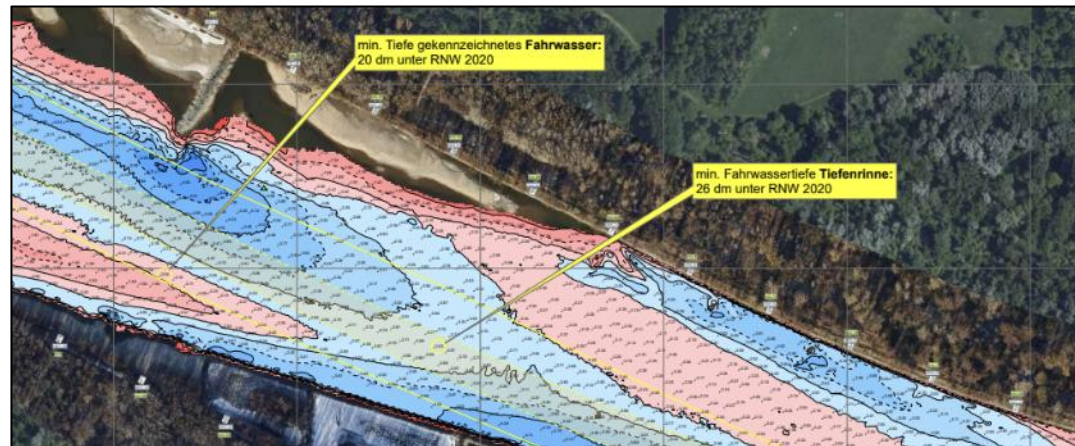


# Austrian experiences: Creation and maintenance of a deep fairway channel



Simon Hartl, Head of Team Waterway Management, viadonau  
Working Group Meeting on Technical Matters of the Danube Commission  
12 May 2026

# The Austrian section of the Danube waterway

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Length: 350.45 km

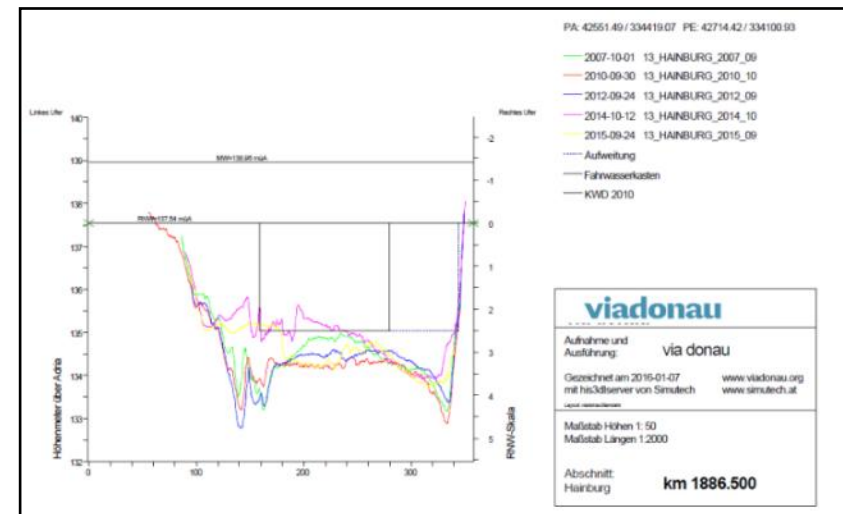
- ~ 90 km free-flowing sections
- ~ 260 km impounded sections
- 10 locks (traffic management)

~ 75% impounded  
~ 25% free flowing



# Challenges in waterway management

- Nautical and maintenance challenges mainly in both **free-flowing sections** due to smaller cross-sections and higher flow velocities of the river (accumulation of bedload and sediments in areas with reduced bed shear stress = “shallow sections”)
- **Monitoring** of shallow sections in free-flowing sections on a regular basis (monthly to bimonthly multibeam surveys)
- **Proactive dredging** measures in shallow sections, i.e. prior to periods with low water levels (according to long-term statistics)



