

**Institute for Biological Research „Siniša Stanković“**

**University of Belgrade**

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## Key role of hydro-morphology and river dynamics for the Danube ecosystem

Momir Paunović



**Cross-sectorial conference: DANUBEparksCONNECTED (WP River Morphology & WILDIsland) in cooperation with Danube STREAM (WP Waterway Management)**

Dunakiliti, Hungary, 25<sup>th</sup>-27<sup>th</sup> of April 2017



## CONTENT:

- Relation of river dynamics, HYMO and biota – general considerations;
- The Danube River: status in respect to HYMO degradation;
- Data availability;
- Biological indicators;
- Are we able to properly detect consequences of HYMO degradation in Large Lowland Rivers?
- and
- Collaboration on the mitigation of the HYMO degradation.



## Relation of river dynamics, HYMO and biota

- It is evident that changes in river dynamics and HYMO degradation strongly influence biota;
- The changes influence structure and function of ecosystems;
- The influences can be reflected on different levels of biological organization and different patterns could be used to detect and measure the level of anthropogenic pressures, in this case change in river dynamics and HYMO parameters;



## The Danube River: status in respect to HYMO degradation;

- Large and very large rivers specific and complex for investigation;
- If we have to detect changes, a lot of effort is needed;
- It is particularly case with assessment of level of HYMO degradation and biological assessment;
- Different protocols available; standards available – developed for other water body types and not fully applicable to large rivers;
- Problems are related to size of the water body (area and depth), water transparency, available equipment, etc.

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# How to identify physical outlook of the very large river?

- NOT ONLY IN THE SHALLOW LITTORAL ZONE!
- Depth: >> 90 % of the water body is not accessible!
- Current: extremely complicated/dynamic vectorial pattern



