

TAKING
COOPERATION
FORWARD



NEW APPROACHES TO GROUNDWATER VULNERABILITY

Ustrón / 7th of June 2018



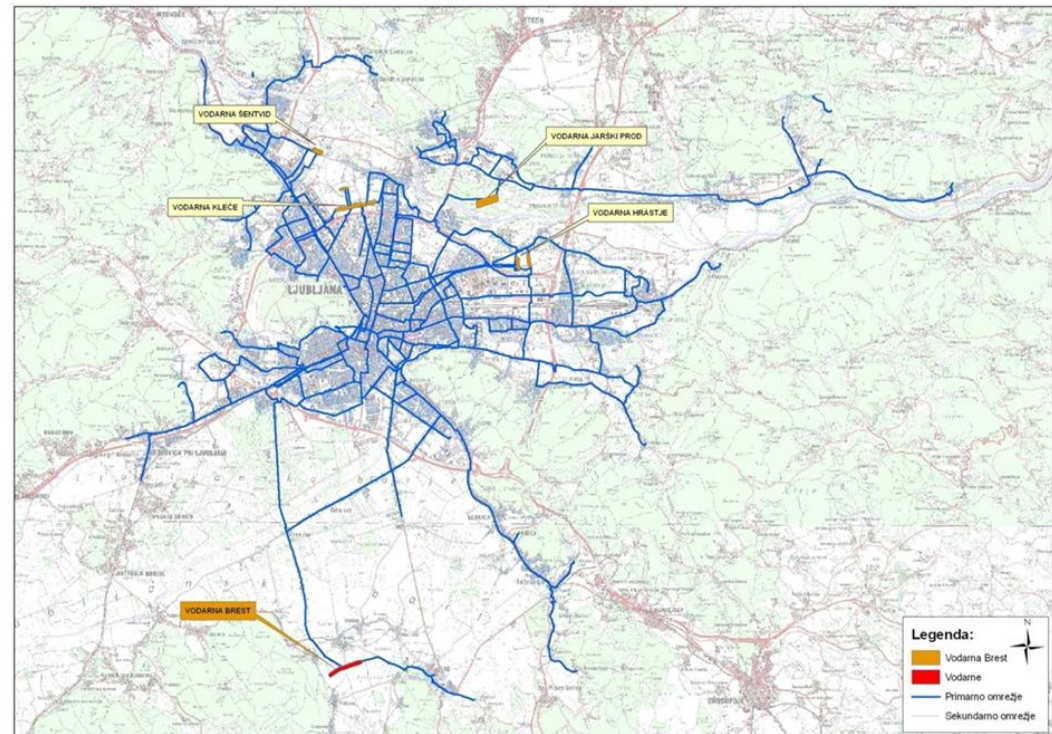
**PLACING A RESERVE DRINKING WATER SOURCE IN
AN URBAN AREA-CRAZY IDEA OR NECESSITY?**



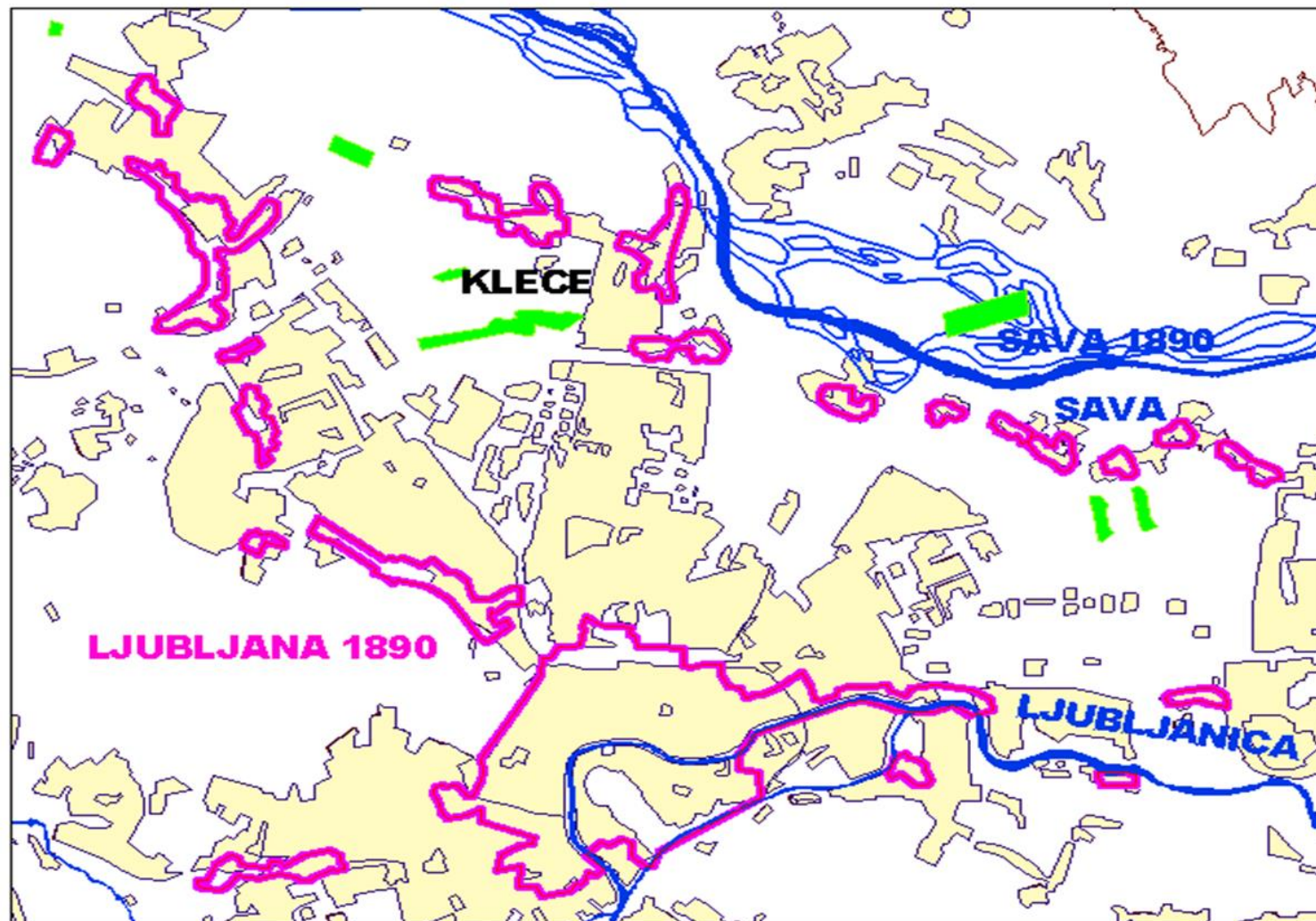
PROLINE-CE / JP VODOVOD-KANALIZACIJA d.o.o. / mag. Branka Bračić Železnik

