

Using GIS in Groundwater Management

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Aims and Objectives 1

- The presentation is a result of 2 projects, financed by European Union:

1.) Life+ project *INCOME* (finalized project)

- GOAL: The **aquifer pollution source registry for the Ljubljana gravel plain** with a comprehensive overview of **past and current point, line or plane pollution sources** that represent a potential risk to drinking water sources of capital Ljubljana.
- COWORKERS: dr. Aleš Smrekar, dr. Mateja Breg Valjavec, Katarina Polajnar Horvat

Aims and Objectives 2

- Presentation is a result of 2 projects, financed by European Union:

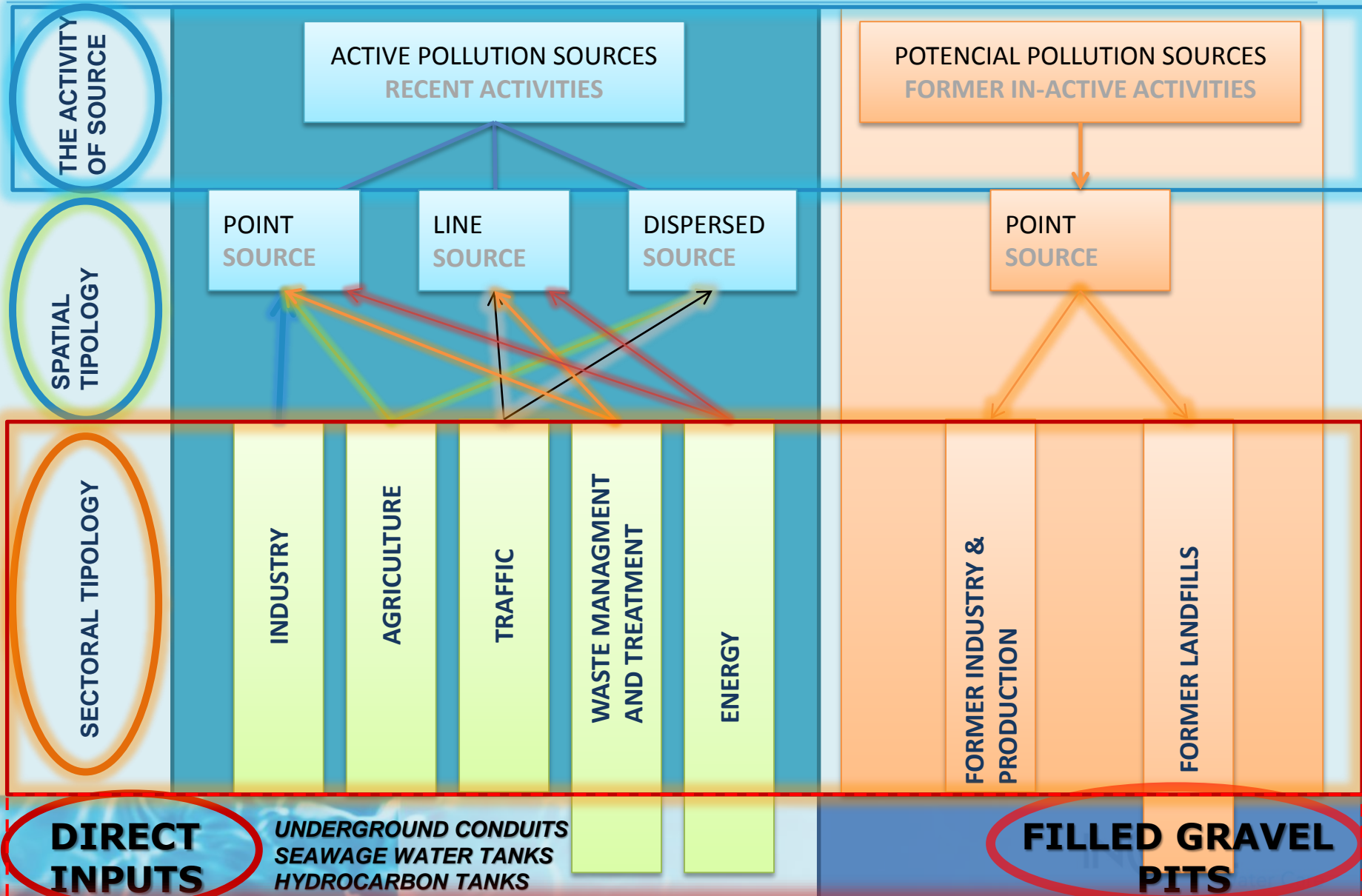
2.) Postdoctoral project *Remote Sensing of Old & Unknown Landfill Sites*



- The main PURPOSE of the project is to create a **methodology for detection and study of unknown landfill sites**, basing it on the analyzed environmental effects of waste dumping, landfilling.
- dr. Mateja Breg Valjavec & Through networking and collaboration with **Haprhasea LLC**, the method will be applied from theory into practice.
- The project is in progress (2013–2015) !

