DanubeSediment

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

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Project Director

18 Apr 2018, Budapest

Project summary

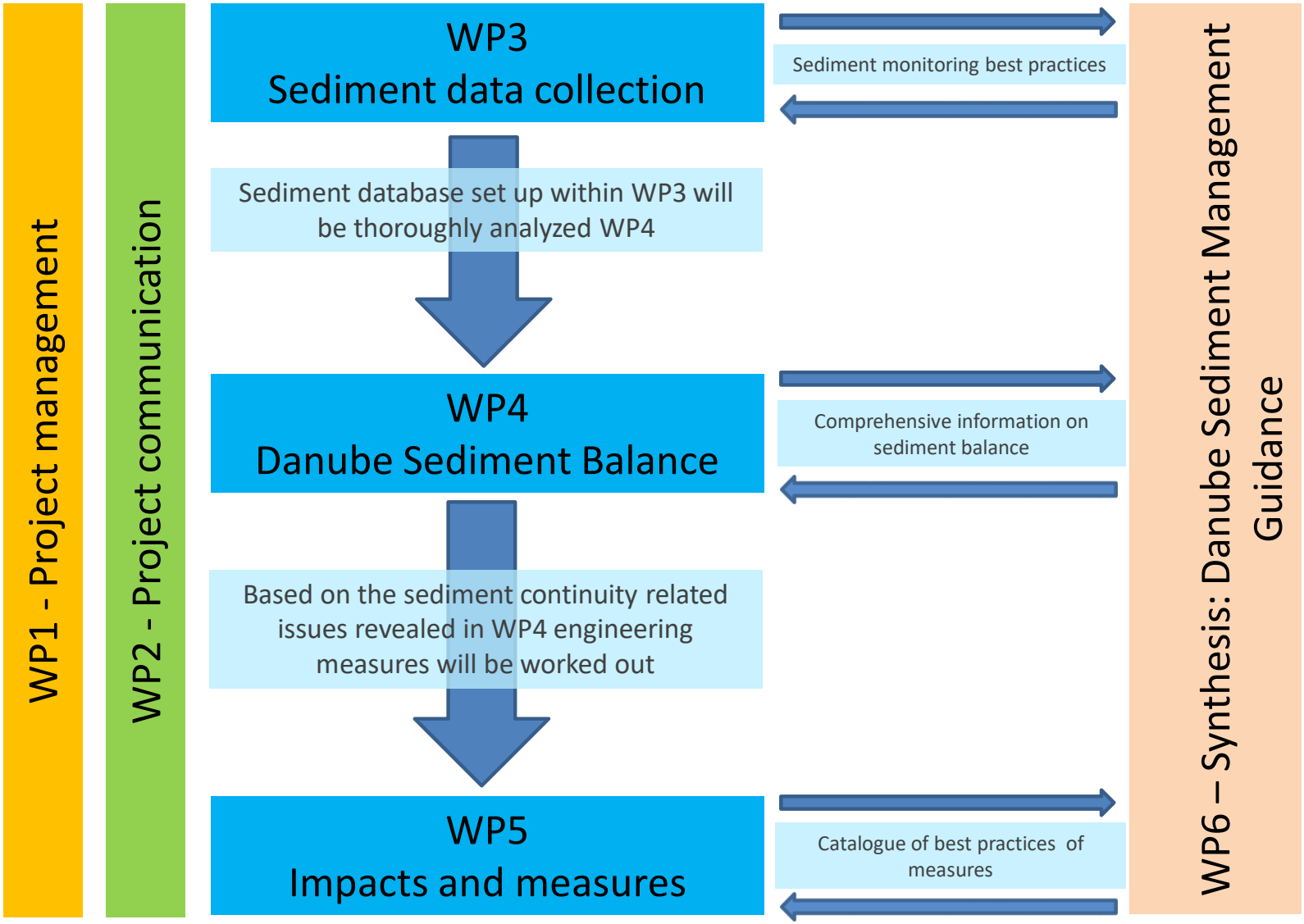
- Project title:
  Danube Sediment Management - Restoration of the Sediment Balance in the Danube River (DanubeSediment)
- Project duration: 01/2017-06/2019 (30 months)
- Programme: **Danube Transnational Programme**
  - Programme Priority:
    PA2. Environment and culture responsible Danube region
  - Programme Specific Objective:
    SO2.1 Strengthen transnational water management and flood risk prevention
- Project Budget: 3.56M EUR
- Lead Partner: Budapest University of Technology and Economics

