

Danube east of Vienna

Waterway Management in a National Park

26. April 2017



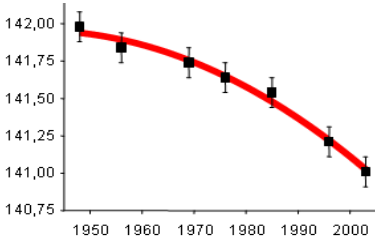
Danube East of Vienna



Approx. 48 km long
 From: Freudenuau Power Plant (River-km 1.921,0)
 To: Austrian-Slovak border (River-km 1.872,7)
 Height difference: approx. 18 m (40 cm/km)
 Fluctuations in water levels: up to 7 m

Deficits & objectives Danube East of Vienna

Riverbed degradation



decoupling of river and floodplains, falling groundwater levels
 → Stabilization of water levels

Heavily regulated river in National Park area



habitats of typical local flora and fauna are at risk
 → Improvement of environmental conditions

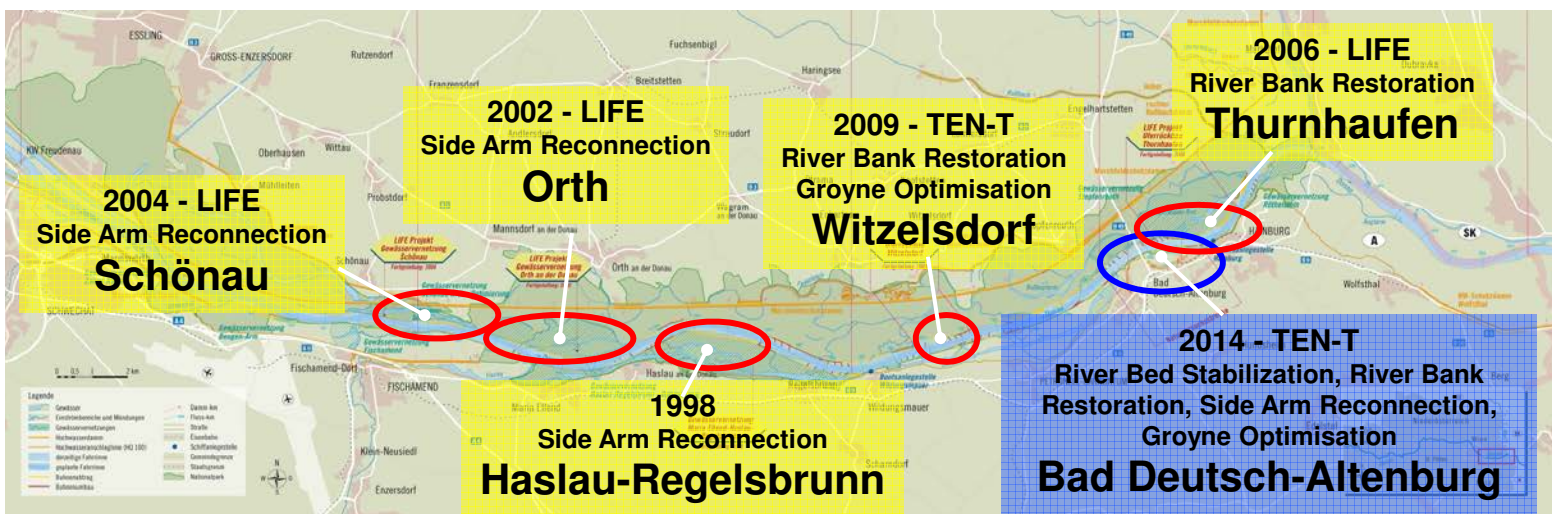
Inadequate fairway depths



limited competitiveness of inland waterway transport
 → Improvement of fairway conditions / opt. waterway infrastructure

High diversification of objectives
 interdisciplinary approach, stakeholder participation