PUBLIC WATER SUPPLY IN LJUBLJANA

- 315.000 CONSUMERS
- 1.115 km PIPELINES
- No of house connections 40.484
- Quantity of sold water: 21.535.120 m³

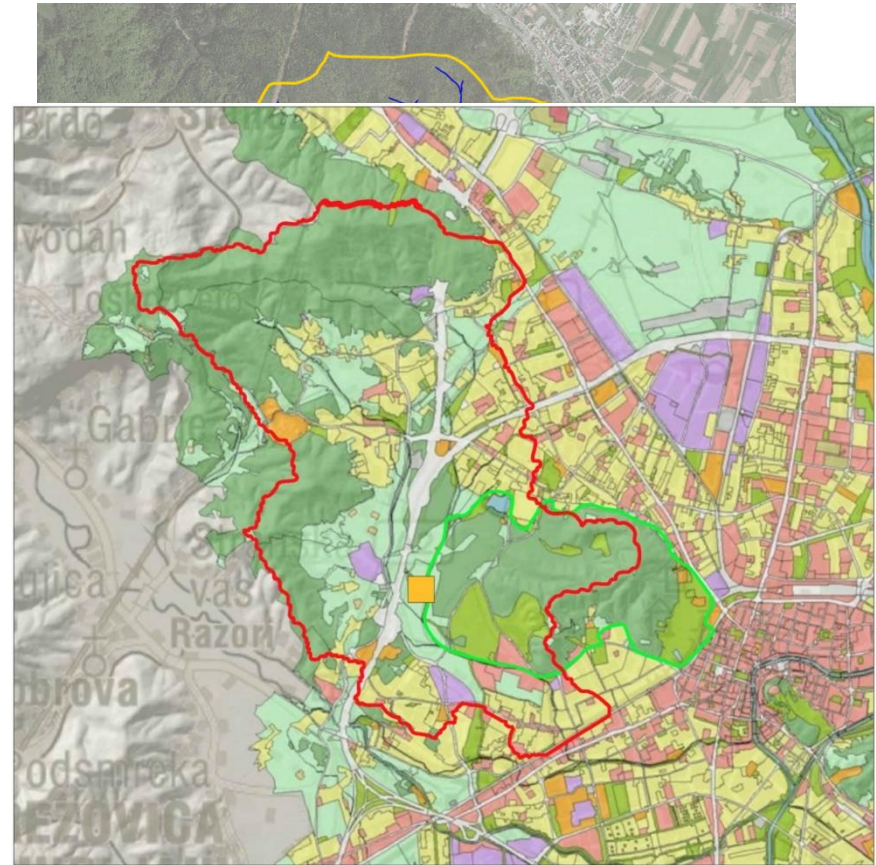


URBAN AREA IN LJUBLJANA YEAR 1890 AND NOWDAYS



PROLINE-CE PROJECT PILOT ACTION

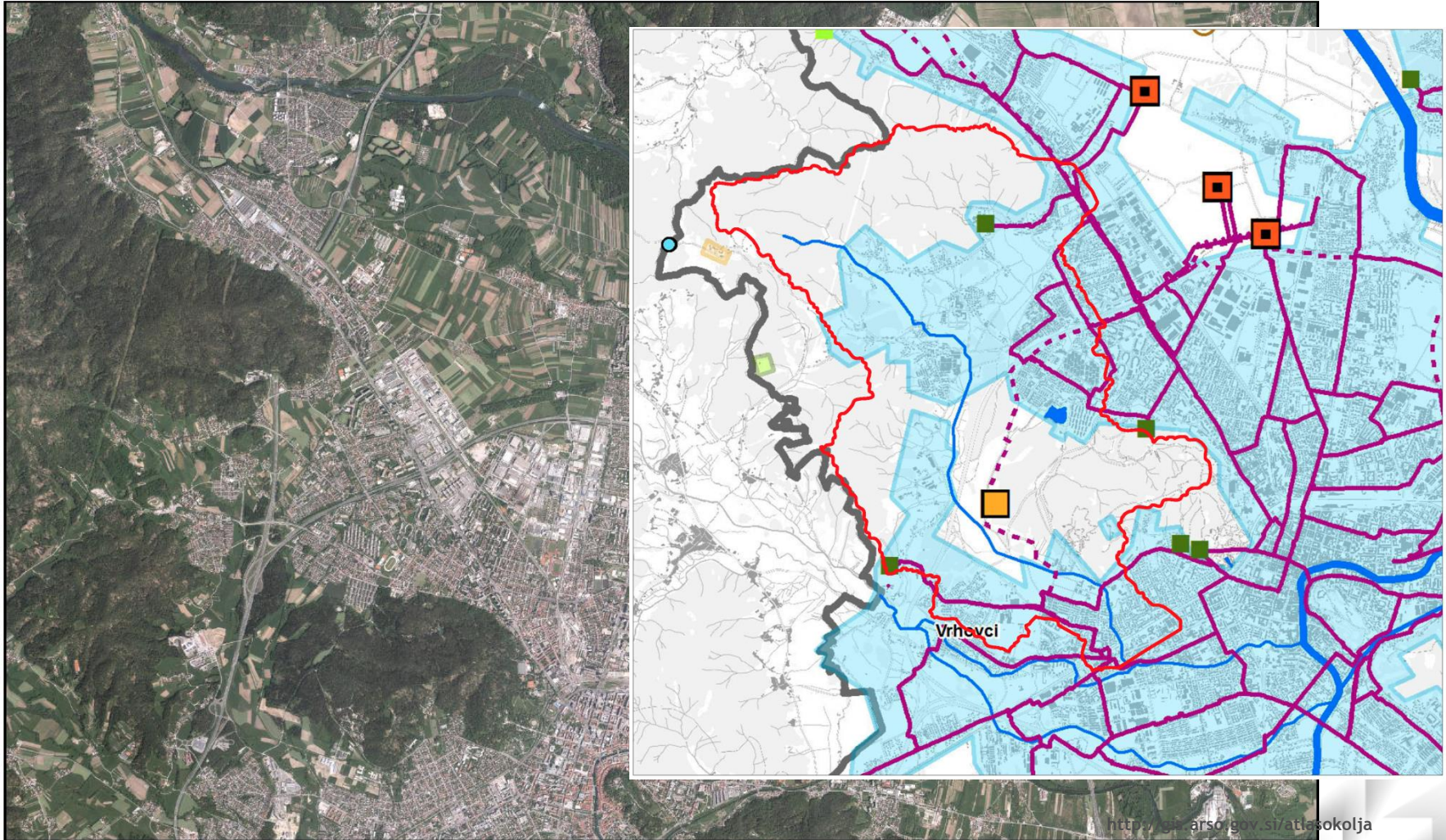
- Reserve drinking water source
- Conflicts of land use: settlement, highway, large open spaces adjacent to the Tivoli Nature Park, Rožnik and Šišenski hrib.
- flooded area with inadequately regulated surface waters coming from the hinterland. Most of these waters flow into urban sewers, which, however, can not receive as much water in high waters.
- A prerequisite for quality drinking water and living in this area is a coordinated management of drinking water resources and land use.



Efficient Practices of Land Use Management Integrating Water Resources Protection and Non-structural Flood Mitigation Experiences

