

# *DanubeSediment*

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

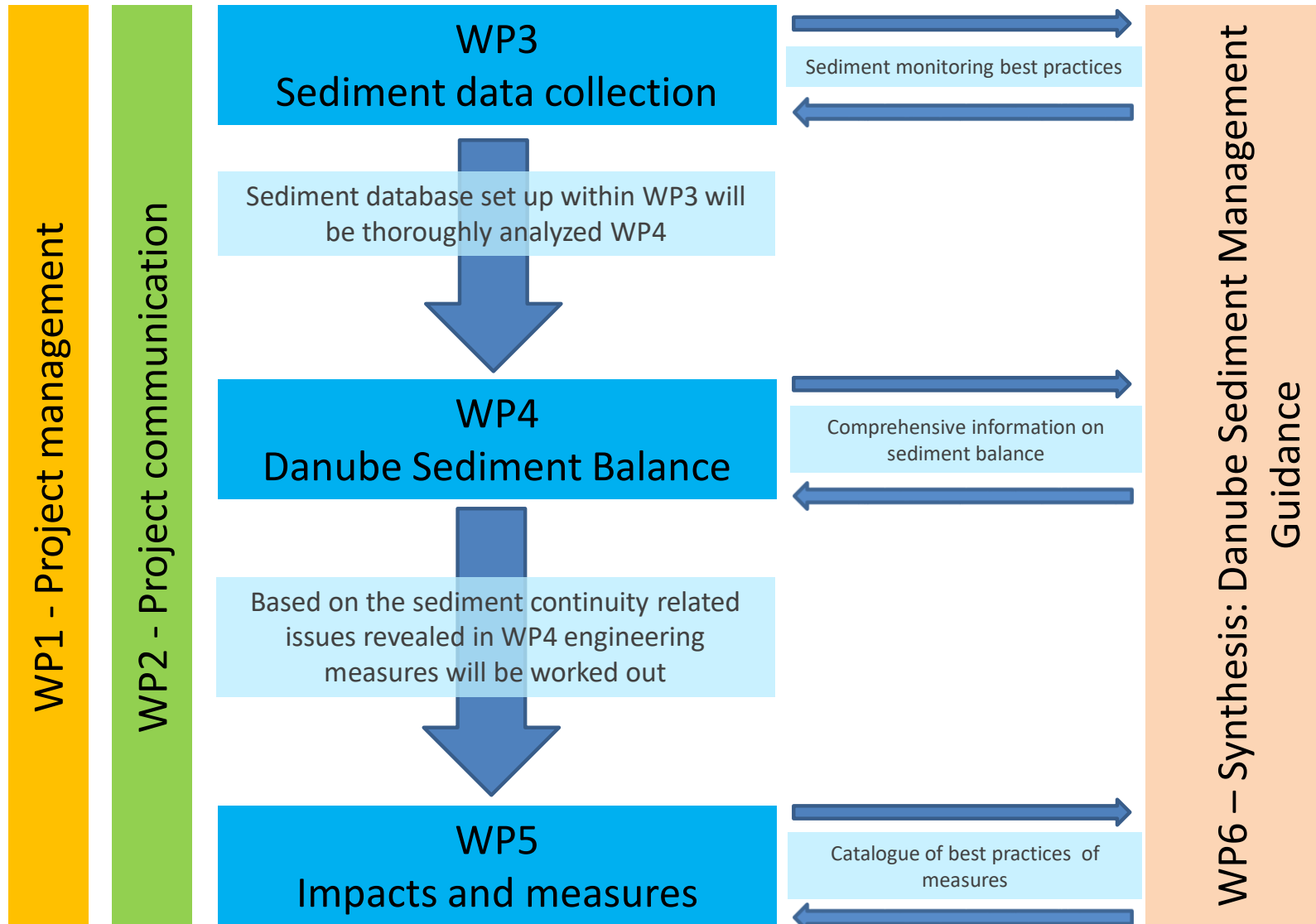
DanubeSediment Team  
18<sup>th</sup> PA4 SG Meeting  
Budapest