The Structure of INCOME Registry

INDIRECT INPUTS



Results available On-line

- <http://akvamarin.geo-zs.si/incomepregledovalnik/>

Pregledovalnik okoljskih podatkov

SLOJI

- REGISTER ONESNAŽEVALCEV
 - TOČKOVNI VIRI ONESNAŽENJA
 - AKTIVNI
 - STARA BREMENA
 - INDUSTRIJA
 - Proizvajalci nevarnih odpadkov (1982)
 - Stari industrijski onesnaževalci (1989)
 - Kemične čistilnice (1989)
 - Lakirnice (1989)
 - Stare galvane (1989)
 - Industrijska ogroženost (2006)
 - GRAMOZNICE
 - LINDSKI VIRI ONESNAŽENJA
 - RAZPRŠENI VIRI ONESNAŽENJA
 - KEMIJSKI PODATKI
 - Kemijske analize
 - Prostorska porazdelitev
 - HIDROGEOLOŠKI OBJEKTI
 - Hidrogeološki objekti - tehnični podatki
 - Gladina podzemne vode
 - KARTOGRAFSKE PODLAGE

Koordinate YX: 454930.27 , 110534.61

0 0.7 1.33 2 2.6667 km

OPOZORILA NAVODILA REZULTATI

Logo: INCOME Skrb za vodo

Logo: ZRCSAZU

Logo: AGENCIJA RS ZA OKOLJE

Izdelava: GeoZS | Oblikovanje: ENKI komunikacije

Common Objectives of both projects



Protection of groundwater



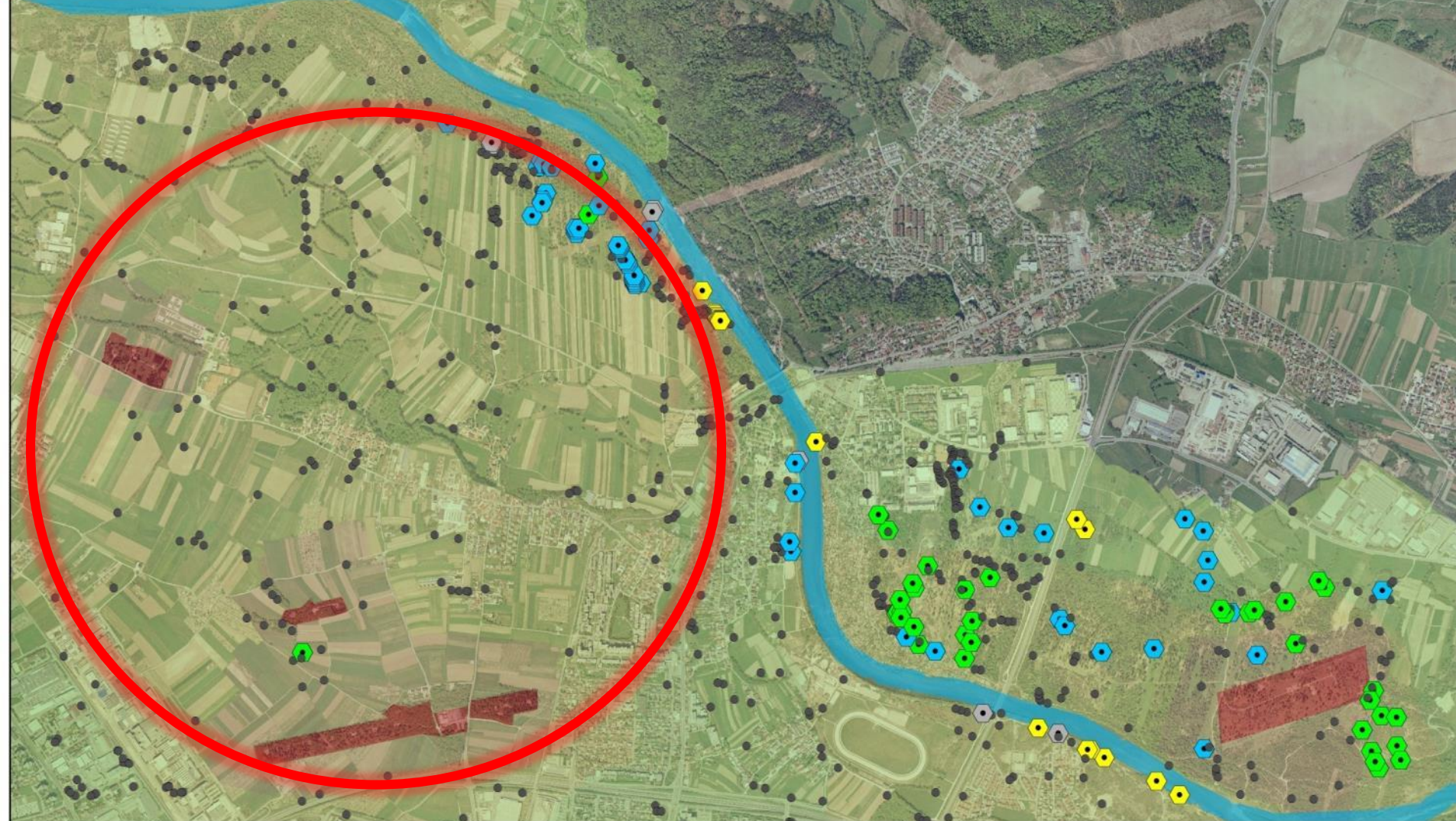
GIS as operative digital on-line registry