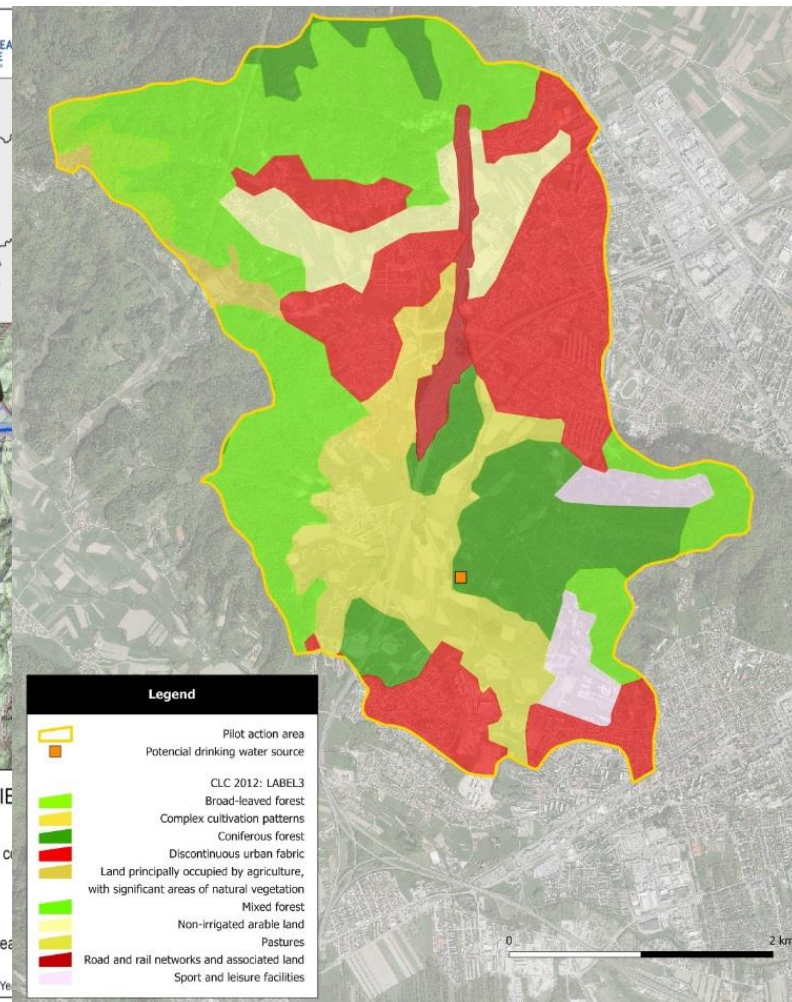
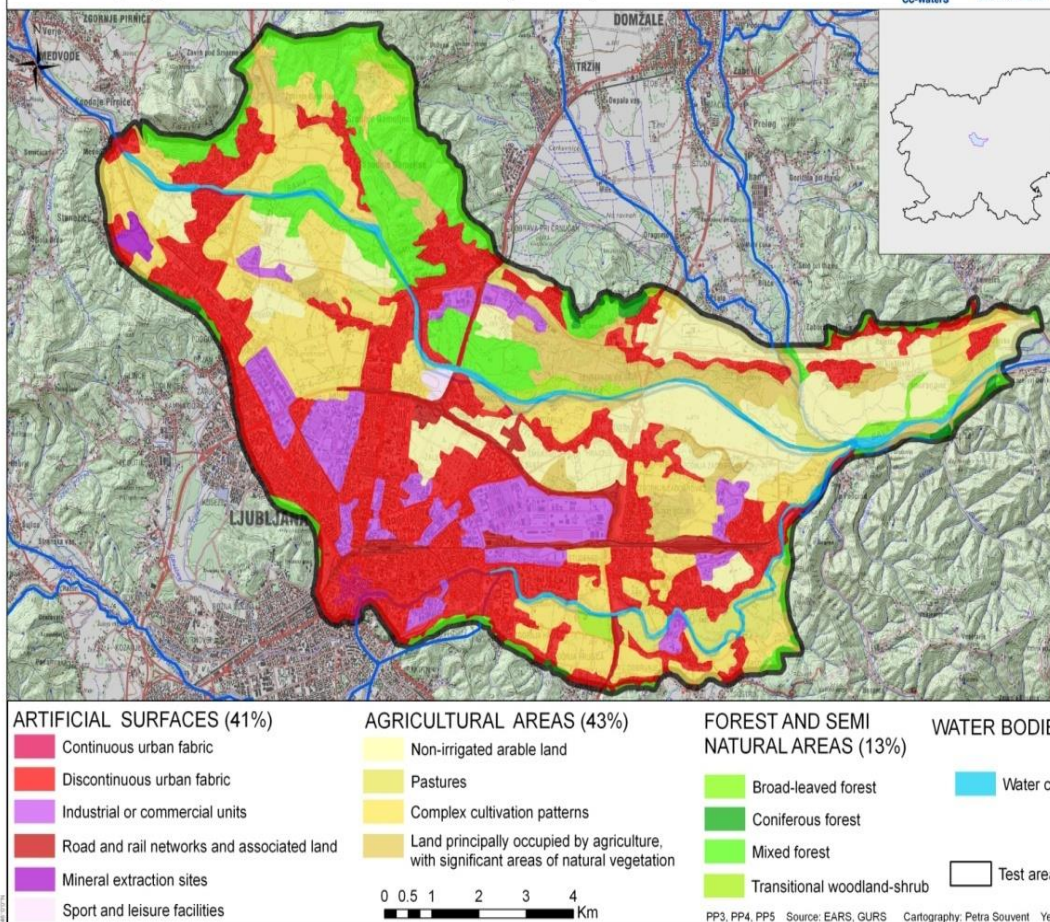