# Prioritisation of maintenance measures – Why prioritise?

- Waterway users need sufficient fairway depths in **low-water periods**  
-> need to remove critical locations **as fast as possible** and prior to low-water periods
- The weakest location on a specific stretch determines the possible **draught loaded** of a vessel
- Once the **weakest spot** has been eliminated, the second weakest spot determines the draught loaded ... etc.
- Determining factors: Limited **dredging capacity** on the market; **suitability of equipment** for free-flowing river; time needed for receiving **official notifications** (environmental, navigation law)

# Prioritisation of maintenance measures – How to prioritise?

To assess the varying urgency of removing “critical/shallow sections” in free-flowing sections, a distinction can be made as to:




- **Depth of the fairway** according to international standards
- **Width of the fairway** according to
  - maximum and/or typical vessel or convoy sizes for the respective river section (restrictions in Austria due to lock dimensions: max. 4-unit pushed convoy)
  - restrictions due to official permits (e.g., under water law east of Vienna: dredging only to a maximum width of 100 m in the fairway)
- **Type of possible traffic**, i.e., oncoming or one-way traffic, with reference to the maximum and/or typical vessel sizes

- > Identification of the width of the "traffic lane" needed by vessels/convoys ...
- ... for **critical locations** in the two free-flowing stretches of the Austrian Danube waterway
  - ... in consideration of **different curve radii** on critical stretches of the waterway
  - ... on the basis of **three general traffic situations** ("levels of service")

Fairway depth of 2.5 m at LNWL  
(= 343 days/year)

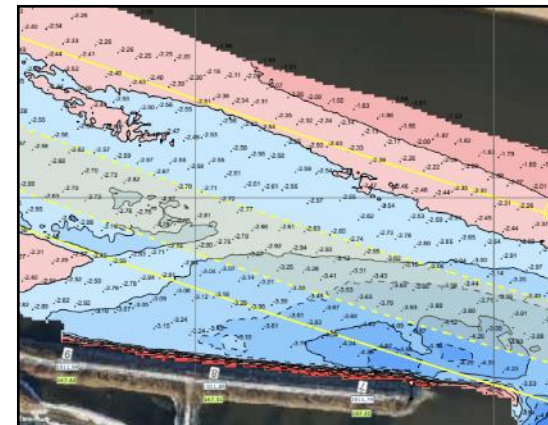
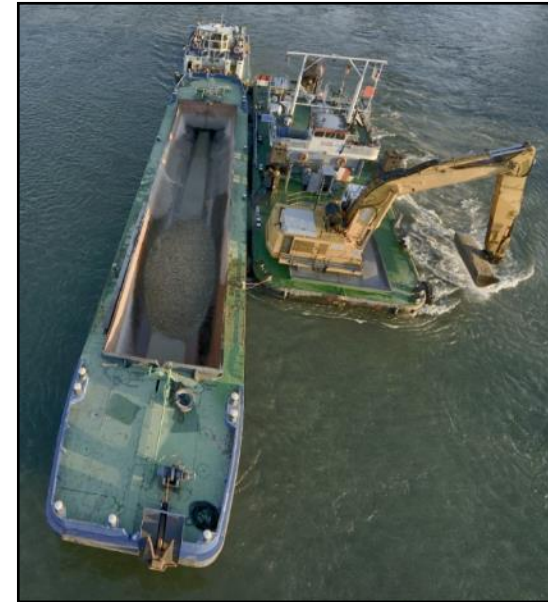
# Levels of service for waterway maintenance

Based on the influencing factors for prioritizing waterway maintenance measures (cf. prior slide), **three levels of service (LoS)** were defined for maintenance on the Austrian section of the Danube waterway:

	LoS 1	LoS 2	LoS 3
	4-unit pushed convoy downstream in one-way traffic	4-unit pushed convoy downstream passing single vessel upstream	Two 4-unit pushed convoys passing
curve radius:			
< 1,000 m	80 m	120 m	160 m
1,000 - 1,500 m	60 m	100 m	120 m
> 1,500 m	40 m	80 m	100 m

