

## Preparing FAIRway 2 works in the Rhine-Danube corridor

### MINUTES (final)

#### Stakeholders' Forum Meeting 09 (SHFM09)

Date	24.09.2024
Time	10:00 – 17:00
Place	Grand Hotel&Restaurant, Obrovacki put bb, 21400 Backa Palanka Link for online participants: <a href="https://meet.google.com/fzp-grcj-vvq">https://meet.google.com/fzp-grcj-vvq</a>
Participants	See List of Participants (LoP)
For the minutes	Katarina Marinković, Predrag Živadinović

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The presentations are available for download on the [Stakeholders' Forum website](#).

#### Welcome note

Mr. Ljubiša Mihajlović welcomed all to the 9th Stakeholder Forum meeting for the Project "Preparing FAIRway 2 Works in the Rhine-Danube Corridor." He introduced himself as a representative of the Directorate for Inland Waterways. The Serbian Ministry (MGSI) is a project partner responsible for organising and coordinating the Stakeholder Forum in the project. He explained that as previously announced, the technical tour would be skipped due to elevated water levels in the Danube. A visit to the Danube riverbank would take place of the technical tour.

Mr. Mihajlović introduced Ms. Nikolina Vujadinović, the newest member of the Plovput team, who delivered a brief presentation on the geographical position and demographics of Bačka Palanka.

Ms. Marina Ilić, the chairperson of the forum meeting, provided an overview of the agenda and the presentations scheduled for the meeting.

#### Monitoring of the Croatian/Serbian Danube Common section

Ms. Lidija Hubalek (MMPI), the Croatian national coordinator for this project, explained that the Croatian part in this project was to carry out monitoring activities on the common HR-RS Danube section. She gave a short overview of the activities.

The draft final documents, draft final monitoring reports and the biodiversity catalogue were presented during the last Forum in July. Many recommendations were received and all comments are appreciated. The documents are being finalized by the experts, who are working to integrate as many recommendations and valuable inputs as possible. It was hoped that everything would be finalised in a few days and sent to all stakeholders for the final round. Gratitude was expressed for the opportunity to receive inputs to produce the best possible documents within the given budget and timeframe.

Several data exchange meetings were conducted with the Serbian team and their consultants. The Croatian team is committed to providing support and assistance to their Serbian counterparts in the forthcoming stages.

## Modelling & Multi-Criteria Analysis of the common Danube section

### Hydraulic and morphological modelling of the SRB-CRO common stretch of the Danube River

(Romeo Soare, Hidrozavod DTD, 2024-09-24\_PPT\_SHFM09\_02\_Romeo\_Soare\_-\_Overview\_Project\_Activities\_corr.pdf)

Mr. Soare, responsible for management activities, provided an update on the project status and progress.

Morphological data has been collected to prioritize critical sectors along the Serbian-Croatian border and the Danube, focusing on navigation parameters to ensure favourable conditions. The Ministry of Construction, Transport, and Infrastructure is collaborating with a Hidrozavod DTD to establish necessary parameters for future projects in the region.

During the inception phase, significant efforts were made to gather and assess various data types—morphological, hydrological, sediment, and biodiversity—all essential for developing a 1D model and calculating a new ENR value. This phase is crucial for identifying navigation bottlenecks and updating the catalogue of critical sections.

A hydrological study is underway to evaluate existing data and determine verification needs for the 1D model, leading to the new ENR value. A multi-criteria analysis, validated with stakeholders, will help select optimal solutions for navigation improvement, supported by the development of 2D hydraulic models.

The project outputs will provide insights into navigation bottlenecks, 1D and 2D models, and a flowchart illustrating the data types utilized, including morphological, hydrological, sediment quality, and biodiversity data. Bottlenecks will be prioritized, defining optimal interventions while considering impacts on biodiversity and river morphology. Alternative solutions will be proposed, emphasizing environmental factors alongside technical considerations for navigation safety and feasibility, aiming at comprehensive results aligned with project objectives.

