | ■ | ■ | □ |
| 17 | | Employee satisfaction | ■ | ■ | ■ | □ |
| 18 | ICT | GIS based situational awareness | ■ | ■ | ■ | ■ |
| 19 | | Communication equipment and protocols | ■ | ■ | ■ | ■ |
| 20 | | Nowcasting and forecasting systems | ■ | ■ | ■ | ■ |
| 21 | | Early identification of accidental pollution and alerting | ■ | ■ | ■ | ■ |
| 22 | | Flood management centres | ■ | ■ | ■ | ■ |
| 23 | INFORMATION MANAGEMENT | Improved data integration | ■ | ■ | ■ | ■ |
| 24 | | Improved supervision and control over the transport of pollutants | ■ | ■ | ■ | ■ |

| | | | | | | | | | |
|----|--|---|---|--|--|--|--|--|--|
| 70 | PLANNING | Bilge water closing valve | | | | | | | |
| 71 | | Prohibition of burning waste on board | | | | | | | |
| 72 | | Standard procedures for the response in the case of accidental pollution | | | | | | | |
| 73 | | Improved cooperation between relevant bodies | | | | | | | |
| 74 | | Information exchange | | | | | | | |
| 75 | | Technology exchange, scientific and technological cooperation | | | | | | | |
| 76 | | PLANNING | Maintenance of contingency management plans on different levels | | | | | | |
| 77 | Planning, execution and improvement of exercises | | | | | | | | |
| 78 | Hazard identification, risk assessment | | | | | | | | |
| 79 | SUPERVISION | Discharge/level monitoring | | | | | | | |
| 80 | | Regular monitoring of water quality, port areas and auditing of hazardous activities | | | | | | | |
| 81 | | Inspection of vessels | | | | | | | |
| 82 | | Real-time monitoring of water quality | | | | | | | |
| 83 | NAVIGATION | Protocols with the key water uses/abstractions | | | | | | | |
| 84 | | Improved integration of governmental sectors | | | | | | | |
| 85 | | Notification of authorities | | | | | | | |
| 86 | | Used Oil Log | | | | | | | |
| 87 | | Transport of hazardous substances | | | | | | | |
| 88 | | Prohibition of further navigation after a spill | | | | | | | |
| 89 | | Implementation of measures for the protection of waters due to the impact of navigation | | | | | | | |
| 90 | OTHER | Adaptation to climate change | | | | | | | |
| 91 | | Demining of the Sava (and Drina) river | | | | | | | |
| 92 | | River bank maintenance | | | | | | | |
| 93 | | River corridor maintenance - floating debris and waste | | | | | | | |
| # | | River corridor maintenance - vegetation, erosion | | | | | | | |

As we can see in the Table 1, many important measures for the reduction of flood risks and accidental pollution risk reduction measures in all countries of the Sava River Basin were identified as not implemented or only partly implemented. The WACOM measures were prepared in order to elaborate the most important measures for improving the preparedness and contingency management. The task of WACOM partnerships was to make an overview and in this comparable way we can learn from one another in order to improve preparedness.

4 Recognized need for implementation of Sava STEER

The involvement of target groups in the WACOM project is crucial due to their specific knowledge in the field, mostly practical knowledge from their daily work. Through the project workshops stakeholders contributed to the analysis of the pilot measures quality and to the overall quality of the project and the final project outcomes.

Target groups gathered several times during the whole lifetime of the project and were actively involved in all steps. Especially in the last steps we worked closely with the participants of the third national workshops (who were our target groups) in all countries (SI, HR, BA and RS). The National Workshops were conducted in: Slovenia on 19.10.2022 (Ljubljana), Croatia on 25.10.2022 (Slav.Brod), in Bosnia and Hercegovina on 26.10.2022 (Sarajevo), in Serbia on 5.12. 2022 (Beograd). In order to reach more stakeholder involvement, the evaluation of level of implementation of proposed measures was held via Polls to gather a broader picture of the implementation in the countries. The measures were presented individually for prioritisation in relation to:

- Status of implementation of the measure in each country (SLO, HRV, BiH, SRB): measure already implemented - partly implemented - measure not implemented;
- Necessity to introduce the measure in the short term or long term: the measure is urgent short-term in the next 6 years - urgent long-term in the next 20 years - immediate and long-term application is necessary - application of the measure is not necessary.

After analysing the implementation status of the measures in the countries, it is unfortunately noted that:

- Approximately 21% of the measures have not been implemented
- Approximately 55% of the measures are partially implemented
- Approximately 12% of the measures are implemented
- the remaining 12% belong to non-evaluated measures

As shown in Figure 1.

It should be noted that some measures were not evaluated and that the evaluation by individual evaluators is subjective. Subjective views are also influenced by individual criticisms of national policy implementation. It should also be noted that some measures are not applicable in all countries (e.g., riverbank demining).

Our main goal is to raise awareness of unimplemented measures for emergency response and planning in the Sava River basin.

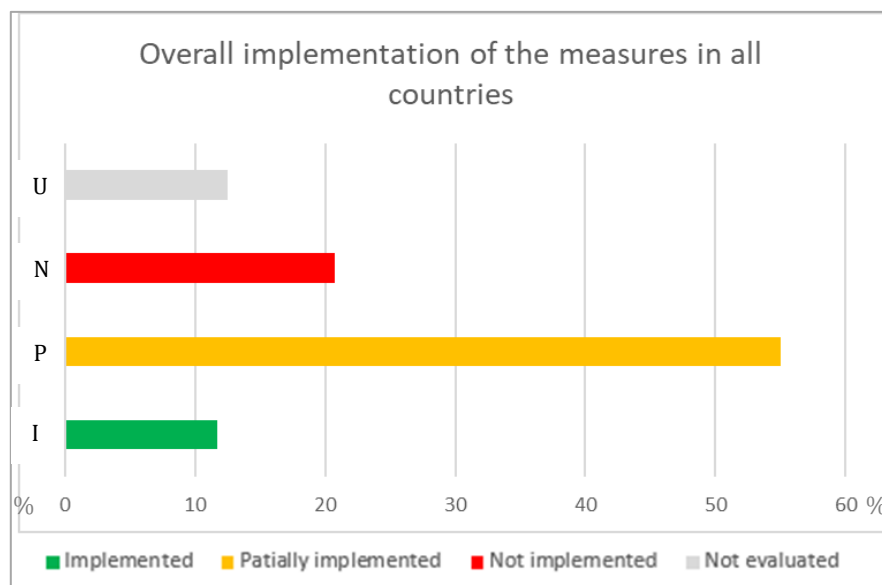


Figure 1: Analysis of level of implementation of the measures in all countries

During the evaluation of the measures in each country, we recognized a lack of attention on importance of identified measures. The measures that were not implemented were analysed in terms of the need to implement that measure in that country. The need to implement the measure was assessed during the national workshops or by the project partners/associates. Together with all involved stakeholders the measures were presented and discussed.

- Necessity to introduce the measures in the short term means that the measure was classified as urgent to be implemented in the next 6 years.

- Long term necessity of the measure implementation means that the measure is important for the long-term functioning of the country and has to be implemented in the next 20 years since such measures need also longer time to be implemented in the national system.
- Some measures were assessed as short- and long-term meaning that the implementation is urgent but must also be maintained through a long-term period.

The main conclusion from the evaluation of the implementation in each country is:

- The need to implement the proposed key actions for efficient and effective response to accidental spills and floods has been identified and needs to be disclosed in the disaster management cycle (preparedness, response, and recovery).
- WACOM partners have identified all key intervention areas as equally important and therefore all areas will be included in the final WACOM strategies.

5 Sava STEER Strategies

Based on conclusions of evaluated implementation per countries was that both strategies (for flood response cooperation and interoperability and for the accidental pollution response cooperation and interoperability) define in elaborative way all necessary arguments relative to the implementation of proposed toolbox and especially procedures related to coordination, modelling and situational awareness.