## Table of content

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- Short info about the project
- State of play

## Project methodology



## Status of Deliverables:

**OUR FIRST PROJECT VIDEO IS ONLINE!**

<http://www.interreg-danube.eu/news-and-events/project-news/3734>

# WP3: Sediment Data Collection

## Activities finalized – Deliverables are available

<http://www.interreg-danube.eu/approved-projects/danubersediment/outputs>



### Sediment data analysis in the Danube River

**Authors:**

*Budapest University of Technology and Economics  
with contributions by the project partners*



Project co-funded by European Union funds (ERDF, IPA)

### Sediment monitoring in the Danube River

**Authors:**

*Budapest University of Technology and Economics  
University of Natural Resources and Life Sciences, Vienna  
with contributions by the project partners*



Project co-funded by European Union funds (ERDF, IPA)

### Handbook on Good Practices in Sediment Monitoring

**Authors:**

*Budapest University of Technology and Economics  
University of Natural Resources and Life Sciences, Vienna  
with contributions by the project partners*



Project co-funded by European Union funds (ERDF, IPA)



## Activity 3.2 – Proposal for a transnational sediment monitoring network

- **Proposed improvements in the sediment monitoring network**

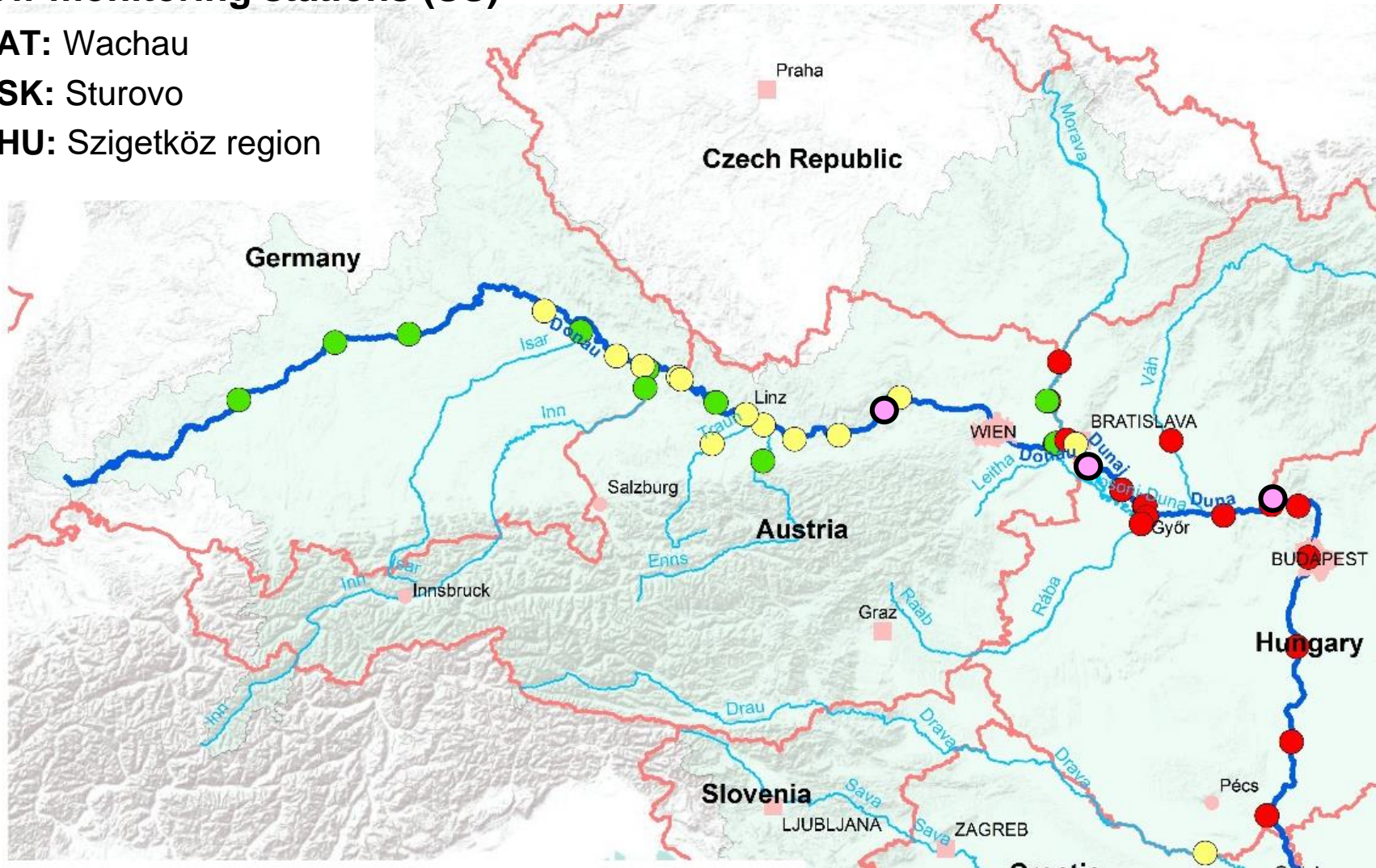
- Improvement of existing monitoring stations
  - Goal: Upgrade the existing monitoring stations applying the same monitoring strategy
  - High temporal resolution: calibrated (!) optical or acoustic backscatter sensor (OBS or ABS)
  - Representative cross-sectional data: multi-point calibration measurements 3-6 times per year with physical sampling and laboratory analysis



