ADAPTING TO GLOBAL CLIMATE CHANGE

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When we talk about the global climat change our decision problem we are facing!

The particular area - the landscape - take place between interactivity natural, economic and social processes. The adaptation are bilateral, dealing with the social technology to defend itself (eg. flood defenses), and secondly to adapt technology (eg. Agriculture varietal conversion) of the expected consequences of global climate change.

You have to know how to defend against and what we have to adapt: it is important for environmental modeling.

Adaptation is the key to environmental modeling. If specific areas, where specific landscape needs to adapt to the society what the future environ-ment.

Supposed changes in the environment

- in the lithosphere
- in the hydrosphere
- in the atmosphere
- in the anthroposphere

ENVIRONMENT = LANDSCAPE

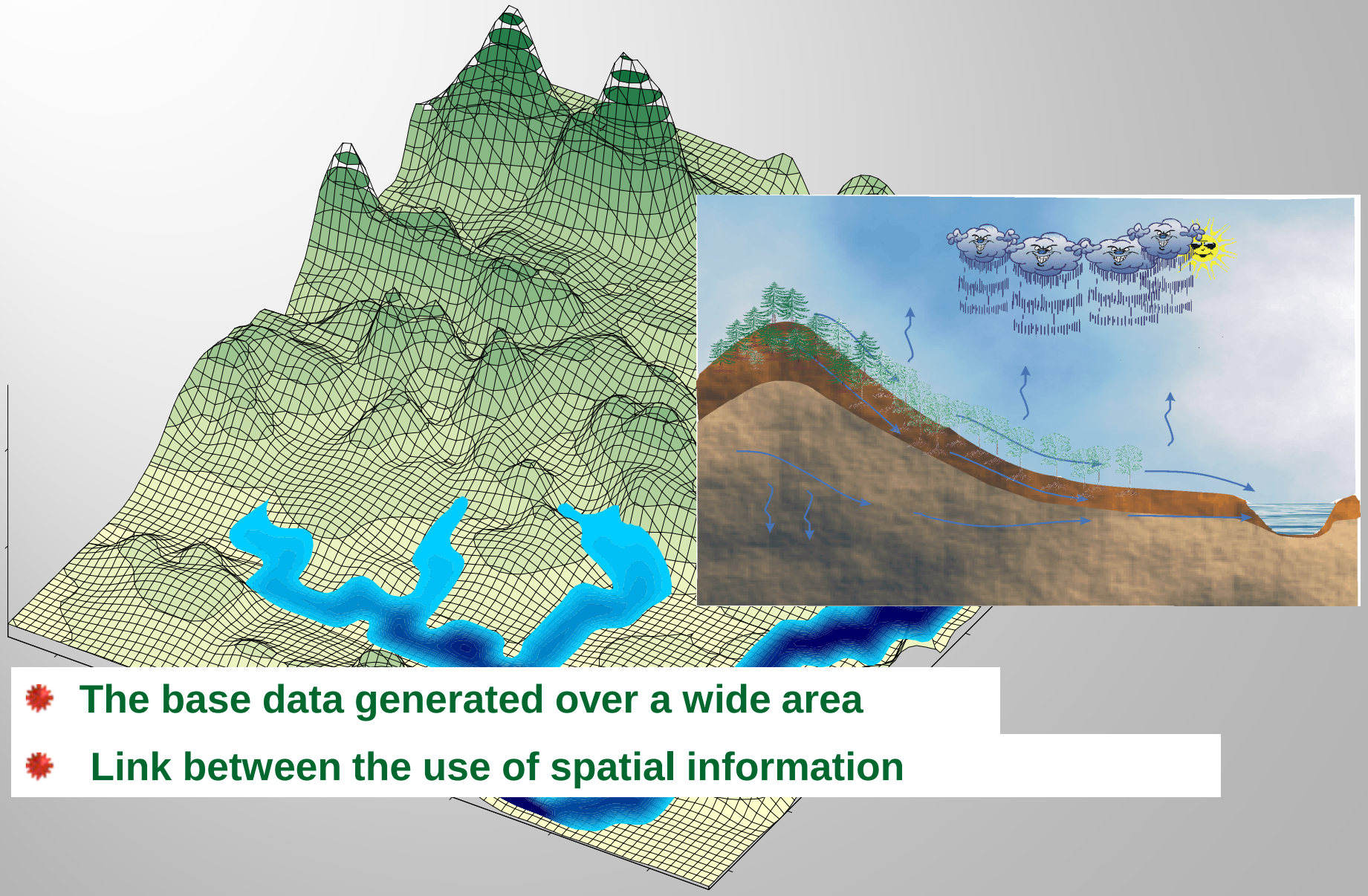
(Verrasztó, 1979., 1993.)