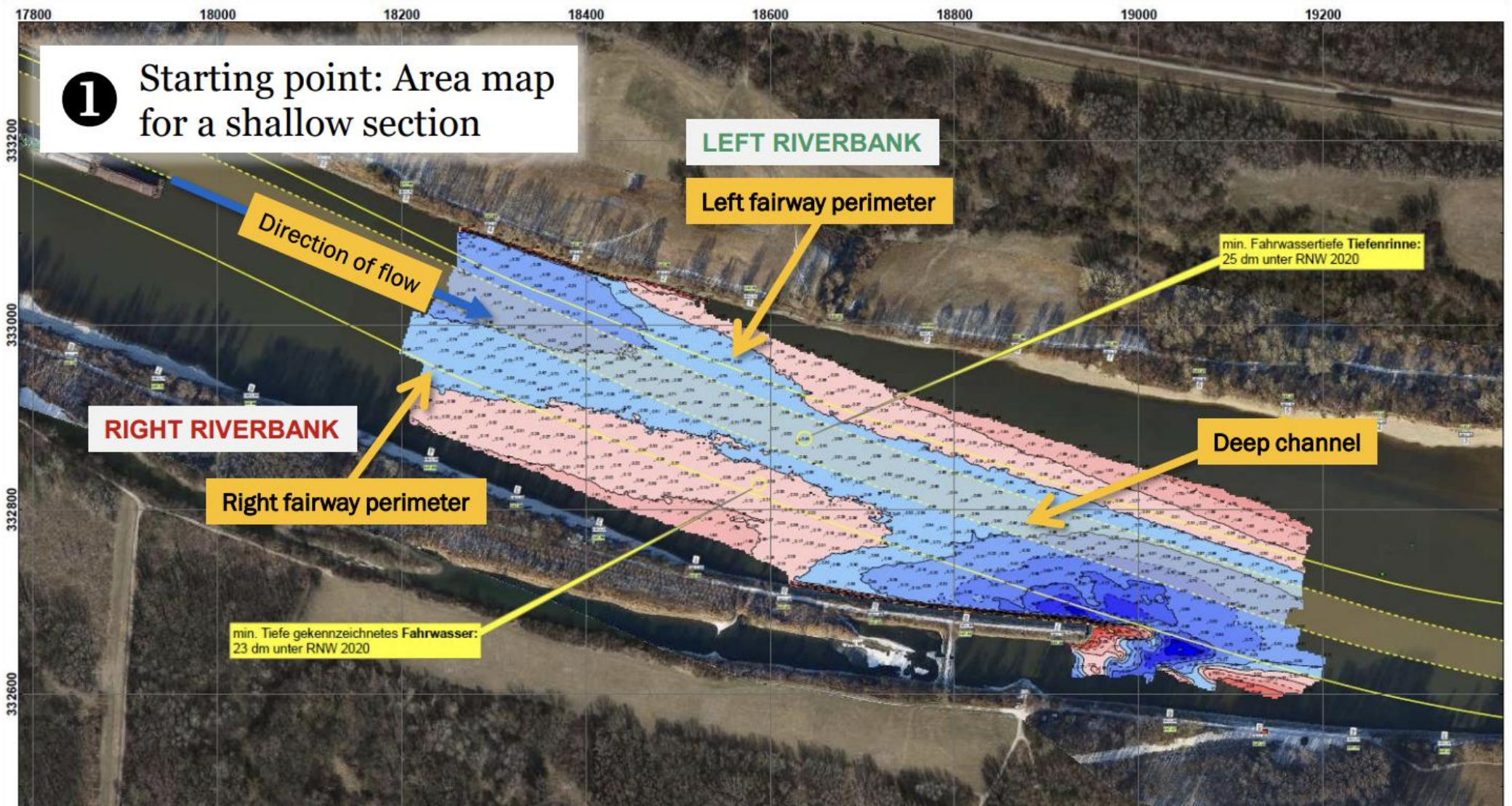
# Maintenance dredging

- Priority is given to dredging in critical or shallow sections to a width according to LoS 1 in order to **restore the continuity of the fairway and the fluidity of traffic as quickly as possible**
- After the continuity of the fairway has been established, dredging will take place in the shallow areas to the **entire width of the fairway** (taking into account official restrictions, e.g. due to water law)
- **Shallow section information** is provided to navigation for both the LoS 1 area (“deep channel”) and the entire width of the fairway