Detection of pollution sources (active and potential)

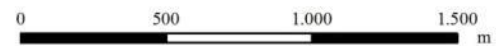


Old landfills as potential pollution sources



THE MICROLOCATIONS OF ILLEGAL WASTE DUMPS ON LJUBLJANSKO POLJE IN YEAR 2006

- gravelpit (No 39)
- humid area (No 18)
- other (No 646)
- dry riverbed (No 51)
- gravel deposits (No 7)



Author: Mateja Breg Valjavec; ©GIAM ZRC SAZU, 2012
 Data source: Smrekar et al 2006. Base layer: DOP, ©GURS, 2006.

PAST LANDSCAPE ANALYSIS

THE MAIN SPATIAL DATA – ARCHIVE AERIAL PHOTOGRAPHS

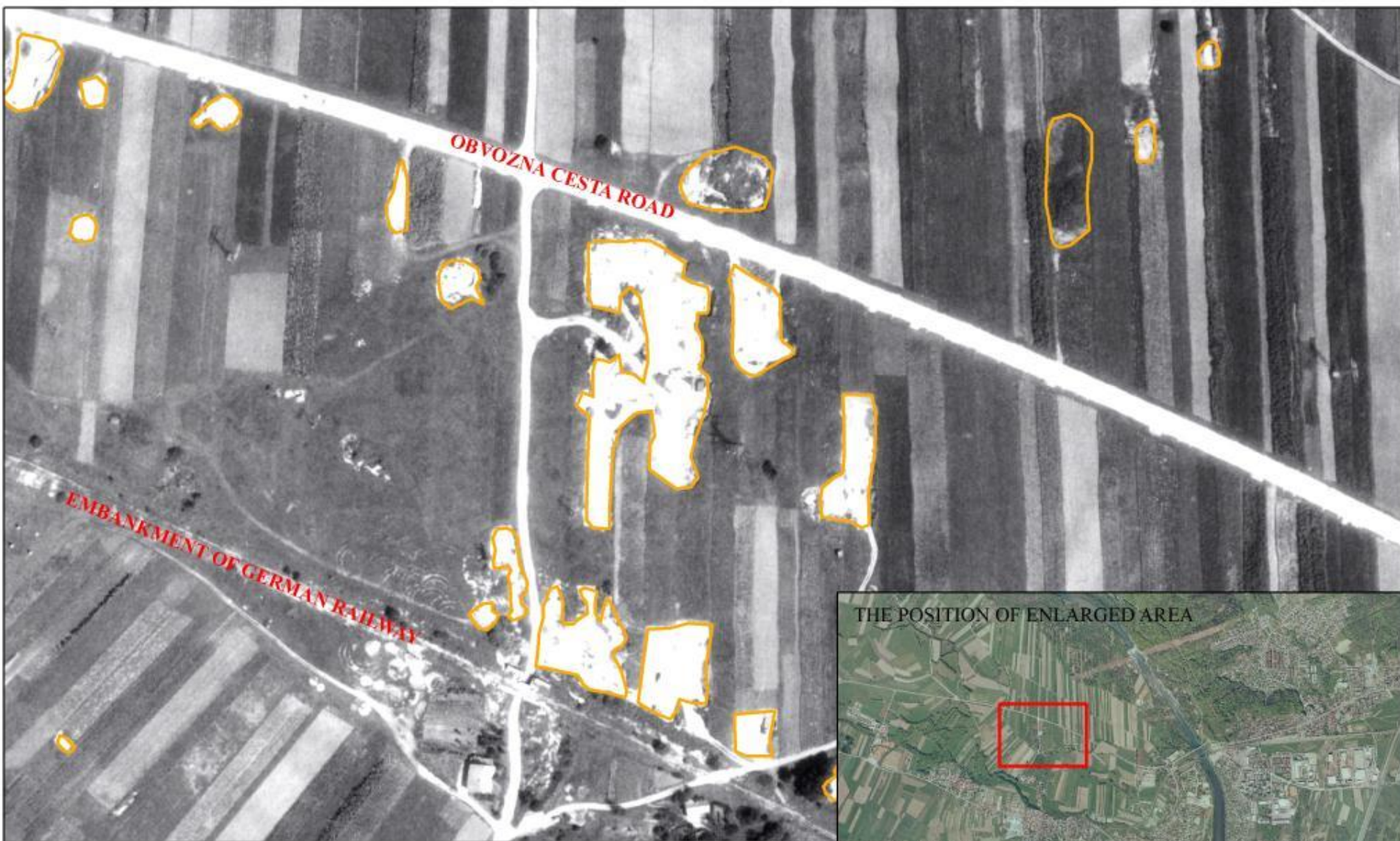


Croatia, Split, October 13–15 2014,

Esri European User Conference




PAST GRAVEL PITS – LJUBLJANA PLAIN



EXAMPLE OF VISUAL INTERPRETATION METHOD ON ENLARGED AREA

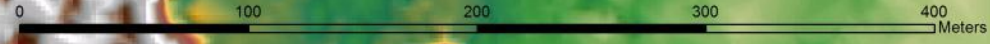
GRAVELPIT AREAS IN YEAR 1959 (visual 2D analysis)