#### **Questions & Answers:**

***Q (Mr. Alexander Zinke, Environment Agency Austria): The monitoring has shown that there are certain environmental degradation processes going on. The task is to improve not only navigability, which is a transport objective, but also to improve the environmental conditions. This is at least the task that the Croatian authorities have under the Water Framework Directive and Natura 2000 Directives. By including environmental objectives in your project, you ensure that you are addressing also those deficits, like identified degradation. Projects improving navigability parallel to improving environmental conditions, have better chance of becoming realized, receive funding from e.g. EU, or World Bank. If you improve only navigability, but do not improve the environmental conditions, it will be more difficult to secure finance.***

Additional information (Mr. Nikola Rosić, Hidrozavod DTD): The upcoming presentation will provide insights into the Multi-Criteria Analysis (MCA), which incorporates environmental criteria, where improvements are evaluated and scored. In addition to navigational improvements, the objective remains to ensure that ecological conditions do not deteriorate.

A (Mr. Romeo Soare, Hidrozavod DTD): The project will adhere to the principles of maintaining both longitudinal and lateral connectivity in accordance with the Water Framework Directive. Its primary aim is to prioritize critical navigation areas while considering environmental factors to prevent further deterioration of the riverbed. Consequently, river morphological results will be crucial alongside hydraulic parameters. After applying MCA analysis to variants proposed and modelled for prioritised critical sectors, with key environmental factors, essential information for future projects focused also on environmental restoration or rehabilitation will be available.

***Q (Mr. Alexander Zinke, Environment Agency Austria): Croatian Waters have the task to prepare measures for improving the environmental conditions of the water body. If there are measures that Croatian Waters have in their portfolio, these measures can be integrated in this project. Thus, early coordination would be so beneficial.***

A (Ms. Lidija Hubalek, MMPI): Unfortunately, there are no representatives from Croatian Waters participating at this meeting. However, OIKON monitoring team has had productive discussions and

meetings with Croatian Waters in the past. Their representatives are/will be involved in any future activities. They are receiving all results and documentation from this project (both through a separate communication and as member/observer of this Stakeholder Forum).

Amendment (Georg Rast) If there is a RBMP there should be as well programme of measures. If there are measures planned by the Croatian Waters in the Danube water body, which are in relation to the objectives of this project, these should be considered in the future modelling activities.

**Q (Mr. Arno Mohl, WWF Austria): The project is clearly focused on navigation, with defined goals in that area. However, it's crucial to consider environmental criteria as well. In an integrated project, environmental objectives must be prioritized equally alongside navigation objectives.**

**What can be expected from the project outcomes? A list of prioritized bottlenecks is being prepared for further action. The question arises: how will these be addressed after the project concludes? Additionally, regarding environmental objectives, which are closely related, how will these be integrated moving forward, especially concerning this river stretch and identified bottlenecks? This is an important inquiry for the contracting authority to address in terms of the strategy for follow-up activities post-project.**

A (Mr. Romeo Soare, Hidrozavod DTD): This question is best directed to the contracting authority regarding the strategy for follow-up activities after the project. It's important to reiterate the project outputs, as they will provide essential data for future initiatives and recommendations for prioritizing bottlenecks, considering both navigation needs and environmental factors.

Additional information (Ms. Marina Ilić, Technical Assistance and chairperson): This is a study to identify and prioritize the most critical sectors, then to conduct the modelling activities including MCA analysis. The next phase will be the preparation of technical documentation, EIA study, and everything else what is needed for realisation.

### **Hydraulic and morphological modelling of the SRB-CRO common stretch of the Danube River, Task 1-2: Hydrological study** (*Jasna Plavšić, Hidrozavod DTD, 2024-09-24 PPT SHFM09\_03 Jasna Plavsic - Hydrological study.pdf*)

The hydrological study aimed to characterize the Danube's hydrological (water) regime in the Serbian and Croatian sector and to compute low and high discharges needed for computation of low and high navigable water levels, as defined by the Danube Commission.

