The importance of SEDIMENTS

Danube Sediment Project

DanubeSediment

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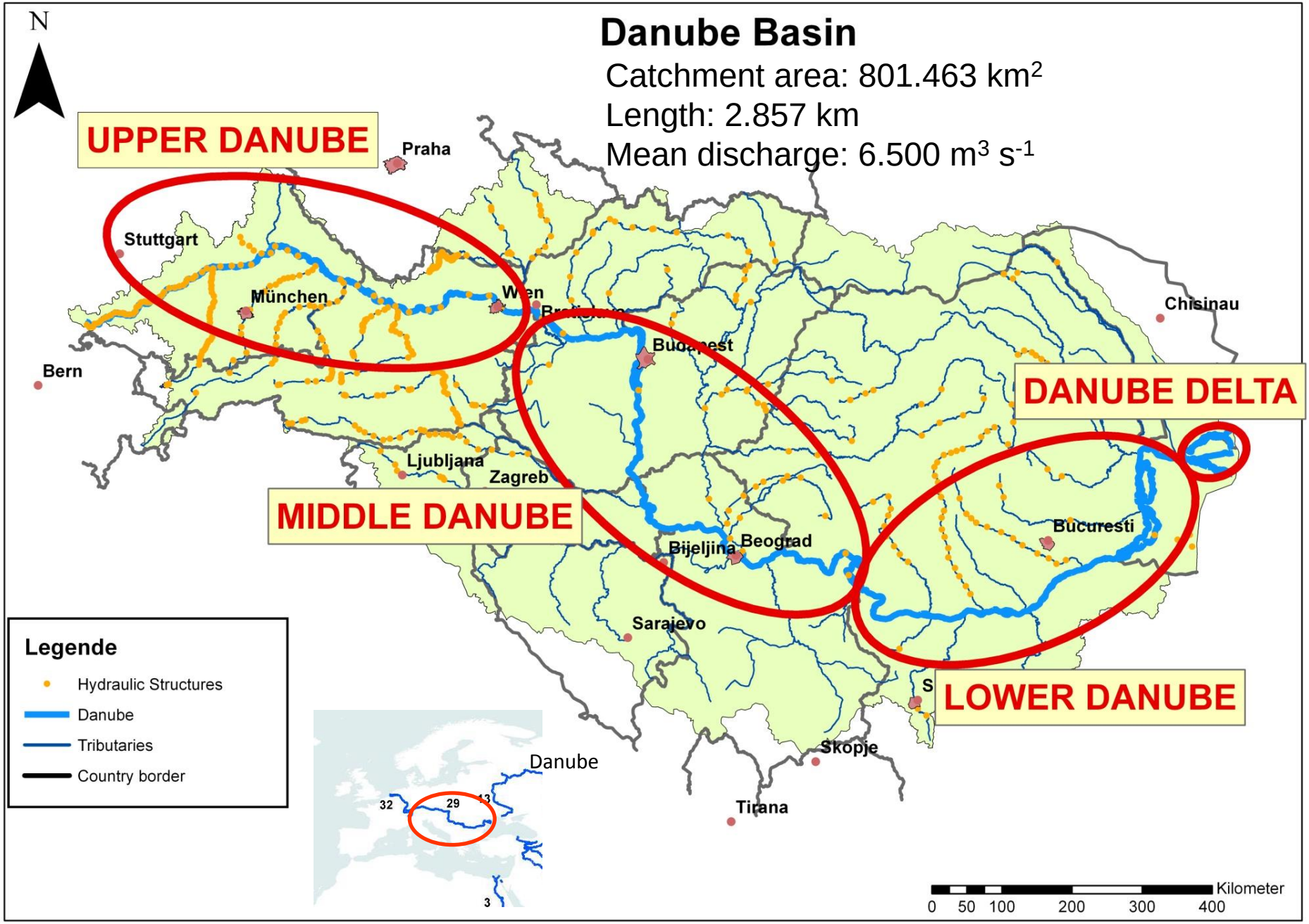
- Relation to Danube River Research and Management DREAM
- Objectives of the Danube Sediment Project for the Danube Transnational Programme → further infos: Sándor Baranya