The strategy is defined in a way to describe the key intervention areas, which should be addressed by different competent authorities in each country (civil protection, floods, accidental pollution, navigation). The transboundary component has already been recognised with the ISRBC and the WACOM project itself. Transboundary cooperation between country partners should be maintained and strengthened along with the implementation of the measures defined in the catalogue. In this way, each measure should be considered (1) from the perspective of improved national implementation (implementation action plan) and (2) from the perspective of cross-border cooperation, in which ISRBC has a central coordinating role. Therefore, two strategies were prepared:

(1) for flood response cooperation and interoperability and

(2) for accidental pollution response cooperation and interoperability.

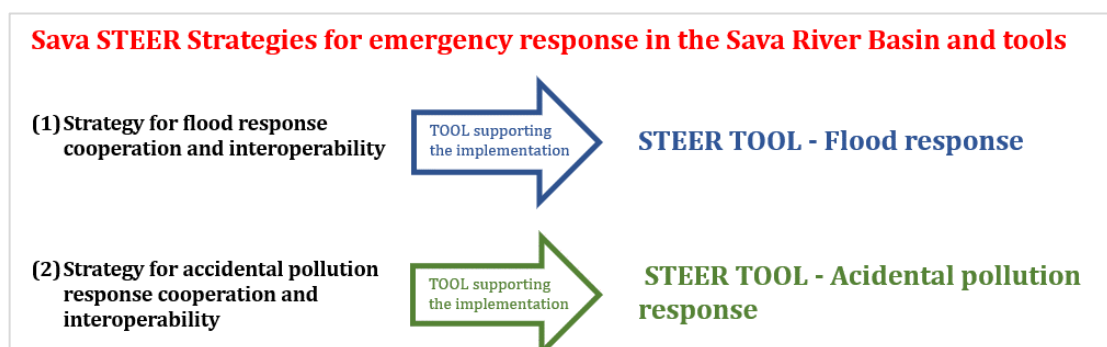
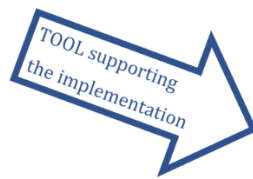


Figure 2: Sava STEER Strategies for emergency response in the Sava River Basin and the proposed tools for implementation of the strategies

6 Sava STEER Implementation Tools

Based on a thorough review of the implemented measures, we found that experts from all countries recognize the need to implement the proposed measures. Since the implementation process of the measures varies from country to country and the instructions cannot be uniform, we focused on a transparent tool that allows the analysis of the implementation status for individual measures by country. The WACOM recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. Monitoring of implementation status would take place every two years during the meetings of the Save Commission's standing expert groups, which would be attended by experts appointed by the Save Commission on the proposal of the Parties' representatives and chaired by the Secretariat's appointed officials.



STEER TOOL - Flood response

| ID | Key area | Measure | SLO | | | | HR | | | | BH | | | | SRB | | | | Guaranteed public involvement | | | | Regulated legislation in this area, duties | | | | Unsecured funding | | | | Control over processes (analytical) ensured | | | |
|----|----------|----------------------------|-----|----|----|-----|-----|----|----|-----|-----|----|----|-----|-----|----|----|-----|-------------------------------|----|----|-----|--|----|----|-----|-------------------|----|----|-----|---|--|--|--|
| | | | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | | | | |
| 1 | Key area | Measure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 3.1 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 4 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 5 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 6 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 7 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 8 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 9 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 10 | Educational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 11 | Financial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | Financial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 13 | Financial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 14 | Financial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 15 | Financial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 16 | Governance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 17 | Governance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 18 | Human Resources Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 19 | Human Resources Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 20 | Human Resources Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 21 | ICT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 22 | ICT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 23 | ICT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 24 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 25 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 26 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 27 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | 28 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 29 | Information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 30 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 31 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | 32 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 33 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | 34 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 35 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 36 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 37 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 38 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 39 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | 40 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 41 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | 42 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | 43 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43 | 44 | Infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Figure 3: Applicable tool supporting the reporting tool enabling development and follow-up of the Sava STEER for flood response cooperation and interoperability

WACOM STEER tool for Flood response is a tool where listed recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. The monitoring of the implementation status takes place every two years in the framework of the meetings of the Permanent Expert Groups of the Save Commission, which are attended by the experts appointed by the Save Commission on the proposal of the representatives of the Contracting Parties and chaired by the appointed officials of the Secretariat.



STEER TOOL - Accidental pollution response

Figure 4: Applicable tool supporting the reporting tool enabling development and follow-up of the Sava STEER for accidental pollution response cooperation and interoperability

WACOM STEER tool for accidental pollution response cooperation and interoperability is a tool where listed recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. The monitoring of the implementation status takes place every two years in the framework of the meetings of the permanent expert groups of the Sava Commission, which are attended by the experts appointed by the Sava Commission on the proposal of the representatives of the Contracting Parties and chaired by the appointed officials of the Secretariat.

7 Conclusions

Both strategies are defined to describe the key intervention areas, which should be addressed by the different competent authorities in each country (civil protection, floods, accidental pollution, navigation). The transboundary component has already been recognized in the ISRBC and the WACOM project itself. Transboundary cooperation between country partners should be maintained and strengthened together with the implementation of the measures defined in the catalogue. In this way, each measure should be considered (1) from the perspective of improved national implementation (implementation action plan) and (2) from the perspective of transboundary cooperation, in which ISRBC has a central coordinating role.

The applicable technology to support the reporting tool that enables the development and follow-up of the Sava STEER has some requirements:

- From a technological point of view, it should be relatively easy to use and adaptable to future requirements (after the WACOM project).
- It should be understandable for reporting entities (usually national authorities responsible for water management, civil protection and navigation).
- It should allow easy exchange of reporting information, analyses, and publications.
- It is recognized that the number of reporting entities is relatively limited (4 countries, 3 reporting entities, about 12 reporting entities in total).
- Explanatory notes should be added and slightly modified to the tool that supports the follow-up of the implementation of the SAVA STEER.
- It should allow tracking of the implementation process of Sava STEER with regular reporting intervals (probably annual reporting).

As an applicable tool, we have defined Excel spreadsheets that meet all these requirements.

Annex 1

D.T4.1.3 Transnational best management practices catalogue



Water Contingency Management in the Sava River Basin

Transnational best management practices catalogue

Deliverable D.T4.1.3

| | |
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1 Introduction

One of main tasks of the WACOM project was to prepare a Transnational best management practice catalogue for improved preparedness and transboundary coordination and interoperability of emergency response in the case of floods and accidental pollution as well as situational awareness.

The purpose of this task was to prepare an overview of Water Management and Civil Protection best management practices. The measures were compiled by project partners which are experts in the field of Water Management as well as in the Civil Protection. In this way, all partners from different fields of work and countries contributed to a thorough analysis of emergency response to flooding and accidental pollution and to situational awareness.

2 Transnational best management practice catalogue

The WACOM catalogue of measures was developed through a multi-stage, multi-stakeholder process. A comprehensive list of measures was developed, harmonized, and prioritized for all countries involved: Slovenia, Croatia, Bosnia and Hercegovina and Serbia.

The development of the harmonized catalogue of measures was a basic prerequisite to map the status of key measures for the reduction of flood risks and accidental pollution risk reduction measures in all countries of the Sava River Basin in a harmonized and thus comparable way, to identify common experiences with these measures, but also to identify differences between countries with respect to the same measure.

It is important to reiterate that the measures are project specific, identified during the development of the WACOM project, focusing in particular on the contingency measures (contingency planning and response). They are specifically related to the measures identified in the national planning documents in the field of flood management (i.e.: flood risk reduction planning documents).

Transnational best management practice catalogue includes 94 measures divided into 14 Key intervention areas. The intervention areas were recognised as priority areas for emergency response and planning in the Sava River Basin (i.e.: Education, Finance, Human resources, Infrastructure, Logistics, Organizational, Planning, etc.)