Landscape elements	Anthropogenic environmental changing processes	SUPPOSED CHANGES IN THE ENVIRONMENT in the lithosphere	in the hydrosphere	in the atmosphere	in the anthroposphere
Geological structure	Man-made structures and the melting of the continental ice-sheets result in growing quantity of water and in a new state of equilibrium in the crust. The generated electromagnetic oscillation and the relieved radioactivity influence geophysical processes.	The rearrangement of the equilibrium increases the number of tectonic micro- and macro-phenomena	Tectonic movements result in changes of hydrological conditions		The man-made structures of global importance are increasingly endangered by landslides, earthquakes and sinking
Geological composition	The extraction of artesian water and hydrocarbons accelerates compaction. Packing waters into the strata, which waters are by-products of hydrocarbon mining and geothermic energy utilization, change the processes of dissolving. The sedimentation processes of the artificially patterned surface water system are changing, and the growing quantity of wastewater sediments results in a new type of diagenesis.	The compaction of the strata results in accelerating diagenesis and metamorphism. Result: subsidence of the surface.	Wastewater sedimentation accelerates the filling up of the lakes. Natural supply of subsurface waters is decreasing.		The man-made structures of global importance are increasingly exposed to hazard due to the landslides, earthquakes and subsidence.
Morphology	The degree of building-up, the intensive agricultural activity and the change of run-off conditions modify the rhythm of erosion–accumulation. The changes in the tectonic and lithological composition result in changes in morphology.	Morphological changes taking place in the surface of the lithosphere by the processes of accumulation and erosion result in considerable changes.	The minor morphological changes influence run-off conditions; the considerable ones change the track and water balance of the surface waters.	Morphological changes and the degree of building-up modify the micro- and mezo- climate.	Agricultural activity is hindered by efforts against erosion. In built-up areas, the processes of accumulation, such as accumulation of sediments cause difficulties. Morphological changes may damage man-made structures.
Climate	Deforestation decreases assimilation. The concentration of SO_2 and CO_2 is increasing in the atmosphere and the warming up accelerates. The UV and radioactive radiation is increasing.	The rising temperature and the growing quantity of SO_2 and CO_2 content of precipitation promote disintegration. Increasing sea level reduces the area of continents, transgression processes become more frequent.	Under the influence of rising temperature the quantity of sweet water in the continental ice sheet is decreasing, the sea level rises. The hydrological cycle accelerate.	The decreasing differences of temperature weaken the large wind systems. Cloud cover will be constant, the quantity of sunshine decreases. Special town climates are developing.	On the decreasing areas of the continents the concentration of population is growing, which results in increasing the CO_2 and SO_2 content of the atmosphere. This may damage the buildings and technical structures.
Hydrological factors	The artificial governing of the surface water increases pollution, the fauna and flora of the water and its self-purification ability decrease. Because of increasing extraction, the pressure conditions are changing.	The eroding and accumulating role of surface waters becomes insignificant.	Draining moorlands promotes the filling up of lakes. Groundwater level is sinking; the duration of lands under water is increasing. The sea pollution results in changing the chemical composition of the seawater.	Running dry of the springs, drying out of the lakes, and the heat pollution of watercourses change the micro- and mezo-climate. The polluted seas do not take part in purifying the atmosphere.	The quantity of clear water, which is the most indispensable material of human life, is decreasing.
Biogenous factors	Owing to the extinction of the natural biotopes, the mammals die out and are succeeded by the man. Cultivated plants replace the natural vegetation.	The intensive agricultural activity decreases deflation. Wastewater slurry contributes to new biogeneous sedimentary processes. The overturned ecological balance leads to the extinction of lithogenic organisms.	Changing of the natural fauna and flora stops the self-purification of surface waters. As a consequence of deforestation, the rate of inflow and run-off is accelerating. The danger of floods is increasing.	The oxygen production of smaller and smaller forests is decreasing, and the oxygen cannot bind the increasing quantity of CO_2 in the atmosphere.	The human biomass is increasing, while the quantity of water and food is considered constant. The infrastructure of transportation segregates the fauna and flora.
Soil	The balance of the alimentation chain turns over, and the natural process of soil development comes to an end.	The increasing erosion, the decreasing of humus development, the accelerating weathering result in the dominancy of B and C levels in the soil instead of A levels	Chemicals getting into the natural waters change their chemical composition and living organisms.	The stop of natural soil development changes the micro- and mezo-climate.	The saving of the soil requires more and more energy. Artifical fertilizers cannot replace the decreasing quantity of stable litter.

This operating system is key to making our environment available information separated into data components, structured so that the thematic map elements available to create part.

The thematic maps allow interactivity between the understanding of the issues, interpreted and modeled makes the physical, chemical, biological relationships between them.