Danube River - Pressures and Impacts

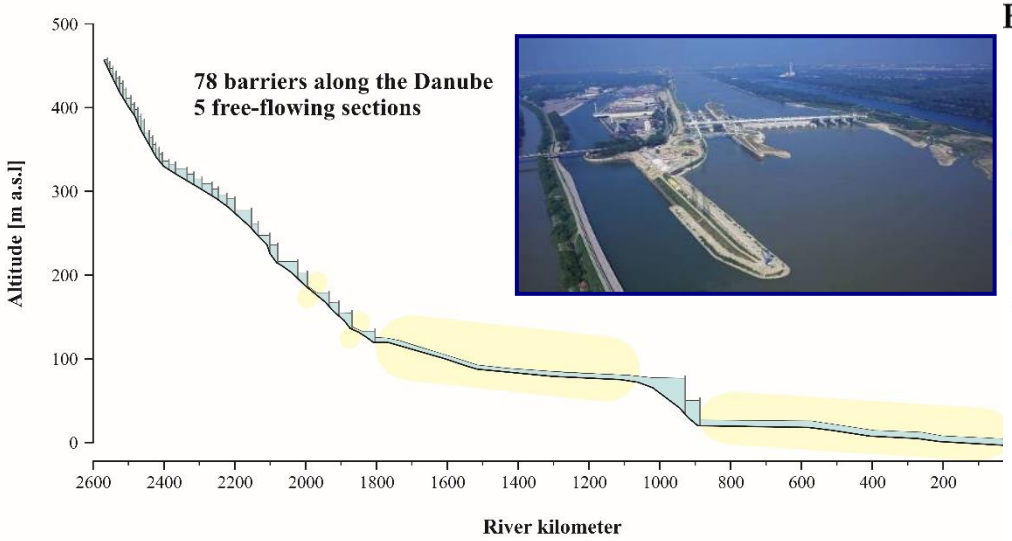

N
Danube Basin
Catchment area: 801.463 km2
Length: 2.857 km
Mean discharge: 6.500 m3 s-1
UPPER DANUBE
MIDDLE DANUBE
DANUBE DELTA
LOWER DANUBE
Praha
Stuttgart
München
Wien
Bern
Ljubljana
Zagreb
Chisinau
Bucuresti
Bijeljina
Beograd
Sarajevo
Skopje
Tirana
Legende
Hydraulic Structures
Danube
Tributaries
Country border
Danube
32
29
13
3
Kilometer
0 50 100 200 300 400

Existing Situation

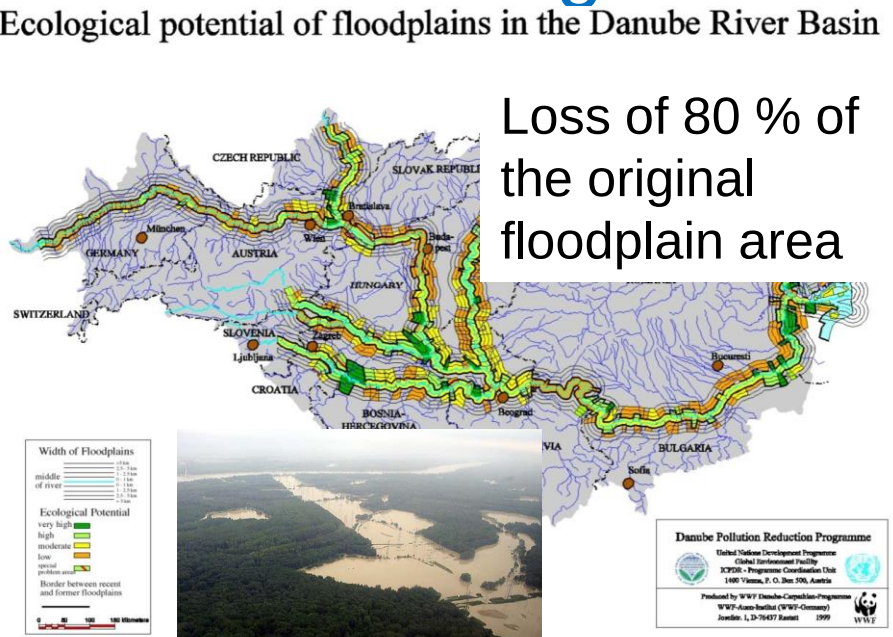
Driving forces and impacts – *Danube River Basin*

- ⇨ Hydropower plants
- ⇨ Flood protection
- ⇨ Navigation
- ⇨ Climate change
- ⇨ Changes in land use
- ⇨ Point and diffuse source pollution