Pilot projects east of Vienna



Pilot Project Bad Deutsch-Altenburg



Granulometric River Bed Improvement. Approx. 120.000 m³ of coarse gravel



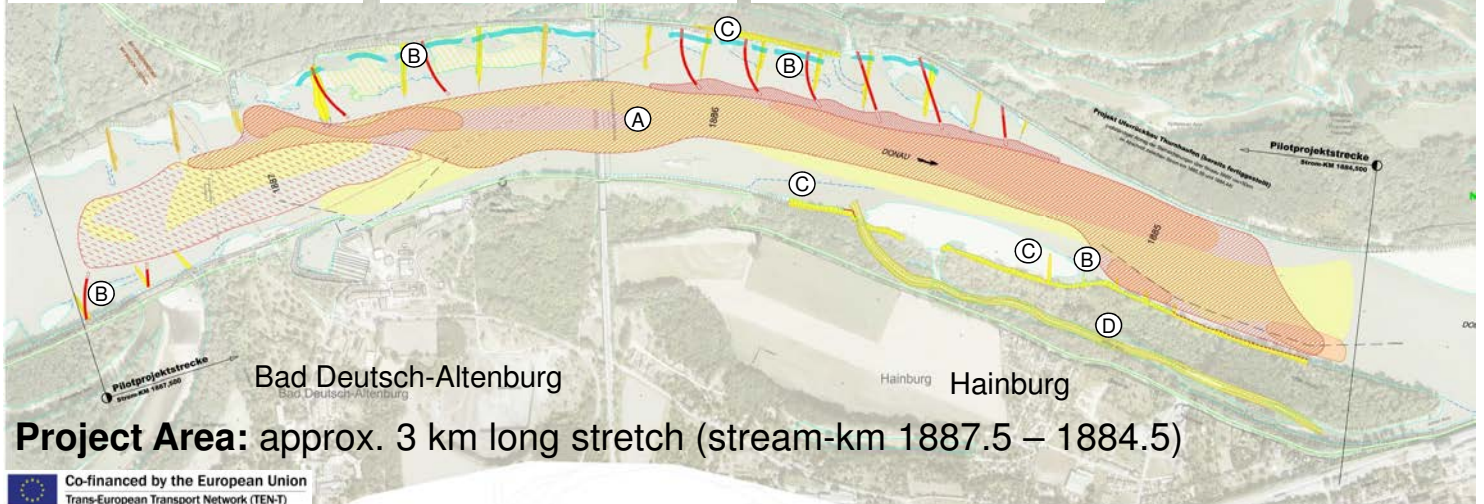
Optimization of Groynes – new location and new shapes -19 old +10 new groynes



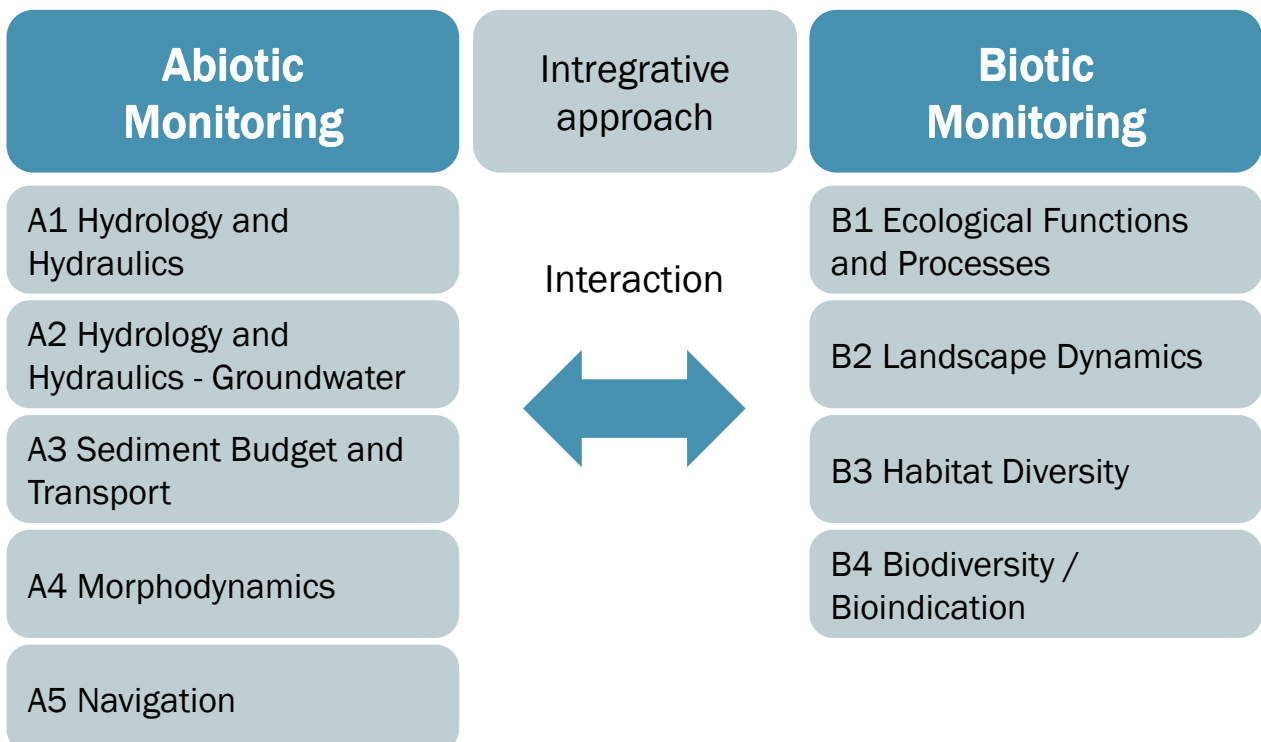
River Bank Restoration - removal of 1,2 km stone amour along the river bank



Reconnection of the Johler Side Arm, 1,4 km long. Discharge of 10 m³/s at low water