- http://www.interreg-danube.eu/approved-projects/danubesediment

Main objectives

- To propose a pragmatic transnational quantitative **sediment monitoring network**
- To establish for the first time the **sediment budget** for the Danube River considering the input of the most important tributaries as well,
- To identify reaches with **surplus and deficit**, river bed aggradation and degradation, **sediment-related problems** in flood risk management, hydropower generation, navigation, ecology
- To gain **knowledge and** better **understanding** of sediment transport and morphodynamic processes in the Danube River
- To develop a **Danube Sediment Management Guidance** (DSMG) and a related **Sediment Manual for Stakeholders** (SMS)

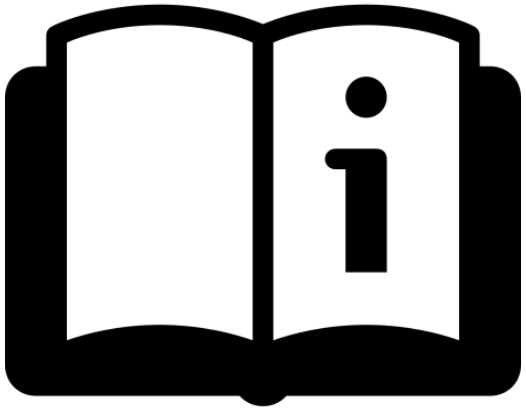
Project methodology



Communication WP2/ 6.3: Status and Outlook

Status of Deliverables:

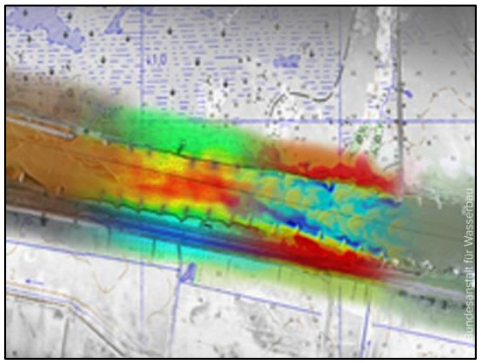
- Internal Handbook ✓
- Communication Plan ✓
- Stakeholder List / Mapping ✓



- Internal Newsletter:
  - 1st newsletter → 120 contacts ✓
  - 2nd Internal Newsletter 4Q/2017 (Xmas) ✓
- External Newsletter:
  - 1st Newsletter sent to 300 stakeholders ✓
  - Translated and sent in 6 languages ✓
  - 2nd External Newsletter 4Q/2017 ✓

River Model Networks – Tracking Tool

- Peer review ✓
- Sent out to all PP 27/07/17 ✓
- Feedback from TUM, BOKU, EAEMDR ✓



WP3: Sediment Data Collection

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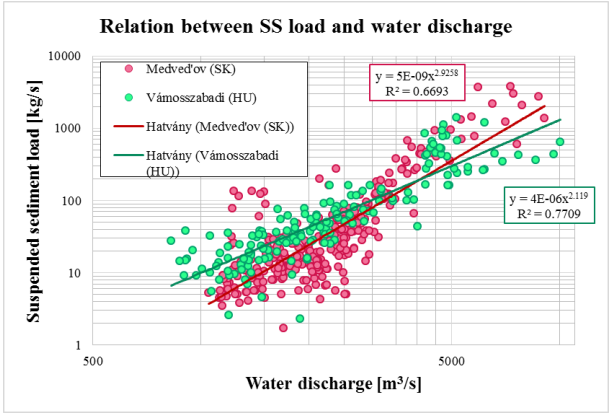
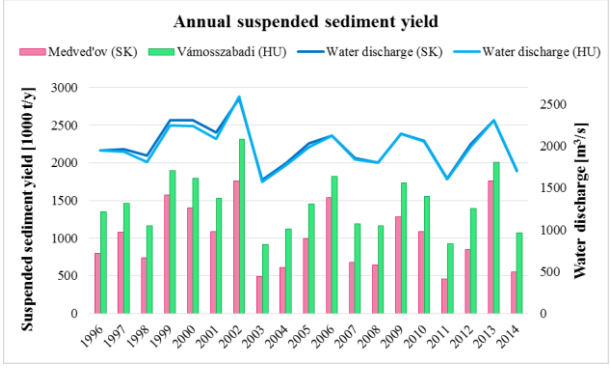
Activity 3.2 (Comparative analysis)