1

# Starting point: Area map for a shallow section



**RIGHT RIVERBANK**

**LEFT RIVERBANK**

**Direction of flow**

**Left fairway perimeter**

**Right fairway perimeter**

**min. Fahrwassertiefe Tiefenrinne:  
25 dm unter RNW 2020**

**Deep channel**

**min. Tiefe gekennzeichnetes Fahrwasser:  
23 dm unter RNW 2020**

gekennzeichnetes Fahrwasser

Tiefenrinne

**Furt Buchenau**  
Strom-Km 1912.4 - 1911.5

**Multibeamaufnahme vom 18.08.2023**  
Die dargestellten Tiefenwerte beziehen sich auf das Reguliereniederwasser 2020 (RNW 2020)  
Richtpegel für aktuelle Wasserstände ist der Pegel Wüdingmauer (Strom-km 1954,72), RNW2020 = 155 cm

Maßstab 1 : 2.000 (DIN A1)

0 50 100 200 m

Datenquelle Österreich:  
Geographik (Eri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Aero, GeoEye, IGN, SIP, satellite, AirPhoto, US, User Contributed),  
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**Information zur Aufnahme**

Es wird darauf hingewiesen, dass die Aufnahme lediglich eine Zusatzinformation zu den publizierten Informationen über die Sechsstellen darstellt. Die abgebildete theoretische Fahrwinne stimmt mit dem in der Inland ECDIS-Karte angegebenen "fairway" überein, kann jedoch vom tatsächlichen Fahrwasser abweichen. ACHTUNG: Für die tatsächliche Begrenzung des Fahrwassers beachten Sie bitte die Schiffsverkehrsregeln (Bogen, Tonnen, Umbochen) vor Ort. Diese sind maßgebend für die Navigation.

Es wird darauf hingewiesen, dass sich die aktuelle Lage der Stromstelle von der Darstellung in der Aufnahme aufgrund der zeitlichen Differenz zum Aufnahmezeitpunkt unterscheiden kann. Zudem kann die Abbildung nicht der Fahrwasserbreite entsprechen. Der Schifffahrer muss daher die mögliche Abstände unter Berücksichtigung der Einseitigkeit und des erforderlichen Fließwassers während der Fahrt, der Art der Ladung und der allgemeinen Sorgfaltspflicht in eigener Verantwortung bestimmen.

**Tiefenmeter**

Blue	- 5.00
Dark Blue	- 4.99 - 4.50
Light Blue	- 4.49 - 4.00
Medium Blue	- 3.99 - 3.50
Light Blue	- 3.49 - 3.00
Light Blue	- 2.99 - 2.50
Light Blue	- 2.49 - 2.00
Light Blue	- 1.99 - 1.50
Light Blue	- 1.49 - 1.00
Light Blue	- 0.99 - 0.50
Light Blue	- 0.49 - 0.00
Light Blue	0.01 - 0.50
Light Blue	0.51 - 1.00
Light Blue	1.01 - 1.50
Light Blue	1.51 - 2.00
Light Blue	2.01 - 2.50
Light Blue	> 2.51



3

Where is the measurement data for the shallowest parts in the fairway?