URBANISED AREA

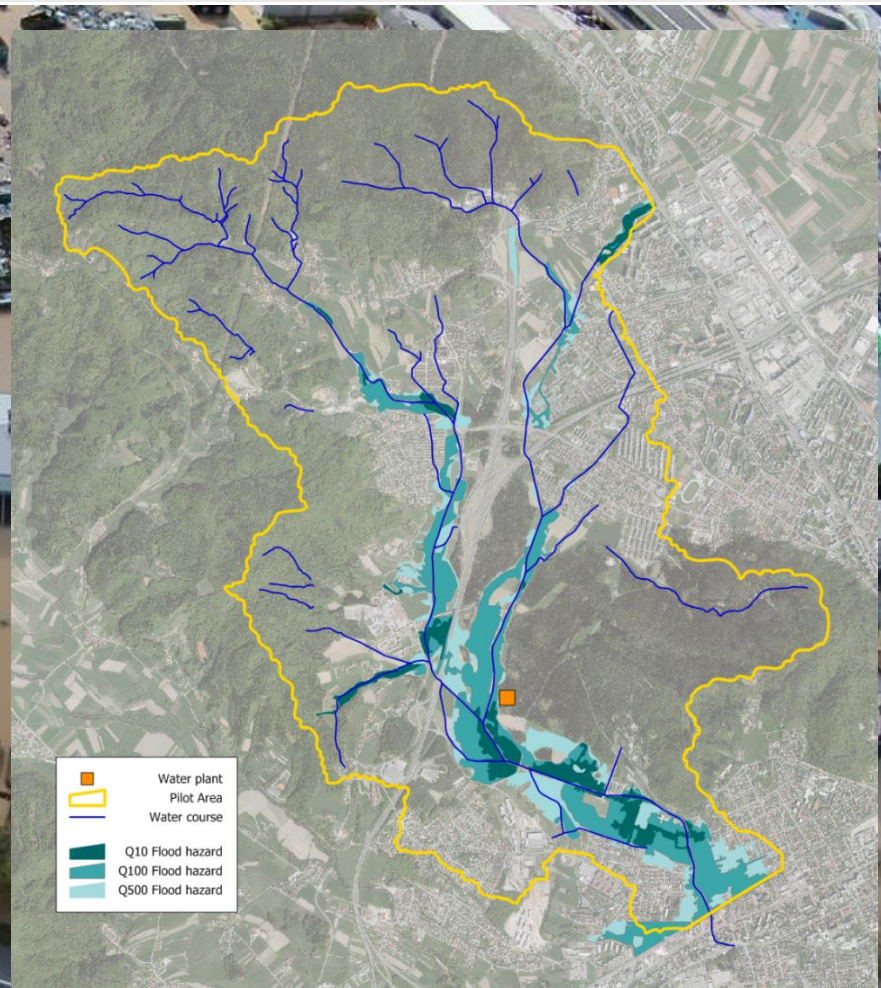


LAND USE

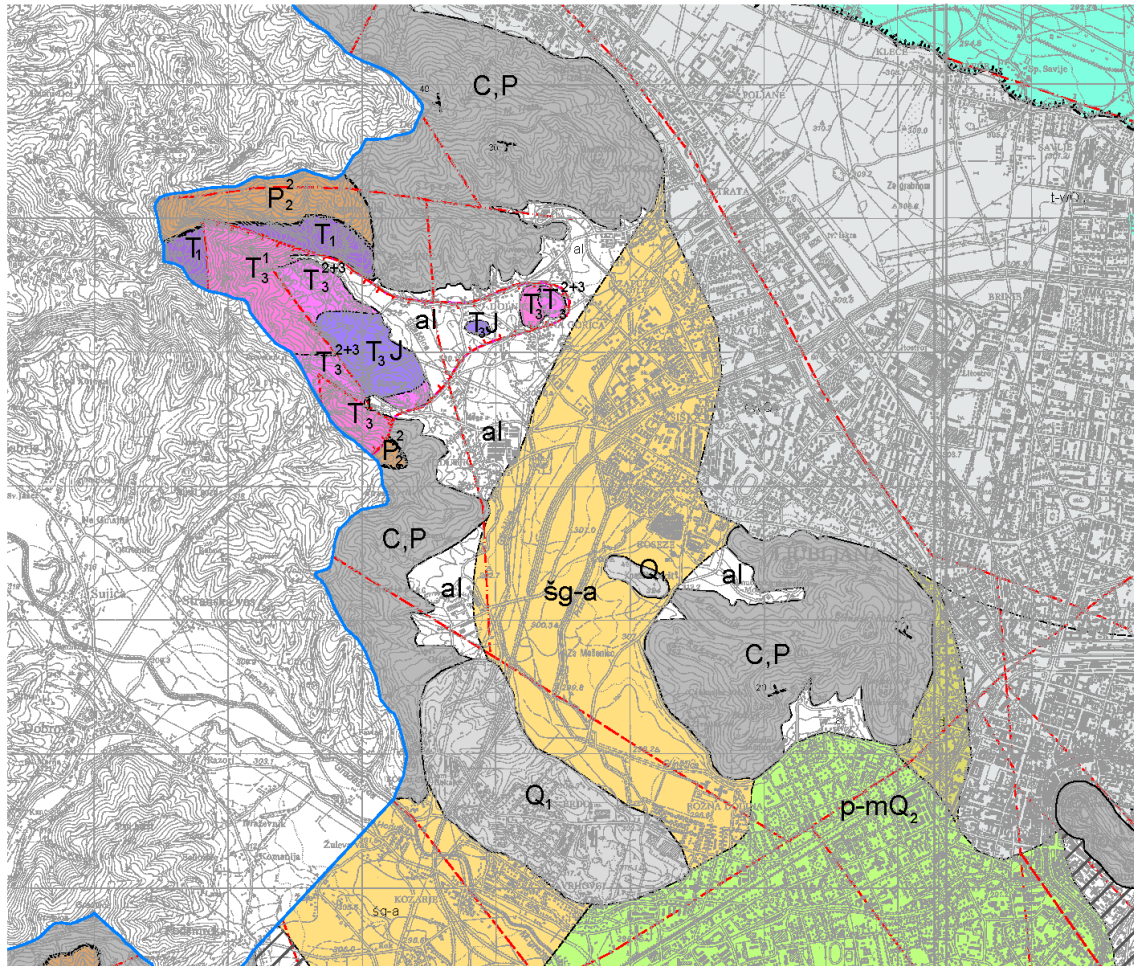
Test area Ljubljana field - Land use after CLC 2006 (detailed)