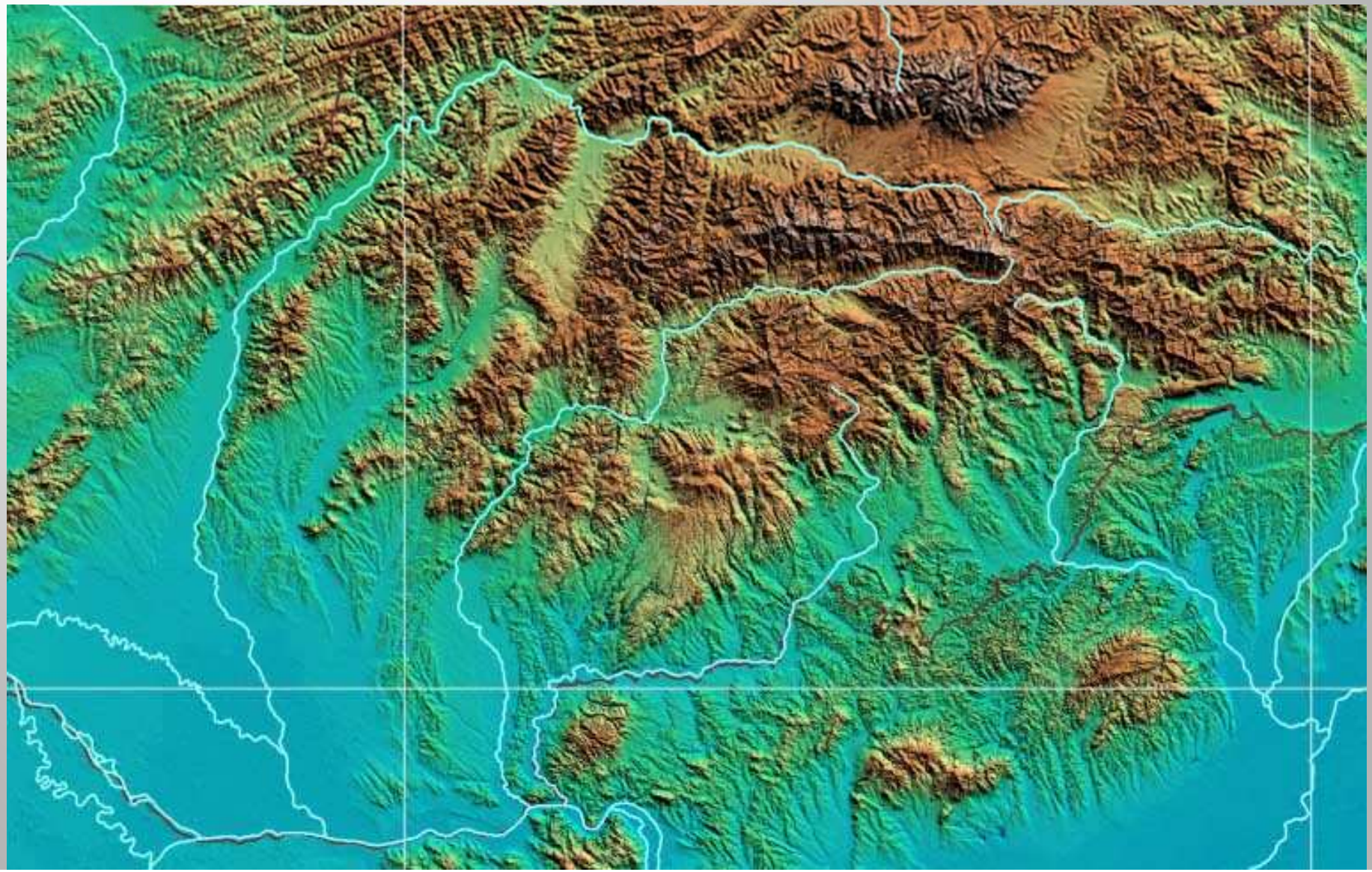
The catchment area



- The base data generated over a wide area
- Link between the use of spatial information

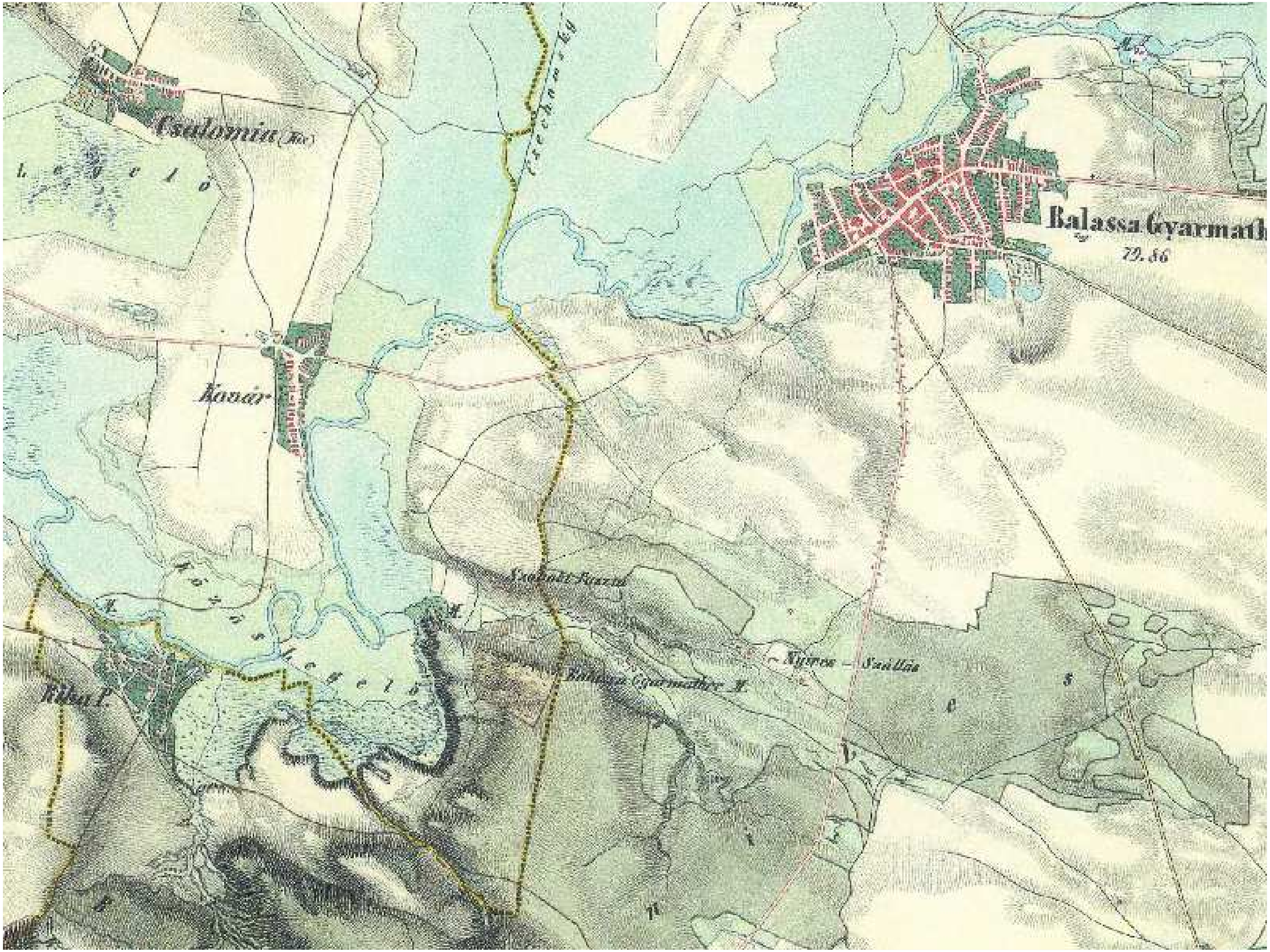
A DEVELOPMENT OF ENVIRONMENTAL MONITORING & FLOOD SYSTEM USING GIS TOOLS IN THE RIVER IPOLY & BÓDVA CATCHMENT