 gravelpit areas

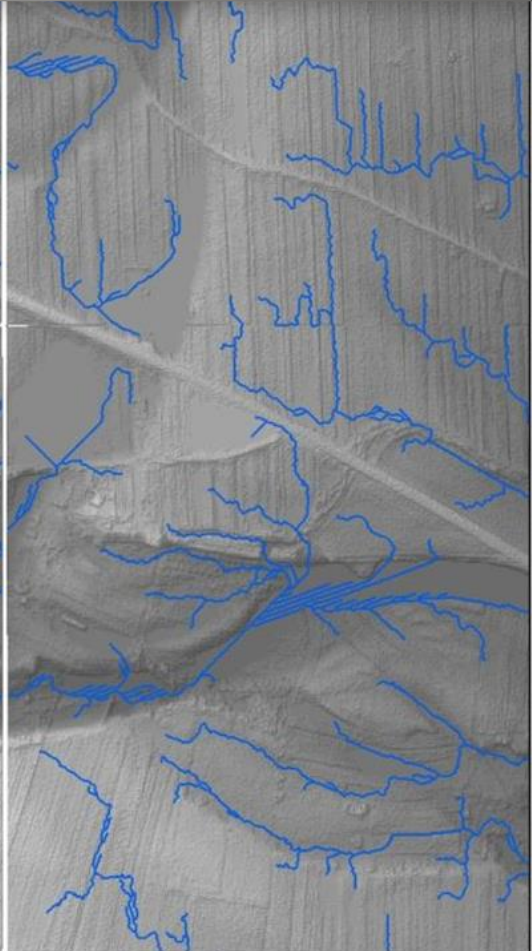
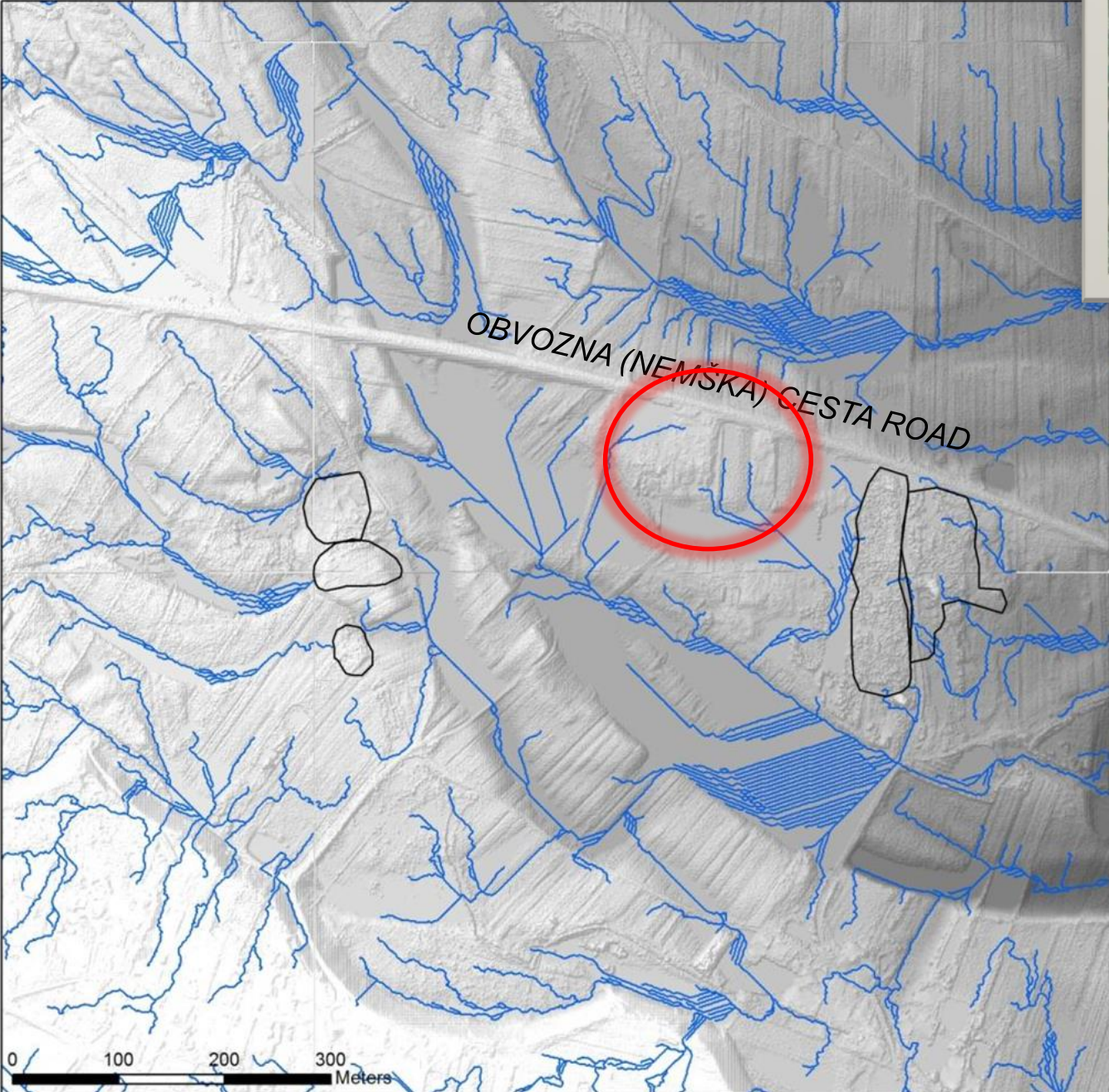
0 25 50 75 100 Meters