Integrative Monitoring Programme

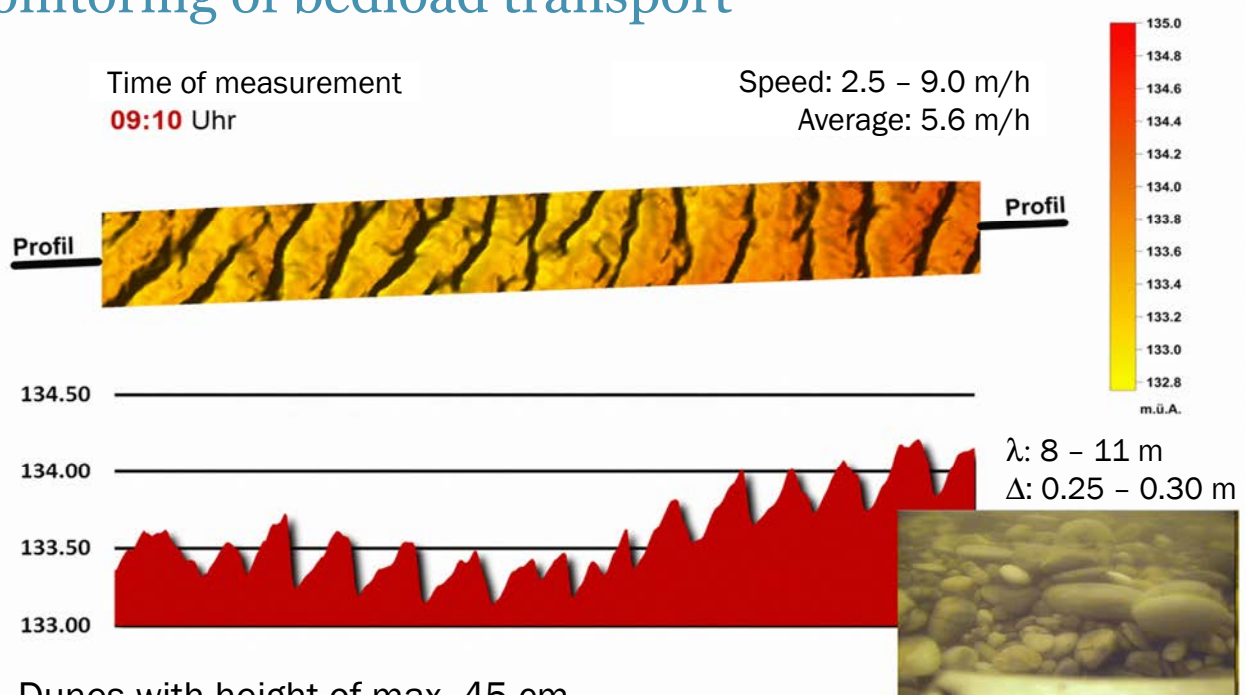


Some Results

- Granulometric riverbed stabilisation is technically feasible within strict quality requirements. It is now „state of the art“.
- Overrun tests confirmed compatibility with navigation (propulsion).
- Contribution of coarser gravel to riverbed stability was over-estimated by numerical and physical models.
- Groynes have a significant influence on the river bed.
- New habitats establish after short periods of higher water levels and were populated nearly immediately.



Results Monitoring of bedload transport



- Dunes with height of max. 45 cm
- After dredging, dunes migrate by approx. 5,6 m/h in the dredging field
- Significant influence on riverbed stability & discussion of fairway depths

Integrated River Engineering Project

From large-scale project towards a catalogue of measures

- The results of the pilot phase have been combined with new developments in waterway management (WAMS) and traffic management (DoRIS Services).
- The **implementation strategy** was adopted to the findings: Turning away from a large scale project (“General Project 2006”) towards adopted maintenance processes and smaller optimization projects.
 - Catalogue of measures for the Danube East of Vienna
- **Realization in order by priority**
 - Priority 1: Realization by 2022 (Action Programme Danube of the MoT)
 - Priority 2: Realization by 2030

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Catalogue of Measures Optimization projects

Step-by-step approach in order by priority



Low-water regulation



Sidearm reconnection



Riverbank restoration

▲ Optimizing regulation structures:
„More” in critical fords
“Less” in sections with river bed
degradation

Small-scale measures are
modifications of piers, traffic
management measures, etc. ►



