




ENGRAVE

Ecological aspects of rivers and set of management measures to ensure functionality of green infrastructure of lowland rivers

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Cross-border workshop “**Landscape planning: integration of ecological, social, cultural and economic aspects**”

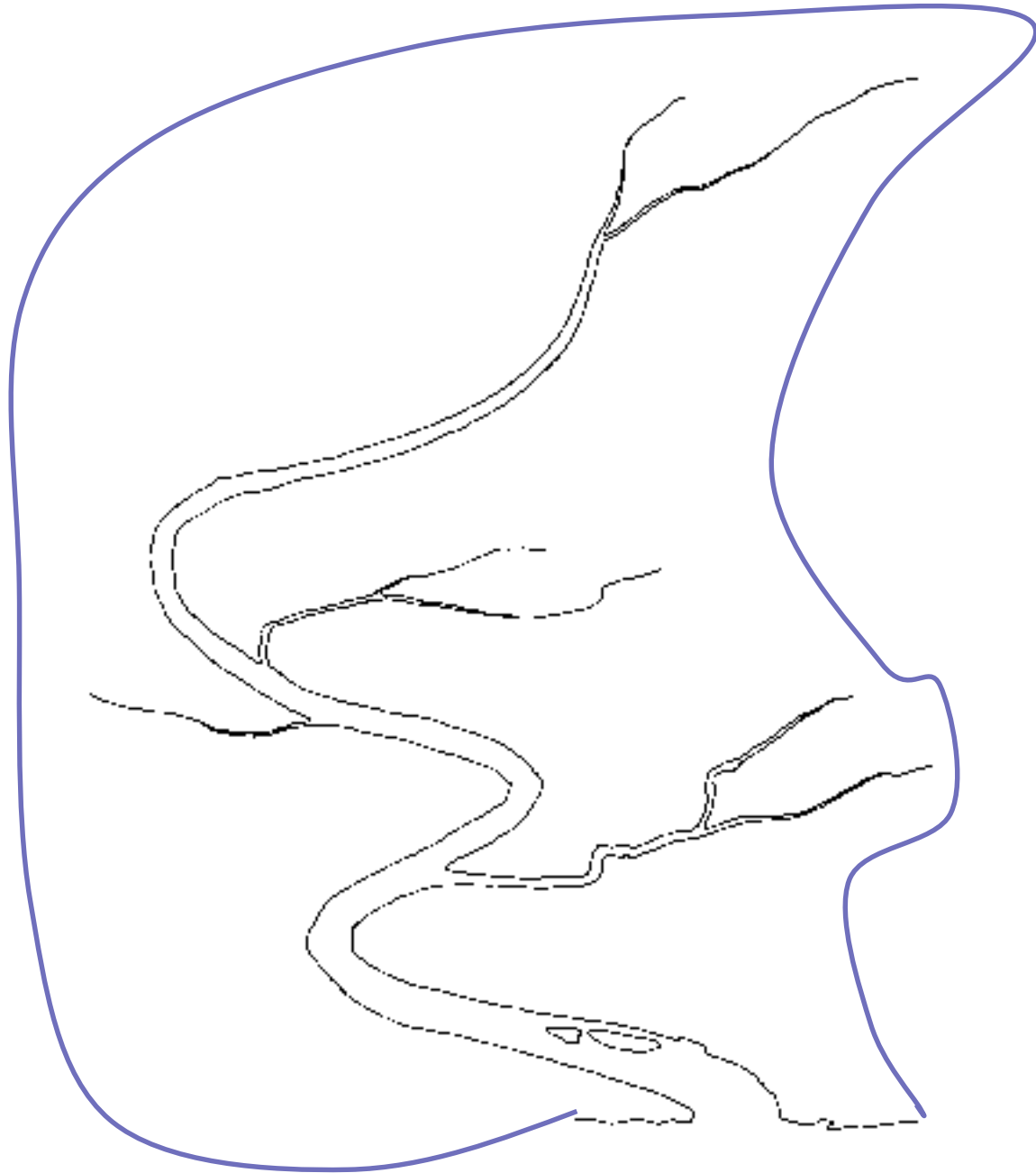
12-09-2019: Bauska

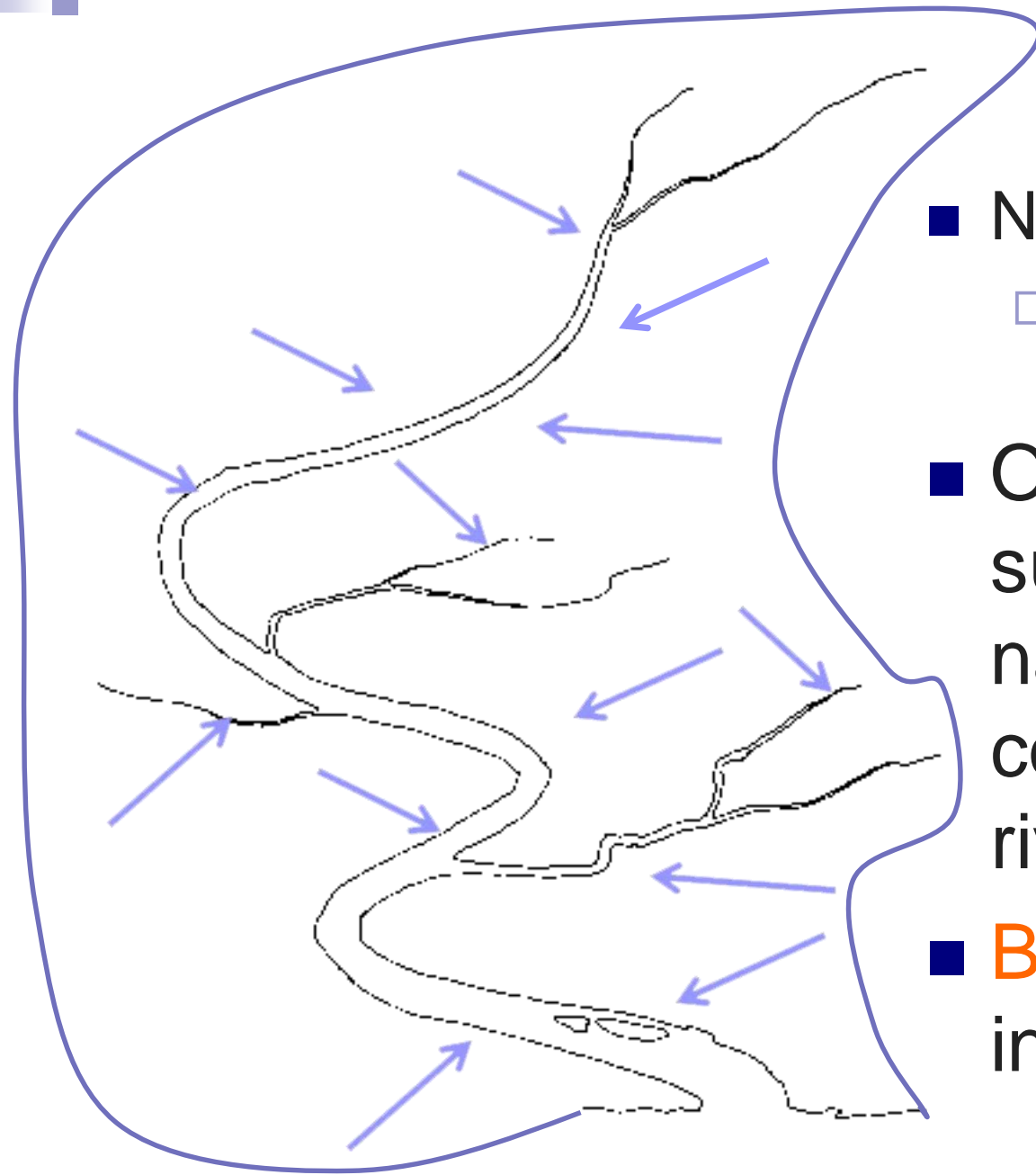


Ecological aspects of **rivers** and set of **management measures** to ensure functionality of **green infrastructure** of lowland rivers

- What is river?
- What is management ?
- What is functionality of river?
- Why river functionality is so important?
- How to get benefit from green infrastructures?

A river is a natural flowing watercourse, which collect water from its surrounding landscape (catchment area) and provide environment for water organisms.