Author: Mateja Breg Valjavec; ©GIAM ZRC SAZU, 2012

THE POSITION OF ENLARGED AREA

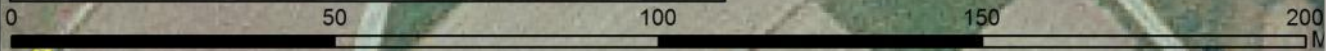
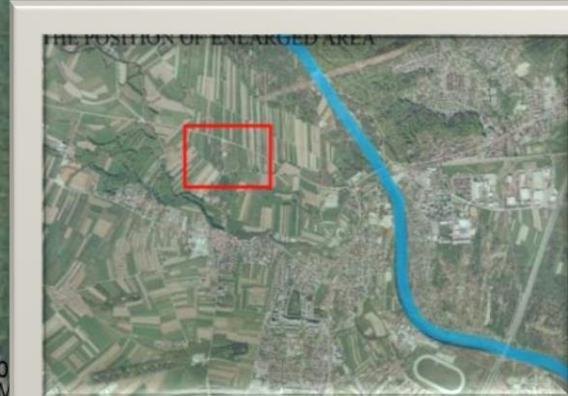
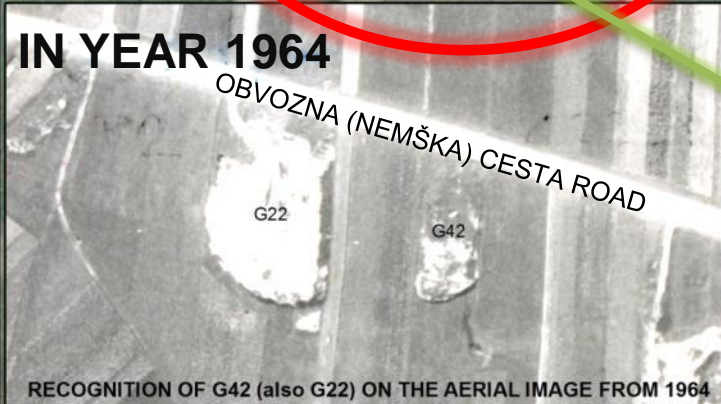