To identify the differences between the countries of the Sava River Basin on the same measure. The catalogue was used as a questionnaire with several categories to capture further similarities and differences. The evaluation of the Transnational best management practice catalogue was performed in two rounds. In both rounds the evaluaters were project partners and associated project partners.

2.1 First round of evaluation of WACOM catalogue of measures

The development of the harmonized catalogue of measures including key flood risk reduction measures and accidental pollution risk reduction measures in all countries of the Sava River Basin.

The evaluation of the Transnational best management practice catalogue was evaluated by project partners from each of the involved country: Slovenia, Croatia, Bosnia and Hercegovina and Serbia.

Categories:

- 1) ID
- 2) KEY INTERVENTION AREA
- 3) TITLE
- 4) DESCRIPTION
- 5) REFERENCE (legislation, guidelines, ppts,...)
- 6) ASSESSMENT OF IMPLEMENTATION in the country
- 7) LEVEL (nac/reg/lok/all) - level of implementation of the measure
- 8) COST CRITERIA (expensive - 1, relatively inexpensive - 5)
- 9) COMPLEXITY OF ORGANIZATION FOR THE IMPLEMENTATION OF THE MEASURE (complex - 1, not complex/straightforward - 5)
- 10) TIME CRITERIA (takes a lot of time for implementation - 1, relatively rapid implementation possible - 5)
- 11) COMMENTS

| ID | Key Intervention area | Title | Description | REFERENCE (legislation, guidelines, ppts,...) | ASSESSMENT OF IMPLEMENTATION in the country | LEVEL (nac/reg/lok/all) - level of implementation of the measure | COST CRITERIA (expensive - 1, relatively inexpensive - 5) | COMPLEXITY OF ORGANIZATION FOR THE IMPLEMENTATION OF THE MEASURE (complex - 1, not complex/straightforward - 5) | TIME CRITERIA (takes a lot of time for implementation - 1, relatively rapid implementation possible - 5) | Comments |
|----|-----------------------|---|---|--|---|---|---|---|--|--|
| | | | | Provide links to the legislation, documents, articles | provide grade (1-not really implemented, missing; 5-fully implemented, excellent) | describe which is the key implementation level of the measure (nac/reg/lok/all) | Assessment (1 bad-5 good) | | | |
| 1 | Educational | Education on all levels | Education on all levels and functions (expert level, governance level, ...) | Zakon o sustavu civilne zaštite: https://civilna-zastita.gov.hr/zakoni/349 | 3 | national | 3 | 4 | 2 | These are rough estimates based on publicly available data |
| 2 | Educational | Social, educational and awareness work with the youth | Work with the youth, educational, awareness, career guidance | Zakon o sustavu civilne zaštite: https://civilna-zastita.gov.hr/zakoni/349 | 2 | national | 2 | 2 | 2 | These are rough estimates based on publicly available data |
| 3 | Educational | Education of general public | Education of general public (schools, general public, different groups) | | 2 | national | 2 | 1 | 2 | These are rough estimates based on publicly available data |
| 4 | Educational | ICS 100 | ICS 100 - basic education of all key personell | | 1 | national | 2 | 2 | 2 | These are rough estimates based on publicly available data |
| 5 | Educational | Microcredits and continuous education | Microcredits and continuous education of all structures, and on all levels | Zakon o sustavu civilne zaštite: https://civilna-zastita.gov.hr/zakoni/349 | 1 | national | 1 | 1 | 1 | These are rough estimates based on publicly available data |
| 6 | Educational | Education of special ICS functions (IC, Safety officer, PR, Operations) | Focused education for specific functions in the incident response | Zakon o sustavu civilne zaštite: https://civilna-zastita.gov.hr/zakoni/349 | 4 | national | 3 | 2 | 2 | These are rough estimates based on publicly available data |

Figure 1: First round of catalogue of measures, prepared for evaluation by project partners

2.2 Second round of evaluation of WACOM catalog of measures

During the first round of assessments, additional measures were identified, particularly in the area of flood management. After new measures were added to the catalogue, additional categories were also added to allow for a better and more thorough analysis:

- Available financial instruments in the country for the measure;
- Assessment of priority of the measure (short term) implemented in 6 years;
- Assessment of priority of the measure (long term) - implemented in approx. 20 years.

With the purpose of better understanding of the measures and easier communication of countries involved, partners added the:

- Translation of the measure title in national language;
- Translation of the measure description in the national language.

After the improvement of the questionnaire, the Transnational best management practice catalogue was sent again to the project partners and associated partners for the second round of evaluation.

Updated categories:

- 1) New ID
- 2) ID
- 3) KEY INTERVENTION AREA
- 4) TITLE
- 5) DESCRIPTION
- 6) TITLE (in national language)
- 7) DESCRIPTION (in national language)
- 8) REFERENCE (legislation, guidelines, ppts,...)
- 9) FINANCIAL INSTRUMENTS
- 10) ASSESSMENT OF IMPLEMENTATION in the country
- 11) COMMENTS (assessment of implementation)
- 12) LEVEL (nac/reg/lok/all) - level of implementation of the measure
- 13) COST CRITERIA (expensive - 1, relatively inexpensive - 5)
- 14) COMPLEXITY OF ORGANIZATION FOR THE IMPLEMENTATION OF THE MEASURE (complex - 1, not complex/straightforward - 5)
- 15) TIME CRITERIA (takes a lot of time for implementation - 1, relatively rapid implementation possible - 5)
- 16) COMMENTS ON THE ASSESSMENT OF COST/COMPLEXITY/TIME EVALUATION
- 17) ASSESSMENT OF PRIORITY OF THE MEASURE (short term) implemented in 6 years
- 18) ASSESSMENT OF PRIORITY OF THE MEASURE (long term) - implemented in approx. 20 years
- 19) COMMENT ON PRIORITY OF THE MEASURE (why the decision of the assessment)
- 20) GENERAL COMMENT
- 21) REPORTING INSTITUTION

| New ID | Key intervention area | Title | Description | Title (in national language) | Description (in national language) | REFERENCE SBB (legislation, guidelines, ppts,...) | FINANCIAL INSTRUMENTS | ASSESSMENT OF IMPLEMENTATION in the country | Comments | Assessment of implementation | LEVEL (naic/reg/lok/all) level of implementation of the measure | COST CRITERIA (responsive - 1, relatively inexpensive - 5) | COMPLEXITY OF ORGANIZATION FOR THE IMPLEMENTATION OF THE MEASURE (complex - 1, not complex/straightforward - 5) | TIME CRITERIA (takes a lot of time for implementation - 1, relatively rapid implementation possible - 5) | Comments of the assessment (cost/complexity/time) | Assessment of priority of the measure (short term) implemented in 6 years | Assessment of priority of the measure (long term) implemented in approx. 10 years | Comment on priority of the measure (why the decision of the assessment) | General comment | Reporting institution | |
|--------|-----------------------|--|--|------------------------------|------------------------------------|---|--|--|--|------------------------------|--|--|---|--|---|---|---|---|----------------------------|--|--|
| | | | | | | Provide links to the legislation, | Please provide a short description of available financial instruments in your country for this measure | provide grade (1 not really implemented, missing; 5 fully) | Please provide short explanation for your assessment, especially when assessment diverging | | describe which is the key implementation level of the measure (naic/reg/lok/all) | Assessment (1 bad-5 good) | | | Please provide comments on the criteria, especially | short term priority (0-5) (low) | Long term priority (high/0-5) (low) | Please provide comments on the assessment of | Any comment on the measure | Please provide a name of the reporting | |
| 1 | Educational | Education on all levels and functions (expert level, governance level, ...) | Education on all levels and functions (expert level, governance level, ...) | | | - Zakon o civilnoj službi ("Sl. glasnik RS", br. 98/2009) - Zakon o vanrednim situacijama ("Sl. glasnik RS", broj ...) - Zakon o smanjenju rizika od katastrofa i poslova/Sektor za vanredne upravljanju vanrednim situacijama ("Sl. glasnik RS", broj ...) | - Ministarstvo unutrašnjih poslova/Sektor za vanredne situacije - Ministarstvo poljoprivrede Šumarstva i vodoprivrede | 3 | Implementacija je u toku | All | | 2 | 2 | 3 | | | | | | | |
| 2 | Educational | Social and educational awareness, work with career the youth guidance | Work with the educational awareness, work with career the youth guidance | | | - Zakon o smanjenju rizika od katastrofa i poslova/Sektor za vanredne upravljanju vanrednim situacijama ("Sl. glasnik RS", broj ...) | - Ministarstvo unutrašnjih poslova/Sektor za vanredne situacije - Ministarstvo zaštite životne sredine - Ministarstvo nauke i obrazovanja | 3 | Implementacija je u toku | All | | 3 | 4 | 3 | | | | | | | |
| 3 | Educational | Education of general public and schools, different activities (groups), raising public awareness | Education of general public and schools, different activities (groups), raising public awareness | | | - Zakon o vodama, ("Sl. glasnik RS", br. 30/2010, 93/2012, 95/2013) - Zakon o zaštiti prirode ("Sl. glasnik RS", br. 36/2009) - ICPDR, AEWS test, PIAC staff | - Ministarstvo poljoprivrede, Šumarstva i vodoprivrede / Direkcija za vode - JKP "Srbijavode" - JKP "Vode Vojvodine" - Republički hidrometeorološki zavod | 3 | Implementacija je u toku | All | 2-3 | 2 | 2 | | | | | | | | |
| 4 | Educational | ICS 100 - basic incident command system on standard protocols in the case of emergencies. | ICS 100 - basic incident command system on standard protocols in the case of emergencies. | | | | - Ministarstvo poljoprivrede, Šumarstva i vodoprivrede / Direkcija za vode | 1 | Implementacija započeta... | Nacionalni | | 3 | 3 | 4 | | | | | | | |
| 5 | Educational | Microcredits | Microcredits | | | N/A | | | | | | | | | | | | | | | |

