





TOXLEARN4EU

## Case study

- National Park Plitvička jezera -

add name

add date



Co-funded by  
the European Union

# National Park Plitvička jezera

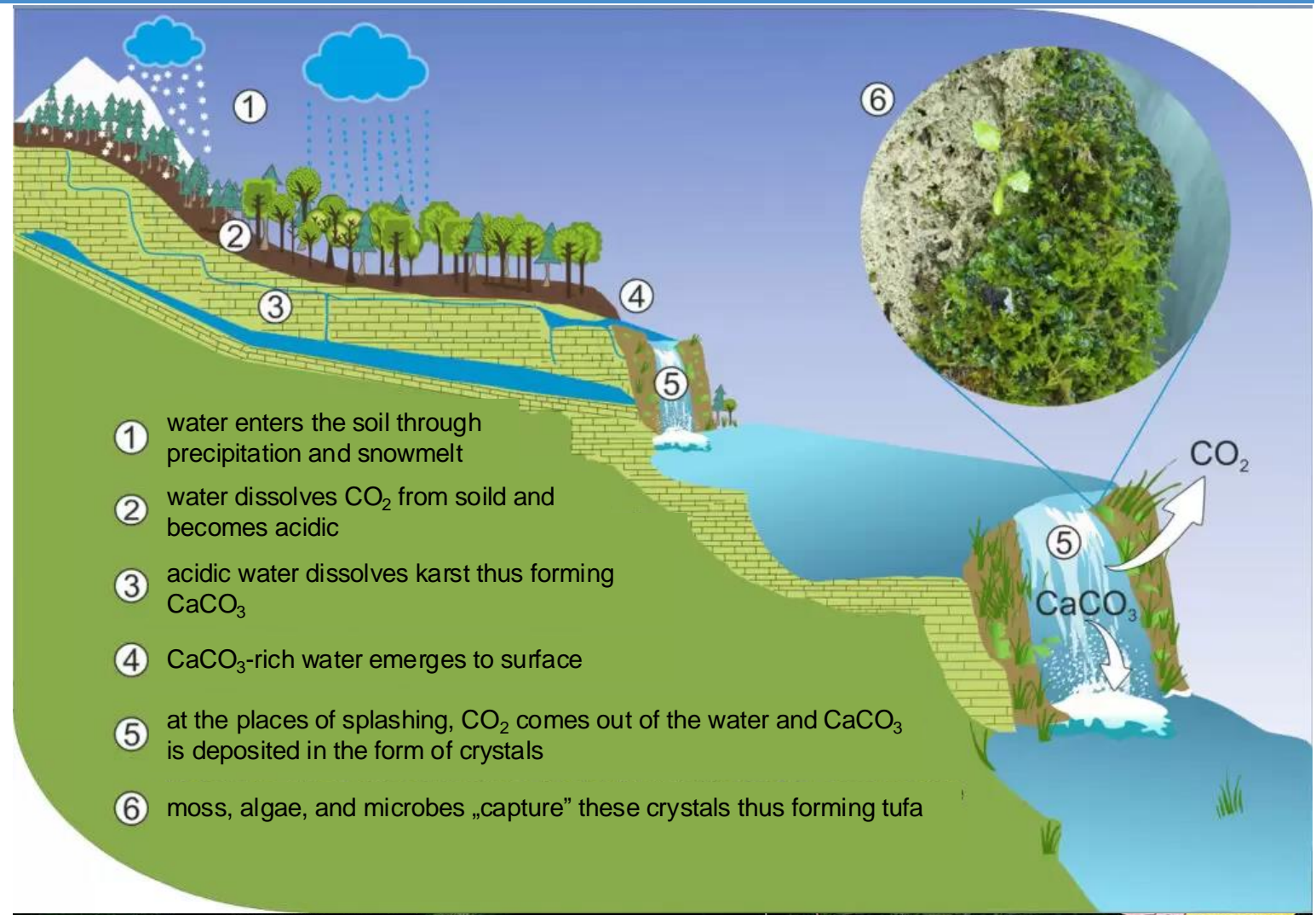
- oldest national park in Croatia (1949)
- since 1979 NP is on the UNESCO world natural heritage list (the oldest in Europe):
  - contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
  - to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
  - to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals





