Co-financed by the Connecting Europe Facility of the European Union

Preparing FAIRway 2 works in the Rhine-Danube Corridor

Wrap up on activities on the common Croatian-Serbian sector &

Assessment of the application of integrated planning process & lessons learned

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SHFM#17, 16.07.2025

Where to start the assessment of integrated planning …

Preparing FAIRway 2 in the Rhine-Danube Corridor

Activities on the common Croatian-Serbian Danube section

2
3

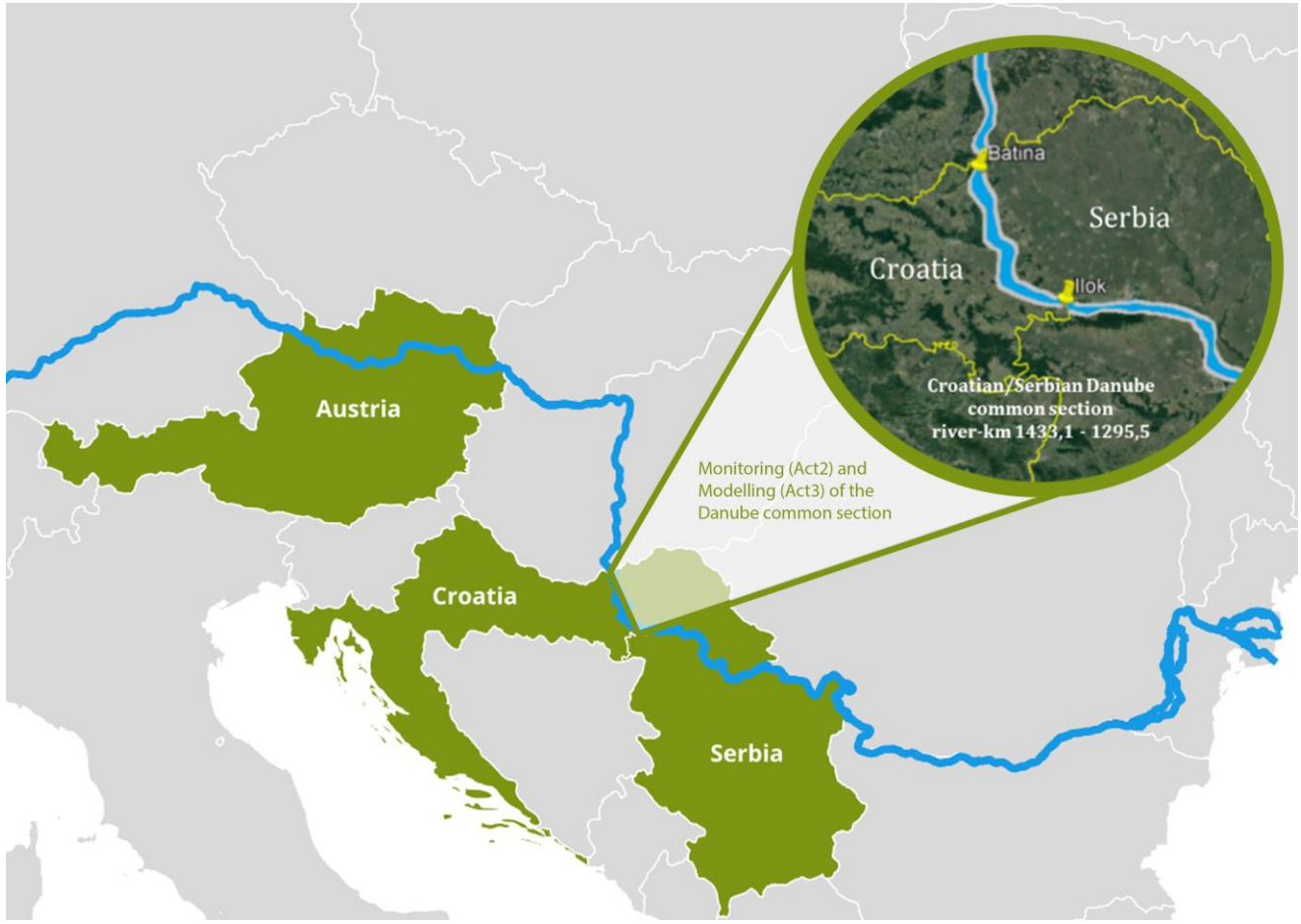
Monitoring
Modelling and Multi-Criteria Analysis

