

# Common Bottleneck WS

---

# Bottleneck Information (Harmonized Web Service)

---

## 1. Introduction

Bottlenecks are parts of fairway (sections/stretchers) causing potential limitations for inland navigation because of limited available depth in the navigation channel and/or due to limited width of the fairway.

Correct, complete and up-to-date information about bottlenecks is of outmost importance for inland navigation, to allow for safe navigation (e.g. avoid groundings), support route planning / voyage planning, and to optimize vessel draught (optimize capacity).

Bottleneck information is being tackled in three different European projects:

- FAIRway Danube, as part of the Waterway Monitoring System (WAMOS)  
WAMOS is a tool being implemented within the FAIRway Danube Project, supporting the Waterway Administrations in fairway maintenance, including the calculation of the availability of the fairway, based on data provided by the local authorities. WAMOS can enhance and/or create information about bottlenecks based on provided data and offers bottleneck information via Web Services.
- Danube STREAM, as part of the Danube FIS portal  
The Danube FIS portal offers FIS (Fairway Information Services) for the Danube River, via website (<http://www.danubeportal.com>) to the public. The data is provided by the local administrations, either via Web Services, or via configuration of the required parameters in the content administrator backend of the FIS portal. Within the project Danube STREAM the bottleneck information provided on the Danube FIS portal is about to be improved during this project.
- RIS COMEX, as part of the Least Water Depth Service  
RIS COMEX (RIS Corridor Management Execution) shall provide RIS on European/Corridor Scale to the public, via a single point of access (via Web Services, and other means (still to be agreed within the project)). Bottleneck information is part of the FIS services being described, specified and implemented in RIS COMEX. Further information is available at <http://www.riscomex.eu>.

The above mentioned initiatives serve different purposes, but all require implementation of Web based Services to exchange bottleneck data. In order to avoid specification of various Web Services in the different projects, causing multiple implementations of bottleneck Web Services on national level, as well as on the 'data consumers' side, all requirements (known until now) shall be met in a common specification.

The specification elaborated in the FAIRway Danube Project already includes requirements brought in by Danube STREAM and RIS COMEX partners. The specification can be found in chapter 2.3, 2.4 and 3.4 of this document.

To understand the context of WAMOS the following 'supporting documents' are provided attached to this document:

- 1) Introduction to WAMOS, objective and relevant parts of the specification  
"2017-09-29\_Waterway Monitoring System.pptx"
- 2) Details about WAMOS out of the 'Software Requirement Specification' including business processes and use cases.  
"WAMOS\_SRS\_Overall Description.docx".
- 3) Illustration of use cases and GUI Mock-ups  
"20170228\_PRISMA\_WAMOS\_Workshop\_2\_Use cases and Mockups.pdf"

The following chapter 2 and chapter 3 are excerpts from the

- WAMOS Data Requirements Catalogue (DRC) including required data elements (source, occurrence, type and content)
- Software Requirement Specification (SRS) specifying the (WS) interface

Adapted to the purpose of using the specification for the set-up of national Bottleneck Web Services, the excerpts have been revised. Data which might be mandatory to be delivered to WAMOS may be conditional or optional for other purposes. The data set descriptions in the present document aim at suiting the objectives of FAIRway Danube, Danube STREAM and RIS COMEX. Project specific details can be found in other documents.

In general, the national Bottleneck Web Services shall deliver data that can be assigned to two categories in line with the expected update frequency.

1. Bottleneck Data  
Hardly changing information on rather static characteristics of the bottleneck, as their location, name, riverbed material or applicable reference gauge and depth reference.
2. Available fairway  
Data describing the availability of the fairway as regards to depth and with on the date of one determined riverbed survey and with reference to the defined depth reference of the bottleneck. The available fairway may be provided for different service levels. The fairway availability includes three Sub-Elements:
  - I. Reference values  
Information on depth and/or width of the bottleneck at reference water level as well as the coordinates of the most critical spot
  - II. Bottleneck PDF  
Information on where a map of the bottleneck can be obtained
  - III. Effective fairway availability  
Information on the effective fairway availability (depth/width/water level) at a determined point in time which may either lie in the past, present or future.

## 2. Data Requirements Catalogue (DRC v2.0 final)

### 2.1. Introduction of the DRC

This document sets out the required data sets to operate WAMOS. The reader of this document will get a clear picture on the information required to operate this system in terms of scope, quality and intended update frequency.

In the first place, the Catalogue of Required Data depicts the current minimum set of data which is intended to be exchanged through national WAMS systems, and trans-national systems, such as the D4D-Portal. All waterway administrations agree on the described data sets and their general properties e.g. sources, update frequency, single attributes.