Figure 2: Second round of catalogue of measures, prepared for evaluation by project partners

2.3 Final version of the WACOM catalog of measures

The Final version of the catalog of measures was prepared on the basis of key measures for the reduction of flood risks and accidental pollution risk reduction measures in all countries of the Sava River Basin in a harmonized and thus comparable way, to identify common experiences with these measures, but also to identify differences between countries with respect to the same measure.

With the classification of the proposed key measures for the efficient and effective response in the case of accidental pollution and floods, observed in the framework of disaster management cycle (preparedness, response, and recovery).

In the conclusions we are aggregating the listed measures to key selected areas of measures, which are grouped in order to address key groups of measures which could be communicated with wider audience during the national workshops and further dissemination of the project results.

Key intervention areas are:

1. Education
2. Finance
3. Governance
4. Human resources
5. Information and communication technologies
6. Supervision
7. Information
8. Infrastructure
9. Knowledge
10. Logistics
11. Organizational
12. Planning,
13. Navigation
14. Other

Within 14 key intervention areas of measures, 94 individual measures have been recognized.

In this phase of the evaluation process (internally by the WACOM project partners) within the WACOM project, we were able to see that several of the individual measures listed, as well as the aggregated measures considered, were assessed as already implemented or partially implemented, but with a considerable distance to the targeted implementations.

The WACOM Transnational best management practice catalogue:

| ID | Key intervention area | Title | Description |
|----|----------------------------|--|--|
| 1 | Educational | Education on all levels | Education on all levels and functions (expert level, governance level, ...) |
| 2 | Educational | Social, educational and awareness work with the youth | Work with the youth, educational, awareness, career guidance |
| 3 | Educational | Education of general public and promotion activities | Education of general public (schools, general public, different groups), raising public awareness, encouraging the public to take part in implementation of flood risk management plans. |
| 4 | Educational | ICS 100 - incident command system standardized framework protocols | ICS 100 - basic education of all key personell on standard protocols in the case of emergencies. |
| 5 | Educational | Microcredentials and continuous education | Microcredits and continuous education of all structures, and on all levels |
| 6 | Educational | Education of special ICS functions (IC, Safety officer, PR, Operations, Planning, Logistics, Administration/finance) | Focused education for specific functions in the incident response |
| 7 | Educational | Other education, research oriented | Other - research oriented and knowledge development, human resources - scholarships, media positioning of the profession |
| 8 | Educational | Supporting Flood and Accidental pollution emergencies | Supporting joint simulation exercises of response (flood and Accidental pollution emergencies) |
| 9 | Financial | Enforcing the polluter pays principle (compensations for the floods) | Enforcing the polluter-pays principle and compensations for the floods in case they are not natural phenomena |
| 10 | Financial | Securing public financial resources | Securing financial resources (various sources - national, direct compensation, EU funds, funds for climate change). |
| 11 | Financial | Improved insurance practices and stimulations for wider penetration of insurance for floods and accidental pollution | Improved insurance practices and stimulations for wider penetration of insurance for floods and accidental pollution |
| 12 | Financial | Individual understanding of financial responsibilities in the case of floods and accidental pollution (education) | Individual understanding of financial responsibilities in the case of floods and accidental pollution (education) |
| 13 | Financial | Education of water users (abstractions) on emergency procedures (floods, accidental pollution) | Integration of procedures in their contingency plans and abstraction permits |
| 14 | Governance | Elective representatives for long-term challenges after the accident | Elective representatives with clear commitment to resolve the long-term challenges related to flood management and accidental pollution management |
| 15 | Governance | Participatory decision making process - water democracy | Participatory decision making process - water democracy (on all levels) |
| 16 | Human Resources Management | Individual communication and indirect education | Coaching, team building, career development, internal communication |
| 17 | Human Resources Management | Employee satisfaction | Mechanisms for monitoring employee satisfaction, employee engagement sentiment, stimulation... |
| 18 | ICT | GIS based situational awareness | Availability of the GIS based situational awareness (eSPIN - SLO, NICS - CRO, BH, and similar), PETRA fleet tracking... |
| 19 | ICT | Communication equipment | Communication equipment (i.e. TETRA) for the secure communication during the emergencies |
| 20 | ICT | Nowcasting and forecasting systems | Development and upgrading of the new casting and forecasting systems (i.e. Sava GIS, Sava HIS and Sava FFWS) and support of linkages with early warning systems |
| 21 | ICT | Early identification of accidental pollution and alerting | Online sensors for the early identification of accidental pollution on key locations, other sensors and alerting software and hardware |
| 22 | ICT | Flood management centres | Establishment/Modernization of the flood management centres, integration of the flood management centers to IoT and smart concepts (4th industrial revolution) |

