

# **Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries:**

## **NATIONAL ACTION PLANS**

**UPDATE MAY 2018**

Developed within the **EU co-financed project FAIRway Danube**

Version 03.09.2018



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Version 03.09.2018



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## 1 Executive summary

These action plans illustrate the status and planned next steps for rehabilitation and maintenance activities in the Danube riparian countries. They are based on the Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries as it was endorsed by a large majority of the Danube Transport Ministers in December 2014. By means of the action plans at hand, the **implementation status of the Master Plan shall be monitored**. Continuous updates are foreseen to provide the necessary information. This document provides the altogether seventh update of the Master Plan and comprises an overview of the fairway situation during 2017. Furthermore, taken and planned measures as well as the resulting budget needs and financing gaps 2018 are illustrated. This document also includes information of the ecological status of the Danube and the relevant aspects, e.g. legal permits, related to maintenance and rehabilitation measures.

According to the Danube River Basin Management Plan 2015 by the International Commission for Protection of the Danube River (ICPDR), the **majority of the Danube is classified as heavily modified water body with moderate or worse ecological potential**. In order to achieve good ecological potential and status (natural water bodies) as required by the Water Framework Directive, **an integrated planning approach is applied in the Danube countries** as regards navigational maintenance and rehabilitation measures.

**Fairway conditions were less favourable in 2017 compared to the previous year.** January and early February were characterised by very low water levels. Additionally, the cold period at the beginning of 2017 caused the formation of ice on the Danube, which led to the closure of navigation on the Upper, the Central and the Lower Danube. In Romania, navigation had to be closed for 42 days. These extreme hydro-meteorological conditions in January caused fairway depths far below 2.5m at most critical sections. From mid-February until the end of the year, minimum fairway depths were mostly exceeded on the **Upper Danube**. On the **Central and Lower Danube** water levels started to decrease in June, dropping below LNWL on several days on the Lower Danube. In combination with insufficient maintenance works or required capital interventions this led to very unfavourable fairway conditions in summer 2017, especially on the Lower Danube. The most critical location was Cochirleni, where the minimum fairway depth was not achieved in July, August and September.

**On several of the 20 main critical sections along the Danube, the recommended fairway depth of 2.5m<sup>1</sup> at Low Navigable Water Level<sup>2</sup> was not achieved throughout the whole year.** However, in some sections, fairway depths just slightly below the 2.5m threshold were provided.

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<sup>1</sup> In some river sections however - in Germany, Slovakia and Hungary - this target is not valid, as it is not achievable by stream regulation and maintenance measures due to physical preconditions. Specific target values apply, e.g. 2.0m in Germany between Straubing and Vilshofen.

<sup>2</sup> The water level reached or exceeded at a Danube water gauge on an average of 94% of days in a year (i.e. on 343 days) over a reference period of several decades.

## Executive summary

Considering the average hydrological conditions in summer 2017 (with the exception of the unusual hydro-meteorological situation in January and early February), significant efforts have to be made as soon as possible to achieve better fairway conditions in the coming years. This particularly entails **more targeted maintenance and rehabilitation measures** and **securing sufficient national budgets for operative tasks**.

**Considerable investments** have been initiated in the last years since launching the Master Plan. The amount varies, but **at least a third of the national needs** declared in 2014 have been satisfied in most countries, which participate in the FAIRway Danube project. Most of the available investment budget is based on EU co-financing. This underlines the important role of the European Union to realize the objectives of the Masterplan. Nevertheless, in some countries **major shares of the investment needs until 2020, as stated in the Master Plan, are not yet secured**. The national contributions via (co-)financing are sometimes not sufficient.

## 2 Introduction

### *Purpose of action plans*

In their conclusions of 3<sup>rd</sup> December 2014 regarding the Fairway Rehabilitation and Maintenance Master Plan for the Danube and its Navigable Tributaries, a large majority of the Danube Transport Ministers agreed to “take the necessary measures (...) to deal within the framework of fairway maintenance with the critical fairway sections identified in the Master Plan, to establish for this purpose national roadmaps which identify individual actions, responsibilities, funding resources and intermediate milestones for the implementation of these measures and to communicate these roadmaps by 30<sup>th</sup> June 2015 to the relevant coordinating bodies”. This is in line with Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network, obliging EU Member States to preserve a good navigation status, while respecting the applicable environmental law. In the Danube Region the “Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube Basin”, endorsed in 2007 by the ICPDR (International Commission for the Protection of the Danube River), Danube Commission and the International Sava River Basin Commission (ISRBC), thereby is a key tool providing guidance for the planning and implementation of waterway projects.

The Master Plan and the action plans are **designed as living documents**. Therefore, their structure and content is constantly under review and will be elaborated in order to provide the highest level of transparency and the greatest benefit for the waterway administrations with regard to their maintenance and rehabilitation activities. The aim is to standardise and simplify the data gathering process as much as possible; the use of electronic support tools is envisaged. In May 2018, the map displaying the critical locations along the Slovak Danube stretch was updated. It appears in Annex II.

In general, the national action plans at hand **create a high level of transparency** which was not available in the years before. Detailed information on operational rehabilitation and maintenance activities are presented. The Master Plan and the corresponding national action plans have therefore opened the black box of previously nationally oriented waterway management approaches for all involved stakeholders. **Transparent illustration of planned and implemented measures** allows coordinated action on national as well as corridor level. **Cost and budget information** allows evaluating efficiency and improving the capability to act on the long run.

The basic maintenance philosophy applied throughout the Master Plan is an important step towards **implementing the most effective, environmentally sound and cost-efficient measures possible**. Improved monitoring/surveying activities create the needed high quality data basis to identify the best measures including **exploiting the potential of fairway realignment** to the maximum extend where possible and reduce dredging interventions as much as possible and purposeful.

### ***Scope of action plans***

Based on the ministerial conclusions of December 2014, Priority Area 1a of the EU Strategy for the Danube Region initiated the elaboration of national action plans in spring 2015. They follow a harmonized structure in order to provide an improved overview of actions taken and planned along the Danube.

The action plans shall be updated continuously in order to serve as a proper monitoring and documentation tool as regards planning of budget and activities. Contents for these updates will be provided in the framework of the CEF-financed FAIRway Danube project which requires a biannual update (October and May) for additional steering purposes for the countries that are project partners (Austria, Slovakia, Hungary, Croatia, Romania, Bulgaria). The remaining Danube riparian countries are integrated via PA1a – Inland Waterways of the European Strategy for the Danube Region and will be asked to contribute data once a year (May). In the **October update**, building on the status report as regards critical locations, hydrological conditions and rehabilitation and maintenance activities undertaken in the course of the year, the focus is laid on the **resulting budget needs** and – if already available – information on **the allocated budget for the coming calendar year**. This shall support effective planning of activities and financing.

The **May update** shall provide a possibility to fine-tune the budget and activity planning for the ongoing year. Furthermore, data on the **status of critical locations, hydrological conditions and implemented measures for the full preceding year** will be provided.

The **summarising tables on costs and budgets** in this report allow only limited comparison between the riparian states, as the national accounting practices vary (e.g. some countries summarize more activities under “maintenance and rehabilitation” than others). The main purpose is to **illustrate the cost and budget development over the years per country, to indicate financing needs and to outline the shares of national and European funding**.

### ***Scope of current report***

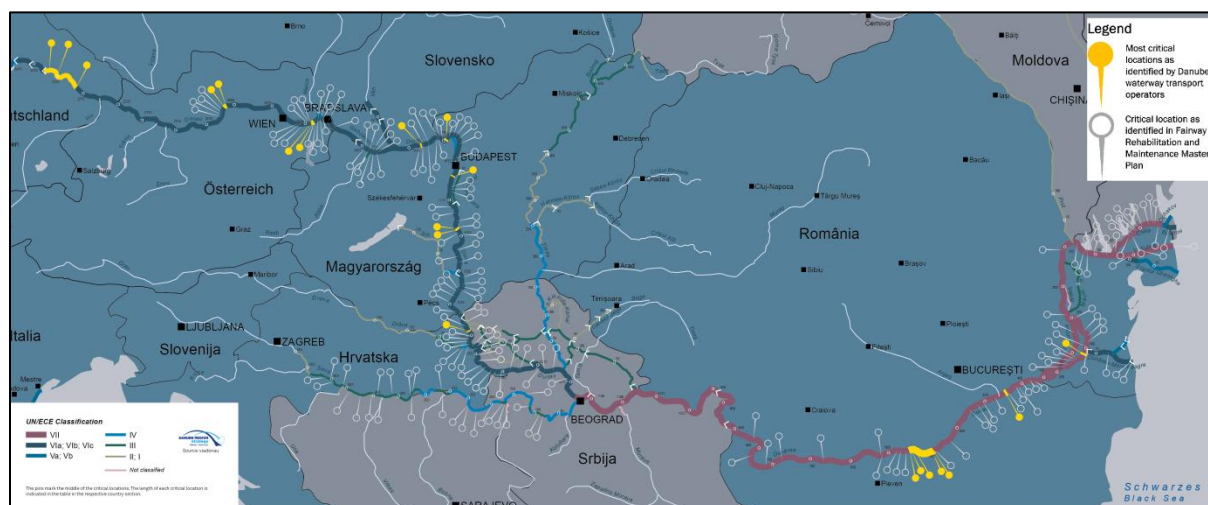
This document updates the sixth National Action Plans of October 2017 for the Fairway Rehabilitation and Maintenance Master Plan for the Danube and its Navigable Tributaries. It is the sixth Action Plan to be elaborated within the FAIRway Danube project.

It focuses on the most critical sections as identified by a sample of 24 important shipping organisations and waterway administrations in December 2014. From the user perspective, the locations and stretches marked yellow in the map and listed in the table below cause the biggest navigational problems and should consequently be treated with the highest priority. For reporting purposes, some of the locations have been grouped in the country chapters.

In some country chapters, a number of critical sections has been added to the ones selected by the shipping organisations. This was the case, if the responsible waterway administrations considered it necessary to additionally report on the status of these locations due to their critical state.

## Introduction

As a general remark, it has to be stated that the exact situation of the critical sections varies over the years due to the intense dynamics of the river.



location and length (km)			right bank / left bank	name of section or location
river-km (from - to)		length		
2,321.70	2,312.00	9.50	DE / DE	Straubing (lock)–Straubing-Sand (port)
2,312.00	2,282.50	29.70	DE / DE	Straubing-Sand (port)–Deggendorf
2,282.50	2,249.90	32.50	DE / DE	Deggendorf – Vilshofen (backwater Kachlet)
2,014.60	2,013.50	1.10	AT / AT	Weißenkirchen
2,010.20	2,008.90	1.30	AT / AT	Dürnstein
1,888.60	1,887.60	1.00	AT / AT	Treuschütt
1,885.00	1,883.50	1.50	AT / AT	Hainburg
1,735.50	1,733.70	1.80	HU / SK	Nyergesújfalu
1,698.00	1,697.00	1.00	HU / HU	Dömös
1,638.40	1,637.40	1.00	HU / HU	Budafok
1,559.80	1,559.70	0.10	HU / HU	Dunaföldvár
1,558.50	1,557.50	1.00	HU / HU	Solt
1,408.20	1,400.00	8.20	HR / RS	Apatin
568,20	567,80	0.40	BG / RO	Milka Island
567,00	566,70	0.30	BG / RO	Belene Island
562,00	561,50	0.50	BG / RO	Coundur Island
541,60	541,00	0.60	BG / RO	Vardim Island
538,50	537,00	1.50	BG / RO	Giska Island
425,90	425,20	0.70	BG / RO	Kosui Island
309,00	308,00	1.00	RO / RO	Cochirleni



### **Recommended Levels of Service**

Notwithstanding the provisions of the TEN-T Regulation (1315/2013), the "European Agreement on Main Inland Waterways of International Importance" (AGN) and the "Recommendations on Minimum Requirements for Standard Fairway Parameters, Hydrotechnical and Other Improvements on the Danube" published by the Danube Commission, the waterway management experts represented in the project NEWADA duo<sup>3</sup> recommended different minimum Levels of Service for the different phases in the waterway maintenance cycle. The recommended minimum Level of Service related to fairway depth for the Danube and its navigable tributaries was thereby defined as **2.50m at Low Navigable Water Level** (LNWL or ENR / Étiage navigable et de régularisation), i.e. on 94% (343 days) of the year, calculated on the basis of the discharge observed over a period of 30 years with the exception of ice periods. In some river sections however, e.g. in Germany<sup>4</sup>, Slovakia and Hungary, this target is not valid, as it is not achievable by stream regulation and maintenance measures due to physical preconditions. This aspect remains valid throughout this document.

As regards the reporting of the status of critical locations or sections in the national chapters, the visual illustration has been modified to include the water level information for the respective month. The recommended **target** of the Fairway Rehabilitation and Maintenance Masterplan is to provide a **fairway depth exceeding 2.5 m<sup>5</sup> at least on as many days per year as show actual water levels equal to or above the statistical Low Navigable Water Level (LNWL)<sup>6</sup>**. Therefore, information on the status of critical locations is only valid in relation to the hydrological conditions in the same period.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is also displayed in the national chapters.

The recommended fairway widths for the minimum depth (both based on NEWADA duo) were defined in order to represent a **"deep fairway channel"** and comprise a range of values for different bend radii for a reference (i.e. the most common) vessel or convoy going downstream in one-way traffic. Higher fairway widths are needed in sharper bends of the waterway, as the drift angle of the respective vessel must be accounted for.

This "deep fairway channel" should be available already prior to low water periods to prevent obstacles to navigation already in advance. Once a fairway depth of 2.5m at LNWL (ENR) for this minimum fairway width (minimum LoS) has been established by dredging or realigning the course of the fairway, the recommended fairway widths shall be maintained in their entirety according to the 2013 Danube Commission Recommendations (Section 7.2.2. of the "Recommendations on Minimum Requirements for Standard Fairway Parameters, Hydrotechnical and Other Improvements on the Danube").

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<sup>3</sup> <http://www.newada-duo.eu/>

<sup>4</sup> In addition, Germany was not a project partner in NEWADA duo and thus did not agree to the NEWADA duo Levels of Service. For the section Straubing-Vilshofen, 2.0m are set as target value by the German waterway administration

<sup>5</sup> Or the respective target value relevant for the special section (e.g. 2.0 m in Straubing-Vilshofen on the German Danube)

<sup>6</sup> LNWL = the water level reached or exceeded at a Danube water gauge on an average of 94% of days in a year (i.e. on 343 days) over a reference period of several decades

## Introduction

The targeted minimum widths of the fairway (NEWADA duo Level of Service 1) are provided below.

- 40 – 80 m in Austria (CEMT class VIb-VIc)
- 60 to 100 m in Slovakia and on the Slovakian – Hungarian border section (CEMT class VIb – VIc)
- 80 to 120 m in Hungary (CEMT class VIb – VIc)
- 80m in Croatia, Serbia, Romania and Bulgaria (including border sections, excluding the maritime Daube). No range for bend radii is defined, as there is usually no passing of vessels and convoys in bends in these sections. Reference vessels for Croatia: (3x2 or 2x3 barges; CEMT class VI C.) Reference vessels for Serbia (CEMT class VIc-VII); reference vessels for Romania and Bulgaria (CEMT class VII)

The overall aim is to implement the recommended Levels of Service on the fairway with reduced physical interventions, which lowers costs as well as environmental impacts. The key precondition to achieve this aim is to establish an improved information basis on the actual status of the critical waterway locations. In order to be able to monitor the development of the “deep fairway channel” (minimum LoS), to decide on the optimum measures under the given circumstances and to provide the users of the waterway with the needed information on a regular basis, monitoring of fairway depths at critical locations has to take place at high frequency (at least once a month). Only such a high quality decision basis allows designing more effective and efficient measures. With the few exceptions mentioned above, this recommended Level of Service should normally be achievable with conventional maintenance measures (ranging from surveying, fairway marking/relocation to dredging), that is, without structural interventions on the infrastructure. Thus, the Master Plan lists measures and costs not only related to dredging, but also for related processes such as surveying or data analysis. Capital dredging – main structural interventions - is not addressed in general.

For the **reporting of conducted rehabilitation and maintenance measures** a graphical approach was chosen to visualise all activities in greatest detail, adding the local and temporal dimension of the works done.

### ***Multifunctional use of rivers***

Apart from the impact of navigation laws on rehabilitation and maintenance activities, further legislation related to aspects like forest, fishery, flood risk and environment need to be taken into account. These Action Plans shall elaborate particularly on the environmental aspects of the measures taken.

Official notifications or permits are needed from the competent national authorities related to water law, nature protection law, and (in some countries) national park law in the context of waterway maintenance measures. The authorities responsible for issuing these environmental permits comply with the goals of the legal instruments of the European Union, such as the Water Framework Directive 2000/60/EC (WFD) or the Environmental Impact Assessment Directive (85/337/EEC) and the Habitats Directive (92/43/EEC) in connection with the Birds Directive (2009/147/EC) which form the NATURA 2000 network. Further relevant Directives may be the Strategic Environmental Impact Assessment Directive (2001/42/EC), the Flood Risk Management Directive (2007/60/EC) and the Public Participation Directive (2003/35/EC).

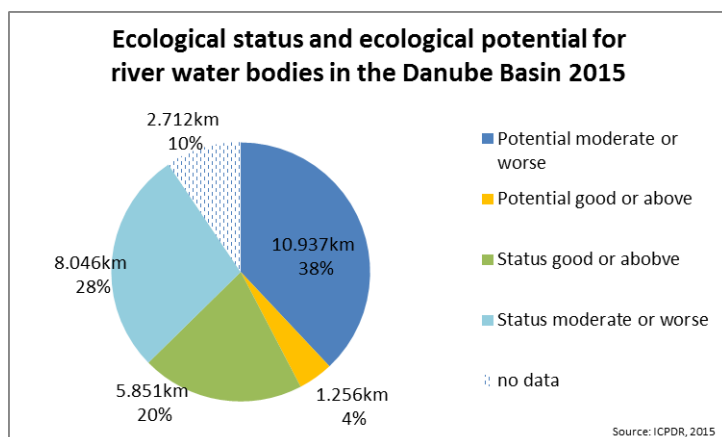


### *Implications of the Water Framework Directive*

The **Water Framework Directive** requires Member States in Article 4.1(a) (i) to "implement the necessary measures to prevent deterioration of the status of all bodies of surface water". Another goal is to protect, enhance, (and restore) these water bodies in order to reach or keep the good chemical and ecological status (or potential, if the water body is classified as heavily modified or artificial) until 2015. An assessment of the situation and measures towards the achievement of these goals must be laid down in River Basin Management Plans. As achieving these goals by 2015 is not realistic for all water bodies, updates of the plans were/are foreseen in 2015 and 2021.

The International Commission for the Protection of the Danube River has currently updated the Danube River Basin Management (DRBM) Plan by end 2015<sup>7</sup>. The plan addresses the key issues requiring joint actions on the basin-wide level (Level A) and is accompanied by more detailed plans on the national level (Level B).

According to the Danube River Basin Management Plan 2015-2021, about 20% of the Danube river basin surface waters have a status good or above (which is the ultimate aim within the WFD), about 4% show a good or above potential. About 49% of the River Water Bodies are at risk or possibly at risk to achieve good ecological status by 2021, about 40% of that share is due to future or ongoing alterations.



The plan also states that “hydropower generation, navigation and flood protection are the key water uses that cause hydromorphological alterations. (...) The alteration of natural hydromorphological conditions can have negative effects on aquatic populations, which might result in failing the EU WFD environmental objectives.”

According to a decision of the European Court of Justice in 2015<sup>8</sup> as regards a dredging project on the river Weser, the following two main conclusions as regards application of the WFD in prac-

<sup>7</sup> <http://www.icpdr.org/main/activities-projects/river-basin-management>

<sup>8</sup> A ECJ process between the Federal Republic of Germany and the German Federation for the Environment and Nature Conservation (Bund für Umwelt und Naturschutz Deutschland e.V.); (Case C-461/13)

## Introduction

tice can be derived and may also serve as guidelines for practical implementation of maintenance and rehabilitation measures on the Danube and its navigable tributaries<sup>9</sup>:

1. Article 4.1(a) (i) to (iii) of the Water Framework Directive must be interpreted as meaning that the Member States are required – unless derogation is granted – to refuse authorization for a specific project if it may lead to a deterioration of the status of a body of surface water, or where it jeopardises the attainment of good surface water status, or of good ecological potential and good surface water chemical status by the date laid down by the Directive.

2. The term "deterioration of the status" of a body of surface water, as described in Article 4.1(a) (i), must be interpreted as meaning that a deterioration exists as soon as the status of at least one quality element, according to Annex V of the Directive, deteriorates by one class –even if this deterioration does not lead to a deterioration in the classification of the respective body of surface water altogether. If a quality element according to Annex V is however already in the lowest class, any deterioration of that respective element constitutes a "deterioration of the status" of the body of surface water.

Based on practical experience of waterway administrations, maintenance activities do not have significant negative influence on the status of a waterway in the majority of cases<sup>10</sup>. However, in cases where maintenance activities are liable to cause deterioration of the water status or put at risk the achievement of environmental objectives, they may only be authorised when all conditions under the exemption of article 4(7) WFD are met:

(a) all practicable steps are taken to mitigate the adverse impact on the status of the body of water;

(b) the reasons for those modifications or alterations are specifically set out and explained in the river basin management plan required under Article 13 and the objectives are reviewed every six years;

(c) the reasons for those modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives set out in paragraph 1 are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development, and

(d) the beneficial objectives served by those modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.

For small projects that do not fall within the scope of the EIA Directive (85/337/EEC), a generic approach can be used within this procedure in order to reduce the assessment burden<sup>11</sup>.

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<sup>9</sup> For more information, see the Weser press release: <http://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf>

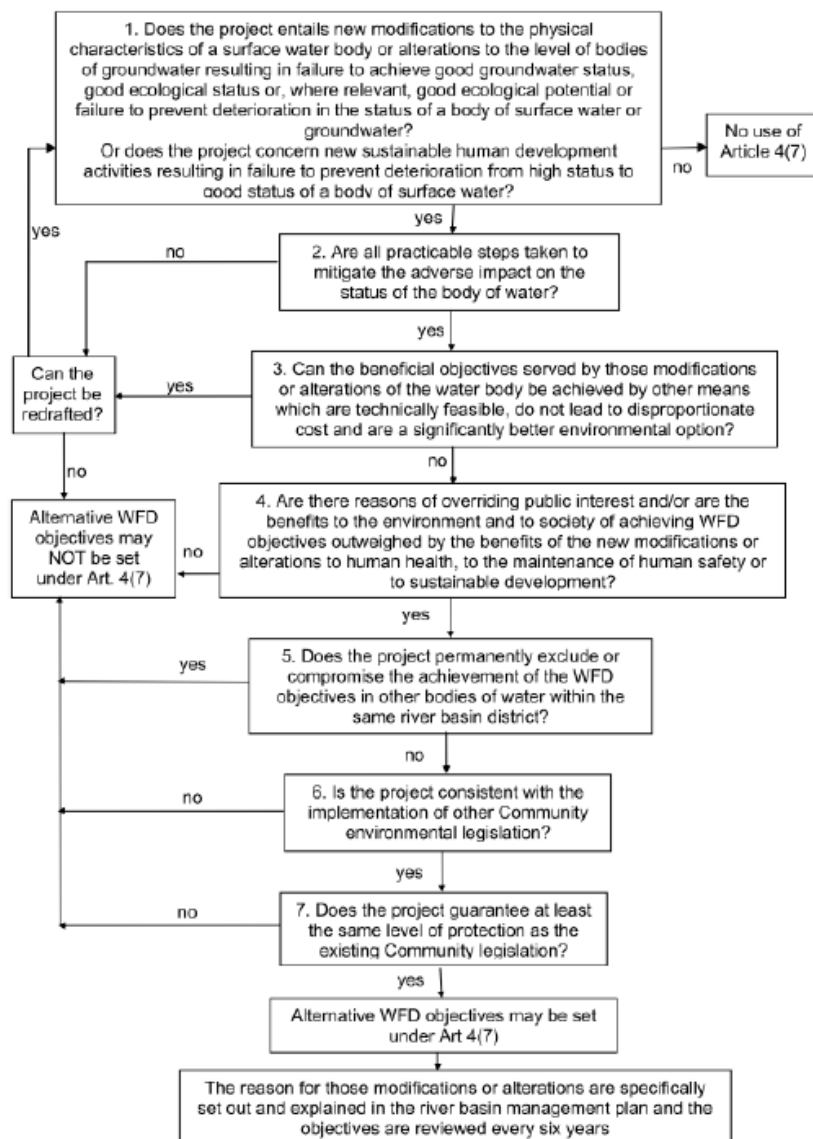
<sup>10</sup> See, e.g., „Leitfaden Umweltbelange bei der Unterhaltung von Bundeswasserstraßen“, Bundesminister für Verkehr und digitale Infrastruktur, Bundesanstalt für Gewässerkunde (Hrsg.), Bonn, 2015, p.12

<sup>11</sup> Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 20 on exemptions to the environmental objectives, European Communities, Luxembourg, 2009 , p.25

## Introduction

The DRBM Plan lists Key Future Infrastructure Projects (FIP) for navigation in its Annex and assesses it regarding their compliance with the WFD objectives and potential applicability of Art 4(7). The FIP comprise solely capital interventions.

The following figure<sup>12</sup> provides an example for an iterative approach regarding application of Art 4(7):



<sup>12</sup> Idem, p.26

### **NATURA 2000**

Natura 2000 sites are not excluded from further infrastructural development. Planned projects need to be assessed regarding their impact on existing genetics, species and ecosystem diversity and, if necessary, rejected or accepted with conditions.

As it is the case within the Water Framework Directive, maintenance activities are usually not seen as “project” as defined by the Habitats Directive. Thus, a full impact assessment is only necessary in exceptional cases<sup>13</sup>. However, if a maintenance measure might have a significant influence as regards the objectives of the Habitat Directive, an assessment has to be performed. In this case, basically the same (but strongly simplified) procedures apply as within a standard impact assessment. For further guidance on application of the Birds and Habitats Directives in navigation related activities, a reference is made to the Guidance Document on Inland Waterway Transport and Natura 2000<sup>14</sup>, issued by the European Commission's Directorate-General for Environment in 2012.

### ***Application of Joint Statement principles***

In October 2007, a "Joint Statement on Inland Navigation and Environmental Sustainability in the Danube River Basin" was concluded by the ICPDR, the Danube Commission and the International Sava Commission. It is in essence aimed at finding the balance between good ecological status (as required by the WFD) and good navigation status (as required by article 15(3)b of the TEN-T guidelines).

The Joint Statement (...) “addresses, first of all, structural interventions and measures on rivers serving inland waterway transport; non-structural measures will also have to be undertaken to successfully upgrade and sustain inland waterway transport economically. (...) Full respect of the existing legal framework, including all relevant transport and environment legislation (national legislation, EU directives and international requirements), is a pre-condition for any activity in the Danube region.”

Some of the most important principles included in the Joint Statement refer to the early **involvement of key stakeholders** and the **creation of a transparent planning process based on comprehensive data**. The Master Plan as such and the continuous update of national action plans have been also created for this reason.

In the years after 2007, the responsible government authorities and interest groups met regularly to discuss the progress achieved so far and how to improve the application of the Joint Statement in waterway projects. Activities on the Fairway Rehabilitation and Maintenance Master Plan have also been presented in the framework of these regular meetings, as well as in the context of the interdisciplinary PA1a Steering Group meetings of the European Union Strategy for the Danube Region.

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<sup>13</sup> Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 20 on exemptions to the environmental objectives, European Communities, Luxembourg, 2009 , p.25

<sup>14</sup> [http://ec.europa.eu/environment/nature/natura2000/management/docs/IWT\\_BHD\\_Guidelines.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/IWT_BHD_Guidelines.pdf)

## Introduction

The rehabilitation and maintenance measures and activities monitored within the context of the Master Plan (surveying, fairway relocation, dredging and better information) have the character of reversible interventions, as recommended by the Joint Statement. **Effects of measures are monitored and – if relevant – adapted** in the context of the national permitting processes. The overall effects of measures shall be summarised in the action plans at hand.

Lastly, the transboundary FAIRway Danube project and the EUSDR support the **use of best practice measures** to improve navigation through the established cooperation mechanisms between waterway administrations.

### *The FAIRway Danube project*

The FAIRway Danube project (07/2015 – 06/2020) is the main overarching initiative to implement the activities of the Danube Fairway Master Plan. Seven project partners represent six riparian states (viadonau (Austria), ARVD - Waterborne Transport Development Agency (Slovakia), OVF - Országos Vizügyi Főigazgatóság together with NDA - Nemzeti Infrastruktúra Fejlesztő Zrt. (Hungary), AVP - Agencija za vodne putove (Croatia), EAEMDR - Executive Agency for Exploration and Maintenance of the Danube River (Bulgaria), AFDJ - Administration of the Lower Danube (Romania), ACN - Administration of the Navigable Canals (Romania)).

As a first step, FAIRway Danube coordinates the updates of the national action plans of the countries participating in the project. The remaining countries (Germany, Bosnia and Herzegovina, Serbia, Moldova and Ukraine) are invited to provide their contributions via the EU Strategy for the Danube Region (Priority Area 1a on Inland Waterways). The related country chapters are attached to this report as an Annex. Further activities within FAIRway Danube comprise:

- Outlining of pilot activities for hydrological services based on the national action plans
- Coordinated purchase of advanced equipment for hydrological services (gauging stations, surveying vessels etc.)
- Realization and Evaluation of pilot activities:
  - Basic data for all critical sections
  - Coherent monitoring scheme for the navigation status
  - Harmonised water level forecasts
  - Optimized relocation of the fairway
- Develop innovative approaches
- Prepare documentation for selected future implementation measures

The FAIRway budget amounts to 23.4 Mio €, including an EU co-financing (CEF) of 19.6 Mio €.

### *Adoption of action plans*

The Action Plans are prepared within the FAIRway project. The FAIRway Steering Committee will be asked to approve the Action Plans for the countries participating in the project (Austria, Slovakia, Hungary, Croatia, Romania and Bulgaria) from a technical point of view. However, the Steering Group of PA1a remains the body responsible for final coordination and adoption of the Action Plans for all Danube riparian countries.

## 3 Synthesis and conclusions

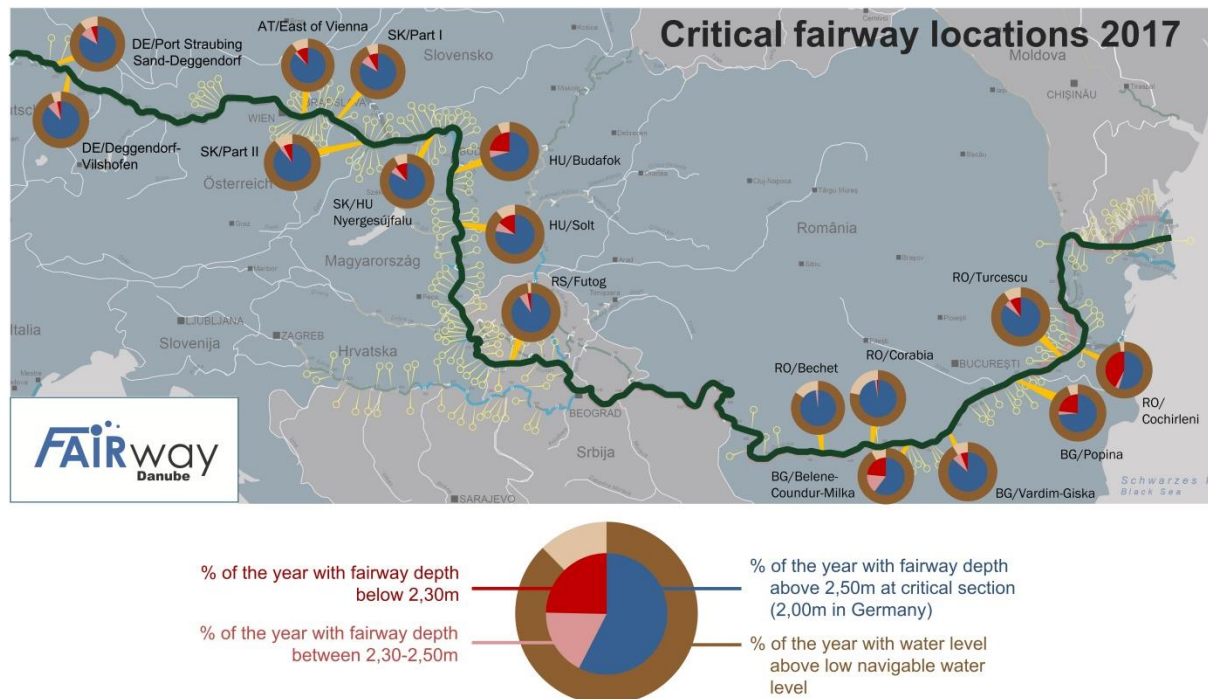
### 3.1 Fairway conditions

**Fairway conditions were less favourable in 2017 compared to the previous year.** January and early February were characterised by very low water levels. On the Upper Danube, water levels remained below LNWL for almost the entire first month. Additionally, the cold period at the beginning of 2017 caused the formation of ice on the Danube, which led to the closure of navigation on the Upper, the Central and the Lower Danube. In Romania, navigation had to be closed for 42 days. These extreme hydro-meteorological conditions in January caused fairway depths far below 2.5m at most critical sections. From mid-February until the end of the year, minimum fairway depths were mostly exceeded on the **Upper Danube**. 2.5m fairway depths were achieved for almost eight months. On the **Central and Lower Danube** water levels started to decrease in June, dropping below LNWL on several days on the Lower Danube. In combination with insufficient maintenance works or required capital interventions this led to very unfavourable fairway conditions in summer 2017, especially on the Lower Danube. The most critical location was Cochirleni, where the minimum fairway depth was not achieved in July, August and September.

The figure below provides a **status overview of the main critical locations on the Danube in 2017**. Locations are only displayed if they showed a critical status in 2017. For each critical location, the **figure illustrates the situation as regards fairway availability (inner circle)** – i.e. the effectiveness of interventions by the waterway managers, **in relation to the water levels (outer circle)** – i.e. the given hydrological framework conditions that cannot be influenced by the waterway managers.

High water levels, measured at static gauging stations, do not automatically guarantee sufficient fairway depths over the fairway width which is required for navigation. Due to the intense dynamics in the free-flowing river sections, the morphology of the riverbed and thus fairway depth and/or width may change rapidly. Maintenance interventions are needed to provide the required fairway parameters under the given hydrological circumstances.





The recommended **target** of the Fairway Rehabilitation and Maintenance Masterplan is to provide a **fairway depth exceeding 2.5 m<sup>15</sup>** at least on as many days per year as show **actual water levels equal to or above the statistical Low Navigable Water Level (LNWL)<sup>16</sup>**. *This situation would correspond to an equal share of the blue and the dark brown circle in the figure above.*

### Key facts displayed in the “Critical fairway locations 2017” figure above:

The recommended Level of Service of 2.5m fairway depth<sup>17</sup> at Low Navigable Water Level could **not be reached on several of the main critical locations** throughout the entire year (inner blue circle does not reach the level of the outer dark brown circle). Considering the hydrological conditions during the entire year of 2017, the unfavourable situation in the second half of the year is a result of insufficient maintenance works or required capital interventions.

In **some sections**, fairway depths just slightly below 2.5m could be provided for some days (light red colour in the inner circle).

Please note: For detailed interpretation, the individual conditions of the critical sections and locations illustrated in the country chapters of the Action Plans need to be taken into account, as the causes, detailed locations and severity of the critical sections are strongly varying. For example, some sections continuously provide fairway depths just slightly below 2.5m. In addition, supporting measures like providing high quality information on the morphology of the critical section to skippers can improve navigability significantly.

<sup>15</sup> Or the respective target value relevant for the special section (e.g. 2.0 m in Straubing-Vilshofen on the German Danube)

<sup>16</sup> LNWL = the water level reached or exceeded at a Danube water gauge on an average of 94% of days in a year (i.e. on 343 days) over a reference period of several decades

## Synthesis and conclusions

In the next figure, the **fairway availability of critical locations in 2017 is compared with the previous years**. Locations are displayed if they had been identified as critical by waterway users in 2014 and if data for 2012–2016 was available. Analogous to the first figure, the targeted availability of 2.5m fairway depth<sup>17</sup> at Low Navigable Water Level would correspond to an *equal height of the blue (availability of 2.5m fairway depth) and the grey (water level above Low Navigable Water Level) columns in the figure below*.

The fairway widths in the figure are minimum widths for minimum Levels of Service which were defined based on the usual traffic volumes on the respective sections.

**Key facts illustrated in the “Fairway availability 2012–2017” figure** on the next page:

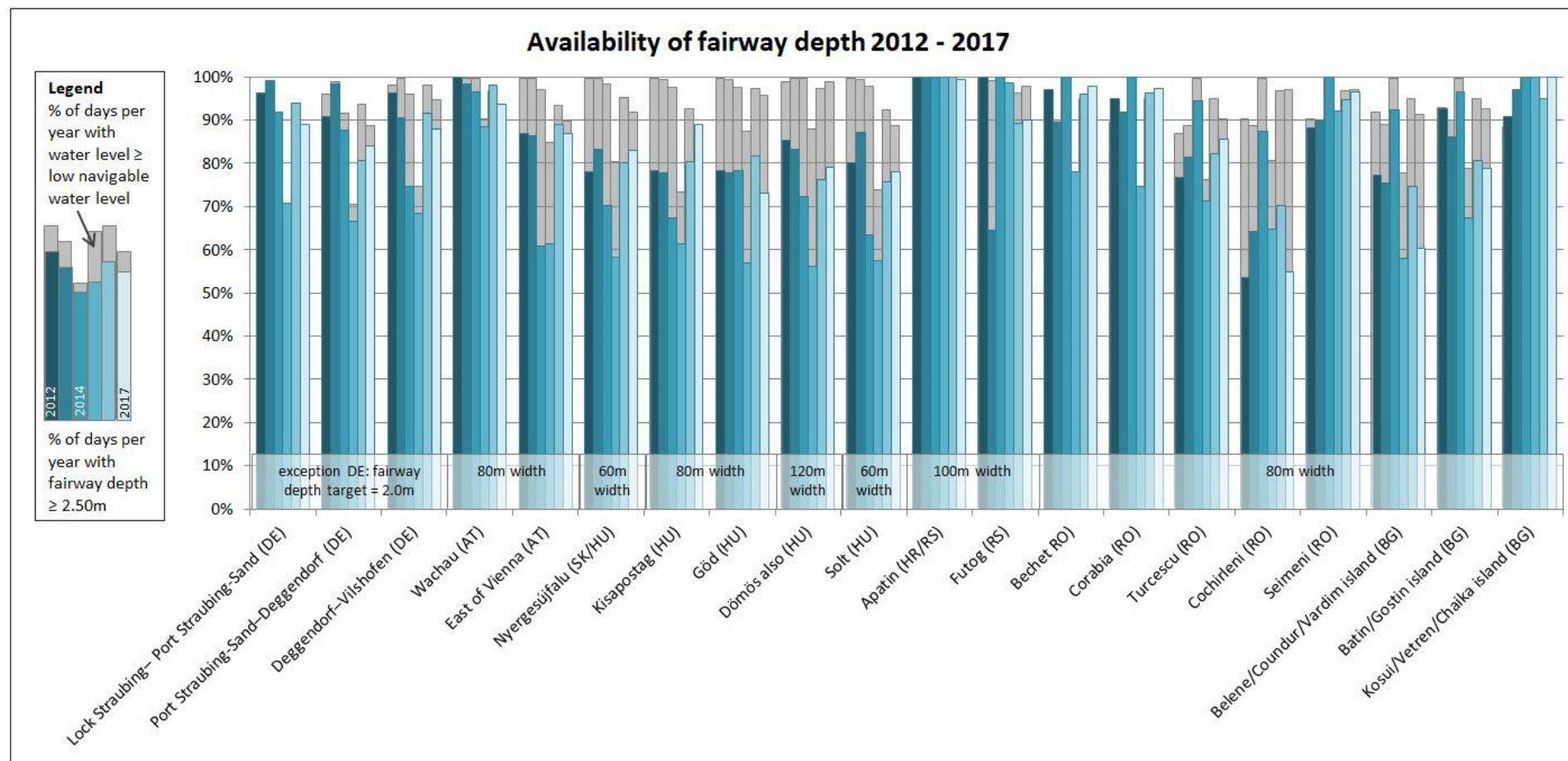
**Fairway availability varies quite intensely** (predominantly dependent on hydrological conditions and implemented maintenance measures).

The figure clearly illustrates the (possible) gap between the available water levels and the actual fairway depths. **The sections for which the gap is the largest over the years show the biggest need for maintenance and/or rehabilitation interventions.** Highly critical locations in terms of maintenance and rehabilitation can be identified: the section East of Vienna, the Hungarian Danube, the area around Milka/Belene/Coundur (BG) and Cochirleni (RO). The section Straubing–Vilshofen (DE) is also critical in terms of navigation conditions. In some Danube sections, measures that go beyond maintenance and rehabilitation would have been required in order to reach the recommended Level of Service.

As already mentioned, it is important to take the depth classes close to 2.5m into account when interpreting this graphic, as these provide a certain range of navigability although not meeting the 2.5m threshold: 2.4m and 2.3m fairway depth was provided on 9 days East of Vienna, on 22 days at Nyergesújfalu, on 11 days in Cochirleni and on 59 days in the Belene/Milka/Coundur area.



## Synthesis and conclusions



### 3.2 Expenditures and budgets for maintenance and rehabilitation

Considering the average hydrological conditions in summer 2017, **more targeted maintenance and rehabilitation measures and sufficient respective budget could have significantly contributed to the achievement of the recommended Levels of Service** in some critical sections.

#### Operational costs

In order to achieve better fairway conditions and to avoid critical situations in the coming years, significant efforts have to be made as soon as possible, including securing the necessary national operational budgets.

The operational expenditures for 2017 and the required operational budgets for 2018 are at a **comparable size** in most of the countries besides Bulgaria. Over 4 Mn. EUR are earmarked for dredging works in Bulgaria (for 3 years); still, a budget gap remains for surveying and marking activities in Bulgaria.

Hungary did not provide budget data. For the fields of work that show the budget gaps, please study the country sections.

	required operational budget 2017 (reported in May 2017)	operational expenditures 2017 (reported in May 2018)	required operational budget 2018	secured operational budget 2018	remaining financing gap 2018
DE	150 000*	1 670 645*	*	*	-
AT	6 110 221	4 515 515	5 626 579**	5 626 579	-
SK	2 700 000	2 624 134	2 422 100	2 422 100	-
HU	1 156 000	No update was provided.			
HR	506 000	495 000	495 000	495 000	-
BA	***				
RS	***				
RO	14 548 726	15 335 284 (6 553 153 for locks)	18 719 481 (6 827 956 for locks)	18 719 481 (6 827 956 for locks)	-
BG	4 002 501	386 378	4 002 501	4 515 964****	629 068
UA	***				

\* Operation and maintenance works are mandatory tasks (sovereign duties) of the Federal Waterways and Shipping Administration (WSV). Due to in-house efforts an assignment of tangible costs and budget requirements per need area is not possible. The sums above only comprise all definable costs; actual costs are in fact substantially larger. For sovereign tasks all necessary investments are by default covered by federal budgets.

\*\* Additionally, almost 2 Mn. EUR are available for costs resulting from the dumping of excavated material further upstream. This procedure keeps sediments in the river system longer, thus counteracting the destabilization of the riverbed.

\*\*\* Budget data might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: [www.fairwaydanube.eu](http://www.fairwaydanube.eu) and [www.danube-navigation.eu](http://www.danube-navigation.eu).

\*\*\*\* The framework contract for 3 years of dredging works was signed in February 2018. The value of the contract (4 129 586 Euro) is not included in the EAEMDR operational plan, but it is secured and available in the Bulgarian Ministry of Transport.

### Investment costs

**Considerable investments** have been initiated in the last years since the launch of the Master Plan. The amount varies, but **at least a third of the national needs declared in 2014 have been satisfied in most countries, which participate in the FAIRway Danube project.** Most of the available investment budget is based on EU co-financing.

	required investments 2014-2020 according to FRMMP	secured investment costs (state budget or other financing) and investments taken*	% thereof EU co-financed	remaining financing gap (% of required investment costs according to FRMMP)
AT	-	568 000	-	-
SK	8 080 000	1 989 200	84%	75.4%
HU	4 333 700	No update was provided.		
HR	4 588 000	2 163 000	72.4%	62.4%
RS	5 383 000	-	-	100%
RO	41 058 000 (thereof locks: 400 000)	21 327 711 (thereof locks: 200 000)	57.4% (locks: 85%)	48% (locks: 50%)
BG	21 132 000	19 434 767	85%	24.7%

\* Some countries have taken investments in areas not foreseen in the FRMMP. For detailed information please check the respective national action plan.

Nevertheless, in some countries **major shares of the investment needs until 2020, as stated in the Master Plan, are not yet secured.** The national contributions via (co-)financing are sometimes not sufficient.

### 3.3 Environmental impacts

According to the Danube River Basin Management Plan 2015 by the International Commission for Protection of the Danube River (ICPDR), the majority of the Danube is classified as heavily modified water body with moderate or worse ecological potential. In order to achieve good ecological potential and status (natural water bodies) as required by the Water Framework Directive, an **integrated planning approach is applied in the Danube countries** as regards navigational maintenance and rehabilitation measures. Information on environmental measures and legal permits related to dredging interventions is provided in the country chapters.

## 4 Austria

viadonau– Österreichische Wasserstraßen-Gesellschaft mbH (state owned) is responsible for fairway maintenance, rehabilitation and upgrade.

### 4.1 AT | Status report on main critical locations including water level information 2012 – 2017

The **recommended Level of Service of 2.5m fairway depth at Low Navigable Water Level** would correspond to an equal height of the blue columns (availability of 2.5m fairway depth) and the white columns framed in blue (water level equal to or above Low Navigable Water Level) in the figures below.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

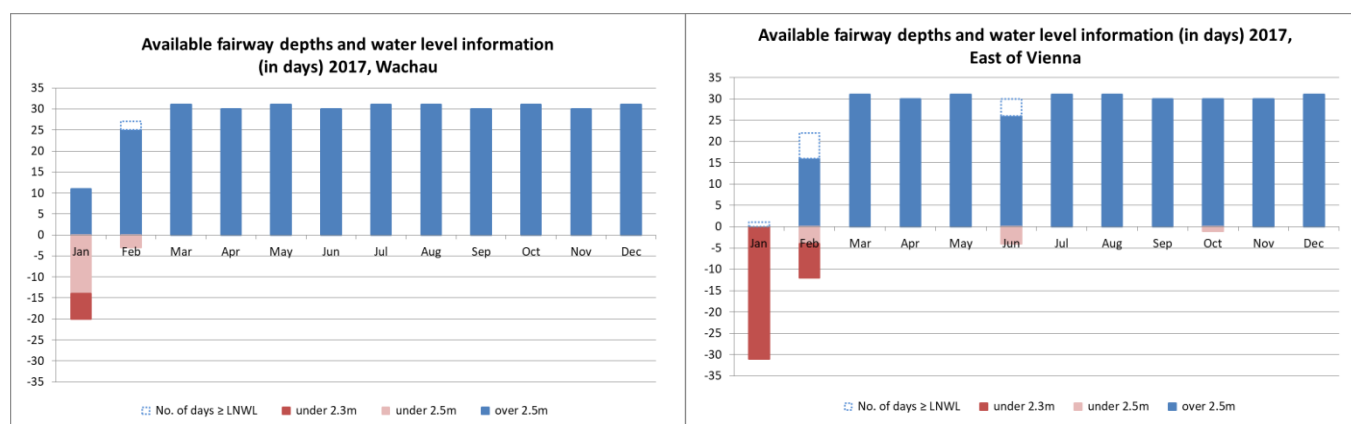
**Number of days with fairway depths  $\geq 2.50\text{m}$  on main critical locations for a fairway width according to Level of Service 1 (40 - 80m)**

Critical location	2012	2013	2014	2015	2016	2017
Wachau	366	359	352	323	359	342
East of Vienna	318	315	222	224	326	317

**Number of days with water level  $\geq$  LNWL on main critical locations**

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Wachau	Kienstock + Dürnstein	366	365	365	330	355	341
East of Vienna	Wildungsmauer + Thebenerstraßl	366	365	355	310	343	328

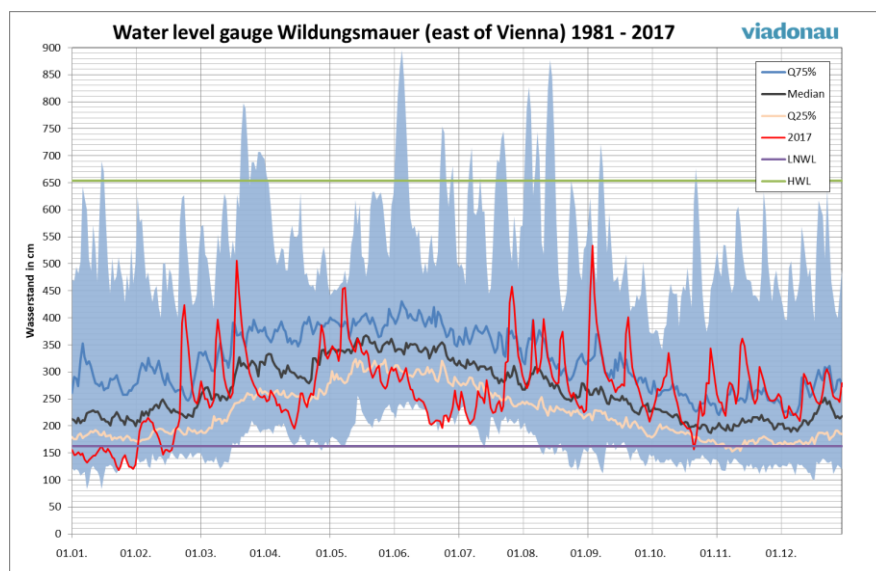
*\*Note from hydrological department: Data for 2017 is operational data and can be subject to change.*



## Action Plan: Austria

In January and February 2017 the Austrian Danube saw extremely bad hydrological conditions, resulting in fairway depths below 2.3m during the whole of January in the critical section East of Vienna. Especially the ford Hainburg was responsible for the unfavourable situation in January. From March onwards, water levels and fairway conditions were good on the entire Austrian Danube.