All data sets described within chapter 2.2. are agreed to be provided by the involved waterway management authorities, ideally through national WAMS instances, or transnational systems. Therefore, the participating waterway authorities are provided with this description of needed data sets for WAMOS. They are supposed to take it up during the conceptualization and development of the national WAMS systems.

In addition, the document shall serve as important basis for the requirement specification and subsequent implementation of WAMOS. The current version of the document shall be seen as agreed. Minor modifications that serve the specified functionalities of WAMOS may be made in coordination with the FAIRway Danube partners, the contractor for supervision and the contractor for software development, but only until the acceptance of a prototype.

This document gives an overview over different data topics and should clarify questions like:

- Relevance of the data set
- Data structure
- Extent of the data set
- Assumptions and constraints

The first column of each data set defines the information source of the attribute by using the following abbreviations.

- (ENC) -Inland ENCs
- (NtS) -Notices to Skippers
- (WA) -Waterway Administration
- (RIS) -RIS-Index

If not stated differently, the source of information also specifies the interpretation of the attribute (in terms of value ranges and validity).

The occurrence of data fields is included in the "Attribute Names" in brackets:

- (M): 'Mandatory' – this element always has to be provided
- (O): 'Optional' – this element may be provided if available
- (C): 'Conditional' – this element has to be provided if certain parameters are met (e.g. one out of three possibilities is to be provided) or in case the information is made available for a specific application (e.g. Conditional data fields are to be provided in case the information is made available for the Danube FAIRway 'WAMOS' system)

## 2.2. General guidelines for data exchange

### Provide homogeneous data sets

Interfaces for data exchange use data structures as defined in the following chapters and are applicable for all involved countries. Each participating authority will provide the data as commonly agreed. Deviations have to be communicated and are only accepted if all project partners agree, and the overall functionality of the system is guaranteed, in an efficient way.

Ideally data sets are provided in a common coordinate system (WGS84) as described below. For visualisation purposes data may be transformed to a common projection system (Web Mercator) within WAMOS. This means that both coordinate systems are an accepted choice for most data deliveries. Map and feature services that are only displayed in the client shall provide their maps in the projected coordinate system (Web Mercator). This allows the display of this information without additional processing. Features which have to be stored and processed in WAMOS shall be transferred in the geodetic coordinate system (WGS84).

Regarding vertical coordinate systems the EVRF2007 is the preferred height reference. Most standards (NtS, RIS-Index) support several vertical references (NAP, Metres above Adriatic Sea, etc.) and therefore WAMOS will also accept other established height references. In order to make data comparable, an agreement on a single vertical reference (absolute and relative) is required for each bottleneck. The only constraint using different vertical reference systems is that only one height reference system (absolute and relative) should be used per bottleneck.

### Align workflows and data processing

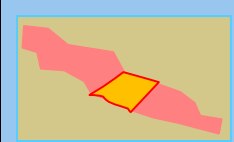
Common (or equivalent) standards for data cleaning, processing and quality control and assurance are most important. Continuous improvements and the alignment of procedures have been issue to several common projects in the past (NEWADA and IRIS projects), as well as in on-going ones (FAIRway Danube, RIS COMEX, Danube STREAM), and will also be followed up in the future. Within the FAIRway Danube project, workflows related to surveying, marking and water level forecasts will be aligned.

## 2.3. Bottlenecks (BN)

Areas with fords (side arms) and lateral sedimentations are in the most cases bottlenecks, and will be identified, and managed within the national WAMS systems. The harmonized data set will be shared and used in WAMOS for visualisations and analytic purposes. Bottlenecks are described through the same attributes as “sections of limited depth”, as defined in the IENC Encoding Guide, edition 2.3.6. and are complemented with additional information.

Caution area: Generally, an area where the skipper has to be made aware of circumstances influencing the safety of navigation. (Inland ENC Harmonisation Group, 2014)

Section of Limited Depth: Generally, a short section of a waterway with limited depth and well known to skippers as of high relevance for safety, also by shipping companies as the reference for the planning of the draught of vessels. (Inland ENC Harmonisation Group, 2014)

	Coverage	<b>Lateral sedimentations and fords on the Danube River, Danube-Black Sea Canal</b>
	Coordinate System	EPSG:4326 (WGS84) EPSG:3857 - Web Mercator
	Vertical Coordinate	None
	Update Frequency	<b>As frequent as situation on site requires (monthly to annually, more frequent on the Lower Danube)</b>
	Format	XML
	Sources	<b>Lateral sedimentations and fords of national WAMS</b>
	Geometry	XML

**Data set quality:**

- Depicts a sector of the waterway with restricted fairway parameters, in this case limited fairway depth and/or width
- Only one vertical depth reference (absolute and relative) shall be used per bottleneck
- WAMOS will create the geometry for the bottlenecks internally using the geometry of the waterway area.