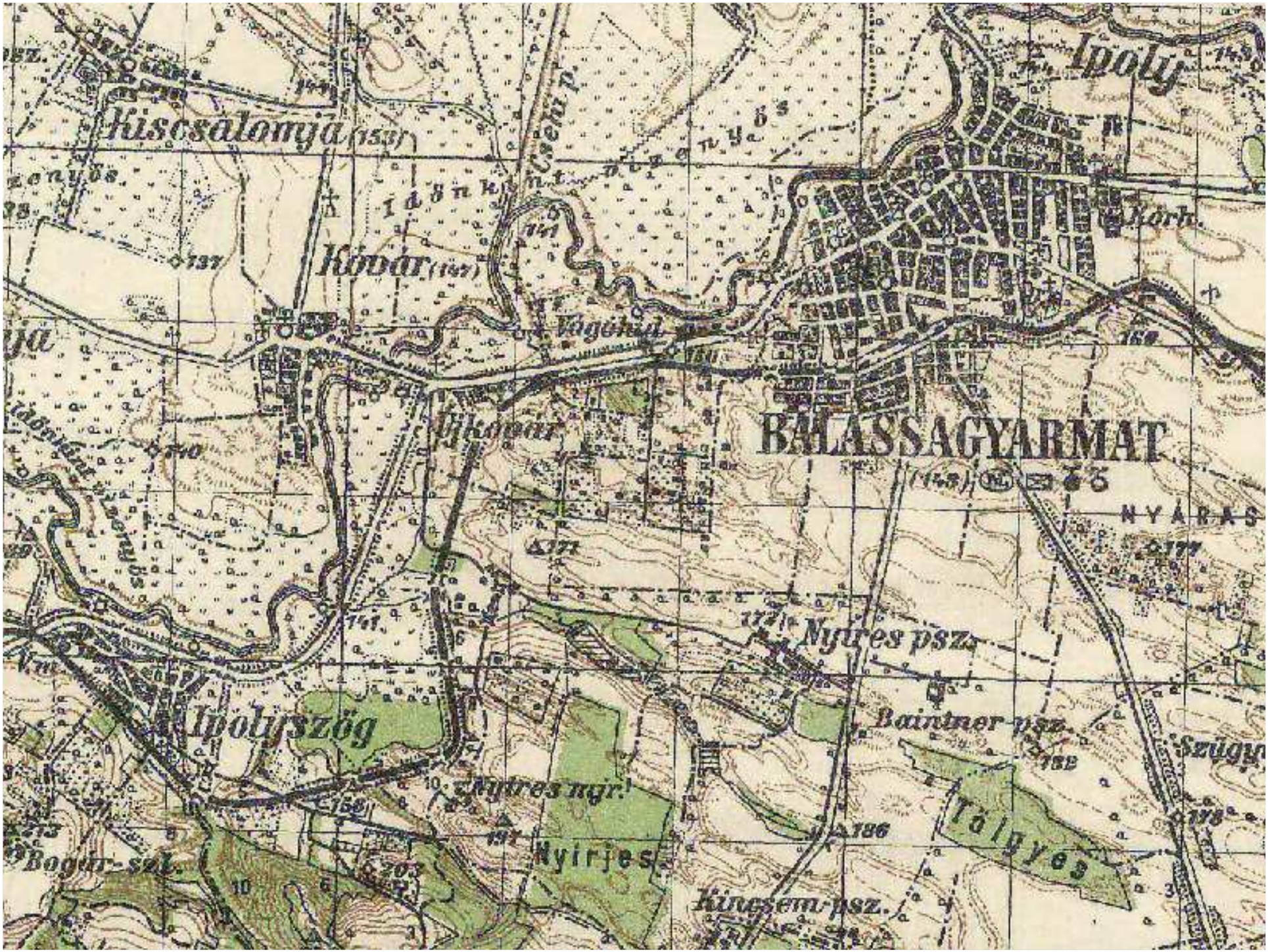
The source of Ipoly & Bódva are in the Northern Carpathians