# WP3: Sediment Data Collection

## New monitoring stations (SS)

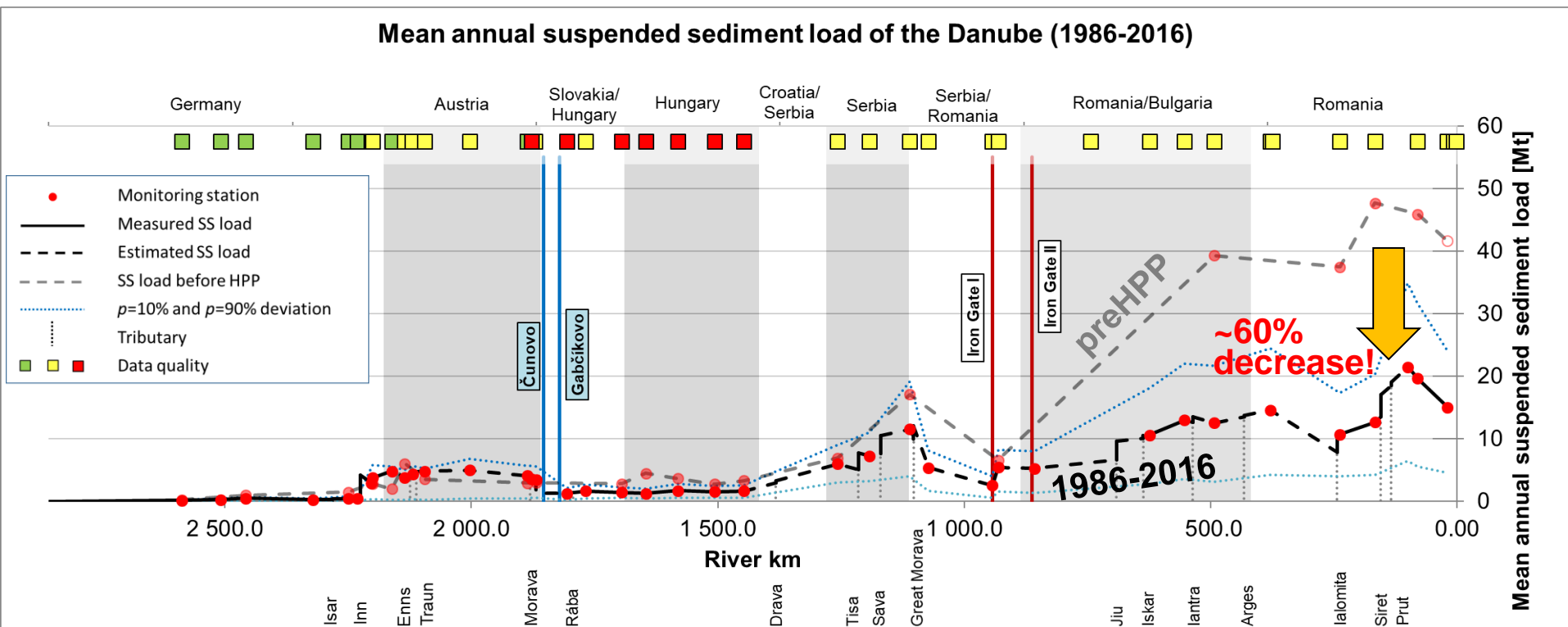
- **AT:** Wachau
- **SK:** Sturovo
- **HU:** Szigetköz region