HINT: In the tables below 'Examples' are given. In case

**Bottleneck Data:**

T.	Attribute Names	Type	Values	Example
WA	<b>bottleneck_id</b> (M)	String	<Country_Code>_<Type of section>_<Count>	AT_Bottleneck_12
WA	<b>fk_g_fid</b> (M)	String	ISRS code of gauge. Foreign key to reference gauge (see ch. 3.1.1)	ATPEC00001G000718947
WA (ENC)	<b>OBJNAM</b> (O)	String	Name of the bottleneck (caution area)	Shallow water area Regelsbrunn
ENC	<b>NOBJNM</b> (O)	String	Object name in national language	Furt Regelsbrunn
WA	<b>from_ISRS</b> (M)	String	ISRS Location Code from	ATXXX000010000018978
WA	<b>to_ISRS</b> (M)	String	ISRS Location Code to	ATXXX000010000018990
WA	<b>rb_lb</b> (O)	String	Defines the ISO_3166-1country codes for the countries of the right and left riverbed separated by an underline “ ”.	AT_SK
WA	<b>riverbed</b> (O)	Enum.	Multiselect of different riverbed materials: <ul style="list-style-type: none"> <li>• Gravel,</li> <li>• Rocky,</li> <li>• Stone,</li> <li>• Andesite,</li> <li>• Sleazy andesite,</li> <li>• Sandy gravel,</li> <li>• Marl,</li> <li>• Sand</li> <li>• Sandy gravel,</li> <li>• Sarmatian limestone,</li> <li>• sandstone peaks</li> <li>• Rough sandy gravel</li> </ul>	Gravel SandyGravel
WA	<b>responsible_country</b> (O)	Enum.	The responsible country code consists of two letters and is defined in ISO standard 3166-1. The official list of country codes is published at <a href="http://www.unece.org/cefact/locode/service/country.htm">http://www.unece.org/cefact/locode/service/country.htm</a> changing responsibilities need a change in the data set	AT
WA	<b>revisiting_time</b> (O)	String	Defines the interval of riverbed surveys recommended for that particular area in [months].	6

			e.g. 6, indicates that after six months the area needs to be surveyed again, resulting in 2 riverbed surveys per year.	
WA	<b>SURTYP (O)</b>	Enum.	Survey Type <ul style="list-style-type: none"> <li>• Multibeam</li> <li>• Singlebeam</li> <li>• ADCP</li> <li>• Inspection tour</li> </ul>	Multibeam
WA	<b>Coverage (O)</b>	Enum.	If single beam: <ul style="list-style-type: none"> <li>- Cross profiles</li> <li>- Longitudinal profiles</li> </ul> If multi beam: coverage: <ul style="list-style-type: none"> <li>- Fairway</li> <li>- River</li> </ul> If ADCP: <ul style="list-style-type: none"> <li>- Cross profiles</li> <li>- Longitudinal profiles</li> </ul> If Inspection tour <ul style="list-style-type: none"> <li>- Cross profiles</li> <li>- Longitudinal profiles</li> <li>- River banks</li> </ul>	Fairway
WA	<b>Limiting factor (O)</b>	Enum	Main limiting factor at the bottleneck, e.g. frequently limited depth at a ford or frequently limited with due to lateral sedimentation or curve radius caused by narrow river bend. If depth and with and/or curve radius is limited at the same time, the dominating limiting factor shall be indicated. <p>1 – depth 2 – width 3 – curve radius</p>	depth
WA	<b>Depth_reference (M)</b>	Enum.	Code for the depth reference of the riverbed survey: <ul style="list-style-type: none"> <li>• 1- LDC</li> <li>• 2 -LNW</li> <li>• 2- ZPG</li> <li>• 3-... code in line with the RIS Index</li> </ul> This information describes the reference level for all data related to bottlenecks.	LNW
WA	<b>Date_Info (M)</b>	DateTime	In case data changed (e.g. name or dimensions of an object), the change date has to be provided here (automatically by the system).	2017-03-30T18:42:41.157+02:00
WA	<b>Source (M)</b>	String	The source of the respective entry is listed in this column. The (short version of the) organization name is provided in plain text. E.g. 'viadonau'	viadonau

## 2.4. Available fairway (AF)

This data set extends the Bottlenecks data set with temporal data describing the condition of the specific area. "Available fairway" is used to calculate the number of days per month/quarter/year with a fairway depth below a targeted depth, over a defined width, in line with the fairway dimensions of different Levels of Service. The calculation uses the attribute "minimum depth" and "minimum width" of the bottleneck as well as the Gauge Measurements to calculate the available fairway depth.