Reference discharges were obtained from flow duration curves and converted into navigable water levels using a steady discharge rating curve. Data from the last 30 years (1994–2023) were collected from eight discharge measurement stations—three in Serbia and five in Croatia. While most Serbian stations had comprehensive data for the whole 30 years (in some cases with gaps), Bačka-Palanka had only 11 years. Croatian stations had data starting from 2001. Stage-discharge rating curves were made available from Croatian side (hydro-meteo service), but not from the Serbian side. The latter were therefore reconstructed from the daily data on stages & discharges (slide #4).

Two main sources of uncertainty were identified: short records and discrepancies in measuring water levels between Serbian stations and differences in stage-discharge rating curves, notably between Bezdán and Batina, and Bačka-Palanka and Ilok. These discrepancies significantly affected the data.

The study aimed to derive average flow duration curves from 1993, excluding ice-affected periods. Short records raised concerns about reliability, and the lack of ice data from Croatian stations limited assumptions. Adjustments were made for shorter records using transfer functions to establish relationships between stations where the full data are available and station with shorter data.

Results indicated significant differences in low flows before and after adjustments, particularly at Bačka Palanka. Following adjustments, stage discharge curves were used to convert discharges into water levels, revealing some inconsistencies for low navigable water levels.

A comparison with previously adopted ENRs showed higher low and lower high navigable water levels than earlier studies, suggesting less extreme results. The final report will include these comparisons and explanations for differences. Key recommendations include improved coordination between Serbian and Croatian hydrometeorological services and the need for longer records to enhance data validity for future studies.

### **Questions & Answers:**

***Q (Mr. Georg Rast, consultant): This presentation is quite engaging. Have you considered including the last Hungarian station in your comparison? There seem to be minimal differences between it and the first station in the Croatian-Serbian sector. Additionally, what about extending the comparison further downstream, where only Serbian measurements are available, given the absence of significant tributaries?***

A (Ms. Jasna Plavšić, Hidrozavod DTD): Obtaining data for projects like this is quite challenging, and even acquiring the information has proven difficult. If we were to involve Hungarian data, it would likely be even more complicated. Nonetheless, it would indeed be very interesting to explore further.

***Q (Mr. Tibor Mikuška, Croatian Society for Bird and Nature Protection): The Apatin station has a long history. Why was it excluded from the analysis, given its significance for the entire platform?***

A (Ms. Jasna Plavšić Hidrozavod DTD): Apatin does not measure discharge; it only records water levels. Our methodology requires discharge data to compute the reference levels, so without that, it cannot be included.

***Q (Mr. Georg Rast, consultant): The high navigation water flow appears significantly lower than old data. Could this indicate a reduction in flood levels or volume?***

A (Ms. Jasna Plavšić, Hidrozavod DTD): Further calculations are needed to confirm this assumption. The observed differences may stem from varying methodologies used to develop flow duration curves. High water levels represent only about 1% of the flow duration curve, equating to just three days a year, making it sensitive to the methodology applied.

***Q (Ms Jasna Muskatirovic, Danube Commission): Which stage-discharge rating curves were used?***

A (Ms. Jasna Plavšić, Hidrozavod DTD): Stage-discharge curves for Croatian stations were made available in the form of regression equations. For Serbian stations, the curves were not delivered by Republic Hydrometeorological Service of Serbia. We reconstructed the curves from simultaneous data on daily discharges and water levels.

***Q (Mr. Arno Mohl, WWF Austria): The study shows that low navigation water levels are higher than official data reported to/available at the Danube Commission. Does this suggest that navigation conditions were previously underestimated?***

A (Ms. Jasna Plavšić, Hidrozavod DTD): It's challenging to draw conclusions, as several factors could explain these differences. Variations in methodology could be one issue, alongside the fact that prior official estimates were based on a 30-year period from 1980 to 2010. Additionally, morphological changes may have occurred, but a thorough analysis is required for definitive answers.