### 4.2 AT | Hydrological conditions at main critical locations 2017



In 2017, water levels were below LNWL for almost the whole of January, due to low rainfall, low temperatures and the occurrence of ice. In the following months, water levels dropped below LNWL only for a few days in February and October.

### 4.3 AT | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014) and last updated in October 2017:

	Key issues	Need for action	Activities performed 2017
AT01	Maintaining water level measurements during extreme weather events	Establishment of back-up energy supply systems at automatic gauging stations	Most important water gauging stations are equipped with high-capacity batteries in combination with solar panels to keep gauges running as stand-alone systems (finalised).
AT02	Maintaining technical equipment of gauging stations to avoid data errors and gaps	Staff for weekly or even daily on-site checks	Inventory of existing gauging stations and classification regarding priority, identification of human and financial resources.

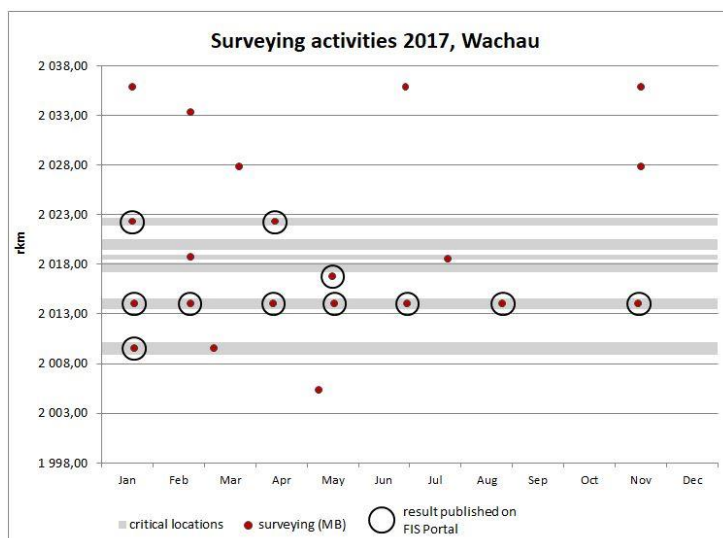
AT 03	Limited flexibility and limited dredging capacity on the market due to small number of dredging service providers	Support opening-up of limited market for dredging activities	Set up of multi-annual framework contract for dredging services with contractors (in force since August 2015).
AT04	High expenditures for maintenance dredging especially in the shallow sections East of Vienna	Implementation of structural, hydraulic engineering works such as groynes	Optimisation of the shallow section at Petronell – Witzelsdorf finalised in October 2015.  The shallow section Bad Deutsch-Altenburg has been optimised in January 2017, monitoring shows stable conditions for inland navigation.
AT05	Providing proper and up-to-date user information on available fairway depths in critical sectors	Display of recent surveying results of shallow sections in a differentiated manner	Designation and display of “deep navigation channel” ( <b>equivalent to the Level of Service 1</b> ) within the existing fairway and integration in the published maps (finalised).

#### 4.4 AT | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations as itemised in the Rehabilitation and Maintenance Master Plan (version December 2014) was last updated in September 2017.

##### Riverbed surveying and waterway monitoring activities 2017

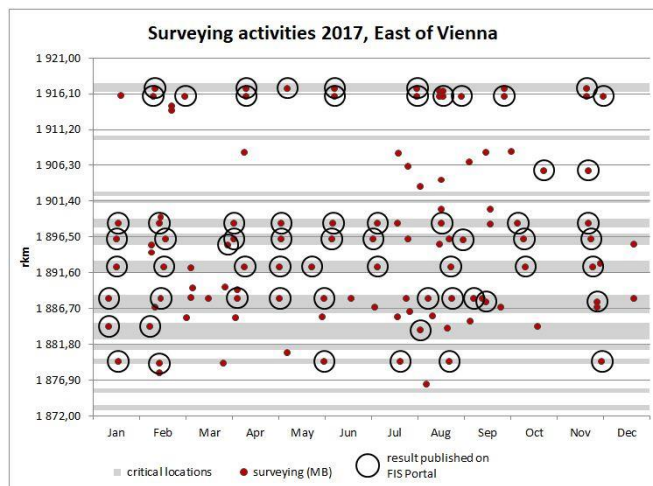
In 2017, the following hydrographic surveys were carried out according to the surveying plan.



In the section Wachau only the most critical location Weißenkirchen (rkm 2013.50 – 2014.60) was surveyed seven times in 2017.

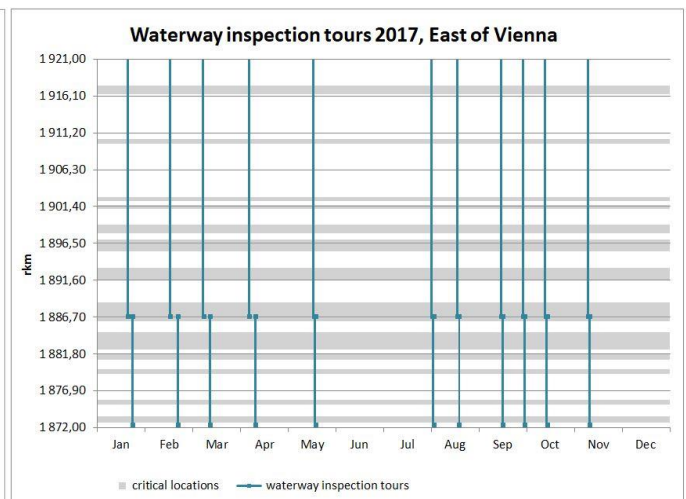
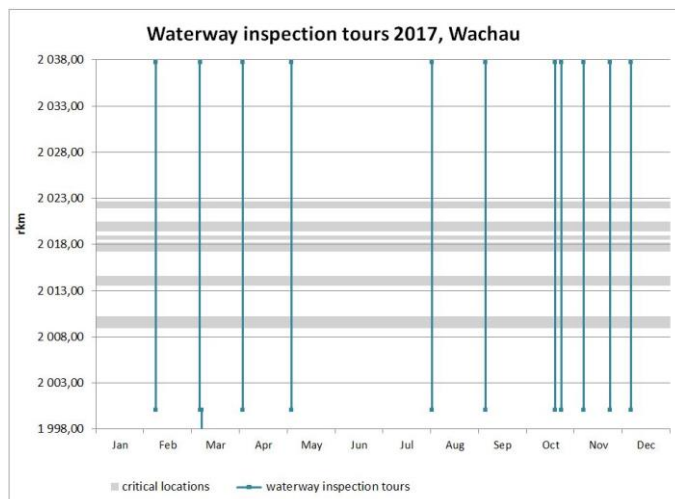


## Action Plan: Austria



In the Danube section east of Vienna the most critical locations Regelsbrunn, Rote Werd, Petronell-Witzelsdorf and Treuschütt were surveyed monthly. The new critical location Lobau at rkm 1916.30 – 1917.50 was also monitored intensively.

Waterway monitoring and inspection tours serve the purpose of quick checks of the fairway and the riverbanks. The tours are conducted solely in longitudinal direction using small vessels, equipped with a single-beam echo-sounder.



### Fairway marking activities 2017

Due to the very limited cross-section of the Austrian stretch of the Danube, fairway relocation is usually no significant option for fairway maintenance at viadonau. In 2017, no significant relocation activities took place on the Austrian stretch of the Danube.

In July 2017 the amendment of the Waterway Act (Wasserstraßengesetz) entered into force which transfers all fairway marking responsibilities (water- and landside fairway marking) from the Austrian Supreme Navigation Authority (“Oberste Schifffahrtsbehörde - OSB”) to viadonau. As of 2018, viadonau will implement fairway marking and relocation on the Austrian Danube with modernised equipment. For that purpose, a marking vessel and new buoys for the entire Austrian stretch were purchased in 2017. By February 2018, all buoys were exchanged for new ones.

**Dredging activities 2017**

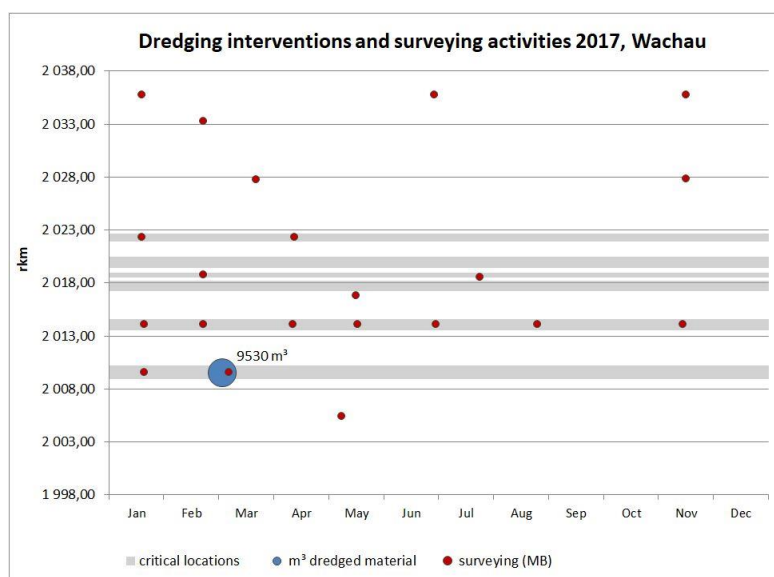
Designation of assignment	Dredging site		Dumping or placement site		Beginning of service	End of service	Material	Utilisation	m <sup>3</sup>	Permits (see next table)
	from river-km	to river-km	from river-km	to river-km						
Hainburg (lateral sedimentation)	1884.70	1883.50	1895.70	1895.20	12.12.2016	11.01.2017	Gravel	Dumping	15566.25	1
Lobau (access to oil port)	1917.50	1916.30	1915.30	1913.70	16.12.2016	17.02.2017	Gravel	Dumping	5127.44	1
Zahnetgrund (ford)	1916.10	1915.60	1915.30	1912.20	18.01.2017	17.02.2017	Gravel	Dumping	11642.49	1
Bad Deutsch-Altenburg (ford)	1887.00	1886.10	1895.70	1894.30	23.01.2017	14.02.2017	Gravel	Dumping	29807.05	1
Schwalbeninsel (lateral sedimentation)	1889.90	1889.40	1895.70	1894.72	24.03.2017	29.04.2017	Gravel	Dumping	3743.14	1
Treuschütt (ford)	1888.40	1888.00	1889.40	1889.10	29.03.2017	04.04.2017	Gravel	Dumping	7202.20	1
Dürnstein (lateral sedimentation)	2010.20	2008.90	2027.90	2027.60	20.02.2017	17.03.2017	Gravel	Dumping	9530.01	2
Treuschütt (ford / bed load trap)	1888.35	1887.7	1908.15	1906.85	29.06.2017	14.09.2017	Gravel	Dumping	80000.12	1, 3
Regelsbrunn (ford)	1899.03	1898.00	1904.60	1904.10	25.07.2017	16.08.2017	Gravel	Dumping	31790.67	1
Rote Werd (ford)	1897.00	1895.40	1906.40	1906.00	10.07.2017	08.08.2017	Gravel	Dumping	43793.07	1
Hainburg (ford)	1884.70	1884.20	1903.90	1903.10	25.07.2017	03.08.2017	Gravel	Dumping	12672.12	1
Schanzl (lateral sedimentation)	1886.10	1885.20	1895.80	1895.20	09.08.2017	10.08.2017	Gravel	Dumping	3415.49	1
Bad Deutsch-Altenburg, (ford)	1886.30	1885.90	1895.80	1895.20	10.08.2017	11.08.2017	Gravel	Dumping	640.59	1
Lobau (ford)	1917.50	1916.30	1915.30	1913.70	17.08.2017	18.08.2017	Gravel	Dumping	1698.10	1
Zahnetgrund (ford)	1916.00	1915.60	1915.50	1912.20	16.08.2017	17.08.2017	Gravel	Dumping	2273.54	1
Treuschütt (ford)	1888.35	1887.60	1895.80	1895.25	11.12.2017	22.12.2017	Gravel	Dumping	15312.97	1



## Action Plan: Austria

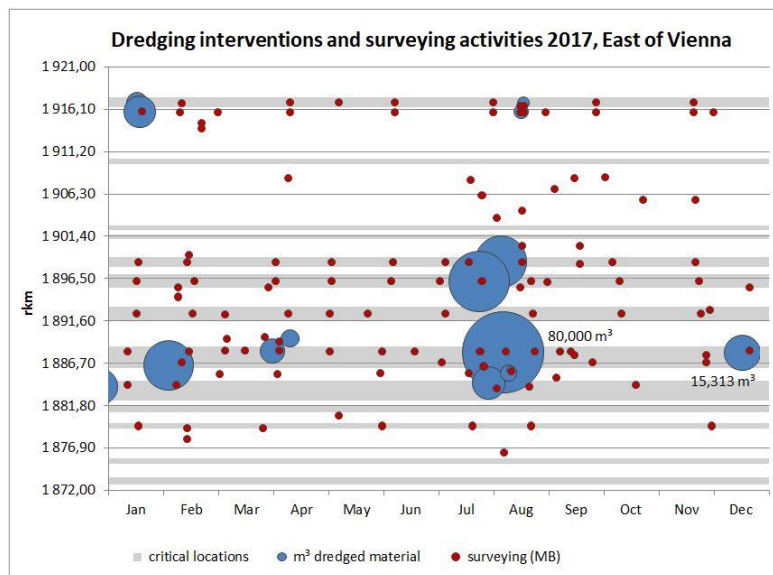
Referenced and relevant permits	Title of permit (original language)	Permitting authority	Permit applicable		Valid until	Type of permit (e.g. environmental, water, navigation law)	Main conditions for permit
			from river-km	to river-km			
1	WSD – generelles Projekt "Regulierungsmaßnahmen zur Verbesserung der Schifffahrtsverhältnisse auf der Donau stromab des KW Freudenau"	Federal Ministry for Agriculture, Forestry, Environment and Water Management	1910.00	1872.70	21/03/2099	Water Law	<ul style="list-style-type: none"> <li>A maximum of 50 % of dredged gravel may be used for structuring measures (river banks, islands), the rest is to be dumped into the river</li> <li>After high waters sediment in ford areas has to be removed as fast as possible at a width of 80/100 m</li> <li>As far as possible, ecological aspects shall be accounted for when planning single measures</li> <li>Dredging measures shall be kept to a minimum</li> </ul>
2	LIFE Natur Projekt Wachau, Uferstrukturierung in der Wachau	Administrative District Authority Krems	2033.35	2003.85	31/12/2020	Water Law, Navigation Law, Nature Conservation Law	<ul style="list-style-type: none"> <li>Establishment of ecological construction supervision, drafting annual monitoring reports</li> <li>Consideration of spawning seasons of fish in performance of measures</li> <li>No impediment for navigation must be created by island structuring measures</li> <li>No technical lining is allowed for newly created islands</li> </ul>
3	Geschiebefang in der Furt Treuschütt	Administrative District Authority Bruck an der Leitha	1888.35	1887.70	30/04/2027	Water Law, Navigation Law, Nature Conservation Law	<ul style="list-style-type: none"> <li>Establishment of ecological construction supervision and hydraulic construction supervision, drafting 5-annual monitoring reports. Final report after 10 years</li> <li>Monitoring the return rates in the sediment trap</li> <li>Safety distance to the gravel lower edge of at least 2.50 m</li> <li>Avoiding a bottom punch</li> </ul>

In 2017, 274,215.25 m<sup>3</sup> were dredged for commercial navigation.



The dredging interventions are reported in combination with the surveying activities. This illustrates the strong dependency of dredging works on up-to-date surveying results. Prior to, during and after dredging works the respective critical locations were surveyed in addition to the regular surveying tours.

In the critical section Wachau only the critical location Dürnstein was dredged at the beginning of the year.



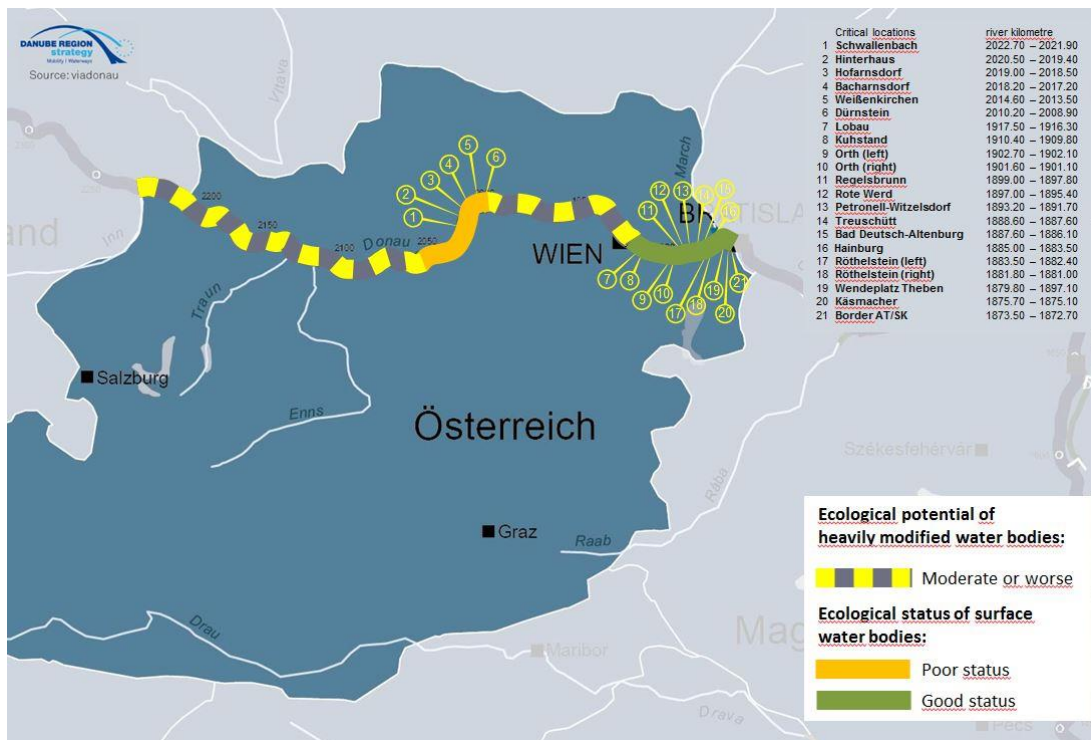
In the section east of Vienna several smaller dredging works were carried out from January to April, the most critical fords were dredged from July to September.

At the ford Treuschütt, about 50,000 of the 80,000 m³ dredged were excavated from the bed load trap.

#### 4.5 AT | Summary of current ecological status and environmental impacts

The main stretch of the Austrian Danube is declared as “Heavily modified water bodies – Final Designation” according to the Water Framework Directive. The only two exceptions pertain to the free flowing sections in the Wachau and the section to the east of Vienna. These two sections are designated as “Natural water bodies”.

The following map displays the ecological status and ecological potential of the Austrian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Austria.



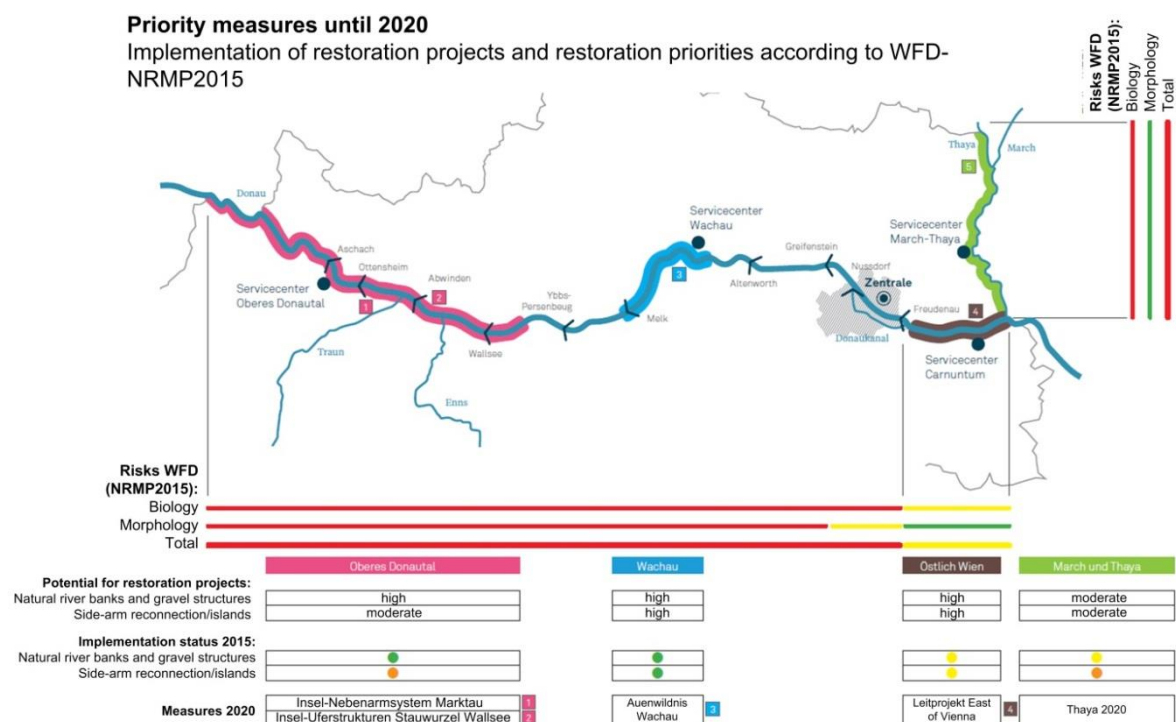
## Ecological status and ecological potential of surface water bodies

(Source: DRBM Plan – Update 2015)

The designation as heavily modified water body of main parts of the Danube is mainly attributed to barrages for hydropower generation within the draft national water management plan for Austria (2015), whereas the attainment of good ecological status is considered to be achieved to the east of Vienna. Good ecological status is estimated to be achievable and possible in the Wachau, whereas good status is already achieved east of Vienna. For the heavily modified water bodies measures are to be implemented for the achievement of the good ecological potential.

## Measures to improve environmental conditions

A significant number of measures have already been taken between 2009 and 2015 to improve river continuity, reconnecting wetlands/floodplains and hydrological alterations like impoundments, ensuring ecological flows. Structural projects to improve the ecological status and ecological potential of the Danube in Austria and priorities are displayed on the map below.



As explained by the draft national water management plan for Austria (2015):

“The Austrian Danube is characterised by a chain of hydropower plants affecting the sediment regime of the Danube. One of the two free flowing sections left is between Vienna (downstream of hydropower plant Freudenau) and the Austrian-Slovakian border where the character of a mountain river is still maintained. This river section shows an ongoing erosion of the riverbed at an average rate of 2.0 to 3.5 cm per year. The decreasing water tables of the Danube and of the associated groundwater seriously affect and endanger the ecology of the floodplains in the “Donau-Auen National Park”. In addition, inadequate

and seasonally strongly fluctuating fairway depths in this section of the river substantially affect navigation.”

“The *Integrated River Engineering Project on the Danube to the East of Vienna* was launched to improve the hydromorphology of the river and ecology of the floodplains (in line with equivalent levels of flood protection) as well as to improve the fairway conditions in this section of the Danube. The main measures are i) the granulometric improvement of the river bed to provide long-term stabilisation of the river bed and of groundwater conditions; ii) restoring lateral connectivity and removing parts of the river bank for long-term stabilisation of the ecological conditions in the National Park “Donau-Auen”; and iii) innovative low water regulation measures which improve fairway conditions for navigation.” The pilot project phase is already concluded; the new “Catalogue of Measures for the Danube east of Vienna” provides the framework for further activities in the free flowing section east of Vienna. Further information on the project is provided on the project’s website: <http://www.viadonau.org/en/>.

### ***Navigation maintenance measures and environmental impacts***

Maintenance works are executed in the framework of navigation law (Wasserstraßengesetz BGBl. I Nr.177/2004), water law (Grundsatzgenehmigungsbescheid “Regulierungsmaßnahmen zur Verbesserung der Schifffahrtsverhältnisse auf der Donau stromab des KW Freudenau“ of 14th August 2003) and the National Park Act (BGBl. I Nr. 17/1999).

By the end of 2015 a general permit was obtained for carrying out maintenance activities outside of the central fairway east of Vienna for a period of 5 years. The project study, which provided the basis for the permit “Erhaltungsmaßnahmen außerhalb der zentralen Fahrrinne östlich von Wien auf dem Gebiet des Nationalparks Donau-Auen – Strom-km 1915,00 bis 1880,00“ was developed in close cooperation with involved key stakeholders. The project study systematically analyses the impacts of maintenance activities on natural species, taking into account opinions drawn up by official experts on nature conservation and water ecology.

## 4.6 AT | Budget status May 2018

*Investments taken for FRMMP implementation 2014 – 2017*

Need areas	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	0	0	0	0
Surveying of the riverbed	0	0	0	0
Water level gauges	0	0	0	0
Marking of the fairway	0	568 000 <sup>1</sup>	0	0
Availability of locks / lock chambers	0	0	0	0
Information on water levels and forecasts	0	0	0	0
Information on fairway depths	0	0	0	0
Information on marking plans	0	0	0	0
Meteorological information	0	0	0	0
Other needs	0	0	0	0
<b>Sum (Euro)</b>	<b>0</b>	<b>568 000</b>	<b>0</b>	<b>0</b>

<sup>1</sup> Costs for the new marking craft which was purchased and put into operation in August 2017.

*Operational expenditures for conducted activities 2017 and budget needs 2018*

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	2 596 015 <sup>1</sup>	2 998 519 <sup>2</sup>	2 998 519	0
Surveying of the riverbed	828 298	820 655	820 655	0
Water level gauges	1 014 563	1 029 859	1 029 859	0
Marking of the fairway	0 <sup>3</sup>	687 829	687 829	0
Availability of locks / lock chambers <sup>4</sup>	-	-	-	-
Information on water levels and forecasts	76 639	89 717	89 717	0
Information on fairway depths <sup>5</sup>	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>4 515 515</b>	<b>5 626 579</b>	<b>5 626 579</b>	<b>0</b>

## Action Plan: Austria

<sup>1</sup> This amount includes only dredging expenditures. The amount is significantly lower than in past years, due to the positive impact of river engineering measures east of Vienna. Another 1 006 857 EUR were spent for dumping the excavated material further upstream. This procedure keeps sediments in the river system longer, thus counteracting the destabilization of the riverbed.

<sup>2</sup> Only dredging budget. Additional 1 948 472 EUR are available for costs resulting from the dumping of excavated material further upstream.

<sup>3</sup> As of 01.01.2018, viadonau will undertake all tasks related to fairway marking (water- and landside) on the Austrian Danube. For that reason, there are no estimated expenditures for 2017.

<sup>4</sup> In Austria, the Verbund Hydropower AG is responsible for maintaining the lock infrastructure (revisions). Viadonau has no expenditures in this area.

<sup>5</sup> Information on fairway depths is provided on the DoRIS website (<http://www.doris.bmvit.gv.at/>) and the DoRIS mobile App. Since many other services are provided as well (e.g. bridge clearance), the expenditures and budget needs for information on fairway depths cannot be displayed separately.

## 4.7 AT | Outlook: actions, milestones and funding sources

AT 01: Water level measurements during extreme weather events		
Conducted activities:	Ensuring automatic water level measurements, validity checks and real-time data transfer throughout extreme weather events and providing these data to management systems	
Current shortcomings:	There are no shortcomings identified, the key issue is basically resolved	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Sufficient funding is available through national/company budgets to maintain the current status	
Next steps:	Real-time data transfer (15-minute intervals) has been established for years and the data is integrated into the management systems of viadonau. To ensure proper operation of the gauging stations during extreme weather events, the most important water gauging stations were equipped with high-capacity batteries in combination with solar panels to keep gauges running as stand-alone systems. With this step, data transfer throughout extreme weather events is ensured. Additionally, the most important gauging stations are gradually being equipped with a second, independent gauge as back-up system. The necessary changes will take some time, but they will not affect the operation of the existing gauges.	
AT 02: Technical equipment of gauging stations		
Planned activities:	Increase the efficiency in the maintenance of the gauging network system, automatic validity checks with cameras (remote)	
Current shortcomings:	Lack of market analysis regarding suitable equipment and software	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable



## Action Plan: Austria

	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Sufficient funding is available through national/company budgets	
Next steps:	Installation of software for automatic checks with cameras	First tests might be conducted end of 2018. Until then, data is continuously being transferred in real-time (see key issue AT 01).
<b>AT 03: Limited dredging market</b>		
Conducted activities:	Europe-wide tendering or dredging contracts in order to attract additional tenderers, e.g. from Germany, the Netherlands or Slovakia etc. Feasibility of purchasing a dredging pontoon for in-house use in "emergency cases". In order to cut down on reaction times and procedures, a multi-annual framework contract was prepared and Europe-wide tendering took place in spring 2015.	
Current shortcomings:	According to public procurement law, contract must be awarded to tenderer with lowest prices; problem in cases of parallel actions (several critical sectors to be dredged at once) if in both cases the same tenderer is awarded (bottle-neck = equipment)	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Sufficient funding is available through national/company budgets	
Next steps:	see description of conducted activities	in force since August 2015
<b>AT 04: High expenditures for maintenance dredging</b>		
Planned activities:	Optimisation and readjustment of shallow section Bad Deutsch-Altenburg completed. Planning and implementation of river engineering measures at other critical locations in the free flowing section east of Vienna.	
Current shortcomings:	Insufficient fairway parameters in shallow sections east of Vienna during low water periods	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No negative impacts to be expected, since possible environmental impacts are taken into account during the planning phase: The <b>Catalogue of Measures for the Danube east of Vienna</b> covers a multitude of river engineering measures in the free flowing section east of Vienna. The measures are designed to stabilize the decrease in water levels, preserve the unique habitats of the Danube floodplains and create a waterway infrastructure that fulfils the requirements of safe and economic navigation.
	Which measures are taken to mitigate these impacts?	
	Is water status still expected to deteriorate?	No

## Action Plan: Austria

Possible funding:	Budget availability 2017/2018: Sufficient funding is available through national/company budgets	
Next steps:	Planning and preparatory work for many individual measures listed in the Catalogue of Measures are in progress	ongoing
<b>AT 05: Proper and up-to-date user information</b>		
Conducted and further planned activities:	Increased update rate of depth data in Inland ECDIS charts; monthly updates of most important shallow sections (further improvement of up-to-date and accurate information). <b>Integration of monthly fairway depths data of critical sectors in the IENC.</b>	
Current shortcomings:	Update rate of depth data of critical sections in Inland ECDIS is currently too low to be of real value to waterway users (twice per year), given that shallow sections are highly dynamic. Topical depth information must nowadays be retrieved from separate information sources (e.g. FIS Portal, shallow section information). Topical data should be integrated in the wide-spread electronic navigational charts according to the Inland ECDIS standards.	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No negative impacts; positive impacts are that waterway users can exploit available depths better without physical interventions.
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	No
Possible funding:	Budget availability 2017/2018: Sufficient funding is available through national/company budgets	
Next steps:	Implementation started in September 2016	



## 5 Slovakia

**SVP - Slovak Water Management Enterprise** (state owned) is responsible for fairway maintenance, rehabilitation and upgrade.

**SHMÚ** - Slovak Hydrometeorological Institute (state owned) is responsible for hydrological data.

### 5.1 SK | Status report on main critical locations including water level information 2012 – 2017

For the Slovak section of the Danube (common AT-SK, national, common SK-HU), the main critical locations are stretches rkm 1880 - 1863 with reference gauge station in Devin, rkm 1810 – 1785 with reference gauge station Medvedov and rkm 1765 – 1710 with reference gauge station in Sturovo. The most critical section on the entire Slovak stretch of Danube regarding the available width and depth is on rkm 1735.5 – 1733.7 (Cenkov = Nyergesújfalu) which is situated on common SK-HU stretch of the Danube.

The **recommended Level of Service of 2.5m fairway depth at Low Navigable Water Level** would correspond to an equal height of the blue columns (availability of 2.5m fairway depth) and the white columns framed in blue (water level equal to or above Low Navigable Water Level) in the figures below.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

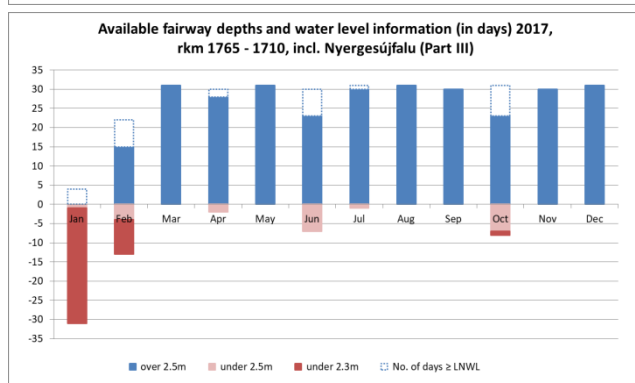
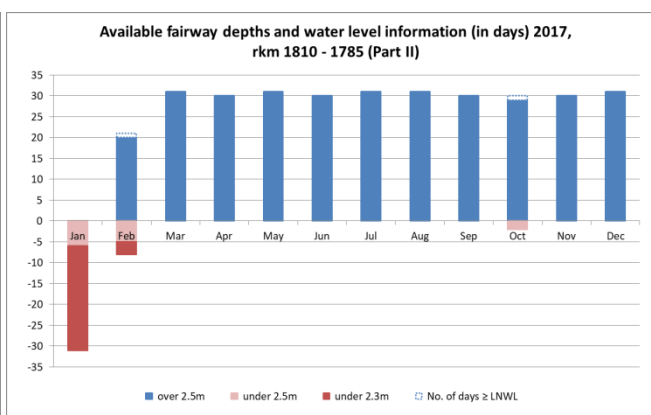
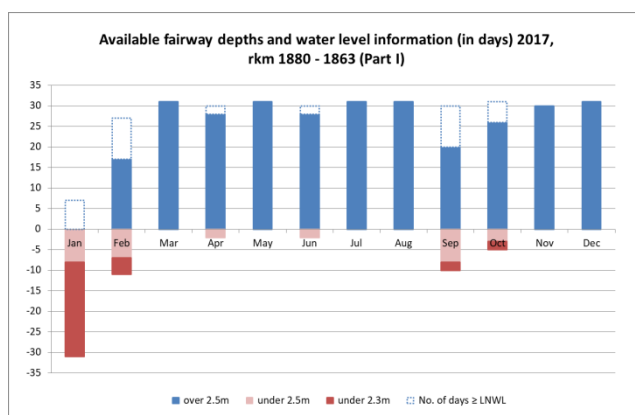
**Number of days with fairway depths  $\geq 2.5\text{m}$  on main critical locations for a fairway width according to Level of Service 1 (targeted minimum fairway widths are 60 to 100 m in Slovakia; on the Slovakian-Hungarian border section, on the Slovakian-Austrian section it is 40 to 80 m)**

Critical location	2012	2013	2014	2015	2016	2017
part I. (rkm 1880 – 1863)	366	365	365	287	310	304
part II. (rkm 1810 – 1785)	360	341	359	307	338	324
part III. (rkm 1765 – 1710) including Nyergesújfalu	303	324	300	223	319	303

### Number of days with water level $\geq$ LNWL on main critical locations

Critical location	Reference gauge	2012	2013	2014	2015	2016	2017
part I. (rkm 1880 – 1863)	Devin	366	362	349	294	345	340
part II. (rkm 1810 – 1785)	Medvedov / Gonyu	366	362	348	259	325	326
part III. (rkm 1765 – 1710) including Nyergesújfalu	Sturovo / Komarom	319	334	292	288	353	332

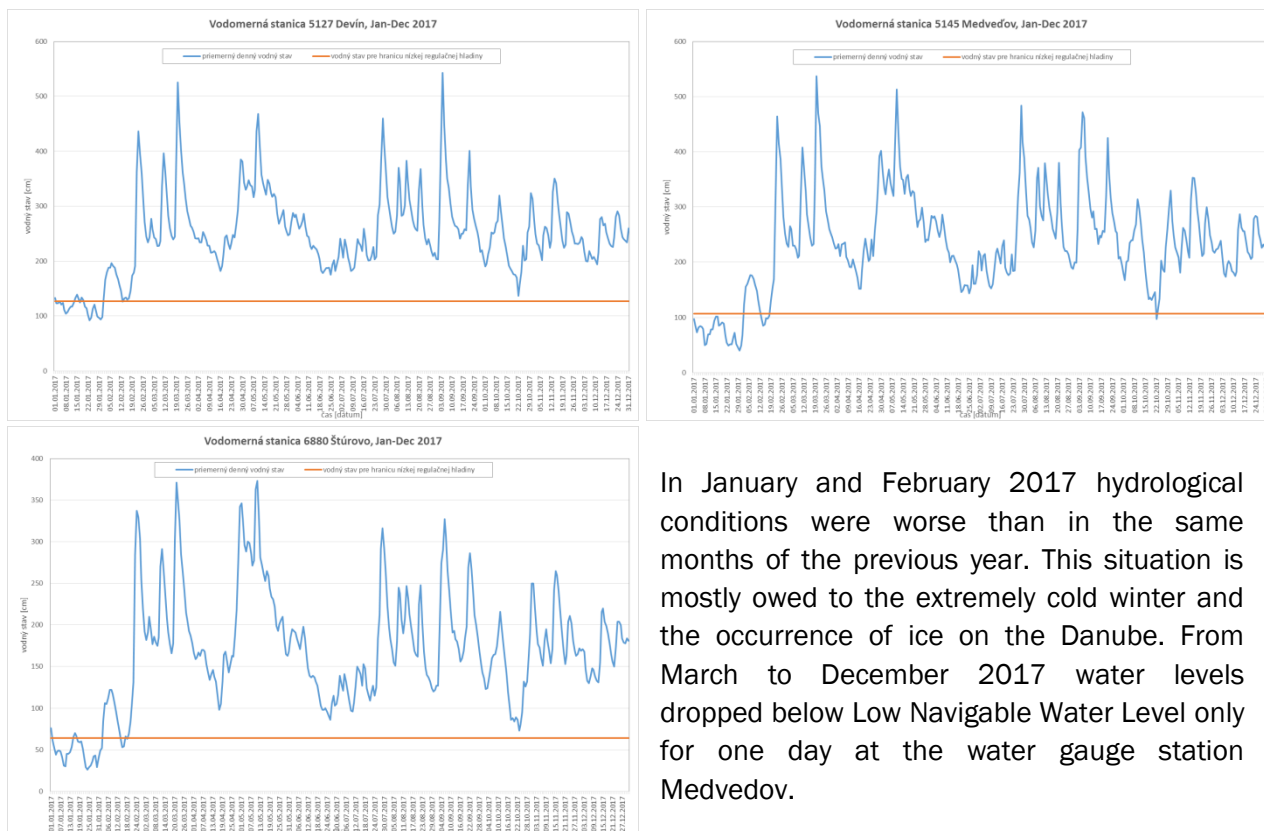
In 2017, for all three measured sections, Part I. (rkm 1880 – 1863) fairway depth of 2.5m and more were realised on 304 days (83,3%), for Part II. (rkm 1810 – 1785) on 324 days (88,8%) and for Part III. (rkm 1765 – 1710) on 303 days (83%).



In Part III., at the most critical section at rkm 1735.5 – 1733.7 – Cenkov (in HU language Nyergesújfalu), fairway depths were below 2.3m on 40 days. This is mostly due to the bad hydrological conditions in January and February. Other than that, the navigation conditions in the mentioned period were standard, no extreme deviations occurred.

The main reasons for not meeting the Level of Service and availability of 2.5m depth is that on Part II. and Part III. the river bottom is from stone (stony riverbed or stony threshold – rocky bottom) which is actually not possible to remove via currently used technology for dredging (maybe detonation and removing of the stone after that). In Part I. the regular dredging intervention was done according to plan.

## 5.2 SK | Hydrological conditions at main critical locations 2017



In January and February 2017 hydrological conditions were worse than in the same months of the previous year. This situation is mostly owed to the extremely cold winter and the occurrence of ice on the Danube. From March to December 2017 water levels dropped below Low Navigable Water Level only for one day at the water gauge station Medvedov.

In 2017, the number of days with water levels  $\geq$  LNWL on critical locations were:

part I. (rkm 1880 – 1863) Devin ->	340 days from 365 days
part II. (rkm 1810 – 1785) Medvedov / Gonyu ->	326 days from 365 days
part III. (rkm 1765 – 1710) including Nyergesújfalu ->	332 days from 365 days

## 5.3 SK | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014):

	Key issues	Need for action	Activities performed 2017
SK 01	Level of detail of monitoring data is suboptimal for exact and cost-effective planning of dredging interventions	Support acquisition of up-to-date multi-beam sounding vessels, equipment and software	Preparation and finalisation of the technical specification, publication of the tender (expected deadline for contract signature February 2018)
SK 02	Out-of-date information technology, missing database for monitoring data	Support establishment of Fairway Management System	Preparation and elaboration of the specification (by the expert) for national WAMS database (within FAIRway Danube project)

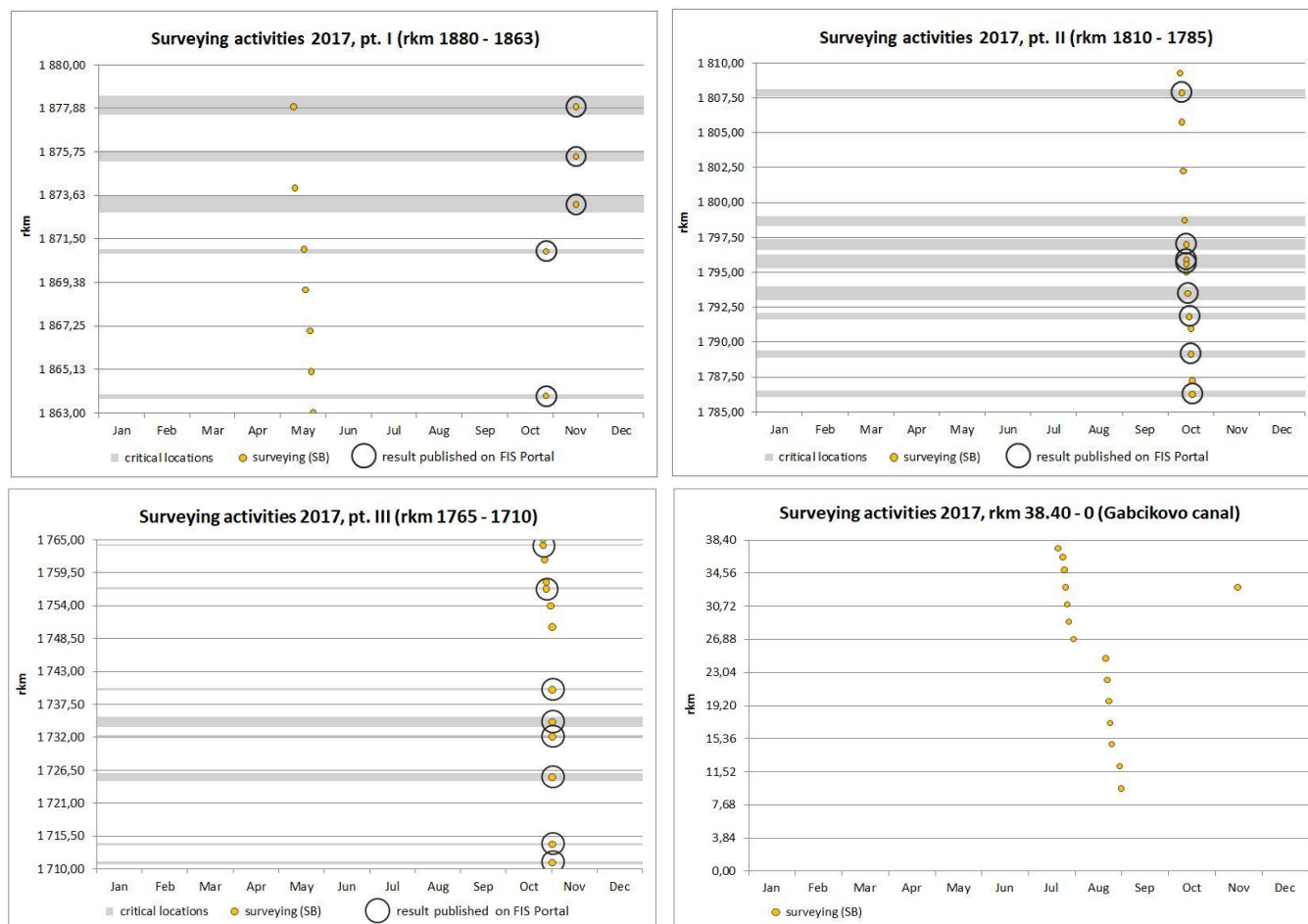
SK 03	Insufficient number of skilled staff to monitor the fairway	Secure education and provision of well-trained staff in the short, medium and long term	<i>Still insufficient number of new staff for monitoring of the fairway (skilled staff we have but close to retirement)</i>
SK 04	Different departments performing the monitoring as an impediment to efficient planning	Support coordination of interfaces and establishment of common database for planning of interventions	<i>Common database will secure better harmonisation of the performing of the monitoring activities - implementation of the national WAMS database (within the FAIRway Danube project)</i>
SK 05	Different coordinate systems used for measurements in border stretches as an impediment to efficient planning	Support cross-border harmonisation of monitoring standards	<i>Harmonization via transboundary water commissions ongoing, exchange processes and data format agreed, cooperation works</i>
SK 06	Old and dredging and marking fleet and equipment	Support acquisition of up-to-date dredging and marking vessels and equipment	<i>Marking vessel: specification finalised, public procurement (tender procedure) finalised, contract signed in December 2017 (delivery in 12-14 months)</i>  <i>Dredging fleet modernisation: activities within the DaReM project – preparation and finalisation of the specification for the tender procedures</i>
SK 07	Lack of staff and resulting missing flexibility in case of urgencies (related to dredging activities)	Secure education and provision of well-trained staff in the short, medium and long term	<i>Still staff missing – new staff (skilled staff we have but close to retirement), but SVP is able to guarantee the performance of dredging activities</i>
SK 08	Frequent need to adjust fairway marking as substitution for dredging activities	Support implementation of semi-automated marking plans based on a common Fairway Management System	<i>Preparation of the specification of national database (FAIRway Danube project), fairway marking done on weekly basis, dredging performance done according to the plan (Project of Dredging – internal material)</i>

#### 5.4 SK | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations as itemised in the Rehabilitation and Maintenance Master Plan (version December 2014) was last updated in September 2017.

### Riverbed surveying activities 2017

The following river bed surveying activities took place according to the annual procedure. Critical locations are monitored within the yearly measurement of the entire Slovakian stretch, but since 2015 SVP is performing extra measurements of the critical sections besides the entire stretch measurement. Surveying is conducted with a single-beam echo-sounder; the profiles are 50m apart.



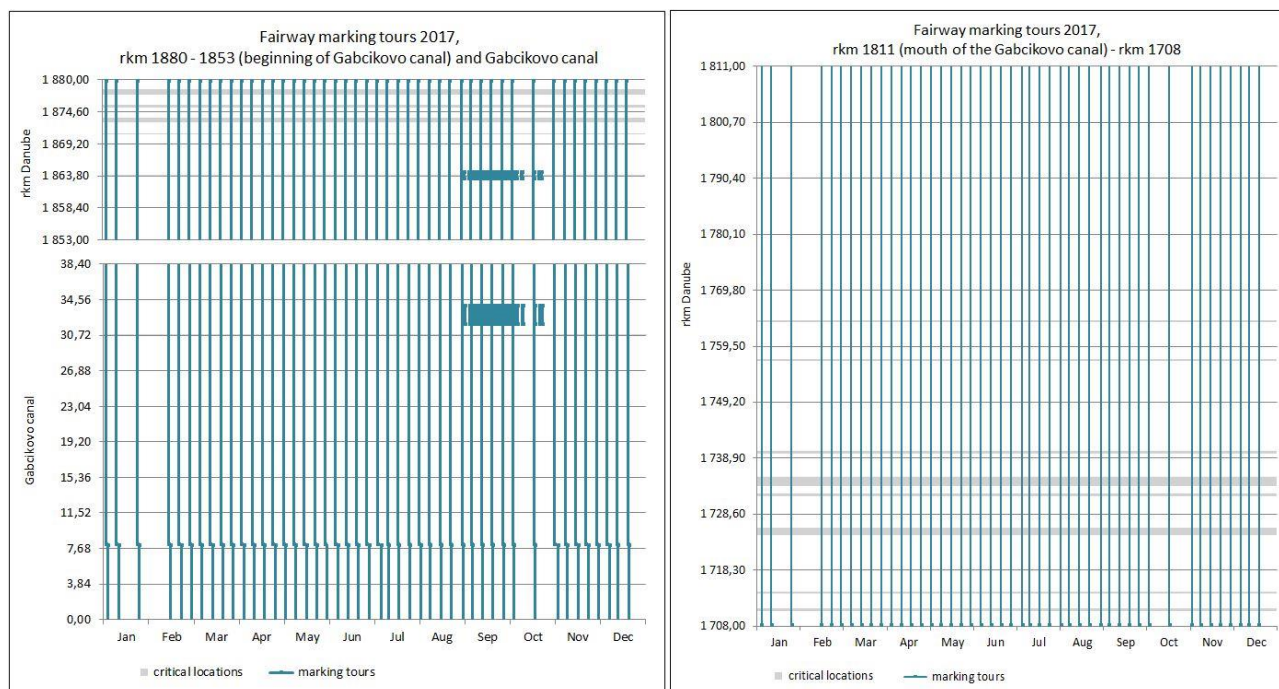
Surveying results were also published on the FIS Portal in May 2017, yet this activity was not monitored until the beginning of 2018. Therefore, there is no exact data on which shallow section information was published in May 2017.