| | | | |
|----|-----------------|---|---|
| 23 | Information | Improved data integration | Improved data/information integration with the public service providers/companies |
| 24 | Information | Improved supervision and control over the transport of pollutants | Information on the movement/transport of pollutants in the territory of specific country jurisdiction |
| 25 | Information | Improved supervision and control over the production, use and storage of pollutants | Information on the production, use and storage of pollutants in the territory of specific country jurisdiction |
| 26 | Information | Registry of water uses (abstractions) | Development of the registry of the key water uses/abstractions potentially under threat of accidental pollution |
| 27 | Information | Floods situational awareness system | Floods - situational awareness information, sharing of on-field status of floods among different activated institutions and units (i.e. information to hydrometeorological services and other from the responders) |
| 28 | Information | Mutual notifying about hazards, disasters, manners of border crossing | Support to procedures for mutual notifying about hazards, data exchange about hazards, manners of border crossing, occurrence of natural and other disasters in border zones (AEWS, PIAC). |
| 29 | Infrastructural | Safe river access locations (rescue) | Development of safe access locations along the key rivers enabling access for the water rescue operations |
| 30 | Infrastructural | Safe river access locations (booms) | Development of safe access locations along the key rivers enabling access for the accidental pollution mitigation measures, including anchorage of booms and staging area for the emergencies |
| 31 | Infrastructural | To add from the Sava flood risk management plan (structural measures, non-structural measures) | To add from the Sava flood risk management plan (structural measures, non-structural measures), encompassing all measures |
| 32 | Infrastructural | Other emergency management related structural measures | Other structural measures related to efficient and effective response during emergencies |
| 33 | Infrastructural | Waterways | Maintenance of waterways |
| 34 | Infrastructural | Reception facilities | Establishment of a sufficiently dense network of reception facilities on the waterway for waste collection. |
| 35 | Knowledge | National and international (EN) standards | Development of national and implementation of international (EN) standards and guidelines |
| 36 | Knowledge | Knowledge base of the polluters | Knowledge base of the polluters, different sources: SEVESO, industrial facilities, traffic, accident risk spots (ARS ICPDR) |
| 37 | Knowledge | Knowledge base of the pollutants and procedures | Knowledge base of the pollutants, their characteristics and procedures in the case of emergencies |
| 38 | Logistics | Availability of the emergency equipment (pollution) | Availability of the equipment necessary for the response in the case of accidental pollution emergencies |
| 39 | Logistics | Availability of the emergency equipment (floods) | Availability of the equipment necessary for the response in the case of floods |
| 40 | Logistics | Rescue tools and resources availability | Necessary tools and resources for the rescue and relief operations (trucks, booms, skimmers, pumps, reservoirs). |
| 41 | Logistics | Identification of service providers for emergency response | Identification of service providers (contracting framework with the service providers) - specialized companies for the emergency response in the case of accidental pollution and floods |
| 42 | Logistics | Costing units supporting administration and finance processes | Costing process - cost monitoring, escalation... |
| 43 | Logistics | Identification of service providers (short listing), contracts with the service providers (companies) supporting the emergencies with their specific services | Identification and contracts with the service providers for the final treatment of polluted materials (earth, skimmers, floating debris...) |
| 44 | Organizational | UN protocols | UN protocols - Barcelona Convention, UNECE |
| 45 | Organizational | PIAC centres and AEWS | Ensuring functioning of PIAC centres in all countries/entities 24/7, functioning of AEWS information platform |
| 46 | Organizational | Clear positioning of the MACS (Multi Agency Coordination System) being in the core of complex response | Clear introduction of MACS (Headquarters) and single institution HQ concept |
| 47 | Organizational | Improved communication in response framework | Improved communication on all levels (institutional, personal) among the key personnel in any response framework. Support establishment of operational centres with a comprehensive overview of contacts for mutual communication between parties and regular updating thereof. |
| 48 | Organizational | International, bilateral and multilateral agreements | Development and maintenance of international bilateral and multilateral agreements (water management based, civil protection based) and mutual assistance |

| | | | |
|----|----------------|--|---|
| 49 | Organizational | River basin management plans and flood management plans | Development and maintenance of river basin management plans/flood management plans - country/entity level; transnational RBMPs |
| 50 | Organizational | Institutional bilateral and multilateral agreements | Development and maintenance of bilateral and multilateral agreements among institutions in any country/entity |
| 51 | Organizational | EU Civil Protection Mechanism | Participation in the EU Civil Protection Mechanism |
| 52 | Organizational | Restoration measures | Preparation, planning of the restoration measures which follow the incident (floods, AP) response stage |
| 53 | Organizational | Protocols enabling involvement of insurance companies | Development of the protocols enabling improved involvement of insurance companies at all levels, engaging the knowledge and procedures of the insurance companies |
| 54 | Organizational | Strategic crisis communication | Strategic development of the crisis communication (learning, programs in plans, analysis...), preparation of the crisis communication protocols, TTX for the crisis communication |
| 55 | Organizational | Improved integration of the levels of MACS | Improved integration of the levels of MACS - state - region - municipality, and institution level HQ |
| 56 | Organizational | Control the of legislation implementation and enforcement | Improved control over the legislation implementation and enforcement (inspectorate) |
| 57 | Organizational | Water management information systems | Development and upgrading of the water management information systems |
| 58 | Organizational | Improved documentation process of the incidents | Improved documentation (national and transnational) process of the incidents, enabling long term storage of quality information on past incidents |
| 59 | Organizational | Improved communication in response framework (companies) | Improved communication with the (contractual) companies being involved in the response framework |
| 60 | Organizational | Communication with navigation community | Improved communication with the navigation community |
| 61 | Organizational | Improved communication and role of the police in case of the incident | Improved communication and role of the police enabling their support to the incident (property protection, traffic...) and prosecution of the criminal activities and wrong doings (carefully). |
| 62 | Organizational | EU whistle blower directive | Implementation of the EU whistle blower directive in the domain of civil protection, water management |
| 63 | Organizational | Certification process for risk management (ISO 33000 family) | Certification process for risk management (ISO 33000 family...) |
| 64 | Organizational | Certification process for asset management (ISO 55000 family) | Certification process for asset management (ISO 55000 family) |
| 65 | Organizational | Certification process for continuous operation management (ISO 22300 family) | Certification process for continuous operation management (ISO 22300 family), especially ISO 22301 |
| 66 | Organizational | Use of EU Civil Protection Mechanisms | Use of the available information resources set at disposal at EU Civil Protection Mechanisms |
| 67 | Organizational | Disaster forensics after the accident | Disaster forensics, aiming at development of learning experiences after the accident (and liabilities, responsibilities). Regular reports on significant flood events, preparation of a study/guide for data and information collection during flood events. |
| 68 | Organizational | Focused flood management for the people with disabilities | Focused flood management for the people with disabilities |
| 69 | Organizational | Focused flood management in relation to cultural heretage | Focused flood management in relation to cultural heretage |
| 70 | Organizational | Bilge water closing valve | Sealing of the closing valve on the pipeline for direct discharge of the bilge water in the closed position. Bilge water must be delivered to the reception facilities. |
| 71 | Organizational | Prohibition of burning waste on board | It shall be prohibited to burn household refuse, sludge, slops and special waste on board. |
| 72 | Organizational | Standard procedures for the response in the case of of acidental pollution | Development and implementation of best available techniques and other measures for control of spills (accidental pollution) in order to idenitfy the technical facilities required for the response. |
| 73 | Organizational | Improved cooperation between relevant bodies | Promotion and organization of national and regional multi-stakeholder round tables (and other forms of mutual activities) for planning the civil protection actions in emergencies with the aim of clarifying procedures, responsibilities and means at disposal of all relevant bodies (public and private). |
| 74 | Organizational | Information exchange | Exchange of information between parties (measures, contingency plans, experience with accidents, development of BAT, emergency preparedness, ...). Creation of an online application for information exchange between stakeholders involved in emergency flood defence as well as for informing the public. |