LJUBLJANA PLAIN

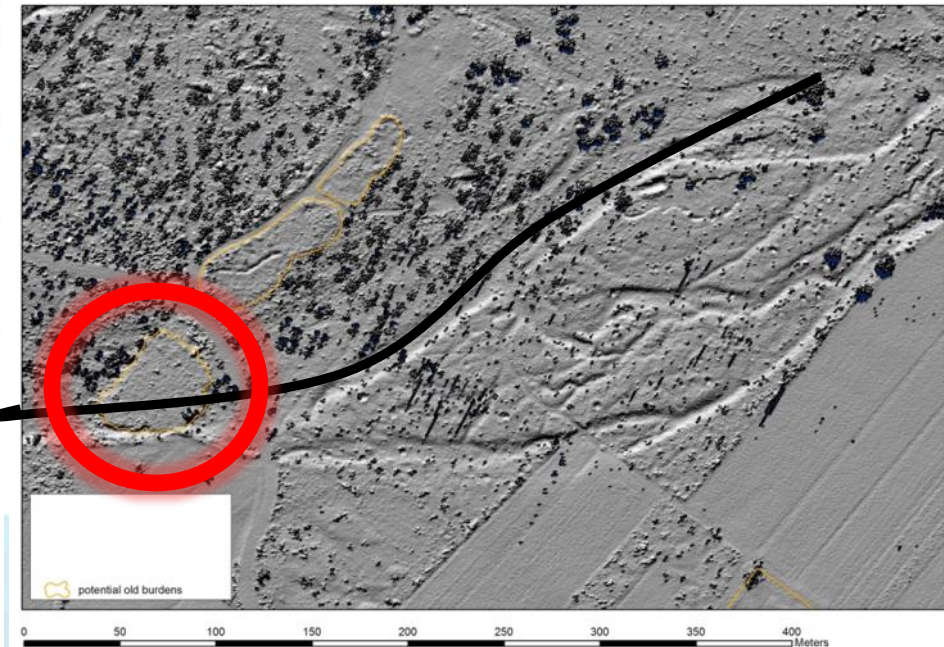