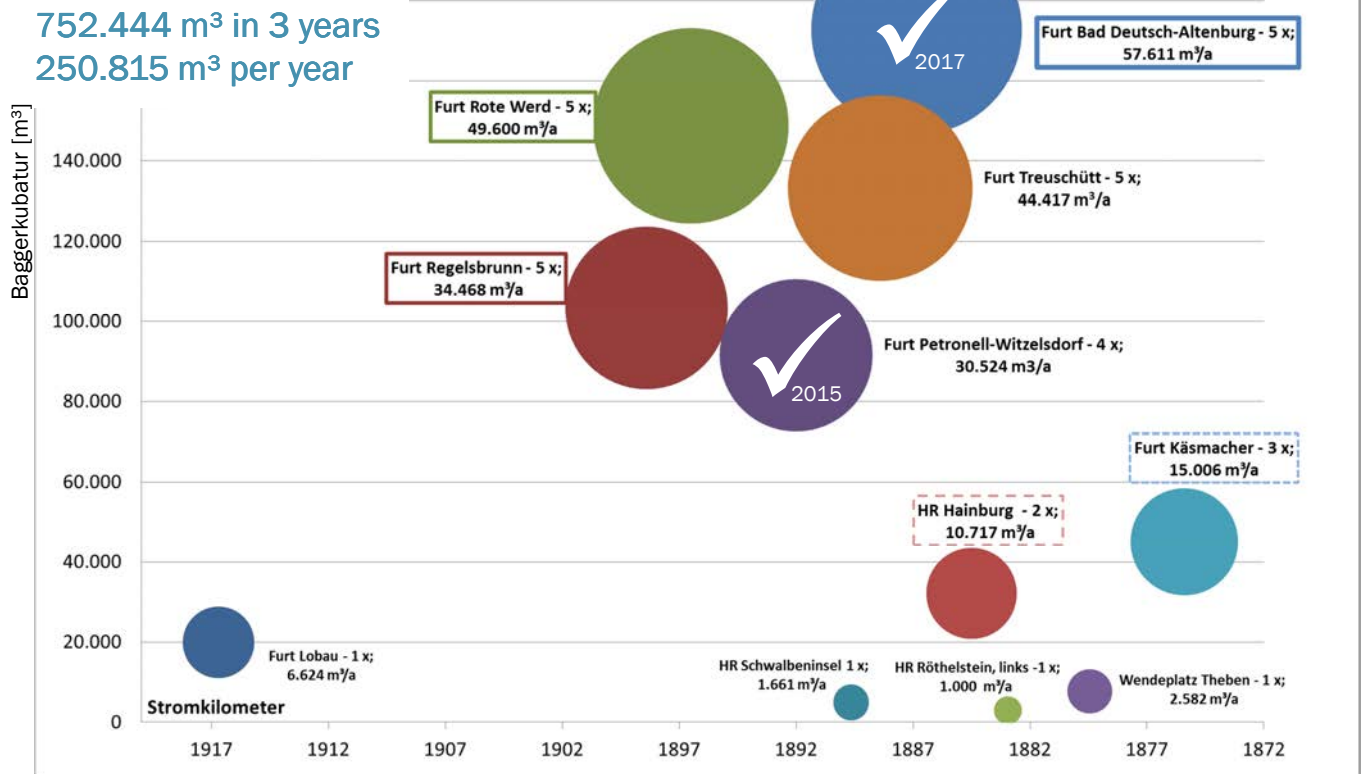
Small-scale Measures



Stabilisation critical scours

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One big bottleneck? - dredging east of Vienna 2014-2016

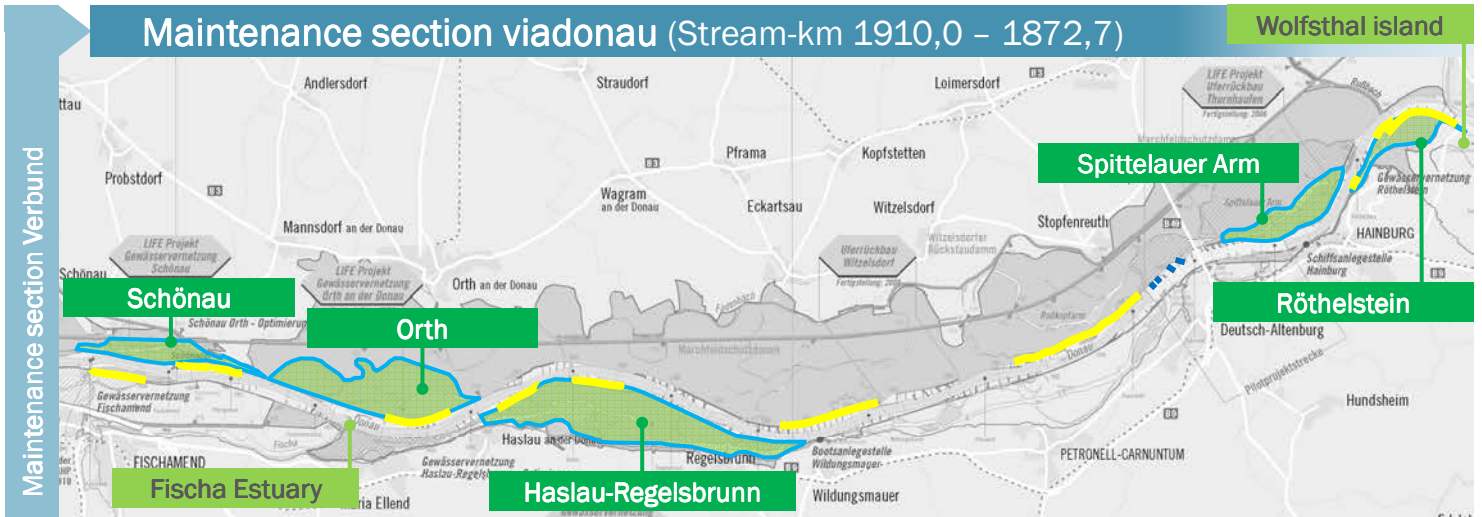


Renaturation works Side arm reconnection and riverbank restoration

viadonau

Maintenance section viadonau (Stream-km 1910,0 – 1872,7)

Wolfsthal island



- side arm reconnection
- riverbank restoration (schematic)

Catalogue of Measures Processes

Processes / Integrative Sediment Management

- opportunity for continuous improvement over the years.
- possibility to react on the effects of the work of previous years, on discharge, etc.