Bed load, particle size, bed movement

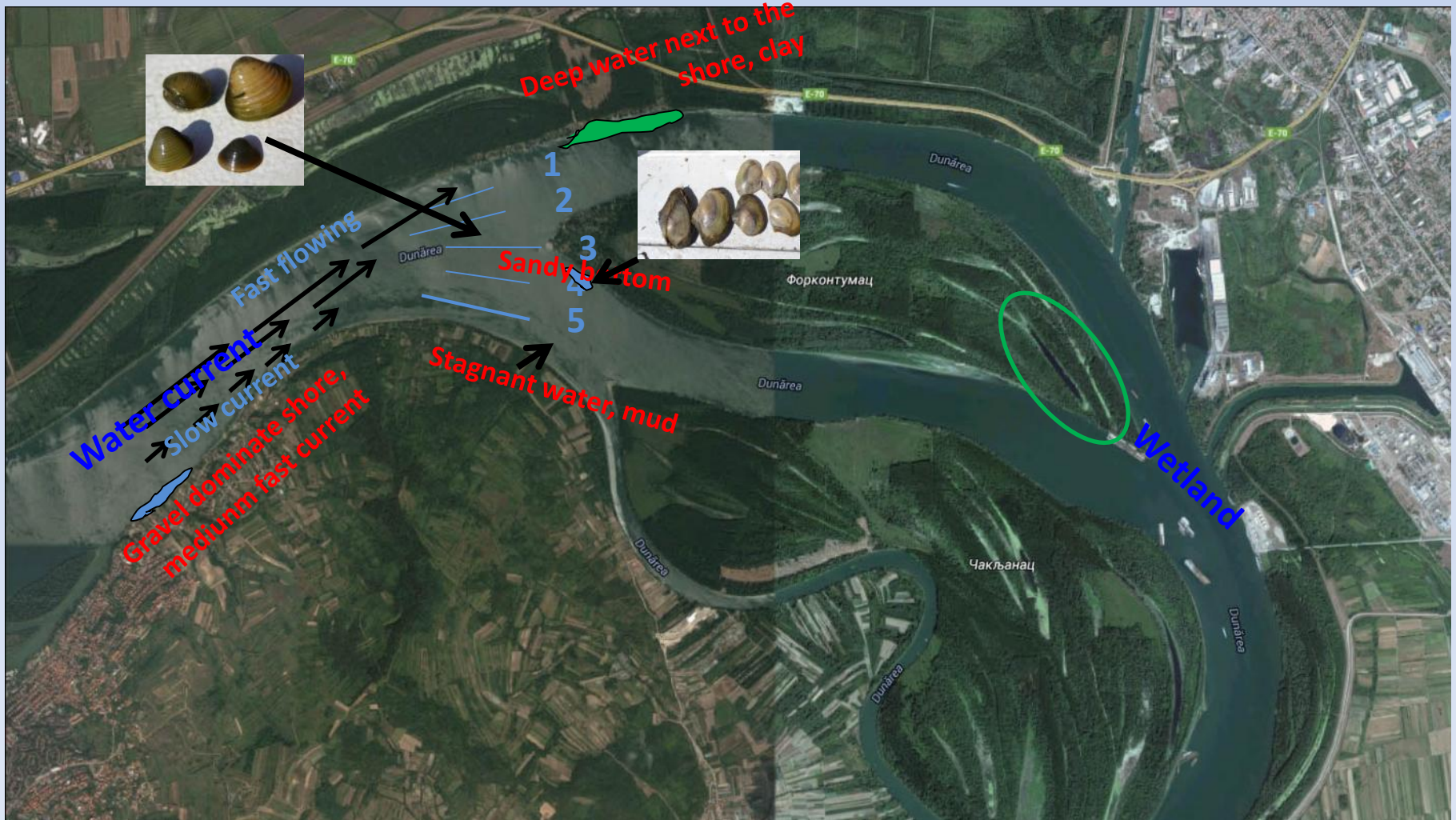
Biota

- Heterogenous spatial/temporal patterns
- Sampling? Effects? Relationships? Stresses? HYMO?

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## Complexity of the system;



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- Dredging



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- Collection of the material by benthological dredge important!!!