Prepare possible variants for future infrastructure related measures on HR-RS common Danube, on the basis of the Joint Statement principles & considering inputs of a multidisciplinary Stakeholder Forum

Riverbed surveys; inventory of existing river regulation structures (digital catalogue), sediments measurements; velocity & flow

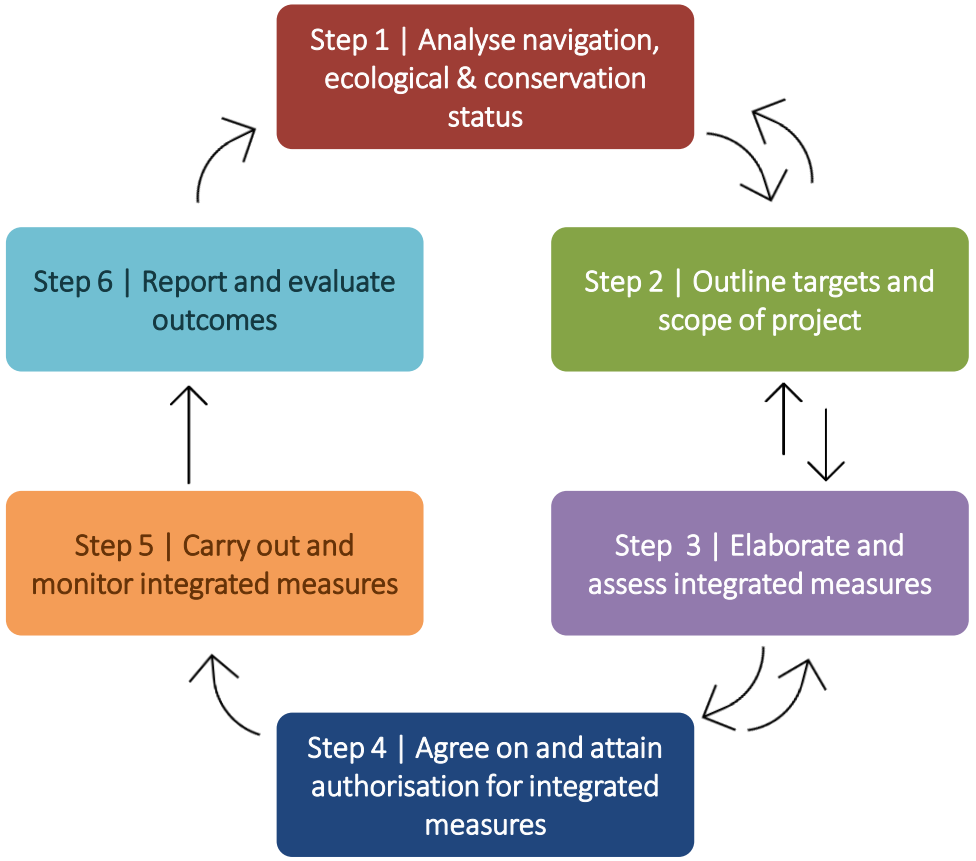
Biodiversity monitoring: inventory of ichthyofauna, ornithofauna, river benthos, floodplain habitats

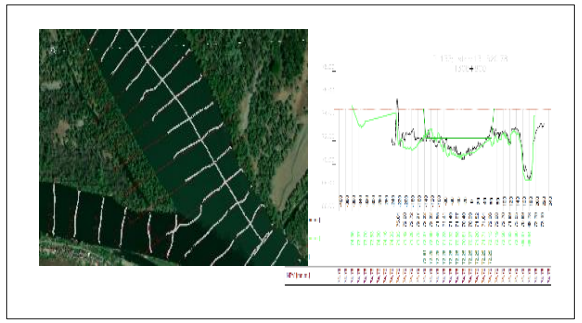
Modeling & MCA: 1D hydraulic model, prioritisation of critical sections, 2D hydrodynamic & morphological model, multi-criteria analysis to define variants, definition of next steps for possible future investments