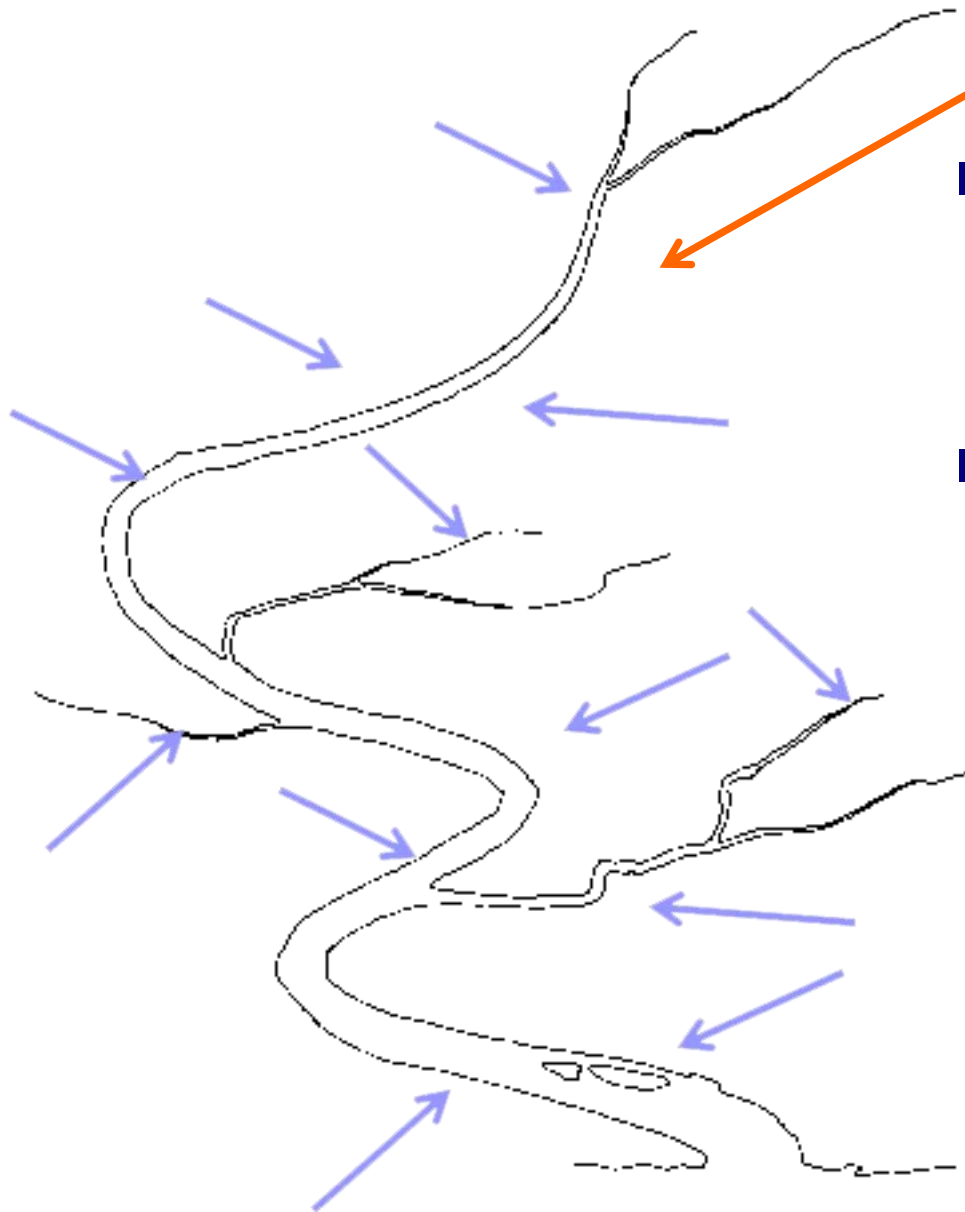




- Nutrients:
 - nitrogen (N) & phosphorus (P)
- Organic substances are natural component of river,
- **BUT** nutrients are in natural amounts