Additional information (Mr. Zdenko Tadić, Hidroing Ltd. Osijek) The last slide highlighted various organisms in the area. When analyzing ecology, in the past, a noticeable decline in medium and low water levels of about 1.5 cm per year was observed. The results can differ based on the analysis period, and extending this period might yield less favorable outcomes. Current conditions should be monitored closely, especially with an anticipated peak in water levels. Historical data from joint measurements by Croatian and Serbian parties showed discrepancies due to different ADCP resolutions. This underscores the need for caution regarding final results and conclusions, especially in light of ongoing water level declines.

Further Information to the Answer (Ms. Jasna Plavšić, Hidrozavod DTD): Once the report is reviewed, it will include an analysis of long-term averages at these stations. While there isn't a straightforward trend, cycles do exist, with each cycle spanning approximately 40 years. Given the extensive measurement period, it's noted that the current cycle is approaching its lowest point. If these cycles hold true, we might anticipate a rising trend in a few years, following the current downward trend. The report will contain a graph illustrating these 40-year cycles.

Additional information (Mr. Romeo Soare, Hidrozavod DTD): I would like to clarify an important aspect, as it has been two months since our last discussion. The distinction between low navigable water levels and hydrological parameters is crucial. Navigation conditions, which refer to depth, are determined by a combination of water level, geological morphology, fairway width, and curvature. In contrast, the low navigable water level itself represents only the hydrological parameters. Essentially, the difference lies between water level and depth.

Additional information after the meeting (Mr Dejan Trifunovic, DC Secretariat): Mr Dejan Trifunovic noted importance to use DC document from 2023: Low and highest navigable water level at the most important hydrological measuring points on the Danube for period 1991-2020, also the versions 1971/2000 and 1981/2010. These documents have been provided to the project team in the meantime.

Additional information after the coffee break (Ms. Marina Ilić): A brief discussion took place during the coffee break. Professor Playšić shared that she has information necessary to compare the results with previously adopted reference levels. Once the final draft is ready, it will be distributed to the Stakeholder Forum. Feedback will be appreciated within a reasonable timeframe in order to ensure the study can be finalised. Finalising this review process is essential for the modelling consultants to proceed with the hydraulic modelling.

**Lot 1: Hydraulic and morphological modelling of the SRB-CRO common stretch of the Danube River: Hydraulic modelling and multi-criteria analysis** (Nikola Rosić, Hidrozavod DTD, 2024-09-24\_PPT\_SHFM09\_04\_Nikola\_Rosic\_-\_Modelling\_and\_MCA.pdf)

The hydraulic modelling process began with creating digital models of riverbed geometry, utilizing multibeam and singlebeam surveys, supplemented by LiDAR and global DEM data. The HEC-RAS 2D model was selected for simulations.

A computational grid was established to define the density of points for hydraulic parameters (slide#6). Boundary conditions were set at Batina for inflow and Ilok for outflow. Calibration of the model was conducted using the data from Croatian hydrological stations, leading to realistic Manning coefficient values.

Verification of the model showed that the maximum difference between observed and calculated water levels was under 10 centimeters (slide#9). Low navigation water levels were analyzed, adopting discharge rates from Aljmaš.

Simulation results identified areas meeting minimal depth conditions and highlighted that 3 or 4 previously critical sectors may no longer be critical. Dredging needs were assessed (dredging refers to the volume of material that needs to be removed to meet navigational conditions). The dredging values are **fictitious** and represent the volume of sediment that needs to be removed to ensure an adequate level of service. In any case, they are used EXCLUSIVELY for the purpose of assessing navigational conditions in terms of dimensions, and under no circumstances for any actual physical dredging of sediment). Values indicating no issues with navigation conditions for Aljmaš, Erdut, and Ilok, while minor issues were noted for Bezdan and Siga Kazuk.

The next step is to prioritize critical sectors for further analysis. This follows a methodology from the Interstate Commission, established in 2014, which outlines two main criteria. The primary criterion is the required dredging works based on fairway widths, defined between 100 and 200 meters (100 actually is a condition from a rocky bottom). The Danube Commission recommends a fairway width of 200 meters, especially in curved sections where navigational issues are most common. This targeted approach aims to identify areas needing immediate dredging to ensure safe navigation.