Hydropower

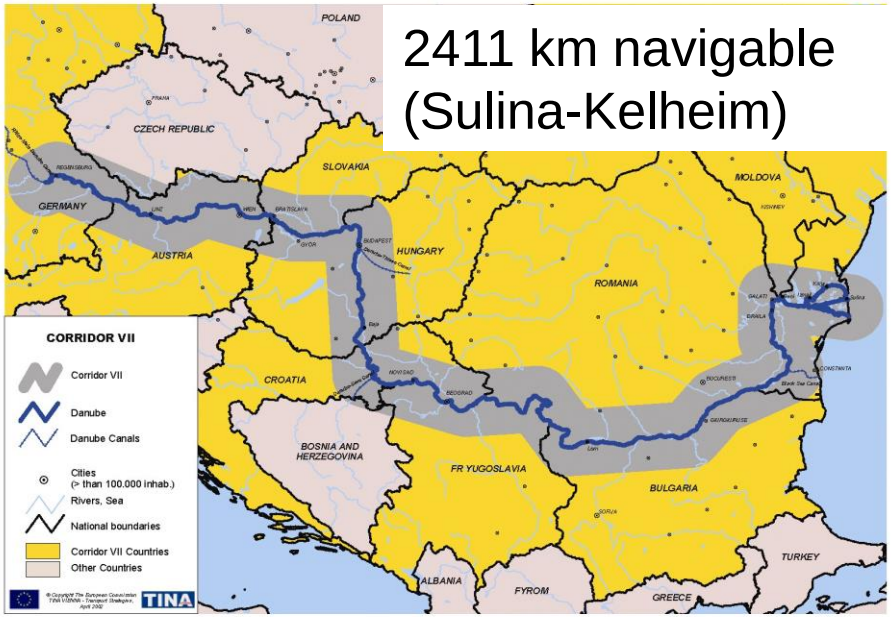


Flood Risk Management



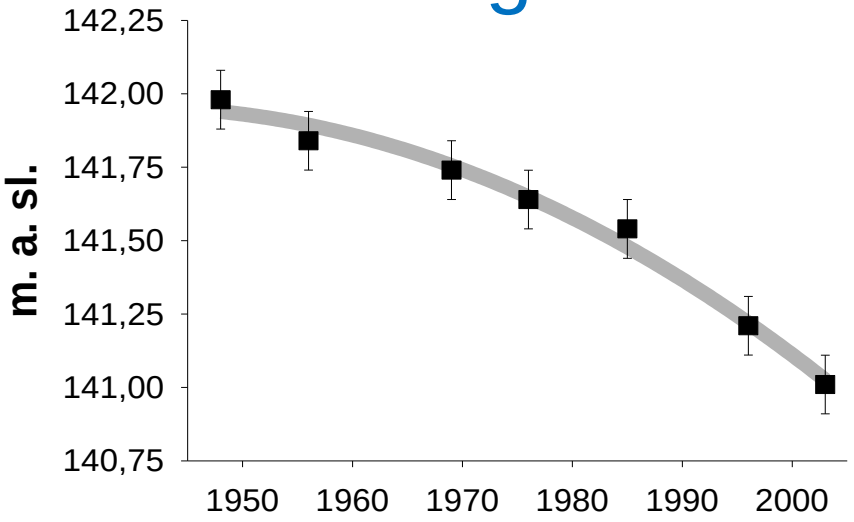
Loss of 80 % of the original floodplain area

International Waterway



2411 km navigable (Sulina-Kelheim)

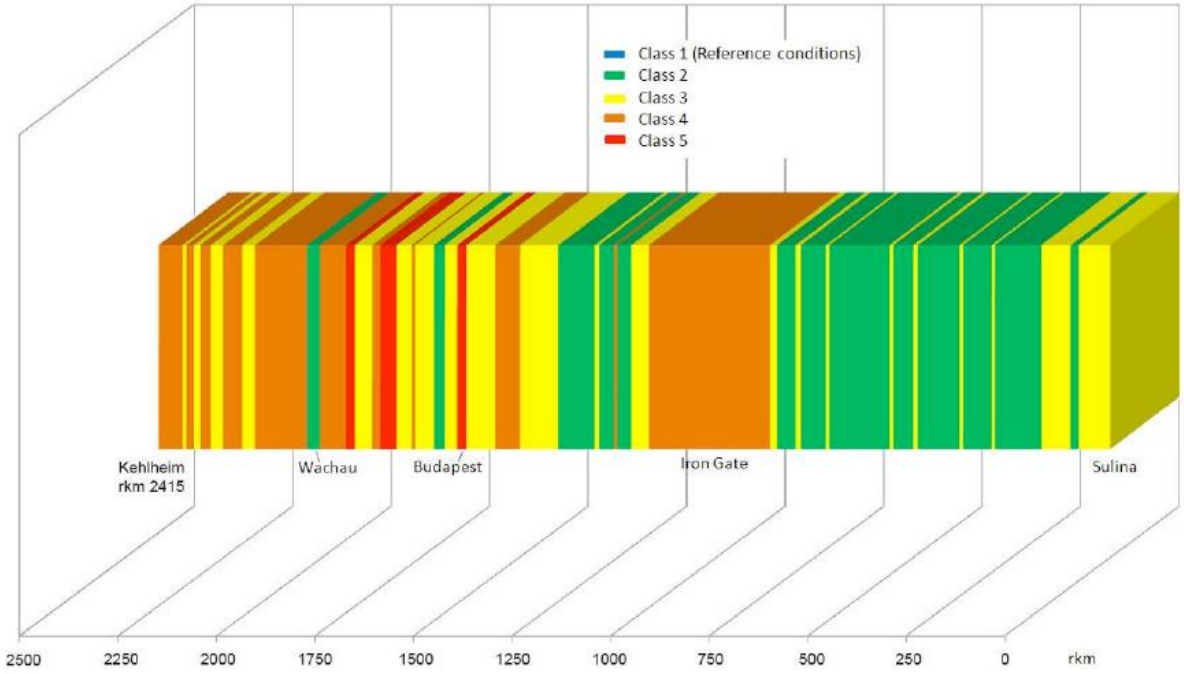
River Bed Degradation



River Morphology

Hydromorphological conditions

Overall total hydromorphological assessment in five classes – longitudinal visualisation