Minimum water depth within the deep channel \* below LNWL 2020 at the date of measurement

min. Fahrwassertiefe Tiefenrinne: 25 dm unter RNW 2020

Minimum water depth within the marked fairway (entire width) below LNWL 2020 at the date of measurement

min. Tiefe gekennzeichnetes Fahrwasser: 23 dm unter RNW 2020

\* **Deep channel** = the area of the fairway which provides the width required for a 4-unit convoy travelling downstream. The respective width of the fairway is dependent on the river bend radii involved. Accordingly, passing and overtaking within the confines of the deep channel is generally not possible. When necessary, and in accordance with Articles 6.04, 6.05 and 6.10 of the Waterway Traffic Act, vessels should wait at a suitable location until it is possible to proceed through a shallow area using the deep channel of the main fairway.

gekennzeichnetes Fahrwasser

Tiefenrinne

**Furt Buchenau**  
Strom-Km 1912.4 - 1911.5

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Richtpegel für aktuelle Wasserstände ist der Pegel Wildungsmauer (Strom-km 1834.72), RNW2020 = 155 cm

Maßstab 1 : 2.000 (DIN A1)

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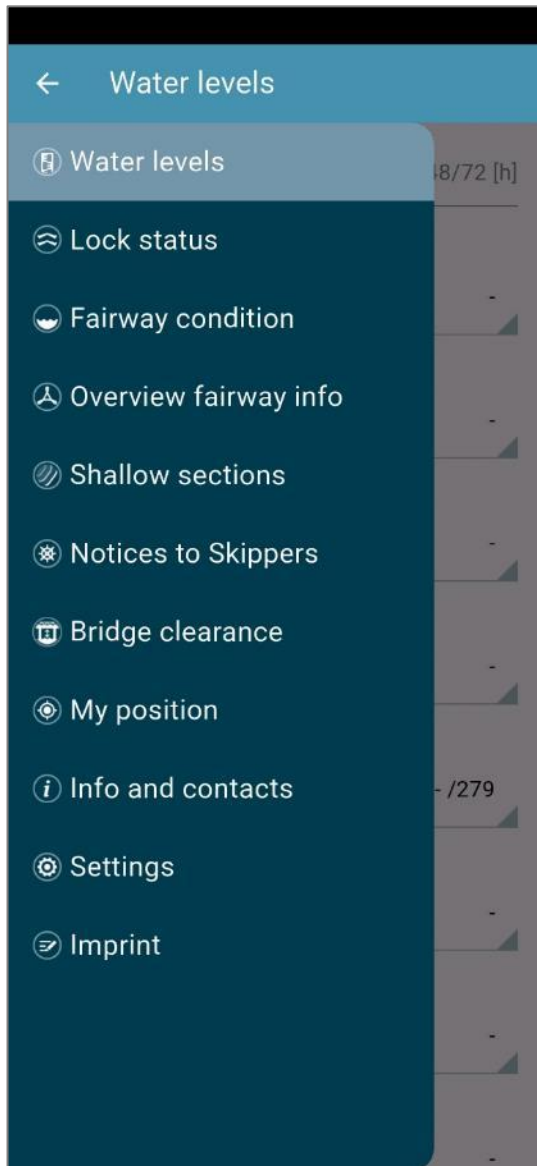
Tiefenrischen

- 5.00
- 4.96 - 4.50
- 4.48 - 4.00
- 3.96 - 3.50
- 3.48 - 3.00
- 2.96 - 2.50
- 2.48 - 2.00
- 1.96 - 1.50
- 1.48 - 1.00
- 0.96 - 0.50
- 0.48 - 0.00
- 0.01 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- > 2.51