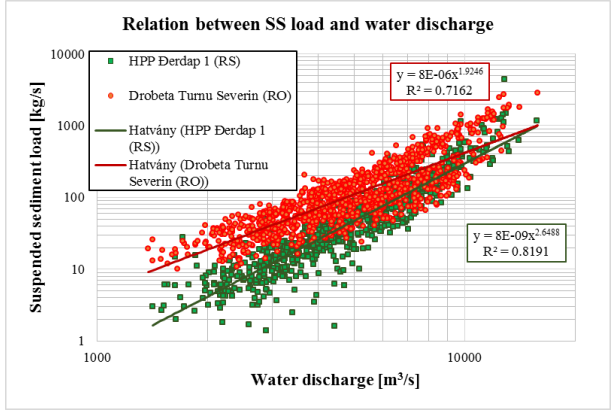
- Comparison of historical data

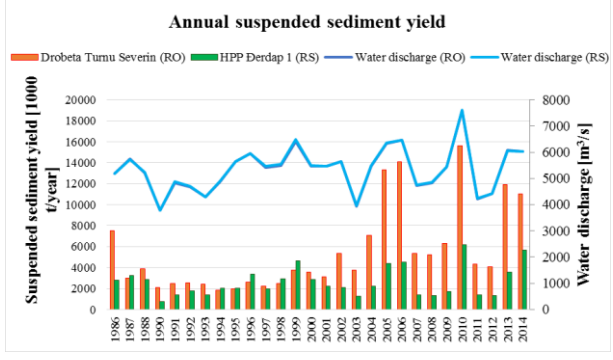
SK-HU



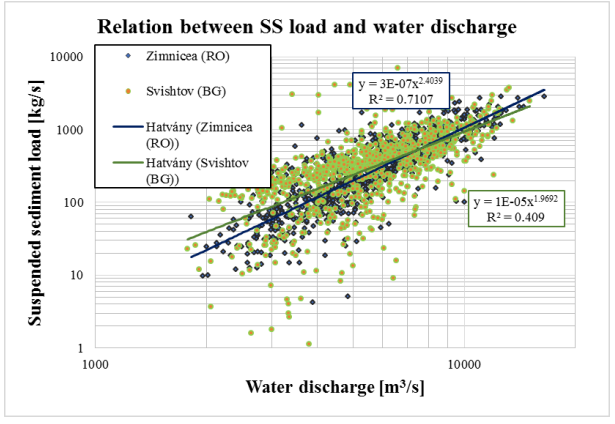


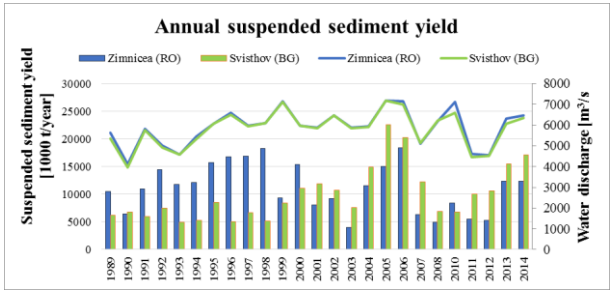
RS-RO





RO-BG





WP3: Sediment Data Collection

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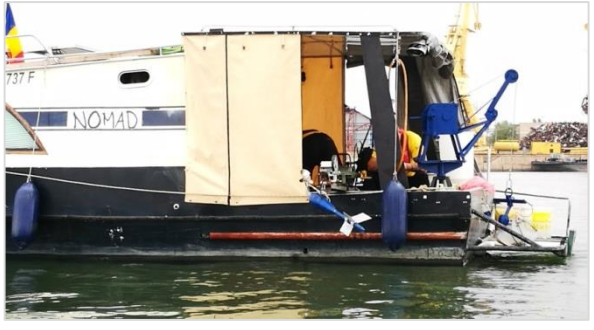
Activity 3.2 (Comparative analysis)

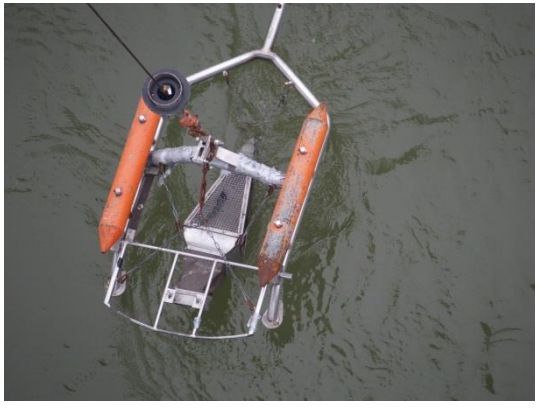
- On-site comparison

Giurgiu (RO)
31.08.2017.

Iron Gate (RS-RO)
20.09.2017.