| | | | |
|----|----------------|---|--|
| 75 | Organizational | Technology exchange, scientific and technological cooperation | Facilitation of exchange of technology between the parties for the prevention of, preparedness for and response to accidents. Cooperation between parties for research and development, including research into less hazardous processes aimed at limiting accidents and consequences. |
| 76 | Planning | Maintenance of contingency management plans on different levels | Development and verification, maintenance of contingency management plans on different levels (plans of joint action, protection and rescue plans) |
| 77 | Planning | Planning, execution and improvement of exercises | Planning, execution and improvement of exercises (operational, TTX, combined exercises) |
| 78 | Planning | Hazard identification, risk assessment | Identification of those hazardous activities which require special preventive measures and safety standards, risk analysis, action plan for the implementation of necessary measures |
| 79 | Supervision | Discharge/level monitoring | Maintenance and upgrade of the discharge/level monitoring network |
| 80 | Supervision | Regular monitoring of water quality, port areas and auditing of hazardous activities | Regular monitoring shall be performed by national monitoring authorities. |
| 81 | Supervision | Inspection of vessels | Carry out inspections of vessels to ensure that requirements for pollution prevention are complied with and to determine causes and situations of a discharge of cargo, waste or waste water. |
| 82 | Supervision | Real-time monitoring of water quality | Established real-time monitoring of key water quality parameters enabling rapid detection of accidental pollution |
| 83 | Navigation | Protocols with the key water uses/abstractions | Development of the protocols with the key water uses/abstractions potentially under threat of accidental pollution (also floods?) |
| 84 | Navigation | Improved integration of governmental sectors | Improved integration of different sectors of the government - civil protection - water management - navigation |
| 85 | Navigation | Notification of authorities | In the event of discharge or the threat of discharge, the boatmaster must notify the nearest competent authority without delay, indicating the position, quantity and the substances spilled. Any vessel that has caused pollution or has detected pollution must immediately report to the competent response authority and notify the vessels in the vicinity of the spill area. |
| 86 | Navigation | Used Oil Log | The boatmaster shall keep and regularly update the Used Oil Log and shall present it to the competent authorities upon request. |
| 87 | Navigation | Transport of hazardous substances | The boatmaster of a vessel transporting hazardous substances shall notify the competent authorities of the Party involved. The Party in question may organize an escort for the vessel on the territory under its jurisdiction. |
| 88 | Navigation | Prohibition of further navigation after a spill | After a spill, the competent authority shall immediately forbid further navigation or allow limited navigation for vessels presenting danger to the environment in order to minimize adverse effects. |
| 89 | Navigation | Implementation of measures for the protection of waters due to the impact of navigation | Implementation of measures for the protection of waters due to the impact of navigation (diary of consumed fuel, bilge water, disposal of waste and hazardous substances from the ship, prohibition of navigation in case of spillage of pollutants) |
| 90 | OTHER | Adaptation to climate change | Measures related to the adaptation to climate change (general) |
| 91 | OTHER | Demining of the Sava (and Drina) river | Mine problem - mine clearance - demining of the Sava (and Drina) river |
| 92 | OTHER | River bank maintenance | Cleaning the river bank - trees, branches and floating debris |
| 93 | OTHER | River corridor maintenance - floating debris and waste | Floating debris and waste (Drina) reduction and cleansing |
| 94 | OTHER | River corridor maintenance - vegetation, erosion | Objective status of river corridors (vegetation, sediments, erosion) following the requirements of WFD for the good ecological status |

3 Conclusions

The WACOM Transnational best management practice catalogue for improved preparedness and transboundary coordination and interoperability of emergency response in the case of floods and accidental pollution as well as situational awareness, was developed through a multi-stage, multi-stakeholder process. A comprehensive list of measures was developed, harmonized, and prioritized for all countries involved: Slovenia, Croatia, Bosnia and Hercegovina and Serbia.

The development of the harmonized catalogue of measures was a basic prerequisite to map the status of key measures for the reduction of flood risks and accidental pollution risk reduction measures in all countries of the Sava River Basin in a harmonized and thus comparable way, to identify common experiences with these measures, but also to identify differences between countries with respect to the same measure.

It is important to reiterate that the measures are project specific, identified during the development of the WACOM project, focusing in particular on the contingency measures (contingency planning and response). They are specifically related to the measures identified in the national planning documents in the field of flood management.

Annex 2

WACOM Sava STEER Tools for flood response and accidental pollution response cooperation and interoperability

WACOM Sava STEER Tools for flood response and accidental pollution response cooperation and interoperability

Based on a thorough review of the implemented measures within the WACOM project, two strategies were prepared:

- (1) for flood response cooperation and interoperability and
- (2) for accidental pollution response cooperation and interoperability.

The WACOM recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. Since the implementation process of the measures varies from country to country and the instructions cannot be uniform, we focused on a transparent tool that allows the analysis of the implementation status for individual measures by country.

WACOM STEER tool for Flood response is a tool where listed recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. The monitoring of the implementation status takes place every two years in the framework of the meetings of the Permanent Expert Groups of the Save Commission, which are attended by the experts appointed by the Save Commission on the proposal of the representatives of the Contracting Parties and chaired by the appointed officials of the Secretariat.

WACOM STEER tool for accidental pollution response cooperation and interoperability is a tool where listed recommendation focuses on the implementation of this tool at the national level, which could contribute to the development of the field. The monitoring of the implementation status takes place every two years in the framework of the meetings of the permanent expert groups of the Sava Commission, which are attended by the experts appointed by the Sava Commission on the proposal of the representatives of the Contracting Parties and chaired by the appointed officials of the Secretariat.

Applicable tool supporting the reporting tool enabling development and follow-up of the Sava STEER for accidental pollution response cooperation and interoperability