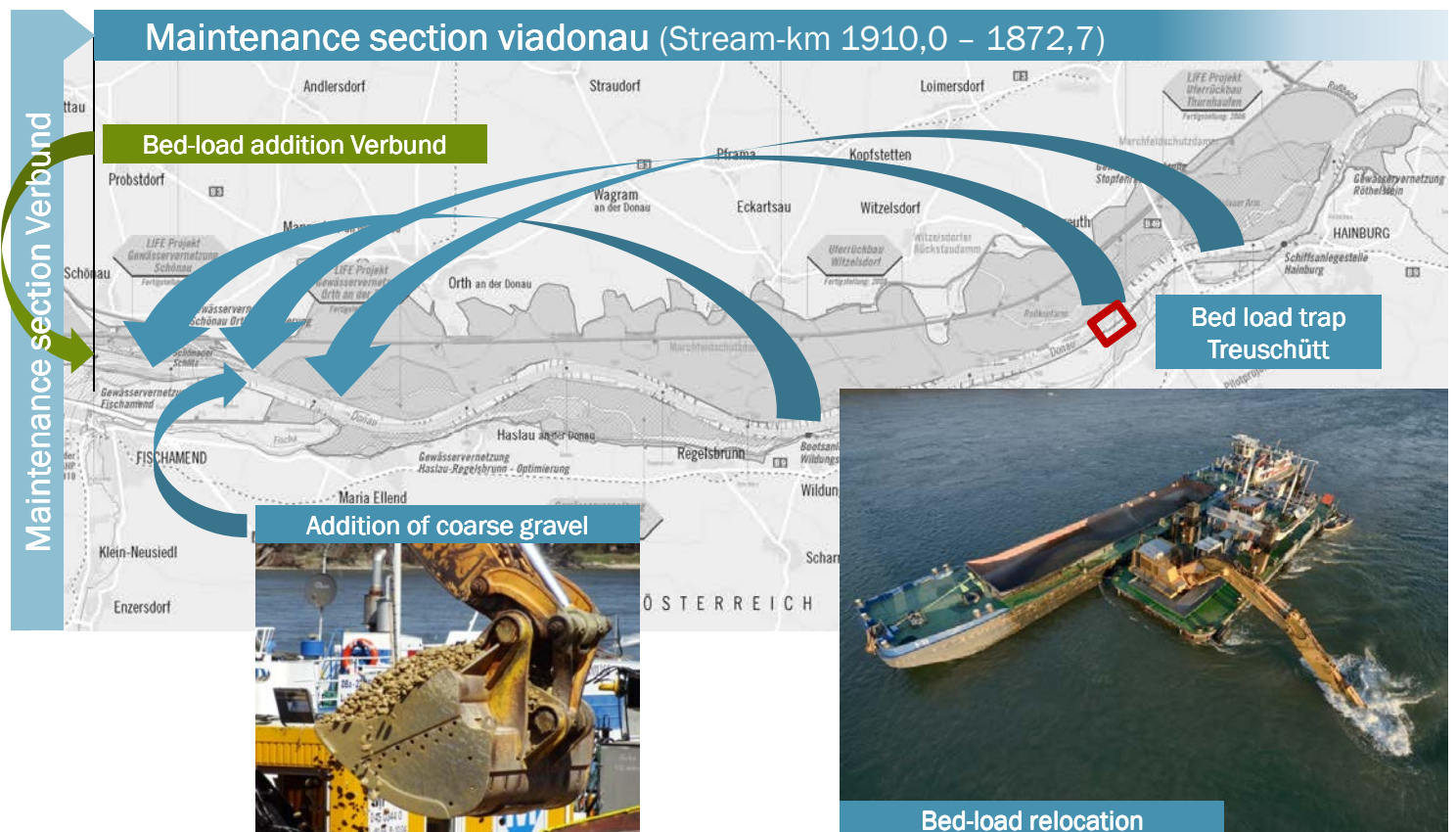
Types of processes

- Relocation of gravel (upstream)
 - gravel excavated in the course of maintenance dredging
 - gravel excavated in bedload traps
- Local addition of coarser gravel