**Questions & Answers:**

***Q (Mr. Georg Rast, consultant): Could you clarify what is meant by "minimal water elevation"? Does it pertain to the concept of minimum water depths?***

A (Mr. Nikola Rosić, Hidrozavod DTD): Minimal water elevation below which recommended fairway width is not met anymore. This represents the vertical distance between that elevation and the low water navigation level. For instance, if there is a vertical distance of one meter above the low water navigation level, dredging or other measures may be required if the minimal requirements are not met. Essentially, this vertical distance serves as a criterion derived from elevation.

***Q (Mr. Daniel Trauner, Environment Agency Austria): What measures will be taken in the future when dredging is necessary, particularly concerning the removal of significant material? In areas experiencing incision issues, should this material be transported back to those locations, or is it more appropriate to dispose it downstream?***

A (Mr. Ljubiša Mihajlović, Plovput): It is usually transported downstream, or even upstream in some cases if there is space for that. These amounts of dredging are just a first impression of how critical or non-critical

is an area. Dredging is not something that will surely happen. Probably none of these will be dredged. So, we will try to find some other type of solutions.

Additional information (Mr. Siniša Špegar Technical Assistance): Regardless of the measures applied in the sector—whether considering training works as a final solution or dredging as a temporary navigation measure—the sediment will be transported downstream.

Additional information (Mr. Nikola Rosić, Hidrozavod DTD): Be aware that those values represent the same current state from 2023. It is just a few meters. The river is a dynamical system, so we will get another result with different riverbed geometries. This is probably the first step in the creation of a model for this riverbed geometry model but that model cannot be used for estimation of dredging volume in the current state. The river is constantly changing.

***Q (Mr. Daniel Trauner, Environment Agency Austria): Despite the designation of this sector as critical and the existing issues, navigation on the Danube continues. How is the situation regularly monitored? What may be an issue today could change tomorrow, as the river is a dynamic system.***

A (Mr. Ljubiša Mihajlović, Plovput): Previous hydrographic measurements and data are crucial to prevent labelling a sector as critical one year and non-critical the next. Ongoing assessments are essential to determine whether a sector remains critical or is likely to become more so in the future. The main objective is to provide outputs for the new ENRs. There is also a need to prioritize the existing list of bottlenecks, which has not been updated in over ten years. A key concern is the lack of clarity regarding outcomes after this project concludes. Current data relies on outdated information from a decade ago, while common values and sectors related to the ENRs are shared. The latest figures indicate approximately 200,000 cubic meters of sediments to be dredged for a stretch of 140 kilometers, suggesting that navigation conditions are generally favourable despite minimal intervention. While some sections present challenges, none indicate an imminent stoppage in the near term. This information could be valuable for the analysis of the data. In this area, the border between Croatia and Serbia remains undefined, leading to significant issues that deter any dredging or work from being undertaken. In Plovput, as the Directorate for Inland Waterways in Serbia, efforts are focused on applying the latest marking plan to address these challenges. Consequently, no significant dredging activities are planned.

***Q (Mr. Alexander Zinke, Environment Agency Austria): Has the same calculation been done for the past, such as 5 years ago, 10 years ago, and 15 years ago?***

A (Mr. Igor Tadić, Hidroing Ltd. Osijek): When this interstate methodology for the Croatian and Serbian section was defined in 2014, there was also a document issued by the former Croatian Agency for Inland Waterways, which dealt with the applicability of those methodologies. We conducted a similar analysis in 2014. A different set of data was used, but the conclusions are the same. The same critical sectors have been critical via this exercise in 2014. We have a long-term set of data that concludes that we have problems in these sections. According to this analysis, the same sectors showed the need, for example, for dredging or certain measures to achieve good navigation status. We have a fairly certain long-term data that shows that these sectors had the same problem in 2014. Different inputs, different ENRs, but the same conclusion.