FLOOD AREA



GEOLOGY OF THE AREA



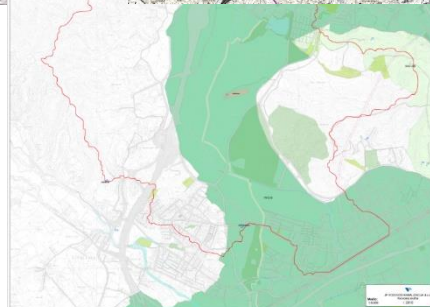
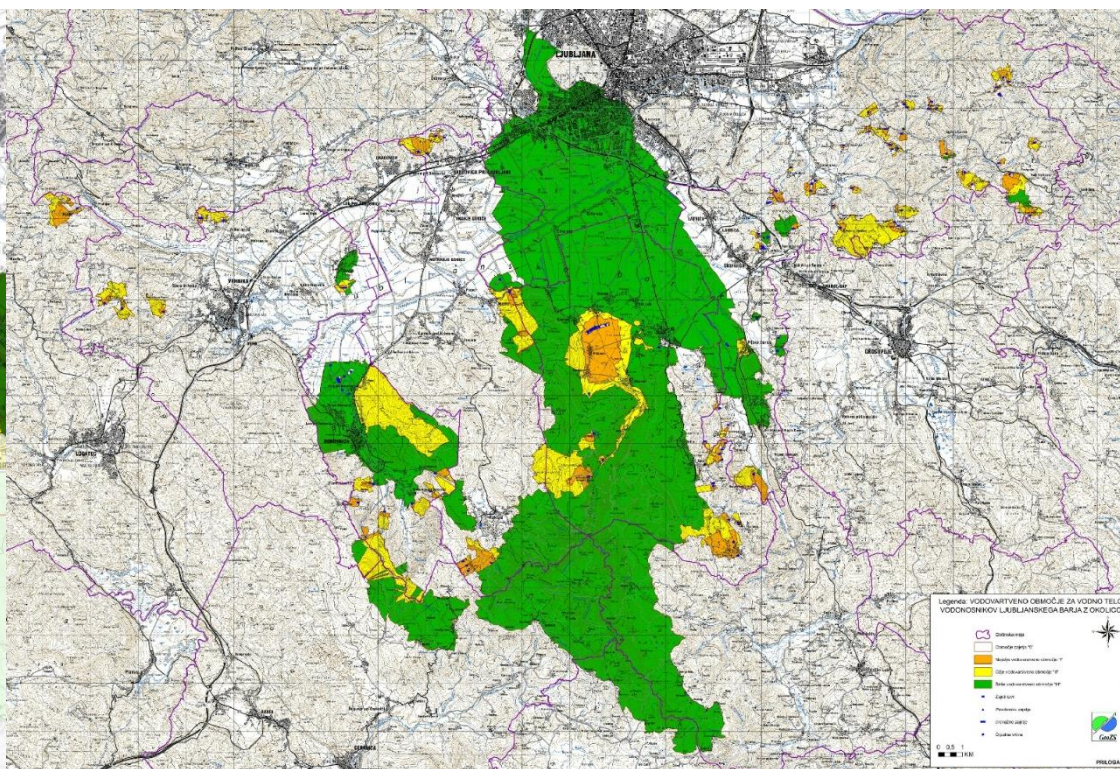
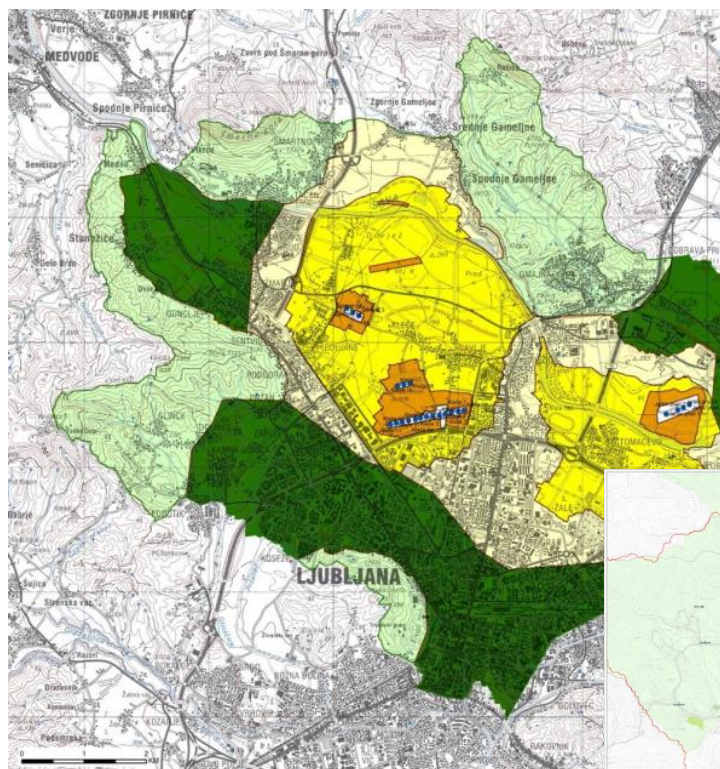
Interreg
CENTRAL EUROPE