The information provided is related to Bottlenecks but can be aggregated to higher levels using defined sections and stretches (see Stretches and Sections).

<p>fairway availability</p>	Coverage	(Bottlenecks)
	Coordinate System	None
	Vertical Coordinate	None
	Update Frequency	Daily provision by Waterway Authority
	Format	XML
	Sources	National WAMS of all participating countries
	Geometry	None

### Data set quality:

- The availability value of the day depends on the daily mean water level and the results of the latest riverbed survey.
- The source gauge measurements have to be already filtered and corrected when calculating the availability. Therefore WAMOS will check the retrieved values for plausibility before integrating them into the system.
- Missing values will be marked as "not available"
- LOS-Level will be calculated automatically by WAMOS.
- Each bottleneck can be provided with min depth and min width. This information should have an accuracy of +/-15-20 cm.

### Fairway availability

T.	Attribute Names	Type	Values	Example
WA	<b>bottleneck_id</b> (M)	String	Foreign key of the bottleneck. This ID identifies the bottleneck uniquely and will be stable over the lifetime of this location	AT_Bottleneck_12
WA	<b>SURDAT</b> (M)	Date	Surveying date (YYYY-MM-DD)	2017-01-14T00:00:00Z
WA	<b>POSITION</b> (O)	Enum.	Position of the shallowest surveyed point (within LOS1) <ul style="list-style-type: none"> <li>• Red buoy</li> <li>• Green buoy</li> <li>• Right bank</li> <li>• Left bank</li> <li>• Middle</li> <li>• All (whole fairway)</li> </ul>	GreenBuoy
WA	<b>Reference_values</b> (C)	Complex type	This element may occur several times including several sub-elements with information on reference depth/width.	
WA	<b>AdditionalData</b> (O)	Complex type	This element may occur several times including additional information about the Bottleneck. E.g. ongoing maintenance measures	
WA	<b>Critical</b> (C)	Boolean	Indicate if the state of the bottleneck is critical or not.	false



Depends on source	<b>Bottleneck_PDFs (C)</b>	Complex type	This element may occur several times including several sub-elements with Bottleneck PDF information as specified below	
WA or WA MO S	<b>Effective_fairway_availability (C)</b>	Complex type	This element may occur several times including several sub-elements with information on actual/forecasted depth/width/water level	
WA	<b>Date_Info (M)</b>	DateTime	In case data changed (e.g. name or dimensions of an object), the change date has to be provided here (automatically by the system).	12.04.2017 12:15:20
WA	<b>Source (M)</b>	String	The source of the respective entry is listed in this column. The (short version of the) organization name is provided in plain text. E.g. 'viadonau'	viadonau

#### Content of the element "Reference\_values".

The element may occur several times including different available depth/width/radius values for the three different levels of service

T.	Attribute Names	Type	Values	Example
WA	<b>fairway_depth (C)</b>	Integer	Shallowest surveyed point. Depth with reference to "depth reference" (e.g. LNW, ZPG) indicated in the bottleneck data set (cm). This information is needed for the calculation of the fairway availability at a certain water level. ➤ At least one value (either depth or width or curve radius) is mandatory.	250
WA	<b>fairway_width (C)</b>	Integer	Minimum width of the fairway at the bottleneck (m) ➤ At least one value (either depth or width or curve radius) is mandatory.	80
WA	<b>fairway_radius (C)</b>	Integer	Minimum curve radius of the fairway at bottleneck (m) ➤ At least one value (either depth or width or curve radius) is mandatory.	750
WA	<b>Shallowest_spot_Lat (O)</b>	Double	Coordinate of the most critical shallowest point, which is decisive for navigation.	48.010101
WA	<b>Shallowest_spot_Long (O)</b>	Double	Coordinate of the most critical shallowest point, which is decisive for navigation.	16.020202
WA	<b>Level_of_Service (C)</b>	Enum.	Level of Service corresponding to the provided available depth/width/curve values: <ul style="list-style-type: none"> <li>• LoS1</li> <li>• LoS2</li> <li>• LoS3</li> </ul>	LoS1

#### Content of the element "AdditionalData".

The element may occur several times including additional information about the Bottleneck e.g. ongoing maintenance measures. The 'KeyValuePair' is defined by the authority providing the information in

coordination with the clients that shall make use of the provided information. To be ready for future use no validation of the AdditionalData is carried out, clients shall discard information provided in this complex type they are not able to process/interpret. If no 'AdditionalData' is available, it is not provided.