# WP3: Sediment Data Collection

## Activity 3.3 – Assessment of sediment data

Longitudinal variation of mean annual SS load (1986-2016) vs. preHPP





## **WP4.1** – activity report – 2nd draft under finalization (contribution: D, AT, SK, HU, RS, HR, RO, BG)



### **Data collection and analyses for sediment balance – WP4.1**

Authors: Water Research Institute & project partners (BME, BOKU, OVF, NARW, NIHW, LfU, NIMH, EAEMDR, HRVODE, IzVRS, TUM, JCI, PLOVPUT)



Project co-funded by European Union funds (ERDF, IPA)

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#### **1. Introduction**

#### **2. Delineation of spatial and temporal scales for sediment budget and morphological analyses**

2.1 Delineation of the spatial scales

2.2 Temporal scales – historical and present

#### **3. Morphological data collected for sediment balance and morphological analyses**

3.1 River bed topography

3.2. River bed sediments

3.3. Dredging/feeding/disposal

3.4 Low flow water level

3.5 Hydromorphological reference conditions

3.6 Vertical reference system

#### **4. Basic assessments, data sorting and analyses-Upper, Middle, Lower Danube**

4.1 Legal framework of data providing and utilization

4.2 Variation of the channel bathymetry (typical cross sections)

4.3 Evolution of the river bed changes – longitudinal profile, aggradation /degradation along particular river reaches