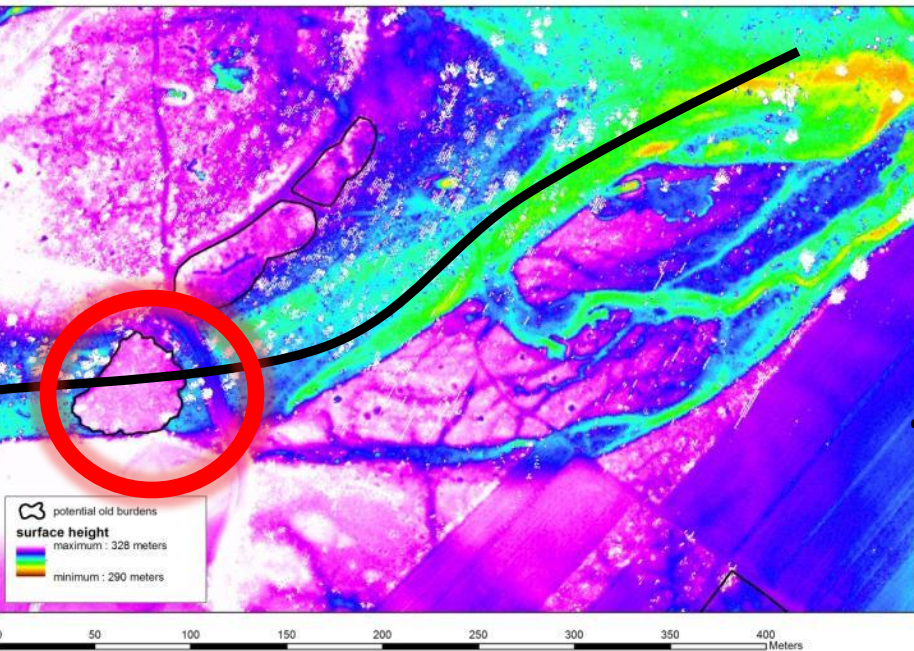
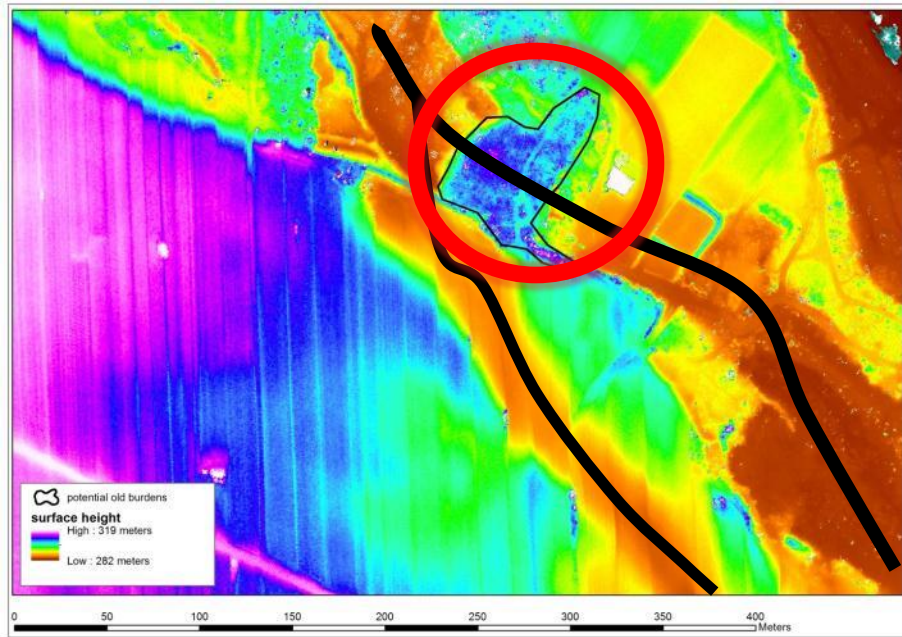