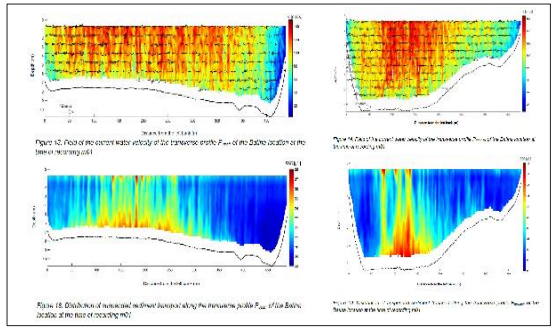


Model Process

… to achieve Good Navigation Status / Good Ecological Status / Favourable Conservation Status



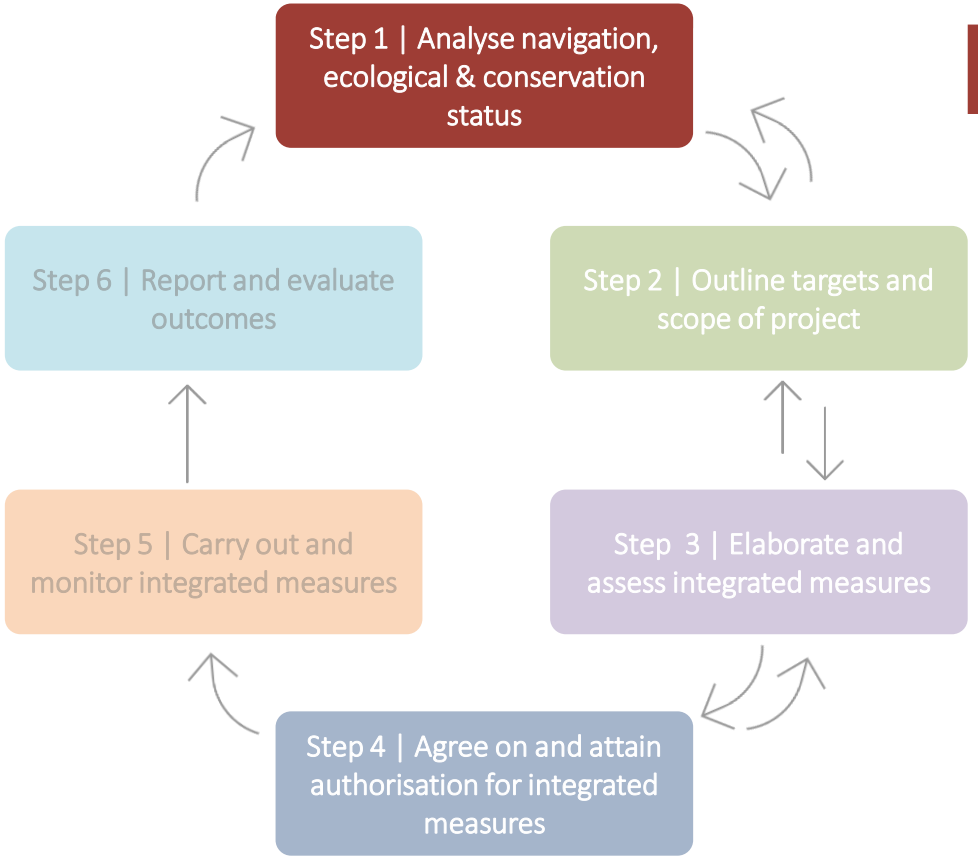




Source: Environmentally sound waterway management in the Danube River Basin. Practical Manual. Danube Stream. 2018

1 | Analyse navigation, ecological & conservation status

Model Process



1 | Analyse navigation, ecological & conservation

1.1 | Analyse navigation status

a) Analyse the **current state of the fairway** based on hydrographic riverbed surveys, including river engineering structures for low-water regulation
b) Use digitalised waterway infrastructure asset management systems (WAMS)
c) Engage qualified personnel or experts for solid baseline measurements and analyses