European Union
European Regional
Development Fund

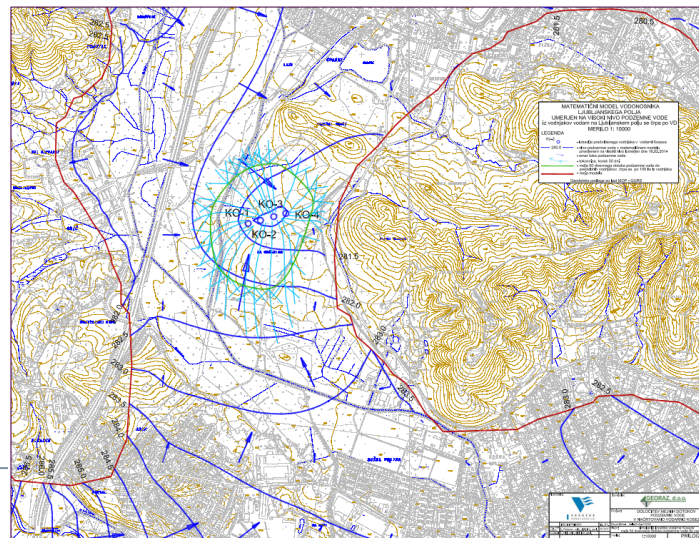
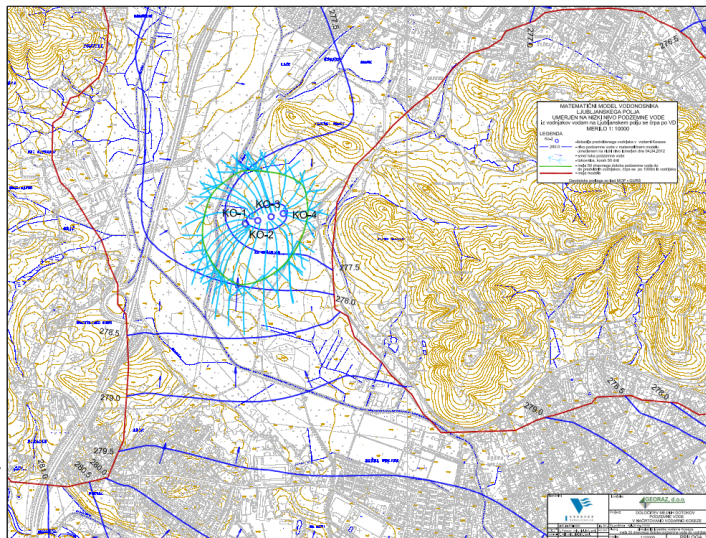
PROLINE-CE