# DoRIS Mobile App

... available on the Google Play Store and the iTunes App Store

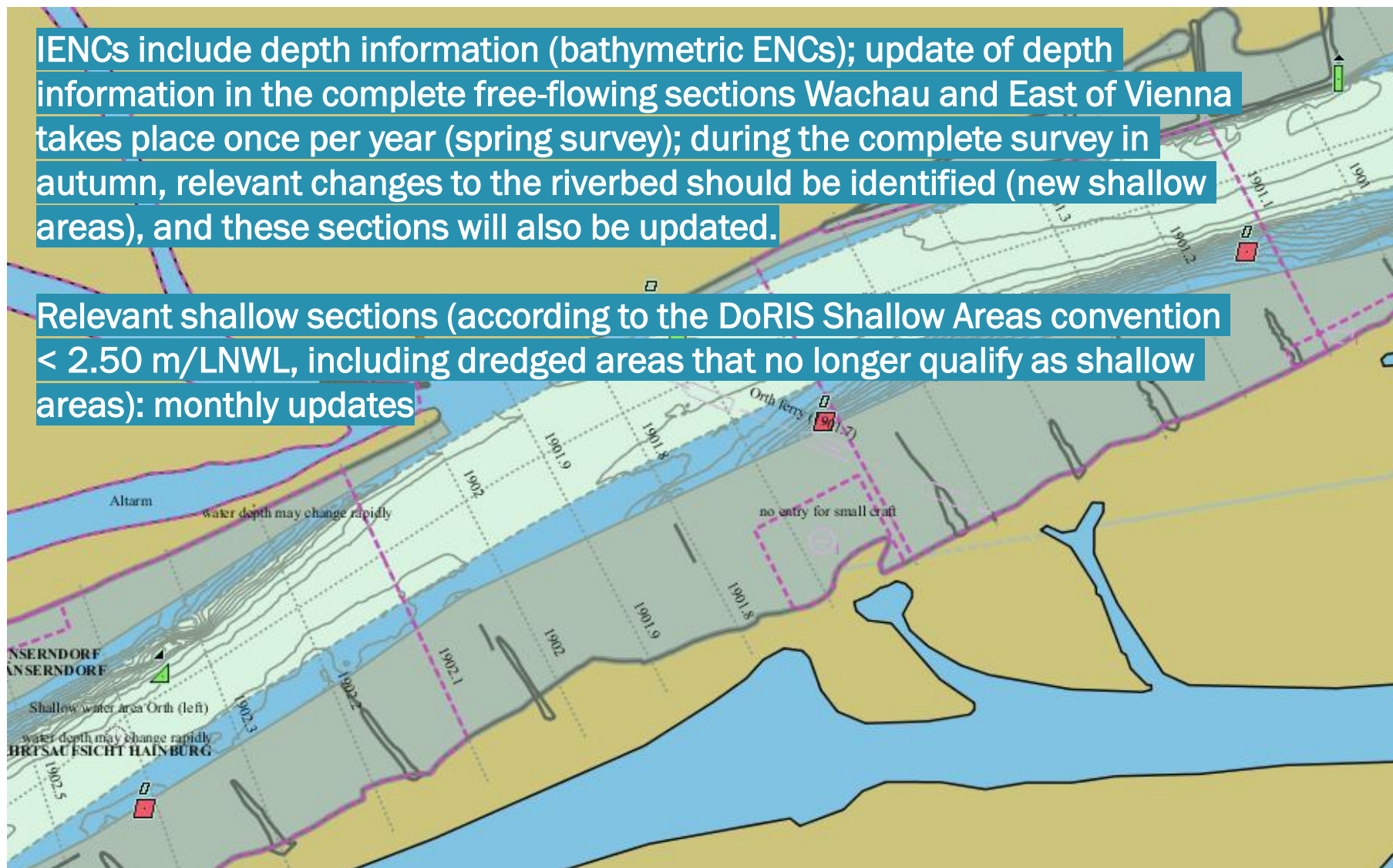
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# Inland ENCs (Electronic Navigational Charts)

INENCs include depth information (bathymetric ENC); update of depth information in the complete free-flowing sections Wachau and East of Vienna takes place once per year (spring survey); during the complete survey in autumn, relevant changes to the riverbed should be identified (new shallow areas), and these sections will also be updated.

Relevant shallow sections (according to the DoRIS Shallow Areas convention  $< 2.50$  m/LNWL, including dredged areas that no longer qualify as shallow areas): monthly updates



# Inland ENC (Electronic Navigational Charts) – planned implementation of recommended track

Definition of recommended tracks in IENC:  
*“A route which has been **specialy examined** to ensure so far as possible that it is free of dangers and along which **ships are advised to navigate**”*



Implementation in the Netherlands

Recommended tracks in IENC include all channels **recommended for hydrographic reasons** to lead safely between shoal depths. The use of such tracks is generally left to the discretion of the captain.