T.	Attribute Names	Type	Values	Example
WA	<b>Key (M)</b>	Text	Key value for the type of additional information about the Bottleneck. E.g. ongoing maintenance measures: <ul style="list-style-type: none"> <li>Maintenance_status</li> </ul> E.g. the time span a specific bottleneck configuration is/was applicable: <ul style="list-style-type: none"> <li>Valid_from_date</li> <li>Valid_to_date</li> </ul>	Maintenance_status
WA	<b>Value (M)</b>	Text	Value for the additional information about the Bottleneck. E.g. dredging: <ul style="list-style-type: none"> <li>dredge</li> <li>„timestamp“ (in case of bottleneck configuration time span -&gt; see explanation below this table)</li> </ul>	dredge  2018-06-06T09:03:44.167+02:00

#### Explanation for bottleneck configuration time span:

Only in case the provision of historic values the following is to be implemented:

- The time span a specific bottleneck configuration is/was applicable is included in the <AdditionalData> element using the keys "Valid\_from\_date" and "Valid\_to\_date".
- The respective time stamp is included in the <Value> element. Each time a bottleneck configuration changes the validity of the configuration ends and a new configuration is created. In this example a specific bottleneck configuration was effective between 06.06.2018 and 27.06.2018:

```
<Key>Valid_from_date</Key>
<Value>2018-06-06T09:03:44.167+02:00</Value>
<Key>Valid_to_date</Key>
<Value>2018-06-27T10:02:26+02:00</Value>
```

- For the current available bottleneck configuration the "Valid\_to\_date" is NOT provided as the configuration is still valid at the time of the request.
- In case a client requires only current and forecasted data (like the Danube FIS portal) this client can simply discard any validity information as it won't process historical data (it is a general rule that AdditionalData shall be discarded that cannot be interpreted by the client).

#### **Content of the element "Bottleneck\_PDFs"**

In general Bottleneck PDFs include a PDF map of the bottleneck showing the background map, the waterway area, the extent of the fairway (LOS1, LOS2, LOS3), the sounding result, depth contours, the shallowest spots within the different Levels of Service using a harmonized template or a PDF map of the bottleneck as provided by the local competent authority.

T.	Attribute Names	Type	Values	Example
WA or WA MO S	<b>ProfilePdfFilename (M)</b>	String	Name of the PDF-file of the depth profile	Furt Regelsbrunn.pdf
WA or WA MO S	<b>ProfilePdfURL (M)</b>	String	URL, where the PDF-file can be loaded from	http://www.doris.bmvit.gv.at/fileadmin/doris_i frame/furten/Furt%20Regelsbrunn.pdf
WA or WA MO S	<b>PDF_Generation_Date (M)</b>	DateTime	Time the shallow section pdf was published by the source	2016-12-16T15:00:47+01:00
WA or WA MO S	<b>Source (M)</b>	String	The source of the respective PDF is listed in this column. The (short version of the) organization name is provided in plain text. E.g. 'viadonau'	viadonau

**Content of the element "Effective\_fairway\_availability":**

The element may occur several times including different available depth/width/water level values for different timestamps for different levels of service