### Fairway marking activities 2017

The fairway marking is done on a weekly basis in Slovakia based on the approved Project of the Marking of the fairway. The marking vessel is also equipped with an echo-sounder, so the marking tours also serve as quick checks of the fairway. Nevertheless, data is not post-processed but used solely for the purpose of marking. Changes of the fairway have not been done in 2017, only the minor changes were realised by the marking vessels staff with movement of the buoys based on actual water level condition (entire stretch).

## Action Plan: Slovakia

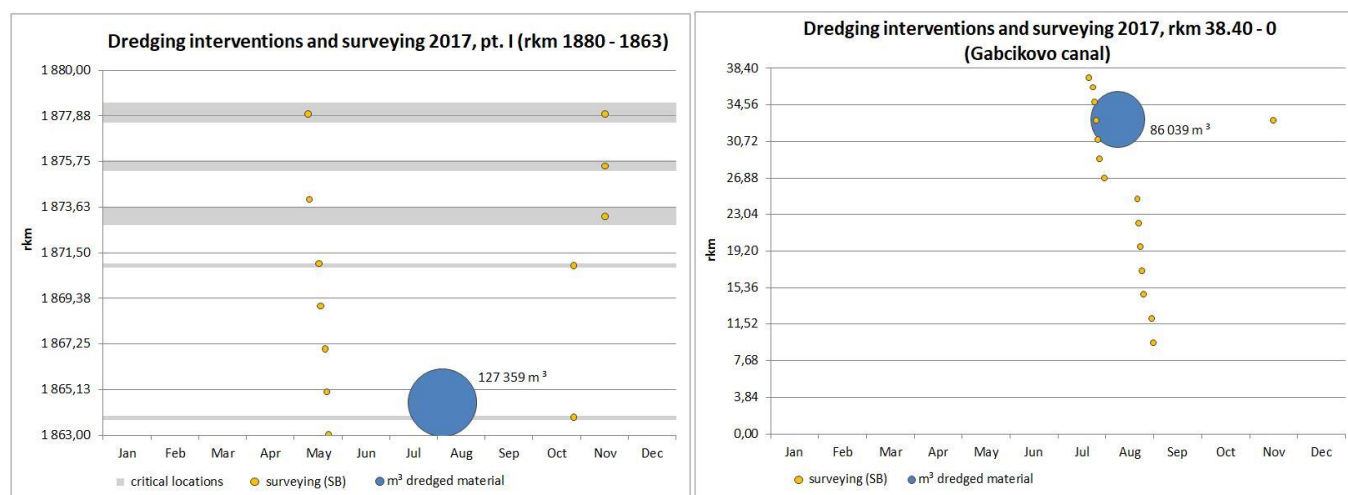
In addition of the planned monitoring tours extra fairway marking and monitoring activities were performed in the period 30.08.-23.10.2017 in the river stretches rkm 34-31 of the Gabčíkovo canal and rkm 1864.5-1863.5 of the Danube. Due to repair works on the asphalt banks of the Gabčíkovo inflow canal, during which the water level had to be lowered 0.8 - 1 m below the normal operation level resulting in aggravated fairway conditions, additional daily monitoring was necessary in the two most critical locations.



## Dredging activities 2017

SVP is doing the maintenance of the fairway based on the parameters of the fairway which have to be guaranteed, width of the fairway on rkm 1790 -1880 is 120m (depth 2.5m + 0.2m) and on rkm 1790 - 1709.8 is 150m (depth 2.8m + 0.2m).

In total, 213 398m<sup>3</sup> were dredged for commercial navigation in 2017 in the two worst critical bottlenecks. (Both bottlenecks also had to be monitored daily during ongoing construction works in September and October – see section “fairway marking” above.)





Dredging from rkm 1865.5 – 1863.5 was conducted from April to December (127 359m<sup>3</sup>). Dredging in the Gabčíkovo canal from km 34 – 32 was conducted from April to November (86 039m<sup>3</sup>).

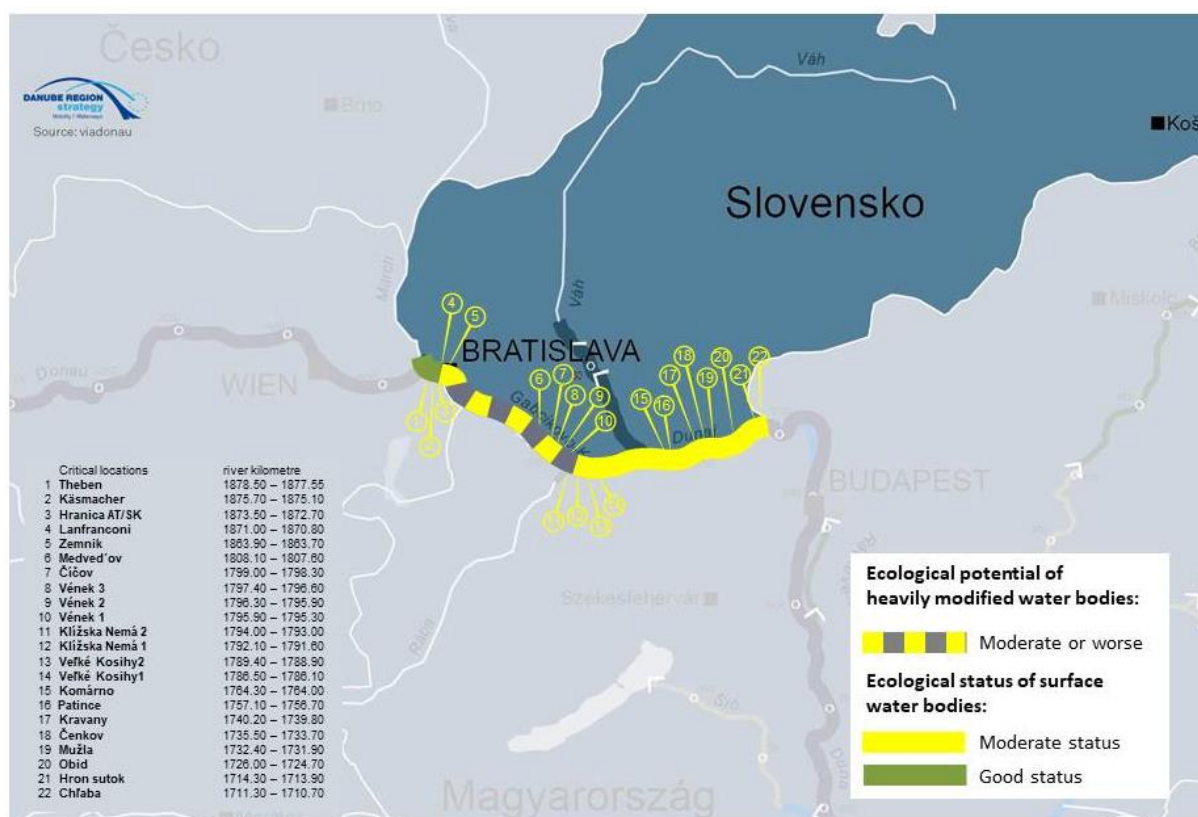
SVP is according to the Act No. 338/2000 Coll. on Inland Navigation the only enterprise which is authorized and responsible to perform fairway marking and works related to marking (dredging included). Thus, only a permission from the Transport Authority is needed, who publishes navigation notices for the time period which is needed for dredging works. These notices ensure navigation safety and are published on the website of the Transport Authority.

The Slovak Ministry of Environment approves the „Plan of dredging works“ for one year. In case that the dredged material is stored on the banks near the Danube and the places are in a protected area, permissions from relevant organisations are needed in addition.

### 5.5 SK | Summary of current ecological status and environmental impacts

The Danube river stretch is in the Slovak Republic divided into four surface water bodies, two of them have been designated as heavily modified water bodies and two as natural water bodies and three of mentioned water bodies are transboundary.

The following map displays the ecological status and ecological potential of the Slovakian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Slovakia.



***Ecological status and ecological potential of surface water bodies***

(Source: DRBM Plan – Update 2015)

According the DRBM Plan – Update 2015, one of the natural water bodies is in good ecological status and one is in moderate ecological status, designated with high confidence level. Both of heavily modified water bodies are in moderate ecological potential designated with medium confidence level. As environmental objectives for both natural water bodies a good ecological status is assigned and for both heavily modified water bodies good ecological potential is assigned. Hydro-morphological conditions of heavily modified water bodies are affected by lateral connectivity interruptions and morphological alterations.

***Measures to improve environmental conditions***

On the three water bodies not reaching the environmental objectives yet, the positive impacts of realised measures is expected until 2021, but still are in the risk of not reaching the targets. For example on the natural water body in moderate ecological status there is a risk of not reaching the targets due to change of biotopes. Measures to improve hydro-morphological conditions were realized, namely reconnection of wetlands/floodplains along the Slovakian part of the Danube River.

***Navigation maintenance measures and environmental impacts***

Maintenance works are executed in the framework of inland navigation law (Zákon o vnútrozemskej plavbe č. 338/2000 Z.z) and in the frame of water law (Zákon o vodách 364/2004 Z.z.) where is mentioned that SVP as the waterway administration is responsible for the maintenance of fairway and waterway in Slovakia.

Actually, there is no project which focuses on the analyses of the impacts of the maintenance activities on environment on Slovak stretch of the Danube River.

## 5.6 SK | Budget status May 2018

*Investments taken for FRMMP implementation 2014 – 2017*

Need areas	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	6 100 000	0	-	6 100 000
Surveying of the riverbed	450 000	578 400	85%	0
Water level gauges	-	-	-	-
Marking of the fairway	1 510 000	1 390 800	85%	0
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	20 000	20 000	0%	0
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>8 080 000</b>	<b>1 989 200</b>	<b>84%</b>	<b>6 090 800</b>

*Operational expenditures for conducted activities 2017 and budget needs 2018*

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	2 050 000	1 868 600	1 868 600	0
Surveying of the riverbed	76 800	83 500	83 500	0
Water level gauges	-	-	-	-
Marking of the fairway	497 334	470 000	470 000	0
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>2 624 134</b>	<b>2 422 100</b>	<b>2 422 100</b>	<b>0</b>

## 5.7 SK | Outlook: actions, milestones and funding sources

<b>SK 01: Level of detail of monitoring data is suboptimal for exact and cost-effective planning of dredging interventions</b>		
Planned activities:	Support acquisition of up-to-date multi-beam sounding vessels, equipment and software, managing of the purchase (within FAIRway Danube)	
Current shortcomings:	Missing of the multi-beam sounding vessel	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Funding through Project FAIRway (CEF)	
Next steps:	Contracting of equipment	February 2018 (completed)
	Delivery of equipment / pilot operation	June 2018 / until 2020
<b>SK 02: Out-of-date information technology, missing database for monitoring data</b>		
Planned activities:	Support establishment of Waterway Management System (WAMS); Establishment, development and installation of the management system is planned within the implementation of the FAIRway Slovakia project	
Current shortcomings:	Missing system	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Funding through Project FAIRway (CEF)	
Next steps:	Preparation of the specification for national WAMS, award of Service Contract for software implementation and operation of the national WAMS	until June 2018
<b>SK 03: Insufficient number of skilled staff to monitor of the fairway</b>		
Planned activities:	Actually only experienced staff available (but close to retirement), securing well-trained staff after purchasing the new surveying vessel (within FAIRway Slovakia)	
Current shortcomings:	Lack of new experienced staff due to company budget limitation (budget depending on Ministry annual budget)	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable

Possible funding:	Budget availability 2017/2018: Funding through Project FAIRway (CEF) and company budget	
Next steps:	Purchase new surveying vessel, need of having newly trained staff – parallel execution of FAIRway Pilots and annual surveying performance	until September 2018
<b>SK 04: Different departments performing the monitoring as an impediment to efficient planning</b>		
Planned activities:	Development and installation of the common database, monitoring done by hydro-morphology department (single-beam) & by Branch Danube (before and after dredging intervention)	
Current shortcomings:	Missing common database	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Funding through Project FAIRway (CEF)	
Next steps:	Preparation of the specification of the national WAMS database (FAIRway Danube project), connection with common WAMOS database (also FAIRway Danube project)	Implementation planned in 2018-2019
<b>SK 05: Different coordinate systems used for measurements in border stretches as an impediment to efficient planning</b>		
Planned activities:	Actually exchanging of the data is based on UTM coordinate system and all cross-border partners exchange the data according to the agreements done on TWC level	
Current shortcomings:	A little bit complicated exchange process	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Funding through company budget, CBC funds	
Next steps:	Data exchange in format necessary for processing is agreed and harmonised on TWC level, cooperation works	Implementation in progress
<b>SK 06: Old and dredging and marking fleet and equipment</b>		
Planned activities:	Acquisition of the new marking vessel (within FAIRway Danube) Modernisation and purchasing of new dredgers later in next investment project	

Current shortcomings:	Old fleet of dredgers (high maintenance fee), old marking vessels, modernisation and acquisition requested	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Project FAIRway (CEF) for marking vessel (multi-operational vessel), for dredgers – follow up investments funds	
Next steps:	Acquisition of new marking vessel (FAIRway Danube project) – contract signed in December 2017 (delivery time 12-14 months)	until beginning of 2019
	Acquisition and modernisation of dredging fleet – planned within the DaReM project – currently finalisation of the specifications for the tender procedures	tender publishing in 2018
<b>SK 07: Lack of staff and resulting missing flexibility in case of urgencies (related to dredging activities)</b>		
Planned activities:	Ensuring of the well-trained and educated staff in parallel with purchasing of the new dredgers	
Current shortcomings:	Too little well-trained staff to operate the equipment	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: Investments funds	
Next steps:	DaReM project – acquisition and modernisation of the dredging fleet – training of the new and existing staff	until 2018-2019
<b>SK 08: Frequent need to adjust fairway marking as substitution for dredging activities</b>		
Planned activities:	Installation of the Fairway Management System (planned within the FAIRway Danube project – WAMOS/WAMS databases)  within the project Danube STREAM: installation of the marking plans applications, harmonisation with marking department (marking trips done on weekly basis)	
Current shortcomings:	Missing management system or common database	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable



## Action Plan: Slovakia

	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018/2019: Funding through Danube Transnational Programme (Danube STREAM project) and CEF (FAIRway Project)	
Next steps:	<p>WAMS/WAMOS databases: activities within the FAIRway Danube project</p> <p>Marking Plans Applications: definition of the structure of the database (possibility of using existing database structure developed within NEWADA duo – Marking plans task)</p>	<p>see key issue SK 02</p> <p>implementation in 2018-2019</p>

## 6 Hungary

The **General Directorate of Water Management** is responsible for fairway maintenance. It has three subordinated regional organizations (Water Directorate, VIZIG) for waterway maintenance on the Danube:

1. North-Transdanubian Water Directorate (1,811-1,708 rkm)
2. Middle-Danube-Valley Water Directorate (1,708-1,560 rkm)
3. Lower-Danube-Valley Water Directorate (1,560-1,433 rkm)

### 6.1 HU | Status report on main critical locations including water level information 2012 – 2017

#### Section rkm 1811 - 1708

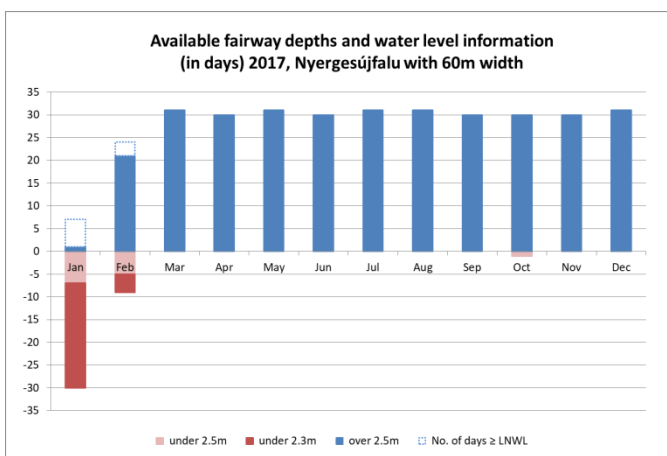
**Number of days with fairway depths  $\geq 2.5$ m on main critical locations** (as identified by the Danube waterway users in a survey by PA1a concluded in December 2014)

Critical location	2012	2013	2014	2015	2016	2017
<b>Nyergesújfalu</b> critical location with <b>60 meters</b> wide fairway	304	314	307	244	326	327
<b>Nyergesújfalu</b> critical location with <b>100 meters</b> wide fairway	286	304	256	213	293	304

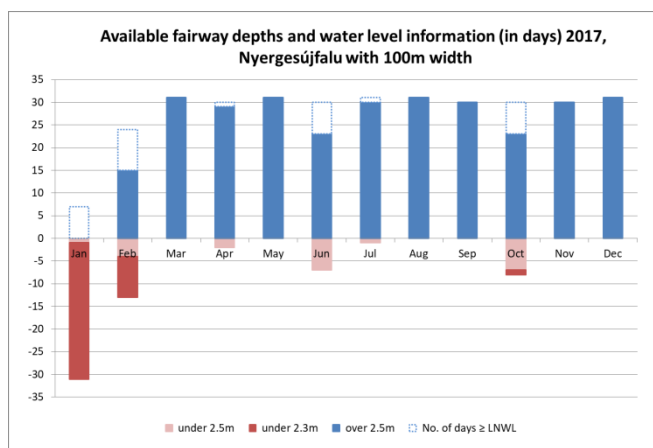
Fairway width (range of values accounts for different curve radii): 60 to 100 m in Slovakia and Slovak - Hungarian border section (Nyergesújfalu) based on Fairway Rehabilitation and Maintenance Master Plan.

**Number of days with water level  $\geq$  LNWL on main critical locations**

Critical location	Reference gauge	2012	2013	2014	2015	2016	2017
Nyergesújfalu	Esztergom	366	365	360	294	349	336



## Action Plan: Hungary



### Section rkm 1,708 - 1,560

#### Number of days with fairway depths $\geq 2.5\text{m}$ on main critical locations

Critical location	2012	2013	2014	2015	2016	2017
Kisapostag critical location with <b>80 meters</b> wide fairway	287	284	246	224	294	326
Göd critical location with <b>80 meters</b> wide fairway	287	284	286	208	299	266
Dömös alsó critical location with <b>120 meters</b> wide fairway	312	304	264	205	279	290
Budafok critical location with <b>60 meters</b> wide fairway	318	308	319	229	310	257

#### Number of days with water level $\geq \text{LNWL}$ on main critical locations

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Dömös-alsó	Nagymaros	363	365	365	322	357	362
Göd	Budapest	366	364	357	320	357	352
Kisapostag	Dunaföldvár	365	364	357	268	340	326

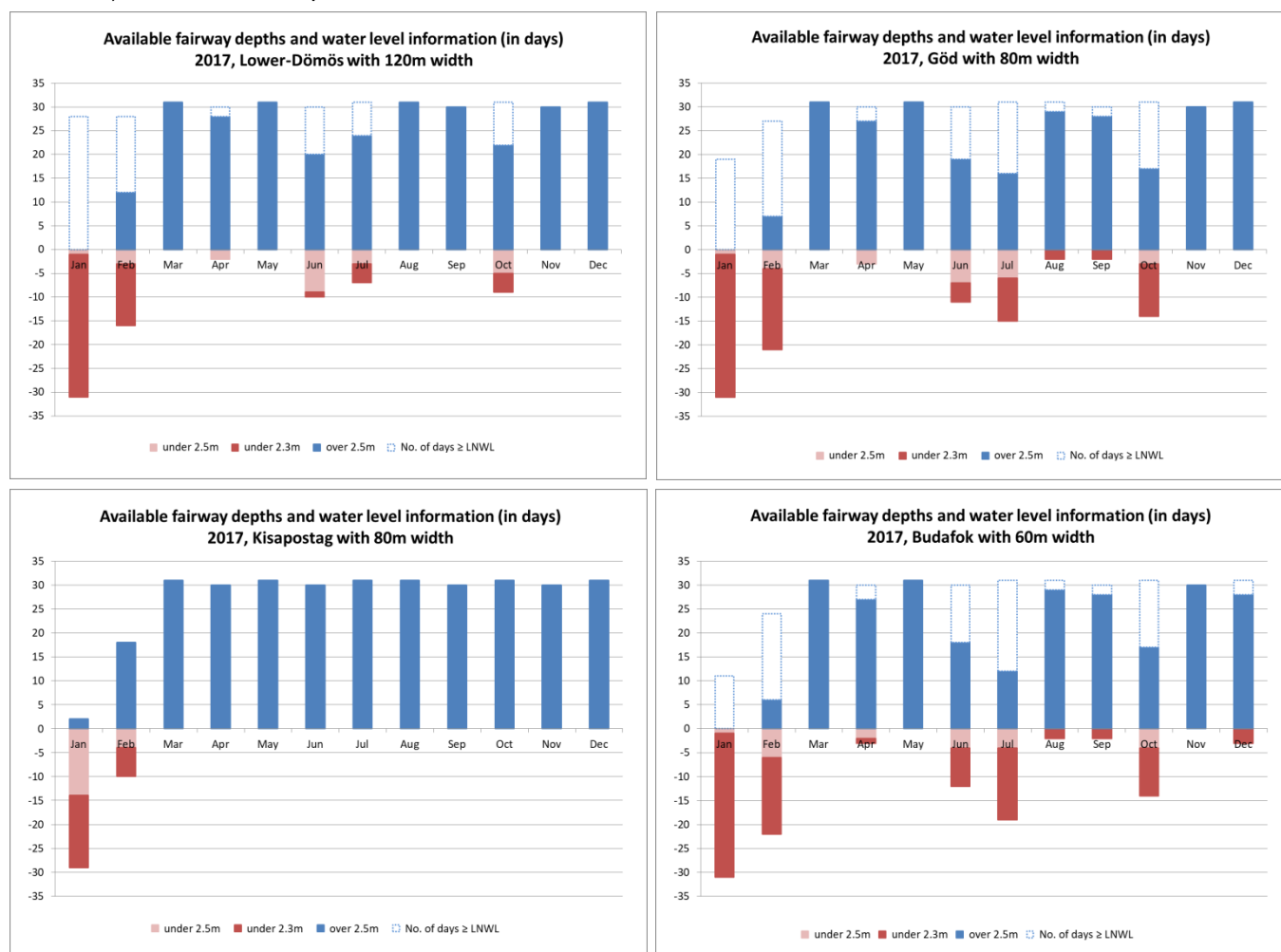
Fairway width (range of values accounts for different curve radii): 80 to 120 m in Hungarian Danube (rkm 1708-1433) section based on Fairway Rehabilitation and Maintenance Master Plan.

Due to the annual changes of water discharge and riverbed the most critical section at KDVIZIG area is not a given ford and also shallow section parameters could change within a year according to the latest riverbed survey.

The critical location Budafok, mentioned by the Danube users in 2014 to be one of the main critical sections, has never been the worst section in terms of depth, but is considered critical because of limited width, which is 60 meters.

## Action Plan: Hungary

As it is probable that further critical locations arise (in addition to the ones mentioned in the table), these will be reported in the text.



### Section rkm 1,560 - 1,433

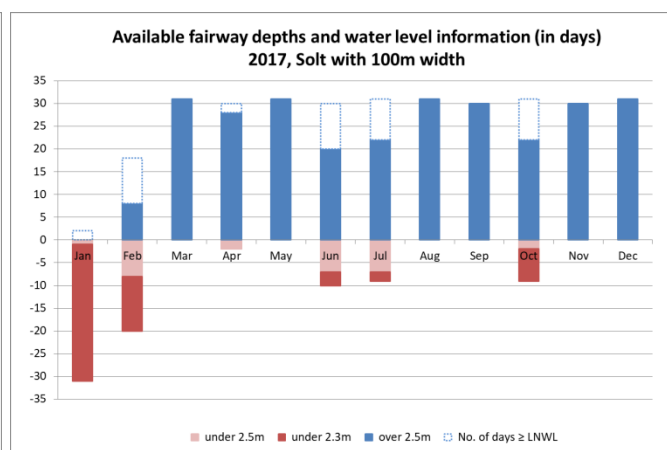
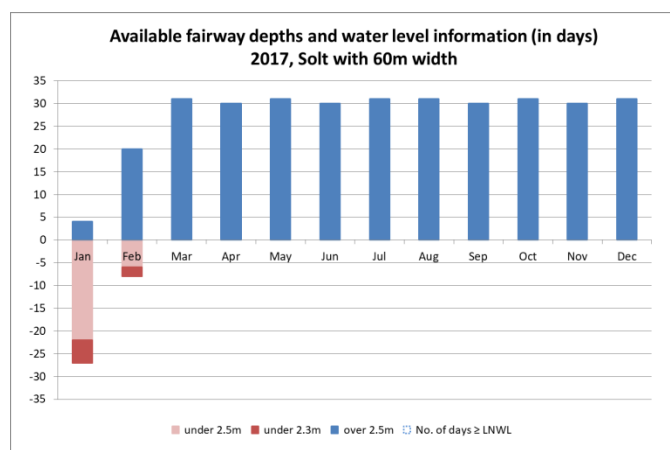
#### Number of days with fairway depths ≥ 2.5m on main critical locations

Critical location	2012	2013	2014	2015	2016	2017
<b>Solt</b> critical location with <b>60 meters</b> wide fairway	365	365	360	277	344	330
<b>Solt</b> critical location with <b>100 meters</b> wide fairway	293	318	232	210	277	284

#### Number of days with water level ≥ LNWL on main critical locations

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Solt	Dunaföldvár	366	364	358	270	339	326

## Action Plan: Hungary



## 6.2 HU | Hydrological conditions at main critical locations 2017

In 2017, water levels were below LNWL for almost the whole of January and large parts of February, due to low rainfall, low temperatures and the occurrence of ice. From March onwards, water levels remained above LNWL for the entire year.

## 6.3 HU | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014) and last updated 2016:

No update was provided.

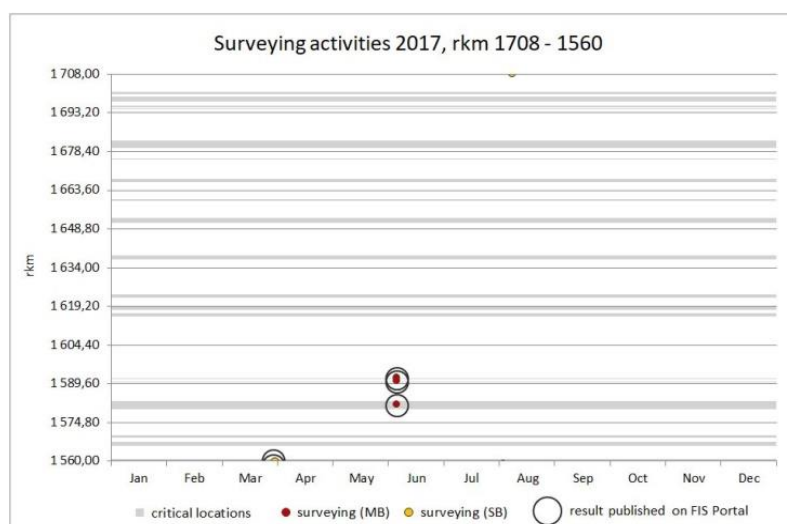
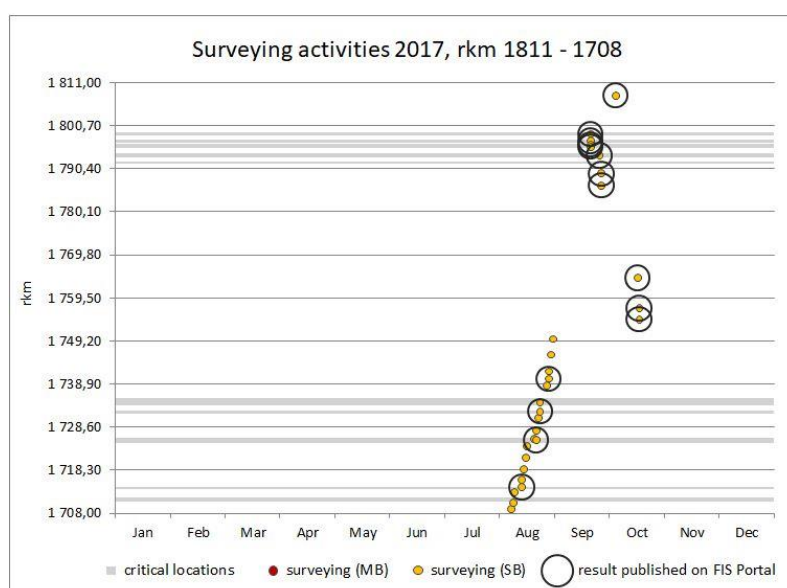
	Key issues	Need for action	Activities performed 2016
HU 01	Level of detail of monitoring data is suboptimal for exact planning	Support acquisition of up-to-date multi-beam sounding equipment and vessels	Test of different types of multi-beam sounding equipment was performed within FAIRway Danube CEF project. Based on the results, the technical specifications for procurement were finalized. The procurement documentation is under preparation by the public procurement consultant.
HU 02	Old monitoring equipment and fleet (related to fairway marking)	Support acquisition of up-to-date vessels and maintenance-free buoys that make marking more cost-effective	Technical specifications for procurement were finalized. The procurement documentation is under preparation within HUMARK CEF project by the public procurement consultant.
HU 03	Integration of updated fairway depths data in the IENC	Support skippers with continuously updated charts	Due to a CEF project by RSOE in progress, a contract has been made and work has started.

## 6.4 HU | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations is itemised in the Rehabilitation and Maintenance Master Plan (version December 2014).

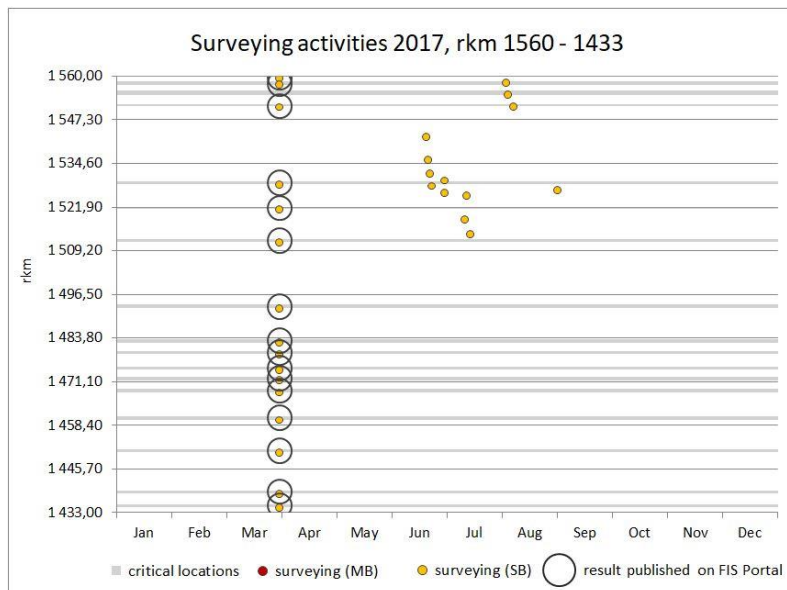
### *Riverbed surveying activities 2017*

The following river bed surveying activities took place according to annual procedure. Surveying was conducted with single-beam technology.

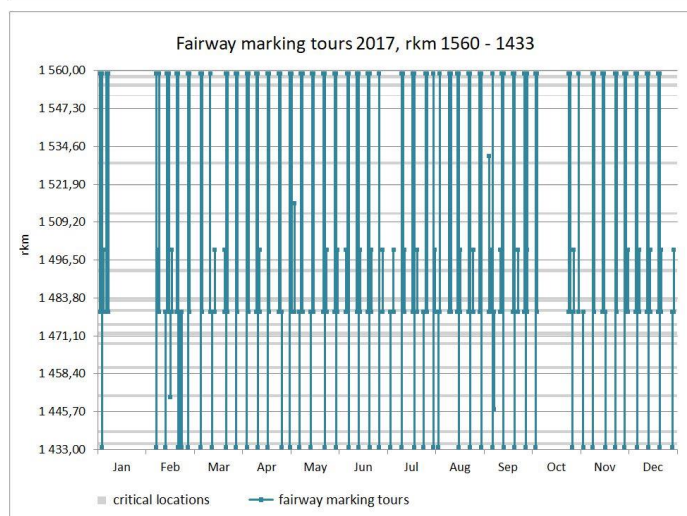
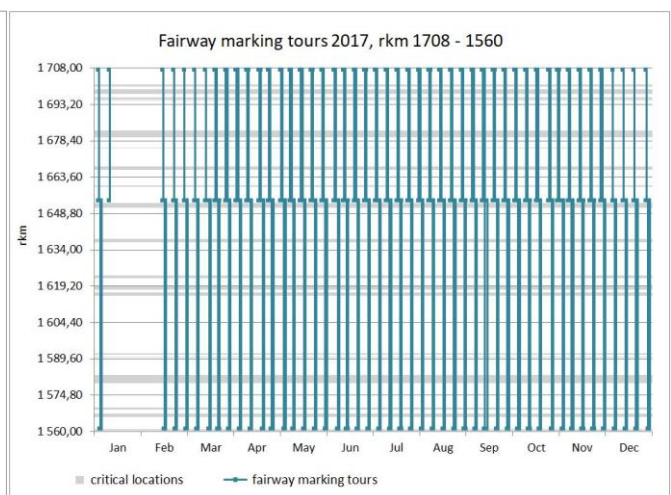
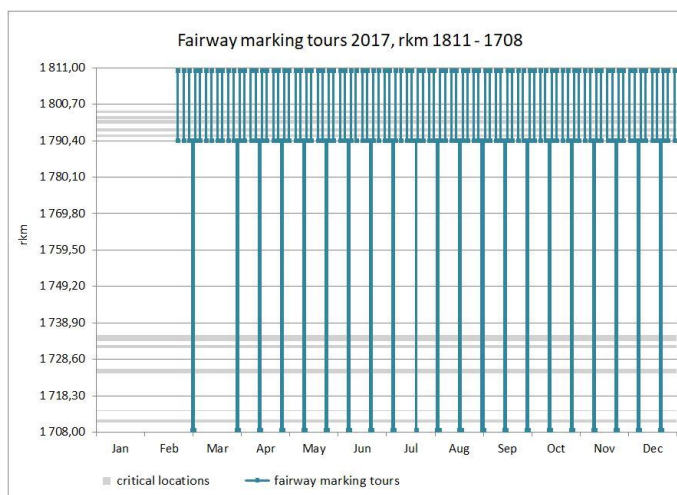




## Action Plan: Hungary



## Fairway marking activities 2017



The fairway marking tours are conducted on a weekly basis in Hungary. Changes of the fairway have not been done in 2017, only the minor changes were realised by the marking vessels staff.

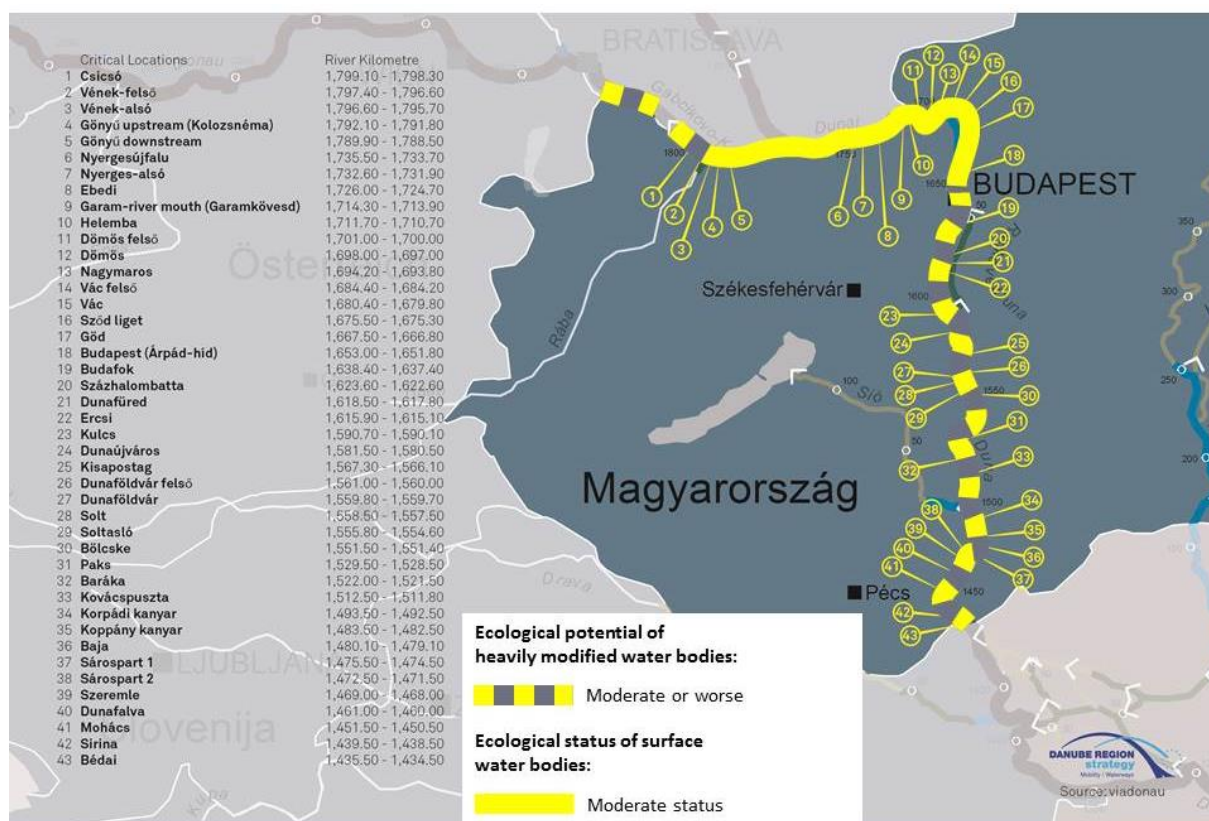
## Dredging activities 2017

No dredging was done for commercial navigation in 2017.

## 6.5 HU | Summary of current ecological status and environmental impacts

The Hungarian section of the Danube is divided into 7 sections. The main stretch of the Hungarian Danube is declared as “Heavily modified water bodies – Final Designation” according to the Water Framework Directive. The only two exceptions are above Budapest; these are designated as “Natural water bodies”.

The following map displays the ecological status and ecological potential of the Hungarian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Hungary.



## Ecological status and ecological potential of surface water bodies

(Source: draft Hungarian NRBM Plan – Update 2015)

The ecological status of the two natural water bodies is moderate; the good ecological status is estimated to be achievable in 2027. The designation as heavily modified water body of main parts of the Danube is mainly attributed to bank revetment, which was supported by biological elements. The good ecological potential is estimated to be achieved as follows: in 2021 1 pc, in

2027 2 pc's and after 2027 2pc's. For the heavily modified water bodies measures are to be implemented in order to achieve good ecological potential.

### ***Measures to improve environmental conditions***

Between 2009 and 2015 several measures have been taken to achieve the better ecological status/potential: improving drinking water quality, improving wastewater collection and treatment, reconnecting wetlands/floodplains.

As explained by the draft National Water Management Plan for Hungary (2015):

- The section named “Danube at Szigetköz” was regulated for flood protection and navigation. In 2015 several structures were built to provide connectivity between the main riverbed and the side branches. The erosion of the riverbed is significant, it exceeds 2 meters. The decreasing water levels of the Danube and of the associated groundwater seriously affect the groundwater-dependent ecosystems and the water supply of the side branches, and endanger the bank-filtered water resources. Because the water level decrease makes the side branches dry up and separate often, some unique and valuable habitats will be lost.
- Due to the flood protection measures (river regulation, flood control and the associated sediment mining) the danger of the icy floods is decreased, ensuring the required size fairway and the flood protection structures protect the flood free areas at the lower Hungarian Danube section named “Danube between Sió outfall and state border”.

Because of the riverbed morphology alterations and the fords the required fairway parameters cannot be guaranteed at the section named “Danube between Gönyű and Szob”. There are 10 fords and 7 narrow sections according to the 2013 river survey. The measures to improve the navigability have to be in line with the other river users’ interest and to keep or improve the good ecological status – as an objective of the integrated river management. For the Danube as protected ecological corridor and Natura 2000 area, treatment and maintenance plans are under development or are already finished. The development of the shipping and the maintenance of the fairway are typically measures, which may restrict the aims of the Water Framework Directive. According to the Water Framework Directive, the 4.7 exemption test is necessary.

### ***Navigation maintenance measures and environmental impacts***

On the Danube fairway setting of the waterway should be established based on local characteristics and dimensions of a typical convoy given by international treaties, laws and regulations. Based on the Danube Commission recommendations (DK/TAG 77/11) for fairway depth it is necessary to ensure a safe journey with a min. 25 dm draft depth.

In the Vienna-Belgrade section (1921.05 to 1170.00 rkm) the fairway width should be at least 120-150 m, but in justified cases (e.g. in the case of sections which are in unfavourable situation because of the geo-morphological conditions, those sections which were in the focus of the general assembly of the Danube Commission when issuing decision no. DK/TAG 69/18) the reduction of the minimum fairway width is allowed if the safety of navigation is ensured.

## Action Plan: Hungary

Maintenance works are executed in the framework of Act. No. XLII of 2000 on water transport and regulation No. 17/2002. of the minister for environment and water. According to the regulation, fairway maintenance activities shall be based on an activity plan, which is prepared by the waterway administration each year by the end of March, and has to be approved by the competent regional water authority.

By the end of 2013, a permit was obtained for carrying out fairway marking activities of the Danube section 1811-1708 rkm.

## 6.6 HU | Budget status May 2018

### Investments taken for FRMMP implementation 2014 –2016

No update was provided.

Need Areas	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	150 000	6 200 000	85%	-
Surveying of the riverbed	749 700	2 940 000	85%	-
Water level gauges	150 000	1 500 000	85%	-
Marking of the fairway	3 187 000	8 675 000	85%	-
Availability of locks / lock chambers	n/a	-	-	-
Information on water levels and forecasts	50 000	10 000	85%	40 000
Information on fairway depths	0	1 220 000	85%	-
Information on marking plans	47 000	620 000	85%	-
Meteorological information	-	-	-	-
Other needs	0	1 016 397	85%	-
<b>Sum (Euro)</b>	<b>4 333 700</b>	<b>22 181 397</b>	<b>85%</b>	<b>40 000</b>

**Operational expenditures for conducted activities and budget needs**

No update was provided.

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	-	-	-	-
Surveying of the riverbed	-	-	-	-
Water level gauges	-	-	-	-
Marking of the fairway	-	-	-	-
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**6.7 HU | Outlook: actions, milestones and funding sources**

No update was provided.

<b>HU 01: Level of detail of monitoring data is suboptimal</b>		
Planned activities:	Purchasing multi-beam sounding equipment and surveying vessel within FAIRway project	
Current shortcomings:	Missing agreement of the Subsidy Contract between Hungarian Ministry of National development as CEF Beneficiary and NIF and OVF as Implementing Bodies	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	not relevant
	Which measures are taken to mitigate these impacts?	not relevant
	Is water status still expected to deteriorate?	not relevant
Possible funding:	CEF 85%, National budget 15% Action no. 2014-EU-TMC-0231-S	
Next steps:	-	-
<b>HU 02: Old monitoring equipment and fleet (related to fairway marking)</b>		
Planned activities:	Purchasing equipment within national CEF project called "Improving fairway marking on the Hungarian section of the Danube in the Rhine-Danube corridor" <ul style="list-style-type: none"> <li>Fairway marking vessels - 3 pcs</li> <li>High-speed patrol boats - 3 pcs</li> <li>Intelligent light buoys - 115 pcs</li> <li>New floating unlighted buoys - 210 pcs</li> </ul>	

## Action Plan: Hungary

	<ul style="list-style-type: none"> <li>• Light bank markers - 55 pcs</li> <li>• New bank marks and navigation control marks - 300 pcs</li> <li>• New river km marks - 400 pcs</li> </ul>	
Current shortcomings:	Missing agreement of the Subsidy Contract between Hungarian Ministry of National development as CEF Beneficiary and NIF and OVF as Implementing Bodies	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	not relevant
	Which measures are taken to mitigate these impacts?	not relevant
	Is water status still expected to deteriorate?	not relevant
Possible funding:	CEF 85%, National budget 15% Action no. 2014-HU-TMC-0605-W	
Next steps:	-	-
<b>HU 03: Integration of fairway depths data in the IENC</b>		
Planned activities:	Develop v2.3 format iENC with updated bathymetric data	
Current shortcomings:	Currently, there are no shortcomings identified	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	not relevant
	Which measures are taken to mitigate these impacts?	not relevant
	Is water status still expected to deteriorate?	not relevant
Possible funding:	CEF 50%, National budget 50% Action no. 2014-HU-TM-0619-W	
Next steps:	-	-



## 7 Croatia

**AVP - Agency for Inland Waterways** (within the Ministry of the Sea, Transport and Infrastructure) is responsible for fairway maintenance, rehabilitation and upgrade.

### 7.1 HR | Status report on main critical locations including water level information 2012 – 2017

The **recommended Level of Service of 2.5m fairway depth at Low Navigable Water Level** would correspond to an equal height of the blue columns (availability of 2.5m fairway depth) and the white columns framed in blue (water level equal to or above Low Navigable Water Level) in the figures below.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

#### Danube

**Number of days with fairway depths  $\geq 2.5\text{m}$  on main critical locations**  
(for a fairway width of 100m)

Critical location	2012	2013	2014	2015	2016	2017
Apatin *	366	365	365	365	366	363

\*Data provided by PLOVPUT

The Danube stretch in Croatia is characterised by sufficient depths but, due to river morphology (large number of sandbars and islands), the achieved fairway width varies. The Apatin sector is characterised by an unstable riverbed, where the flow direction during the low water period is highly subjected to changes. Therefore, the available depth during the same water level may not have the same values. The table below shows the number of days related to the achieved fairway width.

**Number of days below 200/150/120m width** (and depth over 2.5m)

Critical sector in 2015	200 x 2,5	150 x 2,5	120 x 2,5	100 x 2,5
Apatin *	256	363	363	363

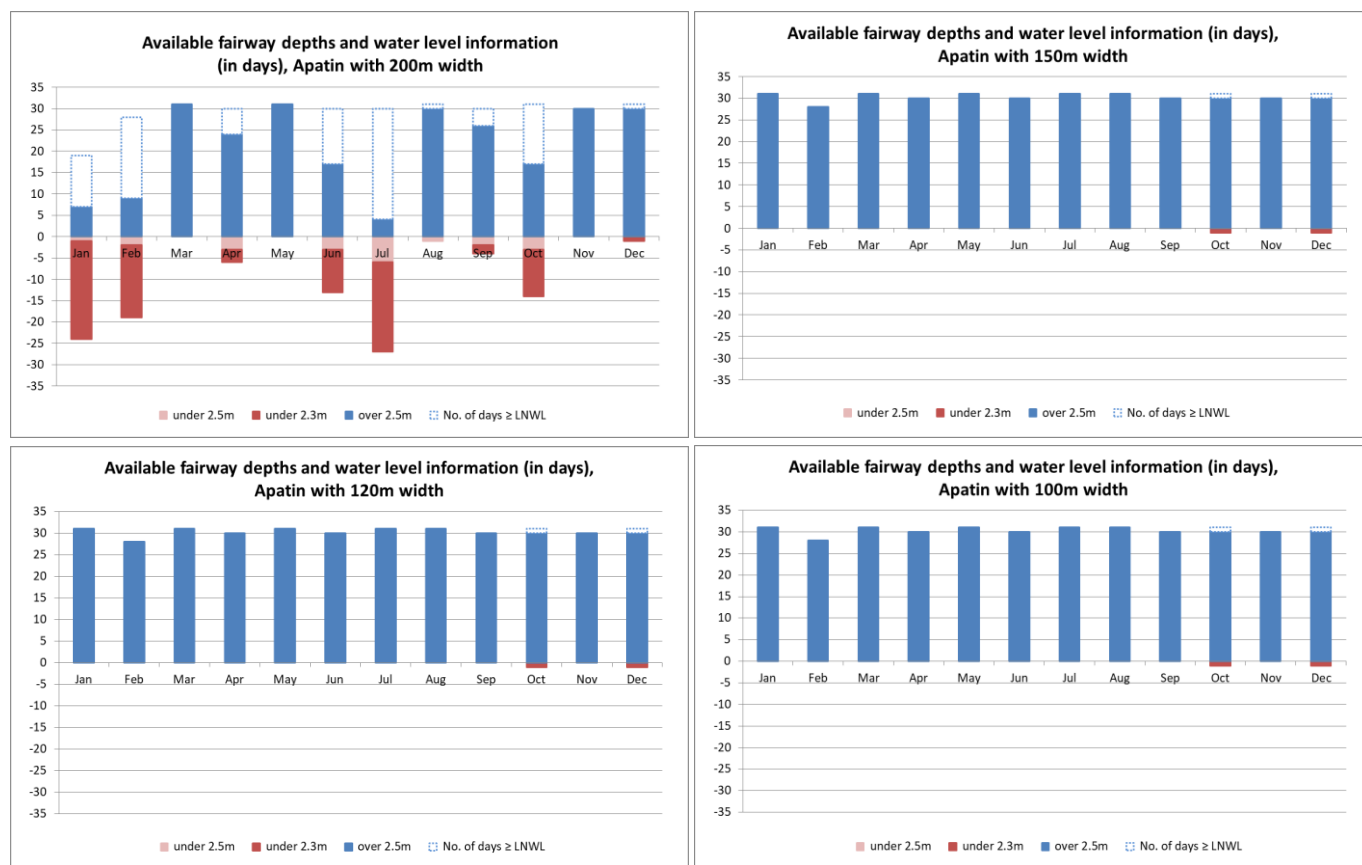
\*Data provided by PLOVPUT

**Number of days with water levels  $\geq \text{LNWL}$  on main critical locations**

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Apatin *	Apatin	366	365	365	315	353	352

\*Data provided by PLOVPUT

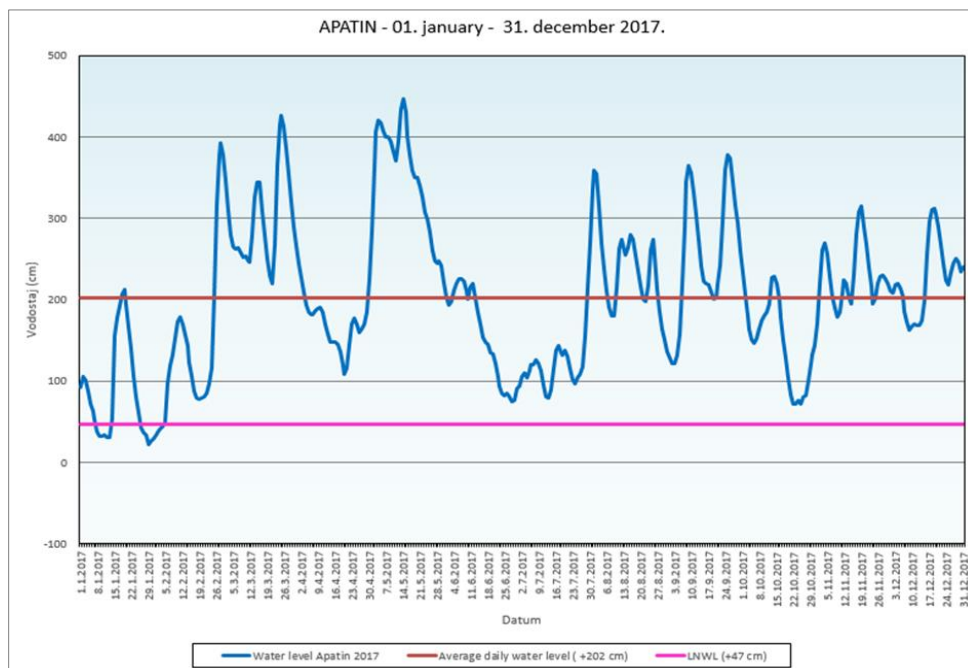
## Action Plan: Croatia



Fairway depths of 2.5 m were available throughout 2017 for the minimum Level of Service (100 m). On the 100 m, 120 m and 150 m fairway width, fairway depths of 2.5 m were achieved on 363 days (99.45%). Only for a fairway width of 200 m, fairway depth of 2.5 m was only achieved on 256 days in 2017 (70.14%).