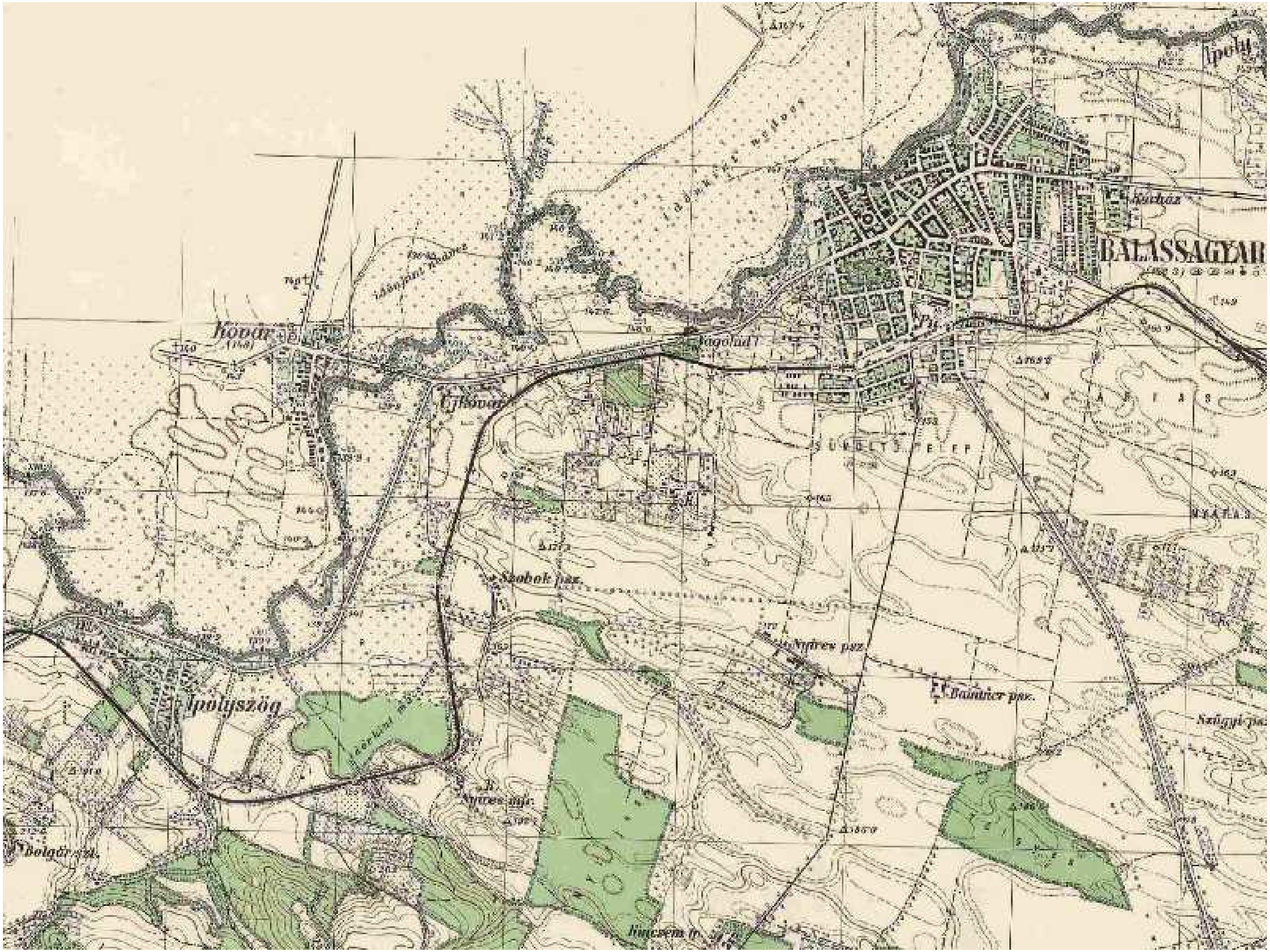


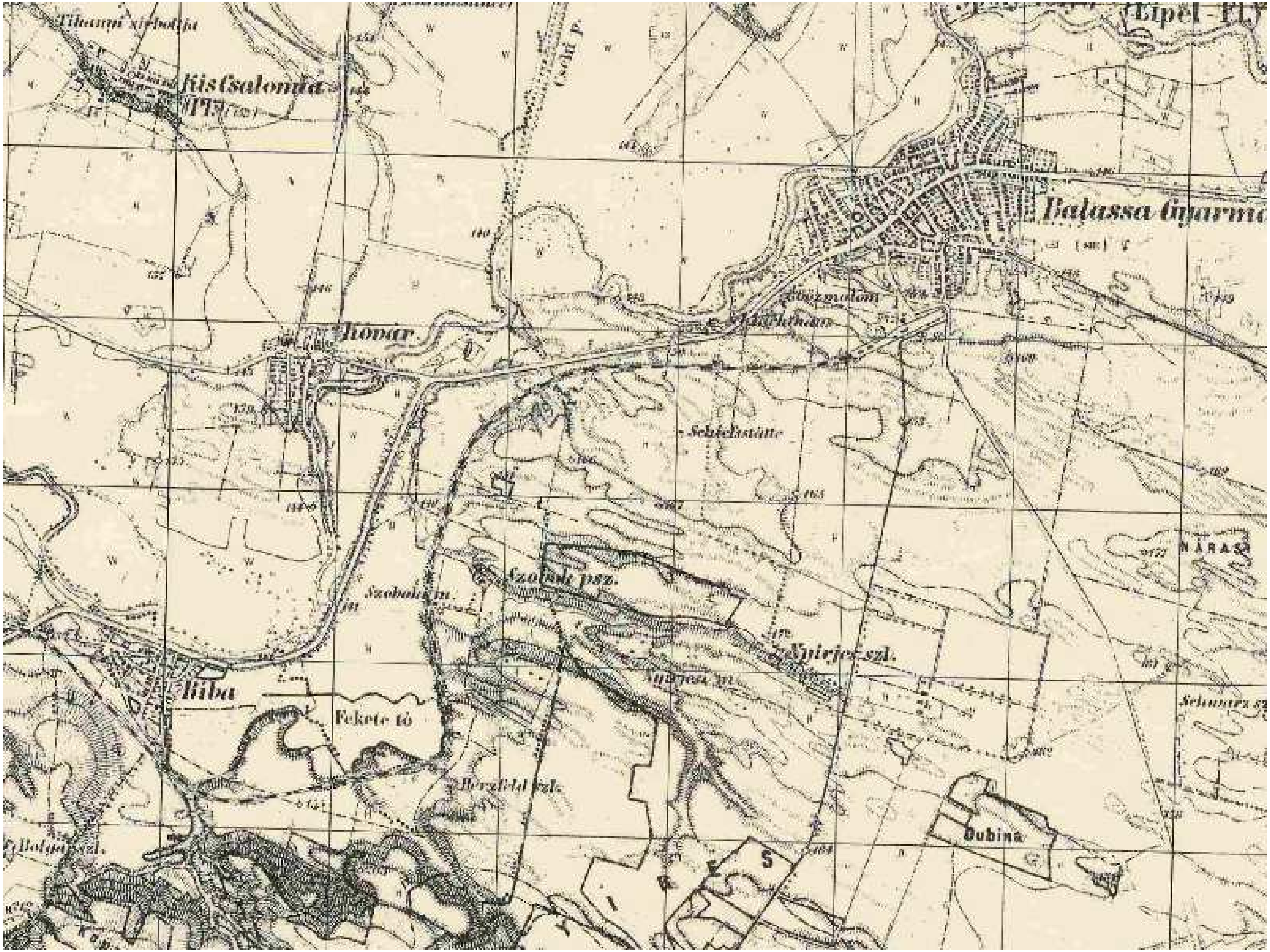
Initial environmental situation.
Historical maps are the basis of our knowledge.
We know what the impacts have occurred since then, and we see the consequences.