T.	Attribute Names	Type	Values	Example
WA MO S or WA	<b>Available_depth_value (C)</b>	Integer	Minimum available water depth at the given Measure_date in cm. <ul style="list-style-type: none"> <li>➤ At least one value (either depth or width or water level) is mandatory.</li> </ul>	250
WA MO S or WA	<b>Available_width_value (C)</b>	Integer	Minimum available width of the fairway at the given Measure_date in cm. <ul style="list-style-type: none"> <li>➤ At least one value (either depth or width or water level) is mandatory.</li> </ul>	8000
WA	<b>Water_level_value (C)</b>	Integer	Water level at the reference gauge station at the given Measure_date in cm. <ul style="list-style-type: none"> <li>➤ At least one value (either depth or width or water level) is mandatory.</li> </ul>	274
WA MO S or WA	<b>Measure_date (M)</b>	DateTime	Date and time for when the available width and/or depth and/or water level is provided.	2018-05-11T11:45:00+02:00
WA MO S or WA	<b>Measure_type (M)</b>	Enum.	Information on how the provided available depth/width/water level values have been created. Possible options are: <ul style="list-style-type: none"> <li>• Measured (based on actual measured water level)</li> <li>• Forecasted (based on forecasted water level)</li> <li>• Minimum guaranteed (based on minimum guaranteed depth set out by the authorities)</li> </ul>	Forecasted
WA	<b>Source (M)</b>	String	The source of the provided available depth/width/water level values is listed in this column. The (short version of the) organization name is provided in plain text. E.g. 'viadonau'	viadonau
WA	<b>Level_of_Service (C)</b>	Enum.	Level of Service of the provided available depth/width values: <ul style="list-style-type: none"> <li>• LoS1</li> <li>• LoS2</li> <li>• LoS3</li> </ul>	LoS1
WA	<b>Forecast_generation_time (C)</b>	DateTime	Date and time the available width/depth/water level forecast was made (the time the model was running resulting in the forecasted values) – for forecasts this element is mandatory, for other measure_types it is not provided	2018-05-11T09:00:00+02:00
WA	<b>Value_lifetime (C)</b>	DateTime	Time when the provided available depth/width/water level values are not actual any more (time until when a measured value may be considered as 'actual' or time until when a forecast is considered as outdated)	2018-05-11T15:00:00+02:00

### 3. Software Requirement Specification (SRS v3.0 final)

#### 3.1. Purpose of the SRS

The purpose of this document is to present a detailed description of the transnational waterway monitoring system - WAMOS. It explains the users, functions, features, constraints of the system, the interfaces to the national systems feeding the shared database and to external systems publishing data to web-portals and web-services like the FIS-portal or RIS COMEX.

#### 3.2. Definitions, Acronyms and Abbreviations

##### **Bottleneck**

Sector of the waterway with restricted fairway parameters, due to morphological, hydrological or traffic density related reasons.

##### **Critical sector**

Sector of the fairway where no sufficient depth/width/vertical clearance is guaranteed and/or available.

A national stretch of the river can include several critical sectors/sections, which may summarize a number of bottlenecks/critical locations (see below figure).

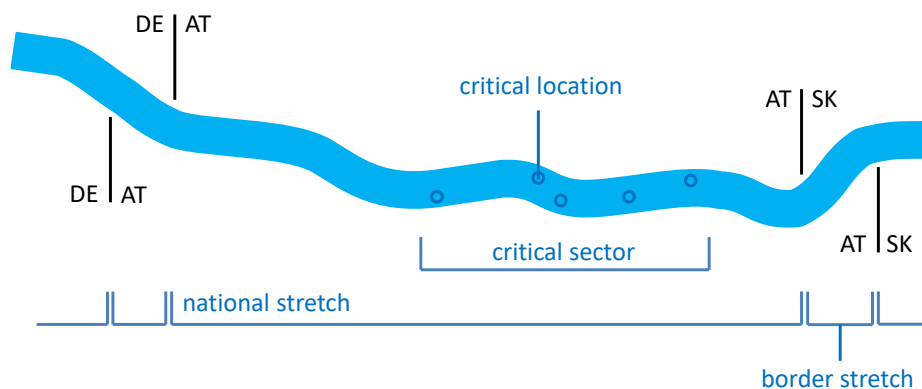


Figure 1: Stretches, Sections and Locations

#### 3.3. System Environment

The main components interacting with WAMOS are shown in Figure 2. There are five components which deliver and two which consume data. A list of the individual data streams can be found in Figure 3 and Figure 4.