## 7.2 HR | Hydrological conditions at main critical locations 2017

In 2017 at the gauging station Apatin, the water level was below LNWL during a short period in January (12 days). The average daily water level was 202 cm. Water levels stayed above LNWL for almost the entire period from February – December 2017, resulting in good navigation conditions. Hydrological conditions were good during the entire year of 2017.



## 7.3 HR | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014) and last updated in October 2017:

	Key issues	Need for action	Activities performed 2017
HR 01	Old monitoring fleet and equipment	Support retrofit and acquisition of up-to-date single-beam sounding equipment, software and vessels	Within the FAIRway Danube project a surveying vessel was purchased with multi-beam equipment (baptism in October 2017).
HR 02	Insufficient number of skilled staff	Secure education and provision of well-trained staff in the short, medium and long term	No new activities.
HR 03	The number and the accuracy of gauging stations should be raised	Support increasing the number and quality of gauging stations	DHMZ performed regular maintaining of existing gauging stations. Within the FAIRway Danube project – purchase of 4 new gauging stations and modernisation of 5 existing ones on the Danube. The equipment is purchased but not yet completely installed.

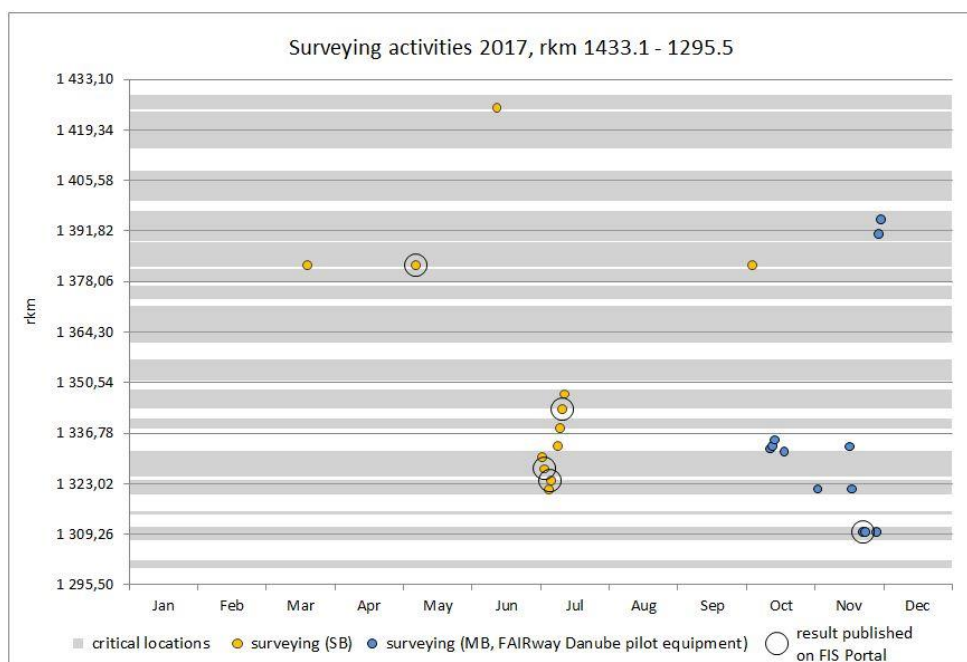
HR 05	Deterioration of equipment of dredging companies	Support acquisition of modern vessel at dredging companies	<i>No new activities. No influence on investment decisions of dredging companies.</i>
HR 06	Cumbersome procurement procedures for dredging activities	Start improved and more efficient concessions procedures for Sava, Drava and Danube	<i>Concessions procedure started in 2016 for Drava – Port.</i>
HR 07	Not enough vessels available with AVP to provide quick reaction on needed marking interventions; equipment and vessel malfunctions	Support acquisition of modern maintenance and marking vessels	<i>Within the FAIRway Danube project – purchase of a marking vessel with single-beam equipment. The tender procedure was finalised, delivery of the vessel is expected in June 2018.</i>
HR 08	Inefficient procedures, suboptimal link between surveying and marking department, insufficient data storage and analysis facilities	Support development and harmonisation of adequate IT tools	<i>Within FAIRway Danube a national WAMS (Waterway Asset Management System) is being implemented and connected to the transnational WAMOS tool. Preparation of tender documentation for procurement of the national WAMS.</i>
HR 09	The low number and the accuracy of gauging stations; non-existence of water level forecasts	Support cooperation between actors involved in water level information and increase the number of additional gauging stations	<i>The hydrological forecast modelling project started in year 2014, using MIKE 11 software tools, and in cooperation with Croatian Waters (Sava and Kupa rivers).  Established great communication between AVP and DHMZ – DHMZ is subcontracted for establishment of 4 new gauging stations and modernisation of 5 existing ones together with development of water level forecast until 2020 on the Danube river within the FAIRway Danube project.</i>
HR 10	Necessity of river engineering measures at Sotin	Implementation of river engineering and training works	<i>Feasibility study concluded in 2015, currently: Environmental Impact Assessment (EIA) ongoing</i>

#### 7.4 HR | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified in the Rehabilitation and Maintenance Master Plan (version December 2014).

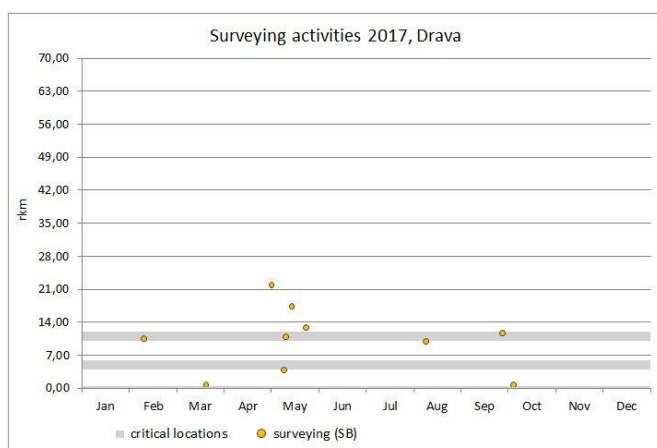
## Riverbed surveying activities 2017

### Danube

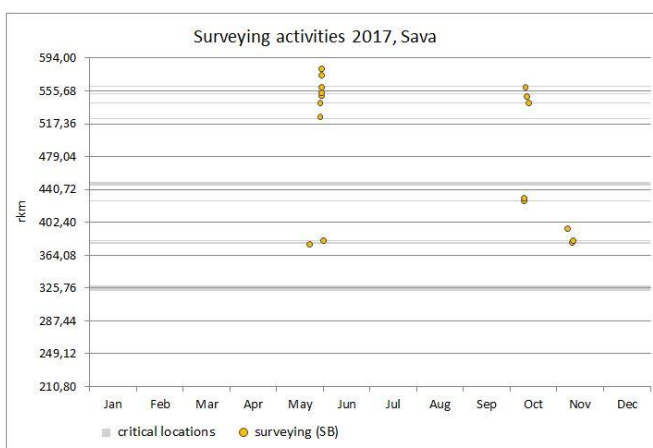


The river bed surveying is done according to an annual surveying plan. This plan consists of annual surveying of the whole Danube sector (single-beam) with main surveying of critical locations and waterway objects on which the maintenance works are planned. The plan also contains surveying of fairway locations for the production of geodetic and morphological surfaces in order to update the technical documentation. In October 2017, surveying activities were conducted with the new surveying vessel with multi-beam equipment, purchased within FAIRway Danube. Pilot operation of this equipment was concentrated on the most critical locations Mohovo (survey result published on the FIS Portal), Sotin and Židovski rukavac.

### Drava



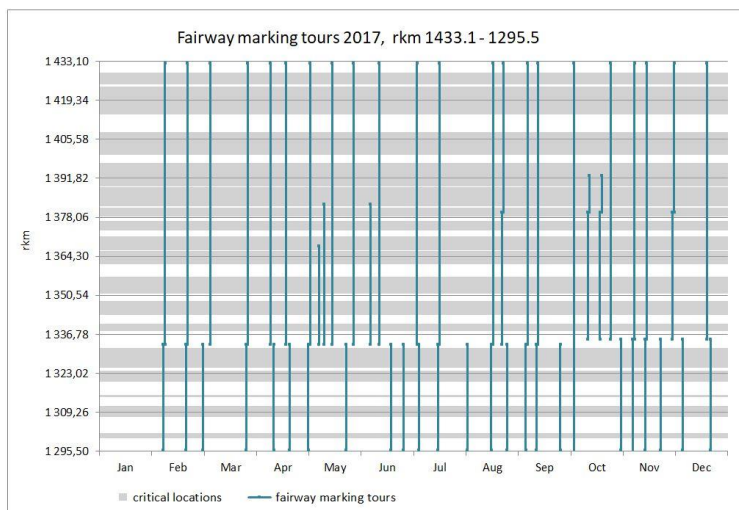
### Sava



### Fairway marking activities 2017

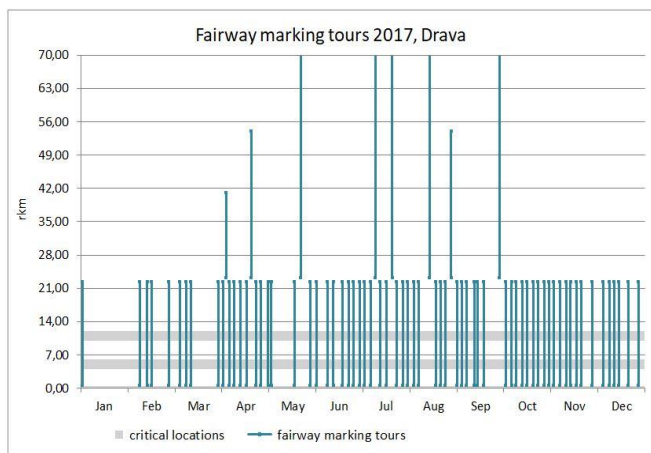
The marking vessel is equipped with an echo-sounder, so the marking tours also serve as quick checks of the fairway. Nevertheless, data is not post-processed but used solely for the purpose of marking. The fairway marking is done approximately every two weeks, based on a work plan.

#### Danube

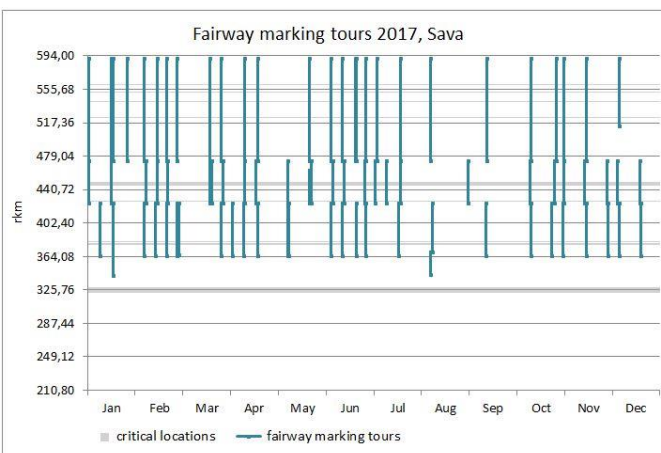


In 2017, the situation on the whole Danube stretch was stable and there was no reallocation of the fairway as the most favourable depth was held throughout the year within the fairway limits of 100m.

#### Drava



#### Sava



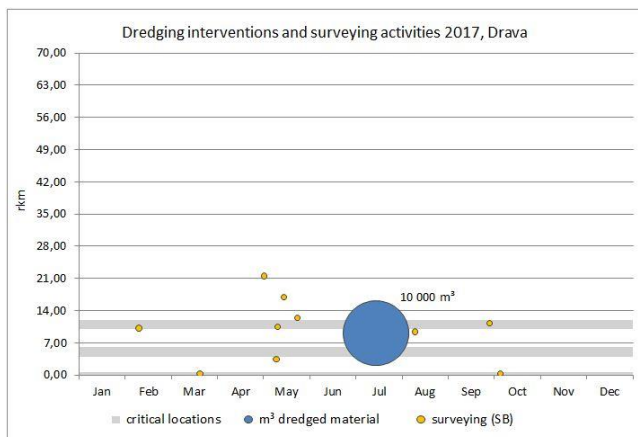
### Dredging activities 2017

In 2017, there was dredging on the Drava river (10,000 m<sup>3</sup>) and on the Sava river (≈ 45,000 m<sup>3</sup>) for commercial navigation.

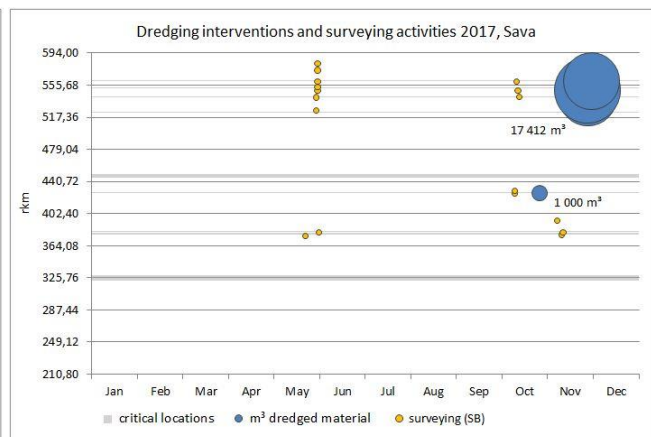
The dredging interventions are reported in combination with the surveying activities. This illustrates the strong dependency of dredging works on up-to-date surveying results. Prior to, during and after dredging works the respective critical locations were surveyed in addition to the regular surveying tours.



## Drava

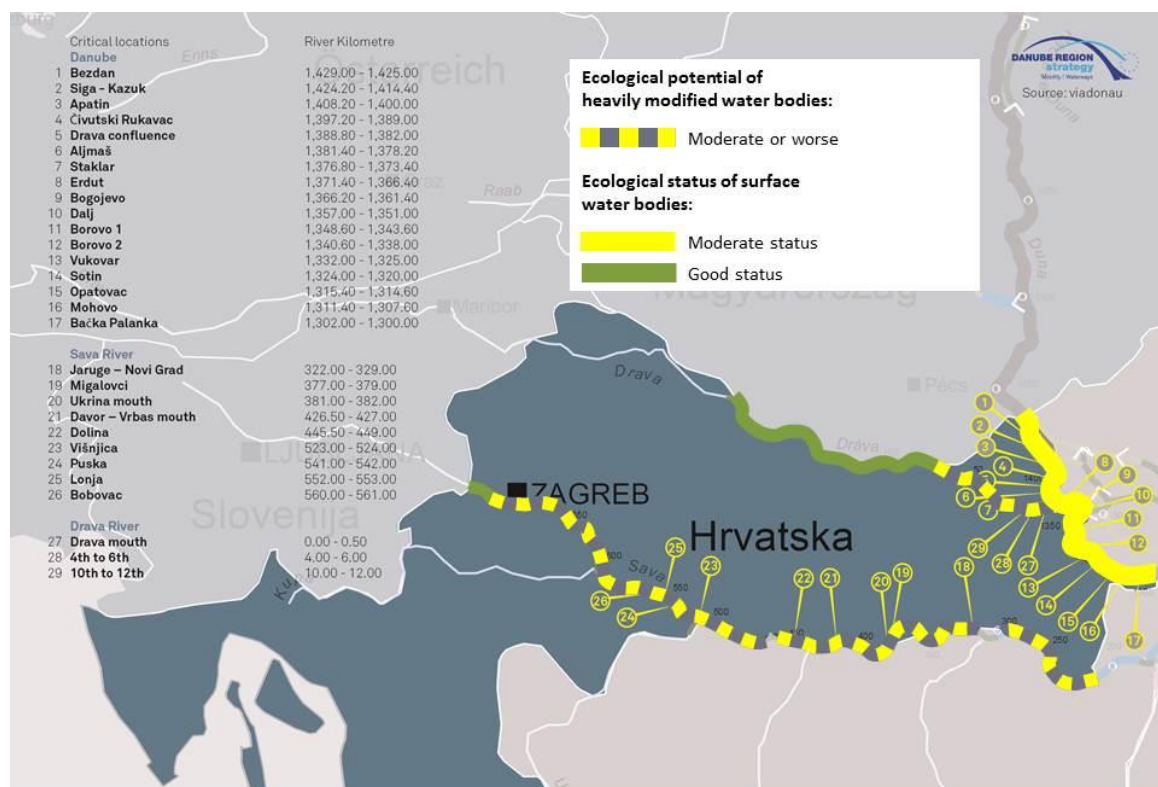


## Sava



## 7.5 HR | Summary of current ecological status and environmental impacts

The following map displays the ecological status and ecological potential of the Croatian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Croatia.



### Ecological status and ecological potential of surface water bodies

(Source: DRBM Plan – Update 2015)

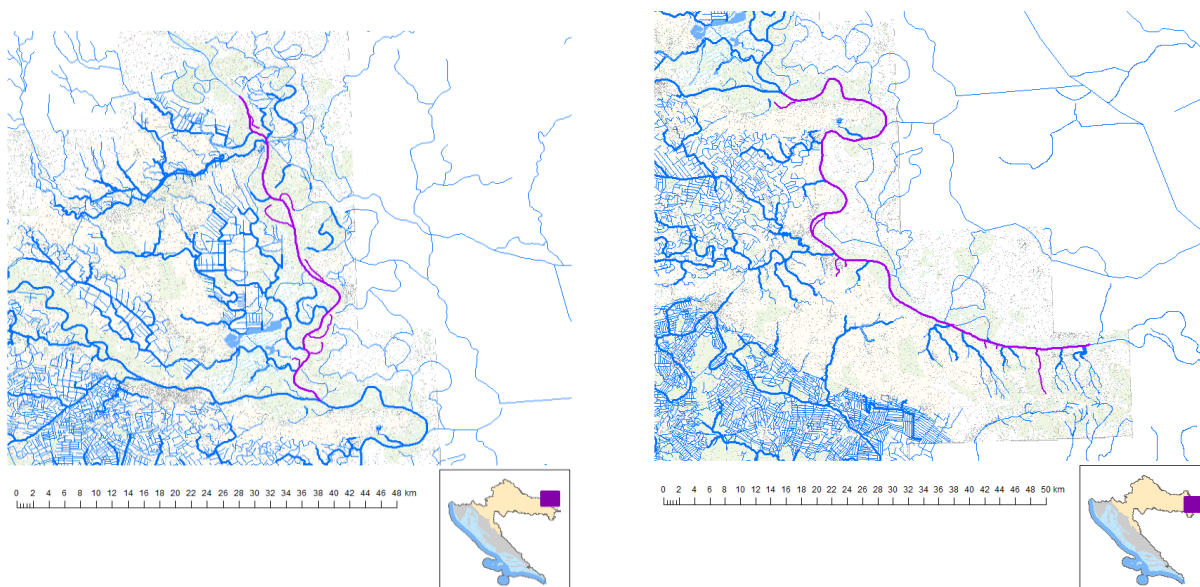
According to the River Basin Management Plan (RBMP) 2016-2021, water bodies on the Danube River in Croatia aren't designated as HMWBs and there are no hydropower plants built there.



## Action Plan: Croatia

In the RBMP 2016-2021, the status of water bodies on the Danube River is assessed according to the Regulation on water quality standard (official gazette 73/2013) and based on the impacts and pressures analysis.

According to the Regulation, the ecological status of the water body (from the Croatian-Hungarian border to the Drava-Danube confluence) is assessed as moderate, and its chemical status as good. Downstream of the Drava-Danube confluence to the Croatian-Serbian border, both the ecological and chemical statuses of the water body are assessed as good.



*Water bodies on the Danube River in Croatia*

### **Measures to improve environmental conditions**

Instruments to control hydro-morphological pressures to water bodies are provided in the Water Act and the Environmental Protection Act.

Hydro-morphological modifications to the water bodies due to physical interventions (projects) that affect the water regime are controlled by issuing water rights acts or binding water rights opinions as part of integrated environmental protection requirements, which precedes the issuance of a location permit or some other form of project approval. Compliance with the specified requirements is controlled during project implementation.

Comprehensive control of the impacts of development plans, programmes and projects on environmental quality, including impacts on the aquatic environment, is regulated by the Environmental Protection Act.

The lack of appropriate hydro-morphological and biological monitoring significantly restricts the possibility to prepare an elaborate programme of measures to control and reduce hydro-morphological pressures to water bodies.

Due to very limited data, the programme of measures for the period 2016-2021 includes activities corresponding to a temporary character of designating artificial and heavily modified water bodies (no regret approach).

### ***Navigation maintenance measures and environmental impacts***

Maintenance works are executed in the framework of navigation law (“Zakon o plovidbi i lukama unutarnjih voda”, official gazette nr. 109/2007, 132/2007, 51A/2013 and 152/2014), Regulation on technical maintenance of waterways (“Pravilnik o tehničkom održavanju vodnih putova”, official gazette nr. 62/2009 and 136/2012) and in accordance with the applicable technical regulations in the field of construction, spatial planning and environmental protection, and water management relating to maintenance works on constructions which are used for the improvement of navigation conditions.

The Annual Maintenance Program is prepared based on the maintenance studies, annual and detailed surveying data, information about the changes in the waterway and data about the execution of works from previous years. When the Program is adopted the Assessment Study of main impact for the ecological network (which is done by official experts on nature conservation and water ecology) must be done towards Ministry of Environment and Nature Protection. Assessment Study contains proposed measures to mitigate adverse impacts of planned activities and program for monitoring and reporting of planned activities. If the proposed mitigation measures / alternatives are eliminating negative effects, the competent authority (Ministry of Environment and Energy or Department of Spatial Planning, Environment and Nature Protection in competent county) issues their conclusions and approval of the procedure. Based on given conclusions the Water conditions (in accordance with Water law) are issued by the Croatian Waters.

By the end of September 2017 there was no need for dredging activities on the Danube river. For the works in Batina section (rkm 1425- 1425+900) required environmental measures are provided by Department of Spatial Planning, Environment and Nature Protection in Osijek-Baranja County and they are in force until 13.7.2017.

## 7.6 HR | Budget status May 2018

*Investments taken for FRMMP implementation 2014 - 2017*

Need Area	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	1 000 000	320 000	0%	680 000
Surveying of the riverbed	241 000	458 000	85%	0
Water level gauges	57 000	70 000	85%	0
Marking of the fairway	3 230 000	1 105 000	85%	2 125 000
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	0	210 000	85%	0
Information on fairway depths	60 000	0	-	60 000
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>4 588 000</b>	<b>2 163 000</b>	<b>72.4%</b>	<b>2 865 000</b>

*Operational expenditures for conducted activities 2017 and budget needs 2018*

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	320 000	320 000	320 000	0
Surveying of the riverbed	25 000	25 000	25 000	0
Water level gauges	10 000	10 000	10 000	0
Marking of the fairway	105 000	105 000	105 000	0
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	30 000 (DHMZ)	30 000 (DHMZ)	30 000 (DHMZ)	0
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	5 000 (DHMZ)	5 000 (DHMZ)	5 000 (DHMZ)	0
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>495 000</b>	<b>495 000</b>	<b>495 000</b>	<b>0</b>

## 7.7 HR | Outlook: actions, milestones and funding sources

<b>HR 01: Old monitoring fleet and equipment</b>		
Planned activities:	This key issue is resolved with the purchase of the new hydrographical equipment (multi-beam) and vessel within FAIRway Danube project	
Current shortcomings:	No shortcomings	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/national budget and CEF funds (FAIRway)	
Next steps:	Vessel and equipment were delivered, execution of pilot operation	until 2020
<b>HR 02: Insufficient number of skilled staff</b>		
Planned activities:	Plans to have additional education of AVP staff in the future, but still no exact starting time	
Current shortcomings:	National restrictions of hiring new staff due to a lack of national funds/budget for additional staff	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: National budget	
Next steps:	Hopefully, the purchase of new equipment/vessels will open the possibility of hiring new workers and additional education	tbd
<b>HR 03: The number and the accuracy of gauging stations should be raised</b>		
Planned activities:	Within the FAIRway Danube project 4 new gauging stations were purchased and 5 existing gauging stations will be modernised until 30.06.2018.	
Current shortcomings:	Delays in installation due to unfavourable weather conditions	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/national budget and CEF funds (FAIRway)	
Next steps:	Putting the gauging stations into operation and provide data transfer from DHMZ to AVP	until the end of 2018

<b>HR 04: Insufficient and hardly predictable financial backings</b>		
Planned activities:	Planning of projects that could help AVP provide additional funds for waterway maintenance	
Current shortcomings:	Insufficient communication between all relevant institutions	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/national budget	
Next steps:	N/A	tbd
<b>HR 05: Deterioration of equipment of dredging companies</b>		
Planned activities:	No planned activities	
Current shortcomings:	Not enough funds/budget	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/privat budget	
Next steps:	N/A	tbd
<b>HR 06: Cumbersome procurement procedures for dredging activities</b>		
Planned activities:	Starting a concessions procedure - waterway will be maintained more efficiently – no more time wasted on a time-consuming procedure	
Current shortcomings:	Time consuming procedures	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	Not applicable
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: national budget	
Next steps:	Concession procedures for Sava, Drava and Danube	Concession for Drava – Port Nemetin started in 2016
<b>HR 07: Not enough vessels available with AVP to provide quick reaction on needed marking interventions; equipment and vessel malfunctions</b>		
Planned activities:	Purchase of new marking vessel and equipment within the FAIRway Danube project. Application for EU co-financing for additional two vessels for the Sava and Drava rivers.	
Current shortcomings:	Lack of staff needed for preparation of applications	

Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/national budget and CEF funds (FAIRway)	
Next steps:	The vessel is currently being built; delivery is expected in June 2018. Preparation of applications for additional vessels.	2020
<b>HR 08: Inefficient procedures, suboptimal link between surveying and marking department, insufficient data storage and analysis facilities</b>		
Planned activities:	The part of needs will be resolved within the FAIRway project – IT tool that will be developed within the project - waterway asset management system (WAMS)	
Current shortcomings:	With enough funds for future operation AVP would be able to plan activities that would improve the current status quo	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: EU funds/national budget and CEF funds (FAIRway)	
Next steps:	Improve the link between surveying and marking department using the IT tool developed within FAIRway Danube project Preparation of the tender documentation for procurement of the national WAMS.	until 2020
<b>HR 09: The low number and the accuracy of gauging stations; non-existence of water level forecasts</b>		
Planned activities:	The project started with modelling the Kupa river and a part of the Sava river from Slovenian border to Sisak. The model will be expanded to the Danube river.	
Current shortcomings:	Hydrological forecast model non-existent	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No environmental impacts
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	Not applicable
Possible funding:	Budget availability 2017/2018: The funding of the project is national at the moment, but DHMZ is going to apply for EU funds	
Next steps:	To continue with the modelling and to increase the number of gauging stations where needed	until 2020

<b>HR 10: Necessity of River engineering measures Sotin</b>		
Planned activities:	Construction of inline structure and two T-groynes	
Current shortcomings:	Formation of sandbar due to the collapse of the high river bank which causes problems for navigation	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	Ecological study is ongoing (done by summer 2018)
	Which measures are taken to mitigate these impacts?	Not applicable
	Is water status still expected to deteriorate?	No
Possible funding:	Budget availability 2017/2018: EU funds/national budget	
Next steps:	Application for EU co-financing	until 2020



## 8 Romania

The **Administration of the Lower Danube (AFDJ)** and the **Administration of the Navigable Canals (ACN)** are responsible for fairway maintenance, rehabilitation and upgrade.

### 8.1 RO | Status report on main critical locations including water level information 2012 – 2017

Since AFDJ is currently in the process of recalculating the Low Navigable Water Level at certain critical locations, the achievement of 2.5m fairway depth is not set in relation to the number of days above Low Navigable Water Level.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

#### Danube

##### *Number of days with fairway depths $\geq 2.5$ m on main critical locations*

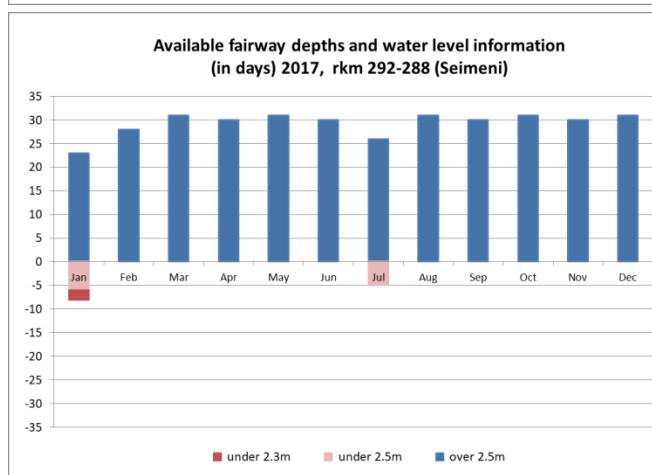
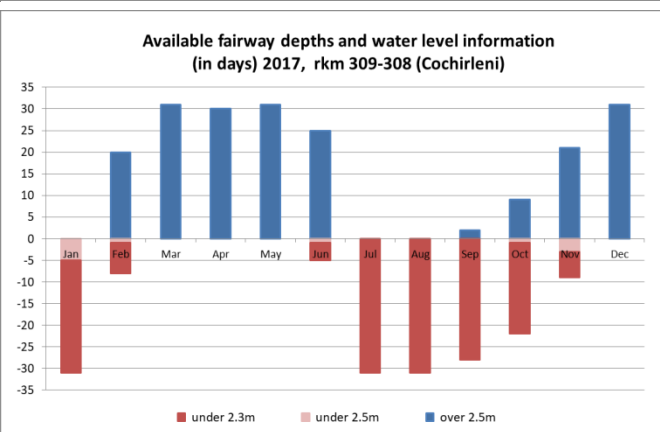
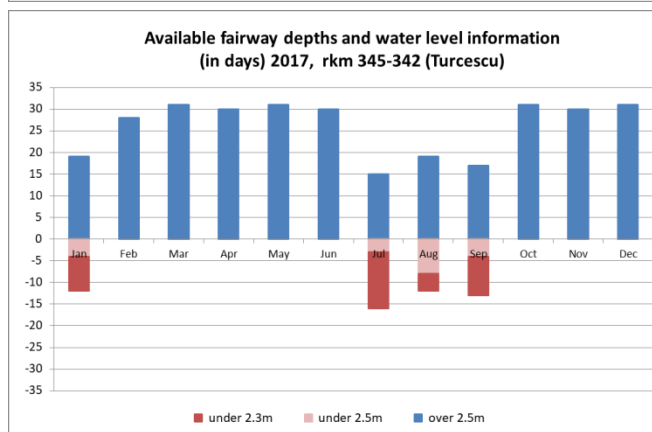
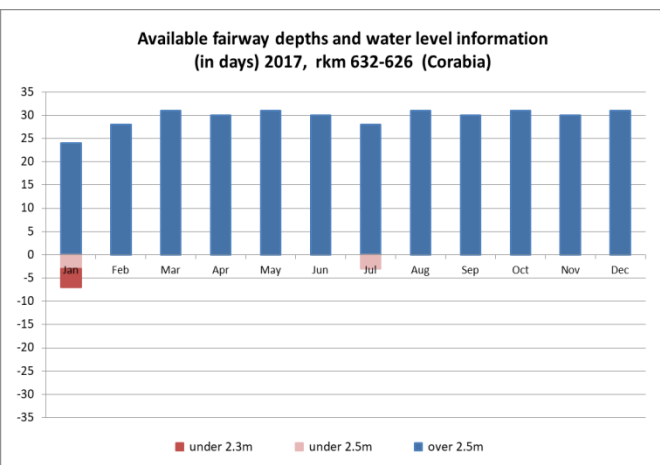
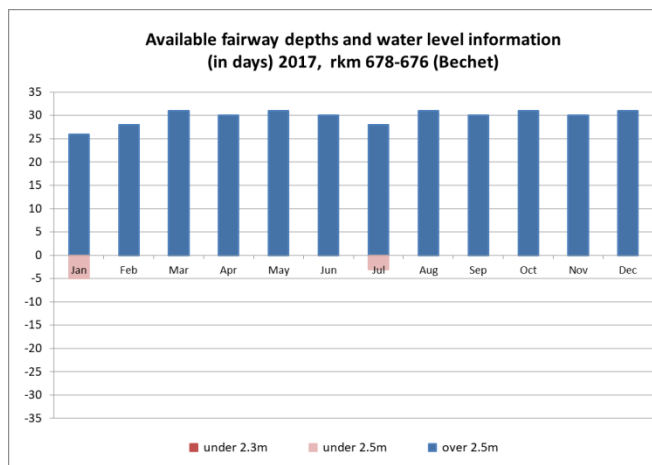
Critical location	2012	2013	2014	2015	2016	2017
Bechet (100m fairway width)	355	327	365	285	351	357
Corabia (100m fairway width)	348	335	365	272	352	355
Turcescu (100m fairway width)	281	297	345	260	301	312
Cochirleni (80m fairway width)	196	234	319	236	257	200
Seimeni (100m fairway width)	323	329	365	336	347	352
Prut (80m fairway width, depth > 7.32m)	352	333	365	308	338	365
Tulcea (100m fairway width, depth > 7.32m)	351	318	365	321	359	365

##### *Number of days with water level $\geq$ LNWL on main critical locations*

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Bechet	Bechet	332	329	365	277	348	309
Corabia	Corabia	328	325	365	258	348	285
Turcescu	Calarasi	319	325	365	279	348	330

## Action Plan: Romania

Cochirleni	Cernavoda	331	325	365	295	355	355
Seimeni	Cernavoda	331	325	365	295	355	355
Prut	Galati	366	365	365	365	353	353
Tulcea	Tulcea	366	365	365	365	359	350



The first half of 2017 (January-June) showed good navigation conditions in most critical sectors, with the exception of January, in which several days with depths below 2.5m were recorded.

It is noteworthy that due to the extreme weather conditions at the beginning of the year, starting January 8, the ice phenomena was reported (44 days of ice phenomena were recorded) on the sector between rkm 1075 and rkm 175.

The worst situation was encountered at rkm 410 - rkm 390 sector, where 34 days of ice bridge have been recorded. **These phenomena have led to the closure of navigation.**

## Action Plan: Romania

In the period July-December 2017, in the free flowing section upstream of Calarasi, good navigation conditions were encountered at most critical sections. In the Calarasi - Cernavoda section, due to the hydrological conditions recorded during July-November, more days with fairway depths below 2.5m occurred, especially in Turcescu and mainly in Cochirleni.

In the maritime sector of the Danube, throughout the entire year, good navigation conditions were encountered, in accordance with minimum recommended depths. It is noteworthy that in this sector the **minimum navigation depth is 7.32m (24 feet)**.



### Danube-Black Sea Canal

Danube Black Sea canals bottom is dredged 1 meter below the Danube River so in the years 2012 - 2017 fairway depths were over 2.5m on the Danube Black Sea canal for the entire period. Between Cernavoda and Agigea locks minimum depth is 7m which allows maritime ships to access the Basarabi and Medgidia ports.

Critical location	2012	2013	2014	2015	2016	2017
confluence with the Danube river km 64-65 - DBSC	365	365	365	365	366	365
Port Medgidia km 37-DBSC	365	365	365	365	366	365
Downstream Navodari lock – CPAMN	365	365	365	365	366	365
Port Luminita – river branch Luminita	365	365	365	365	366	365

During 2017 there were no restrictions for navigation in the reported critical locations due to low navigable water levels.

Nevertheless, navigation on navigable canals was closed or restricted due to meteorological conditions as follows:

### 1. Due to winter conditions and ice phenomena:

- on the DBSC navigation was permitted under winter conditions: broken ice on the entire stretch, the convoys were permitted to navigate with maximum length of 220m and maximum width of 11m
- port areas were closed due to ice phenomena
- Poarta Alba-Midia Navodari Canal: starting with 10.01.2017 navigation was closed on the entire stretch due to an ice thickness of 10-15 cm until 08.02.2017
- starting with 08.02.2017 navigation was opened between km 10 up to the confluence with the Danube-Black Sea Canal; on this stretch navigation was permitted under winter conditions: broken ice (between km 0 up to km 10 navigation on Poarta Alba-Midia Navodari Canal was still closed)
- starting with 20.02.2017 navigation on Poarta Alba-Midia Navodari Canal was permitted under winter conditions: broken ice on the entire stretch
- starting with 20.02.2017 the port operation was opened in Medgidia, Ovidiu and Basarabi; Luminita port was still closed due to ice bridge within the port area
- starting with 23.02.2017 navigation on the Danube-Black Sea Canal was performed under normal conditions and ports were opened to navigation and ports operation

In conclusion, due to ice phenomena on Poarta Alba-Midia Navodari Canal navigation was closed for 29 days on the entire canal (km 0+000-27+500) and for another 13 days for the section between km 0+000-10+000

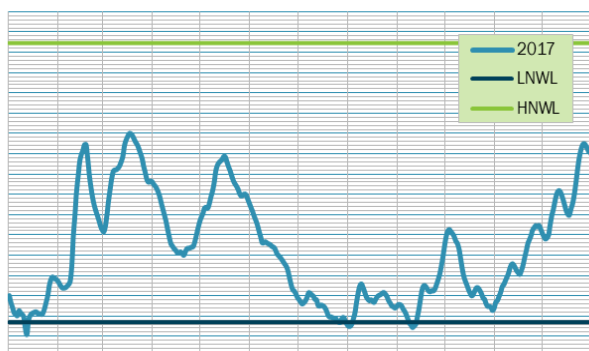
### 2. Due to unfavourable weather conditions

- During 2017 navigation on the canals was closed due to fog conditions (137 hours) and due to strong wind conditions (560 hours)
- In these conditions the measures taken by Romanian Naval Authority were to close the port of Constanta and the measures taken by ACN were to restrict the navigation on canals.

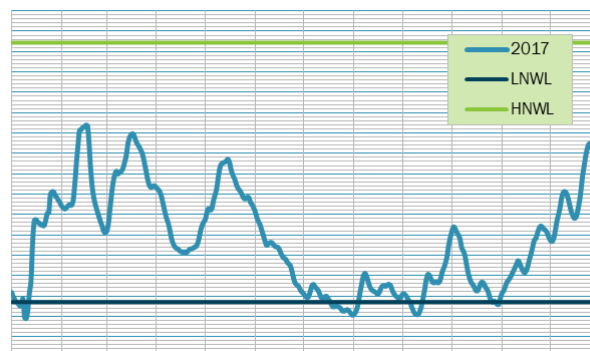
## 8.2 RO | Hydrological conditions at main critical locations 2017

In 2017, in terms of water levels, the gauging stations recorded values above LNWL during most of the time. At the beginning of the year, a few days were recorded with values below LNWL (which also determined the recorded depths below 2.5m). Until the end of June there was an increase in water levels, with values above LNWL. The maximum values were recorded in February-March (discharge 8550m<sup>3</sup>/s in Bechet). Starting with July, water levels began to decrease, approaching the LNWL and eventually falling below LNWL. The lowest water levels were recorded in July, September and November, which led to the recording of the depths below 2.5m, especially in the section Calarasi - Cernavoda.

Water level gauge of Cernavoda 2017



Water level gauge of Calarasi 2017



Due to the hydro-meteorological conditions recorded in January and February that influenced the occurrence of ice phenomena, for the safety of naval traffic, navigation between rkm 1075 and rkm 175 was closed between 10 January and 21 February (42 days).

### 8.3 RO | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014):

#### Danube

	Key issues	Need for action	Activities performed 2017
RO 01	Insufficient number of sounding vessels	Support acquisition of up-to-date sounding equipment to raise the coverage of surveyed areas.	<i>Pilot action for surveying activity defined within the FAIRway Danube project.</i> <i>The tender procedure for the sounding vessel was finalised and the contract was signed, with terms of delivery in June 2018.</i>
RO 02	Insufficient number of automatic gauging stations.	Support acquisition of additional automatic gauging stations, especially for critical sections.	<i>Finalised the project for elaboration of the feasibility study for rehabilitating and extending the network of hydrometric stations on the Romanian sector of Danube- HyQ Danube project, implemented within the SOPT 2007 – 2013.</i> <i>The feasibility study will be approved within the Technical – Economical Committee of the Ministry of Transport in June 2018.</i>  <i>Procurement and pilot action of 6 new automatic gauging stations and a centralized computer system defined within the FAIRway Danube project.</i> <i>Tender procedure is ongoing. The infrastructure for installing 6 new and 4 rehabilitated gauging stations was installed within the FAIRway Danube project.</i> <i>The technical specifications for these automatic gauging stations were prepared.</i>

			<i>Elaborated the draft project proposal within the SOPT 2014-2020 for rehabilitating and extending the network of hydrometric stations on the Romanian sector of the Danube. The project proposal will be finalised and submitted until March 2018 in order to be approved for funding.</i>
RO 03	Lack of dredging equipment, specialized personnel and deficiency of investments in river regulation	Support acquisition of dredging equipment performance to increase the efficiency of working problem areas and the possibility of intervention at any time where it is needed	<p><i>Elaborated the Romanian – Bulgarian Common Plan of measures necessary for 2017 including dredging works.</i></p> <p><i>Ensured enough budget for dredging works during 2017 in order to ensure the good navigation status.</i></p> <p><i>Set-up of the necessary actions within the SWIM project for purchasing the dredging equipment and performing the capital dredging works.</i></p> <p><i>Prepared the documentation in order to launch the tender procedure for dredging equipment within the SWIM project.</i></p> <p><i>The tender procedure was launched by the end of 2017, the contract was signed in March 2018 with delivery terms March 2019.</i></p> <p><i>Prepared the documentation for relaunch of the tender procedure for purchasing the dredging equipment using state budget funds.</i></p>
RO 04	Inefficient procedures. The documentation to draw up a contract for dredging is time-consuming.	Support standardization and simplification of documentation procedures.	<p><i>Elaborated the draft version of the Measures Plan together with Bulgarian administration within the SWIM project.</i></p> <p><i>Elaborated the internal procedures for different types of activities in order to finalise the Internal Control Code of AFDJ.</i></p> <p><i>The Framework Contract for dredging works for the period 2016 – 2018 is ongoing, in order to make interventions in proper time.</i></p>
RO 05	Lack of efficient vessels and special equipment for marking.	Support acquisition of vessels equipped with advanced machines to perform operations board assembly / disassembly floating signals.	<p><i>Defining the pilot actions for the marking activity within the FAIRway Danube project.</i></p> <p><i>Launched the tender procedure for purchasing the marking vessel.</i></p> <p><i>The tender procedure was finalized in October 2017 and the delivery term is November 2018.</i></p>
RO 06	Insufficient number of buoys and position monitoring equipment.  Unavailable automated system for the transmission of information on the buoys. The dissemination of information could be improved.	<p>Support acquisition of buoys and monitoring equipment.</p> <p>Support establishment of an automated monitoring system and improve the provision of information on fairway marks.</p>	<p><i>In 2017, 80 pieces of standard buoys were manufactured and a new design for floating signalisation was developed.</i></p>

RO 07	Unavailable forecast for water levels.	Support establishment of a water level forecast	<p><i>Finalised the project for the feasibility study for rehabilitating and extending the network of hydrometric stations on the Romanian sector of Danube - HyQ Danube project, implemented within the SOPT 2007 – 2013. The feasibility study will be approved within the Technical – Economical Committee of the Ministry of Transport in June 2018.</i></p> <p><i>Elaborated the draft project proposal within the SOPT 2014 - 2020 for rehabilitating and extending the network of hydrometric stations on the Romanian stretch of the Danube.</i></p> <p><i>The project proposal will be finalised and submitted until August 2018 in order to be approved for funding.</i></p> <p><i>Defining the pilot action for water level forecast within the FAIRway Danube project. Elaborated the draft technical specification for developing the necessary tools, used for improving the water level forecast for the Lower Danube.</i></p>
RO 08	Information could be provided customer-friendly using established river information portals.	Support customer-friendly processing and dissemination of information.	<p><i>AFDJ forwarded the information to the FIS PORTAL.</i></p> <p><i>AFDJ forwarded the information to the RoRIS PORTAL.</i></p> <p><i>AFDJ provided fairway information on the official website: <a href="http://www.afdj.ro">www.afdj.ro</a> and MobileRIS application.</i></p>
RO 09	Unavailable digital terrain models for shallow sections.	Support set-up of digital terrain models for shallow sections.	<p><i>The digital terrain model has been developed within the FAST DANUBE project and is available for the entire Romanian – Bulgarian sector.</i></p>
RO 10	Insufficient number and quality of weather stations.	Support improvement of meteorological information.	<p><i>Finalised the project for the feasibility study for rehabilitating and extending the network of hydrometric stations on the Romanian sector of Danube - HyQ Danube project, implemented within the SOPT 2007 – 2013. The feasibility study will be approved within the Technical – Economical Committee of the Ministry of Transport in June 2018.</i></p> <p><i>Elaborated the draft project proposal within the SOPT 2014 - 2020 for rehabilitating and extending the network of hydrometric stations on the Romanian sector of the Danube. The project proposal will be finalised and submitted until August 2018 in order to be approved for funding.</i></p> <p><i>Pilot actions were defined within the FAIRway Danube project.</i></p> <p><i>Purchased a performant hydro-meteorological buoy for Sulina Bar, with funds from the state budget.</i></p>



RO 11	Missing interconnection with database of other waterway administrations to exchange data	Support interconnection between databases of different waterway administrations	<i>The pilot action for transnational data gathering and exchange was defined within the FAIRway Danube project. The tender procedure for the WAMOS tool and the national WAMS implementations is under preparation.</i>
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### Danube-Black Sea Canal

	<b>Key issues</b>	<b>Need for action</b>	<b>Activities performed 2017</b>
RO 01	Insufficient number of sounding vessels	Support acquisition of up-to-date sounding equipment to raise the coverage of surveyed areas.	<i>Defining of the action within the proposed FAIRway Danube project. At the end of 2016 the portable single-beam echo-sounder was procured. The equipment has started pilot operation within FAIRway Danube in October 2017.</i>
RO 02	Insufficient number of automatic gauging stations.	Support acquisition of additional automatic gauging stations, especially for critical sections.	<i>Finalised the project for the feasibility study for rehabilitating and extending the network of hydrometric stations on the Romanian sector of Danube - HyQ Danube project, implemented within the SOPT 2007 - 2013.  Defining of the action within the FAIRway Danube project. The tender procedure for the rehabilitation of 4 existing gauging stations and procurement of 4 new gauging stations was launched for the second time and is in technical evaluation. The contract is expected to be signed in June 2018 and the works to be finalised in December 2018.</i>
RO 03	Lack of dredging equipment, specialized personnel and deficiency of investments in river regulation	Support acquisition of dredging equipment performance to increase the efficiency of working problem areas and the possibility of intervention at any time where it is needed	<i>No dredging works took place in 2017. Optimum navigation conditions were assured in this period.</i>
RO 07	Unavailable forecast for water levels.	Support establishment of a water level forecast	<i>Defining of the action within the FAIRway Danube project.</i>

## 8.4 RO | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations as itemised in the Rehabilitation and Maintenance Master Plan (version December 2014) was last updated in September 2017.