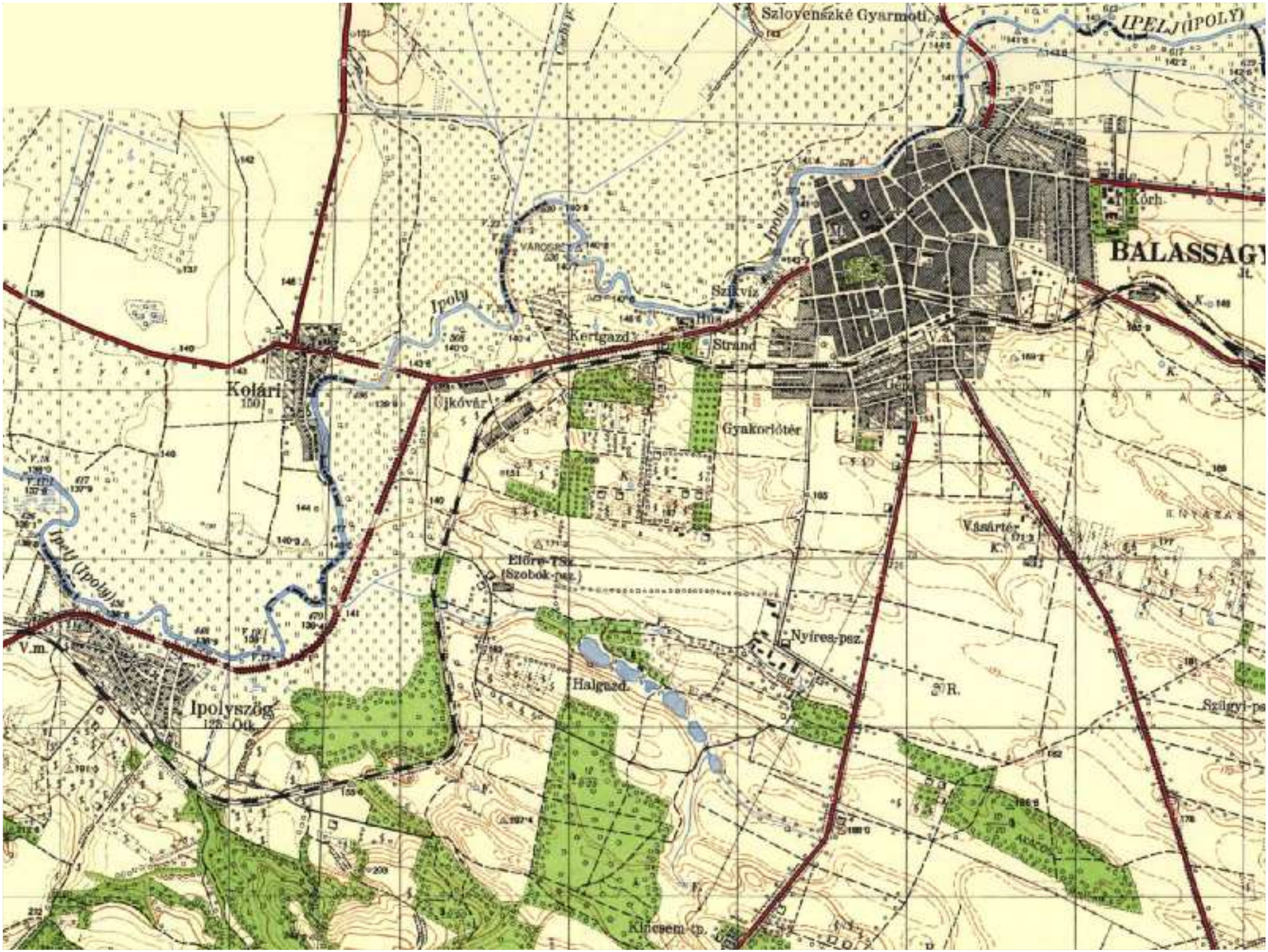

Garam
Zólyom
Selmecbánya
bánya
Korpona
Losonc
Ipoly
Balassagyarmat
Salgótarj
Nagymaros
Vác
tergom
Visegrád
Gy