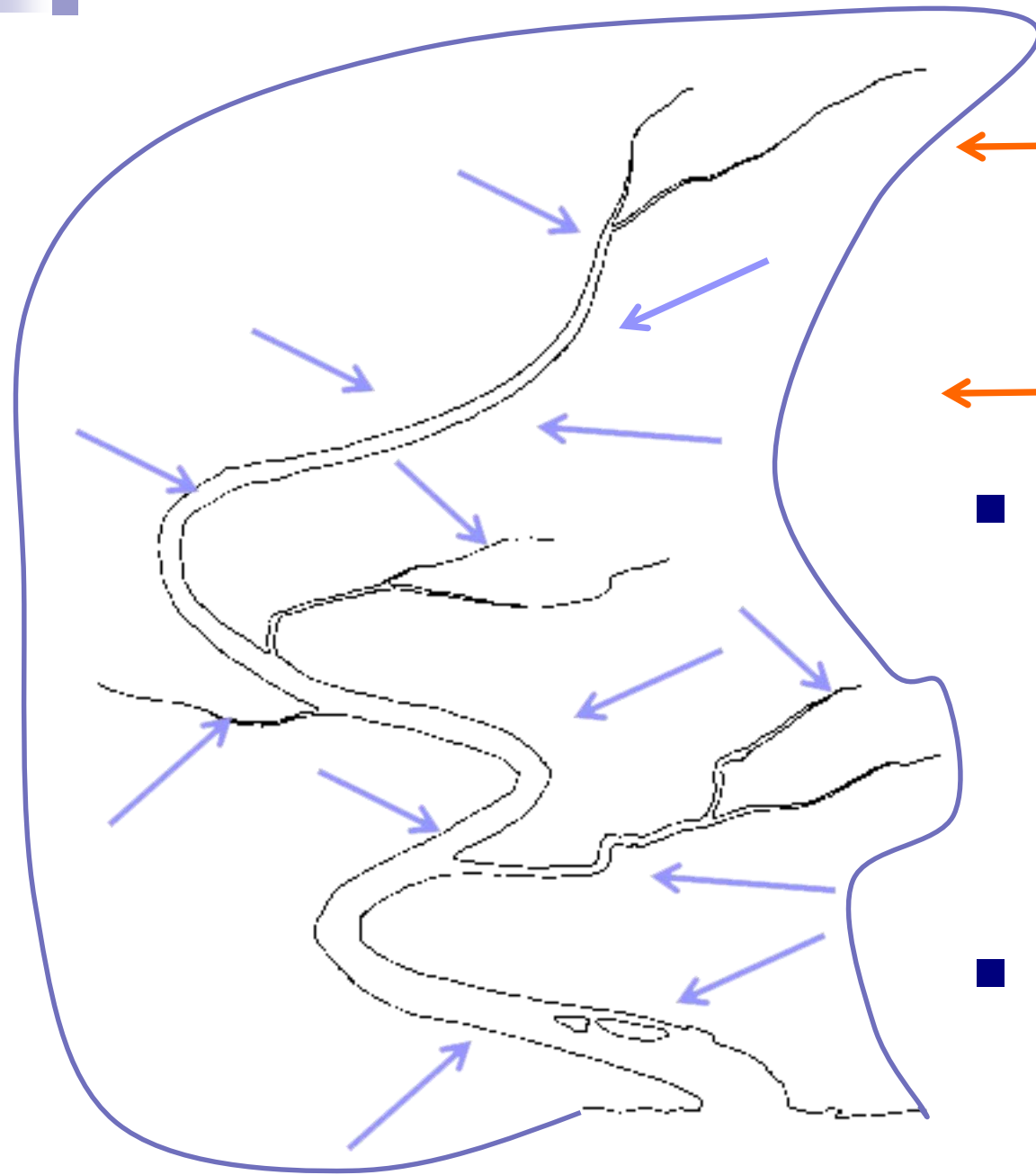
Natural condition of River Mēmele





- Globalization process has impacted also rivers;
- Due to economic development in the past few decades amount of nutrients & organic substances have drastically increased

What is river?



- Use of fertilizers, which originates in other catchment area (even in other continent), increase nutrient runoff
- The amounts collected by river therefore becomes unnatural

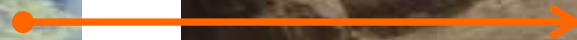


Existing condition of
River Mēmele

The management of river is:

- Measures to reduce loads of nutrients;
- **Practical measures** to restore **good functionality** of river

What is management ?



In practice, the management of river is effort to bring river back to more natural condition

What is functionality of river?

- (1) To **transport** water and sediments (by gravity) from headwaters to ocean (sea);
- (2) To ensure **self-purification** capacity corresponding to particular type of river
- (3) To provide **habitats** for water plants and animals corresponding to particular type of river

Why river functionality is so important?

The water **transport** is interrupted or disturb at all by:

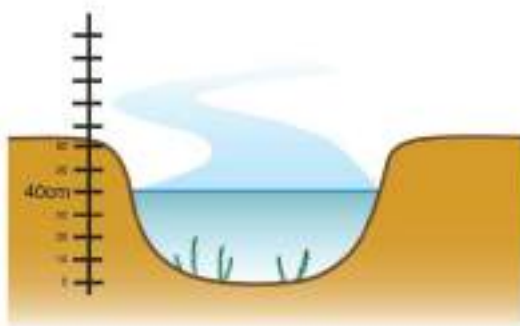
- Tree falls
- Overgrowth with submerged or emerged plants
- Dams created by beavers or humans



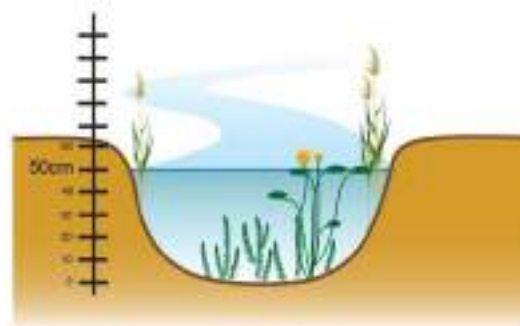
Why river functionality is so important?

Transport

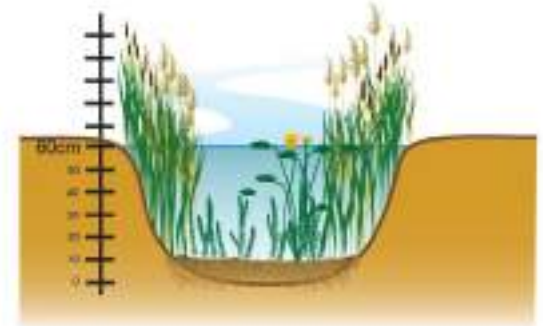
Effects of waterplant expansion creates both bank rewetting and nutrient runoff



500l



500l



500l

What is functionality of river?