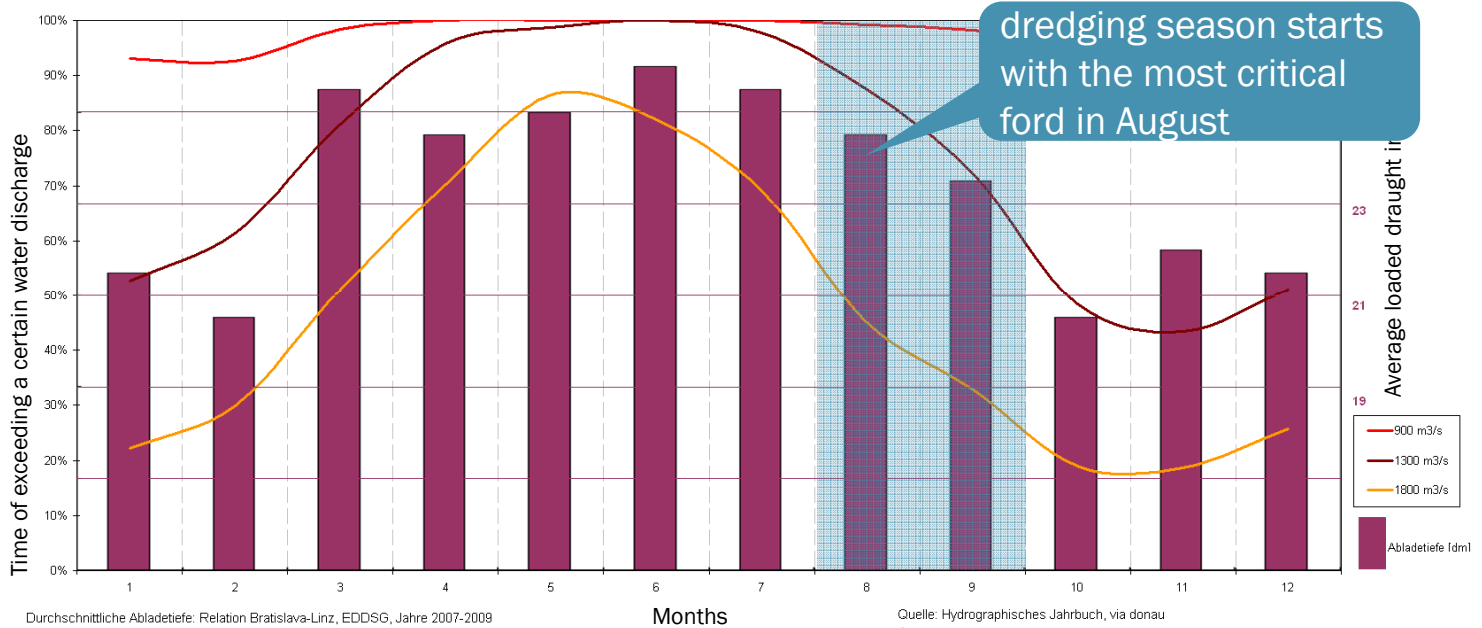
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Integrative Sediment Management



Discharge and loaded draught proactive and timely dredging of critical fords

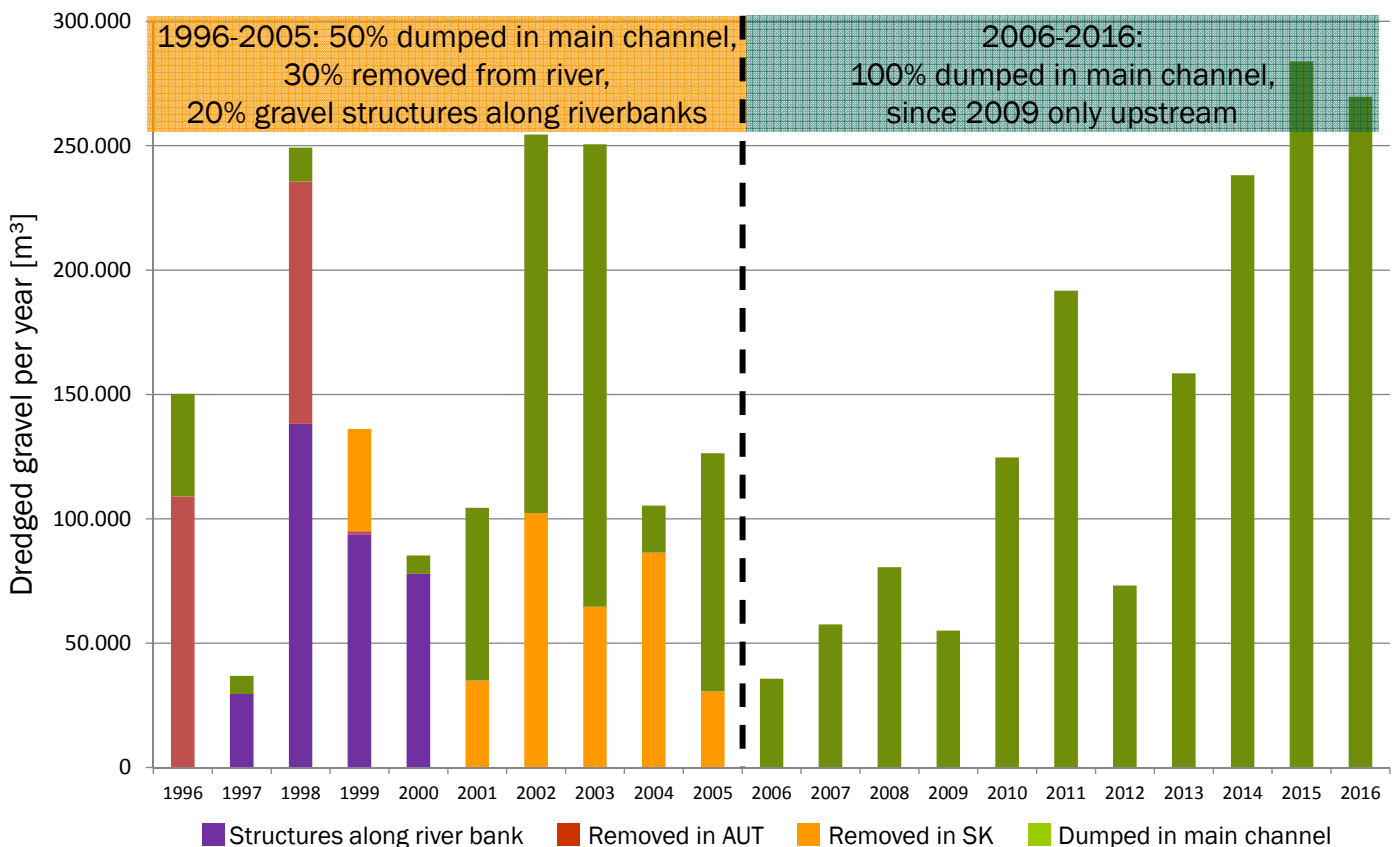
Correlation between average loaded draught and discharge - Vienna