| ID | Key intervention area | Measure | Guaranteed public involvement | | | | Regulated legislation in this area | | | | secured funding | | | | control over processes (analytics) ensure | | | |
|----|----------------------------|---|-------------------------------|----|----|-----|------------------------------------|----|----|-----|-----------------|----|----|-----|---|----|----|-----|
| | | | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB | SLO | HR | BH | SRB |
| 1 | Educational | Education on all levels | | | | | | | | | | | | | | | | |
| 2 | Educational | Social, educational and awareness work with the youth | | | | | | | | | | | | | | | | |
| 3 | Educational | Education of general public and promotion activities | | | | | | | | | | | | | | | | |
| 4 | Educational | ICS 100 - incident command system standardized framework protocols | | | | | | | | | | | | | | | | |
| 5 | Educational | Microcredentials and continuous education | | | | | | | | | | | | | | | | |
| 6 | Educational | Education of special ICS functions (IC, Safety officer, PR, Operations, Planning, Logistics, Administration/Finance) | | | | | | | | | | | | | | | | |
| 7 | Educational | Other education, research oriented | | | | | | | | | | | | | | | | |
| 8 | Educational | Supporting Accidental pollution emergencies | | | | | | | | | | | | | | | | |
| 9 | Financial | Enforcing the polluter pays principle | | | | | | | | | | | | | | | | |
| 10 | Financial | Securing public financial resources | | | | | | | | | | | | | | | | |
| 11 | Financial | Improved insurance practices and stimulations for wider penetration of insurance for accidental pollution | | | | | | | | | | | | | | | | |
| 12 | Financial | Individual understanding of financial responsibilities in the case of accidental pollution (education) | | | | | | | | | | | | | | | | |
| 13 | Financial | Education of water users (abstractions) on emergency procedures (accidental pollution) | | | | | | | | | | | | | | | | |
| 14 | Governance | Elective representatives for long-term challenges after the accident | | | | | | | | | | | | | | | | |
| 15 | Governance | Participatory decision making process - water democracy | | | | | | | | | | | | | | | | |
| 16 | Human Resources Management | Individual communication and indirect education | | | | | | | | | | | | | | | | |
| 17 | Human Resources Management | Employee satisfaction | | | | | | | | | | | | | | | | |
| 18 | ICT | GIS based situational awareness | | | | | | | | | | | | | | | | |
| 19 | ICT | Communication equipment and protocols | | | | | | | | | | | | | | | | |
| 20 | ICT | Nowcasting and forecasting systems | | | | | | | | | | | | | | | | |
| 21 | ICT | Early identification of accidental pollution and alerting | | | | | | | | | | | | | | | | |
| 22 | Information | Improved data integration | | | | | | | | | | | | | | | | |
| 23 | Information | Improved supervision and control over the transport of pollutants | | | | | | | | | | | | | | | | |
| 24 | Information | Improved supervision and control over the production, use and storage of pollutants | | | | | | | | | | | | | | | | |
| 25 | Information | Registry of water uses (abstractions) | | | | | | | | | | | | | | | | |
| 26 | Information | Mutual notifying about hazards, disasters, manners of border crossing | | | | | | | | | | | | | | | | |
| 27 | Infrastructural | Safe river access locations (rescue) | | | | | | | | | | | | | | | | |
| 28 | Infrastructural | Safe river access locations (booms) | | | | | | | | | | | | | | | | |
| 29 | Infrastructural | Additional measures from the Sava flood risk management plan (structural measures, non-structural measures) | | | | | | | | | | | | | | | | |
| 30 | Infrastructural | Other emergency management related structural measures | | | | | | | | | | | | | | | | |
| 31 | Infrastructural | Waterways | | | | | | | | | | | | | | | | |
| 32 | Infrastructural | Reception facilities | | | | | | | | | | | | | | | | |
| 33 | Knowledge | National and international (EN) standards | | | | | | | | | | | | | | | | |
| 34 | Knowledge | Knowledge base of the polluters | | | | | | | | | | | | | | | | |
| 35 | Knowledge | Knowledge base of the pollutants and procedures | | | | | | | | | | | | | | | | |
| 36 | Logistics | Availability of the emergency equipment (pollution) | | | | | | | | | | | | | | | | |
| 37 | Logistics | Rescue tools and resources availability | | | | | | | | | | | | | | | | |
| 38 | Logistics | Identification of service providers for emergency response | | | | | | | | | | | | | | | | |
| 39 | Logistics | Casting units supporting administration and finance processes | | | | | | | | | | | | | | | | |
| 40 | Logistics | Identification of service providers (short listing), contracts with the service providers (companies) supporting the emergencies with their specific services | | | | | | | | | | | | | | | | |
| 41 | Organizational | UN protocols | | | | | | | | | | | | | | | | |
| 42 | Organizational | MAC centres and AEMS | | | | | | | | | | | | | | | | |
| 43 | Organizational | Clear positioning of the MACS (Multi Agency Coordination System) being in the core of complex response | | | | | | | | | | | | | | | | |
| 44 | Organizational | Improved communication in response framework | | | | | | | | | | | | | | | | |
| 45 | Organizational | International, bilateral and multilateral agreements | | | | | | | | | | | | | | | | |
| 46 | Organizational | River basin management plans and flood management plans | | | | | | | | | | | | | | | | |
| 47 | Organizational | Institutional bilateral and multilateral agreements | | | | | | | | | | | | | | | | |
| 48 | Organizational | EU Civil Protection Mechanism | | | | | | | | | | | | | | | | |
| 49 | Organizational | Restoration measures | | | | | | | | | | | | | | | | |
| 50 | Organizational | Protocols enabling involvement of insurance companies | | | | | | | | | | | | | | | | |
| 51 | Organizational | Strategic crisis communication | | | | | | | | | | | | | | | | |
| 52 | Organizational | Improved integration of the levels of MACS | | | | | | | | | | | | | | | | |
| 53 | Organizational | Control of the legislation implementation and enforcement | | | | | | | | | | | | | | | | |
| 54 | Organizational | Water management information systems | | | | | | | | | | | | | | | | |
| 55 | Organizational | Improved documentation process of the incidents | | | | | | | | | | | | | | | | |
| 56 | Organizational | Improved communication in response framework (companies) | | | | | | | | | | | | | | | | |
| 57 | Organizational | Communication with the navigation community | | | | | | | | | | | | | | | | |
| 58 | Organizational | Improved communication and role of the police in the case of an incident | | | | | | | | | | | | | | | | |
| 59 | Organizational | EU whistle blower directive | | | | | | | | | | | | | | | | |
| 60 | Organizational | Certification process for risk management (ISO 33000 family) | | | | | | | | | | | | | | | | |
| 61 | Organizational | Certification process for asset management (ISO 55000 family) | | | | | | | | | | | | | | | | |
| 62 | Organizational | Certification process for continuous operation management (ISO 22300 family) | | | | | | | | | | | | | | | | |
| 63 | Organizational | Use of EU Civil Protection Mechanisms | | | | | | | | | | | | | | | | |
| 64 | Organizational | Disaster forensics after the accident | | | | | | | | | | | | | | | | |
| 65 | Organizational | Ballast water closing valve | | | | | | | | | | | | | | | | |
| 66 | Organizational | Prohibition of burning waste on board | | | | | | | | | | | | | | | | |
| 67 | Organizational | Standard procedures for the response in the case of accidental pollution | | | | | | | | | | | | | | | | |
| 68 | Organizational | Improved cooperation between relevant bodies | | | | | | | | | | | | | | | | |
| 69 | Organizational | Information exchange | | | | | | | | | | | | | | | | |
| 70 | Organizational | Technology exchange, scientific and technological cooperation | | | | | | | | | | | | | | | | |
| 71 | Planning | Maintenance of contingency management plans on different levels | | | | | | | | | | | | | | | | |
| 72 | Planning | Planning, execution and improvement of exercises | | | | | | | | | | | | | | | | |
| 73 | Planning | Hazard identification, risk assessment | | | | | | | | | | | | | | | | |
| 74 | Supervision | Discharge/level monitoring | | | | | | | | | | | | | | | | |
| 75 | Supervision | Regular monitoring of water quality, port areas and auditing of hazardous activities | | | | | | | | | | | | | | | | |
| 76 | Supervision | Inspection of vessels | | | | | | | | | | | | | | | | |
| 77 | Supervision | Real-time monitoring of water quality | | | | | | | | | | | | | | | | |
| 78 | Navigation | Protocols with the key water users/abstractions | | | | | | | | | | | | | | | | |
| 79 | Navigation | Improved integration of governmental sectors | | | | | | | | | | | | | | | | |
| 80 | Navigation | Notification of authorities | | | | | | | | | | | | | | | | |
| 81 | Navigation | Used Oil Log | | | | | | | | | | | | | | | | |
| 82 | Navigation | Transport of hazardous substances | | | | | | | | | | | | | | | | |
| 83 | Navigation | Prohibition of further navigation after a spill | | | | | | | | | | | | | | | | |
| 84 | Navigation | Implementation of measures for the protection of waters due to the impact of navigation | | | | | | | | | | | | | | | | |
| 85 | OTHER | Adaptation to climate change | | | | | | | | | | | | | | | | |
| 86 | OTHER | Demining of the Sava (and Drina) river | | | | | | | | | | | | | | | | |
| 87 | OTHER | River bank maintenance | | | | | | | | | | | | | | | | |
| 88 | OTHER | River corridor maintenance - floating debris and waste | | | | | | | | | | | | | | | | |
| 89 | OTHER | River corridor maintenance - vegetation, erosion | | | | | | | | | | | | | | | | |

For 2022: Insert from the evaluated WACOM Catalogue of measures

→ Evaluate in 2023 and compare with 2022 - improvement in which areas?

→ Evaluate in 2025 and compare with 2023 - improvement in which areas?



Applicable tool supporting the reporting tool enabling development and follow-up of the Sava STEER for flood response cooperation and interoperability