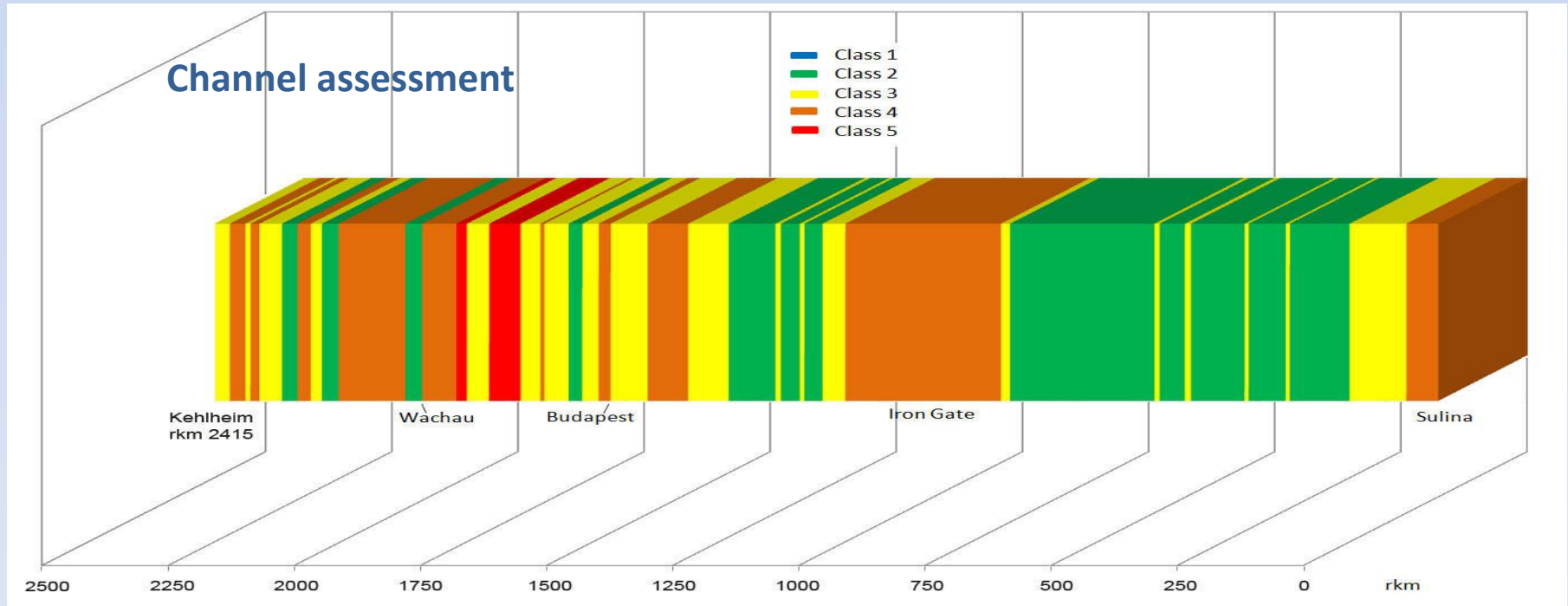




## The Danube River: status in respect to HYMO degradation;

- The assessment of the HYMO status of the Danube River – national RBMP and the Danube expeditions;