Additional information (Ms. Jasna Muškatirović, Danube Commission): Plovput has a database of hydrographic surveys starting from 1965 onwards. Every year, the same profiles have been surveyed, every single profile has been compared (years 1987 to 2011). Profiles with highest morphological changes over the years were used as a basis for the identification of critical sectors on the joint section. It's not a one-year survey, it is more than 30 years of surveys.

***Q (Mr. Georg Rast, consultant): The grid of two-dimensional model has about 30 meters. Is it quadratic or is it rectangular? What are the lateral limitations of your two-dimensional model? Are they beyond the banks?***

A (Mr. Nikola Rosić, Hidrozavod DTD): It's not structured, it is an unstructured computational grid. Also, octagonal elements can be included. Lateral limitations are not beyond the banks.

***Q (Mr. Georg Rast, consultant): The water temperatures in the Danube are changing a lot from 26 down to 5 degrees. The viscosity is also changing by more than 50%. Would it be an important factor?***

A (Mr. Nikola Rosić, Hidrozavod DTD): I'm not sure that it can be a significant factor. Turbulent effects are more important in hydraulic sense, from hydraulic perspective, from perspective of derivation of water levels.

**Q (Mr. Alexander Zinke, Environment Agency Austria):** *If water quality is discussed, the dredging volume ratio or water depth ratio is referred to. The relation between water quality, which pertains to physical quality, chemical quality, etc., and water depth is considered. The water depth ratio is used as an indicator for water quality because it reflects the conditions that affect aquatic ecosystems.*

A (Mr. Nikola Rosić, Hidrozavod DTD): Water depth is in relation with water temperature. We don't have a temperature model. There are different aspects of water quality. We will get expert judgments from ecological experts.

**Q (Mr. Tibor Mikuška, Croatian Society for Bird and Nature Protection):** *For one criterion, several indicators are provided, but one scoring system is used. How could these five different indicators be combined to obtain a single score?*

A (Mr. Nikola Rosić, Hidrozavod DTD): Every indicator gets the score, final score for one criteria is aggregated scores of indicators from that criteria. MCA is still under preparation.

**Q (Mr. Tibor Mikuška, Croatian Society for Bird and Nature Protection):** *When discussing fish and bird populations and habitat suitability areas, it is emphasized that the entire floodplain data must be utilized. Calculating habitat suitability cannot be effectively done without considering the entire floodplain. The focus is currently only on the river, which poses a problem. While the river may provide adequate conditions for species like Sand martin, habitat suitability encompasses more than just the river itself. The floodplain is crucial for habitat considerations and cannot be overlooked. There are several questions regarding how these issues will be addressed.*

A (Mr. Nikola Rosić, Hidrozavod DTD): Lateral connectivity between main channel and floodplain will be addressed in the study.

A (Mr. Zoran Rašić, Technical Assistance): All activities inside the riverbed will not affect the level of the full riverbed. That means, actually, that no adverse effects expected for the floodplain. Do-nothing scenario and the scenario after some activities will be the same for the floodplain.

Additional information (Mr. Gorčin Cvijanović, University of Belgrade –Institute for Multidisciplinary Research – external presentation): If spawning sites are discussed, the main concern is the lack of monitoring in the Republic of Serbia, resulting in less data about those grounds. It is confirmed that fish are present, but the discussion can focus on their monitoring situation and duration. The lack of monitoring is expected to affect modelling due to insufficient input. How monitoring occurs and sampling is conducted remains unclear, requiring a longer timeframe, which is lacking. This isn't specific to the project but relates to the general state strategy. In other words, the improvement of the situation can be defined, such as an increase in species. However, important species may be lacking, while invasive species could increase biodiversity metrics. The question is whether the protection of certain species will be prioritized or just the inlets.

**Q (Ms. Kerstin Böck, WWF Austria):** *Riverbed incision is also an important aspect to consider in the MCA - is this part of the "Hydromorphology" criterion?*

A (Mr. Nikola Rosić, Hidrozavod DTD): The trend of erosion cannot be addressed for the entire common stretch. However, favourable solutions involve morphological changes that do not significantly impact the riverbed or that positively affect it.