1.2 | Analyse ecological status

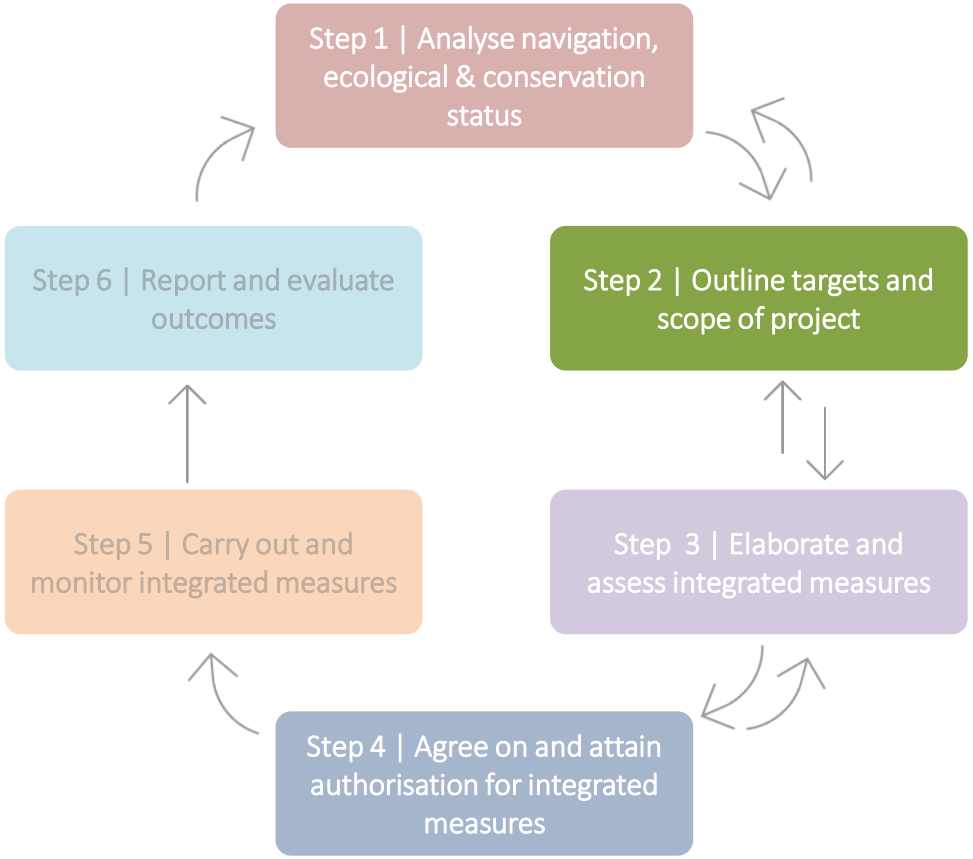
a) Consult responsible **water authority and valid River Basin Management Plan**
b) Compare the measured status against so-called type-specific reference conditions

1.3 | Analyse conservation status

a) If Nature sites are involved, **consult Standard Data Form (SDF)** which accompanies every Natura 2000 site and/or Natura 2000 management plan
b) Determine conservation status of species or habitat type for which the Natura 2000 site was designated

Step 2 | Outline targets and scope of project

Model Process



Step 2 | Outline targets and scope of project

2.1 | Provide outline of initial project concept

a) Provide outline/sketch of possible measures/actions
b) Outline project targets (improve/retain navigation, ecological, conservation status) – provide broad justification for the need for action, based on analysis of navigation, ecological & conservation status (step 1)
c) Specify geographical scope/location (river-km)
d) Identify potentially affected water bodies, species and habitats