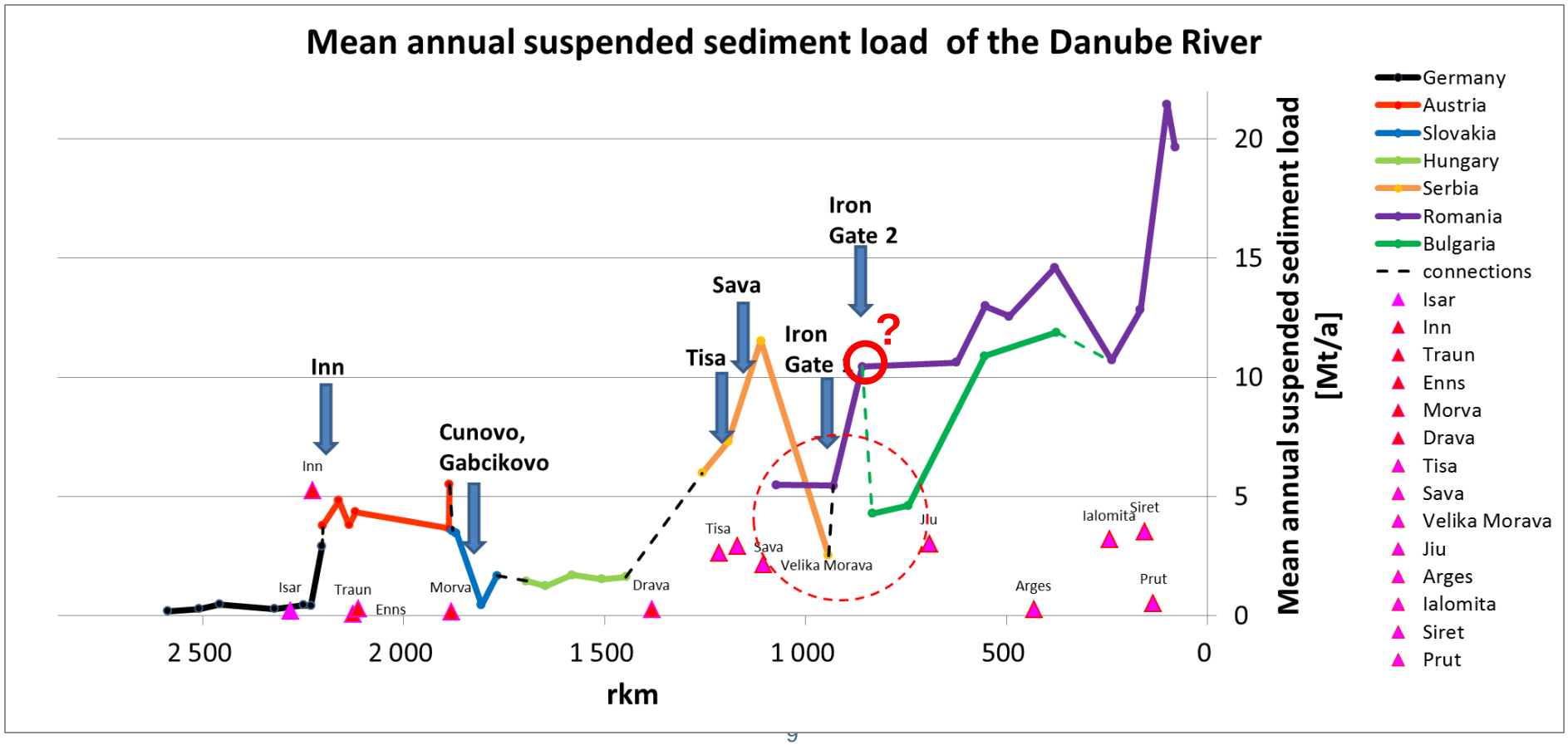
Bad-Deutsch Altenburg (AT)
08-09.11.2017.



WP3: Sediment Data Collection

Activity 3.3 – Assessment of sediment data

- Mean annual suspended sediment load between 1986-2016



WP4

Components of the sediment budget equation:

a) Inputs

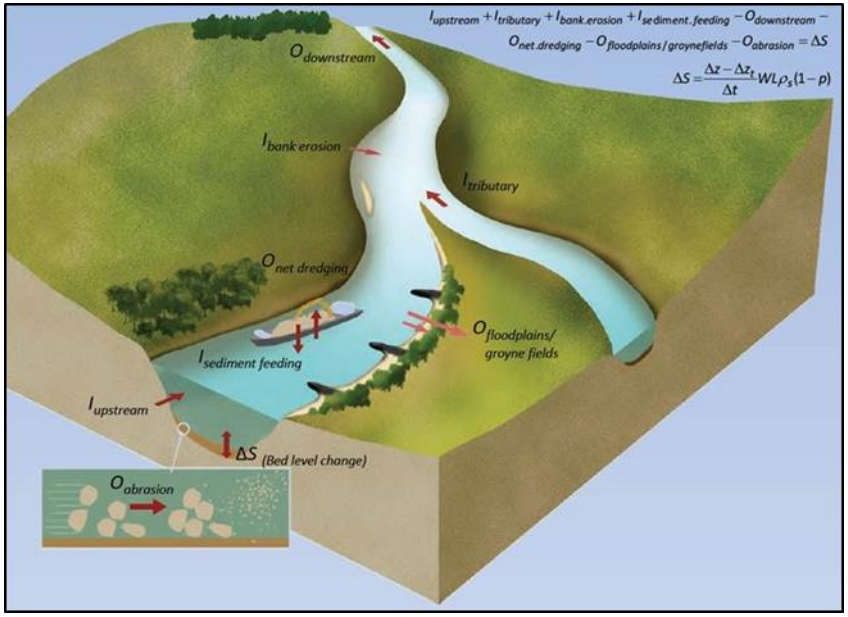
- Iu - sediment transport from upstream situated river reach
- It - sediment transport from tributaries
- Ia - sediments fed artificially into the river