WATER PROTECTION ZONES

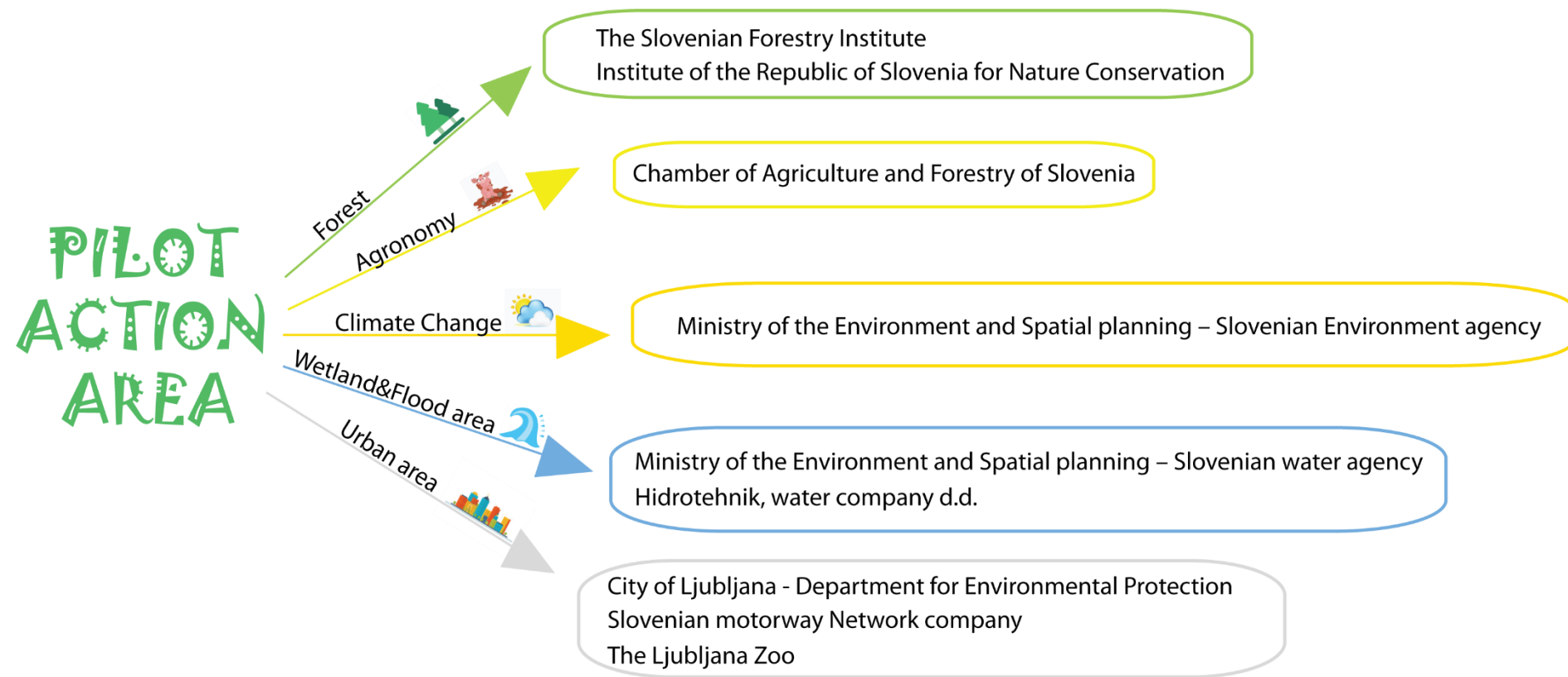


- ❖ Detailed study of the potential water source:
 - 4 potential wells, each 60m deep, with groundwater intake of 100l/s each
 - Numerical model simulation for low and high groundwater level
- ❖ Proposal of 6 piezometers for determination of permeability (pumping tests) and GW levels monitoring
 - Two years measurements new → new calibration of numerical model for optimal allocation of the first pumping well and reambulation of DWPZs (50th (DWPZ I) and 400th isochrone (DWPZ II))



Numerical model of groundwater level in case of low (left) and high (right) hydrological state

STAKEHOLDERS



THREATS TO WATER SOURCE

Topic	Identified GAP	Measure	Stakeholder
Land use management	Agriculture: inflexible time ban of fertilizers and manure application	Redefinition of time ban of fertilizers and manure application	Chamber of Agriculture and Forestry of Slovenia
	Abandoning private forests, aging of forests and with it exposing vulnerable forests to natural disasters	Forestry subsidies and encouraging foresters to younger their forests	The Slovenian Forestry Institute



THREATS TO WATER SOURCE

Topic	Identified GAP	Measure	Stakeholder
Non-structural flood mitigation	Legalization of illegal construction on flood areas	To prevent legalization of construction on flood areas	Ministry of the Environment and Spatial planning - Slovenian water agency
	Surface water intrusion in the well	Sealed wells heads	Ministry of the Environment and Spatial planning - Slovenian water agency,
	Pollution sources in flood prone areas are not known / identified	Register of potential point pollution sources	City of Ljubljana - Department for Environmental Protection
	River banks vegetation is not maintained	Reducing river banks vegetation	The Slovenian Forestry Institute, Ministry of the Environment and Spatial planning - Slovenian water agency, Hidrotehnik, water company d.d.



THREATS TO WATER SOURCE

Topic	Identified GAP	Measure	Stakeholder
Drinking Water sources protection	Unarranged road rainwater discharge	Collection and treatment of road rainwater discharge, particularly within drinking water protection areas	Slovenian motorway Network company (DARS)
	Individualistic (Non-Sectoral) approach to common problematics regarding protection of drinking water resources	Joined and integrated management of drinking water resources (horizontal and vertical co-operation)	All
	Lack and not effective control over Implementation of DWPZ restrictions	Strict implementation and inspection of DWPZ restrictions	Ministry of the Environment and Spatial planning - Slovenian water agency
	DWPZ areas are not determined - problem of spatial planning	With modeling DWPZ areas will be determined	City of Ljubljana - Department for Environmental Protection



NEXT STEPS...

- Prepare action plan how manage the land use and protect the drinking water source
- Incorporate the action plan in spatial planning
- Establish the water protection zones and preparation of Decree