### *Riverbed surveying and waterway monitoring activities 2017*

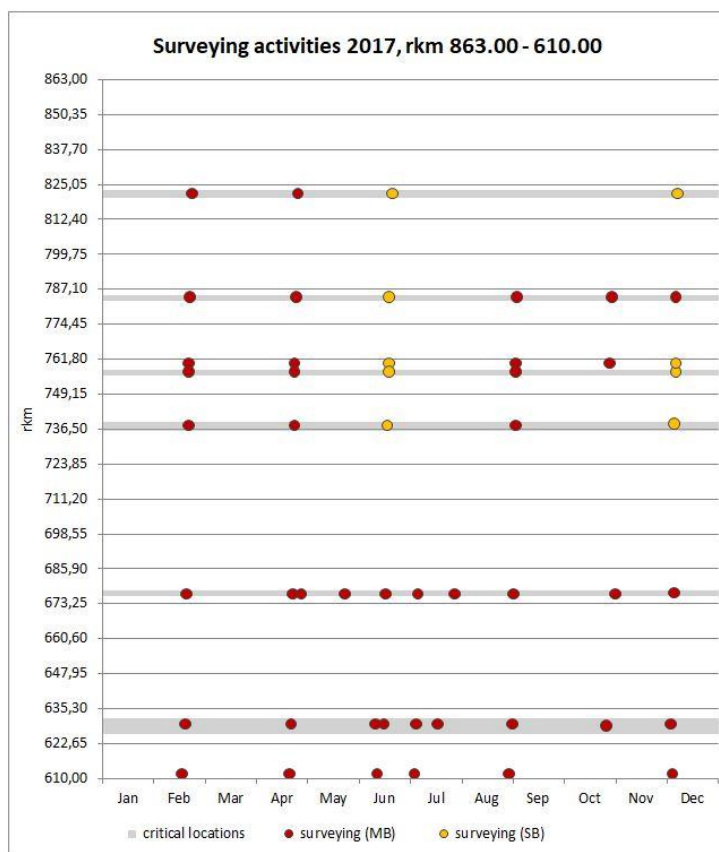
In the period mentioned, the following river bed surveying activities were performed in accordance with an annual plan and depending on the water levels and fairway dimensions. The charts below show the sections monitored.

#### Danube

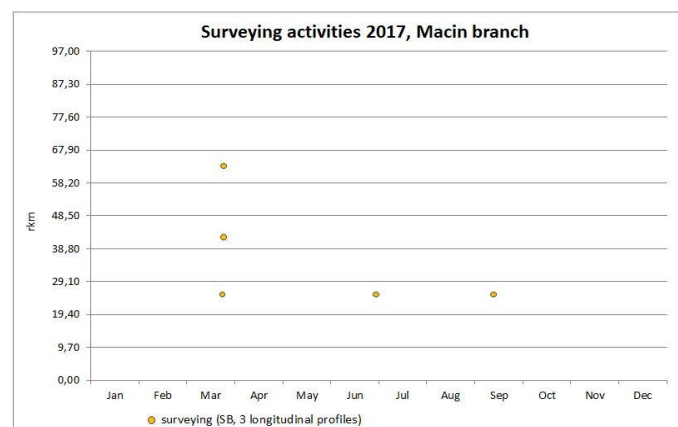
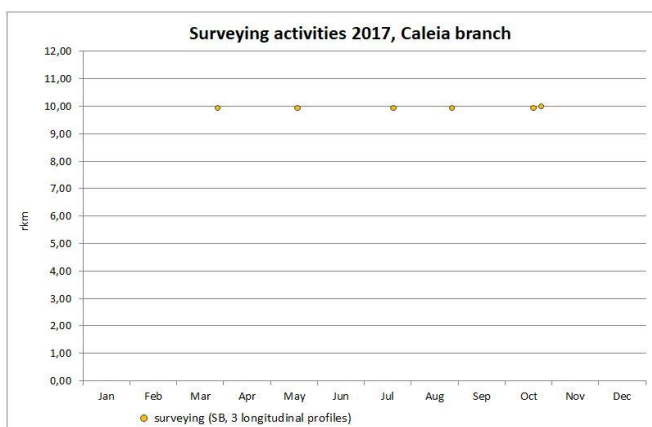
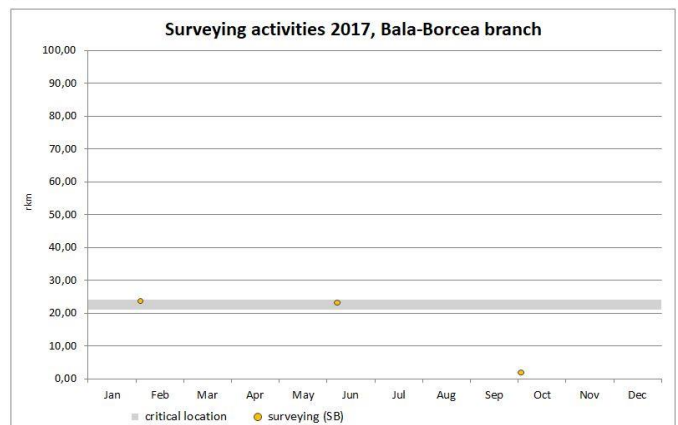
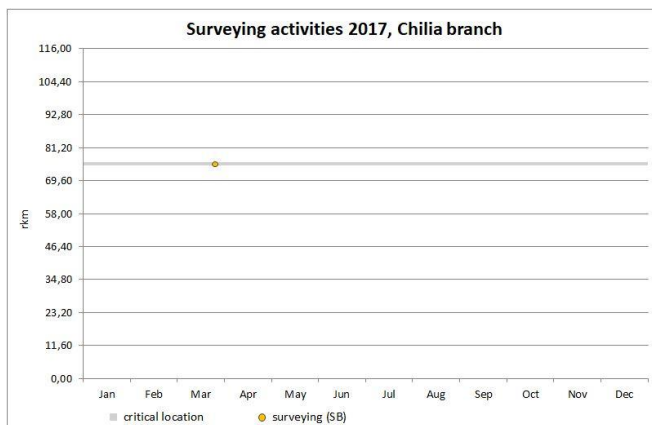
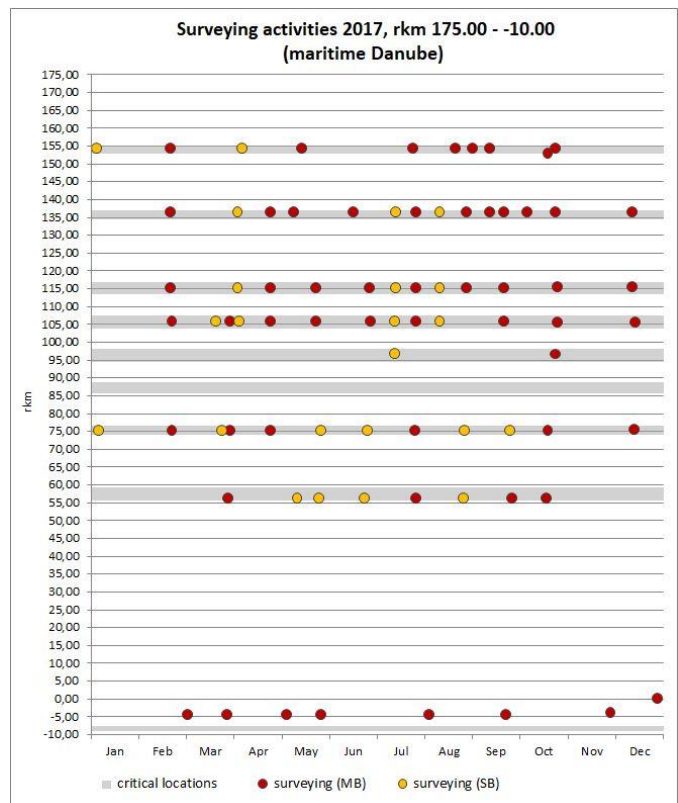
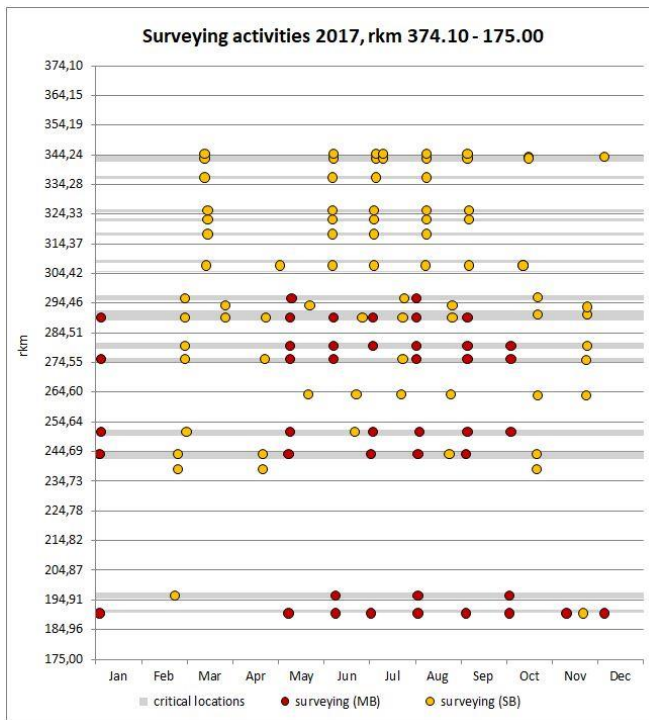
Shallow sections are always monitored by detailed surveys and control surveys.

In 2017, especially the shallow sections have been measured at least once per month. The surveys were carried out for planning and establishing the areas for dredging works and as surveys for monitoring. Single-beam surveying tours are either conducted with a specialised surveying vessel, recording cross-profiles, or, in some cases, with a marking vessel (equipped with an echo-sounder), recording 3-5 longitudinal profiles.

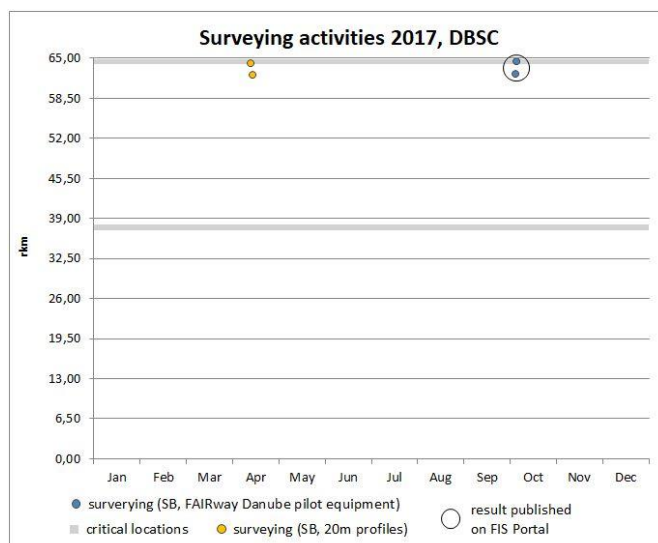
Surveying results were also published on the FIS Portal in 2017, yet this activity was not monitored until the beginning of 2018. Therefore, there is no data on which shallow section information was published in 2017.



## Action Plan: Romania



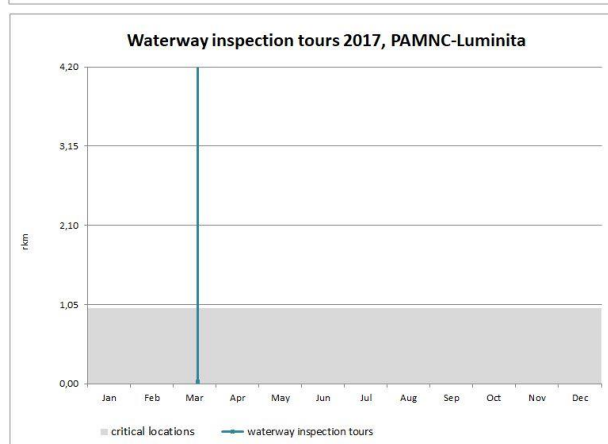
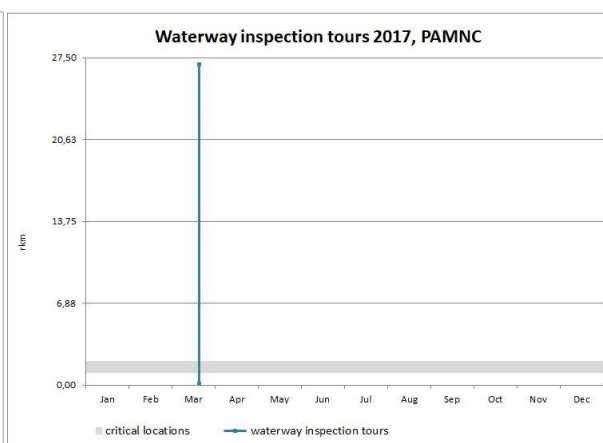
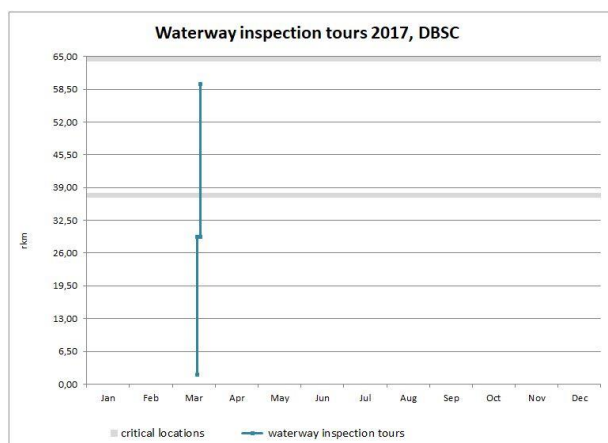
## Danube-Black Sea Canal



The critical location Cernavoda was surveyed four times in 2017 with single-beam equipment and a profile density of 20m.

According to the pilot operation plan established within the FAIRway Danube project, a waterway inspection and monitoring tour will be performed at least once per year. The monitoring will be performed with a specialised vessel equipped with portable single-beam equipment, purchased within the FAIRway Danube project.

The first inspection tour took place in March 2017 and lasted 4 days. The inspection tour took place both on the Danube-Black Sea Canal and the Poarta Alba-Midia Navodari Canal; the vessel travelled along the longitudinal axis.

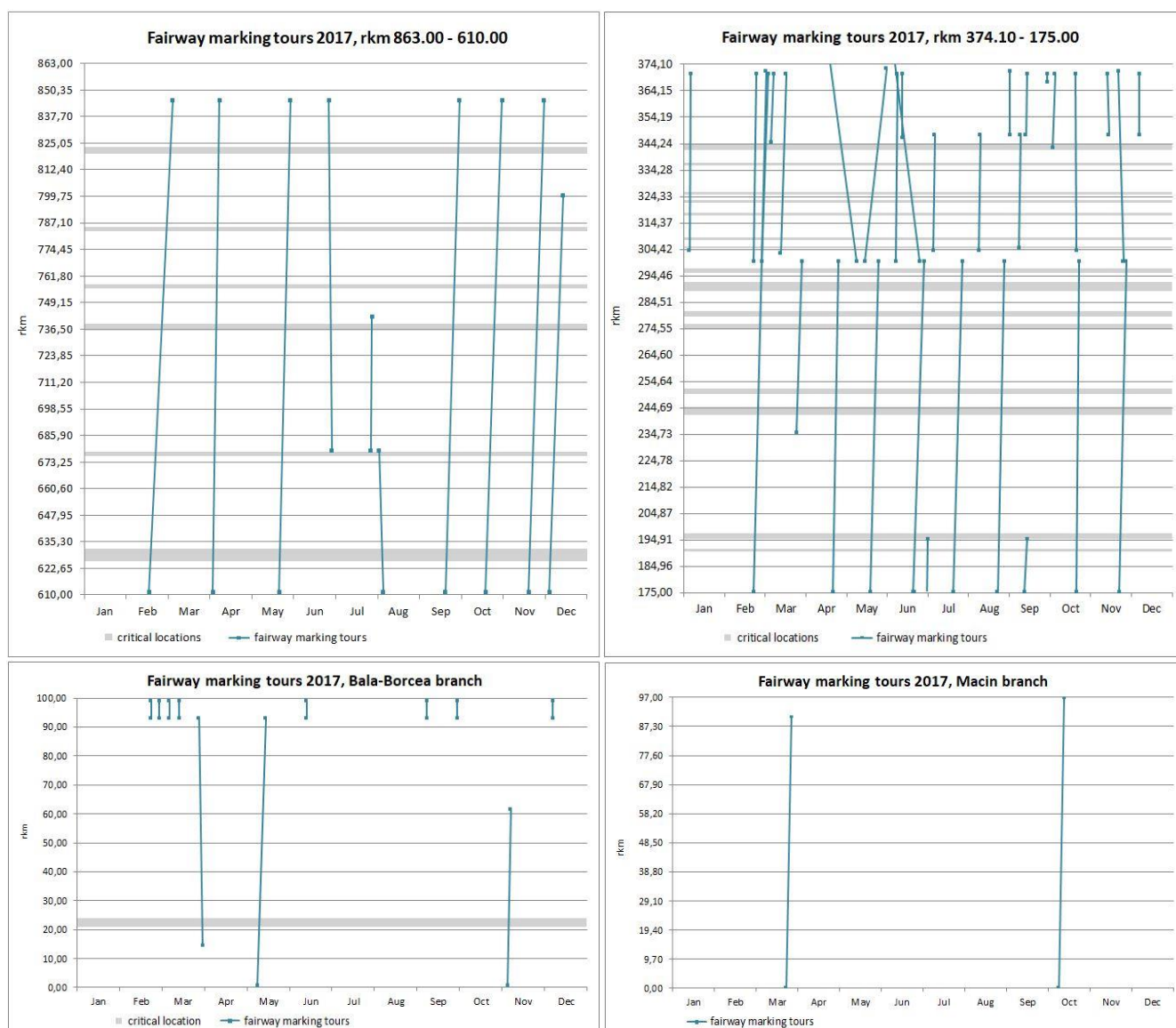


## Fairway marking activities 2017

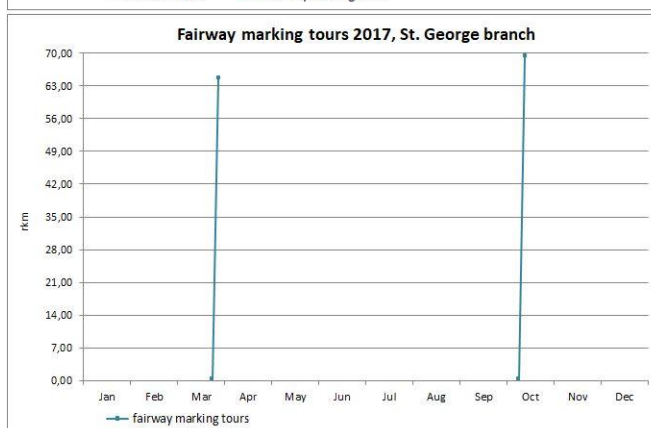
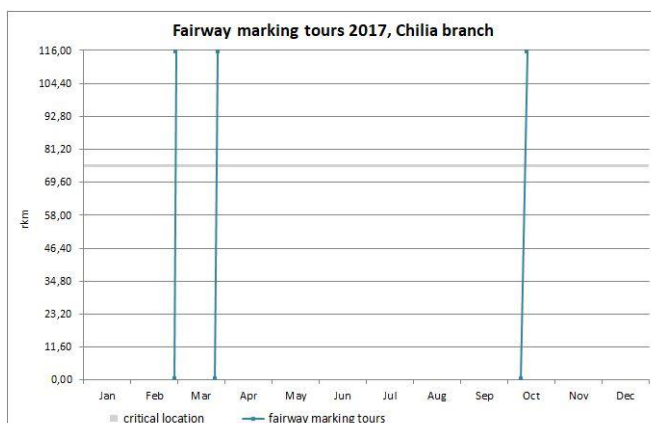
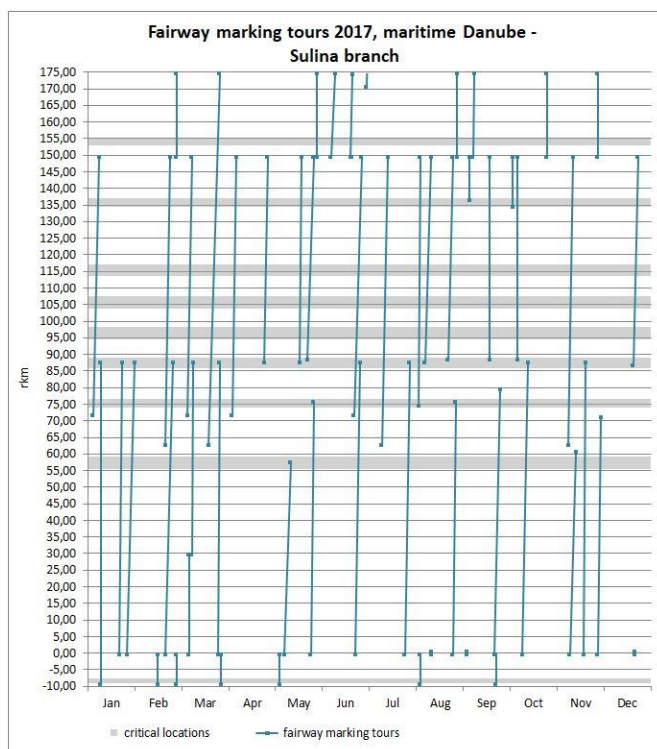
### Danube

Based on the annual plan and the actual situation of the waterway, monthly field trips were performed with specialised marking vessels. Depending on the hydrological conditions, recourse to the fairway buoying works were conducted (especially in Bechet, Turcescu and Cochirleni). When necessary due to low water levels (below LNWL), the fairway was narrowed. Preventively, when water levels were close to LNWL values, interventions for narrowing the fairway and ensuring depths for navigation were performed.

Most of the field inspection and marking tours included some kind of small intervention or narrowing of the fairway. There was no relocation of the fairway in 2017 year.



## Action Plan: Romania



## Dredging activities 2017

### Danube

The following fairway dredging measures for the ensuring navigation conditions were implemented on the Romanian Danube:

Designation of assignment	Dredging site		Dumping or placement site		Beginning of service	End of service	Material	Utilisation	m <sup>3</sup>	Permits (see next table)
	from river km	to river km	from river km	to river km						
Isaccea	107.4	103.7	107.5	107.0	06.03.2017	07.04.2017	Fine sediment	Dumping	297.232	1,2
Isaccea	116.7	113.0	112.0	111.0	07.04.2017	01.05.2017	Fine sediment	Dumping	102.102	1,2
Cochirleni	310.0	304.0	305.0	304.0	03.05.2017	27.07.2017	Fine sediment	Dumping	42.748	n/a
Bechet	678.0	675.0	672.0	671.0	05.05.2017	25.05.2017	Fine sediment	Dumping	64.157	n/a
Corabia	632.0	626.0	624.0	625.0	01.06.2017	10.06.2017	Fine sediment	Dumping	24.025	n/a
Seimeni	292.6	288.0	289.0	288.5	01.06.2017	31.08.2017	Fine sediment	Dumping	70.334	n/a
Calnovat	613.0	610.0	613.0	614.0	20.06.2017	05.07.2017	Fine sediment	Dumping	27.415	n/a
Dunarea Veche	191.5	189.0	188.0	187.5	03.07.2017	29.09.2017	Fine sediment	Dumping	49.227	n/a



## Action Plan: Romania

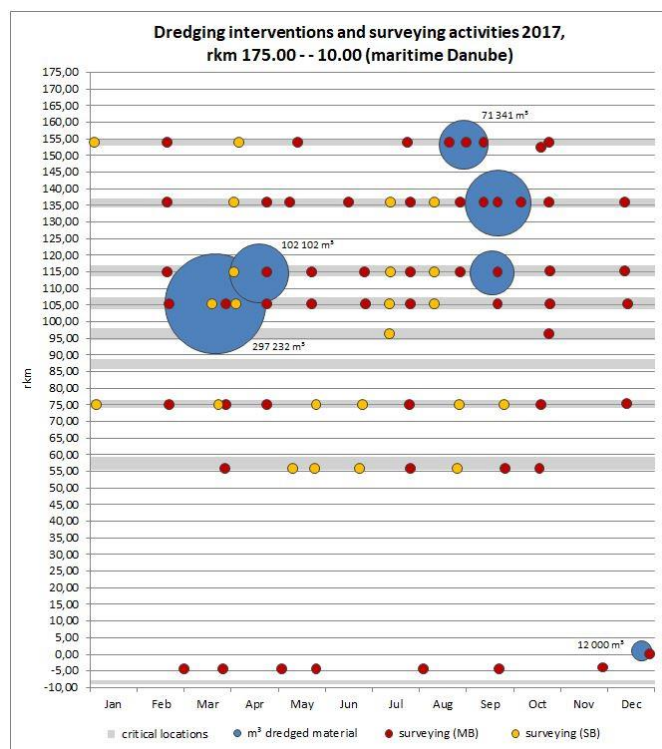
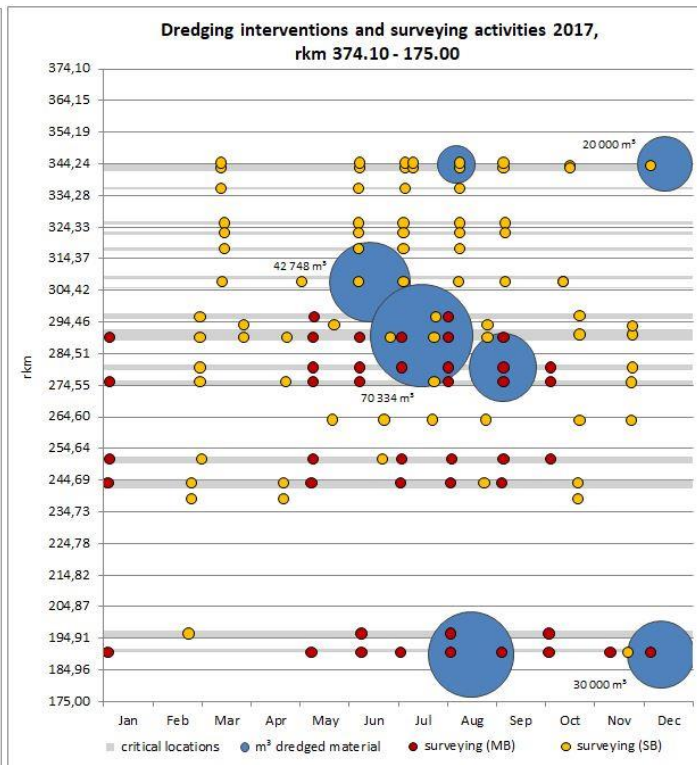
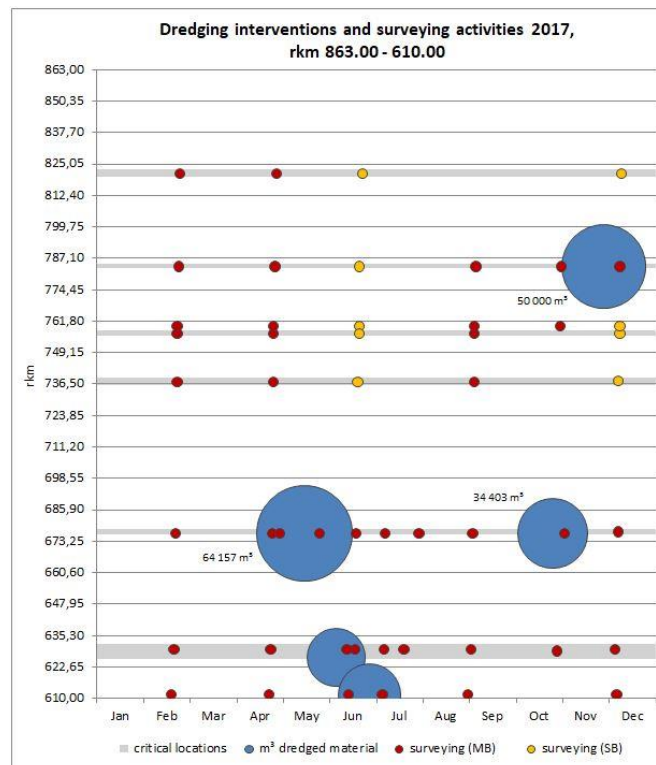
Caragheorghe	345.0	343.0	341.5	341.0	15.07.2017	30.08.2017	Fine sediment	Dumping	9.252	n/a
Capidava	281.5	279.0	279.8	279.4	10.08.2017	30.09.2017	Fine sediment	Dumping	30.439	n/a
Siret	155.0	152.0	158.0	157.5	23.08.2017	04.09.2017	Fine sediment	Dumping	71.341	n/a
Prut	137.0	135.0	138.6	138.0	04.09.2017	30.09.2017	Fine sediment	Dumping	127.265	1,2
Isaccea	116.7	113.0	112.0	111.0	11.09.2017	22.09.2017	Fine sediment	Dumping	57.015	n/a
Bechet	678.0	675.0	672.0	671.0	17.10.2017	31.10.2017	Fine sediment	Dumping	34.403	n/a
Bogdan	785.0	783.0	782.0	781.0	17.11.2017	05.12.2017	Fine sediment	Dumping	50.000	n/a
Dunarea Veche	191.5	189.0	188.0	187.5	22.11.2017	30.12.2017	Fine sediment	Dumping	30.000	n/a
Caragheorghe	345.0	343.0	341.5	341.0	27.11.2017	30.12.2017	Fine sediment	Dumping	20.000	n/a
Sulina	0.7	1.0	-8.0	-7.0	20.12.2017	23.12.2017	Fine sediment	Dumping	12.000	1,2

Referenced and relevant permits	Title of permit (original language)	Permitting authority	Permit applicable		Valid until	Type of permit (e.g. environmental, water, navigation law)	Main conditions for permit
			from river-km	to river-km			
1	Autorizația nr. 284 din 13.11.2013	Environmental Protection Agency Galati	0	175	12/11/2023	Navigation law	<ul style="list-style-type: none"> <li>To respect the Law no. 211/2011 regarding the regime of waste;</li> <li>To respect Government Decision no. 235/2007 regarding the management of the used oil;</li> <li>To respect the provisions of the International Convention for the Prevention of Pollution From Ships - MARPOL 73/78;</li> <li>It is forbidden the abandonment or storage in any way, in riverbed or on the banks of surface water or maritime of any kind of waste</li> <li>Monitoring of the quality of the environment</li> <li>Monitoring of the chemical composition of dredged material</li> </ul>
2	Autorizația nr. 1154 din 25.02.2013	Administration of the Danube Delta Biosphere Reserve	0	175	25/02/2023	Water Law	<ul style="list-style-type: none"> <li>the dredging works within the Danube Delta Biosphere Reserve in Bara Sulina Mm critical points at 77-90, Rostock Mm 31, Mm 41 upstream Tulcea, Isaccea Mm + 800-Mm 58</li> <li>storage of the dredged material on the dredger „Dunărea Maritimă”</li> <li>discharge of the dredged material in the discharge areas in Bara Sulina 2 km offshore, km 108-km 109 St. Gheorghe arm, left bank, upstream Tulcea – Mm 45 + 500 right bank, 58-Mm 58 Isaccea Mm + 1/2 right bank</li> </ul>



## Action Plan: Romania

The dredging interventions are reported in combination with the surveying activities. This illustrates the strong dependency of dredging works on up-to-date surveying results. Prior to, during and after dredging works the respective critical locations were surveyed in addition to the regular surveying tours.



In 2017, in the Danube river sector, dredging works started in May and a volume of 452,000 m³ was dredged by third parties. In the maritime Danube, dredging works started in March and a volume of 666,955 m³ was dredged with AFDJ resources.

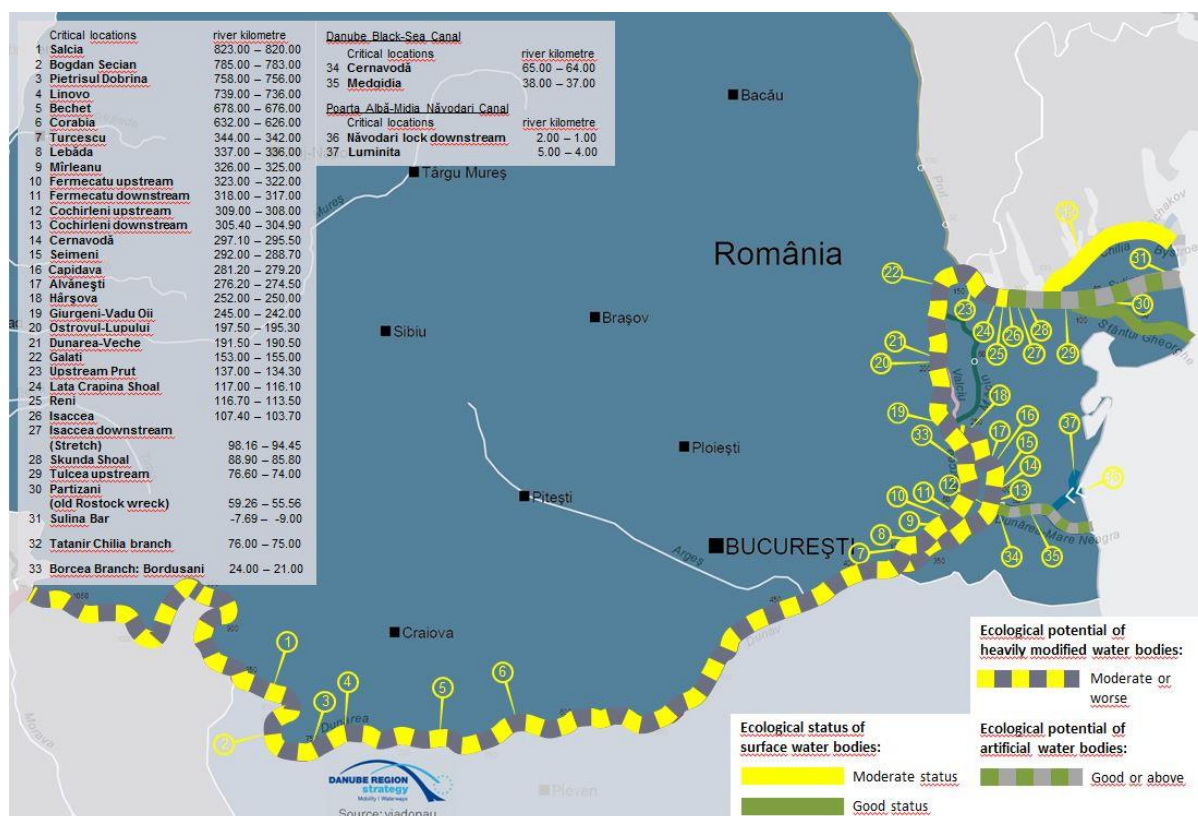
In total, a volume of 1,118,955 m³ was dredged, to ensure good navigation conditions on the Romanian Danube sector.

## Danube-Black Sea Canal

During 2017 no dredging works were performed on the navigable canals.

### 8.5 RO | Summary of current ecological status and environmental impacts

The following map displays the ecological status and ecological potential of the Romanian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Romania.



## Danube

### Ecological status and ecological potential of surface water bodies

The Danube River is the main navigable route from Romania. On Romanian territory, the waterway is divided into riverine Danube, from entering the country to Galati and maritime Danube from Galati until it flows into the Black Sea. Also, the Danube - Black Sea channel (CDMN) and Poarta Alba - Midia - Năvodari channel (CPAMN) provides the connection with the Black Sea. In terms of ecological status as defined in the Water Framework Directive, most water bodies are good and moderate ecological status or ecological potential moderate.

Target "status deterioration" of water bodies is a key element in the protection of water bodies. Damage / risk of damage to the ecological status of water bodies in relation to new infrastructure projects will be permitted only in compliance with Art. 4.7 of the Water Framework Directive.

Deteriorating (green) of water bodies considering item level of quality of the state of incorporation, applying the principle of "most unfavourable situations / one out all out", given the provisions of Annex V of the Water Framework Directive.

New projects / works are identified within a planning cycle and that were not contained in the Management Plan precedent can be implemented with the requirements Art. 4.7 of the WFD (where the expected risk of deterioration of the ecological / we achieve good status of the water body), to be published / contained in the following Management Plan.

Also, in cases where there is a change the environmental objective by passing water body category of natural water bodies heavily modified water bodies this is achieved by compliance with Art. 4.7 and Art. 4.3 of the WFD.

At the international river basin district of the Danube were established by the first and second Management Plan of the district Danube management objectives of the core management issues surface waters represented by: organic pollution, nutrient pollution, and pollution by hazardous substances, morphological alterations. For each category of important issues of water management and management objectives have been defined deadlines and 'targets' / compliance objectives and programs of specific measures. These objectives have been taken at national level as part of the process of water management in the Danube district. Detailed information on the management objectives at the Danube basin and sub-basin Tisa can be obtained by accessing the website: [www.icpdr.org](http://www.icpdr.org) (public section).

### ***Measures to improve environmental conditions***

Potential work types, with the horizon of implementation during 2016-2020, largely depend on the availability of funding, and other issues such as, for example technical feasibility, availability of land where the work are executed, etc. In the call CEF Transportation was approved for funding the project "Technical assistance for reviewing and completing the feasibility study on improving navigation conditions on the joint Romanian-Bulgarian Danube and Additional studies " (former ISPA project II), with a deadline for completion in December 2018. Within the POS-T 2007-2013 was funded project "Improvement of navigation on the Danube between Calarasi and Braila, Km 375 - Km 175" (former ISPA project I). For the critical point Bala, will study an alternative solution within the project Study of alternative technical solutions about the works which will be carried out on the critical point 01 Bala, in the project "Improving the navigation conditions on the Danube between Calarasi and Braila, km. 375–km.175, Stage II". The projects mentioned have regard to the „Joint Statement on guiding principles for the development of Inland navigation and environmental Protection in the Danube River basin", adopted in December 2007 / January 2008. Thus, it was envisaged protection of the riparian environment and the necessary conditions and processes that lead to a sustainable development of inland navigation, the set measures to reduce the effects due to navigation. Within infrastructure works also mention the works included in the Romanian Operational Programme as follows: major projects that will be implemented during the programming can be found at the following link: <http://www.fonduri-ue.ro /Operational Programme Infrastructure 2014>. Potential future infrastructure works will be subjected to an analysis in terms of damage / deterioration state / ecological potential of water bodies in the light of Art. 4.7 of the Water Framework Directive.

Information detailed in the National Plan for Management of the Danube River Basin.

## Action Plan: Romania

Within the project "Technical Assistance for Revising and Complementing the Feasibility Study Regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies - FAST DANUBE" financed under the Connecting Europe Facility Program, was finalised the tender procedure and was signed the contract with the consultant for feasibility study elaboration.

In order to achieve the environmental objectives will be developed documents required for EIA and will be considered the information presented in the 2011 feasibility study EIA report, and update that report in accordance with Article 5 and Annex III of the EIA Directive as last amended, and with the specific legal provisions of Romania and Bulgaria.

Within the procedure all mandatory documents shall be prepared, including:

- EIA report with a Non-Technical Summary
- Environmental Monitoring Program for the preferred option
- Assessment of risk and vulnerability to climate change
- Report on Impacts of the Project on Water Bodies in accordance with Article 4.7 of WFD
- Relevant documents to conduct cross-border consultations between Romania and Bulgaria to meet ESPOO requirements.

Also, will be prepared arguments and evidence to support mitigating measures, and compensatory measures if they are relevant, documentation for public consultation, and as appropriate draft documents to explain and argue where major public interest may need to be a consideration for Environmental Approval by both Romanian and Bulgarian authorities.

All 12 critical sites are located within or partially within Natura 2000 sites in both Romania and Bulgaria (and partly within Habitats and Birds Directive sites; pSCI, SCI, SAC, SPA) and thus require an Appropriate Assessment which will influence the development of solutions and details of the preferred option.

Will be undertaken Appropriate Assessment procedures in parallel with EIA procedures within a transboundary context according to the legal requirements, and ensure that the EIA includes a fully developed Environmental Management Plan for monitoring environmental impacts and appropriate.

### ***Measures to ensure longitudinal connectivity***

For the Danube River from Romanian sector, the Iron Gate Dams 1 & 2 (EN / RS) has significant river and habitat continuity interruptions.

Regarding additional measures such as ensuring longitudinal connectivity of water bodies within the period of drafting the by - second Management Plan was envisaged generally a prioritization of measures to ensure firstly connectivity longitudinal if transverse sealing existing heights below 15 m (considered technically feasible) on watercourses. Also analysed the possibility of providing longitudinal connectivity of water bodies for dams with heights greater than 15 m for the first Management Plan were provided as measures / tools, research studies which aimed at this goal. The next stage will analyse the requirements of Article 4.7., the WFD and will be identified "alternative objectives" related by taking test compliance with the requirements of Art. 4.7. and other bodies of water which are expected deterioration / or non-ecological potential environmental objectives in the context of new infrastructure projects.

Navigation on the project "Improvement of navigation on the Danube between Calarasi and Braila, km 375- km 175" (ISPA), will be improved through the application of the alternative solution resulted in the project Study of alternative technical solutions about the works which will be carried out on the critical point 01 Bala, in the project "Improving the navigation conditions on the



Danube between Calarasi and Braila, km. 375–km.175, Stage II” which will include the report on environmental impact assessment (EIA) report on adequate assessment (AA). Works done in critical points 02 Epuraşu and 10 Ostrovul Lupu will not have negative impact on the environment, according to the data monitored within the project "Monitoring the environmental impact of works to improve navigation conditions on the Danube between Călăraşi and Braila, km 375 - km 175". In order to achieve the environmental objectives within the project "Technical Assistance for Revising and Complementing the Feasibility Study Regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies - FAST DANUBE" will be developed documents required for EIA and will be considered the information presented in the 2011 feasibility study EIA report, and update that report in accordance with Article 5 and Annex III of the EIA Directive as last amended, and with the specific legal provisions of Romania and Bulgaria.

The EIA report will also include the *assessment of risk and vulnerability to climate change* for the sector of the Danube studied in the Project, and the *Report on the Impact of the Project on the Water Body in the Area Studied* will be prepared to assess the requirements of Article 4.7 of the Water Framework Directive.

will be seek constructive solutions that can optimise the incorporation of the "measures with the lowest impact" for every critical sector, and will be determined appropriate mitigation measures which will help minimise the project's environmental impacts (including those on Natura 2000 sites).

Will be undertaken Appropriate Assessment procedures in parallel with EIA procedures within a transboundary context according to the legal requirements, and ensure that the EIA includes a fully developed Environmental Management Plan for monitoring environmental impacts and appropriate assessment.

Consistent with District Management Plan International Danube

(<http://icpdr.org/main/management-plans-danube-river-basin-published>) measures proposed in the program of measures of the Management Plan were correlated with impact climate change.

### **Danube-Black Sea Canal**

#### ***Ecological status and ecological potential of surface water bodies***

ACN particularly monitors the water quality in the navigable canals, taking into consideration that the canals represent a source for drinkable water for the nearby residences.

In order to respect the Water Framework Directive, the global quality of the navigable canals water, regarding chemical properties should be according to the second class of quality, appropriate for a good ecological state.

ACN has the following responsibilities, according with the Water Management regulation: to operate and maintain the navigable canals with respect of operating procedures; to provide to the users the required waters quantity in order to maintain the normal level of canal water; to receive treated wastewater from users in specified range of water quality parameters; to maintain in operating conditions the warning systems for cases of emergency, accidents and the informational system.

In case of critical situations such as natural calamities, flood, water intrushes for increasing the discharge of exceeding water to the sea, ACN uses lockage processes and flood management.

### ***Measures to improve environmental conditions***

According with the Environmental regulation ACN has the following responsibilities:

To publish a public report on its website or other media, on a quarterly frequency about the environmental activity (in accordance with art. 26, paragraph 1 of Government Decision no 878/2005);

- to monitor the water quality of the navigable canals in order to comply with the limits imposed by the current water legislation;
- compliance with Plans for intervention and combating accidental pollution;
- to monitor and prohibit the discharges of the waste waters from the ships in transit, that can be loaded with hydrocarbons, detergents or other hazardous substances and to inform environmental agency.

In order to improve the results for the above responsibilities, ACN has done the following:

- a program to identify and evaluate the environmental aspects of all processes/projects of the company;
- identify, evaluate and classify the environmental impacts associated with the environmental aspects of all the processes /projects of the company;
- periodically updates of Plans for intervention and combating accidental pollution, the environmental management program for the company, the environmental monitoring program
- periodically training of employees regarding the environmental legislation and waste management
- the automatic system for monitoring water quality parameters using automatic stations along the navigable canals
- chemical analysis in the company's laboratory, as well as the visual observation of hydro technical agents in the field

### ***Navigation maintenance measures and environmental impacts***

The maintenance of fairway supposed to maintain the wet section of the canals in limits of the designed parameters through periodic dredging of alluvial material deposits by water taken from the Danube and rising from hydrographic basin. Dredging periods will be established so that solid deposits on the bottom of canals do not exceed thickness of 1 m (max 1.25 m) for the Danube Black Sea Canal and 0.75 m (max. 1 m) for Poarta Alba-Midia Navodari Canal. Dredging works are realised by keeping traffic open at least one way of navigation with corresponding signalization. The navigation dispatcher of ACN has the responsibility to notify the seafarers, by notification, all changes on sailing conditions.