**Q (Mr. Alexander Zinke, Environment Agency Austria):** *Due to the deterioration of ecological habitats and species resulting from riverbed incision, intervention is necessary. Corrective actions to reduce or halt erosion are crucial. The question is whether some proposed measures could help mitigate this erosion effect. The fact of riverbed incision cannot be ignored with new measures; it must be demonstrated that these measures do not worsen the situation. This is a key factor in your proposals. If you can contribute to reducing this process, you will have a clear asset.*

A (Mr. Nikola Rosić, Hidrozavod DTD): Some sectors experience greater erosion than others downstream, making it essential to consider sediment transport integrally along the entire stretch. The criteria involve the alteration and non-uniformity of morphological features, which cannot solely address riverbed erosion.

**Q (Mr. Alexander Zinke, Environment Agency Austria):** *As a result of monitoring, it is now known which species were found at specific sites. This enables the mapping of ecologically critical areas or points, which must be incorporated into the model. Some areas are ecologically essential, requiring careful management, while others are less critical, allowing for easier interventions in the riverbed.*

A (Mr. Gorčin Cvijanović, University of Belgrade –Institute for Multidisciplinary Research – external presentation):

It seems that critical navigation is being assessed, and based on that, the environmental impact on the area is being evaluated. The question arises: why assess environmental areas not directly related to the sites affected by the measures? Is there an obligation to conduct such assessments? For instance, if a critical environmental site is upstream and won't be impacted, is it still important to assess it for their purposes?

Additional information (Mr. Alexander Zinke, *Environment Agency Austria*): The number of prioritized critical areas has now been reduced. However, there are still 13 sectors that are critical for navigation, though only a few have been selected as higher priority. The next step is to overlay these areas with the results of ecological monitoring to identify which critical navigation areas require caution regarding interventions that could further impact essential ecological sites. This approach minimizes disputes and conflicts. From the 6 or 7 areas, it may be possible to identify only 2 or 3 where specific measures can create a win-win situation—enhancing navigability while maintaining or improving ecological quality.

***Q (Mr. Arno Mohl, WWF Austria): Data quality remains a concern, as the mere occurrence of a fish species does not indicate that an area is a crucial habitat without understanding population structure or spawning areas. This issue needs to be addressed when evaluating these sectors. Additionally, it is well known that the most natural areas are often the primary challenges for navigation. Natural sections are critical regarding interventions, and this status must be carefully considered in assessing potential measures.***

A (Mr. Alexander Zinke, *Environment Agency Austria*): Before conducting this exercise, it would be beneficial to perform the map overlay, as it simplifies the task at hand. This does not imply that an easy solution will be found, but it may clarify the situation. Simultaneously, the ecological monitoring results highlight specific areas of concern—not the entire 137,5 km, but only the most critical sections. With the overlay, focus can be directed to these areas. The next step involves determining the criteria and indicators to be used, allowing for a more targeted exercise.

Before conducting this exercise, it would be beneficial to perform the map overlay, as it simplifies the task at hand. This does not imply that an easy solution will be found, but it may clarify the situation. Currently, the number of identified high-priority sections critical for navigation has been reduced to 6 or 7, which is a significant result. However, there are still 13 sectors that are critical, and those selected for further investigation are fewer. Simultaneously, the results from ecological monitoring highlight specific areas of concern—not the entire 140 or 130 km, but only the most critical sections. With the overlay, focus can be directed to these areas. The next step involves determining the criteria and indicators to be used, allowing for a more targeted approach.

Additional information (Mr. Igor Tadić, Hidroing): The overlay has already been completed in the monitoring portion, as there is a GIS database that digitalizes all monitoring activities related to biodiversity. While an expert analysis is still needed for species-specific assessments, the digital overlay is fully established. However, an overlay of the 6 or 7 navigation sites or sectors has not yet been created. Nevertheless, the GIS database exists, as monitoring activities were conducted across all 17 sectors, and shapefiles are available for this data.