## Some results of JDS2 HYMO assessment:

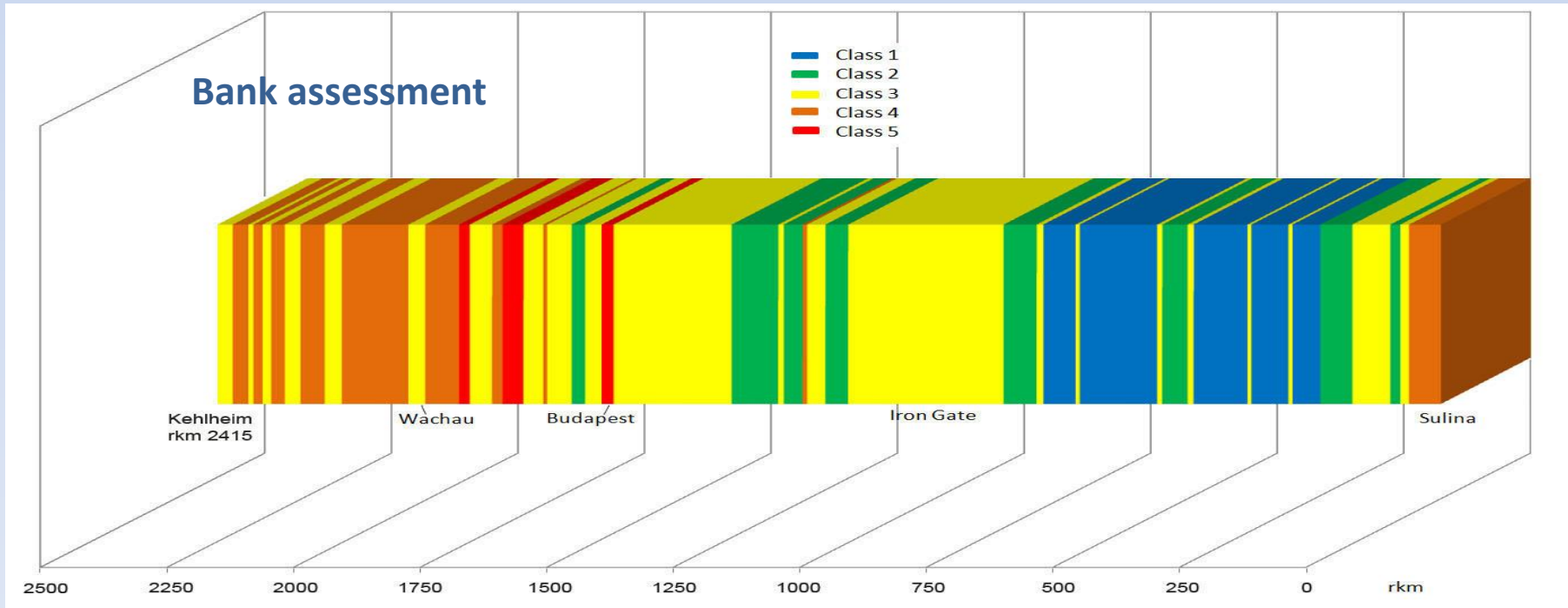


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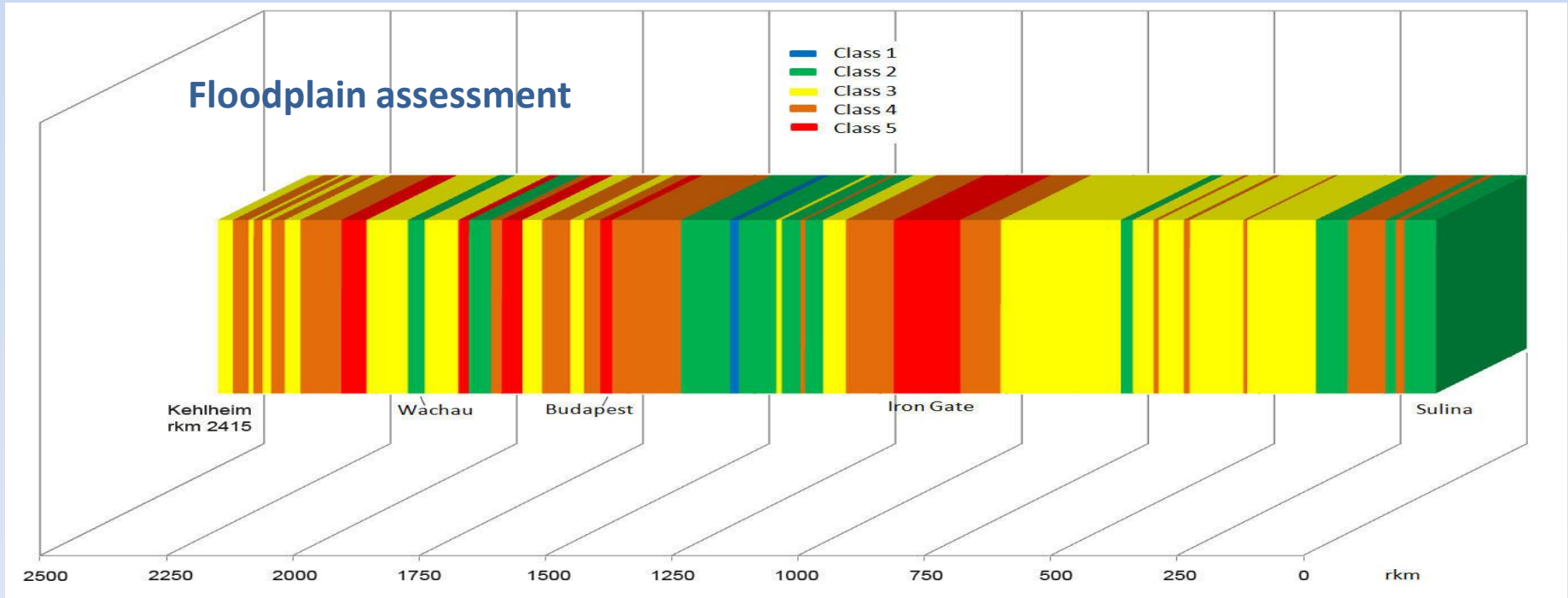