## 8.6 RO | Budget status May 2018

*Investments taken for FRMMP implementation 2014 – 2017*

The figures in this table comprise AFDJ and ACN investments	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	23 500 000	15 555 051	49%	7 944 949
Surveying of the riverbed	5 433 000	434 000	78%	4 999 000
Water level gauges	300 000	246 650	80%	53 350
Marking of the fairway	10 274 000	3 750 000	82%	6 524 000
Availability of locks / lock chambers	400 000	200 000	85%	200 000
Information on water levels and forecasts	206 000	206 000	85%	0
Information on fairway depths	400 000	400 000	85%	0
Information on marking plans	80 000	80 000	85%	0
Meteorological information	365 000	356 010	56%	8 990
Other needs	100 000	100 000	64%	0
<b>Sum (Euro)</b>	<b>41 058 000</b>	<b>21 327 711</b>	<b>57.4%</b>	<b>19 730 289</b>

*Operational expenditures for conducted activities 2017 and budget needs 2018 (AFDJ and ACN)*

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	3 553 678	6 491 100	6 491 100	0
Surveying of the riverbed	980 900	1 009 892	1 009 892	0
Water level gauges	-	-	-	-
Marking of the fairway	4 108 340	4 148 172	4 148 172	0
Availability of locks / lock chambers	6 553 153	6 827 956	6 827 956	0
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	139 213	242 361	242 361	0
<b>Sum</b>	<b>15 335 284</b>	<b>18 719 481</b>	<b>18 719 481</b>	<b>0</b>

**Operational expenditures 2017 and budget needs 2018 (AFDJ)**

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	3 553 678	3 800 000	3 800 000	0
Surveying of the riverbed	976 073	1 000 000	1 000 000	0
Water level gauges	-	-	-	-
Marking of the fairway	4 096 240	4 100 000	4 100 000	0
Availability of locks / lock chambers	-	-	-	-
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	-	-	-	-
<b>Sum</b>	<b>8 625 991</b>	<b>8 900 000</b>	<b>8 900 000</b>	<b>0</b>

**Operational expenditures 2017 and budget needs 2018 (ACN)**

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	0	2 691 100	2 691 100	0
Surveying of the riverbed	4 827	9 892	9 892	0
Water level gauges	-	-	-	-
Marking of the fairway	12 100	48 172	48 172	0
Availability of locks / lock chambers	6 553 153	6 827 956	6 827 956	0
Information on water levels and forecasts	-	-	-	-
Information on fairway depths	-	-	-	-
Information on marking plans	-	-	-	-
Meteorological information	-	-	-	-
Other needs	139 213	242 361	242 361	0
<b>Sum</b>	<b>6 709 293</b>	<b>9 819 481</b>	<b>9 819 481</b>	<b>0</b>

## 8.7 RO | Outlook: actions, milestones and funding sources

**Danube and Danube-Black Sea Canal**

<b>RO 01: Insufficient number of sounding vessels</b>		
Planned activities:	Support acquisition of up-to-date sounding equipment to raise the coverage of surveyed areas (managing of the purchasing)	
Current shortcomings:	Insufficient sounding vessels and equipment, modernisation and acquisition requested	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through CEF Programme – FAIRway Danube project Operational Programme Transport 2014-2020	
Next steps:	<b>AFDJ:</b> Delivery and start of operation of the sounding vessel and equipment	by the end of June 2018
	<b>ACN:</b> Finalization of feasibility study for design and building of 2 multifunctional vessels	until December 2018
	Design and building of 2 multifunctional vessels (depending the financial resources)	until December 2020
<b>RO 02: Insufficient number of automatic gauging stations.</b>		
Planned activities:	Support acquisition of additional automatic gauging stations, especially for critical sections	
Current shortcomings:	Insufficient number of automatic gauging stations , especially for critical sections	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Funding through SOP-T 2007-2013 – HyQ Danube Project Budget availability 2017/2018: CEF Programme – FAIRway Danube project Operational Programme	
Next steps:	<b>AFDJ:</b> Approve the feasibility study and the investment within the Technical – Economical Committee of the Ministry of Transport in June 2018.	June 2018
	Launching the acquisition procedure and necessary actions in order to put into operation 10 automatic gauging stations (6 new and 4 rehabilitated) in selected pilot areas within the FAIRway Danube project	June 2018

	Submitting the project proposal for realisation of the network of hydrometric stations (installation or rehabilitation of 54 hydrometric stations)	until August 2018
	Organising the tender and realisation of the network of hydrometric stations	until the end of 2021
	<b>ACN:</b> Acquisition procedure for modernization and extension of the existing gauging network system + execution	until December 2018
<b>RO 03: Lack of dredging equipment, specialized personnel and deficiency of investments in river regulation</b>		
Planned activities:	Support acquisition of dredging equipment performance to increase the efficiency of working problem areas and the possibility of intervention at any time where it is needed	
Current shortcomings:	<b>AFDJ:</b> Missing dredging equipment for critical river sectors and the possibility of intervention at any time where it is needed Lack of new specialized personnel due to the restrictions of national legislation Low level waterway infrastructure  <b>ACN:</b> One of the important issues to ACN is to ensure the stability of navigable canals banks, in an area where the gap between service road level and natural ground level is up to 55 m (about 20 km on Danube-Black Sea canal – each shore and about 7 km on Poarta Alba-Midia Navodari canal – on each shore)	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through state budget CEF-Programme	
Next steps:	<b>AFDJ:</b> Monitoring the contract for dredging equipment procurement within the SWIM project  Finalise the tender procedure for acquisition of dredging equipment with funds from state budget  Submit the project proposal for two river tugs  New dredging equipment needs new specialized personnel – engage the specialized personnel and training existing staff  <b>ACN:</b> Currently ACN is looking to identify the possible financial resources for execution of works If ACN identifies the financial allocation for this project, the feasibility study (financed by ISPA funds) for	until March 2019  end of 2018  2018 - 2019 2018 - 2019  until December 2018

	protection and consolidation of banks will be revised and updated Design and execution of works (protection and consolidation of banks)	until 2020
<b>RO 04: Inefficient procedures. The documentation to draw up a contract for dredging is time-consuming.</b>		
Planned activities:	Support standardization and simplification of documentation procedures	
Current shortcomings:	Inefficient procedures	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through AFDJ budget/state budget CEF-Programme	
Next steps:	<b>AFDJ:</b> Preparing specific documentation for the efficient procedures concerning with existing standards and national legislation Elaboration and permanent update of the Measures Plan together with Bulgarian administration for capital dredging activity on the common Romanian – Bulgarian sector of the Danube	until July 2018  2018 - 2021
<b>RO 05: Lack of efficient vessels and special equipment for marking</b>		
Planned activities:	Support acquisition of vessels equipped with advanced machines to perform operations board assembly / disassembly floating signals	
Current shortcomings:	Missing the efficient vessels and special equipment for marking	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Funding through SOP-T 2007-2013 – Feasibility study for technical vessels Budget availability 2017/2018: CEF-Programme – FAIRway Danube project	
Next steps:	<b>AFDJ:</b> Monitoring the contract for the marking vessel procurement  Delivery and putting into operation the marking vessel	November 2018  December 2018
<b>RO 06: Insufficient number of buoys and position monitoring equipment. Unavailable automated system for the transmission of information on the buoys. The dissemination of information could be improved</b>		
Planned activities:	Support acquisition of buoys and monitoring equipment Support establishment of an automated monitoring system and improve the provision of information on fairway marks	

Current shortcomings:	Insufficient number of buoys and position monitoring equipment	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through CEF-Programme – FAIRway Danube project Operational Programme 2014 - 2020 AFDJ budget/state budget	
Next steps:	<b>AFDJ:</b> Preparing the technical specification for public procurement for marking system equipment	until December 2018
	Improving and monitoring Romanian marking system	until the end of 2018
	Manufacturing the buoys using the new design	until the end of 2018
<b>RO 07: Unavailable forecast for water levels</b>		
Planned activities:	Support establishment of a water level forecast	
Current shortcomings:	Unavailable forecast for water levels	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Funding through SOP-T 2007-2013 – HyQ Danube Project Budget availability 2017/2018: CEF-Programme – FAIRway Danube project next call of CEF-Programme or next Investment Programme	
Next steps:	<b>AFDJ:</b> Approve the feasibility study and the investment within the Technical – Economical Committee of the Ministry of Transport	June 2018
	Acquisition of 10 automatic gauging station and put into operation in the selected pilot areas within FAIRway Danube project	September 2018
	Realisation of hydrological database within the FAIRway Danube project	until the end of 2018
	Set-up the mathematical model used for water level forecast	end of 2018
	Submitting the project proposal for realisation of the network of hydrometric stations	until August 2018
	Implement a national water level forecast for 5 days with a high accuracy for the next 2-3 days (AFDJ+ACN)	until March 2019
	Organising the tender and realisation of the network of hydrometric stations (install/rehabilitate 54 hydrometric stations)	until the end of 2021



	<b>ACN:</b> Organising the tender for automatic gauging stations and for installation of the automatic gauging stations in selected locations  Implement a national water level forecast for 5 days with a high accuracy for the next 2-3 days (AFDJ+ACN)	until December 2018  until March 2019
<b>RO 08: Information could be provided customer-friendly using established river information portals.</b>		
Planned activities:	Support customer-friendly processing and dissemination of information	
Current shortcomings:	Insufficient quality and frequency of transmitting information to users	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through AFDJ budget/state budget Danube Transnational Programme 2014-2020	
Next steps:	<b>AFDJ:</b> Increasing technical capacity for processing and publishing fairway information Update of FIS Portal and D4D Portal within Danube Stream Project Update the RoRIS Portal Update the fairway information on the company website and mobile RIS application  <b>ACN:</b> Update the RoRIS portal Update the fairway information on the company website Update of FIS Portal and D4D Portal within Danube Stream Project	until the end of 2018 permanently  permanently permanently  permanently permanently  until the end of 2018
<b>RO 09: Unavailable digital terrain models for shallow sections.</b>		
Planned activities:	Support set-up of digital terrain models for shallow sections	
Current shortcomings:	Unavailable digital terrain models for shallow sections	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Budget availability 2017/2018: Funding through AFDJ budget/ state budget CEF-Programme	
Next steps:	<b>AFDJ:</b> Realisation of data base for hydrographical data	end of 2018
<b>RO 10: Insufficient number and quality of weather stations.</b>		
Planned activities:	Support improvement of meteorological information	
Current shortcomings:	Insufficient number and quality of weather stations	

Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Funding through SOP-T 2007-2013 – HyQ Danube Project Budget availability 2017/2018: CEF-Programme – FAIRway Danube project next call of CEF-Programme or next Investment Programme	
Next steps:	<b>AFDJ:</b> Approve the feasibility study and the investment within the Technical – Economical Committee of the Ministry of Transport	June 2018
	Acquisition of 10 automatic gauging station and put into operation in the selected pilot areas within FAIRway Danube project	until September 2018
	Submitting the project proposal for realisation of the network of hydrometric stations	until August 2018
	Organising the tender for and install or rehabilitate 54 hydrometric stations	until the end of 2021
<b>RO 11: Missing interconnection with databases of other waterway administrations to exchange data</b>		
Planned activities:	Support interconnection between databases of different waterway administrations	
Current shortcomings:	Insufficient interconnection with databases of other waterway administrations to exchange data	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	no environmental impacts
	Which measures are taken to mitigate these impacts?	N/A
	Is water status still expected to deteriorate?	N/A
Possible funding:	Funding through SOP-T 2007-2013 – HyQ Danube Project Budget availability 2017/2018: CEF-Programme – FAIRway Danube project and other project proposal AFDJ budget/state budget	
Next steps:	<b>AFDJ:</b> Acquisition of hardware and software for creating data base within the FAIRway Danube project and SWIM project	end of 2018
	Creating data base with the same structure with other waterway administrations for improving the data exchange service within the FAIRway Danube project	end of 2018

## 9 Bulgaria

**EAEMDR – Executive Agency "Exploration and Maintenance of the Danube River"** (a public authority within Ministry of Transport) is responsible for fairway maintenance, rehabilitation and upgrade.

### 9.1 BG | Status report on main critical locations including water level information 2012 - 2017

Since EAEMDR is currently in the process of recalculating the Low Navigable Water Level at certain critical locations, the achievement of 2.5m fairway depth is not set in relation to the number of days above Low Navigable Water Level.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

#### *Number of days with fairway depths $\geq 2.5$ m on critical locations*

This table includes the main critical locations as identified by the Danube waterway users in the Master Plan in December 2014 (*marked grey*) and further very critical locations as additionally identified by EAEMDR. The fairway width is given related to LoS 1 (80m fairway width).

Critical location rkm from-to	Critical location name	2012	2013	2014	2015	2016	2017
km 610 - km 607	Somovit	318	327	365	313	366	365
km 591 - km 584	Sredniak island Palets island	345	346	365	316	366	365
km 569 - km 561	Belene island Milka island Kondur island	283	275	337	212	273	220
km 548 - km 540	Vardim island	292	309	360	268	327	316
km 539 - km 530	Yantra River Giska Island	316	317	360	253	306	337
km 525 - km 520	Batin island	339	314	352	246	295	288
km 476 - km 472	Gostin island	337	326	365	365	366	365
km 463 - km 460	Mishka island	366	365	365	365	366	365
km 458 - km 455	Brashlian island	341	365	365	365	313	263
km 441 - km 435	Radetski island	366	365	365	365	366	365

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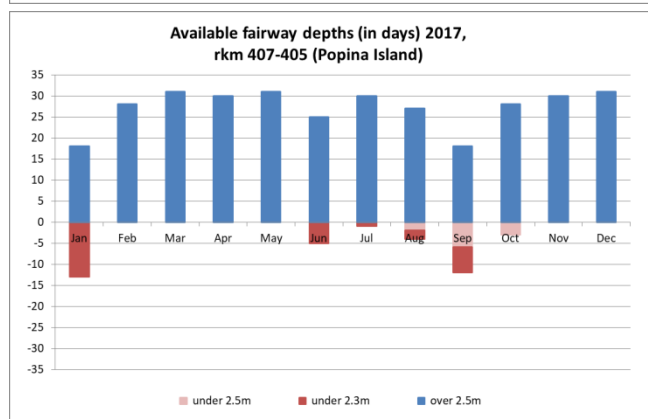
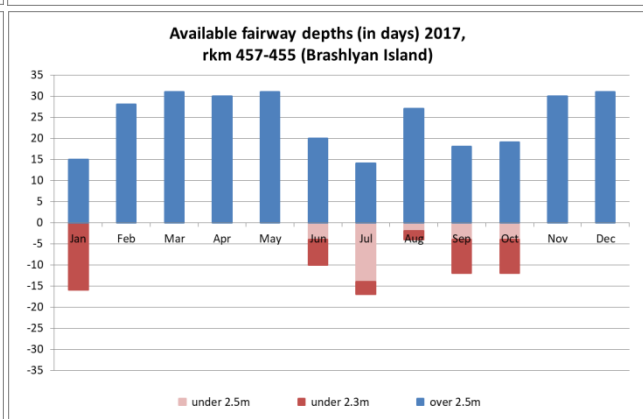
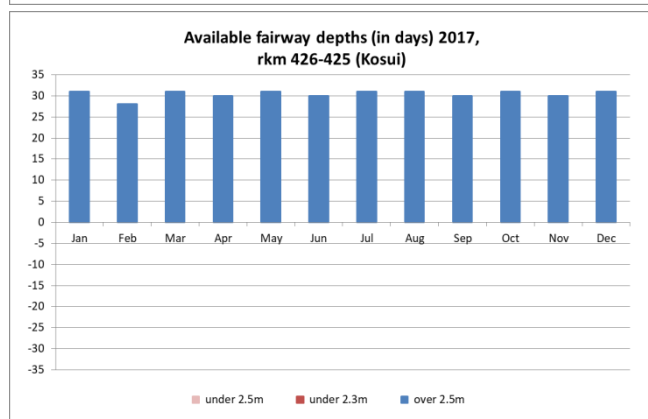
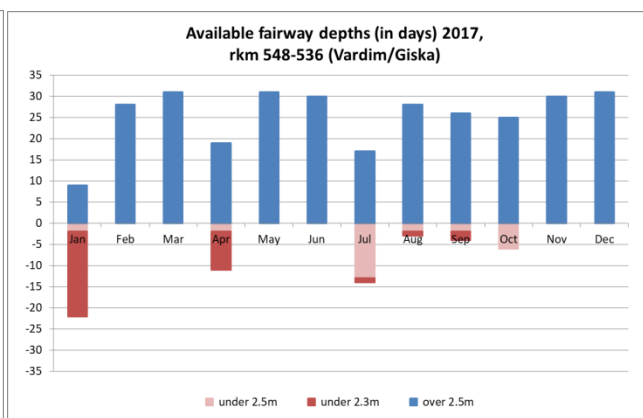
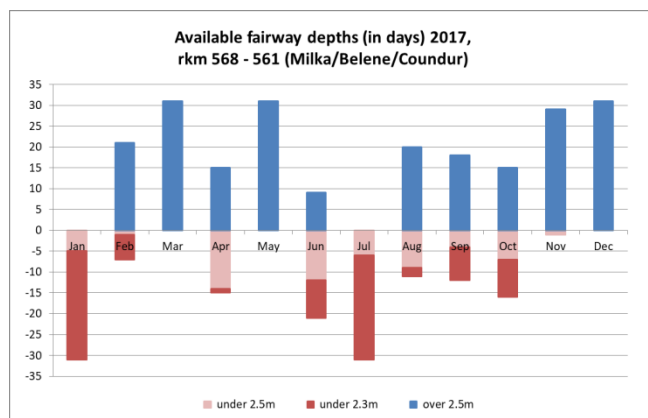
km 426 - km 420	Kosui island Dunavets island	332	354	365	322	366	365
km 414 - km 410	Malak Preslavets is- land	345	341	365	365	366	361
km 408 - km 399	Popina island	342	365	365	311	304	269
km 395 - km 390	Vetren island	345	365	365	365	366	365
km 386 - km 382	Chajka island	346	358	365	365	366	365

### Number of days with water level $\geq$ LNWL on main critical locations

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
567.00-566.70 – Belene island 562.00-561.50 – Coundur/Milka is- land 541.60-541.00 – Vardim island 538.50-537 – Giska island	Svishtov km 554.300	337	326	365	285	348	334
523.80-523.20 – Batin island 475.70-475.30 – Gostin island	Ruse km 495.600	341	329	365	288	348	339
425.90-425.20- Kosui island 391.60-391.10 – Vetren island 383.50-382.50 – Chajka island	Silistra km 375.500	325	326	365	293	348	343

2017 began with depths below 25dm in the critical sections in January and early February, low water storms and low temperatures led to the appearance of ice and, in some places, the ice flow phenomena were 100%. This complicated situation led to a complete closing of navigation and some problems for the ship owners related to the safety of their vessels. The high average water levels observed until April and then their sharp decline caused an appearance of critical stretches, even at level +194 Svishtov. A bottleneck was identified again in the area of Milka Island, with depths <25dm on 59 days and the fairway width reached only 70m. Problems with the depth also arose in the areas of Brashlyan Island (rkm 457 - 455) and Popina Island (rkm 407 - 405).

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Minimum depth measured in the critical location Milka Island in 2017:

- Depth below 25 dm was observed in April 2017 at water level +194 cm at gauging station Svishtov
- Number of days with depths <25 dm below ENR – 50

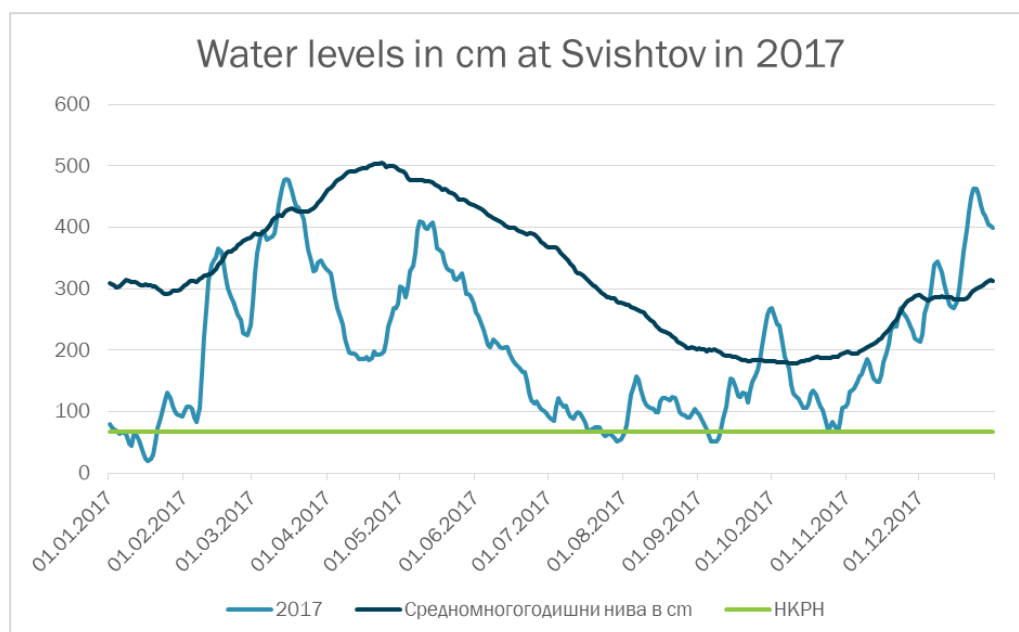
As a general statement, fairway depths less than 25 dm at critical locations were observed at different water levels and different water levels occur at certain gauging stations where the same water discharges are measured. The tendency of the last couple of years points towards decreasing of the observed water levels.

Some of the identified reasons for deterioration of the navigational conditions in the past years are listed below:

- Alteration in the hydraulic characteristics of the riverbed due to disturbed sediment transport in the upper, middle Danube and its tributaries;
- Reduced water discharges;
- Unprotected from erosion coasts and islands;
- Reduced diameter of debris (sediments).

### 9.2 BG | Hydrological conditions at main critical locations 2017

The first half of 2017 could be characterized as a year of insufficient water. The number of days with water levels below the LNWL in the critical locations for reference gauge Svishtov until 30.06.2017 was 16. In June water levels dropped again, approaching LNWL.



2017 started with severe weather conditions and ice phenomena appearance. Theoretically, ice flow phenomena appears when the sum of the minimal twenty-four-hour periods is approximately  $-70$ ;  $-80^{\circ}\text{C}$ . In the winter of 2016-2017 ice appeared on the night of 08.01.2017 and by the morning the ice flow was above 40%. The sum of the negative average twenty-four-hour periods was hardly  $-17.1^{\circ}\text{C}$ . These phenomena are a result of the relatively cold December 2016 when the average twenty-four-hour period temperatures were positive but near the  $0^{\circ}\text{C}$  almost the entire month along the entire Danube river valley. This led to a decrease of the water temperature to  $2^{\circ}\text{C}$ . The combination of low water levels (on 08.01.2017 the water level at Ruse was 47 cm), snowfall, north-east wind and the low water temperature led to ice flow phenomena and surprisingly fast appearance of ice above 40% overnight.



### 9.3 BG | Key issues and related activities 2017

Related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014), the need for action and the activities performed are described below:

	Key issues	Need for action	Activities performed 2017
BG 01	Old or insufficient measuring equipment	Support acquisition of up-to-date (renewed single-beam and additional multi-beam) sounding equipment	<p><i>The FAIRway Danube project was approved by INEA and funded under CEF. Activity 3 includes the delivery of specialized vessel with multi-beam echo-sounder and 10 automatic gauging stations. Tender procedure for the vessel was re-launched in February 2017 and the contract for delivery of specialized vessel was signed on 4th of July 2017. The surveying vessel was delivered in January 2018. The preparation of the tender documents for launching the procedure for the stations is in progress and will most probably be finalized and the tender will be launched in July 2018.</i></p> <p><i>The project "Improvement of the systems for navigation and topo-hydrographic measurements on the Danube – phase 2" was approved for funding under OPTTI 2014-2020. The surveying vessel with multi-beam equipment was delivered in February 2017 and baptized in March 2017.</i></p>
BG 02	Limited number of skilled personnel	Secure education and provision of well-trained staff in the short, medium and long term	<p><i>In 2014 a training course on AutoCAD Civil 3D and ArcGIS Desktop was held; several EAEMDR employees were trained.</i></p> <p><b>See key issue BG8.</b></p>
BG 03	To a large extend, interventions are planned on short term due to rapidly changing fairway conditions	Support improvement of monitoring procedures, data basics and methods for analysis and planning of interventions	<p><i>The FAIRway Danube project was approved by INEA and funded under CEF. Activity 3 includes delivery of a national Waterway Asset Management System and a transnational Waterway Monitoring System. An agreement regarding the joint procurement of the transnational Waterway Monitoring System was concluded and the procurement documents were elaborated.</i></p> <p><i>The selected consultant - PRISMA solutions EDV-Dienstleistungen GmbH developed the Data Requirements Catalogue and a comprehensive Software Requirement Specification, approved on 29.09.2017. Regarding software development the hearing with the bidders was held on 12.12.2017.</i></p> <p><i>The FAST Danube project was approved by INEA and funded under CEF. Within the project a feasibility study for river engineering measures in the common Bulgarian-Romanian sector will be elaborated.</i></p>

			<p>The public procurement for the selection of a consultant was conducted and the contract awarding the service was signed in February 2017. Two complete surveying campaigns were performed (one in April 2017, one in September 2017) on the preliminary selected critical locations in both Bulgarian and Romanian stretches. Based on the historical and newly collected data a mathematical model was elaborated, verified and calibrated. Preparation of separate reports for EIA and AA has started.</p>
BG 04	<p>Inefficient allocation of resources due to suboptimal information support system, lack of consistent database of riverbed surveys and cumbersome procedures</p>	<p>Support introduction of a Fairway Management System</p>	<p>The FAIRway Danube project was approved by INEA and funded under CEF. Activity 3 includes delivery of a national Waterway Asset Management System and a transnational Waterway Monitoring System. <b>For status see key issue BG 03.</b></p> <p>The project "Improvement of the systems for navigation and topo-hydrographic measurements on the Danube – phase 2" was approved for funding under OPTTI 2014-2020. Within the project a specialized surveying vessel to provide data for internal processes (the WAMS) and WAMOS was delivered.</p>
BG 05	<p>Only very little dredging works of the fairway have been performed for many years because of insufficient dredging equipment and limited financial resources</p>	<p>Support acquisition of up-to-date dredging equipment</p> <p>Increase available annual resources for dredging works</p> <p>Support implementation of structural river engineering measures</p>	<p>The project "Modernization and optimization of the activities for rehabilitation of the fairway in the common Bulgarian-Romanian section of the Danube River, through delivery of equipment" was approved by the Managing Authority of OPTTI 2014-2020 in the beginning of 2018. The Grant Agreement was signed on 29.01.2018. The project foresees delivery of a multifunctional dredger (cutter suction dredger), a set of pipelines, manoeuvring vessel, pontoon and a barge. The technical specifications and tender dossiers for 2 public procurement procedures are under elaboration.</p> <p>In 2017, a framework contract was signed by the Ministry of Transport for the implementation of maintenance dredging works by a subcontractor. The contract is valid for three years and worth about 3.5 Mn EUR. The financial means for conducting the dredging works are secured until 2020.</p> <p>FAST Danube project was approved by INEA and funded under CEF. Within the project a feasibility study for river engineering measures in the common Bulgarian-Romanian sector will be elaborated. Based on the findings of FAST Danube project, an engineering project will be prepared and possible financial sources identified.</p>

BG 06	High traffic risks due to loss or incorrectness of navigation signs provoked by accidents with ships or insufficient maintenance	Enable improved surveillance of navigation activities by electronic means  Increase resources for maintenance of floating signs	<i>The delivered floating and coastal navigational signs within project „Improvement of the systems for navigation and topo-hydrographic measurements along the Danube River” under OPT 2007-2013, were positioned. The system for control of location of floating signs and coastal light beacons in real time has been tested and was fully operable by the end of 2015. Possible extension of the system for control of location of the signs is under internal discussion and could be financed under the OPTTI 2014-2020.</i>  <i>The necessary resources are secured and available.</i>
BG 07	Insufficient marking equipment	Support acquisition of monitoring and marking equipment	<i>FAIRway Danube project was approved by INEA and funded under CEF. Activity 3 includes delivery of specialized monitoring equipment, including a multi-beam echosounder and a marking vessel. The tender procedure for the marking vessel was launched in March 2017. The contract for the delivery was signed on 23th of August 2017. Delivery is expected in August 2018.</i>  <i>A new monitoring vessel was purchased in the course of the project “Improvement of the systems for navigation and topo-hydrographic measurements on the Danube – phase 2” (see BG01).</i>
BG 08	Limited number of skilled personnel (regarding fairway marking)	Secure education and provision of well-trained staff in the short, medium and long term	<i>A project for improving the administrative and technical capacity of the Agency was submitted to priority axes 5 – Technical assistance of Operational program on “Transport and Transport Infrastructure 2014-2020” and approved by the MA in September 2016. The implementation of the activities included in the project also started in September 2016, when the Grant Agreement was signed between EAEMDR and the MA of the operational program.</i>  <i>The project includes the following activities: organization and conduction of trainings to improve the qualifications of the Agency`s employees working on projects; specialized training on Public Procurement Act; information and publicity/presentation and communication skills; financial implementation and completion of projects under operational programmes; development, management, monitoring and reporting on the implementation of projects under programs funded by the ESIF; Auto CAD training; improvement of the existing office equipment;</i>

			optimization of the existing web-site/development of an online platform for publishing of information.
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#### 9.4 BG | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations as itemised in the Rehabilitation and Maintenance Master Plan (version December 2014) was updated in September 2017.

##### ***Riverbed surveying activities 2017***

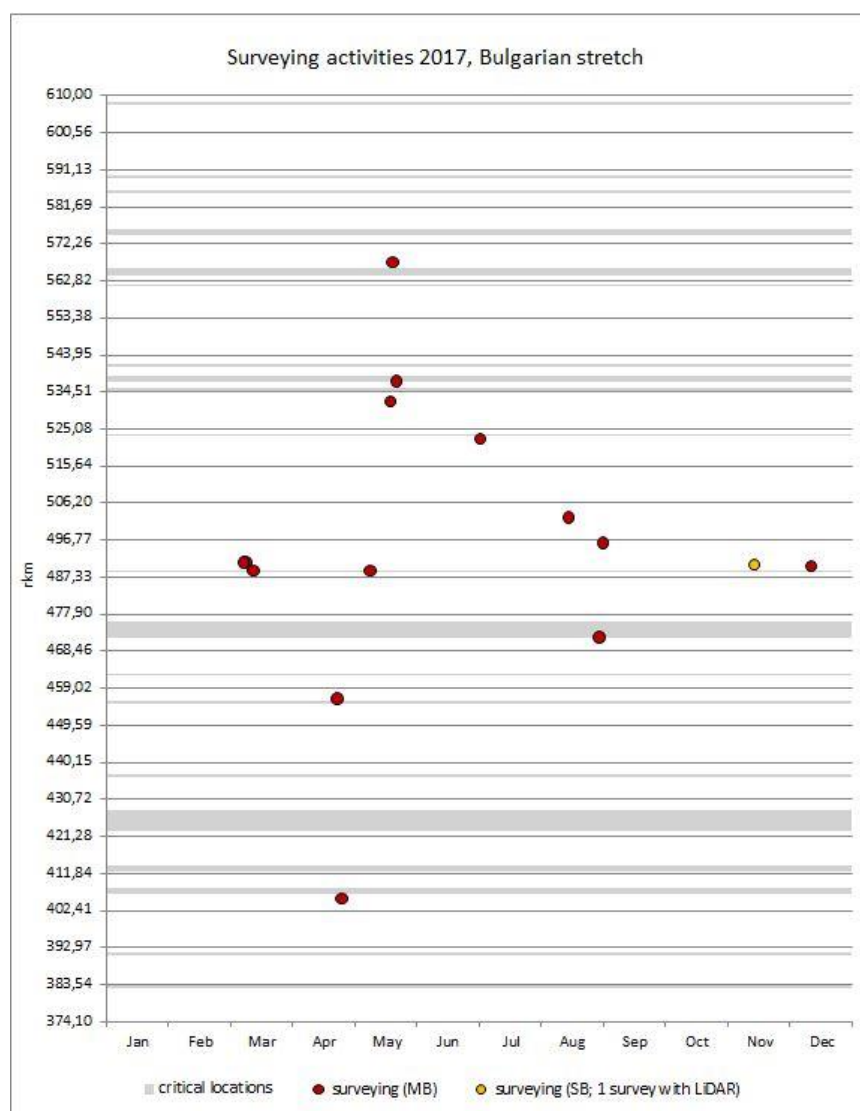
Since 2017 the hydrographical surveys are carried out with Multi-beam and/or LiDAR systems with the hydrographical ship “Danube-1”, purchased within the project “*Improvement of the systems for navigation and topo-hydrographic measurements on the Danube – phase 2*”.

The locations to be surveyed in 2017 were prioritized by the hydrographic department. The following surveys were performed in 2017:

1	Hydrographical survey in the critical navigable sections and for the safety in the area of Ruse-Giurgiu bridge
2	Firth EAEMDR - two complete surveys were carried out with common approx. surface of 71 500 sqm
3	Survey of sunken vessel at rkm 491
4	Survey of 3 sunken vessels in the area of Ruse-Giurgiu bridge
5	Survey of sunken vessel at rkm 537 with approx. surface of 90 000 sqm on 10.08.2017
6	Survey of critical section Milka Island rkm 568,5 – rkm 566,0 with approx. surface of 2 097 000 sqm
7	Survey of critical section Garvan Island rkm 408 – rkm 403 with approximate surface of 871 600 sqm
8	Survey of critical section in the area of M. Brashlian Island rkm 457,400 – rkm 455,200 with approx. surface of 873 240 sqm
9	Survey of critical section in the area of rkm 533,500 – rkm 530,500 with approx. surface of 2 058 300 sqm
10	Survey of critical section in the area of Batin Island rkm 521-524
11	Survey with LiDAR system from Ruse to Tutrakan – 18-19.07.2017 and 28-29.08.2017
12	Multi-beam survey of the berths in the area of Ruse – 15.08.2017
13	Svishtov water level gauge – leveling – 17.08.2017
14	Survey with multi-beam system in the area from rkm 471 to rkm 473 – 30.08.2017
15	Survey of sunken vessel from rkm 495 to rkm 497 – 01.09.2017
16	Survey with multi-beam and LiDAR system at the area of Vidin-Kalafat bridge – 09-12.09.2017
17	Lom water level gauge – leveling – 12.09.2017
18	Survey with LiDAR system in the area of Vidin quay wall – 13.09.2017
19	Survey with LiDAR system from Vidin to Timok River – 13.09.2017
20	Novo selo water level gauge – leveling – 13.09.2017

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21	Survey with LiDAR system from Svishtov to Belene Island – 15.09.2017
22	Survey with single-beam system and GPS station at rkm 776 – 25.10.2017
23	Survey with single-beam system and GPS station at rkm 722 – 26.10.2017
24	Survey with LiDAR system from Oryahovo to Somovit rkm 678-610 – 27.10.2017
25	Single-beam survey of the EAEMDR firth rkm 490-491 – 13.11.2017
26	Survey with multi-beam system and LiDAR of the Ruse-Giurgiu bridge – 12.12.2017





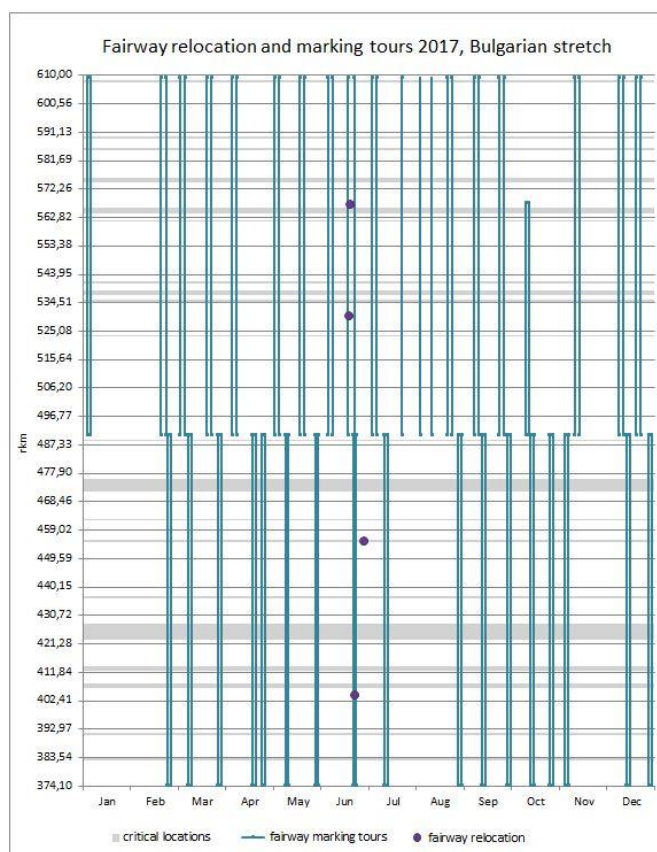
## Fairway marking activities 2017

Fairway marking tours are done with the EAEMDR marking vessel, equipped with a single-beam echo-sounder. The tours are quick checks to determine the need for more detailed surveying and fairway relocation activities. They are conducted several times per month. When necessary, the fairway is narrowed / widened or the trajectory is changed.

The depth measurements conducted during the marking and monitoring tours were also published on the FIS Portal in 2017, yet this activity was not monitored until the beginning of 2018. Therefore, there is no data on which shallow section information was published in 2017.

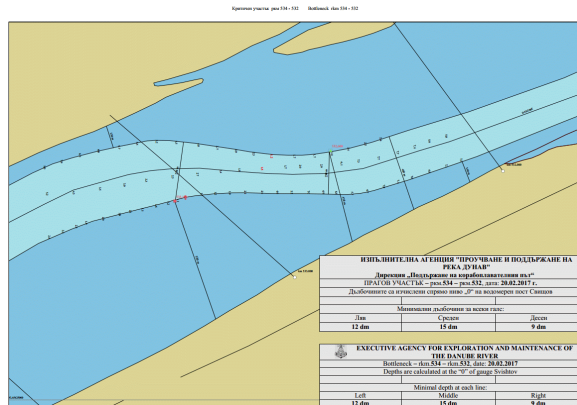
In 2017, the fairway trajectory was changed and significantly improved in the areas of:

- area from km 534 – km 530
- Milka Island – km 568 – km 564
- Garvan Island – km 407 – km 404
- area from km 458 – km 456

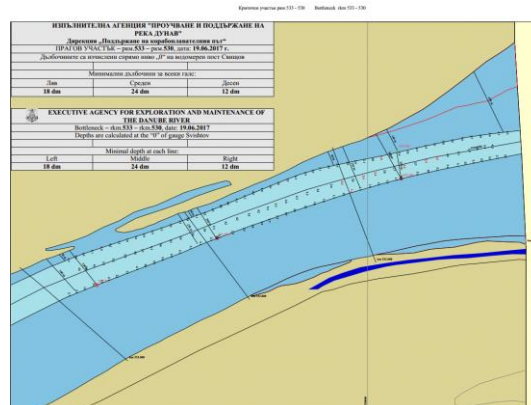


### Area from km 534 – km 530

Changing of the fairway trajectory on 19.06.2017



20.02.2017



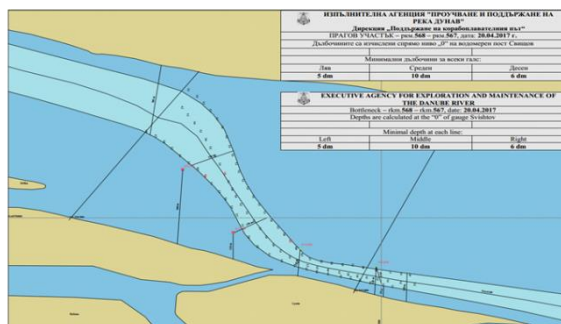
19.06.2017



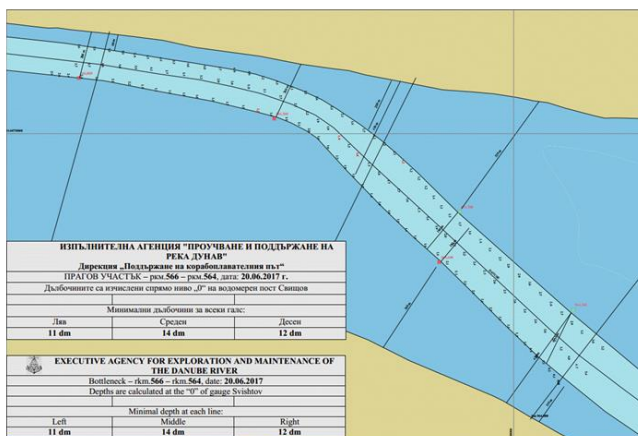
## Action Plan: Bulgaria

### Milka Island – km 568 – km 564

Changing of the fairway trajectory on 20.06.2017



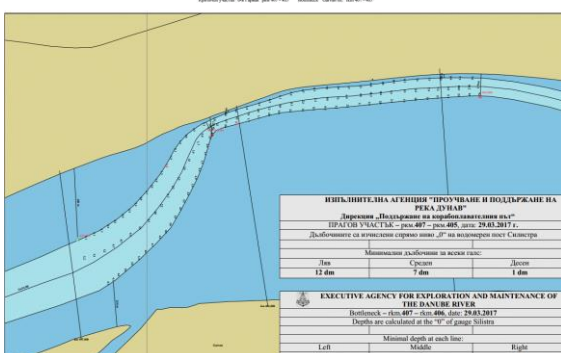
20.04.2017



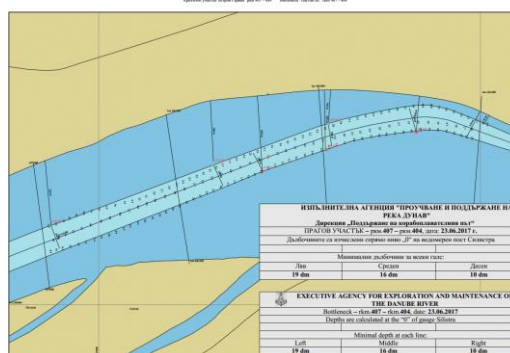
20.06.2017

### Garvan Island – km 407 – km 404

Changing of the fairway trajectory on 23.06.2017



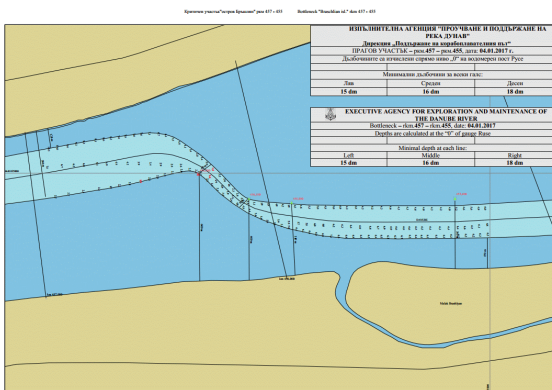
29.03.2017



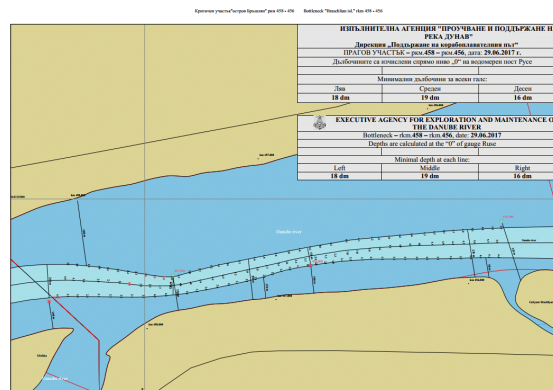
23.06.2017

### Area from km 458 – km 456

Changing of the fairway trajectory on 29.06.2017



04.01.2017



29.06.2017

### ***Dredging activities 2017***

No dredging activities on the fairway were performed by EAEMDR in 2017. The main reason lies in the lack of suitable dredging equipment available to EAEMDR (see key issue BG 05). The extremely limited financial resources additionally hamper the execution of dredging works with the equipment which is available. In March 2017, a tender for dredging on the fairway from rkm 610.000 until rkm 374.100 on the Danube was published. The deadline for receiving offers was 02.05.2017. The framework contract for conducting dredging works was signed in February 2018.

## **9.5 BG | Summary of current ecological status and environmental impacts**

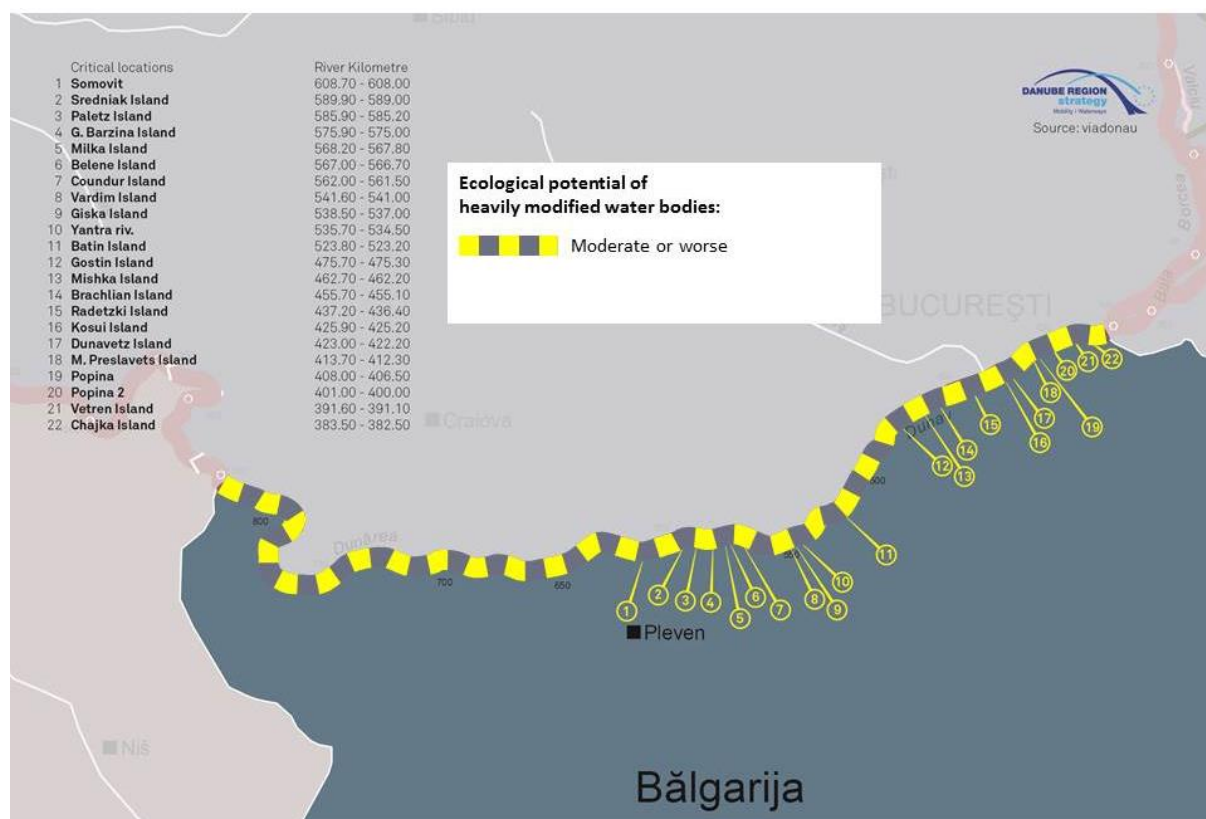
The whole Bulgarian stretch of the Danube River is classified as Heavily Modified Water Body. According to the Danube River Basin Management Plan 2010-2015 the ecological status and ecological potential of the Bulgarian Danube was determined as moderate. The new Danube River Basin Management Plan 2016-2021 has been approved on 29.12.2016 with decision of the Council of Ministers.

During the update of the DRBMP the current impact on the Bulgarian stretch of the Danube River was investigated, according to the criteria for preliminary HMWB identification. Based on the preliminary results for the Danube River, it could not be determined as HMWB. Moreover, the approved national criteria for HMWB identification are not applicable for large rivers as Danube in their original version.

One of the main deliverables of the on-going project “Intercalibration of the methods for analysis of biological quality elements (BQE) for the types of surface waters on the territory of Bulgaria, corresponding to common European types in the Geographical intercalibration groups” (November 2013 - December 2016) is detailed assessment of the hydro-morphological change of the Danube River. The project foresees assessment of the stage of modification of the lateral connectivity of the river, because the construction of dikes for the purpose of flood protection has the main impact on the hydro-morphological regime of the river.

Taking into account that the Danube River is boundary during the process of HMWB classification the impact of the Romanian side was considered, including the cumulative effect of both countries. In the updated DRBMP for Romania the Danube River is classified as HMWB. During the joint meeting in 2015 between Bulgarian and Romanian Ministries of environment, the Bulgarian delegation informed the participants that at this stage the Danube could not be identified as HMWB based only on the analysis of the hydromorphological impact on the Bulgarian territory. For the moment the Danube River is defined as HMWB.

The following map displays the ecological status and ecological potential of the Bulgarian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Bulgaria.



### Ecological status and ecological potential of surface water bodies

(Source: DRBM Plan – Update 2015)

For the heavily modified water bodies measures are to be implemented for the achievement of the good ecological potential.

Within the new DRBMP the assessment of the impact on the surface waters in the Danube region from the human activities was updated in compliance with the requirements of the Act for the water and Regulation No H-4 from 14.09.2012 on the characterization of the surface waters.

Based on the collected, analyzed and processed information on the Danube region the following main categories of surface water impact are identified:

- Impact from point sources of pollution;
- Impact from diffuse sources of pollution;
- Impact from hydro morphological changes;
- Impact from invasive species;
- Impact from climate changes.

The main activities generating hydro-morphological pressure on water bodies in region of the Danube River are: water abstraction (including related equipment construction), production of electricity through Water power plant, flood protection, abstraction of sedimentary deposits, navigation.

Construction of dykes and river corrections are carried out in order to provide protection floods of the population. The corrections of the rivers change the shape of the river (removing the meanders) and the river profile; the speed is also changing of the current. These changes lead to changes in ecosystems in these areas. The presence of dug interrupts connection with the natural floodplains and leads to the drainage of the riparian wetlands. Abstraction of sediment is performed to ensure the conductivity of river bed and for the construction purposes, which changes the bottom and the profile of the river, which has a severe negative impact on habitats.

### ***Measures to improve environmental conditions***

According to the Structural Regulations of EAEMDR the only ecology related activities, performed by the Agency are:

- participation in localization and removal of pollution, caused by navigation in the common BG-RO section of the Danube River;
- collecting oily and greasy ship waste from transit vessels.

In the past 10 years the Executive agency has implemented two projects, related to the waste management of inland navigation on the Danube (WANDA – 2009-2012; CO-WANDA – 2012-2014) and a project called WATER – Danube integrated water management. The three – year strategic project launched in June 2012 addressed the achievement of the integrated water management and environmental protection objectives for the Danube Floodplain as required by the European Union Water Framework Directive 2000/60/EC (WFD). The general objective of the Danube WATER project was to create a common management and monitoring system for water quality in extreme environmental conditions (floods, droughts, accidental pollution by chemical and radioactive substances), including providing a data and information dissemination mechanism, necessary for the regional development of the border area.

Several ecological projects were implemented in the period 2009-2015 along the Bulgarian stretch of the Danube River, with focus on natural parks.

The project: Limiting the negative influence of invasive species and restoration of the natural habitats, through planting of local species in Srebarna Nature Reserve has been financed under the national operational programme on environment 2007-2013. The beneficiary was the Regional Inspectorate of Environment and Water – Rousse and the project was implemented during 2013. The goal of the project is to protect the biodiversity in the Srebarna Nature Reserve and to restore and maintain the habitats - subject of protection. The project included exploration activities as: inventory of the forest habitats (natural and / or semi-natural) in Srebarna Nature Reserve and the habitat 91 EC\*, as part of them; analysis of the state and the evaluation of its favorable conservation status; working out a program for reforestation of areas with native species (technological plans for reforestation), exempt from hybrid poplar; initial study of the vegetation in terms of invasiveness of the territory of Srebarna Nature Reserve, by walkthrough and testing of the protected territory and determining of the invasive plant species, their area distribution and their impact on the natural vegetation in the wetland; and implementation of the practical measures: marking of the invasive species and implementation of effective measures for eliminating them and limiting their negative impact; activities on utilization operations of the extracted material, according to the developed methodology; implementation of activities for rehabilitation and repair of the gateways in the Srebarna Nature Reserve, etc.

## Action Plan: Bulgaria

Project Implementation of activities for planning and management of reserve "Chuprene", reserve "Gorna Korja" and managed reserve "Ibisha" (situated on km 717 of the River Danube). The project has been financed under the national operational programme on environment 2007-2013. The beneficiary of the project was the Regional Inspectorate of Environment and Water – Montana. The main activities implemented within the project were:

- Identification and analysis of currently available information for each of the three protected areas;
- Field research, incl. forestry taxation in order to provide the necessary additional information;
- Conducting workshops both formal and in operating order;
- Data analysis and evaluation of the environmental and socio-economic importance of the protected areas;
- Development of database for protected areas and identifying monitoring scheme for its supplementing;
- Defining territorial regimes and norms for use;
- Identifying the main threats to protected areas as well as identifying long-term objectives and constraints;
- Development of long-term and short-term programmes, plans and projects;
- Conducting a public discussion for each of the protected areas.

### ***Navigation maintenance measures and environmental impacts***

Maintenance works of the fairway on the Danube River are executed in the framework of the Water Act (SG 67/27.07.1999, last amended SG61/11.08.2015), Law for the maritime spaces, the inland waterways and the ports of the Republic of Bulgaria (SG 12/11.02.2000, last amended SG52/10.07.2015).