b) Outputs

- Od - sediment transport to downstream situated river reach
- Odr - removal of riverbed sediments by dredging activities
- Of and Og - sedimentation in the floodplains and/or groyne fields
- Oa - abrasion of riverbed material

c) Storage

- ΔS – change of sediment mass stored in the area

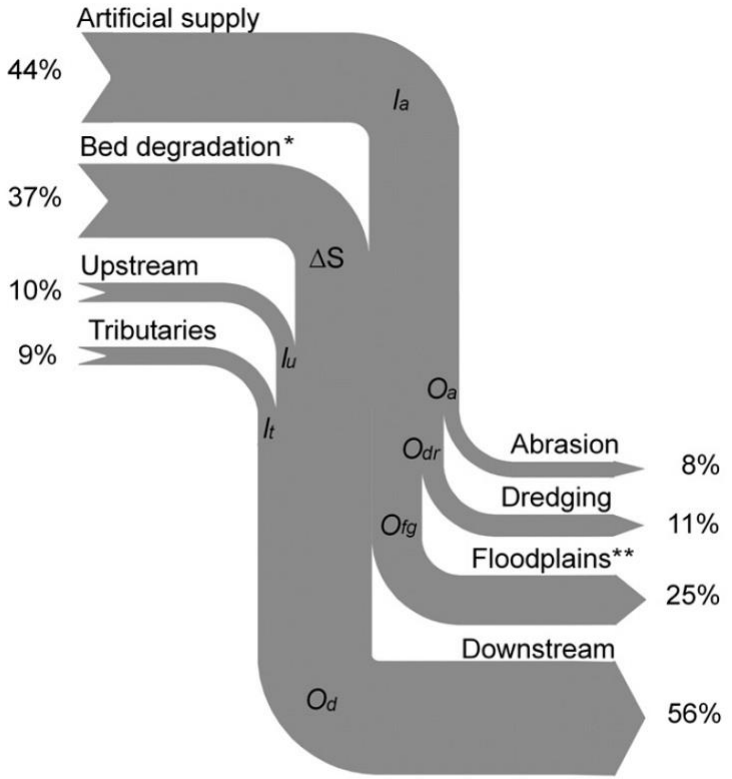


Sediment budget equation for partial river section (in tonnes/a):

(Iu + It + Ia) – (Od + Odr + Of + Og + Oa) = ΔS

Expected outcome in WP4, similar to the one for the Rhine River

Final estimated sediment budget

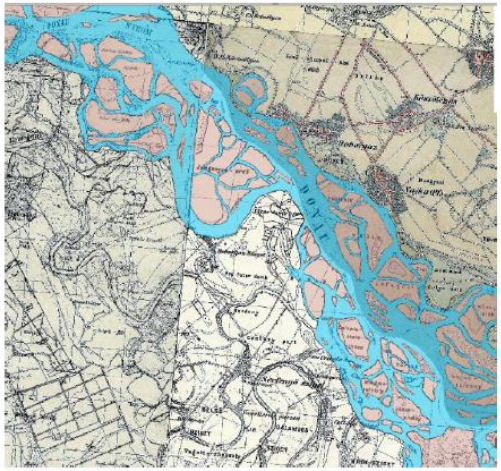


Sediment budget for gravel and sand for the Rhine reach between km 336 and km 621 (period 1985–2006). *Internal component of the channel itself, **estimated, including groyne field deposition.

GIS Development

Required GIS data

- Assessment of Lateral changes:
  - Historical (reference) state of the Danube channel and its patterns - *polygon*
  - Present Danube river channel and patterns - polygon
- River processes (sections of erosion/sedimentation) – *polyline* - geographical interpretation of data assessed within WP4 data analyses (xls)
- Present flood dykes to document present floodplain width (also in WP6) – *polyline*
- GIS data structure was presented at ICPDR IMGIS Expert Group meeting in October 2017