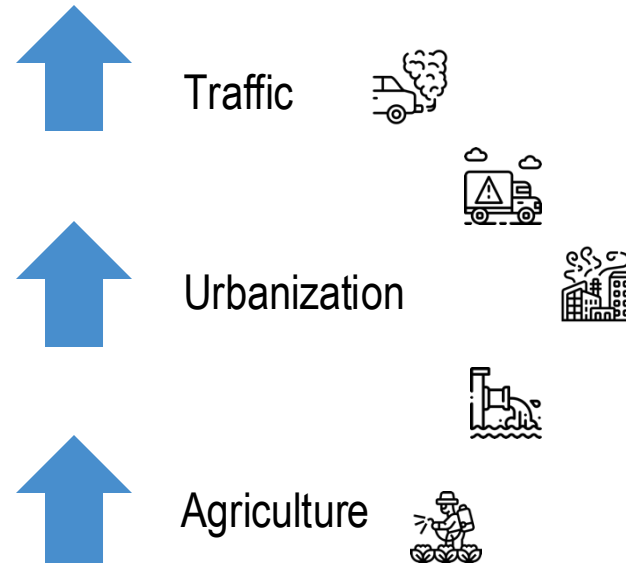
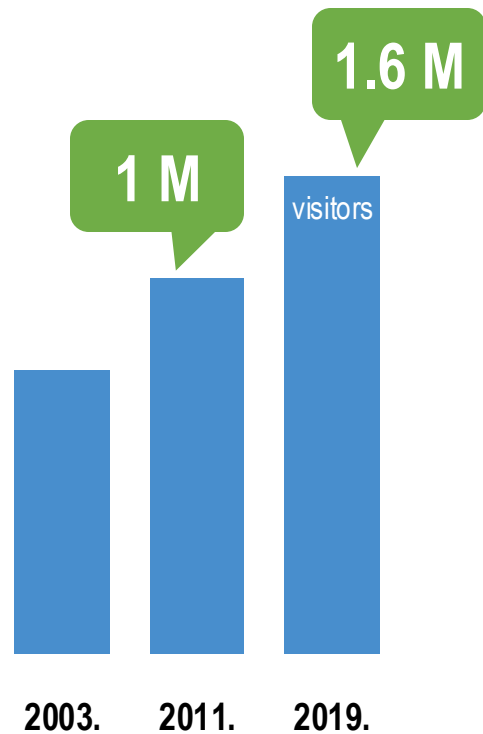
# National Park Plitvička jezera

- complex of 16 lakes
- major water sources: White and Black river, Rječica, and Plitvica
- karst: Limestone - calcium carbonate (calcite) or the double carbonate of calcium and magnesium (dolomite)
- tufa: hollow, **porous rock** created from the deposition of dissolved calcium carbonate in the water by plants, algae and mosses
- specific and **sensitive** conditions to grow/sustain tufa



# Definition of case problem

- mass tourism and increased anthropogenic activity



UNESCO reports:

- Impacts of tourism/visitors/recreation
- Major visitor accommodation and associated infrastructure
- Pollution and water contamination
- Air pollution

## Croatia Urged to Heed UNESCO's Plitvice Threat

Sven Milekic | Zagreb, ZAGREB | BIRN | July 21, 2016 08:05

Experts and activists say that UNESCO's warning, about removing Croatia's Plitvice Lakes from its heritage list, should be 'taken seriously'.