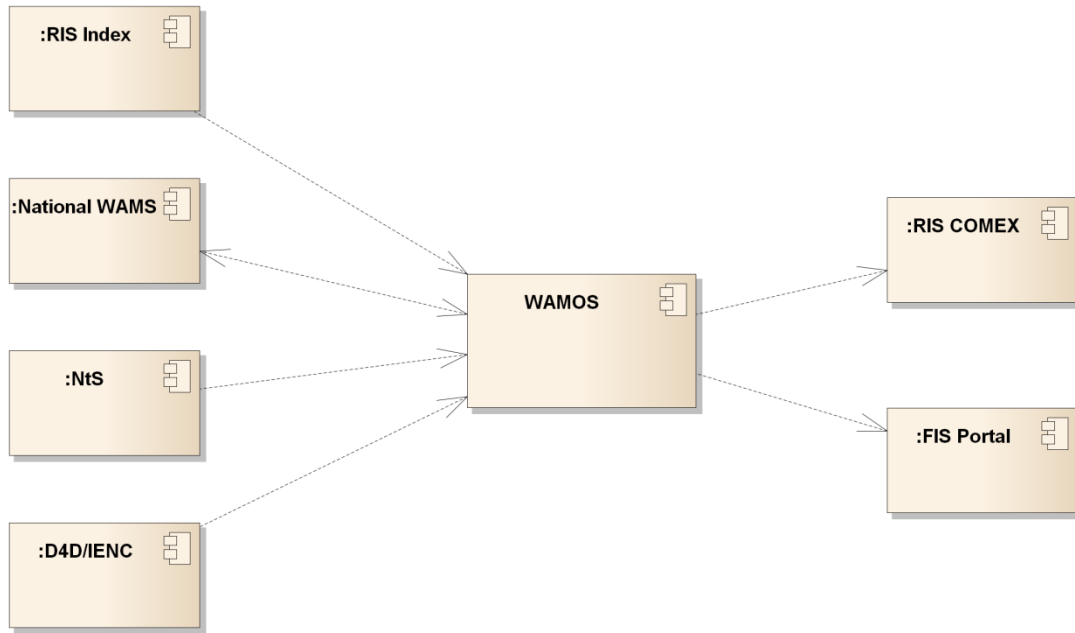


Figure 2: System Environment

### 3.4. Interface Available Fairway Depths

<b>Identity</b>	<b>IFFA (Interface Available Fairway Depths )</b>
<b>Description</b>	<p>The WAMOS Available Fairway Depths import interface integrates the Available Fairway Depths determined by the national authorities in the WAMOS System.</p> <p>The export interface provides the current availability for each critical section to external systems.</p> <p>The information of Available Fairway Depth describes the Level of Service of a particular Bottleneck as well as the current depth and width for this service levels. The interface is used by the use case [SUC11] for importing manually defined values (see also chapter 3.2.1. of the Data Requirements Catalogue for a detailed description of the data format).</p>
<pre>     graph LR       National_WAMS[":National WAMS"] -- "Available Fairway Depths «XML»" --&gt; WAMOS_Interface[":WAMOS Interface"]       WAMOS_Interface -- "Available Fairway Depths «XML»" --&gt; RIS_COMEX[":RIS COMEX"]   </pre>	
<p>Figure 3: Information flow Available Fairway Depths</p>	

<b>Assumptions</b>	All values concerning water depths are based on gauge zero of the reference gauge. All attributes, the attribute definition and possible values are based on the Data Requirement Document format. All values which are not in the allowed value range shall raise an error.
<b>Requires</b>	none
<b>Provides</b>	XML- SOAP interface
<b>Usage Constraints</b>	The Available Fairway Depths will be published by the Waterway Authorities once per day stating the availability of the previous day. This data is updated using the import method of the interface.  The current Available Fairway Depths must be provided using the semiautomatic calculation method. As the relevant measures of a bottleneck will only change, if waterway gauge measurements are updated, which is currently planned every 15 minutes, a change in availability can only be expected in this timeframe. The export contains the Available Fairway Depths of all bottlenecks, and it is possible to filter the bottleneck or waterway gauge by id.
<b>Operations</b>	In general, the manual import takes place every day, publishing the availability of the day before. Manually calculated availability will replace the semi-automatic calculations created by WAMOS. If no manual calculation is available WAMOS will calculate the availability depending on the available data.
<b>Quality</b>	The WAMOS interface must provide all current Available Fairway Depths information in less than 10 seconds.  The WAMOS interface must import Available Fairway Depths information of one waterway authority in less than 5 seconds.
<b>Security</b>	WAMOS serves its interfaces via HTTPS using TLS. So all interface calls will be encrypted. The WAMOS server will need a valid and trusted SSL certificate to ensure the servers authenticity to other systems.
<b>Import</b>	Pull (automatic process - interval as provided, the default is daily)
<b>Export</b>	Pull (interval as requested by external sources)

**Request\_import (determined by waterway authority)**

Method	Sample
WSDL	Annex\System_Interfaces\WSDL\IFFA\IFFA.wsdl
Methods	import_fa_request.xml

**Response\_import (determined by waterway authority)**

Status	Response
200	import_fa_response.xml
400	Not Found
401	Unauthorized
500	Internal Server Error

**Request\_export**

Method	Sample
WSDL	Annex\System_Interfaces\WAMOS_WSDL\IFFA\IFFA.wsdl
Methods	get_bottleneck_fa_request.xml get_section_fa_request.xml get_stretch_fa_request.xml

**Response\_export**

Status	Response
200	get_bottleneck_fa_response.xml get_stretch_fa_response.xml get_section_fa_response.xml
400	Not Found
401	Unauthorized
500	Internal Server Error

### 3.5. Use Case

ID	SUC11
Title:	Import Available Fairway Depths

**Description:** In case of a non semi-automatic calculation of the Fairway Availability the values have to be imported manually from the national authorities.