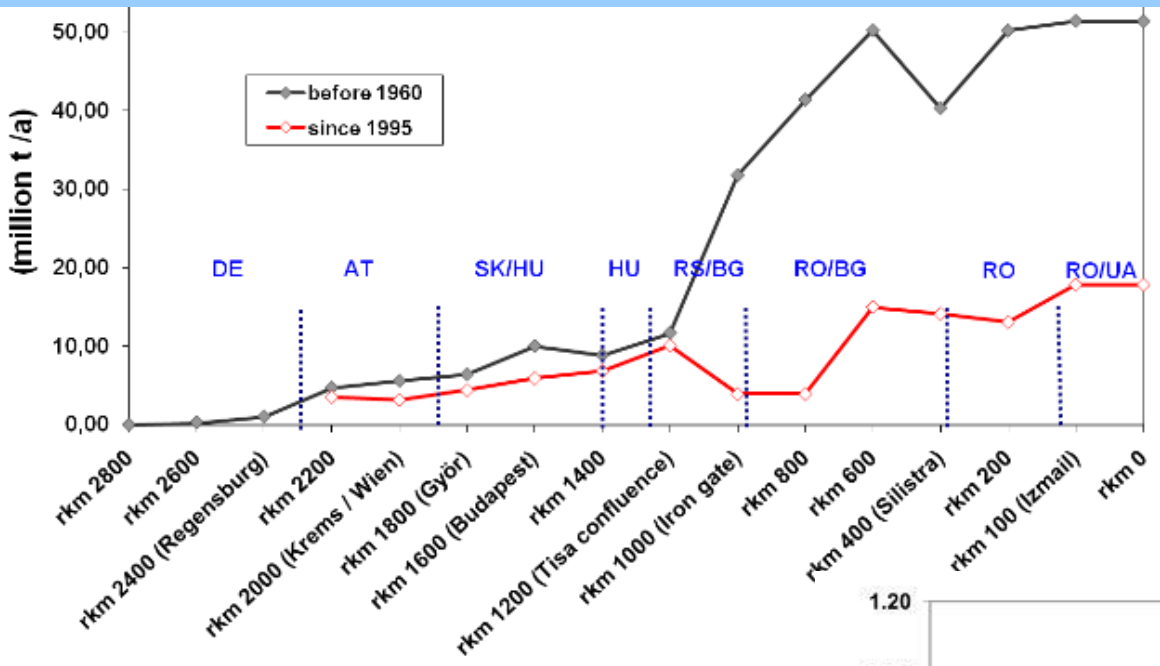
1/3 good hydromorphological conditions

1/3 strongly altered

Upper Danube - most affected by significant hydromorphological changes

ICPDR, JDS, 2008

Change of Sediment Yield



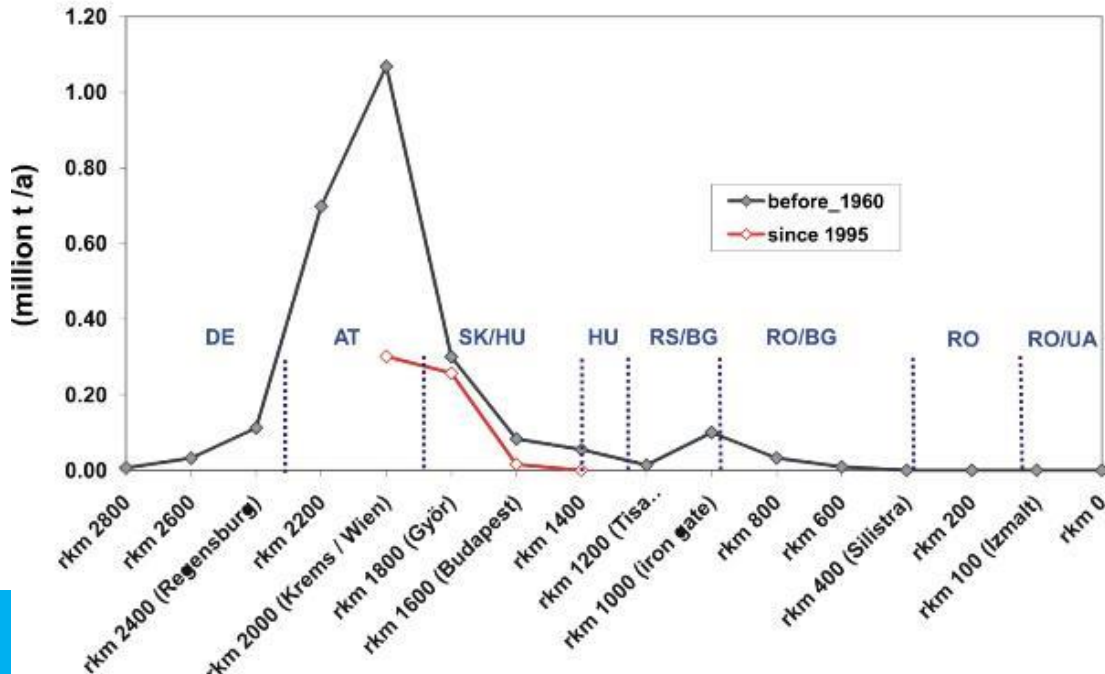
Surplus <-> Deficit