Natural condition of river

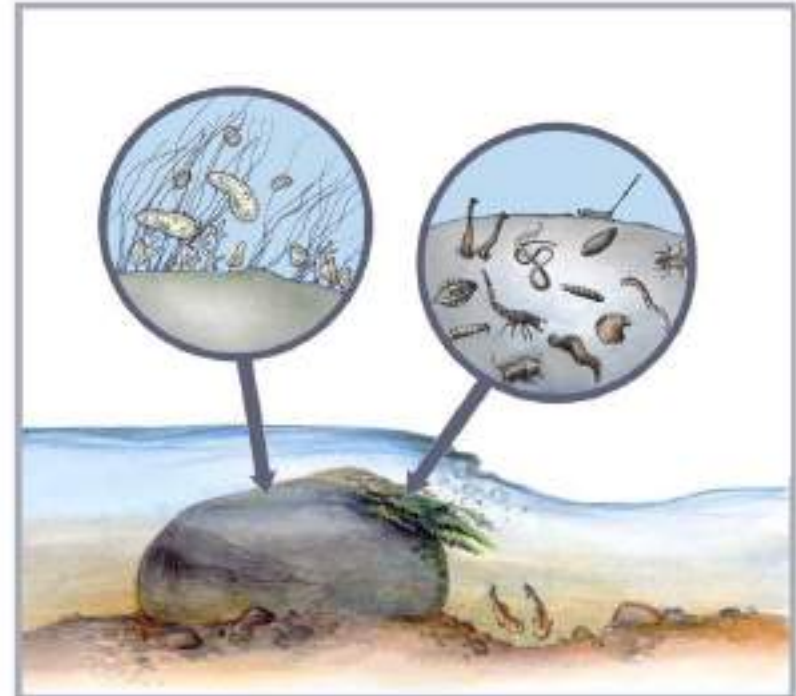


Owergrowth
with plants
< 30%

What is functionality of river?

Self-purification capacity corresponding to particular type of river

- The ability of rivers to assimilate pollution of organic origin and restore to its own natural quality;
- A complex process, which consist of biological, chemical and physical processes



Why river functionality is so important?

Self-purification capacity corresponding to particular type of river

- within 5–10 m² of riffle area is reduced pollution equal to 1 PE*

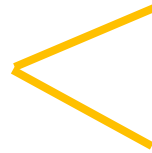


*in waste-water treatment is the number expressing the sum of the pollution load produced during 24 hours per 1 people

Why river functionality is so important?

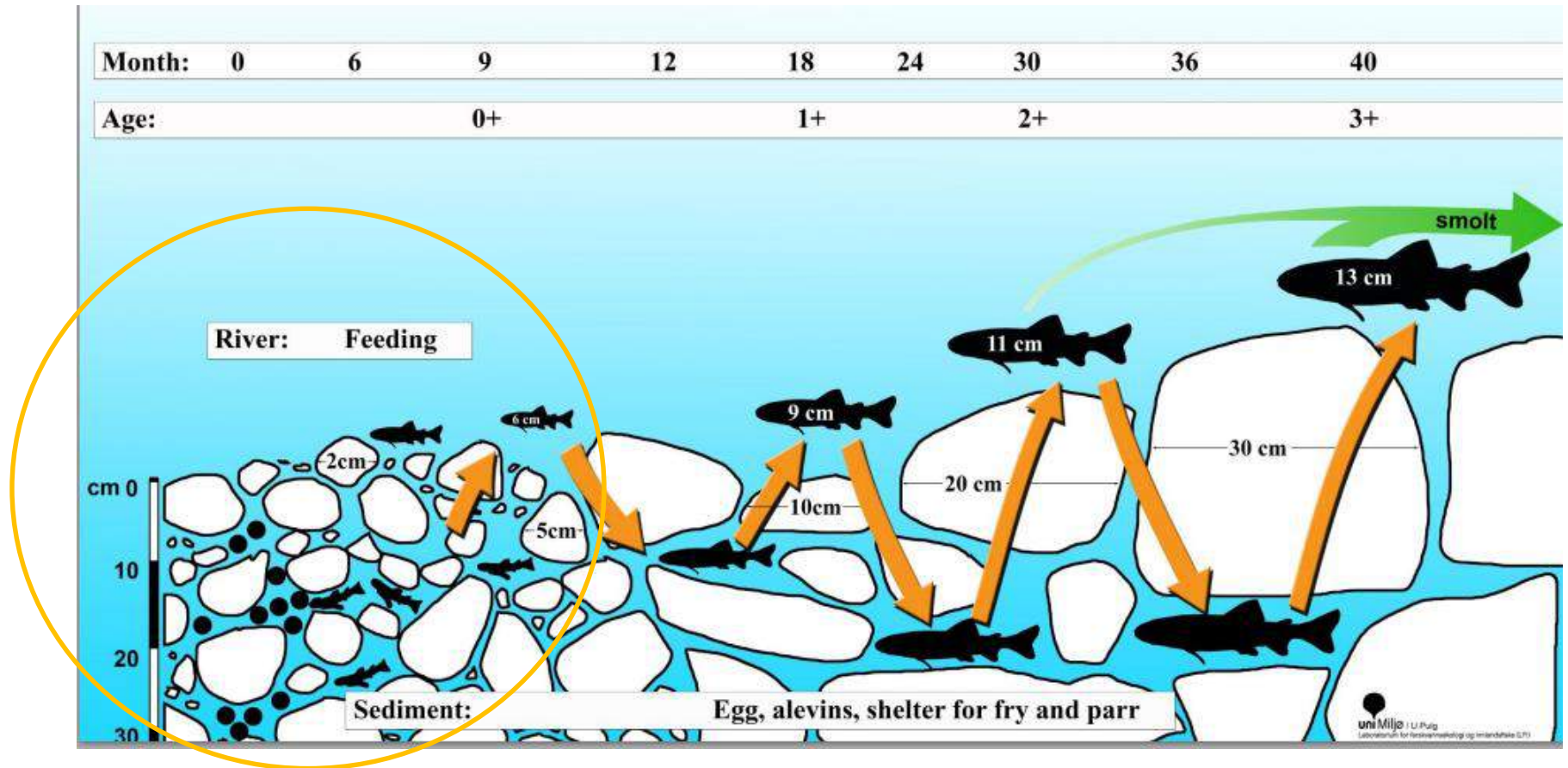
Self-purification capacity corresponding to particular type of river