No dredging activities on the fairway were performed by EAEMDR during the past years. The main maintenance activity performed by the Agency is marking of the fairway. The negative environmental impact from the marking activity can be considered insignificant.



## 9.6 BG | Budget status May 2018

*Investments taken for FRMMP implementation 2014 – 2017*

Need areas	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	8 020 000	10 549 321	85%	0
Surveying of the riverbed	3 810 000	3 827 822	85%	0
Water level gauges	0	400 000	85%	0
Marking of the fairway	9 215 000	4 062 623	85%	5 152 377
Availability of locks / lock chambers	n/a	n/a	n/a	n/a
Information on water levels and forecasts	0	125 000	85%	0
Information on fairway depths	12 000	320 000	85%	0
Information on marking plans	0	0	0	0
Meteorological information	75 000	0	0	75 000
Other needs	0	150 000	85%	0
<b>Sum (Euro)</b>	<b>21 132 000</b>	<b>19 434 767</b>	<b>85%</b>	<b>5 227 377</b>

*Operational expenditures for conducted activities 2017 and budget needs 2018*

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	0	3 067 751 <sup>2</sup>	4 129 586 <sup>3</sup>	-
Surveying of the riverbed	53 988	600 000	53 988	546 012
Water level gauges	38 232 <sup>1</sup>	5 000	38 232 <sup>1</sup>	-
Marking of the fairway	185 694	268 750	185 694	83 056
Availability of locks / lock chambers	n/a	n/a	n/a	n/a
Information on water levels and forecasts	38 232 <sup>1</sup>	14 000	38 232 <sup>1</sup>	-
Information on fairway depths	6 000	6 000	6 000	0
Information on marking plans	6 000	6 000	6 000	0
Meteorological information	38 232 <sup>1</sup>	15 000	38 232 <sup>1</sup>	-
Other needs	20 000	20 000	20 000	0
<b>Sum (Euro)</b>	<b>386 378</b>	<b>4 002 501</b>	<b>4 515 964</b>	<b>629 068</b>



## Action Plan: Bulgaria

<sup>1</sup> The operational expenditures for 2017 in lines “water level gauges”, “information on water level and forecasts” and “meteorological information” (114 700 Euro) could not be provided separately for each activity, because the stations on Bulgarian riverbanks provide both hydrological and meteorological information.

<sup>2</sup> In 2016, a tender documentation for public procurement for dredging in the fairway was elaborated and the estimated indicative budget for one year is 3,067,751 Euro.

<sup>3</sup> The framework contract for 3 years for dredging works was signed in February 2018. The value of the contract (4 129 586 Euro) is not included in EAEMDR operational plan, but it is secured and available in the Bulgarian Ministry of Transport.

## 9.7 BG | Outlook: planned actions, milestones and funding sources

<b>BG 01: Old or insufficient measuring equipment</b>		
Planned activities:	Implementation of FAIRway Danube project - delivery of surveying vessel, equipped with a multi-beam echo sounder and delivery of automatic gauging stations	
Current shortcomings:	None identified	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	Some of the automatic gauging stations will be installed in the area of natural parks, but no negative impact is expected, as stated in the confirmation letter from MOEW
	Which measures are taken to mitigate these impacts?	-
	Is water status still expected to deteriorate?	-
Possible funding:	CEF	
Next steps:	The public procurement procedure for the surveying vessel was launched in December 2016. Delivery of the surveying vessel was in February 2018; the measurements with the vessel started in March 2018 and will be carried out mainly at critical locations on the Danube. As for the gauging stations, the tender is expected to be launched in July 2018. The delivered equipment will be used in the monitoring pilot sub-activity within FAIRway Danube project. This sub-activity covers the analysis of the data collected by the surveying vessel and the water level gauges.	2018
<b>BG 02: Education and skilled staff</b>		
Planned activities:	<p>The requirements for sufficient training for personnel to operate the equipment, delivered within FAIRway Danube project and project “Improvement of the systems for navigation and topo-hydrographic measurement – phase 2”, are included in the terms of reference for the deliveries. In respect to the project schedule some of the trainings were conducted at the end of 2016 and the beginning of 2017.</p> <p>A project proposal for improving the administrative and technical capacity of the Agency was submitted to priority axes 5 – Technical assistance of Operational programme on “Transport and Transport Infrastructure 2014-2020”.</p>	

	<p>The MA approved the project in September 2016.</p> <p>The implementation of the activities included in the project (namely, organization and conduction of trainings to improve the qualifications of the Agency's employees working on projects, specialized training on Public Procurement Act, information and publicity/presentation and communication skills; financial implementation and completion of projects under operational programmes; development, management, monitoring and reporting on the implementation of projects under programs funded by the ESIF, as well as Auto CAD training; improvement of the existing office equipment; optimization of the existing website/development of an online platform for publishing of information) also started in September 2016, when the Grand Agreement was signed.</p>	
Current shortcomings:	None identified	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	n/a
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	Operational Programme "Transport and Transport Infrastructure 2014-2020"	
Next steps:	Finalisation of project "Increasing the capacity of EAEMDR for implementation of projects under the OPTTI 2014-2020, and improvement of the material and technical base of the Agency"	2018
<b>BG 03: Interventions are planned on short term due to rapidly changing fairway conditions</b>		
Planned activities:	<p>Currently, EAEMDR operates 9 automatic hydrological and 9 automatic meteorological stations, delivered within project "Improvement of the systems for navigation and topo-hydrographic measurements along the Danube River", OPT 2007-2013</p> <p>Procurement of additional gauging stations, surveying vessel (for good data basis), national WAMS and transnational WAMOS tools are foreseen within project FAIRway Danube</p>	
Current shortcomings:	Insufficient data available and non-state-of-the-art methods of gathering of fairway information (multi-beam)	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	Some of the automatic gauging stations will be installed in the area of natural parks, but no negative impact is expected, as stated in the confirmation letter from MOEW
	Which measures are taken to mitigate these impacts?	-
	Is water status still expected to deteriorate?	-
Possible funding:	CEF	
Next steps:	Delivery of the equipment and software and start of operation	2018 – 2019

<b>BG 04: Suboptimal information support, lack of consistent database</b>		
Planned activities:	Procurement of national WAMS and transnational WAMOS tools are foreseen within project FAIRway Danube (see also key issues BG 03)	
Current shortcomings:	No Fairway Management System available	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	n/a
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	CEF	
Next steps:	Procurement of the transnational WAMOS and delivery of the software	2018 – 2019
	Elaboration of the technical specification for the software implementation of the national WAMS	end of 2017
	Delivery of software and hardware components for the national WAMS	June 2019
<b>BG 05: Insufficient dredging equipment and limited financial resources</b>		
Planned activities:	Implementation of project “Modernization and optimization of the activities for rehabilitation of the fairway in the common Bulgarian-Romanian section of the Danube River” (OPTTI 2014-2020) with delivery of a dredger  Conducting river engineering measures within project FAST Danube	
Current shortcomings:	Very little dredging works, limited financial resources for interventions, but need for rehabilitation measures	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	Environmental impacts of the planned river engineering measures conducted within FAST Danube are considered in the EIA conducted in Activity 2 of the project
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	CEF (Fast Danube) Operational Programme “Transport and Transport Infrastructure 2014-2020”	
Next steps:	Elaboration of the technical specification for the dredging equipment.	End of 2017- beginning of 2018
	Elaboration of the tender documents and launch of the public procurement.	End of 2017- beginning of 2018

<b>BG 07: Insufficient marking equipment</b>		
Planned activities:	Procurement of a specialized marking vessel within project FAIRway Danube	
Current shortcomings:	non-state-of-the-art marking equipment	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	n/a
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	CEF	
Next steps:	Delivery of the marking vessel	August 2018

## Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries:

### ANNEX I

to the

NATIONAL ACTION PLANS

UPDATE MAY 2018

Coordinated by **Priority Area 1a** of the **EU Strategy for the Danube Region**.

## 10 Germany

The **Federal Waterways and Shipping Administration (WSV)** is responsible for fairway maintenance, rehabilitation and upgrade.

### 10.1 DE | Status report on main critical locations including water level information 2012 –2017

The **Level of Service of 2.0m fairway depth<sup>17</sup> at Low Navigable Water Level** for the free flowing section between Straubing and Vilshofen would correspond to an equal height of the blue (availability of 2.0m fairway depth) and the white columns framed in blue (water level above Low Navigable Water Level) in the figures below.

It is also important to take the depth classes close to 2.0m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.0m threshold. Therefore, the **number of days with 1.9 or 1.8m fairway depth** is displayed additionally.

#### *Number of days with fairway depth $\geq 2.00$ m (target value<sup>17</sup>) for main critical locations*

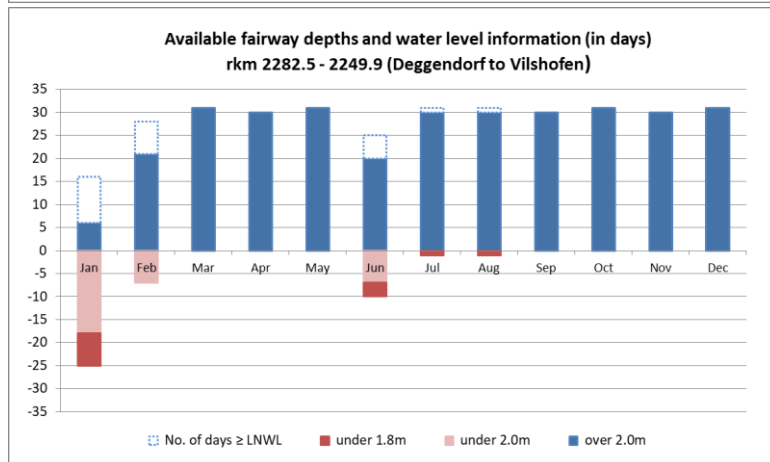
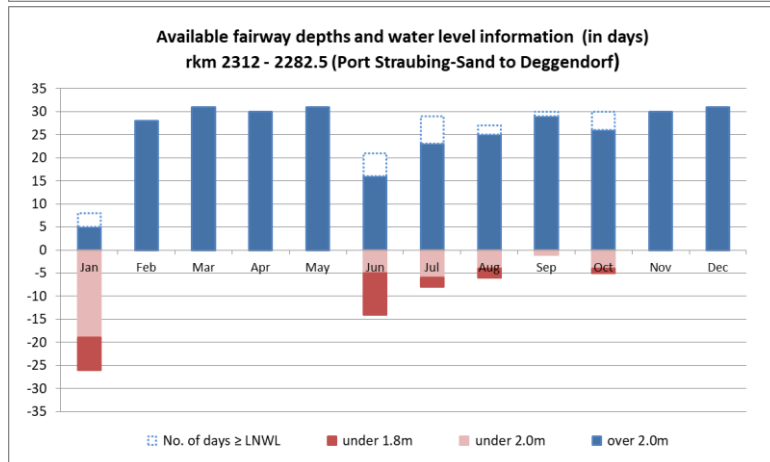
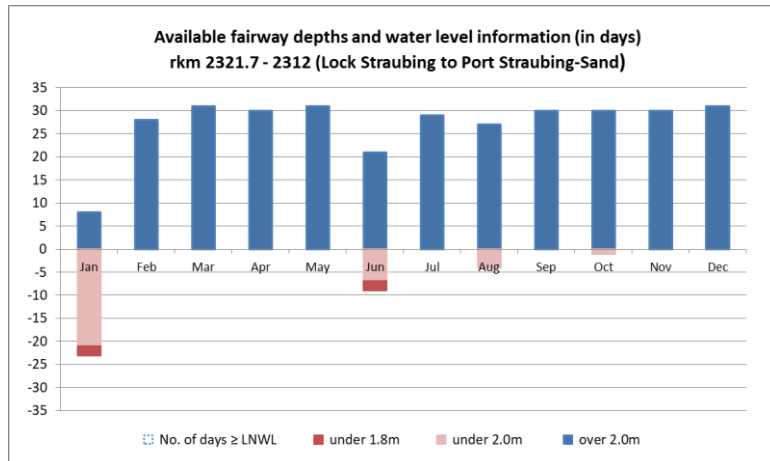
Critical location	2012	2013	2014	2015	2016	2017
Lock Straubing to Port Straubing-Sand	352	362	335	258	344	326
Port Straubing-Sand to Deggendorf	332	359	320	243	295	305
Deggendorf to Vilshofen	352	330	272	250	335	321

#### *Number of days with water level $\geq$ LNWL on main critical locations*

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Lock Straubing–Port Straubing-Sand	Pfelling	352	362	335	258	344	326
Port Straubing-Sand–Deggendorf	Pfelling	352	362	335	258	344	326
Deggendorf–Vilshofen	Hofkirchen	360	365	351	273	360	345

<sup>17</sup> In the free flowing section between Straubing and Vilshofen a fairway depth of 2.50 m as defined by NEWADA duo is neither developable nor maintainable. In this section the objective is to maintain the fairway depth of 2.00 m related to LNWL (in Germany: RNW).





In 2017, there was no critical sedimentation in the critical section from lock Straubing to port Straubing-Sand. Thus, the number of days with fairway depths above 2.0 m (target value) is equal to the number of days with available water levels above LNWL (equal height of the blue and the white columns). Discharges and water levels have been low, notably in January and midyear.

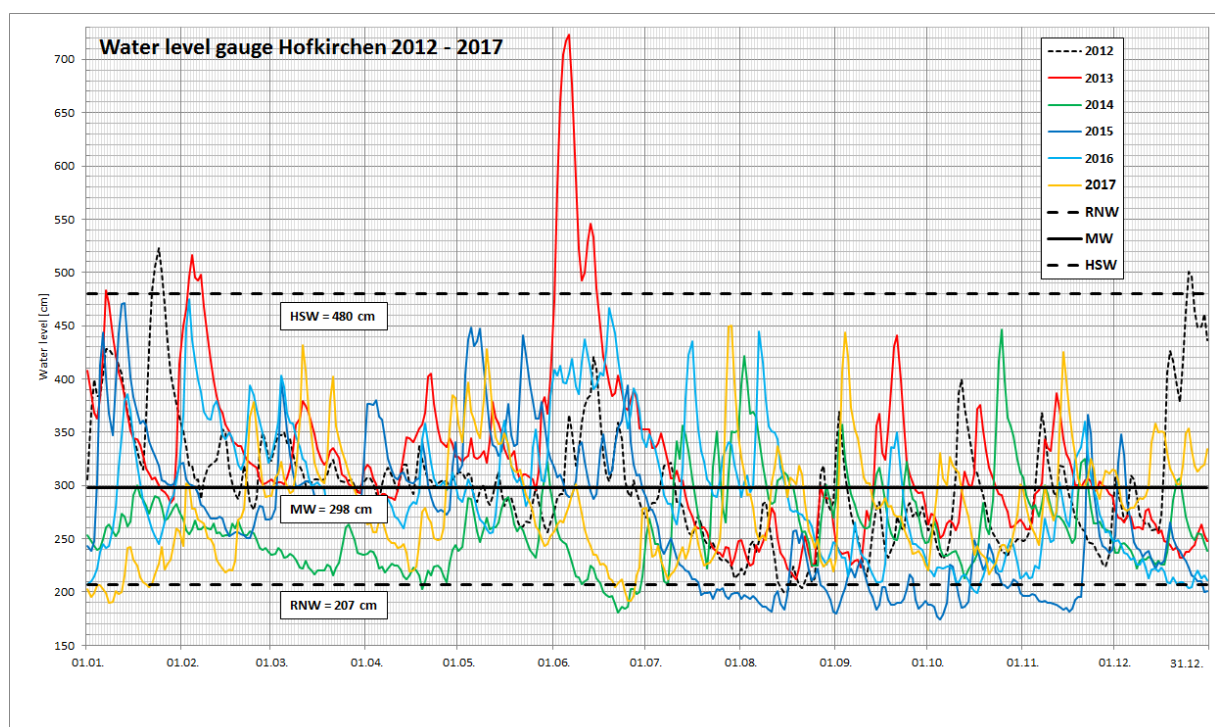
Regarding the section from port Straubing-Sand up to the city of Deggendorf, existing sedimentation did not yield fairway limitations due to sufficient available water levels from February to May and in November/December. The main reasons for not meeting the target Level of Service of 2.0 m at LNWL in the other months, especially in January/June/July, was the combination of required dredging works and low water levels. Overall, 2.0 m fairway depth were formally **not** provided on

60 days (16,4% of the year), which already includes 39 days (10,7%) with low water levels. Thus, on 21 days (5,8% of the year) immediate dredging would have improved shipping conditions.

In the section Deggendorf–Vilshofen sedimentation led to fairway limitations at the beginning and at the middle of 2017, combined with particularly low water levels. The available fairway depths dropped below the envisaged 2.0 metres on 44 days (12% of the year), or rather 24 days (6,6%) taking into account the effective available water levels ( $\geq$  RNW). Moreover, there was an ice period at the end of January and the beginning of February.

Generally, closures of navigation due to naval accidents, ice periods, flood events as well as service and maintenance works in the waterway (complex dredging) and constructive works (locks, weirs, groynes etc.) are not included in the above compilation.

## 10.2 DE | Hydrological conditions at main critical locations 2017



While the year 2015 (dark blue line) was characterized by very unfavourable hydrological conditions from a shipping perspective, this situation much improved in 2016 (light blue line). In 2017 (orange line), water levels were on average slightly lower than in 2016 and fell below RNW twice, namely at the beginning and at the middle of the year. Moreover, navigation had to be closed due to ice on the Danube from 21<sup>st</sup> of January until 8<sup>th</sup> of February.

### 10.3 DE | Key issues and related activities 2017

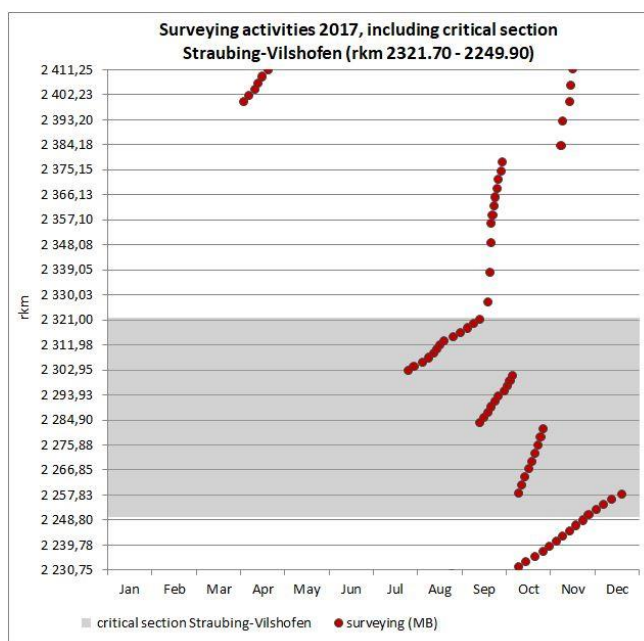
Activities performed related to the key issues illustrated in the Fairway Rehabilitation and Maintenance Master Plan (version: December 2014, cf. 10.7):

	Key issues	Need for action	Activities performed 2017
DE 01	20% of dredging works may be conducted by WSV itself, while 80% are tendered (providing sufficient available capacity)	Preserve a certain percentage of execution by the authority itself to keep professional expertise, equipment, skilled staff, autonomy, and the capacity to act in special market or emergency situations	<i>Dredging activities overall: 164.000 m<sup>3</sup> (cf. 10.4) Thereof government-operated: 600 m<sup>3</sup> (however, own capacities would have been available)</i>
DE 02	Enhancing the information on water levels	Implementing an hourly push-mode (currently pull-mode via modem) Duplication for redundancy purpose	<i>Approximately 10% (overall 60%) successful implementation for gauges at German Danube section</i>

### 10.4 DE | Review of monitoring, rehabilitation and maintenance activities 2017

The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations was itemised in the Rehabilitation and Maintenance Master Plan (version December 2014).

#### Riverbed surveying activities 2017



Monitoring of the fairway on the entire German Waterway Danube (including the free flowing section between Straubing and Vilshofen) is conducted annually. Every two years the navigable water beyond/alongside the fairway is recorded. All measurements (for several purposes) are performed by the sounding vessel “Kepler” via triple-head multibeam echosounder (each producing a swath of depth readings from a single ping).

Additional surveying activities after special incidents (e.g. floods, naval accidents) as well as in the context of development measures are conducted by means of multiple single beams mounted on a frame (work boats “Laber” and “Regen”) and via

a double-head multibeam echosounder (sounding vessel “Tangens”), respectively. These event-driven surveying activities are not included in the compilation of scheduled measuring campaigns.

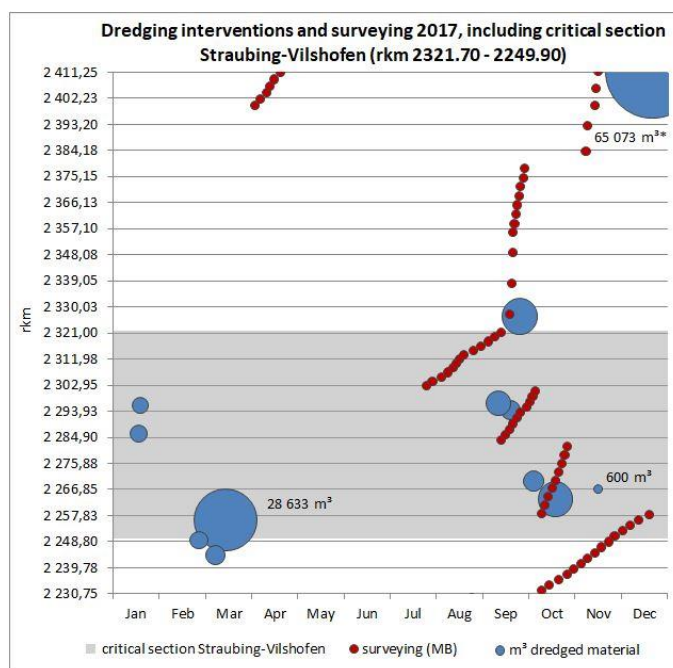
### Fairway relocation and marking activities 2017

Due to the geometrical and hydraulic boundary conditions (e.g. limited cross-section, narrow curves, and small discharges) at the German section of the Danube, fairway relocation is usually not an option. In 2017, there was no significant relocation activity in Germany.

### Dredging activities 2017

Designation of assignment (navigable route only)		Dredging site (river-km)	Dumping or placement site (river-km)	Beginning - end of service	Material	Quantity [m³]
<b>Reservoir Jochenstein</b>	Erlau	2214,600 - 2214,400	2214,600 - 2213,800	21.11.2017 - 27.11.2017	Sand / Gravel	2.932
		2215,300 - 2215,100	2214,600 - 2213,800	06.11.2017 - 21.11.2017	Sand / Gravel	20.784
<b>Reservoir Kachlet</b>	Windorf	2244,400 - 2244,200	2232,500 - 2231,700	03.03.2017 - 13.03.2017	Sand / Gravel	2.585
<b>Straubing - Vilshofen</b>	Vilshofen	2249,725 - 2249,450	2232,500 - 2231,700	20.02.2017 - 02.03.2017	Sand / Gravel	2.226
<b>(free flowing section)</b>	Hofkircher	2256,555 - 2256,515	2268,150	28.02.2017 - 29.03.2017	Sand / Gravel	28.633
	Betw een Hofkirchen and Winzer	2260,050 - 2258,800	2261,900 - 2261,400	12.12.2016 - 15.12.2016	Sand / Gravel	4.628
	Betw een Hofkirchen and Winzer	2260,400 - 2260,175	2262,200 - 2261,100	25.10.2017	Sand / Gravel	1.117
	Betw een Hofkirchen and Winzer	2261,175 - 2260,675	2262,200 - 2261,100	23.10.2017 - 24.10.2017	Sand / Gravel	1.459
	Betw een Hofkirchen and Winzer	2262,200 - 2260,700	2261,900 - 2261,400	15.12.2016 - 20.12.2016	Sand / Gravel	3.364
	Betw een Hofkirchen and Winzer	2262,200 - 2261,600	2262,200 - 2261,100	18.10.2017 - 20.10.2017	Sand / Gravel	1.996
	Winzer	2263,100 - 2262,850	2262,200 - 2261,100	17.10.2017	Sand / Gravel	303
	Winzer	2263,500 - 2262,900	2262,200 - 2261,100	13.10.2017 - 16.10.2017	Sand / Gravel	1.503
	Betw een Winzer and Aicha	2267,225 - 2266,900	2270,000 - 2269,000	10.10.2017 - 12.10.2017	Sand / Gravel	2.487
	Betw een Winzer and Aicha	2267,200 - 2267,100	2266,800 - 2266,500	14.11.2017 - 15.11.2017	Sand / Gravel	600 <sup>*1</sup>
	Betw een Winzer and Aicha	2269,100 - 2268,575	2270,000 - 2269,000	05.10.2017 - 09.10.2017	Sand / Gravel	1.249
	Betw een Winzer and Aicha	2270,800 - 2270,275	2270,000 - 2269,000	28.09.2017 - 04.10.2017	Sand / Gravel	1.341
	Aicha	2271,275 - 2270,950	2270,000 - 2269,000	27.09.2017	Sand / Gravel	547
	Aicha	2271,750 - 2271,450	2261,900 - 2261,400	21.12.2016	Sand / Gravel	702
	near Niederaltich	2274,775 - 2274,675	2274,000 - 2273,500	26.09.2017	Sand / Gravel	395
	near Niederaltich	2275,025 - 2274,750	2274,000 - 2273,500	22.09.2017 - 25.09.2017	Sand / Gravel	1.083
	near Deggendorf	2379,294 - 2379,191	2367,550 - 2367,400	20.09.2017 - 28.09.2017	Sand / Gravel	8.086
	Deggendorf	2283,425 - 2283,275	2290,150 - 2289,400	16.01.2017	Sand / Gravel	214
	near Deggendorf	2289,775 - 2289,125	2290,150 - 2289,400	16. - 17.01.2017	Sand / Gravel	1.889
	Kleinschw arzach	2293,400 - 2293,075	2290,500 - 2289,500	19.09.2017 - 21.09.2017	Sand / Gravel	1.546
	Steinkirchen	2295,900 - 2295,475	2290,500 - 2289,500	15.09.2017 - 18.09.2017	Sand / Gravel	1.154
	Steinkirchen	2296,175 - 2295,900	2290,150 - 2289,400	18.01.2017	Sand / Gravel	983
	Mariaposching	2296,300 - 2296,200	2290,150 - 2289,400	18.01.2017	Sand / Gravel	321
	Mariaposching	2296,475 - 2296,350	2290,150 - 2289,400	17.01.2017	Sand / Gravel	461
	Mariaposching	2296,950 - 2296,425	2290,500 - 2289,500	11.09.2017 - 14.09.2017	Sand / Gravel	2.611
	Mariaposching	2297,550 - 2297,075	2290,500 - 2289,500	06.09.2017 - 08.09.2017	Sand / Gravel	1.641
<b>Reservoir Bad Abbach</b>	Kelheim	2412,120 - 2411,700	2395,000 - 2394,000	05.10.2017 - 07.03.2018	Sand / Gravel	65.073

\*1: Executed by the Waterways and Shipping Office itself.



\* Dredging was performed from October 2017 until March 2018.

In total 163,311 m³ were dredged for commercial navigation in 2017 on the entire German waterway Danube. This figure includes three dredging activities conducted at the end of 2016 which were invoiced in 2017.

Regarding official permissions (cf. 10.5), the Waterways and Shipping Office Regensburg presents annually (usually in February) all planned dredging measures to institutions and stakeholders from water resources management, fishery and nature conservation in order to achieve mutual agreement. In addition, unscheduled dredging works are conducted as sovereign tasks to maintain safety.



The figure shows that most fords were dredged from January to March (winter) and in September/October (autumn).

### 10.5 DE | Summary of current ecological status and environmental impacts

As regards the Danube corridor there are all classifications of surface water bodies for the German waterway section. The Main-Danube Canal is classified as artificial and heavily modified water body, respectively. The main stretch of the German Danube is impounded and therefore declared as heavily modified while the free flowing section between Straubing and Vilshofen is designated as natural water body.

The following map displays the ecological status and ecological potential of the German Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Germany.



#### **Ecological status and ecological potential of surface water bodies**

(Source: DRBM Plan – Update 2015)

The ecological potential of the heavily modified German Danube stretches is moderate. The same classification applies to the free flowing section Straubing–Vilshofen though the status of the biological quality elements fish and benthic invertebrates is actually good.

#### **Measures to improve environmental conditions**

Measures have already been taken until 2015 to improve river continuity for fish migration, re-connecting adjacent floodplains/wetlands, impoundments, and water abstractions.

*“Inland navigation can contribute to making transport more environmentally sustainable, particularly where it can act as a substitute for road transport. It can, however, also have significant influence on river ecosystems, jeopardizing the goals of the WFD” (DRBM Plan – Update 2015).*

These different ecological points of view, namely a regional and a global perspective, also apply to the development of the waterway and improvement of flood protection on the Danube between Straubing and Vilshofen. This project contains an upgrading of the waterway solely by stream control measures (without locks/weirs) and improvements of flood protection measures up to a 100-year-event, both in combination with a suitable landscape management plan. The latter is characterized by an interactive and iterative planning procedure of engineering and accompanying landscape management measures to prevent, minimize, (re)assess and finally compensate unavoidable impacts. These obligations and responsibilities under environmental law include a public and stakeholder involvement. The plan approval order for the 1<sup>st</sup> subsection from Straubing to Deggen- dorf (confluence Isar) is expected midyear 2019. As regards the 2<sup>nd</sup> subsection from Deggen- dorf to Vilshofen a scoping was held and a planning approval procedure is prepared to start end of 2018. Further information on the project is provided on the project’s website <http://www.lebensader-donau.de/>.

#### ***Navigation maintenance measures and environmental impacts***

Maintenance works are executed under environmental law (Federal Nature Conservation Act) and in accordance with the Federal Waterways Act. The corresponding measures in Federal waterways do not require permission under water law, but have to consider the objectives of WFD as well as all significant flood protection issues by mutual agreement with the water resources management administration. Maintenance measures are neither impacts in terms of environmental law nor projects/plans in terms of environmental impact assessment or FFH Directive because the approved state is only restored. Naturally, the respective issues have to be considered but no special permission or exemption is needed. The same release with regard to formal requirements exists for species conservation law. The implementation in practice is described in chapter 10.4.



## 10.6 DE | Budget status May 2018

*Investments taken for FRMMP implementation 2014 – 2020*

	Required additional investment 2014 – 2020 according to FRMMP	Investment cost secured by state or other co-financing	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	0	0	0	0
Surveying of the riverbed	0	0	0	0
Water level gauges	0	0	0	0
Marking of the fairway	0	0	0	0
Availability of locks / lock chambers	0	0	0	0
Information on water levels and forecasts	0	0	0	0
Information on fairway depths	0	0	0	0
Information on marking plans	0	0	0	0
Meteorological information	0	0	0	0
<b>Sum (Euro)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

*Operational expenditures for conducted activities 2017 and budget needs 2018*

Need areas	Operational expenditures 2017* <sup>1</sup>	Required operational budget 2018	Secured* <sup>3</sup> operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth) (here only dredging costs cf. 10.4)	1 670 645	-	-	0
Surveying of the riverbed	-	-	-	0
Water level gauges	-	-	-	0
Marking of the fairway	-	-	-	0
Availability of locks / lock chambers	-	-	-	0
Information on water levels and forecasts* <sup>2</sup>	-	-	-	0
Information on fairway depths* <sup>2</sup>	-	-	-	0
Information on marking plans* <sup>2</sup>	-	-	-	0
Meteorological information* <sup>2</sup>	-	-	-	0
Other needs	-	-	-	-
<b>Sum (Euro)</b>	<b>1 670 645*<sup>1</sup></b>	<b>-</b>	<b>*<sup>3</sup></b>	<b>0</b>

\*<sup>1</sup> Operation and maintenance works are mandatory tasks (sovereign duties) of the Federal Waterways and Shipping Administration (WSV). Due to in-house efforts an assignment of tangible costs per need area is not possible. The sum (see above) only comprises all definable costs, actual costs are in fact substantially larger.

\*<sup>2</sup> Job completion in legal and administrative co-operation with Free State of Bavaria (Water Resources Management Administration), German Federal Institute of Hydrology (BfG), and German Weather Service (DWD).

\*<sup>3</sup> For sovereign tasks all necessary investments are by default covered by federal budgets.

## 10.7 DE | Outlook: actions, milestones and funding sources

<b>DE 01: 20% of dredging works may be conducted by WSV itself (providing sufficient available capacity for government-operation)</b>		
Planned activities:	Continuous training (personnel), maintenance and repair (gear) to provide skilled operational staff and appropriate equipment	
Current shortcomings:	No current shortcomings identified	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No such impact
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	Budget availability: National Funding is assured	
Next steps:	Market Observation (current dredging prices), monitoring waterway (safety and ease of shipping)	permanentLY
<b>DE 02: Improved water level information</b>		
Planned activities:	Implementation of a nationwide "push-target" (EDP System) Provision of hardware and capacity for Danube gauges	
Current shortcomings:	Temporary suspension due to other tasks of higher priority	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No such impact
	Which measures are taken to mitigate these impacts?	n/a
	Is water status still expected to deteriorate?	n/a
Possible funding:	Budget availability: National Funding is assured	
Next steps:	Configuration of an independent parallel system in terms of availability including redundancy for remaining 40% of gauges (cf. 10.3)	until 12/18

## 11 Serbia

**PLOVPUT** (Directorate for Inland Waterways within the Ministry of Construction, Transport and Infrastructure) is responsible for fairway maintenance.

### 11.1 RS | Status report on main critical locations including water level information 2012 – 2017

The **recommended Level of Service of 2.5m fairway depth at Low Navigable Water Level** would correspond to an equal height of the blue columns (availability of 2.5m fairway depth) and the white columns framed in blue (water level equal to or above Low Navigable Water Level) in the figures below.

It is also important to take the depth classes close to 2.5m into account when interpreting the status of critical locations, as these provide a certain range of navigability although not meeting the 2.5m threshold. Therefore, the **number of days with 2.4 or 2.3m fairway depth** is displayed additionally.

#### Danube

##### ***Number of days with fairway depths $\geq 2.5$ m on main critical locations***

(fairway width reduced to 100 m – minimum LoS)

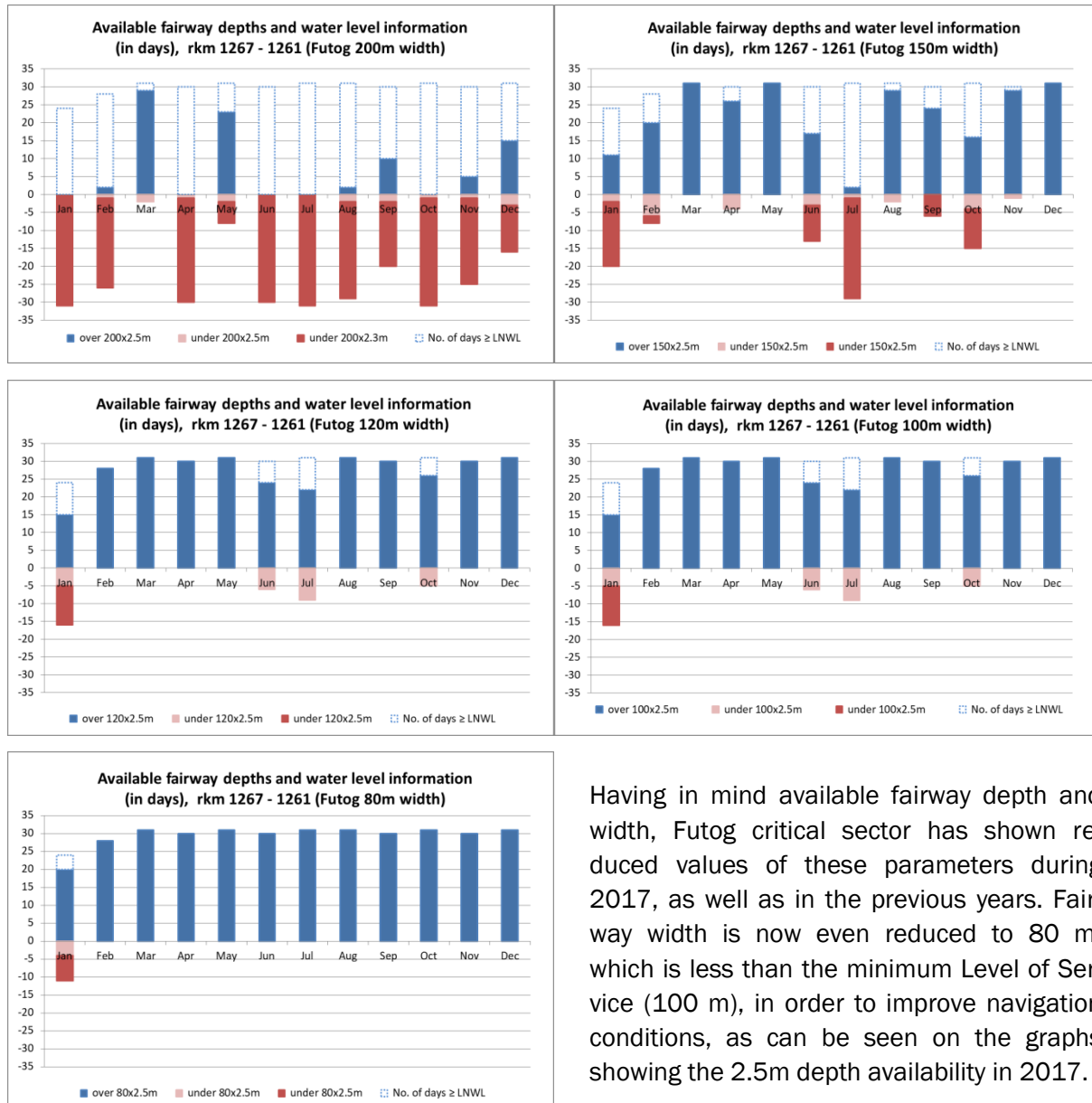
Critical location	2012	2013	2014	2015	2016	2017
Apatin	366	365	365	365	366	365
Futog	366	235	365	360	327	329

##### ***Number of days with water level $\geq$ LNWL on main critical locations***

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
Apatin	Apatin	366	365	365	316	353	353
Futog	Novi sad	366	363	365	324	353	358

The critical location Apatin was identified as the most critical one by Danube waterway users in a survey by PA1a conducted in December 2014. Apatin is, however, not the most critical location for navigation in terms of available fairway parameters (depth and width). The most critical location for navigation in terms of available fairway parameters (depth and width) is Futog.

The Apatin critical location will be dealt with in the Croatian chapter, in order to avoid duplication of information. Data on Apatin location is jointly prepared by both Croatian and Serbian administration, in order to guarantee harmonized data provision.



Having in mind available fairway depth and width, Futog critical sector has shown reduced values of these parameters during 2017, as well as in the previous years. Fairway width is now even reduced to 80 m, which is less than the minimum Level of Service (100 m), in order to improve navigation conditions, as can be seen on the graphs showing the 2.5m depth availability in 2017.

On the 80 m fairway width, fairway depth of 2.5 m was achieved on 354 days (96.99%), increasing the percentage of fairway availability in relation to 2016, which confirms the necessity of the conducted width reduction.

On the 100 m fairway width, fairway depth of 2.5 m was achieved on 329 days (90.14%), which is still much more than on the 150 m fairway width, where this depth was available for 267 days (not mentioning the 200 m width with only 86 days available regarding the recommended level of service).

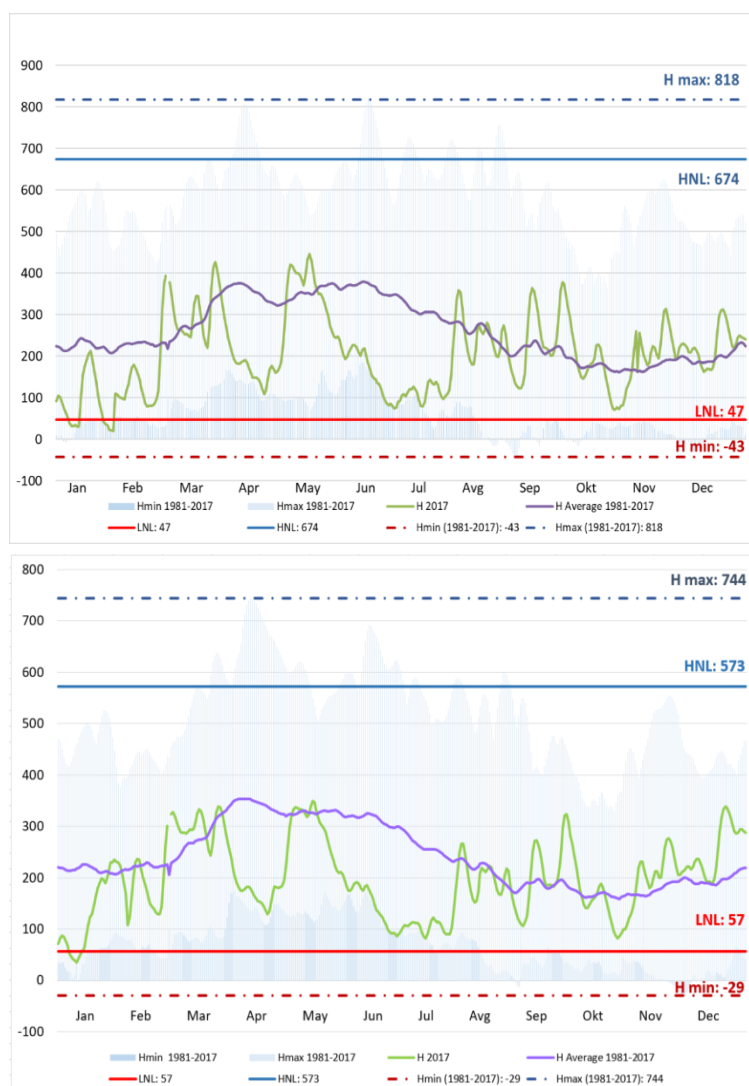
## Sava

**Number of days with fairway depths  $\geq 2.5$  m on main critical locations**  
(fairway width 55 m)

Critical location	2012	2013	2014	2015	2016	2017
Sabac	n/a	n/a	306	216	337	276
Kamicak	n/a	n/a	346	203	324	290

Due to the lower water levels in 2017, 2.5 m fairway depths were available on the Sava River for fewer days than in the previous year. But, having in mind the navigation status amelioration due to dredging works performed from July to October 2017 on the critical sector Kamicak, this had a significant effect on the overall number of days with available depths of 2.5m, even for a fairway width of 75 m, which is now established in this critical sector.

### 11.2 RS | Hydrological conditions at main critical locations 2017



**Gauging station Apatin:** In 2017, 12 days with water levels below LNWL have been recorded, all of them in January. Water levels were low also from June to August and at the end of October, but always above the LNWL. Multiannual hydrograph for the gauging station Apatin and water level data for 2017 are presented in the figure on the left.

**Gauging station Novi Sad** (reference gauging station for the critical sector Futog): In 2017, 7 days with water levels below LNWL have been recorded, also all of them in January. Multiannual hydrograph for the gauging station Novi Sad and water level data for 2017 are presented in the figure on the left. It can be seen that the 2017 water level graph is compatible with the 1981-2017 averages, with the exception of the January values that were a bit lower than usual.

### 11.3 RS | Key issues and related activities 2017

	Key issues	Need for action	Activities performed 2017
RS 01	Limitations of available data due to insufficient number of vessels and surveying equipment Limited budget for monitoring activities	Support acquisition/retrofit of up-to-date single-beam sounding equipment, software and vessels  Enforce cooperation with AVP on joint stretch and improve data exchange	<i>No new surveying equipment has been acquired, due to limited budget resources.</i>  <i>Exchange of hydrographic data with AVP has been performed, in line with established procedure, improving the frequency of hydrographic data collection.</i>
RS 02	Insufficient number of skilled staff	Secure education and provision of well-trained staff in the short, medium and long term  Facilitate different geographical organization of surveying teams to allow more effective and efficient performances  Enable expert exchange with other Danube waterway administrations	<i>At the end of 2015, the decision of rationalization of the number of employees in the Governmental institutions has been announced. According to that decision, Directorate for Inland Waterways started a procedure of reduction of the number of employees from 89 to 70. This reduction was performed at the beginning of 2016.</i>  <i>Different geographical organization of surveying teams to allow more effective and efficient performances is linked to the acquisition of an additional vessel and equipment for hydrographic surveying activities. Since no acquisition of vessel and equipment for hydrographic activities has been performed, due to lack of budget resources and rationalization of the number of employees, no changes in geographical organization have been performed.</i>  <i>No expert exchange with other Danube waterway administrations has been performed.</i>
RS 03	Insufficient number of automatic gauging stations in the free flowing section	Support acquisition and operation of additional gauging stations.	<i>No new automatic gauging stations have been acquired, due to limited budget resources.</i>
RS 04	Further absence of budget for dredging activities will lead to deterioration of navigation conditions, while the cost-benefit ratio of these activities is very favourable	Secure sufficient and predictable financial means	<i>No dredging in the fairway has been performed on the Danube River, due to limited budget resources.</i> <i>Dredging works were performed on the critical sector Kamicak from July to October 2017, with 30,000 m<sup>3</sup> of dredged material.</i>



		Implement structural hydraulic engineering works in order to reduce the recurring need for dredging interventions	<i>In 2017, the EU-funded project, co-funded by the Republic of Serbia, "River Training and Dredging Works on Critical Sectors on the Danube River &amp; Supervision and Environmental Monitoring of River Training and Dredging Works on Critical Sectors on the Danube River" has started, which implementation consists of two contracts – Works Contract and Supervision and Environmental Monitoring Service Contract.</i>
RS 05	Old marking vessels and equipment	Support acquisition of up-to-date marking vessels and buoys	<i>No acquisition of up-to-date marking vessels and buoys has been performed, due to lack of budget resources. New buoys will be provided through the project "Technical Assistance and Supervision for Installation of Equipment and Integration of Navigation Monitoring System on the Danube River", which has started on July 1<sup>st</sup>, 2016.</i>
RS 06	Inefficiencies due to missing comprehensive database and web tool for navigation aids	Support development of a web application for marking activities on the Danube and its tributaries integrating Croatia and Romania	<i>Web application for marking activities on the Danube has been developed and put into operation.</i>
RS 07	Limited number of skilled personnel and inability to employ new staff due to Government regulation and restrictions	Secure education and provision of well-trained staff in the short, medium and long term	<i>At the end of 2015, decision of rationalization of the number of employees in the Governmental institutions has been announced. According to that decision, Directorate for Inland Waterways started procedure of reduction of the number of employees from 89 to 70. This reduction has been performed at the beginning of 2016.</i>
RS 08	The low number of gauging stations results in incomplete water level information and lead to inaccurate forecasts	Support acquisition and operation of additional gauging stations.	<i>No activities were performed, due to lack of budget resources. Within the project "Supervision and Environmental Monitoring of River Training and Dredging Works on the Critical Sectors on the Danube River", new automatic gauging stations are required to be provided before the start of the works, which is scheduled for July 2018.</i>

RS 09	Provision of dynamic fairway information to users	Launching of Navigational Bulletin, an on-line fairway information services portal for the Republic of Serbia (Danube, Sava and Tisza Rivers)	<i>Navigational bulletin, and online portal for provision of dynamic fairway information services, was launched in 2015. The following dynamic information are available: water levels, water levels forecast, wind speed and direction, Notices to Skippers, waterway marking system, available depths at critical sectors, forecast of available depth at critical sectors, available vertical clearances at bridges, forecast of available vertical clearances at bridges, available depth at berths, forecast of available depth at berths, availability of locks, availability of river information services, contact information of relevant authorities. Data is available in Serbian, German and French language.</i> <i>url:</i> <a href="http://www.plovput.rs/navigation-al-bulletin">http://www.plovput.rs/navigation-al-bulletin</a>
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#### 11.4 RS | Review of monitoring, rehabilitation and maintenance activities 2017

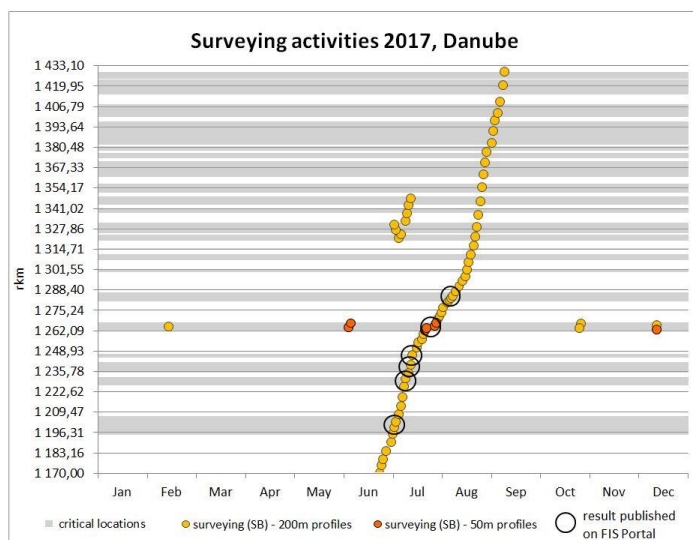
The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified by the waterway administrations. The list of critical locations as itemised in the Rehabilitation and Maintenance Master Plan (version December 2014).

##### ***Riverbed surveying activities 2017***

Every year the entire Serbian stretches of the Danube, Sava and Tisza are being surveyed. MCTI-Directorate of Inland Waterways undertakes regular annual surveys of the Danube for the bathymetric measurement of cross-sections. The cross-profile data are coded NO and consist of text files containing x-coordinate, y-coordinate and bed elevation in m.a.s.l.