2.2 | Screening of possibly applicable legal provisions

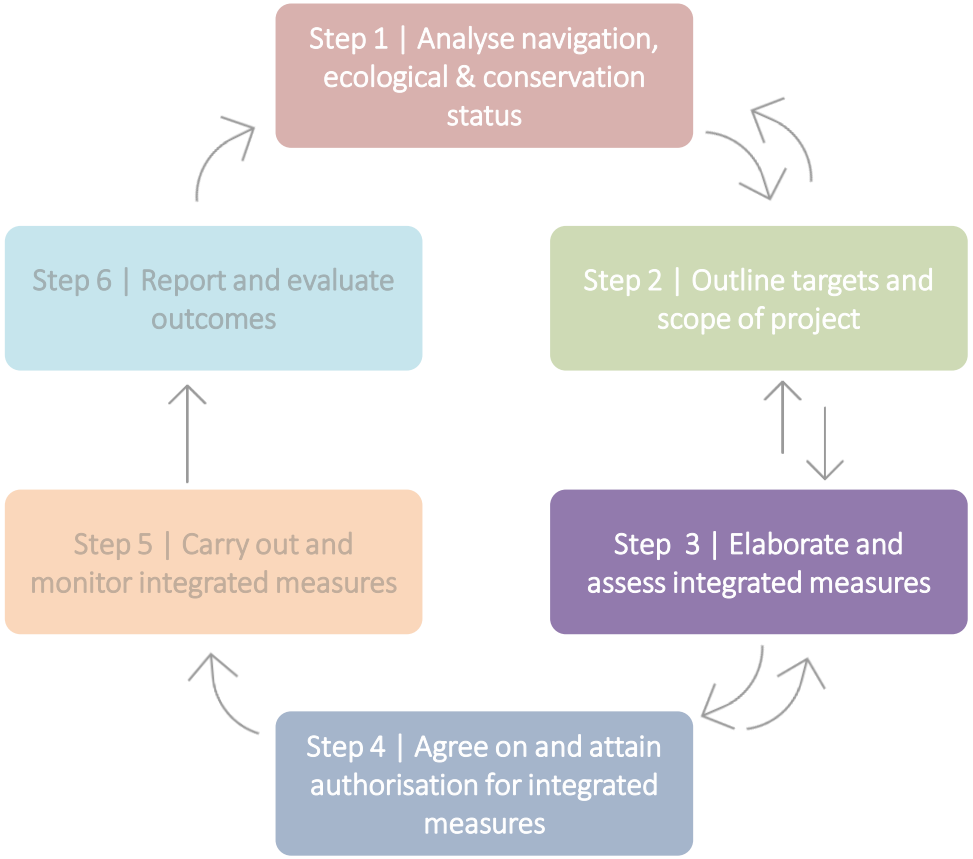
a) Relevance regarding national water act?
b) Are any direct or indirect effects on water body status/potential expected (WFD)?
c) Could any adjacent Natura 2000 sites be possibly affected?
d) Could any adjacent national park or otherwise protected area be possibly affected?

2.3 | Based on answers to previous questions, inform and engage responsible authorities, experts and stakeholders accordingly in further planning process – proportionate to envisaged project scope & impacts

a) Organise briefing meeting with responsible authorities and engaged experts as well as stakeholders to discuss initial project scope
b) Set up multidisciplinary planning team, proportionate to the envisaged project scope and impacts

Step 3 | Plan and assess integrated measures

Model Process



Step 3 | Plan and assess (integrated) measures

3.1 | Identify technically feasible options

a) List range of technically feasible options for integrated water and environmental protection activities

3.2 | Assess impacts on navigation status (TEN-T Regulation)

a) Assess and measure possible impacts of traffic management measures, infrastructure maintenance measures or rehabilitation measures
b) Apply WAMS systems where possible to determine impacts

3.3 | Assess impacts on conservation status (Natura 2000)

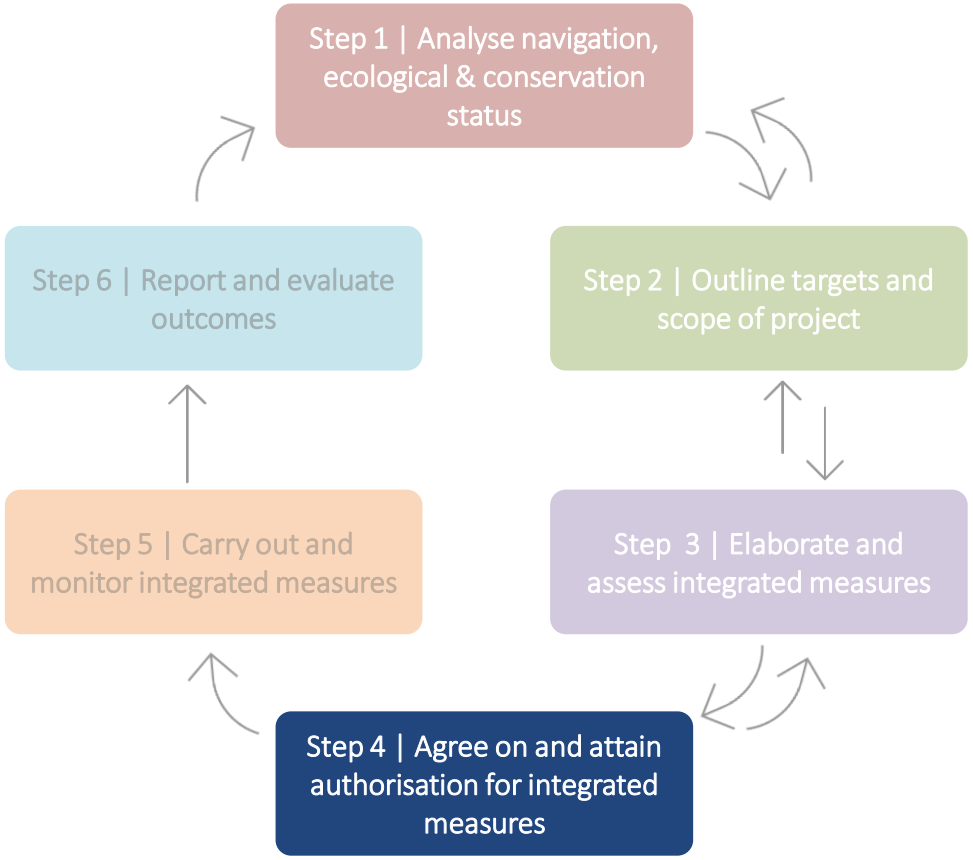
a) Could proposed measures affect a Nature 2000 area?
b) If yes, assess whether proposed measures could lead to deterioration or disturbances of defined habitats and species. Information on habitat types and species in the specific Natura 2000 should be publicly available through the Natura 2000 data sources.
c) If deterioration of one of the protection objectives cannot be ruled out, specific expertise should be arranged. Together with experts, alternative ways to avoid or to minimize damage should be investigated & documented.