- Slow or lowland rivers
- Rapid or fast flowing rivers



Why river functionality is so important

To provide **habitats** for water plants and animals corresponding to particular type of river



Already 15% sand and fine sediment addition destroy salmonid spawning grounds

Why river functionality is so important?

To provide **habitats** for water plants and animals corresponding to particular type of river

For mussels - *Margarita margaritifera* and *Unio Crassus* - 25% sand and fine sediment addition is fatal



Why river functionality is so important?

We can use river as green (blue) infrastructure, which provides a lot of ecosystem services, including



BUT only in case if river functionality is good

Recreation



Boating



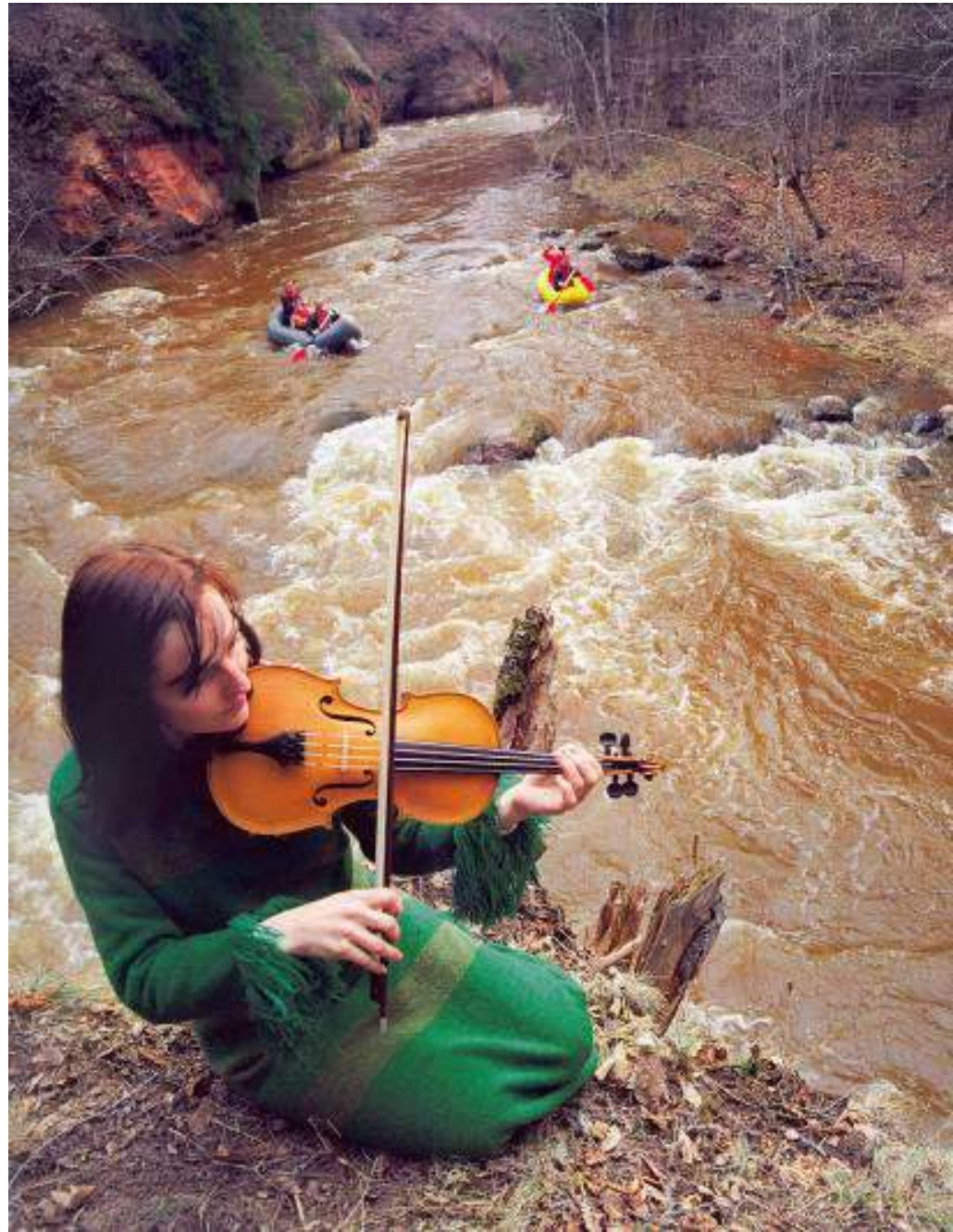


Waterside development





Rest next to the
water



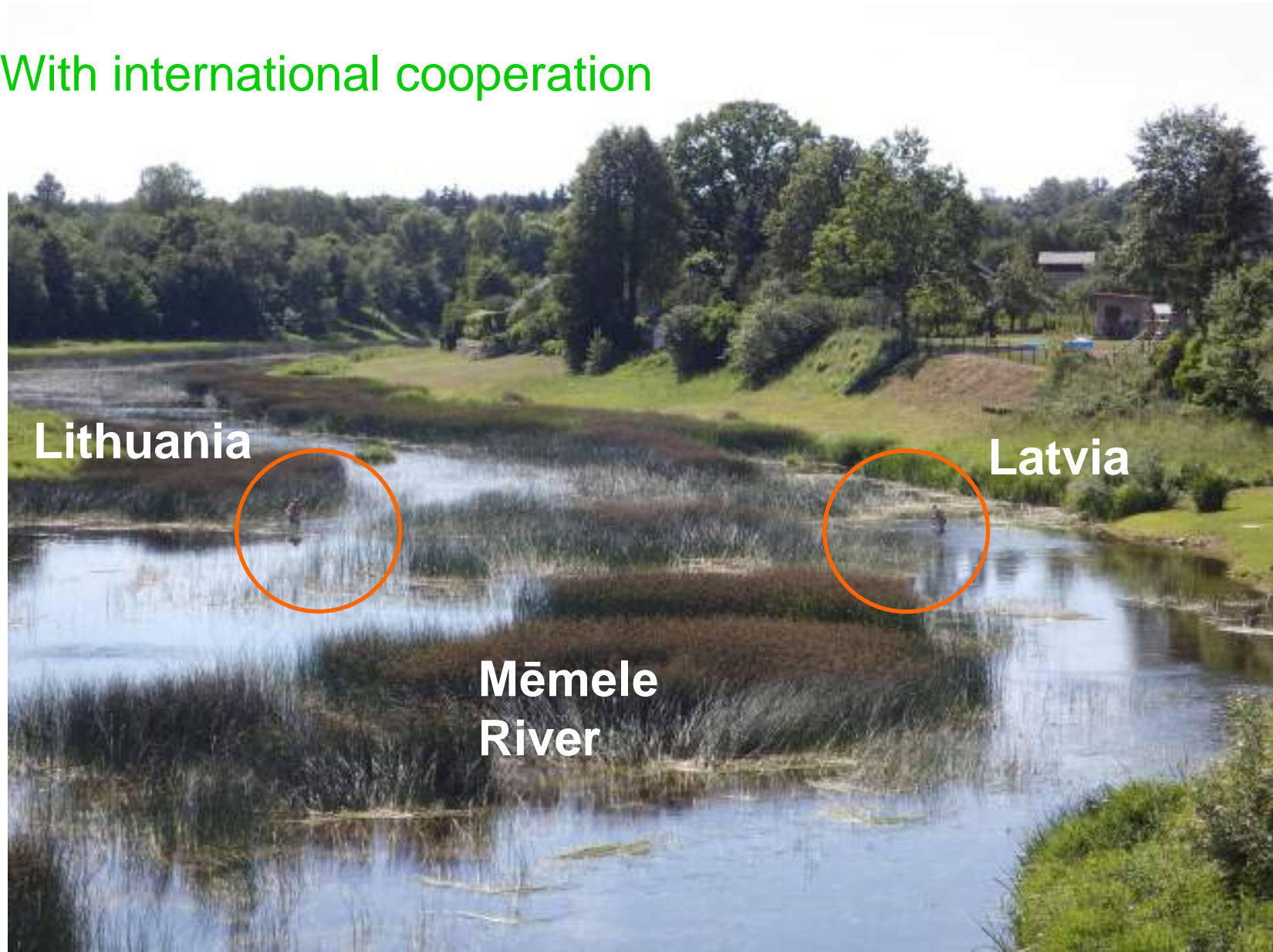
How to get benefit from green infrastructures?