| ID | Key intervention area | Measure | Guaranteed public involvement | | | | Regulated legislation in this area, duties, | | | | secured funding | | | | control over processes (analytics) ensures | | | |
|----|----------------------------|---|-------------------------------|----|-----|-----|---|----|-----|-----|-----------------|----|-----|-----|--|----|-----|-----|
| | | | SLO | HR | BiH | SRB | SLO | HR | BiH | SRB | SLO | HR | BiH | SRB | SLO | HR | BiH | SRB |
| 1 | Educational | Education on all levels | | | | | | | | | | | | | | | | |
| 2 | Educational | Social, educational and awareness work with the youth | | | | | | | | | | | | | | | | |
| 3 | Educational | Education of general public and promotion activities | | | | | | | | | | | | | | | | |
| 4 | Educational | ICS 100 - incident command system standardized framework protocols | | | | | | | | | | | | | | | | |
| 5 | Educational | Microcredentials and continuous education | | | | | | | | | | | | | | | | |
| 6 | Educational | Education of special ICS functions (IC, Safety officer, PR, Operations, Planning, Logistics, Administration/finance) | | | | | | | | | | | | | | | | |
| 7 | Educational | Other education, research oriented | | | | | | | | | | | | | | | | |
| 8 | Educational | Supporting Flood emergencies | | | | | | | | | | | | | | | | |
| 9 | Financial | Enforcing the compensations for the floods principle | | | | | | | | | | | | | | | | |
| 10 | Financial | Securing public financial resources | | | | | | | | | | | | | | | | |
| 11 | Financial | Improved insurance practices and stimulations for wider penetration of insurance for floods | | | | | | | | | | | | | | | | |
| 12 | Financial | Individual understanding of financial responsibilities in the case of floods (education) | | | | | | | | | | | | | | | | |
| 13 | Financial | Education of water users (abstractions) on emergency procedures (floods) | | | | | | | | | | | | | | | | |
| 14 | Governance | Elective representatives for long-term challenges after the accident | | | | | | | | | | | | | | | | |
| 15 | Governance | Participatory decision making process - water democracy | | | | | | | | | | | | | | | | |
| 16 | Human Resources Management | Individual communication and indirect education | | | | | | | | | | | | | | | | |
| 17 | Human Resources Management | Employee satisfaction | | | | | | | | | | | | | | | | |
| 18 | ICT | GIS based situational awareness | | | | | | | | | | | | | | | | |
| 19 | ICT | Communication equipment and protocols | | | | | | | | | | | | | | | | |
| 20 | ICT | Nowcasting and forecasting systems | | | | | | | | | | | | | | | | |
| 21 | ICT | Flood management centres | | | | | | | | | | | | | | | | |
| 22 | Information | Improved data integration | | | | | | | | | | | | | | | | |
| 23 | Information | Registry of water uses (abstractions) | | | | | | | | | | | | | | | | |
| 24 | Information | Floods situational awareness system | | | | | | | | | | | | | | | | |
| 25 | Information | Mutual notifying about hazards, disasters, manners of border crossing | | | | | | | | | | | | | | | | |
| 26 | Infrastructural | Safe river access locations (rescue) | | | | | | | | | | | | | | | | |
| 27 | Infrastructural | Safe river access locations (booms) | | | | | | | | | | | | | | | | |
| 28 | Infrastructural | Additional measures from the Sava flood risk management plan (structural measures, non-structural measures) | | | | | | | | | | | | | | | | |
| 29 | Infrastructural | Other emergency management related structural measures | | | | | | | | | | | | | | | | |
| 30 | Infrastructural | Waterways | | | | | | | | | | | | | | | | |
| 31 | Infrastructural | Reception facilities | | | | | | | | | | | | | | | | |
| 32 | Knowledge | National and international (EN) standards | | | | | | | | | | | | | | | | |
| 33 | Knowledge | Knowledge base of the polluters | | | | | | | | | | | | | | | | |
| 34 | Knowledge | Knowledge base of the pollutants and procedures | | | | | | | | | | | | | | | | |
| 35 | Logistics | Availability of the emergency equipment (floods) | | | | | | | | | | | | | | | | |
| 36 | Logistics | Rescue tools and resources availability | | | | | | | | | | | | | | | | |
| 37 | Logistics | Identification of service providers for emergency response | | | | | | | | | | | | | | | | |
| 38 | Logistics | Costing units supporting administration and finance processes | | | | | | | | | | | | | | | | |
| 39 | Logistics | Identification of service providers (short listing), contracts with the service providers (companies) supporting the emergencies with their specific services | | | | | | | | | | | | | | | | |
| 40 | Organizational | UN protocols | | | | | | | | | | | | | | | | |
| 41 | Organizational | PIAC centres and AEWS | | | | | | | | | | | | | | | | |
| 42 | Organizational | Clear positioning of the MACS (Multi Agency Coordination System) being in the core of complex response | | | | | | | | | | | | | | | | |
| 43 | Organizational | Improved communication in response framework | | | | | | | | | | | | | | | | |
| 44 | Organizational | International, bilateral and multilateral agreements | | | | | | | | | | | | | | | | |
| 45 | Organizational | River basin management plans and flood management plans | | | | | | | | | | | | | | | | |
| 46 | Organizational | Institutional bilateral and multilateral agreements | | | | | | | | | | | | | | | | |
| 47 | Organizational | EU Civil Protection Mechanism | | | | | | | | | | | | | | | | |
| 48 | Organizational | Restoration measures | | | | | | | | | | | | | | | | |
| 49 | Organizational | Protocols enabling involvement of insurance companies | | | | | | | | | | | | | | | | |
| 50 | Organizational | Strategic crisis communication | | | | | | | | | | | | | | | | |
| 51 | Organizational | Improved integration of the levels of MACS | | | | | | | | | | | | | | | | |
| 52 | Organizational | Control the of legislation implementation and enforcement | | | | | | | | | | | | | | | | |
| 53 | Organizational | Water management information systems | | | | | | | | | | | | | | | | |
| 54 | Organizational | Improved documentation process of the incidents | | | | | | | | | | | | | | | | |
| 55 | Organizational | Improved communication in response framework (companies) | | | | | | | | | | | | | | | | |
| 56 | Organizational | Communication with the navigation community | | | | | | | | | | | | | | | | |
| 57 | Organizational | Improved communication and role of the police in the case of an incident | | | | | | | | | | | | | | | | |
| 58 | Organizational | EU whistle blower directive | | | | | | | | | | | | | | | | |
| 59 | Organizational | Certification process for risk management (ISO 33000 family) | | | | | | | | | | | | | | | | |
| 60 | Organizational | Certification process for asset management (ISO 55000 family) | | | | | | | | | | | | | | | | |
| 61 | Organizational | Certification process for continuous operation management (ISO 22300 family) | | | | | | | | | | | | | | | | |
| 62 | Organizational | Use of EU Civil Protection Mechanisms | | | | | | | | | | | | | | | | |
| 63 | Organizational | Focused flood management for the people with disabilities | | | | | | | | | | | | | | | | |
| 64 | Organizational | Focused flood management in relation to cultural heritage | | | | | | | | | | | | | | | | |
| 65 | Organizational | Bioge water closing valve | | | | | | | | | | | | | | | | |
| 66 | Organizational | Improved cooperation between relevant bodies | | | | | | | | | | | | | | | | |
| 67 | Organizational | Information exchange | | | | | | | | | | | | | | | | |
| 68 | Organizational | Technology exchange, scientific and technological cooperation | | | | | | | | | | | | | | | | |
| 69 | Planning | Maintenance of contingency management plans on different levels | | | | | | | | | | | | | | | | |
| 70 | Planning | Planning, execution and improvement of exercises | | | | | | | | | | | | | | | | |
| 71 | Planning | Hazard identification, risk assessment | | | | | | | | | | | | | | | | |
| 72 | Supervision | Discharge/level monitoring | | | | | | | | | | | | | | | | |
| 73 | Supervision | Regular monitoring of water quality, port areas and auditing of hazardous activities | | | | | | | | | | | | | | | | |
| 74 | Supervision | Inspection of vessels | | | | | | | | | | | | | | | | |
| 75 | Supervision | Real-time monitoring of water quality | | | | | | | | | | | | | | | | |
| 76 | Navigation | Protocols with the key water uses/abstractions | | | | | | | | | | | | | | | | |
| 77 | Navigation | Improved integration of governmental sectors | | | | | | | | | | | | | | | | |
| 78 | Navigation | Notification of authorities | | | | | | | | | | | | | | | | |
| 79 | Navigation | Used Oil Log | | | | | | | | | | | | | | | | |
| 80 | Navigation | Implementation of measures for the protection of waters due to the impact of navigation | | | | | | | | | | | | | | | | |
| 81 | OTHER | Adaptation to climate change | | | | | | | | | | | | | | | | |
| 82 | OTHER | Demining of the Sava (and Drina) river | | | | | | | | | | | | | | | | |
| 83 | OTHER | River bank maintenance | | | | | | | | | | | | | | | | |
| 84 | OTHER | River corridor maintenance - floating debris and waste | | | | | | | | | | | | | | | | |
| 85 | OTHER | River corridor maintenance - vegetation, erosion | | | | | | | | | | | | | | | | |

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→ Evaluate in 2023 and compare with 2022 - improvement in which areas?

→ Evaluate in 2025 and compare with 2023 - improvement in which areas?