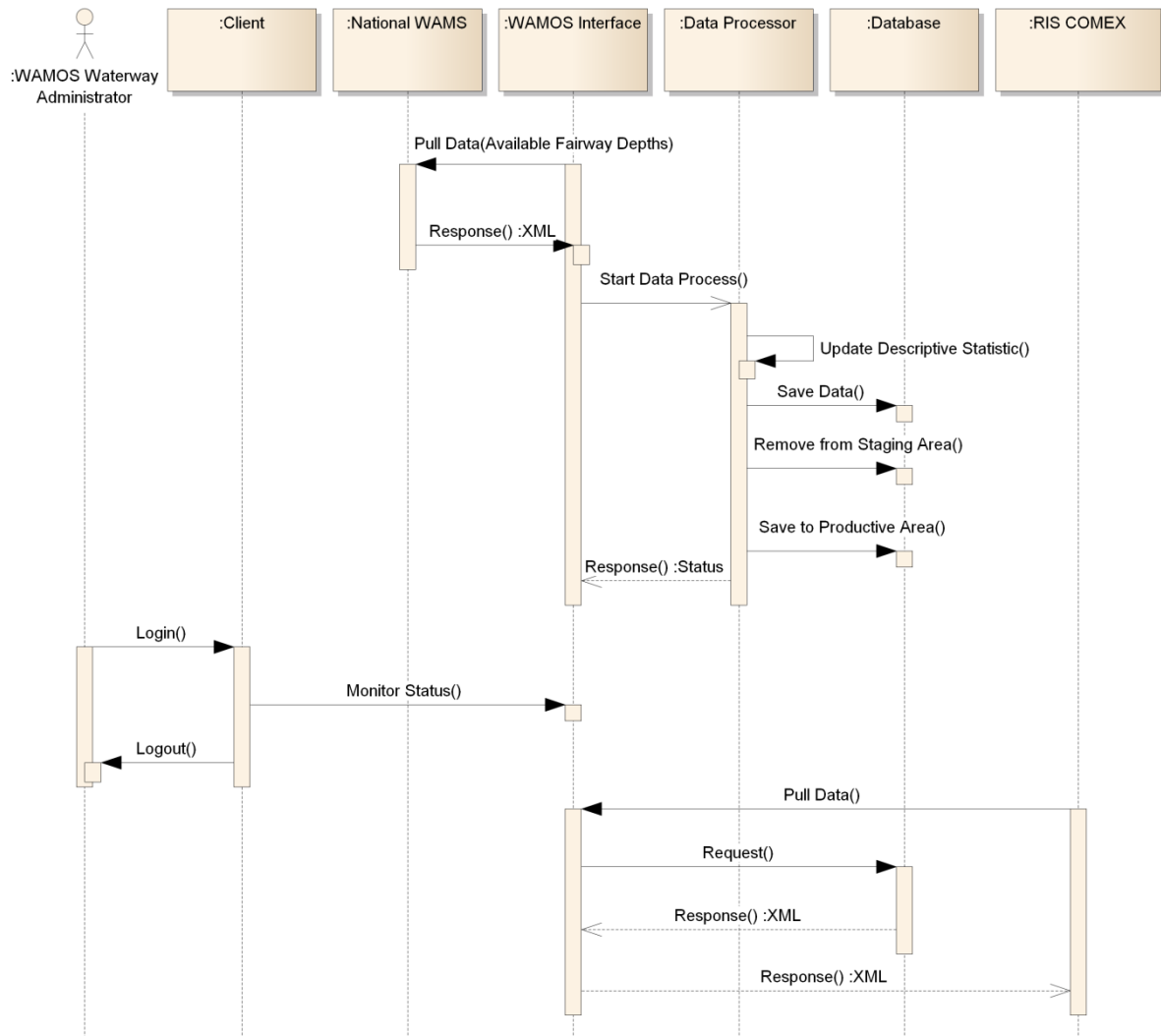


Figure 4: Sequence Diagram of the Available Fairway Depth Import Process

The Fairway Availability import of Gauge Measurements is a fully automatic process. The data request intervals shall be configurable. WAMOS actively has to request the Fairway Availability data.