4.4 River bed sediments – variation of sediment size

#### **5. Conclusions & Recommendations**

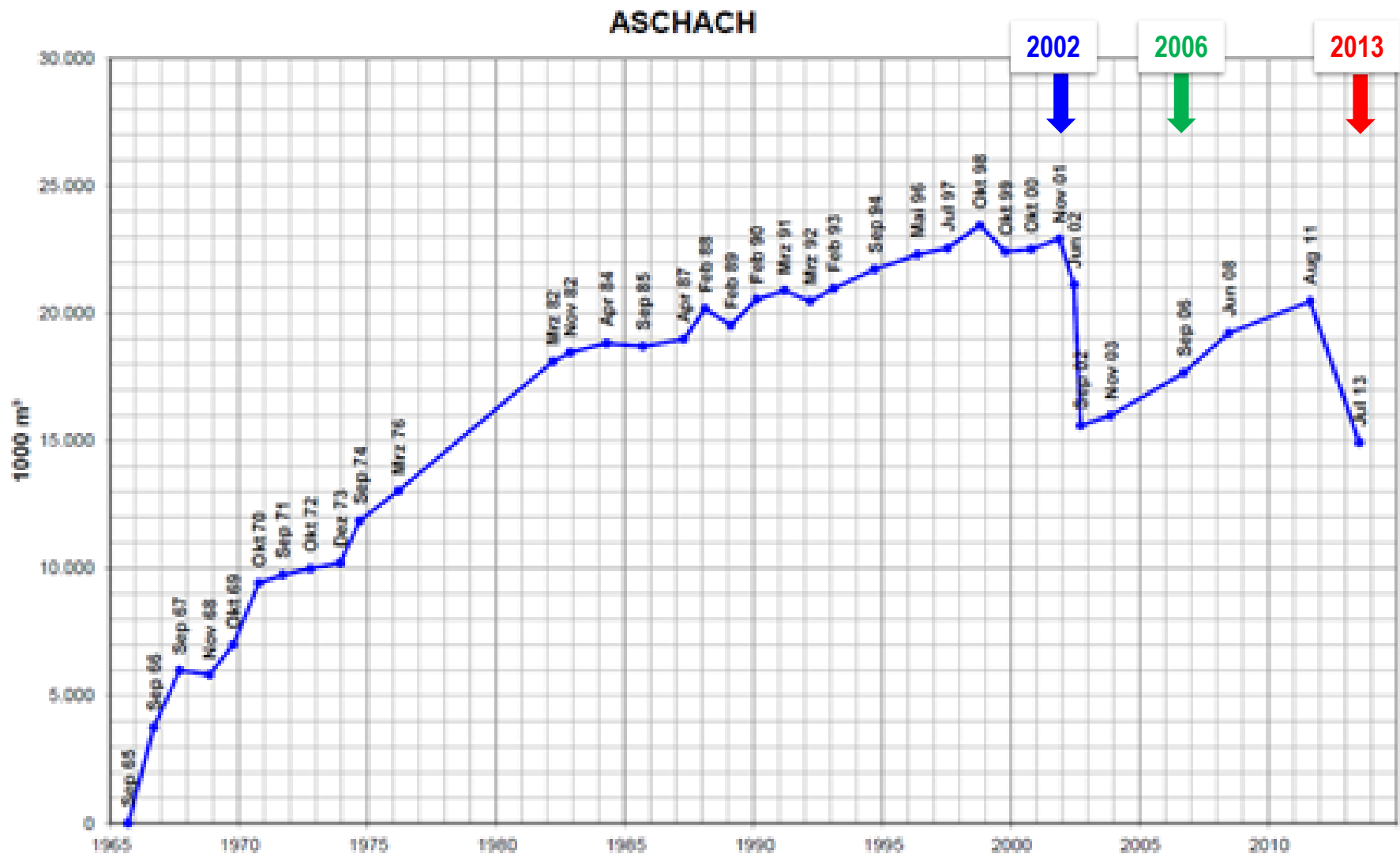
#### **List of Abbreviations**

#### **References**

## Long-term erosion-sedimentation reaches based on morphological data summary & expert judgement



## Act. 4.2 Assessment of sediment balance





# Sedimentation during flood 2013

## Sediments: Deposition in floodplains



**Machland**



(Gmde Ardagger Markt, Pressl, 2013)



**Eferdinger Becken**



Verbund, Schmallfuss, 2013)



## WP5: Activity 5.1 – Drivers and pressures

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



### **Interactions of Key Drivers and Pressures on the Morphodynamics of the Danube**

**Authors:** National Administration "Romanian Waters",  
with contributions by the project partners



## WP5: Activity 5.2 - Risk methodology

- The risk methodology proposed within the project
  - the key drivers responsible for the alteration of sediment regime impacting entire Danube River and all major selected tributaries, the most important (in terms of river stretch impacted):
    - flood protection (99%), hydropower (89%), water supply (53%), dredging (not for navigation) (49%), navigation (40%), agriculture (39%).*
  - anthropogenic pressures on the sediment regime, (Report 5.1.2.) - hydromorphological alterations at the Danube Basin-wide scale are evident and are generated by the following:

Pressures Categories		Indicators describing the pressure category
Interruption of longitudinal continuity	dams, weirs, sluices, groynes	Density of barriers (no./km) or height of obstacle (cm)
	Reservoirs (impoundments) with hydro-peaking effect	Gradient of decreasing/increasing water level (cm/h)
Morphological alteration due to dredging	Dredging / extraction	Dredged / extracted volume (Mio m <sup>3</sup> )
Interruption of lateral connectivity	dykes agricultural and fishponds	Length of dykes/length of water body (%) Affected area/floodplain area
	regulation works in the river channel, cutting meanders, artificial channels, river channel maintenance	Length of regulation works/length of water body (%)

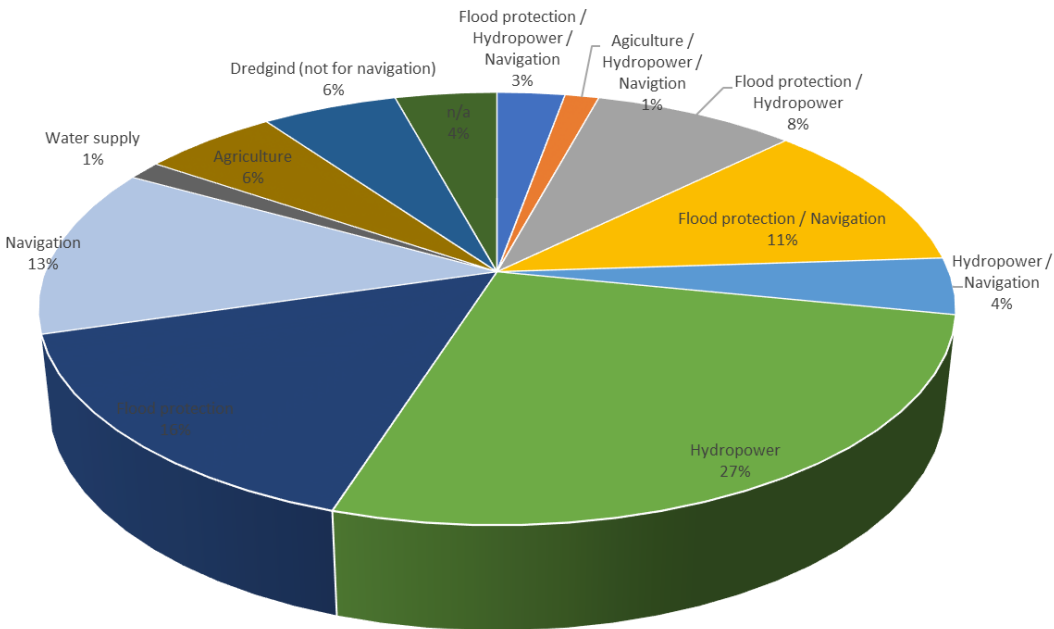
1.Driver											
2.1.Country:		2.2.Status of the project/measure									
3.1.Project / measure:		3.2.Localization of the project/measure along the major selected tributaries									
3.3. Responsible authority		3.4.Main target of the measure:		Measure against sedimentation							
				Measure to stop bed erosion							
4.Project/measure summary		4.1.Location									
		4.2.Application									
		4.3.Parameter									
		4.4.Aim and background of the project									
		4.5.Costs		4.5.1.construction		4.5.2.maintenance					
		4.6.Objectives/ Goals of the project/measure									
		4.7.Description of the measure		4.7.1.Category		state of the art		tested (implemented at least once)		state of science (no field test yet)	
				4.7.2.Other categories							
				4.7.3.Type		recurring		non-recurring			
				4.7.4.Other types/details							
		4.7.5. Shorter description									
		4.8.Activities									
		4.9.Scaling		4.9.1.Spatial:							
				4.9.2.Temporal:							
		4.10.Effects		L - low							
				M - medium							
				H - high							
				4.10.1.Hydro-dynamics:		water level					
						flow velocity					
other											
4.10.2.Sediment dynamics:		transport capacity									
4.10.3.Morpho-dynamics:		continuity									
4.10.4.Ecology:		substrate									
4.10.4.Ecology:		habitat diversity									
4.11.Impact of measures on water users		L - low									
4.12.Cost effectiveness of the measures		M - medium									
4.13.Interrelation with other measures		H - high									
4.14.Assessment before implementation		L - low									
4.15.Assessment during implementation		M - medium									
4.16.Assessment after implementation		H - high									
4.17.Recommended as good practice measure		Yes		No							
4.18.Reasons for recommended or excluded as good practice											
4.19.Add pictures/images /schematic diagram before and after project/measure implementation (if available)											
4.20.Additional information											
4.21.Website of the project											