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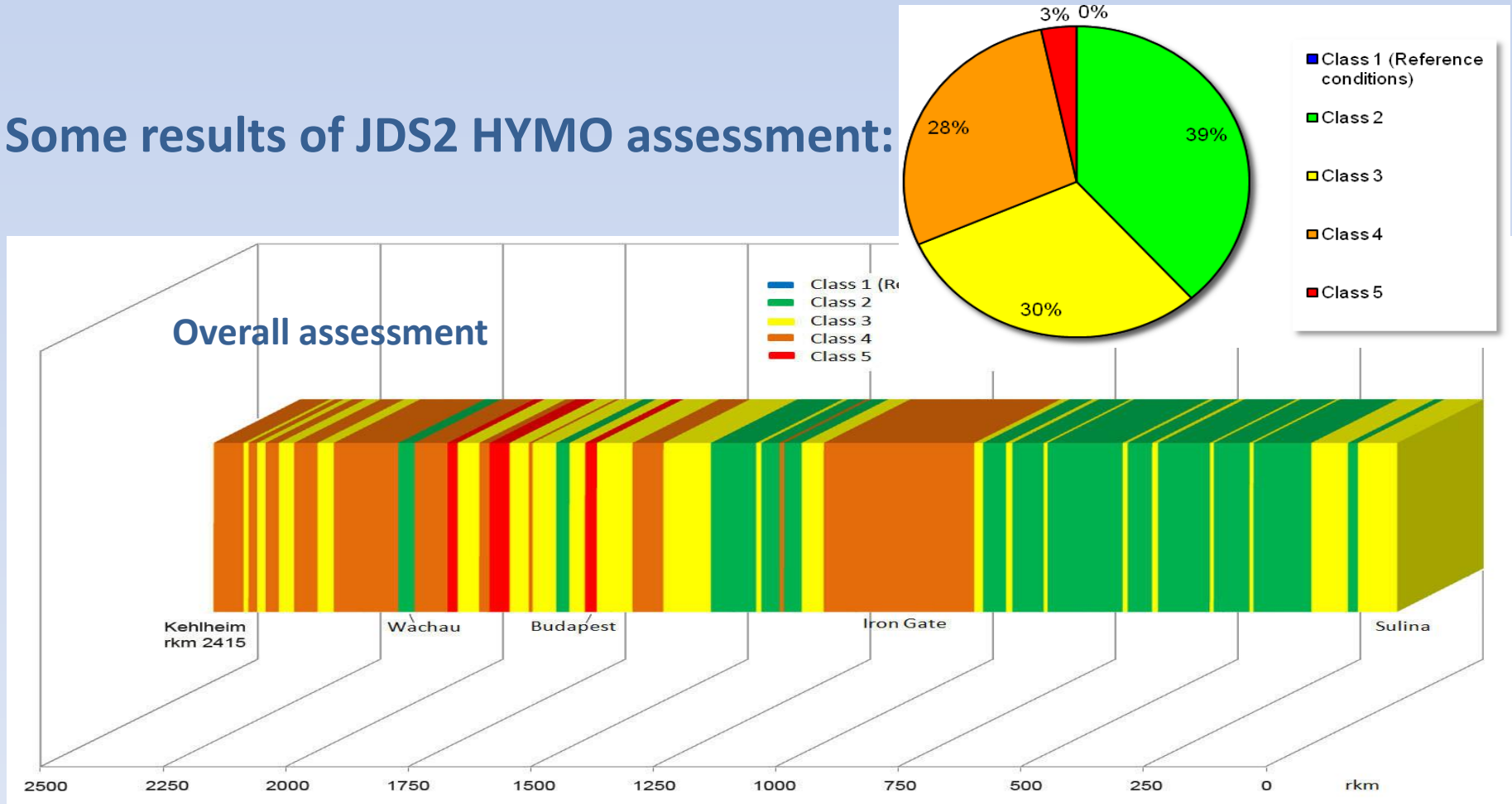


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# The Danube River: status in respect to HYMO degradation;

## Some results of JDS2 HYMO assessment:





## Data availability;

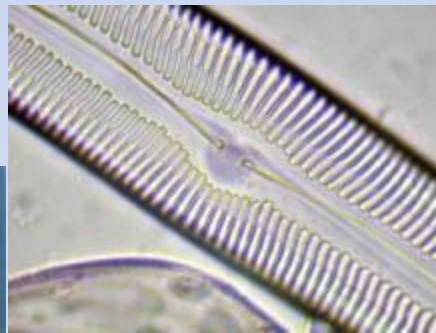
- For preparing study/research on relation of biological parameters and HYMO degradation, with confident results/conclusion, comparable datasets are needed;
- JDS datasets (2001, 2007 and 2013) are useful for such considerations, but still we need more data – JDS 4 under preparation, planned for 2019;
- Biological Quality Elements to be used as indicators.