With hard works



How to get benefit from green infrastructures?

With international cooperation



How to select equipment and method?

The selection of management measures depends from finances, but as well as from motivation (which cost nothing)



How to get benefit from green infrastructures?

The selection of management measures depends from the river depth and type of river bed



Recommended for big and medium size rivers with muddy bed = lowland rivers – for plants mowing

How to get benefit from green infrastructures?

The selection of management measures depends from the river depth and size of area to be managed



Recommended for big and medium size rivers with muddy bed – for plants mowing



How to get benefit from green infrastructures?

The selection of management measures depends from type of river bed and condition



Recommended for shallow rivers (until 1,2 m) with naturally stony river bed – for plant removal together with roots

How to get benefit from green infrastructures?

The selection of management measures depends from type of river bed and condition. Recommended for overgrown banks and narrow streams, to remove emerged plants with their



Recommended for overgrown banks and narrow streams, to remove emerged plants with their roots

How to get benefit from green infrastructures?



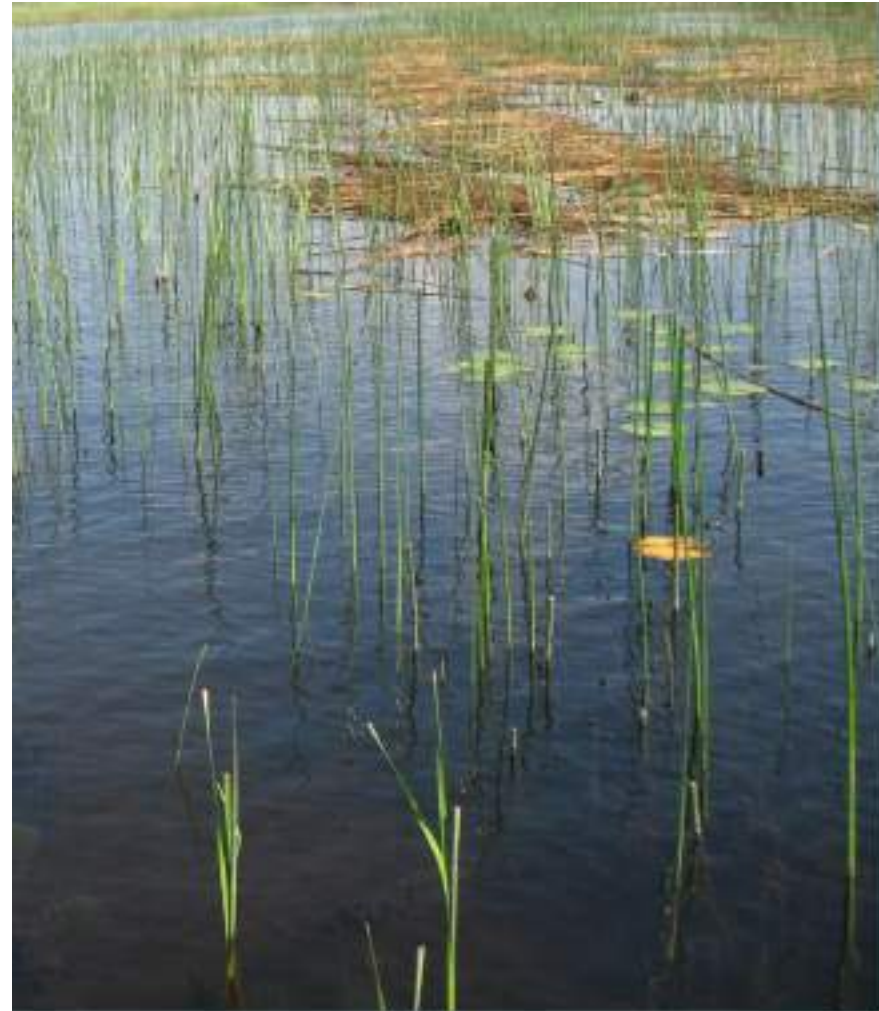
How to get benefit from green infrastructures?

To reach condition of «weak» overgrowth, the plants have to be mowed

- 3 times per summer
- Activity repeated 2 years

Recommendations:

- To get better results - to mow smaller area with several repeats instead of bigger area with only one mow



What to by equipment or services?

Truxor:

- **Equipment costs:** 90,000 EUR;
- **Services costs:** 425 EUR/ha in average (without VAT) + transportation;
- «+» for dense stands

Boat

- **Equipment costs:** 8,000 EUR;
- **Services costs:** 425 EUR/ha in average (without VAT) + transportation
- «+» for sparse stands
- «-»:
 - ☐ Can mow only in water;
 - ☐ Cutted plants can be only pushed to the coast;
 - ☐ More time is needed for 1 ha cutting





THANK YOU FOR ATTENTION!

**ASK QUESTIONS DURING
PRACTICAL DEMONSTRATION**