River pattern categories

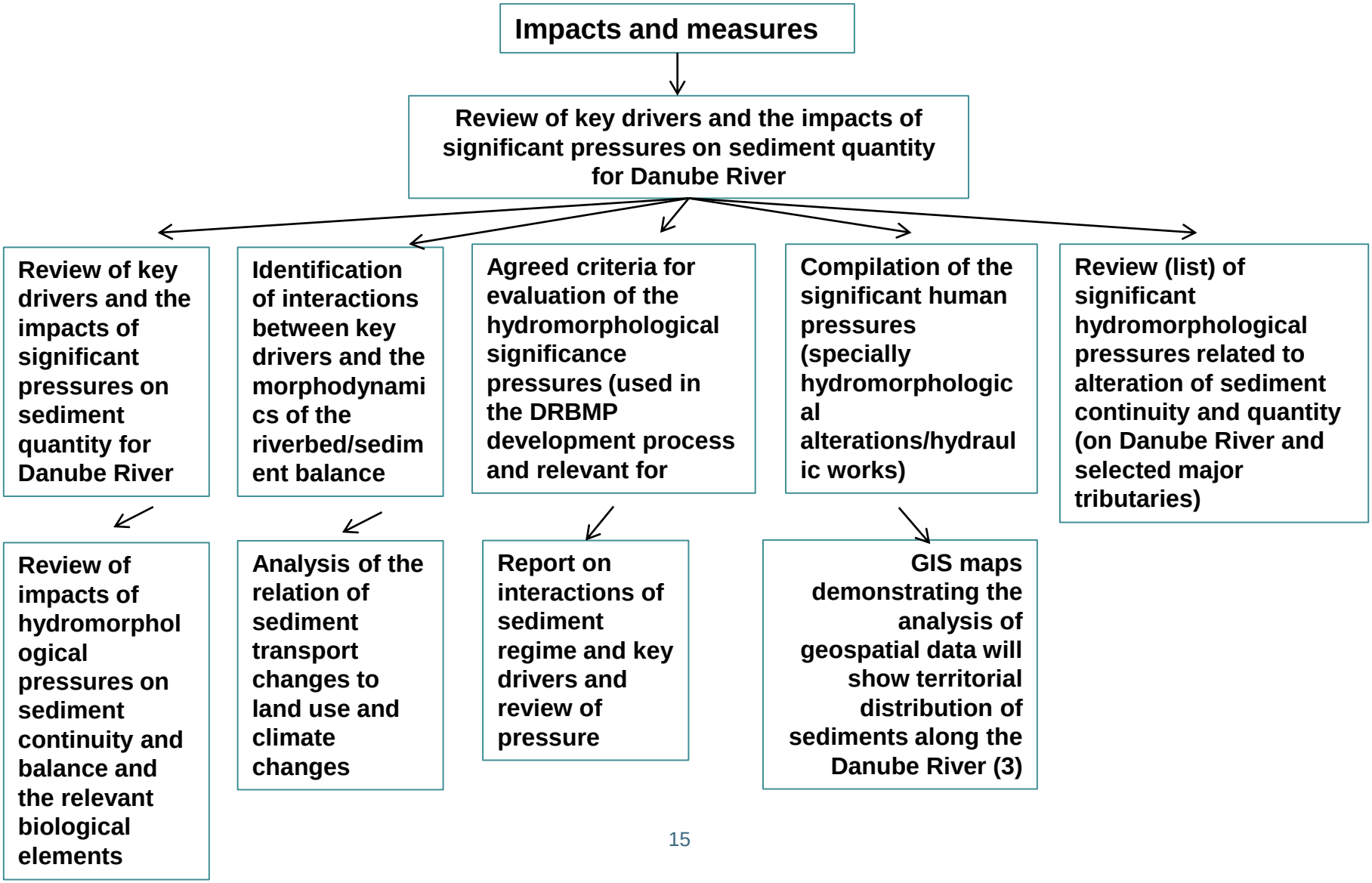
Lateral Changes HISTORICAL (REFERENCE) STATE		
Attribute	Description	Value
RiverPattern	Danube channel incl. short reach of main tributaries incl. side-arm system	D
RiverPattern	Island	I
RiverPattern	Relict	R

Lateral Changes PRESENT STATE		
Attribute	Description	Value
RiverPattern	Danube channel incl. short reach of main tributaries incl. connected side-arms	D
RiverPattern	Island	I
RiverPattern	Side-arm (cut-off)	SA
RiverPattern	Point bar	PB
RiverPattern	Lateral bar	LB

2. Driver Pressure, Status, Impact, Response (DPSIR)

- DPSIR Concept (describing elements, linking elements, according to *Guidane no 3....*)
- Key driver - Pressure Relationships
- DPSIR framework in relation to water issues & sediment
- Climate change and land use in the frame of DPSIR sediment driver assessment