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## Biological indicators;

Fish



Algae

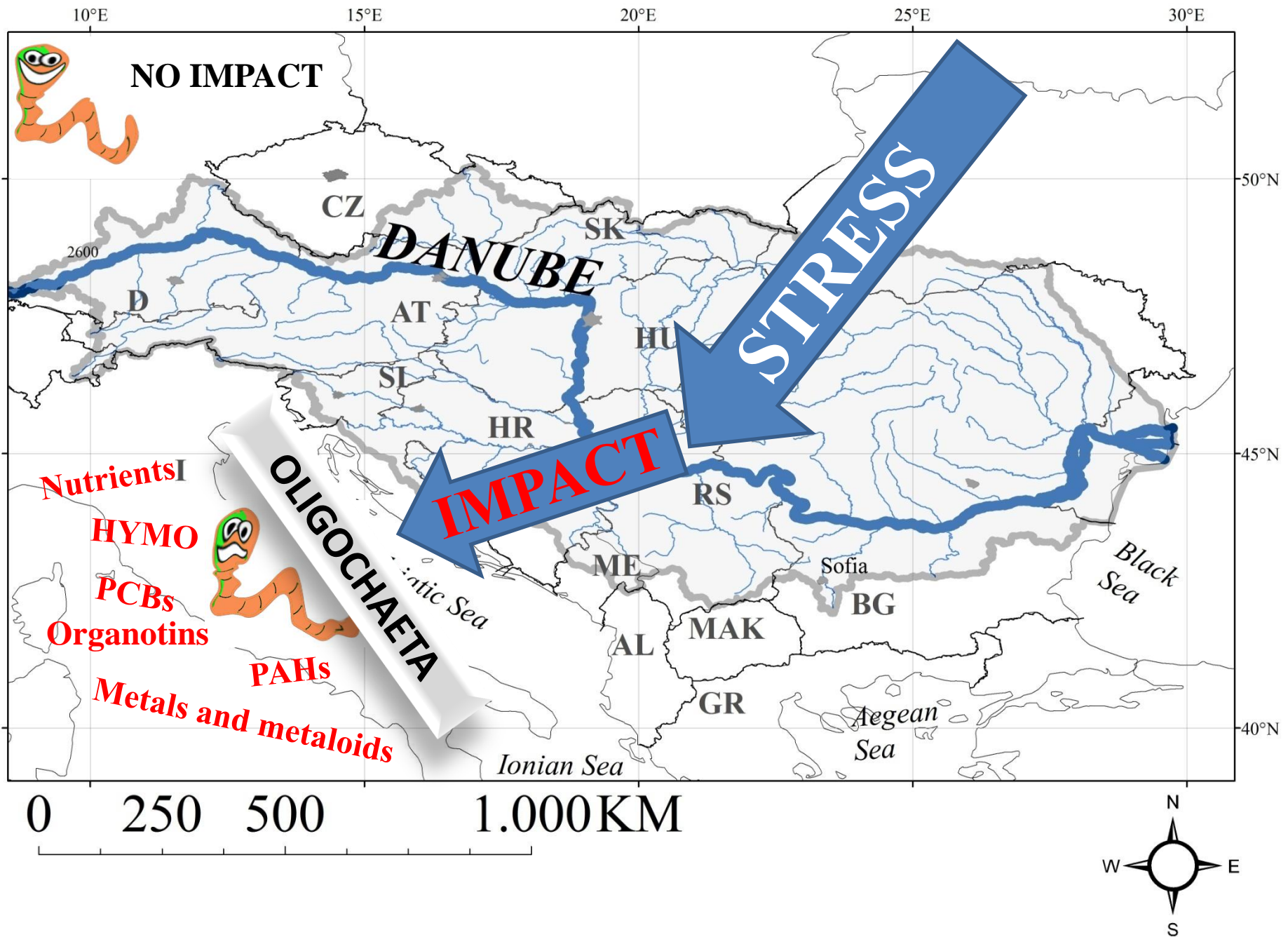


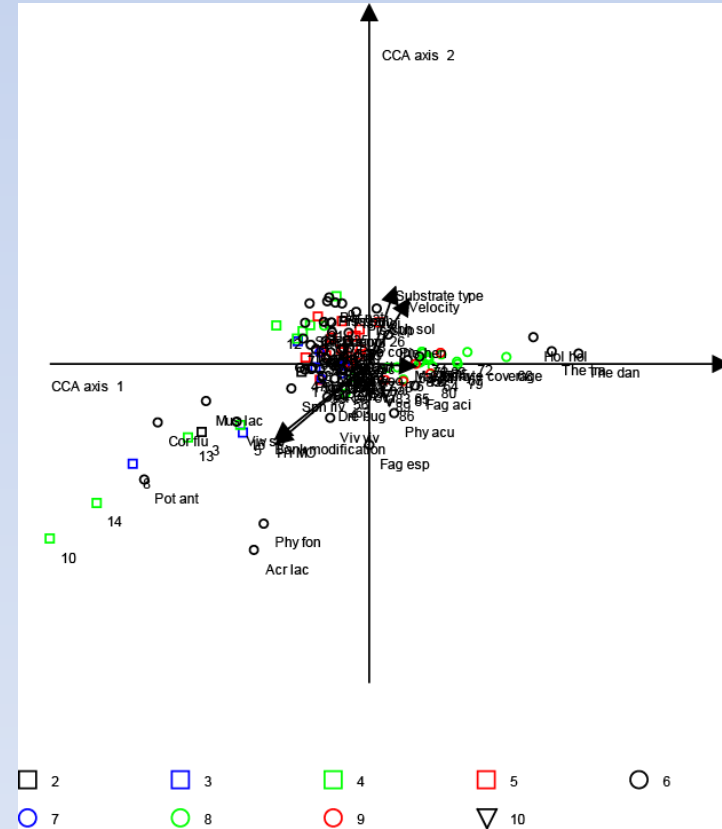
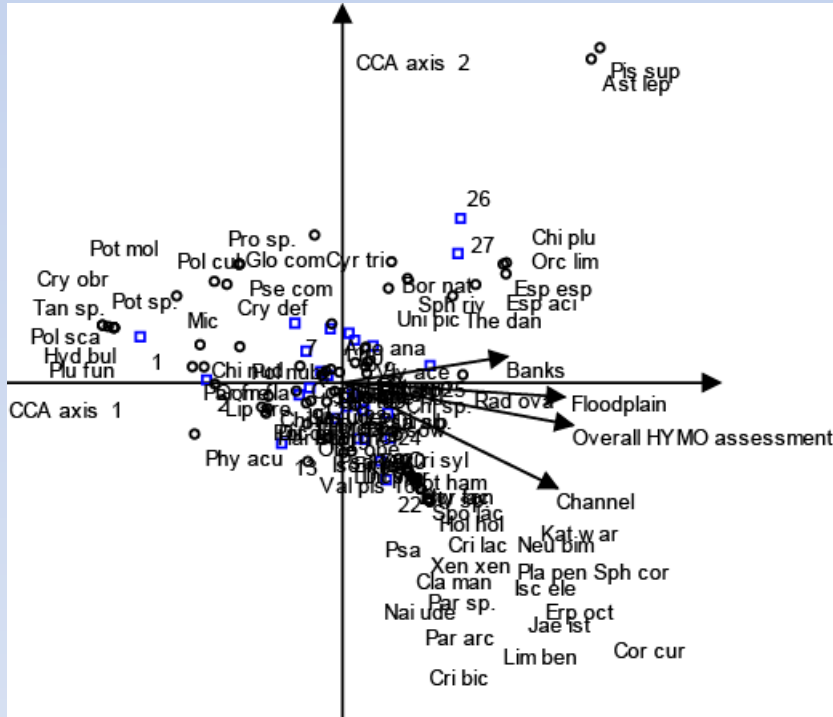
Aquatic macrophytes



Macroinvertebrates







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## Are we able to properly detect consequences of HYMO degradation in Large Lowland Rivers?

- Still a lot of work is needed.
- Indexes to be further elaborated:
- BMWP, ASPT, IBI - macroinvertebrates;
- Share of specific taxa groups e.g. Oligochaeta - macroinvertebrates;
- Share of motile species - phytobenthos;
- Use of other indexes is needed.

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