Deposition of suspended load in the reservoirs and impounded reaches

→ River bed erosion (2 to 10 cm per year)

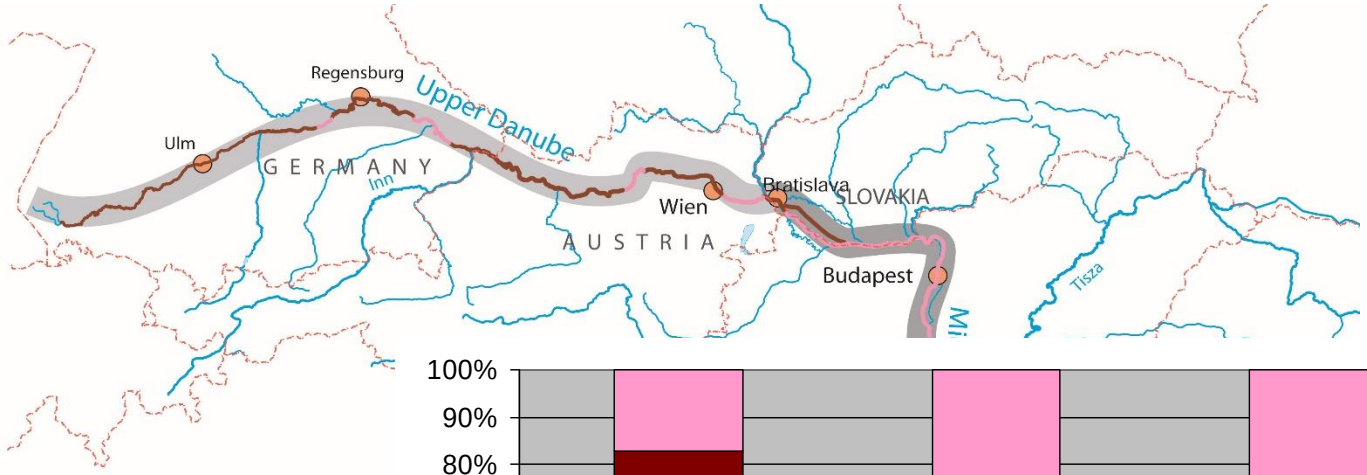
→ Coastal erosion (up to 17 m per year)

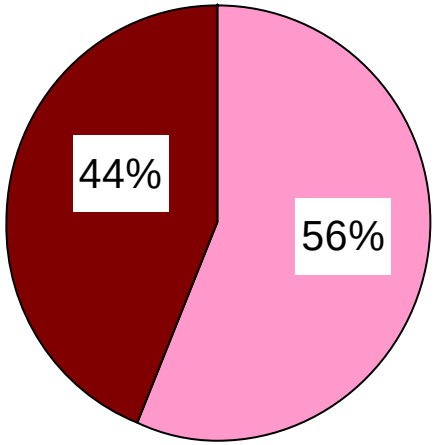
Danube Monography, 1993; Bruk et al., 2002; Bondar et al., 2000, Habersack, Jäger, Hauer, Schwarz, 2013