bars: average loaded draught of vessels between Bratislava-Linz. EDDSG 2007-2009
 lines: probability of exceeding 3 different water discharges between low and mean water (average over 30 years)

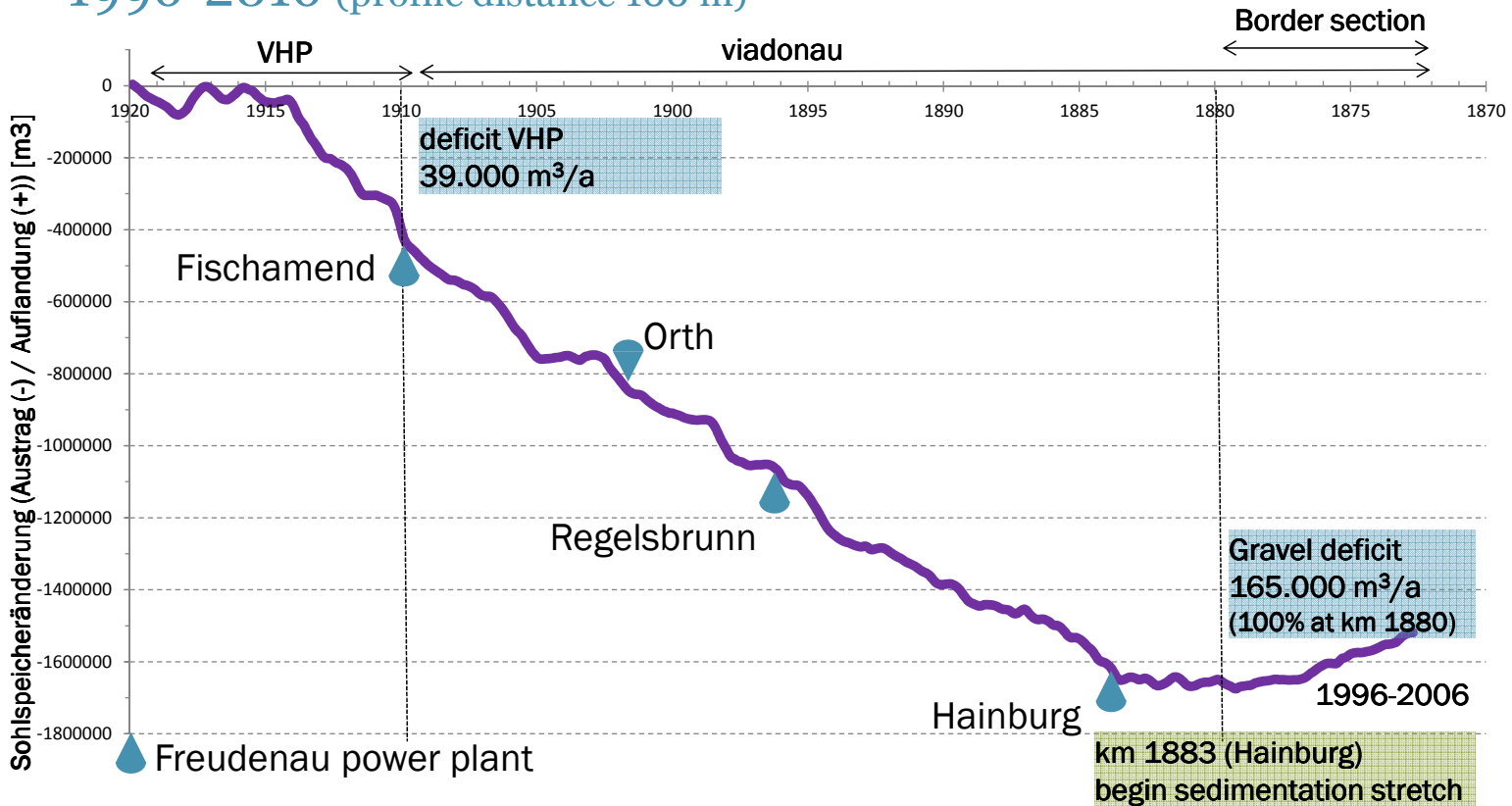
Sediment management

Usage of dredged gravel east of Vienna 1996-2016



Added up gravel deficit 1996-2016 (profile distance 100 m)