Additional information (Ms. Lidija Hubalek, MMPI): This GIS database has been created for our purposes. Usernames and passwords will be provided within the next two to three weeks, as promised.

***Additional comment (Ms. Lucia Karpatyova): The preliminary results related to navigational bottlenecks (critical sectors) were presented, of which few seem to be no longer critical. Out of these, 6 or 7 have been identified as high priority due to their negative impact on the navigation safety. These will still be confirmed between the Croatian and Serbian waterway authorities. However, the modelling activities must continue. It is therefore proposed, if the Stakeholder Forum agrees, to give a "go" to the modelling consultants to continue the preparation of variants for these critical sectors.***

A (Stakeholder Forum): There were no objections to this proposal, so the modelling consultants can continue with modelling activities on the identified high priority critical sectors considering the input discussed during the meeting.

## External presentations

[Presenter: Gorčin Cvijanović/University of Belgrade – Institute for Multidisciplinary Research.

See 2024-09-24\_PPT\_SHFM09\_05\_Gorcin\_Cvijanovic\_-\_External\_-\_Fish\_migration.pdf]

The fish telemetry research began in 2015 with the tagging of large fish using surgical transmitters below the Iron Gate dam. This allowed for two years of data collection on their movements. Collaborative efforts with organizations like ICPDR and DDM from Romania expanded the deployment of monitoring technology, enhancing the tracking of migratory fish across various habitats.

By 2019, over 40 specimens were monitored, focusing on their behaviour in relation to newly constructed fish passes. A network of 12 receivers was established upstream and downstream of these passes to gather real-time data on fish movements.

Advanced modelling techniques were developed through partnerships with experts, enabling precise assessments of fish interactions with their environment. The research provided valuable insights into migration patterns and habitat use.

Ultimately, the collected data will inform the design of fish passes and other infrastructure projects, ensuring they effectively support fish migration. This work highlights the importance of telemetry in understanding aquatic ecosystems and will guide future environmental initiatives aimed at preserving fish populations and their habitats.

The design of fish passes is crucial for determining migratory behaviour. While some fish will naturally pass through a constructed fish pass, it is essential to understand the purpose behind these structures. Different species have varying needs; for instance, while vimba is a migratory species, it may not thrive in high-velocity flows, preferring calmer waters.

When constructing fish passes for species like sturgeons, which prefer slower currents, it is vital to consider their natural habitats. Additionally, the entrance design must include adequate attraction velocity to encourage fish to enter. If the entrance is not optimally positioned, certain species may not utilize the fish pass effectively. Understanding these factors is essential for successful fish pass implementation and to ensure that they meet the needs of the targeted species.

## Next steps & AOB

- Stakeholder Forum meetings planning for 2024

Following the discussions among participants at the Forum, it has been decided that the next meeting will take place on **28<sup>th</sup> of October 2024**. Additionally, two more meetings are scheduled. First one is scheduled for 20<sup>th</sup> of November 2024. and the second one to be agreed (somewhere at the beginning of December). Further details will be provided as the dates approach.

- Draft (final) reports – first set

The available modelling results were presented during the meeting. The input received before, during and close after the meeting will be consolidated into the first set of final draft reports (as indicated in the progress overview) and will be sent to the Stakeholder Forum for review, feedback and clarifications where necessary. Feedback from Stakeholders will be expected within a reasonable timeframe - to be indicated in the email. Hydraulic modelling will continue, and the input provided will be taken into account as the modelling progresses.

## Upcoming Meetings

Meeting	Date / time	Place
Stakeholder Forum Meeting #10	28 October 2024	Online
Stakeholder Forum Meeting #11	20 November 2024	Online
Stakeholder Forum Meeting #12	11 December 2024 (morning)	Online

## Attachments

- List of participants (separate file)
- Presentations (Stakeholder Forum website: <https://www.viadonau.org/en/company/project-database/preparing-fairway-2-works-in-the-rhine-danube-corridor-study/stakeholder-forum>)