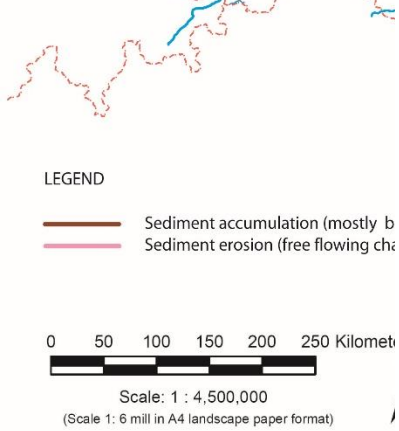


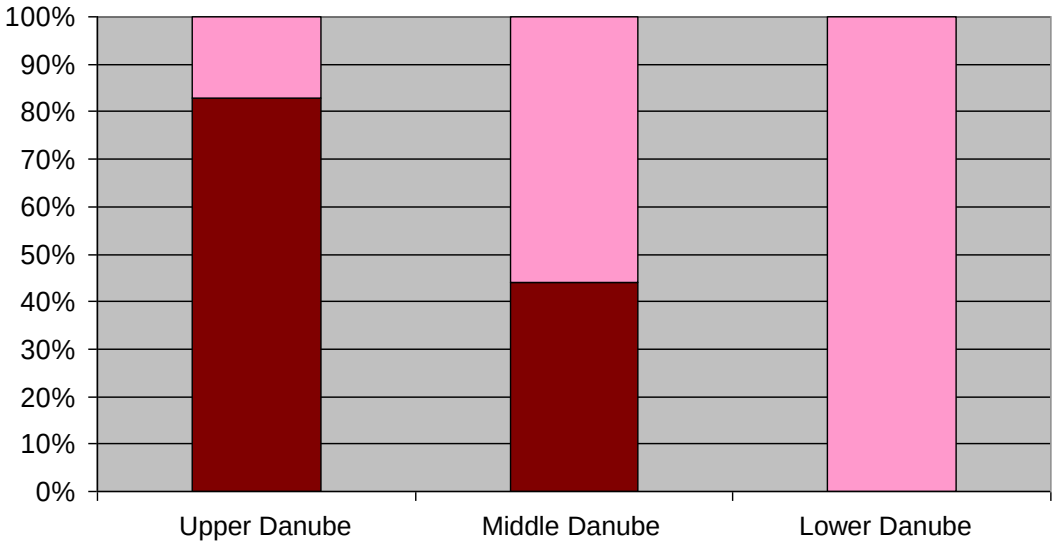
Results – Catchment scale

Erosion and Deposition reaches









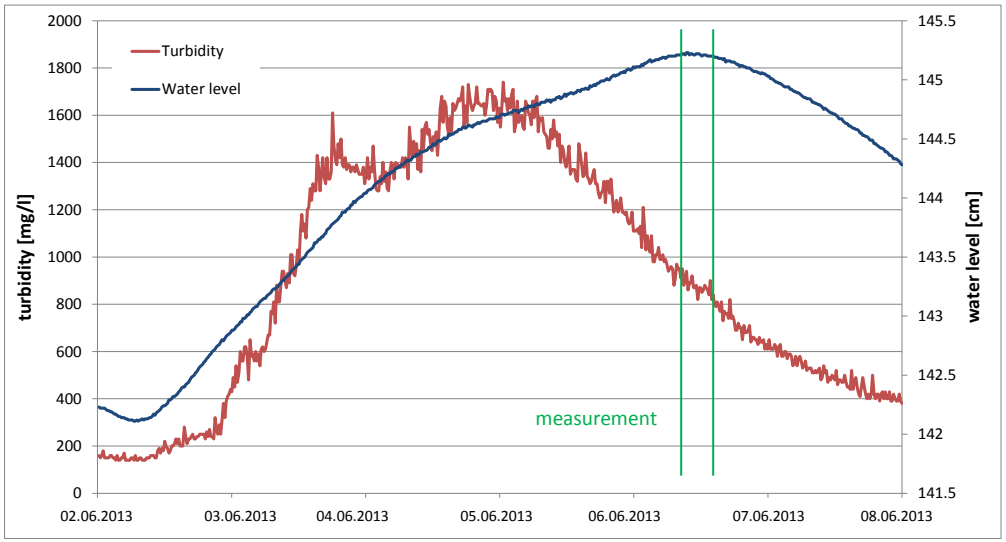
Habersack, Jäger, Hauer, Schwarz, 2013