WP5: Impacts and measures



PM meeting
01.03.2018
WP 5 – Impact and measures

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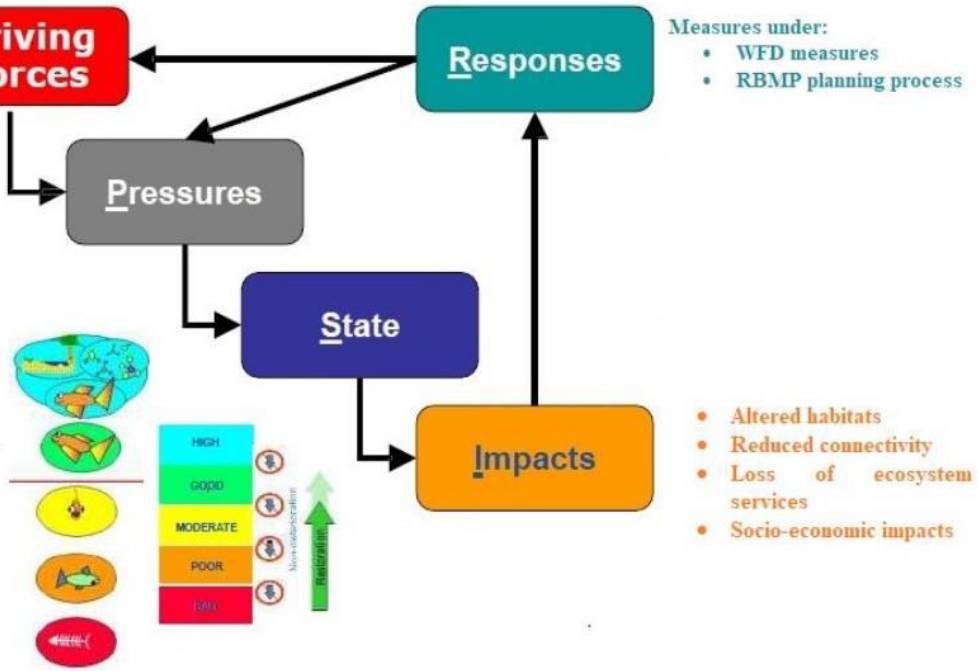
Activity 5. 1. Review of key drivers and the impacts of significant pressures on sediment quantity for Danube River (from 04/2017 – to 03/2018)

WFD: The DPSIR approach: 6-years cycle

- Hydropower
- Navigation
- Flood protection
- Agriculture
- Water supply for population and industry
- Gravel extraction for other purposes than navigation

- Dams
- Weirs
- Ship locks
- Barriers for slope silt / sediment drainage groins
- Dredging to allow navigation and ensuring flood protection
- Dredging for other purposes
- River channel maintenance
- Regularization works of river channel
- Artificial channels (for flood protection, navigation, diversion etc.)



DPSIR approach (adapted from Peter Pollard, Scotish Environment Protection Agency)

WP5: Impacts and measures

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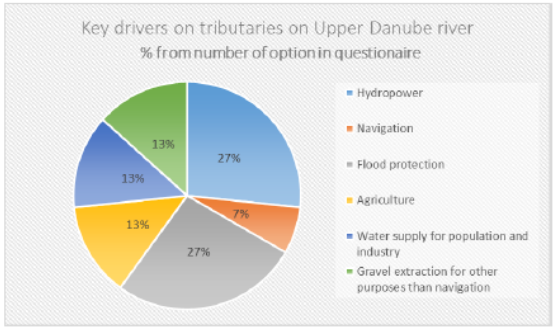
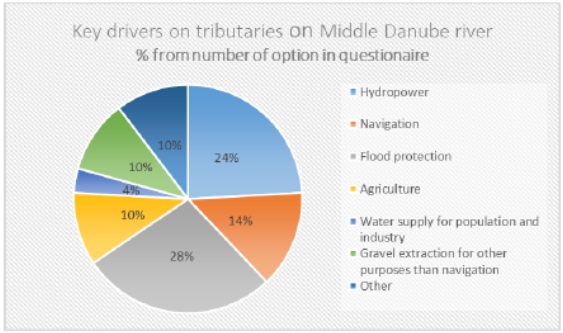
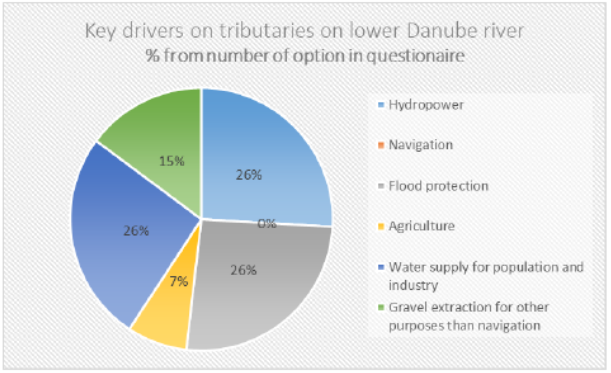