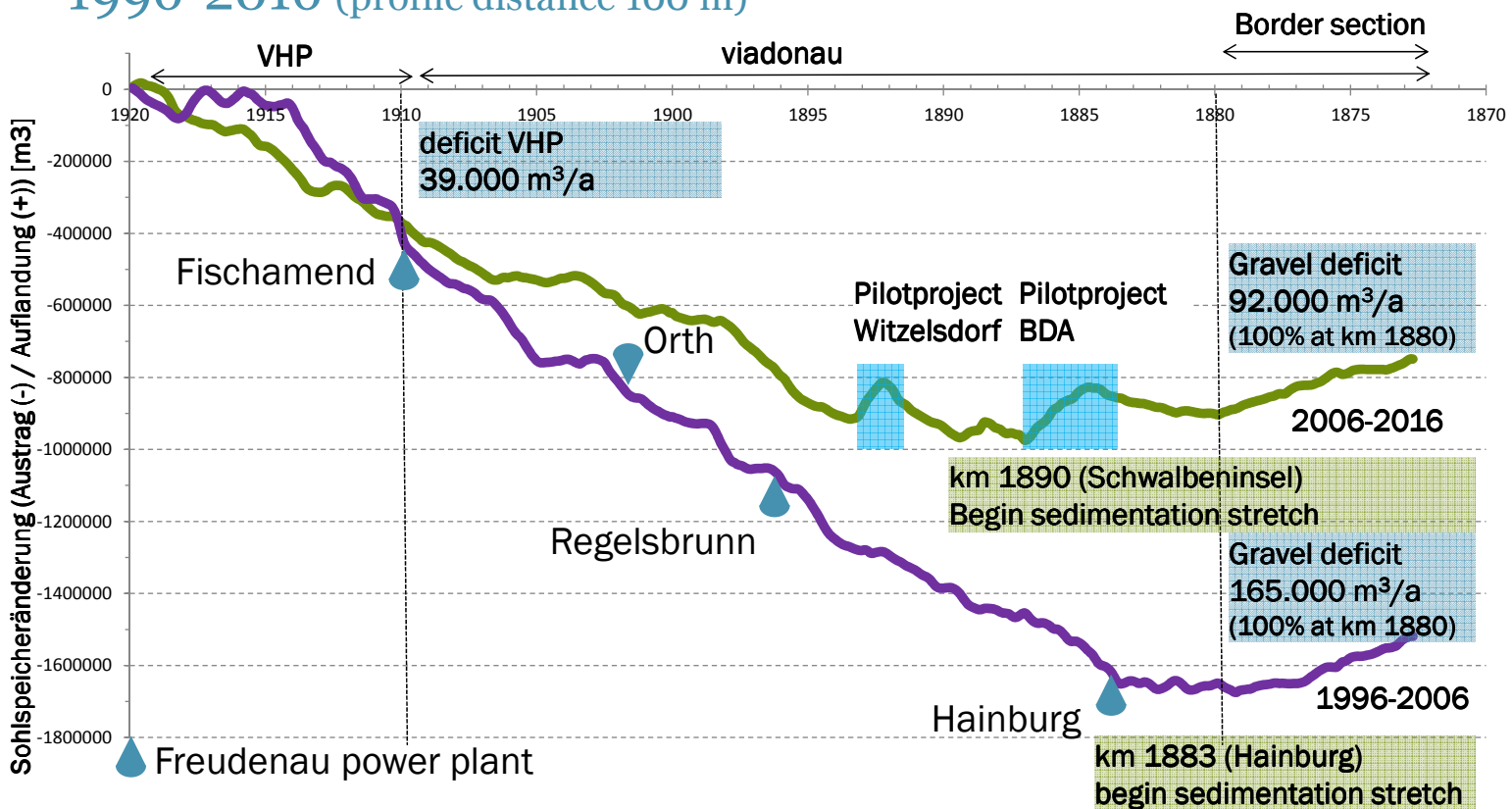
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Added up gravel deficit 1996-2016 (profile distance 100 m)

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Integrated River Engineering Project / Catalogue of Measures

Supporting processes

- **Scientific supervision / Monitoring** to measure the impact of the measures and to ensure ongoing “Learning from the river” also in future.
- Continuation of **stakeholder participation** to integrate stakeholders from ecology and navigation and civil society.
 - Possibility to accompany and influence the implementation of the Catalogue of Measures.
 - Discussion on guiding principles for future management of the free-flowing section.

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Stakeholder Forum 2012-2015

The Stakeholder Forum (“Akteursforum”) allowed the **structured integration of stakeholders** in the project. The forum ...

- accompanied the realization of the Pilot Project Bad Deutsch-Altenburg
- discussed the outcome and the consequences for future projects, especially the consequences for the Integrated River Engineering Project

Ten stakeholders with voting power:

- 4 stakeholders from economy / navigation sector
- 4 stakeholders from environmental NGOs
- 1 representative of National Park
- 1 representative of ICPDR

Observers were welcome to the meetings



The stakeholders were supported by an independent **Scientific Board**. It was made of 5 experts for the fields of navigation, ecological river engineering, hydrology and ground water, biodiversity, hydrobiology and fish ecology

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Thank you for your attention!

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