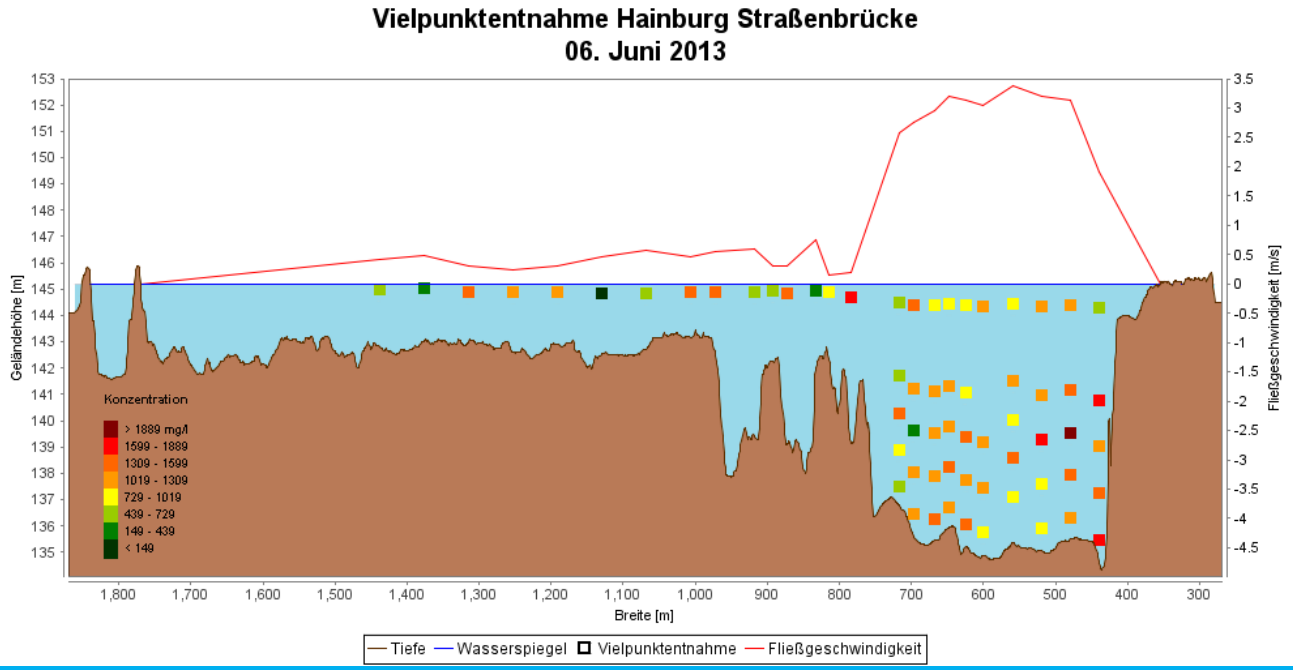
Bypass channel / Danube Island Vienna

Flood 2013

Suspended sediments

- **Flood event June 2013**





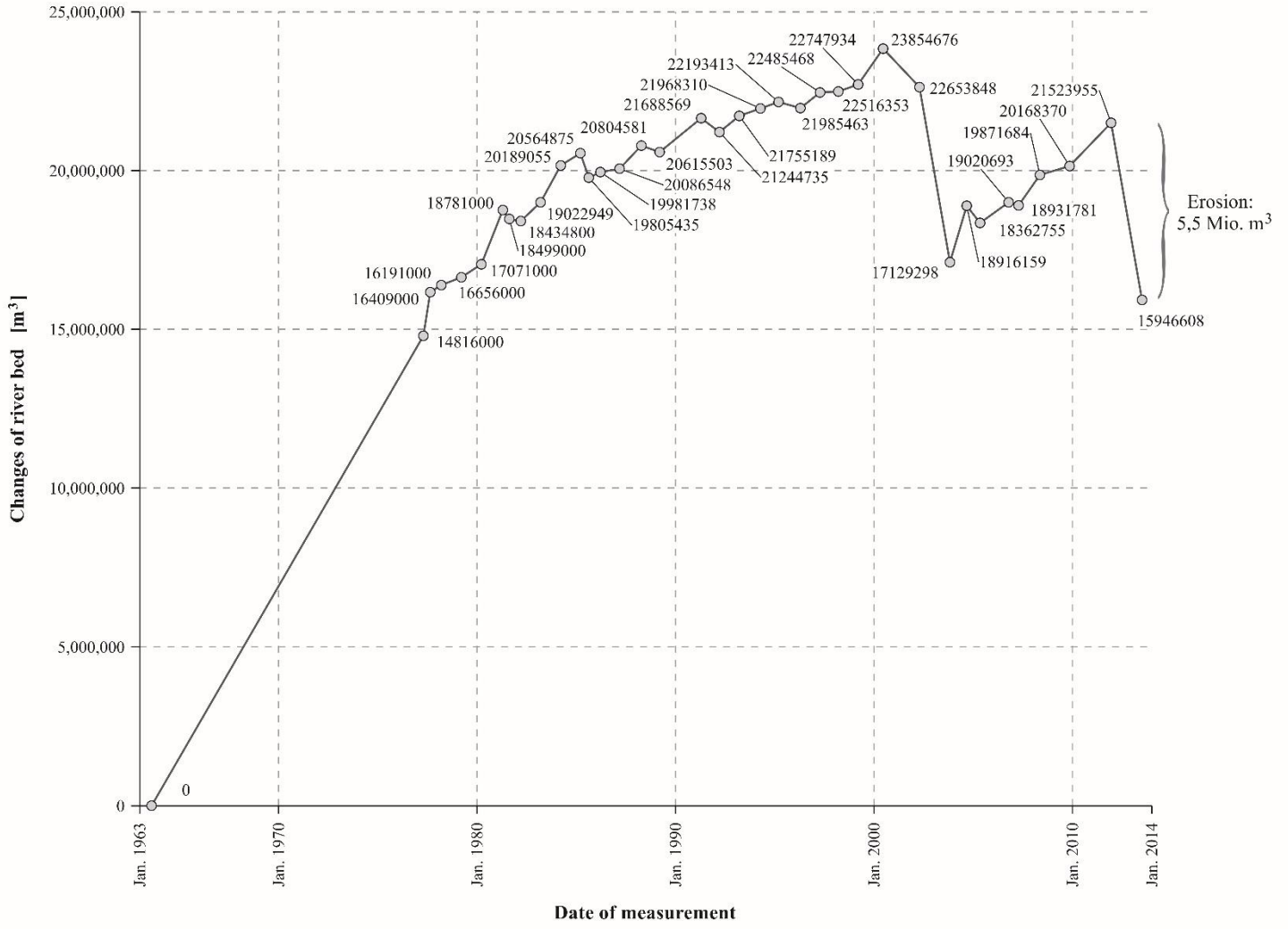
$Q = 10.738\ m^3/s$

$s_m = 1.120\ mg/l$

$Q_s = 11.980\ kg/s$

(IWHW, 2013)