© Plitvice Lakes. Photo: Wikimedia Commons /Tomise

# Case - gameplay



- 3 groups

RESEARCH INSTITUTE

GOVERNMENT

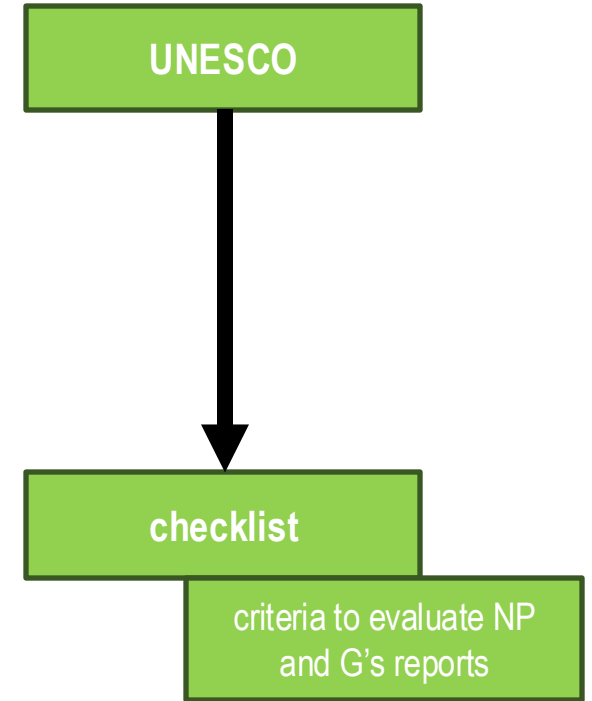
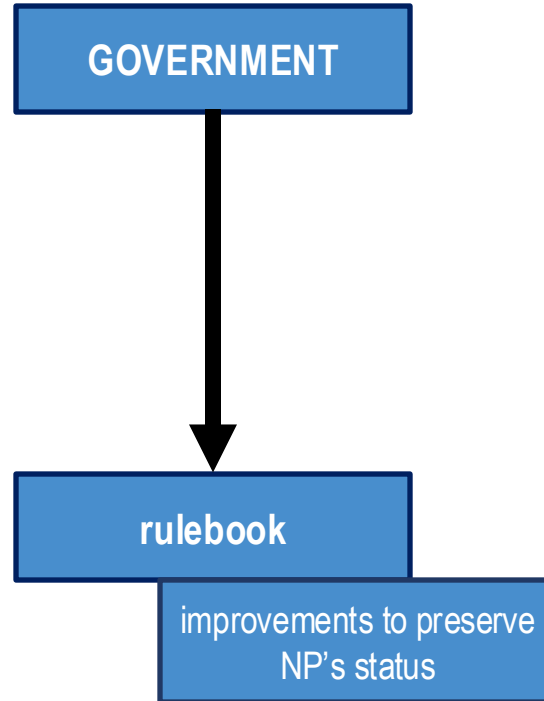
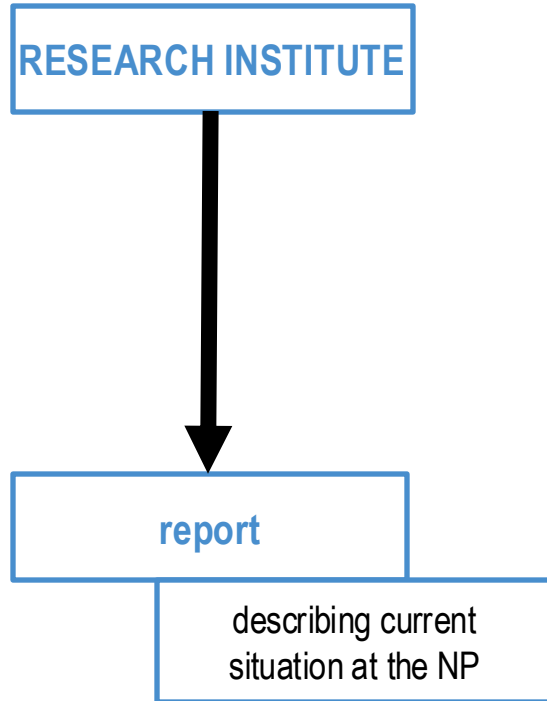
UNESCO

- **be creative**

- all have a fixed budget of **1.000 TOXcash**
- you can pick the data you need, **you don't have to pick all at once** – but during the course of the summer school
- you can use literature, the Internet, reliable sources
- you will get periodical subtasks
- on **add date** you have to present the group's work in **15 min** allowing **5 min** for questions
- you can always ask for support from your lecturers
- it'd be great if you could keep the work within the group
- at the end we will announce the winner