-> Austria: recommended track = **centre line of the defined deep channel** for the shallow sections of the Austrian Danube

**Implementation envisaged for the Austrian Danube in 2026!**

# Inland ENC (Electronic Navigational Charts) – planned implementation of recommended track

Next implementation steps – “recommended track” (Austria)

## 1. Technical & hydrographic definition

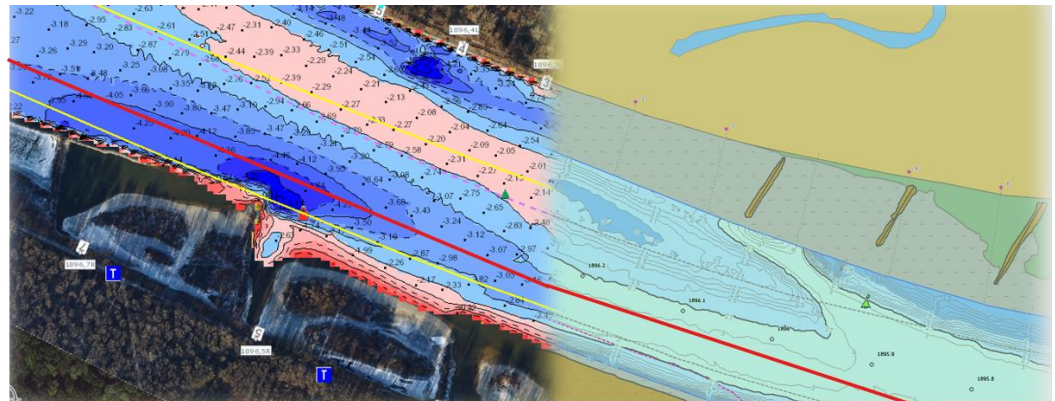
- Define track criteria
- Assign responsibilities for definition and approval
- Align with captains and Inland ECDIS experts

## 2. Technical specification

- Finalise encoding rules (objects&attributes) according to Inland ECDIS Standard
- Check consistency with existing Inland ENCs and bathymetric IENCs

## 3. Pilot implementation & testing

- Select test section
- Implement in base IENC
- Practical tests and collection of feedback from captains



# Inland ENC (Electronic Navigational Charts) – planned implementation of recommended track

Next implementation steps – “recommended track” (Austria)

## 4. Update & maintenance concept

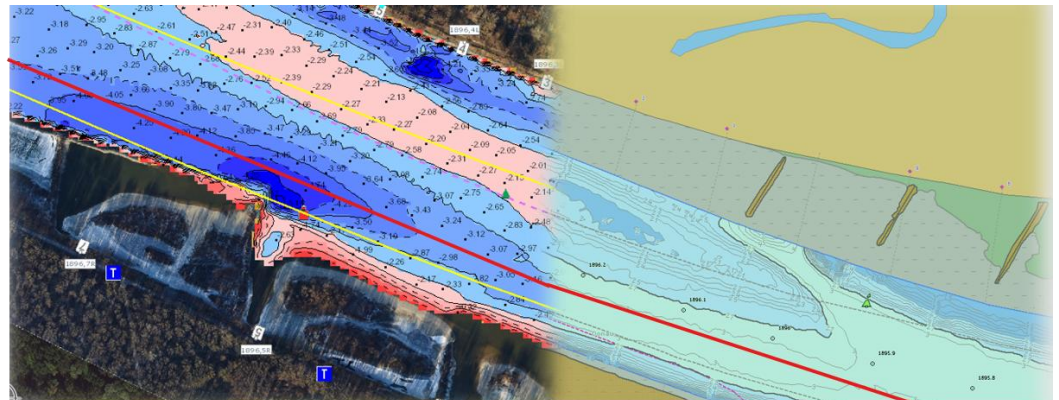
- Define update interval (e.g. monthly in synchronisation with bathymetric IENC updates)
- Maintain versioning and documentation

## 5. Communication & roll-out

- Inform users (e.g. RIS, Notices to Skippers)
- Clarify recommended status
- Coordinate with neighboring countries in border areas

## 6. Evaluation

- Monitor usage and feedback



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