3.4 | Assess impacts on ecological status/potential (WFD)

a) Is the project likely to have effects on water body status/potential?
b) Is the project expected to cause a deterioration / non-achievement of good status / potential?
c) Is an Article 4(7) Test required during the authorisation phase?

Model Process

Step 4 | Agree on and attain authorisation for integrated measures



Step 4 | Agree on and attain authorisation for integrated measures

4.1 | Establish maximum transparency

a) Hold regular coordination meetings between waterway authorities, water and nature conservation authorities to identify conditions at an early stage and to identify opportunities for synergies between previously separated activities in the same area
b) Involve in-house and external experts to provide a solid decision basis
c) Adjust the level of detail and size of the documentation to the complexity of the measures and the ecological sensitivity of the areas involved

Lessons learned

- Regular **biodiversity monitoring** activities on the Danube (cooperation and data exchange between both countries) creating also the data repository for any future potential initiatives and projects – (1) by responsible national authorities and/or on the (2) request & respective budget assignment by waterway administrations (e.g., adaptations/sharing/handing over of responsibilities, etc.)
- Data on the **status of river bodies** from responsible national authorities (with required granularity of data – to be communicated to these authorities) to fit the waterway management projects.
- Future phases should actively involve environmental organizations/parties and establish a **clear, joint governance structure** (incl. responsibilities and accountabilities) to carry on and balance waterway and natural resources management efforts. Enhanced cross-sectoral dialogue and detailed ecological assessments are needed to integrate concrete conservation measures alongside infrastructure development.

Monitoring activities

Recommendations out of monitoring activities (1/2)

Overview

All planned activities—planning, fieldwork, analysis, reporting, and meetings—were successfully completed on schedule (2023–mid-2024). Future recommendations aim to support adaptive management of the Danube in the Croatia–Serbia border zone, ensuring navigability, biodiversity protection, and ecosystem service maintenance in compliance with EU and national regulations (e.g., WFD, Natura 2000, Birds & Habitats Directives).

General Recommendations

- **Data Use & Compliance**: Utilize newly collected data to ensure compliance with environmental regulations and align fairway development with conservation/restoration measures (UBA).
- **EU Principles**: Apply the "Do No Significant Harm" principle and EU Taxonomy Regulation in planning infrastructure projects.
- Data Interpretation: Further interpret monitoring data to assess impacts of riverbed incision, reduced flow (climate change), and biodiversity shifts.
- **Bottleneck Analysis**: Assess ecological status of 17 bottlenecks and propose hydrological, sediment transport, and conservation improvements (WWF).
- **Baseline Assessment**: Evaluate historical conditions to understand hydromorphological/ecological trends and guide future measures.
- **Habitat Extension**: Expand future research to include standing water habitats crucial for species like Graphoderus bilineatus and certain dragonflies.
- **Biodiversity Context**: Ecologically contextualize biodiversity data for future fairway planning.