WP5: Activity 5.3 – Measures on good practices

Assessment of Factsheets  
(71 factsheets collected so far)




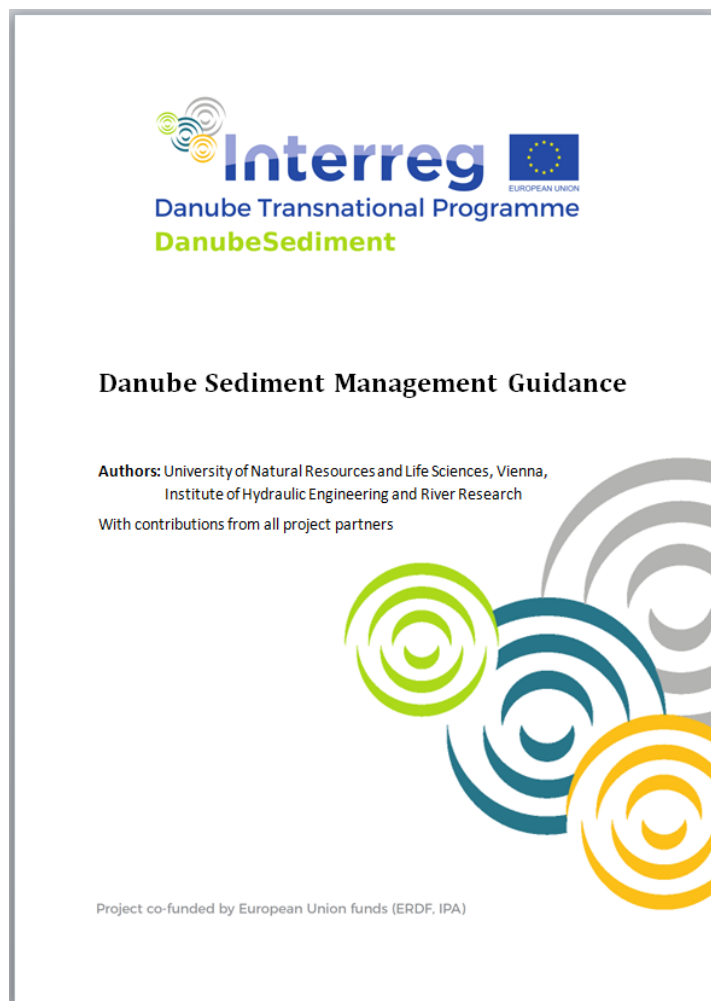
drafting the Catalogue of measures



- 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



# Act. 6.2 DSMG



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[www.interreg-danube.eu/danubesediment](http://www.interreg-danube.eu/danubesediment)

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# Act. 6.4 SMS



## Sediment Manual for Stakeholders

**Authors:** University of Natural Resources and Life Sciences, Vienna,  
Institute of Hydraulic Engineering and River Research  
With contributions from all project partners

Project co-funded by European Union funds (ERDF, IPA)



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## Latest information

- International stakeholder workshops/WPs have been organised
  - 18/04/18 WP3, Budapest
  - 26/06/19 WP5, Bucharest
  - 21/10/19 WP4, Bratislava
- National Stakeholder Workshops have been done

- **Final Project Event** "Transnational Cooperation for Sediment Management in the Danube,, (incl. WP6 stakeholder workshop) on **19/11/19 in Budapest**

**Thank you for your attention**