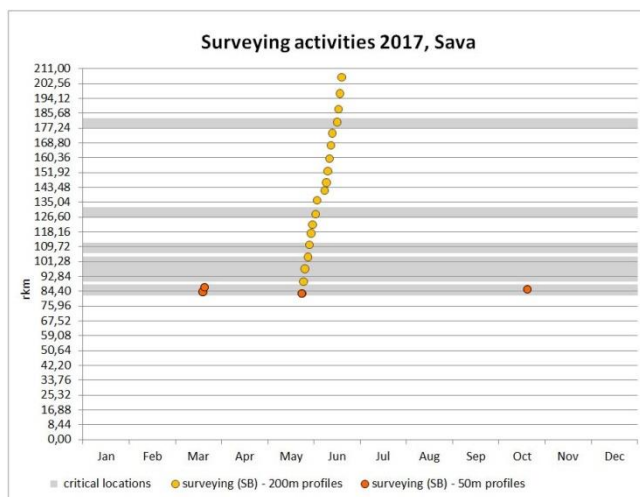
The NO cross-sections are defined as NO profiles determined at an interval of approximately 200 meters, with DP profiles at interval of 50 meters in critical sectors only. The majority of NO profiles covers the Danube River bed between bank lines and is perpendicular to the fairway. These profiles are surveyed once a year using single-beam equipment.

## Danube

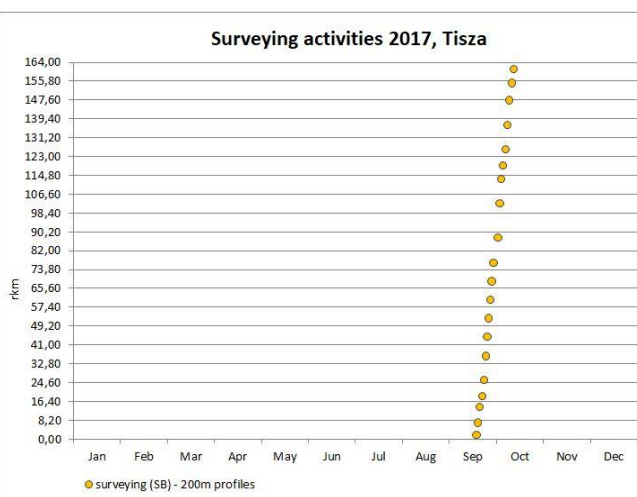


Additionally to the whole Danube stretch in Serbia upstream Grocka, the critical sector Futog was surveyed several times in 2017 (in February, June, July, October and December), recording cross-profiles of the riverbed only 50 m apart, influencing three times changes in the fairway trajectory.

## Sava



## Tisza

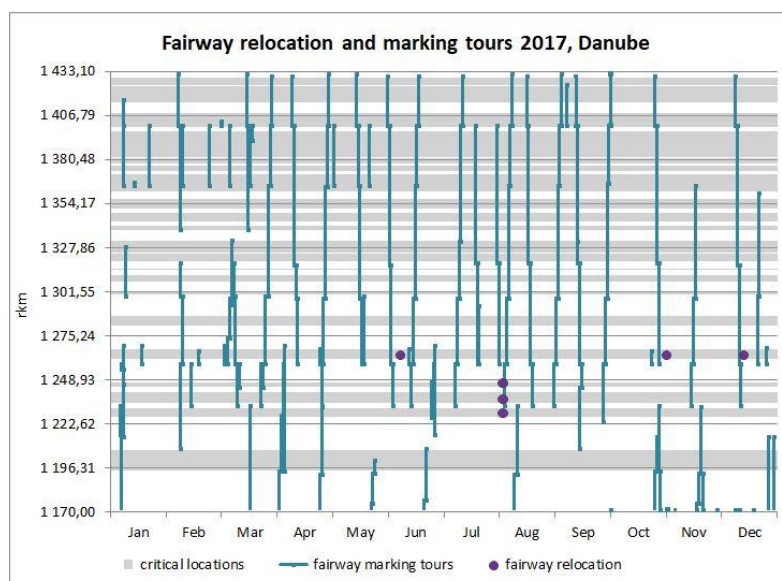


## Fairway marking activities 2017

### Danube

River-km (from-to)	Number of relocation interventions	Comments
1267.4 – 1261.6	3	Realignment and reduction of the width of the fairway at the critical sector Futog due to dynamic morphological developments and identified available depth and width.
1247.0 – 1244.8	1	Realignment and reduction of the width of the fairway at the critical sector Arankina ada due to dynamic morphological developments and identified available depth and width.
1241.6 – 1235.0	1	Realignment and reduction of the width of the fairway at the critical sector Cortanovci due to dynamic morphological developments and identified available depth and width.

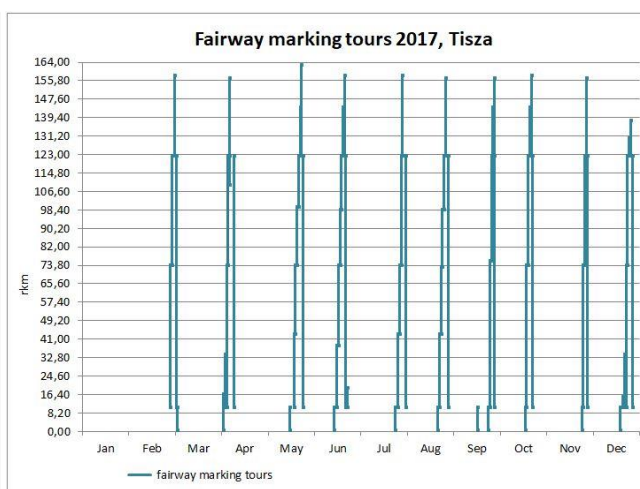
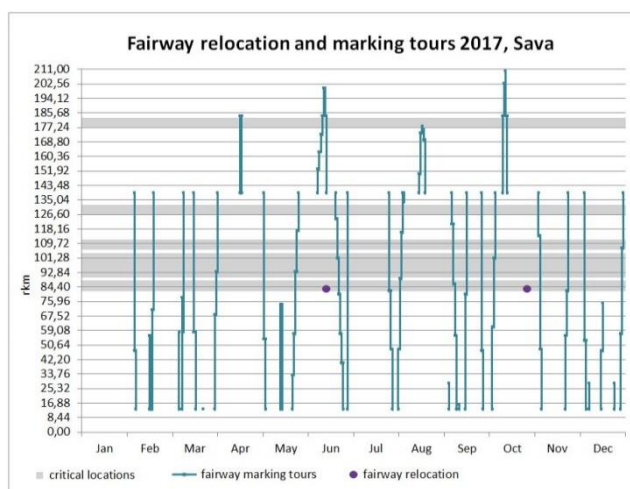
1232.0 – 1226.6	1	Realignment and reduction of the width of the fairway at the critical sector Beska due to dynamic morphological developments and identified available depth and width.
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### Sava

River-km (from-to)	Frequency of relocation interventions	Comments
88.2 – 82.0	2	Realignment and reduction of the width of the fairway at the critical sector Kamicak in accordance to available depth, before and after the performed dredging works.

### Tisza

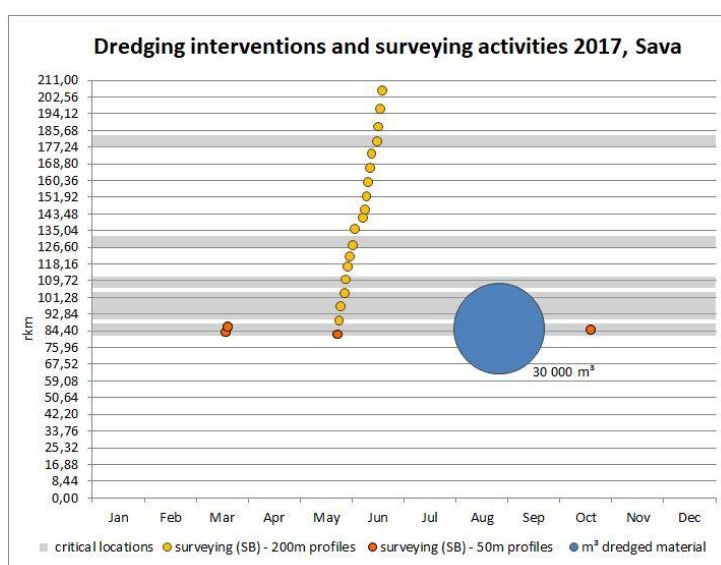


Due to the very limited cross-section of the Tisza, fairway relocation is usually no significant option for fairway maintenance. In 2017, no significant relocation activities took place on the Tisza. Marking and waterway inspection tours were conducted on a monthly basis.

### Dredging activities 2017

No dredging activities were performed in the Danube fairway. Dredging of sediment from rkm 86.3 to rkm 84.8 was performed at the Kamicak critical sector on the Sava River from July 2017 to the middle of October. The dredged sediment has been dumped within the Sava River, in line with the adopted sediment balance principle.

Designation of assignment	Dredging site		Dumping or placement site		Beginning of service	End of service	Material	Utilisation	m3	Permits (see next table)
	from river-km	to river-km	from river-km	to river-km						
Dredging of sediment at the critical sector Kamicak	86.3	84.8	86.2	84.7	07.07.2017	15.10.2017	Sedra	Dumping	30 000	-

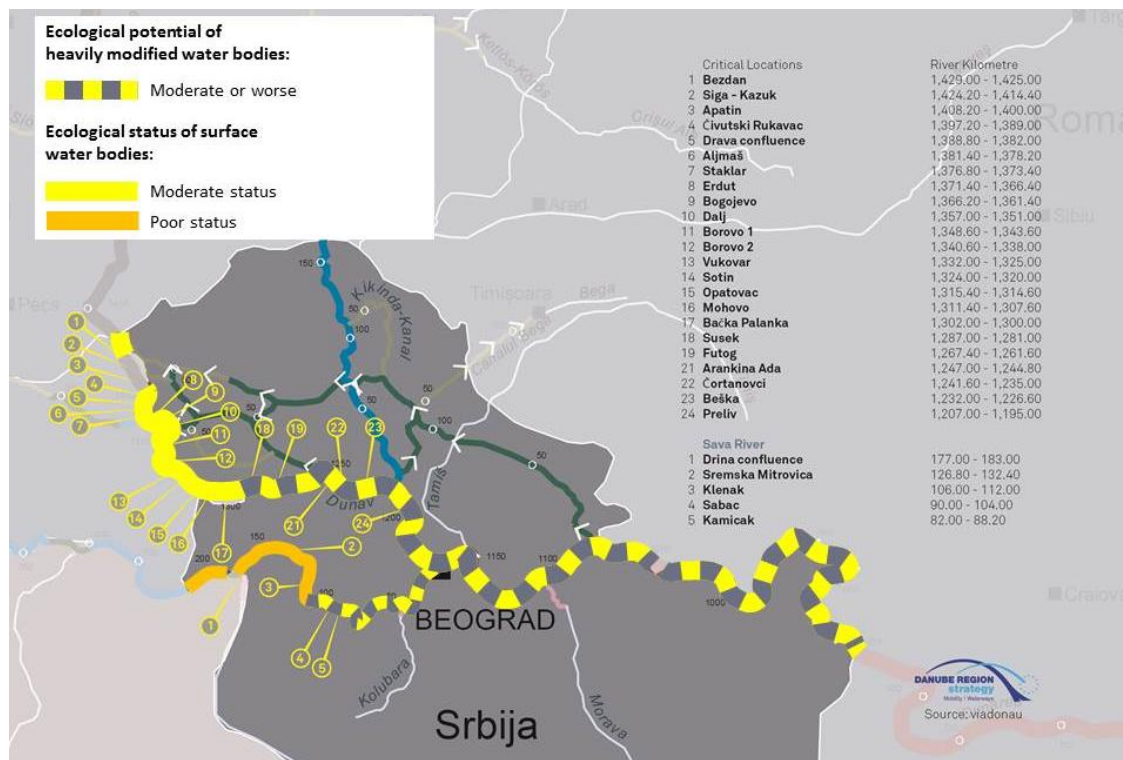


The dredging interventions are reported in combination with the surveying activities. This illustrates the strong dependency of dredging works on up-to-date surveying results. Prior to and after dredging works the respective critical locations were surveyed in detail, using 50 m profiles.

### 11.5 RS | Summary of current ecological status and environmental impacts

The following map displays the ecological status and ecological potential of the Serbian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Serbia.





### **Ecological status and ecological potential of surface water bodies**

(Source: DRBM Plan – Update 2015)

The ecological status of the Danube waterbody in the Republic of Serbia is identified within the DRBMP as moderate in the upper stretch to moderate to worse in the middle and lower stretch. Having in mind a long term absence of river training and dredging works for the purpose of fairway maintenance, no major impact to the existing quality of the waterbody was identified.

### **Measures to improve environmental conditions**

No specific activities are being performed by the authority responsible for waterway maintenance.

### **Navigation maintenance measures and environmental impacts**

Due to the absence of budget for maintenance dredging activities, fairway maintenance activities are limited to hydrographic surveying activities and waterway marking activities, with no effect on the environment.

In 2017, an EU-funded project of river training and dredging works on critical sectors on the Danube River in Serbia has started, including an independent environmental monitoring component as a part of the Supervision contract. The environmental monitoring will be performed before, during and after river training and dredging works, in order to properly identify and evaluate effects of the works to environmental components, in terms of hydro-morphology, sediment and water quality and biology.



## 11.6 RS | Budget status May 2018

### Investments taken for FRMMP implementation 2014 – 2017

Need areas	Required investments 2014 – 2020 according to FRMMP	Secured investment costs (state budget or other financing) and investments taken	% thereof EU co-financed	Remaining financing gap - Investments according to FRMMP
Minimum fairway parameters (dredging)	0	0	-	0
Surveying of the riverbed	260 000	0	-	260 000
Water level gauges	48 000	0	-	48 000
Marking of the fairway	5 075 000	0	-	5 075 000
Availability of locks / lock chambers	0	0	-	0
Information on water levels and forecasts	0	0	-	0
Information on fairway depths	0	0	-	0
Information on marking plans	0	0	-	0
Meteorological information	0	0	-	0
Other needs	0	0	-	0
<b>Sum (Euro)</b>	<b>5 383 000</b>	<b>0</b>	<b>-</b>	<b>5 383 000</b>

### Operational expenditures for conducted activities 2017 and budget needs 2018

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	0	0	0	0
Surveying of the riverbed	0	0	0	0
Water level gauges	0	0	0	0
Marking of the fairway	0	0	0	0
Availability of locks / lock chambers	n/a	n/a	n/a	n/a
Information on water levels and forecasts	0	0	0	0
Information on fairway depths	0	0	0	0
Information on marking plans	0	0	0	0
Meteorological information	0	0	0	0
Other needs	0	0	0	0
<b>Sum (Euro)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## 11.7 RS | Outlook: planned actions, milestones and funding sources

<b>RS 04: Absence of dredging budget will lead to deterioration of navigation conditions</b>		
Planned activities:	Implementation of the IPA 2013 project “River Training and Dredging Works on Critical Sectors on the Danube River & Supervision and Environmental Monitoring of River Training and Dredging Works on Critical Sectors on the Danube River”	
Current shortcomings:	Not only is there insufficient budget available to conduct dredging interventions in critical sectors, but the recurring need for dredging interventions due to the dynamic morphological changes of the riverbed would result in high expenditures for maintenance dredging.	
Environmental relevance of planned activities:	What are the main expected environmental impacts?	No negative impacts are to be expected, since the environmental issues are taken into account in the course of the supervision and environmental monitoring conducted throughout the project runtime.
	Which measures are taken to mitigate these impacts?	
	Is water status still expected to deteriorate?	No
Possible funding:	EU co-funding IPA 2013 and national funding	
Next steps:	River training structures will be established on three critical sectors – Futog, Cortanovci and Preliv;	2018/2019
	Capital dredging will be executed on five critical sectors – Susek, Futog, Arankina Ada, Cortanovci and Beska	2019/2020

## 12 Bosnia and Herzegovina

Currently there is no agency on state level which is responsible for maintenance, rehabilitation and upgrade.

### 12.1 BA | Status report on main critical locations including water level information 2012 – 2017

**Number of days with fairway depths  $\geq 2.5\text{m}$  on main critical locations** (as listed in the FRMMP):

Critical location	2012	2013	2014	2015	2016	2017
From rkm 69,7 To rkm 72,9	No data available. <sup>18</sup>					
From rkm 79,9 To rkm 85,8						
From rkm 88,3 To rkm 101,9						
From rkm 103,5 To rkm 109,8						
From rkm 173,8 To rkm 176,6						
From rkm 177,8 To rkm 187,4						
From rkm 189,2 To rkm 202,5						
From rkm 202,5 To rkm 225,1						
From rkm 225,1 To rkm 260,7						
From rkm 260,7 To rkm 306,8						
From rkm 306,8 To rkm 331,5						
From rkm 364,4 To rkm 395,5						
From rkm 417,1 To rkm 445,7						
From rkm 445,7 To rkm 459,9						
From rkm 459,9 To rkm 480,4						
From rkm 480,4 To rkm 511,8						

<sup>18</sup> Data might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu).

**Number of days with water level  $\geq$  LNWL on main critical locations**

Not applicable (please see the explanation given below).

Critical location	Reference gauges	2012	2013	2014	2015	2016	2017
x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x

The main reasons for not meeting the level of service are the following:

The Sava river waterway needs huge and comprehensive rehabilitation and reconstruction works in order to ensure considerable and full usage of the waterway. The rehabilitation and reconstruction works should also ensure necessary conditions for safe navigation along the Sava River, which concedes afterwards regular maintenance works of the fairway. Sava river waterway is included in the core transport network in Bosnia and Herzegovina, and its rehabilitation is one of the priorities in the transport sector in the country.

Once the rehabilitation works are completed and fairway infrastructure parameters are harmonised with the appropriate parameters along the Danube fairway, the regular maintenance works shall be established, following the principles and guidelines from the Fairway Rehabilitation and Maintenance Master Plan (cycle of monitoring, planning, execution, information), including usage of best practices and experience of other countries in the Danube region in this respect. Bosnia and Herzegovina currently maintains the fairway signalling system of the Sava river fairway from rkm 343 to rkm 211 on BiH and Croatian fairway/river banks, and from rkm 211 to rkm 178 for BiH part of the fairway/river bank, according to the Agreement between the Government of the Republic of Croatia and the Council of ministers of Bosnia and Herzegovina on inland waterways navigation, its signalling and maintenance.

**12.2 BA | Hydrological conditions at main critical locations 2017**

Not applicable (please see the explanation given above).

### 12.3 BA | Key issues and related activities 2017

	Key issues	Need for action	Activities performed 2017
BA 01	In order to rehabilitate the Sava fairway, it is necessary to prepare Study and Technical documentation for rehabilitation works. Documentation includes prepare of Environmental and Social Impact Assessment Study (ESIA), update of Preliminary design from the Feasibility study (FS prepared by the Sava Commission in 2008) and Main design.	The financial means need to be secured for preparation of study and technical documentation for the rehabilitation works on the Sava river waterway, to be upgraded to Va navigation class (according to the parameters for Va class given by the Sava Commission)	No update available. <sup>19</sup>

### 12.4 BA | Review of monitoring, rehabilitation and maintenance activities 2017

Currently, there is no update available for rehabilitation and maintenance tasks.<sup>19</sup>

#### Riverbed surveying activities 2017

River-km (from-to)	Frequency of surveying	Type of survey (single-/multi-beam)
Not applicable.		

#### Fairway relocation and marking activities 2017

Not applicable.

#### Dredging activities 2017

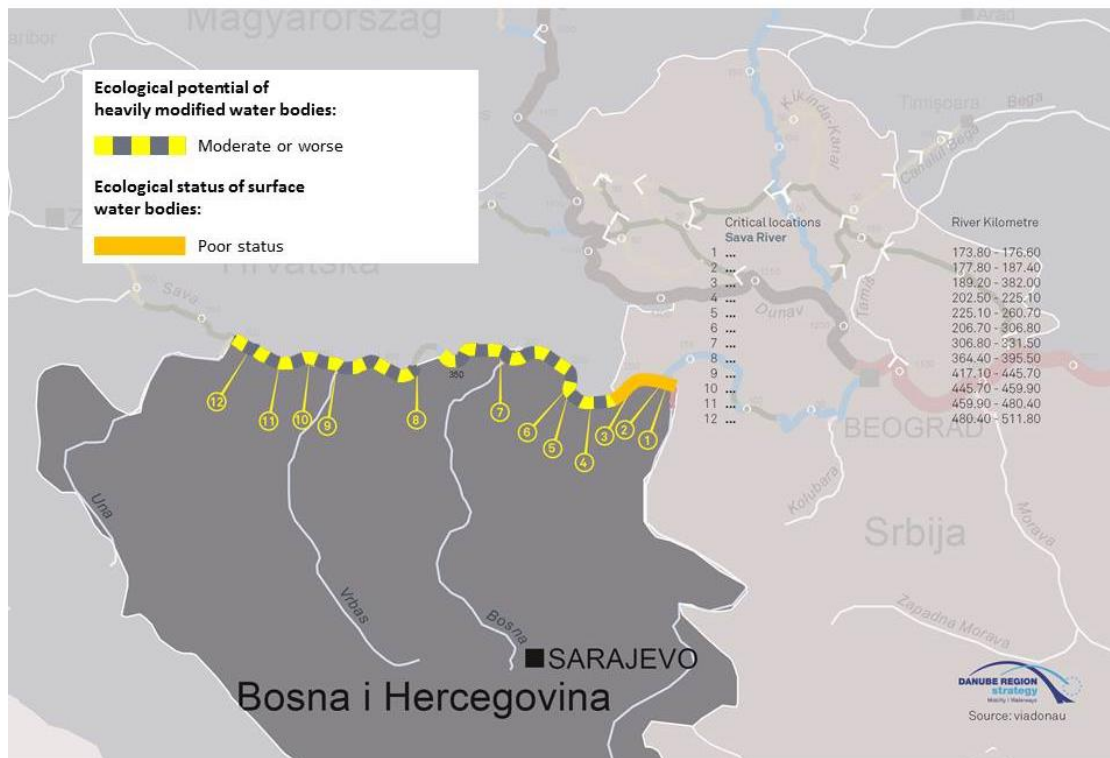
Designation of assignment	Dredging site		Dumping or placement site		Beginning of service	End of service	Material	Utilisation	m <sup>3</sup>	Permits (see next table)
	from river-km	to river-km	from river-km	to river-km						
x	x	x	x	x	x	x	x	x	x	x

Referenced and relevant permits	Title of permit (original language)	Permitting authority	Permit applicable		Valid until	Type of permit (e.g. environmental, water, navigation law)	Main conditions for permit
			from river-km	to river-km			
1	x	x	x	x	x	x	x

<sup>19</sup> Information and data might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu).

## 12.5 BA | Summary of current ecological status and environmental impacts

The following map displays the ecological status and ecological potential of the Save in waters Bosnia and Herzegovina – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Bosnia and Herzegovina.



### *Ecological status and ecological potential of surface water bodies*

No information available.<sup>20</sup>

### *Measures to improve environmental conditions*

No information available.<sup>20</sup>

### *Navigation maintenance measures and environmental impacts*

No information available.<sup>20</sup>

<sup>20</sup> Information might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu).



## 12.6 BA | Budget status May 2018

### Operational expenditures 2017 and budget needs 2018

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	No update available. <sup>21</sup>			
Surveying of the riverbed				
Water level gauges				
Marking of the fairway				
Availability of locks / lock chambers				
Information on water levels and forecasts				
Information on fairway depths				
Information on marking plans				
Meteorological information				
Other needs				
<b>Sum (Euro)</b>				

## 12.7 BA | Outlook: planned actions, milestones and funding sources

No data provided.

BA 01: ....		
Planned activities:		
Current shortcomings:		
Environmental relevance of planned activities:	What are the main expected environmental impacts?	xxx
	Which measures are taken to mitigate these impacts?	xxx
	Is water status still expected to deteriorate?	xxx
Possible funding:		
Next steps:		

<sup>21</sup> Budget data might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu).

## 13 Moldova

*No update has been provided by Moldova for May 2018. The text of the Roadmap June 2015 is given below.*

The Danube stretch of Moldova is only about 500 metres long and is restricted to the port area of Giurgiulesti. Fairway administration and maintenance of the Danube waterway in Moldova is carried out by the Romanian AFDJ on the basis of a bilateral agreement.

### 13.1 MD | Status report on main critical locations including water level information 2012 – 2017

According to the Fairway Rehabilitation and Maintenance Master Plan (version December 2014), there are no critical locations.

### 13.2 MD | Hydrological conditions at main critical locations 2017

Not relevant.

### 13.3 MD | Key issues and related activities 2017

In the Fairway Rehabilitation and Maintenance Master Plan (version December 2014), no key issues were identified.

### 13.4 MD | Review of monitoring, rehabilitation and maintenance activities 2017

According to the Fairway Rehabilitation and Maintenance Master Plan (version December 2014), no rehabilitation and maintenance activities were implemented.

### 13.5 MD | Summary of current ecological status and environmental impacts

#### ***Ecological status and ecological potential of surface water bodies***

(Source: DRBM Plan – Update 2015)

No data available.

#### ***Measures to improve environmental conditions***

No data available.

#### ***Navigation maintenance measures and environmental impacts***

No data available.

### 13.6 MD | Budget status May 2018

No data available.

### 13.7 MD | Outlook: planned actions, milestones and funding sources

Not relevant.

## 14 Ukraine

The State Enterprise «**Ukrainian Sea Ports Authority**» of the Ministry of Infrastructure of Ukraine is responsible for maintenance, rehabilitation and upgrade.

### 14.1 UA | Status report on main critical locations including water level information 2012 –2017

The report on the state of the main critical areas in 2012 – 2014 is subject to the list of the Main European Inland Waterways-IWT («The blue book»). According to the United Nations Economic Commission for Europe (UNECE), the part of river Danube from 0 to 116 km of Chilia branch where *Danube-Black Sea Deep-Water Navigation Route* (DBSDWNR) was defined as a category E80-09 waterway with a planned fairway depth of 7.2 metres. «The blue book» was developed under the AGN - European Agreement on Main Inland Waterways of International Importance (Decree of the President of Ukraine from 28.09.2009 №767/2009 on the “accession of Ukraine to the European Agreement on Main Inland Waterways of International Importance (CMBП/AGN)”).

Works in the specified section of the Danube river, namely deepening of the river in order to provide navigation parameters, would be works in border waters which, according to the Agreement between the Governments of Ukraine and Romania on the Romanian-Ukrainian State Border's Regime, Collaboration and Mutual Assistance in Border Issues (signed in 2003) and the Agreement on cooperation in the field of water management at the border waters (1997), should be agreed with the Romanian side. Until now, Romania has refused to agree to the implementation of the project "Creating a Deepwater Navigation Course 'Danube – Black Sea' on the Ukrainian section of the delta" (hereinafter referred to as DNC 'Danube – Black Sea'). The main argument is the failure by Ukraine to comply fully with the requirements of the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) on the DNC 'Danube – Black Sea'.

The last dredging works on the river crossings of the DNC Danube - Black Sea (mouth of Kilia, Starostambulsk, Bystre) were carried out in 2005.

Regarding the implementation of the requirements of the Espoo Convention the Ministry of Ecology and Natural Resources of Ukraine provided the Romanian authorities with a letter dated 27.04.2018 concerning a 'Roadmap for bringing the DNC Danube - Black Sea on the Ukrainian section of the delta in full compliance with the Espoo Convention', adopted by the Implementation Committee Espoo Convention at the 41<sup>st</sup> session (regular meeting of the Implementation Committee on the Convention on Environmental Impact Assessment in the Transboundary Context and the Protocol on Strategic Environmental Assessment (March 13-15, 2018 in Geneva, Switzerland)). In addition, according to the results of the integrated environmental monitoring during the operation of the DNC Danube - Black Sea, which is being performed since 2004 under the guidance of the Ukrainian Scientific and Research Institute of Ecological Problems of the Ministry of Ecology and Natural Resources of Ukraine), the following conclusion was made:

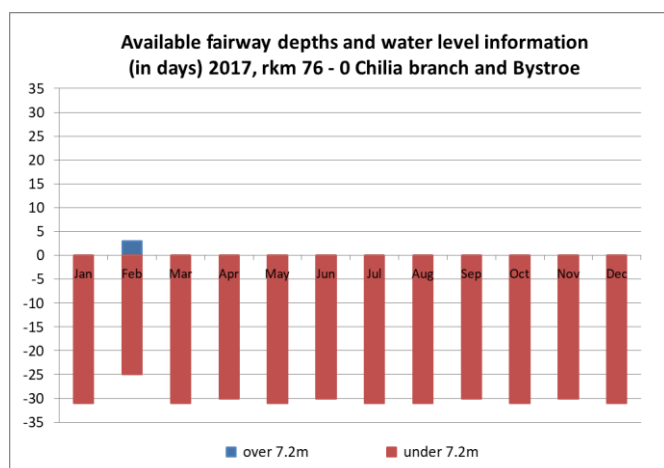
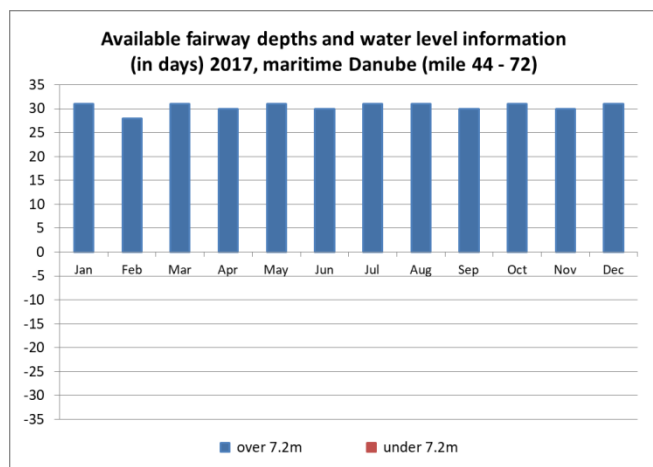
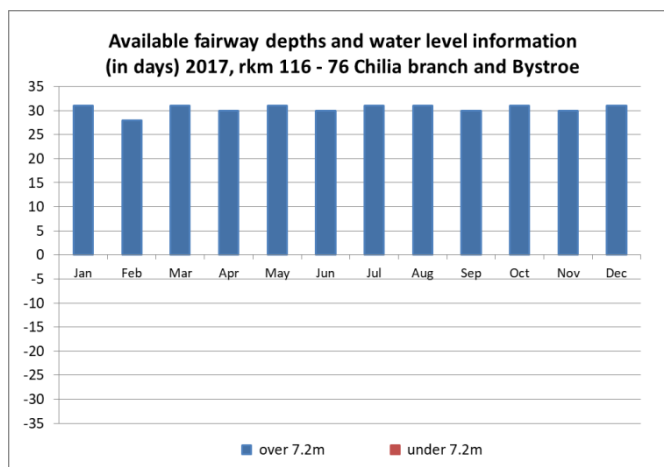
"According to the monitoring results, no significant impacts on the exploitation of the DNC Danube - Black Sea were identified as well as the work on supporting the passport characteristics of the maritime approach channel of the river basin of the DNC 'Danube – Black Sea', as well as the transboundary impact of the sea dump of soils, development and storage of bottom sediments. Therefore, conducted in 2017, monitoring studies indicate that there is no significant transboundary impact."

### Number of days with fairway depths $\geq 7.2\text{m}$ on main critical locations

Critical location	2012	2013	2014	2015	2016	2017
44 – 72 mile (maritime Danube)	366	365	365	x	366	365
116 – 76 km	366	365	365	x	366	365
76 – 0 km	366	365	365	x	51	3

### Number of days with water level $\geq \text{LNWL}$ on main critical locations

Critical location	Reference gauge	2012	2013	2014	2015	2016	2017
44 - 72 mile (maritime Danube)	Reni	327	326	365	x	366	x
116 – 76 km	Izmail	305	328	365	x	330	x
76 – 0 km	Vylkove	330	348	363	x	330 (at gauge Izmail)	x



The depth at the section 0-76 km of the Danube-Black Sea Deep-Water Navigation Route and the mouth of the marine approach channel *Bystroe* will be 7.2m after construction. For most of 2017 the depth was 4.7m.

## 14.2 UA | Hydrological conditions at main critical locations 2017

The Danube Hydrometeorological Observatory (DHO) is responsible for the hydrometeorological issues at the Ukrainian part of Danube.

One of the main tasks of DHMO is the provision of hydrometeorological support to the companies and organizations of the Danube region. Water level forecasts for the Danube waterway from Germany to the Black Sea are published with different forecast horizons. Short-term forecasts with a forecast horizon from 24 to 72 hours for 17 gauging stations are published daily. Forecasts of characteristic water levels (mean, minimal and maximal) for 10 days are published for 11 gauging stations as are monthly forecasts.

One in four days forecasts of average, minimum and maximum water levels are provided on 11 sections and once a month forecasts of average, minimum and maximum water levels are provided for the coming month on 16 sections.

Water level forecasts are provided to companies of the marine industry and are also published on the websites of DHMO ([www.dhmo.org.ua](http://www.dhmo.org.ua)) and the River Information Service on inland waterways of Ukraine (<http://ukrris.com.ua/>).

The hydrometeorological regime and its variability are among the main factors defining the opportunities for navigation on the Danube. Difficulties for navigation on the Ukrainian part of the Danube occur in the following situations:

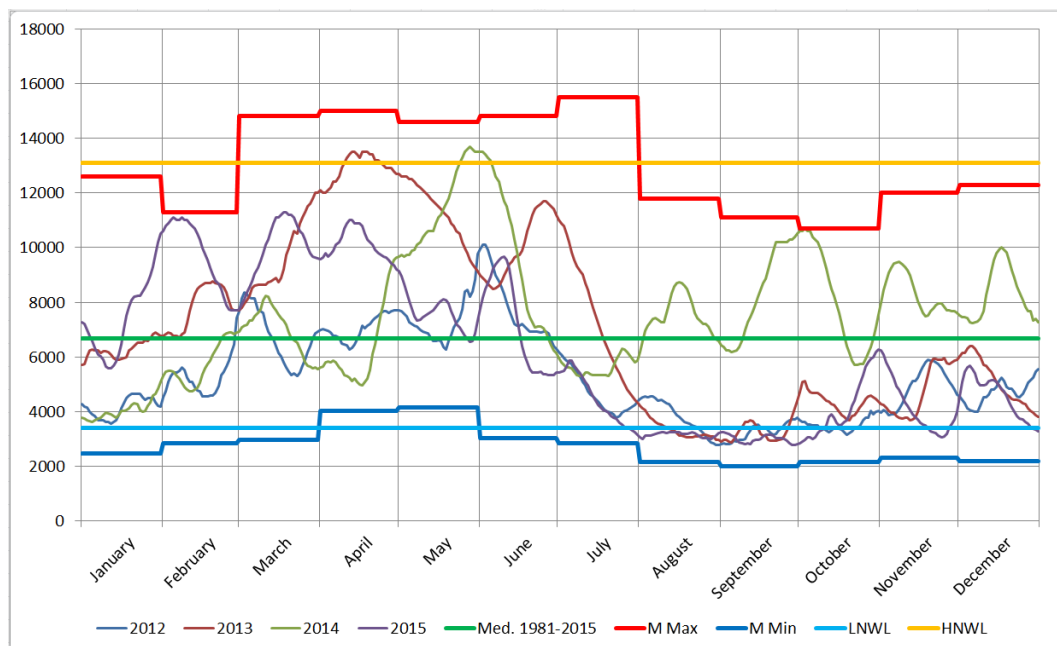
- minimum water levels in the summer and autumn low-water period
- maximum water levels during the spring and summer floods
- a sharp decline in depth on limiting sections of the river as a result of sedimentation after the passage of floods or flash-floods
- periods of high intensive ice phenomena (thick ice drift, ice jams and freezing )

Thus, the main principle of customer support lies in the operative provision of actual and forecast information on the hydrological regime for navigation companies.

The long-term hydrological monitoring performed at the Ukrainian section of the Danube reveals some tendencies in alterations of the hydrological regime, affecting the conditions for navigation. A permanent mathematical model of the Danube delta must be created in the future as a tool for the feasibility study and evaluation of changes in the hydromorphology of the delta, due to different possible scenarios of climate change and Danube water discharge as well as sediment runoff alterations, Black Sea level fluctuations or planned hydrotechnical works.



The water discharge m<sup>3</sup>/s on the gauging station Reni in 1981 – 2015  
No update for the year 2017 was provided.<sup>22</sup>



### 14.3 UA | Key issues and related activities 2017

	Key issues	Need for action	Activities performed 2017 <sup>22</sup>
UA 01	Maintenance of the waterway	Ensuring compliance with the international environmental conventions and bilateral agreements with Romania	No update available.

<sup>22</sup> Data and information might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu)

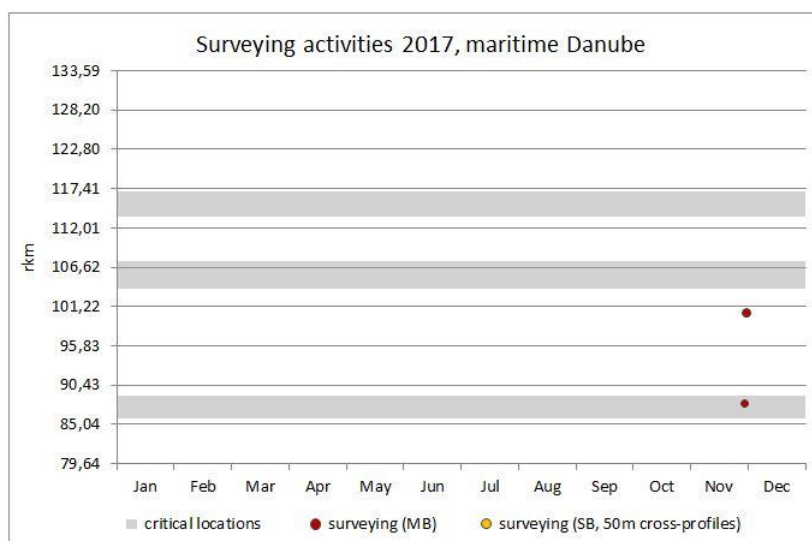
UA 02	Hydrological forecasts are not precise enough	Improve the accuracy of hydrological forecasts supporting Danube navigation	<p>The software complex of “Analytical and expert system for navigable water level forecasting” was developed by Ukrainian Scientific Research Hydrometeorological Institute in 2015.</p> <p>The method of corresponding daily water level gradients implemented in the analytical system allows for the production of highly reliable daily, 10-day and monthly forecasts. The experimental use of this software complex within the Danube Hydrometeorological Observatory during 2015 demonstrated the proven quality of the water levels forecasts for the Danube waterway. Further implementation of computer-assisted methods for hydrological forecasting in DHMO practice will raise the quality of customers’ hydrological support.</p>
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#### 14.4 UA | Review of monitoring, rehabilitation and maintenance activities 2017

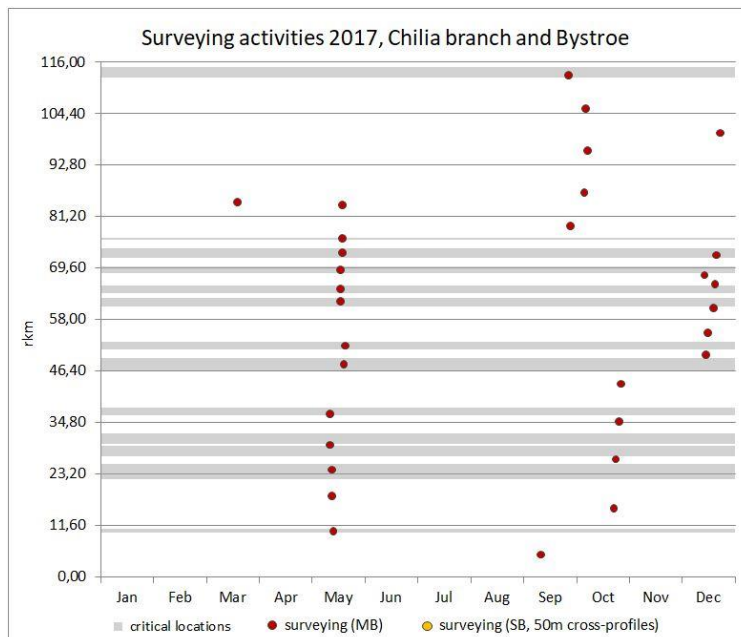
The surveying and monitoring, dredging and fairway marking activities are visualised in charts, each of which represents a specific river section. The vertical axis displays the river-kilometres; the horizontal axis adds the temporal dimension, showing when exactly rehabilitation or maintenance measures were conducted. The grey horizontal bars represent the critical locations, as identified in the Rehabilitation and Maintenance Master Plan (version December 2014).

##### *Riverbed surveying activities 2017*

##### Maritime Danube



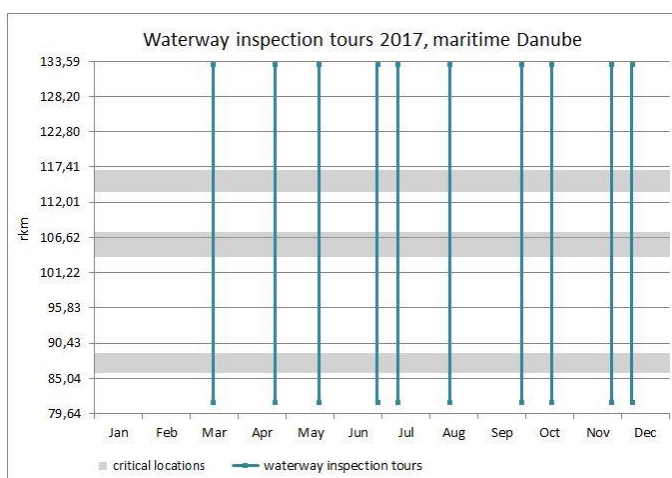
### Chilia branch – Bystroe



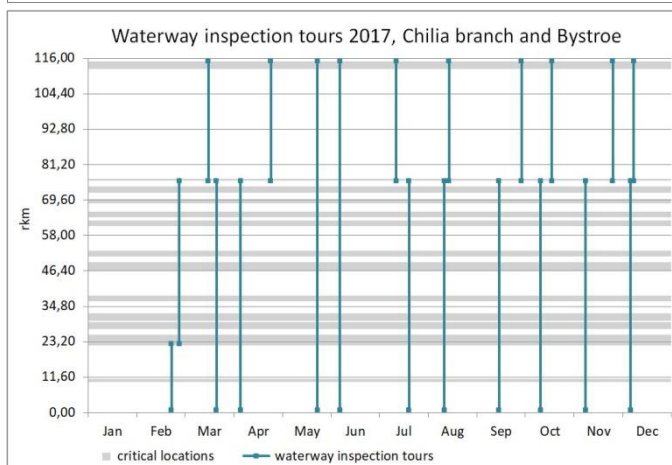
The entire Chilia branch and Bystroe maritime approach channel were surveyed with multi-beam equipment in summer and winter 2017.

### *Waterway monitoring tours 2017*

#### Maritime Danube and Chilia branch – Bystroe



Waterway monitoring and inspection tours are conducted once almost every month with a small vessel, equipped with a single-beam echo-sounder. The boat travels along the axis and the edges of the fairway to check for changes along the entire Ukrainian river stretch.



### ***Fairway relocation and marking activities 2017***

In 2017 no changes were made to the fairway trajectory.

The operation of the following navigation equipment was maintained on a regular basis:

shore-based facilities in total	369 pcs
luminous	54 pcs
informational	144 pcs
km and m	171 pcs
light buoys in total	34 pcs

### ***Dredging activities 2017***

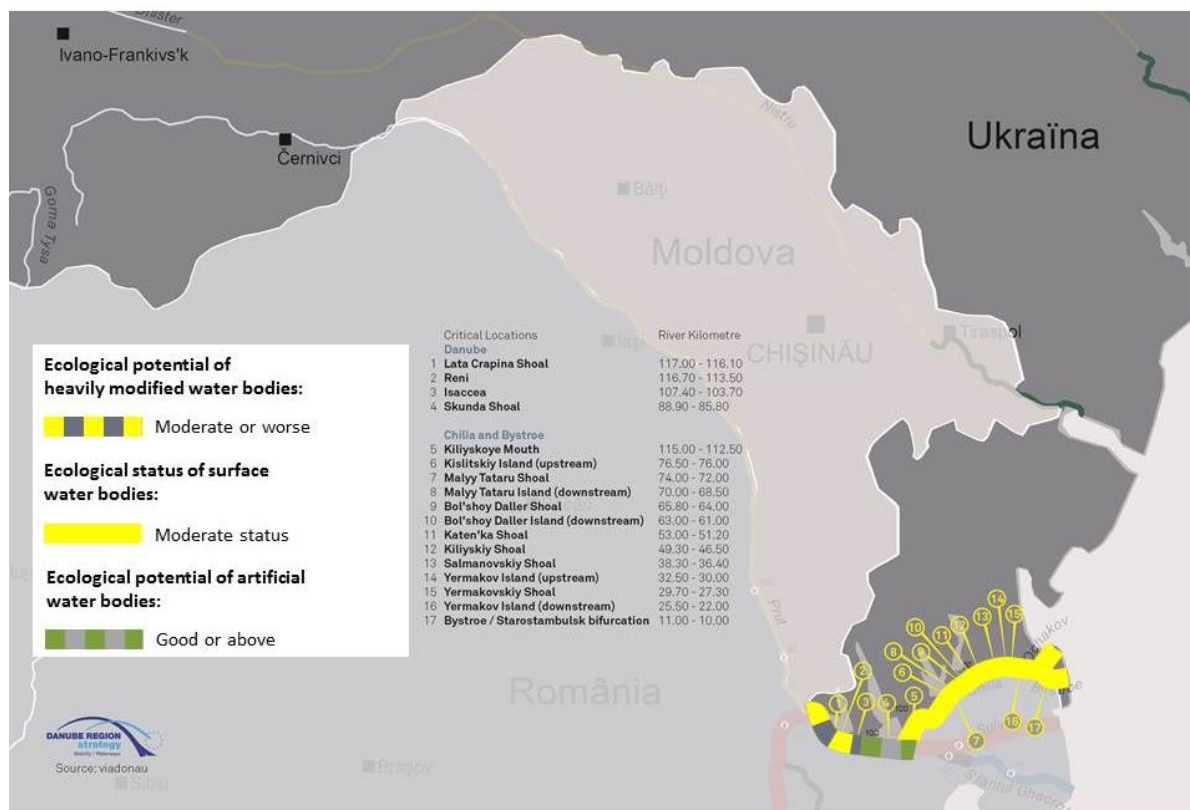
Operational dredging is carried out exclusively on the maritime approach channel of the river basin of the DNC 'Danube – Black Sea'. In total, 316 613.34 m<sup>3</sup> were dredged in 2017.

Year	Quarter	Volume of dredging [m3]
2017	I	5610
	II	212015.24
	III	21824.5
	IV	77163.6
<b>In total for a year</b>		<b>316613.34</b>

Works on the section of the Danube River - namely dredging river shallow sections (sections located along the state border with Romania) - are carried out as works in transboundary waters, which are regulated by the bilateral agreements between the Governments of Ukraine and Romania on the Ukrainian-Romanian State Border Cooperation and Mutual Assistance on Border Issues (signed on 17.06.2003, entered in force on 12.05.2004) and the Agreement between the Government of Ukraine and the Government of Romania on Cooperation in the Field of Water Management in Transboundary Waters (signed on 30.09.1997, entered in force on 28.01.1999) and are to be agreed with the Romanian side.

## 14.5 UA | Summary of current ecological status and environmental impacts

The following map displays the ecological status and ecological potential of the Ukrainian Danube – according to the Danube River Basin Management Plan/Update 2015 – against the background of the critical navigation locations in Ukraine.



### ***Ecological status and ecological potential of surface water bodies***

(Source: DRBM Plan – Update 2015)

No information available.

### ***Measures to improve environmental conditions***

No information available.

### ***Navigation maintenance measures and environmental impacts***

To resolve the issues related to the implementation of the Espoo Convention provisions, Resolution of the Cabinet of Ministers of Ukraine (02.04.2008 №295) formed Interagency Coordinating Council for implementation the Espoo Convention in Ukraine which is headed by the Minister of Ecology and Natural Resources of Ukraine. Decision-making on the future implementation of the project to creating the DNR Danube - Black Sea (full development or of the first phase of the project) is exclusively within the competence of the Government of Ukraine.

## 14.6 UA | Budget status May 2018

### Operational expenditures 2017 and budget needs 2018

Need areas	Operational expenditures 2017	Required operational budget 2018	Secured operational budget 2018	Remaining financing gap 2018
Minimum fairway parameters (width/depth)	No update available. <sup>23</sup>			
Surveying of the riverbed				
Water level gauges				
Marking of the fairway				
Availability of locks / lock chambers				
Information on water levels and forecasts				
Information on fairway depths				
Information on marking plans				
Meteorological information				
Other needs				
<b>Sum (Euro)</b>				

## 14.7 UA | Outlook: planned actions, milestones and funding sources

No updated information available.

UA 01: ....		
Planned activities:		
Current shortcomings:		
Environmental relevance of planned activities:	What are the main expected environmental impacts?	xxx
	Which measures are taken to mitigate these impacts?	xxx
	Is water status still expected to deteriorate?	xxx
Possible funding:		
Next steps:		

<sup>23</sup> Budget data might be provided at a later stage. In this case an updated version of this National Action Plan update will be made available on the following websites: <http://www.fairwaydanube.eu/> and [www.danube-navigation.eu](http://www.danube-navigation.eu).



# Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries:

## ANNEX II

to the

NATIONAL ACTION PLANS

UPDATE MAY 2018

Coordinated by **Priority Area 1a** of the **EU Strategy for the Danube Region**.

## Slovakia: Overview of Critical Locations