Key drivers on tributaries on Upper Danube

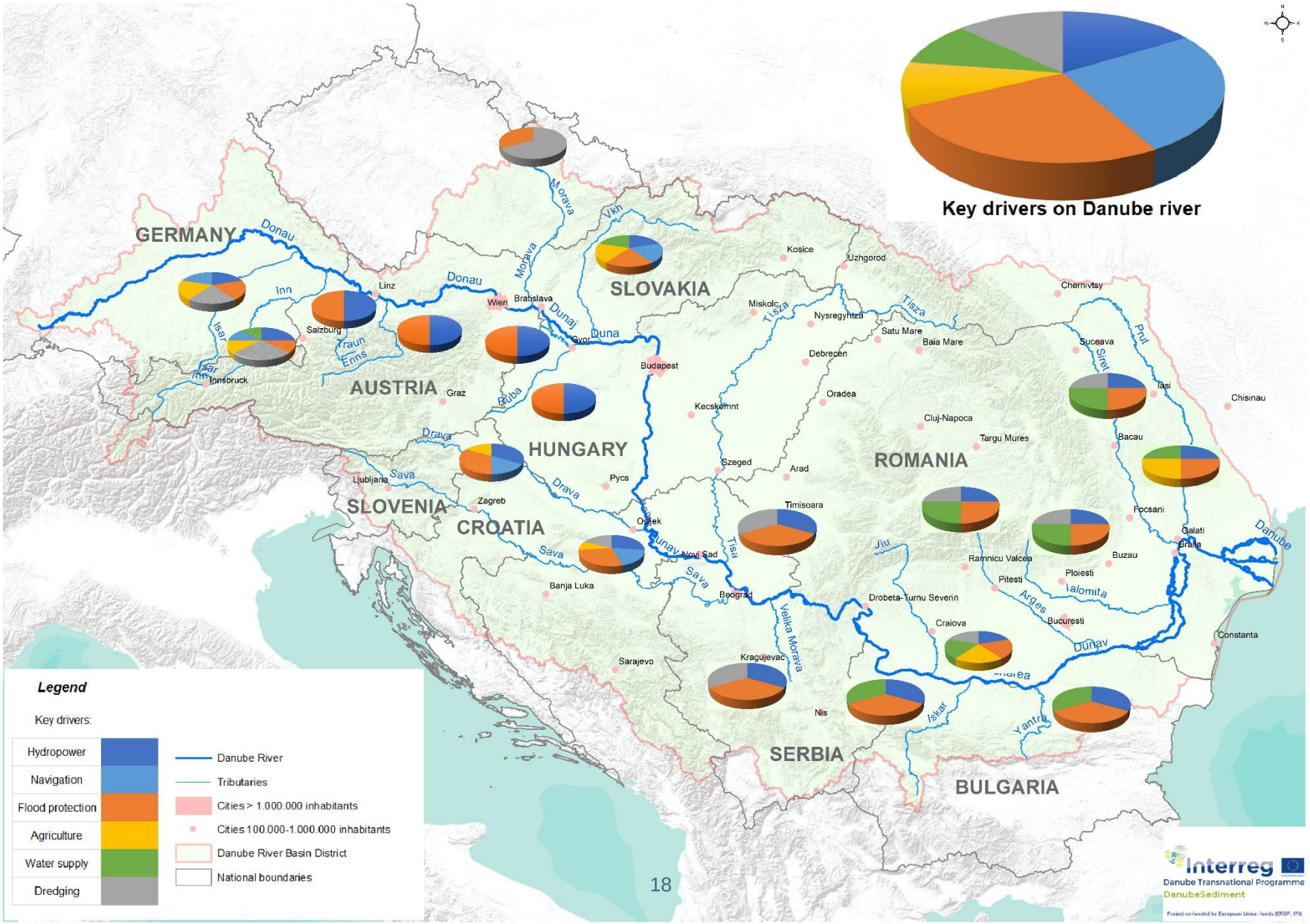


Key drivers on tributaries on Middle Danube



Key drivers on Lower Danube

WP5: Impacts and measures



WP6: Danube Sediment Management Guidance

- Synthesis of WP3 to WP5
- Development of Danube Sediment Management Guidance (DSMG)
  - Statement of problems and needs
  - Suggestions for an improved monitoring
  - Sediment budget
  - Practical measures
  - Key question
  - Recommendations
- **Stakeholder Involvement**
- Preparation of a Sediment Manual for Stakeholders (SMS)
  - Hydropower
  - Navigation
  - Flood risk management
  - River basin management incl. ecology

Acknowledgment

- ICPDR
- Ministry of Foreign Affaires and Trade of Hungary,
- EUSDR (PA4 and PA5)
- JRC (sediment data set)
- DTP

Thank you for your attention