# Case - final outcome

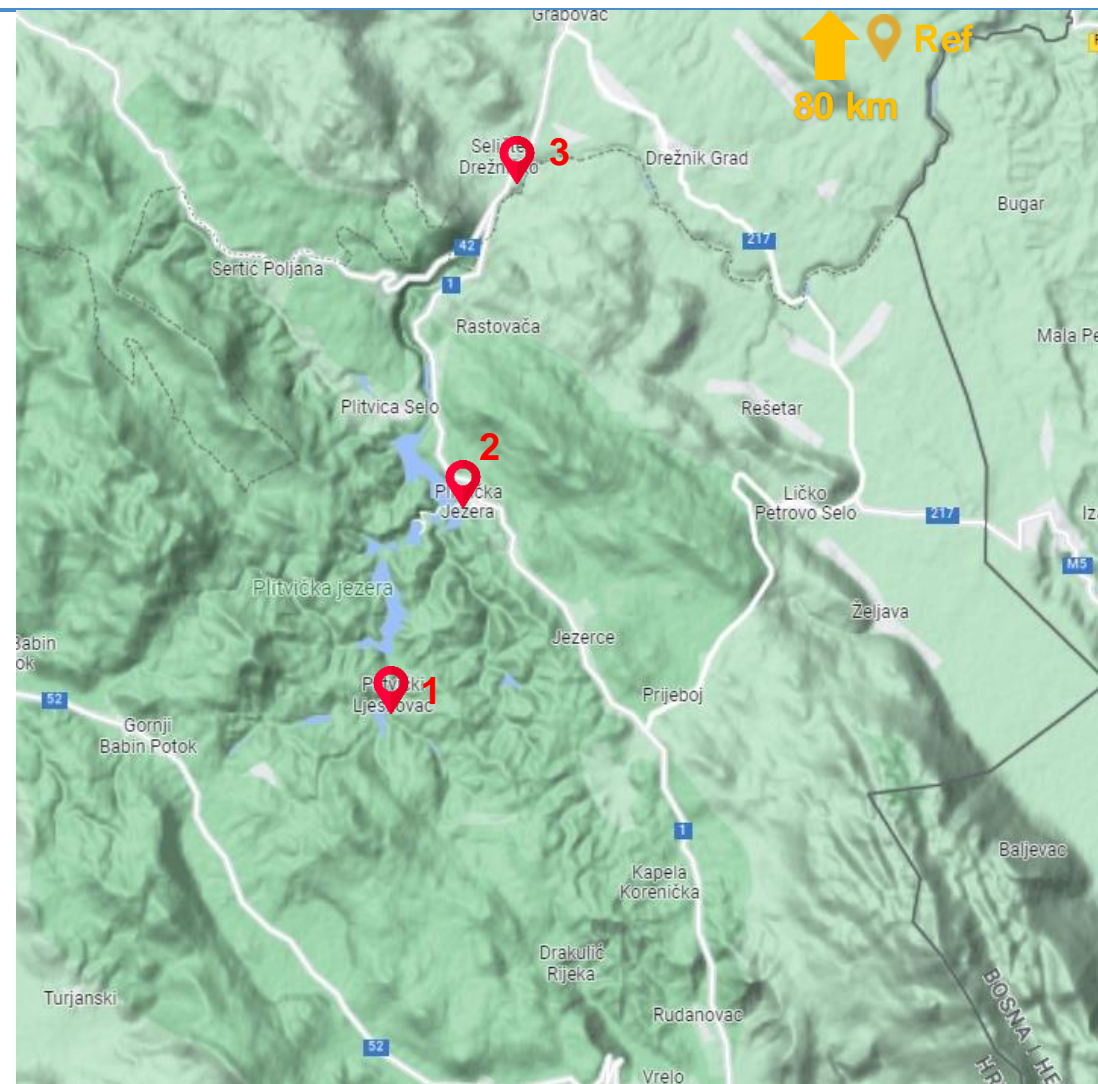
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# Case - database

- 3 monitoring sites
- 1 referent site
- 6 groups of analyses:
  - radionuclides
  - persistent organic pollutants
  - air pollution
  - metals
  - microbiology and water quality
  - genotoxicity
- **budget**





# The database

- budget: 1.000 TOXcash
- price list:

Pricelist	method	medium	per site/2 seasons
Radionuclides	Gamma activity	sediment and water	35
	Gamma activity	moss and fish	40
Genotox	Comet assay 2D cells	water	20
	Comet assay 3D cells	water	30
	Comet assay 2D cells	sediment	20
	Comet assay 3D cells	sediment	30
	Comet assay <i>in vivo</i>	fish	30
POPs	OCP, GC	sediment	30
	PCB, GC	sediment	30
	OCP, GC	moss	50
	PCB, GC	moss	50
Air pollution	PM, gravimetry	air	85
	PM, sensors	air	25
	PAHs, HPLC	air	100
Metals	ICP-MS	water	100
	ICP-MS	fish	125
Water quality	Microbiology, CFU	water	30
	Chemistry, GC-MS	water	30