LJUBLJANA PLAIN

SAMPLE AREA 3 - G42



Convex Landforms inside Relict Riverbeds



Application of Register

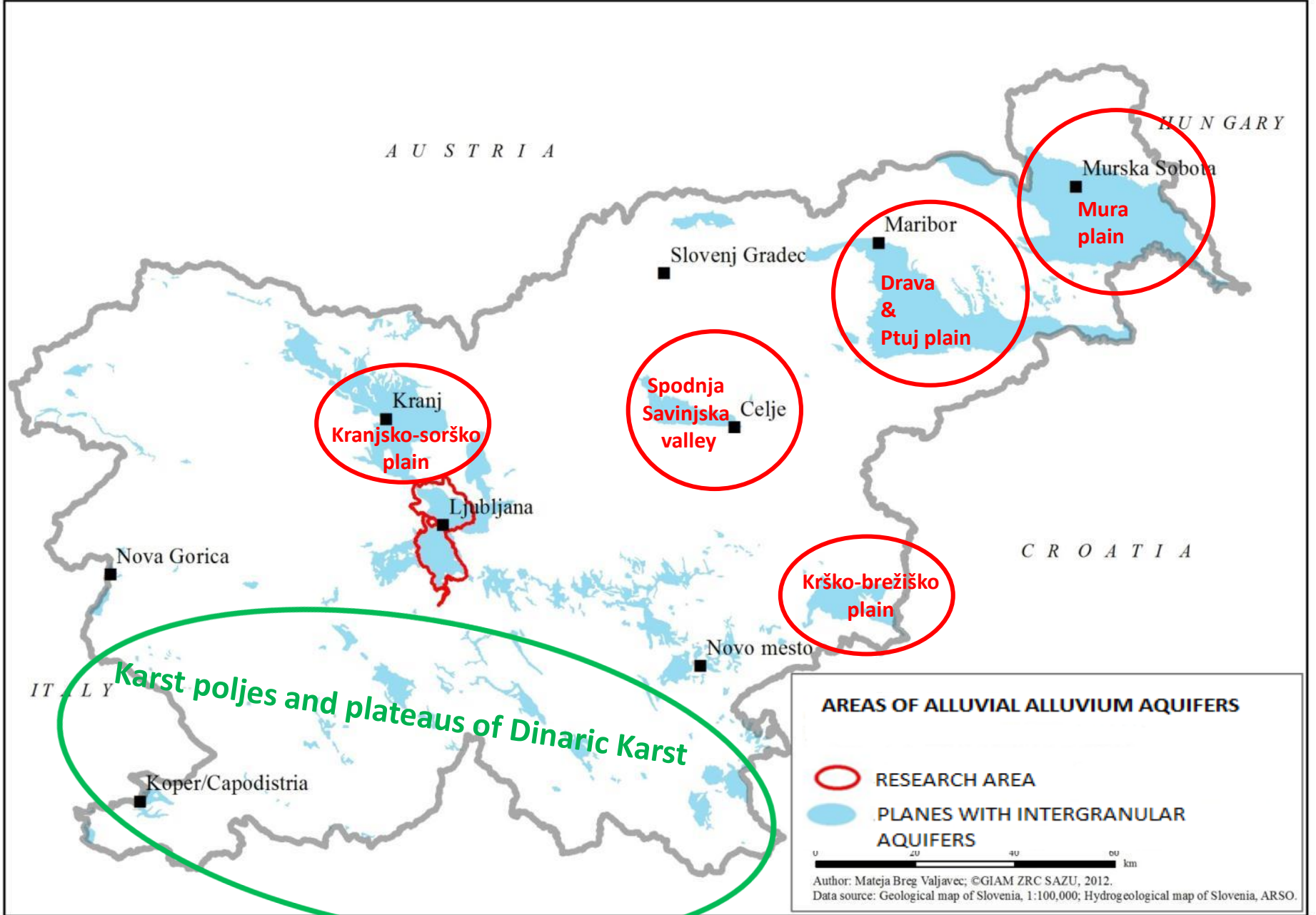
1. as **PROFESSIONAL BASIS** for immediate response to emergency situations in the environment,
2. at **INSPECTIONS** work, which deals with the control of pollutants, and in the case of pollution, since register enables the traceability of potential sources of pollution,
3. in the **IMPACT ASSESMENT ANALYSIS** on water resources and the environment,
4. in the preparation of **REHABILITATION PROGRAMS** of degraded environment,
5. in monitoring of **INDICATORS OF ENVIRONMENTAL PROTECTION**,
6. as one of the foundations of appropriate **SPATIAL PLANNING**,
7. when **PLANNING A DRINKING WATER SUPPLY AND THE WATER SUPPLY SYSTEMS.**

Problems with obtaining data about today's pollution sources

1. data are scattered across different institutions (SEA, SMARS, SORS, various ministries),
2. protecting information of a confidential nature (SORS),
3. some data are available only in aggregate form (SORS) so we can not geo-locate them,
4. scepticism of data media to their distribution (data on private tankers of hydrocarbons),
5. certain data do not demonstrate a willingness to cooperate,
6. data do not exist (data on chemicals)
7. intensive research work.

Who are the EndUsers?

- 1. NATIONAL AND LOCAL AUTHORITIES , INSTITUTIONS, NGOs** dealing with the monitoring of environment and spatial planning,
- 2. RESEARCH AND EDUCATION INSTITUTIONS,**
- 3. PROFESIONALS** FOR ENVIRONMENTAL IMPACT ASSESSMENT,
- 4. MANAGERS OF THE WATER SUPPLY SYSTEMS AND SEWAGE OPERATORS**





THANK YOU !