Sedimentation-Remobilisation Reservoir Aschach



Data base Verbund

related to

DREAM

Danube River REsearch And Management

Description of DREAM Activities

(1) Construction of two large Responsible River Modelling Centers/hydraulic engineering laboratories (up to 10 m^3/s)

(2) Cooperation of existing hydraulic engineering laboratories

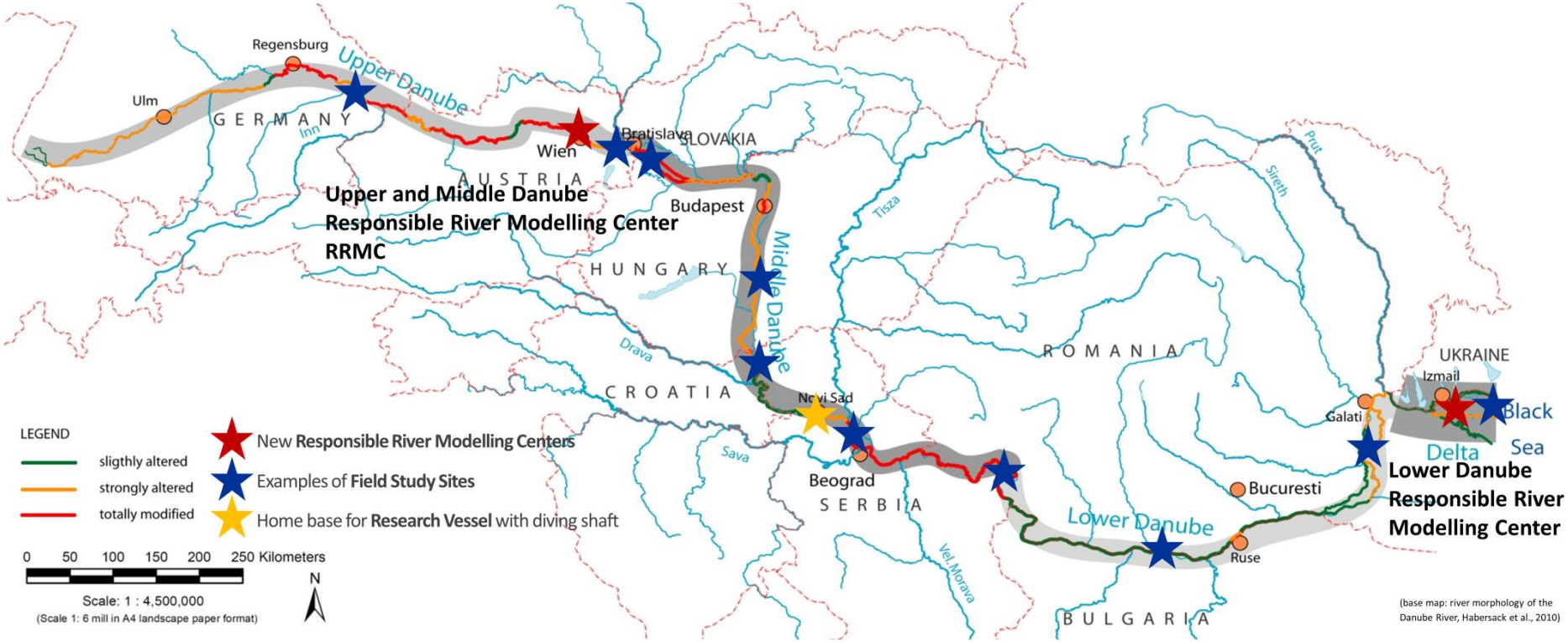
(3) Formation of a cluster/network of river engineering simulation tools

(4) Establishment of a network of field study sites along the Danube River and tributaries

(5) Construction and operation of a research vessel with diving shaft for the whole Danube

(6) Establishment of a network of existing and extended Danube River Research Institutions throughout all riparian countries

DREAM Implementation for Research Infrastructure



Accepted Project in the Danube Transnational Programme

→ **Danube Sediment Management - Restoration of the Sediment Balance in the Danube River**

The main aims of the proposed project are

- To establish for the first time a Danube river basin sediment budget
- To identify reaches with surplus and deficit, river bed aggradation and degradation, sediment-related problems in flood risk management, drinking water production, hydropower generation, navigation, water quality and ecology, as well as
- To gain knowledge and better understanding of sediment transport and morphodynamic processes in the Danube River

- Ultimately this should lead to the first transnational **Danube Sediment Management Guidance and Sediment Manual**