Source: FINAL MONITORING REPORT FOR SUB-ACTIVITIES 2.2 AND 2.3 (version 24.10.2024), Chapter 5.

Monitoring activities

Recommendations out of monitoring activities (2/2)

Specific Recommendations

- Hydrology & Morphology Monitoring
  - Inform Hrvatske Vode of completed inventories, surveys, and installed piezometers.
  - Ensure **continuous data collection** (e.g., water levels, sediment flow) to support long-term analysis.
- Fish Inventory
  - Share results with relevant ministries and establish regular monitoring of endangered/Natura 2000 species.
  - Expand electrofishing and sonar monitoring; harmonize assessments and establish long-term monitoring stations.
  - Implement strategies to control invasive species.
- Habitat Inventory
  - **Harmonize conservation status and mitigation assessments across Croatian and Serbian sectors**.
  - Develop **connectivity maps of alluvial habitats and establish monitoring of key Natura 2000 types** (3130, 3150, 3270, 6440, 91E0*, 91F0).
  - Align national habitat monitoring with future Danube assessments.
- Bird Inventory
  - Implement **regular monitoring of bird species in floodplains and riverbanks**.
  - Share data with ministries and integrate with existing monitoring in protected areas (e.g., Kopački rit, Gornje Podunavlje).
  - Publicly share observational data via platforms like www.observado.org.
- River Benthos Inventory
  - Include **benthic data in Hrvatske Vode** databases.
  - Monitor **ecological status using macroinvertebrates** and expand research to stagnant water bodies for broader habitat assessment.

Source: FINAL MONITORING REPORT FOR SUB-ACTIVITIES 2.2 AND 2.3 (version 24.10.2024), Chapter 5.

Modelling activities

Recommendations out of modelling activities (1/2)

Overview

Planned activities—developed 1D hydraulic model for the selected flows, updated existing Low Water Navigation Levels (ENRs (LWNLs)) at selected water level gauges and cross sections, redefined and prioritized navigational bottlenecks, performed 2D hydrodynamic and morphological modelling of prioritized navigational bottlenecks, defined criteria for the multi-criteria analysis, which take into account navigational, environmental, cost (feasibility) and climate change vulnerability issues, defined alternative solutions for prioritized sectors and developed integrated study on alternative solutions containing results of planned activities were mainly completed (mid-2024–mid-2025).

General Recommendations / NEXT steps

- **Holistic Approach to Inland Navigation Development:** Ensure sustainability and environmental responsibility by integrating innovative, resilient solutions that enhance navigation while protecting the Danube River ecosystem.
- **Adaptive Approaches:** Implement a combination of structural, nature-based, and non-structural measures tailored to specific conditions to optimize outcomes.
- **Effective River Management:** Consider physical, ecological, and social processes and their interactions. Develop strategies that enhance system planning and management, minimizing conflicts and achieving long-term sustainability.
- **EU Principles:** Apply the *Do No Significant Harm* principle and adhere to the EU Taxonomy Regulation when planning infrastructure projects to ensure compliance with environmental and sustainability standards.
- **Intergovernmental Cooperation:** Strengthen and expand collaboration between Serbian and Croatian river administrations to improve the management of 17 bottlenecks along the mutual sector of the Danube River.

Source: INTEGRATED STUDY ON ALTERNATIVE SOLUTIONS

Modelling activities

Recommendations out of modelling activities (2/2)

Specific Recommendations / NEXT steps

- **Updated ENRs (LWNLs):** The Serbian river administration shall inform the Hydrometeorological Institute of the Republic of Serbia and the Danube Commission about the updated ENRs. Both administrations shall incorporate updated ENRs into everyday operations;
- **Bottleneck Catalogue at the shared stretch of the Danube:** Both administrations shall regularly update the Bottleneck Catalogue to ensure effective management and navigation improvements;
- **Sustainable solutions:** Both administrations shall explore opportunities to develop potential sustainable solutions for addressing navigational challenges in prioritized bottlenecks, in alignment with these General and Specific recommendations;
- **MCA:** Both administrations shall adopt the MCA approach in the planning process to ensure structured and effective decision-making;
- **Application of the 2D model:** shall serve as a capacity-building exercise and be integrated into regular planning operations for both administrations.

Source: INTEGRATED STUDY ON ALTERNATIVE SOLUTIONS

Availability of the project results

National contact points

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Preparing FAIRway 2 works – webpage

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