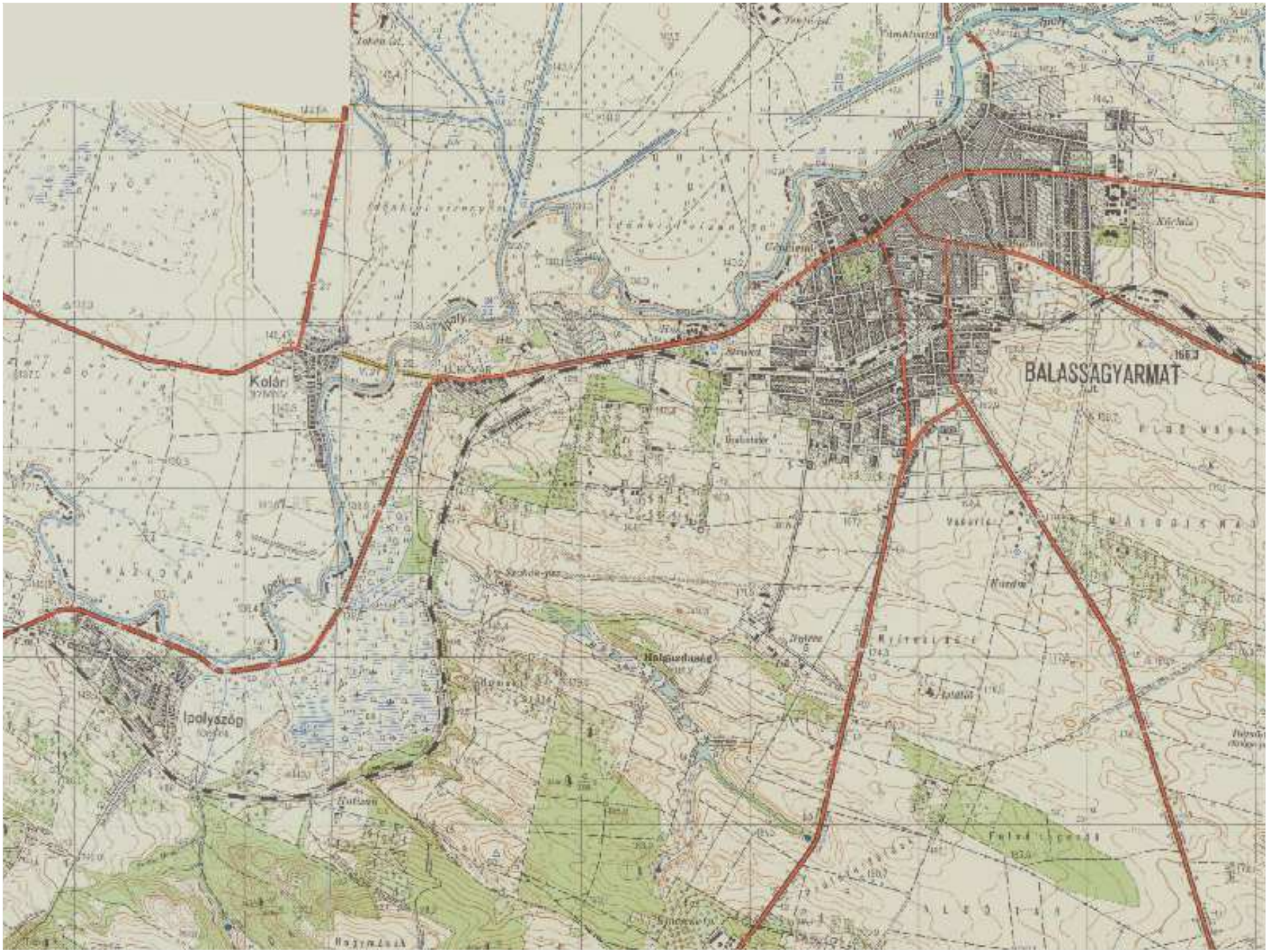

Csalomia
L e g e l ő
Kanár
Balassa Gyarmath
79. 86

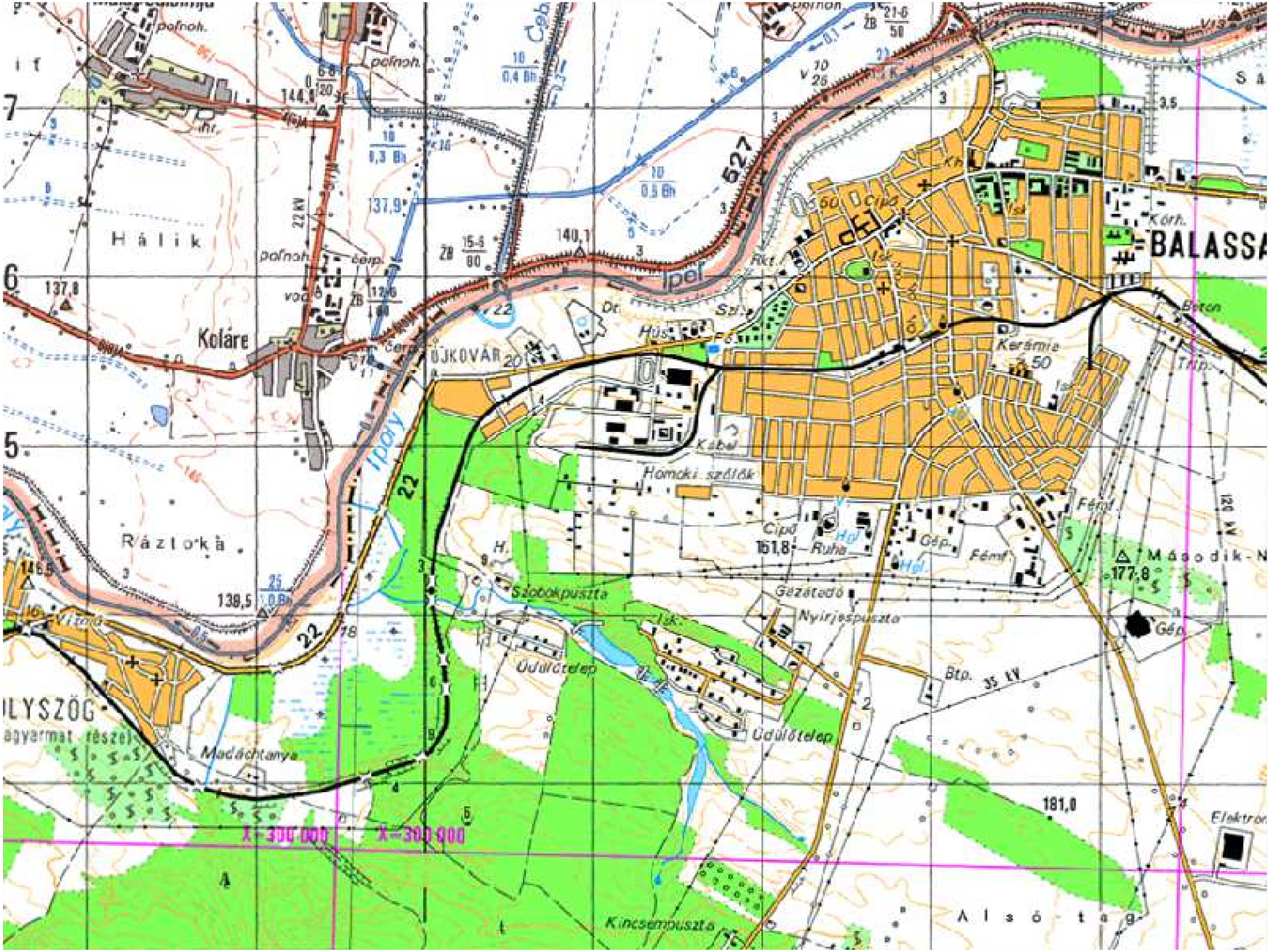

Ipoly
Kiscsalomja
Kövár
Vágóhíd
BALASSAGYARMAT
NYÁRAS
Nyíres psza
Ipolyszög
Baintner psz.
Nyíres nyír.
Nyírjes
Bogár-szl.
Kivesem-psz.
Tölgyes


Ipoly
BALASSAGYAR
Kővár
Ipolyszög
Szobok psz.

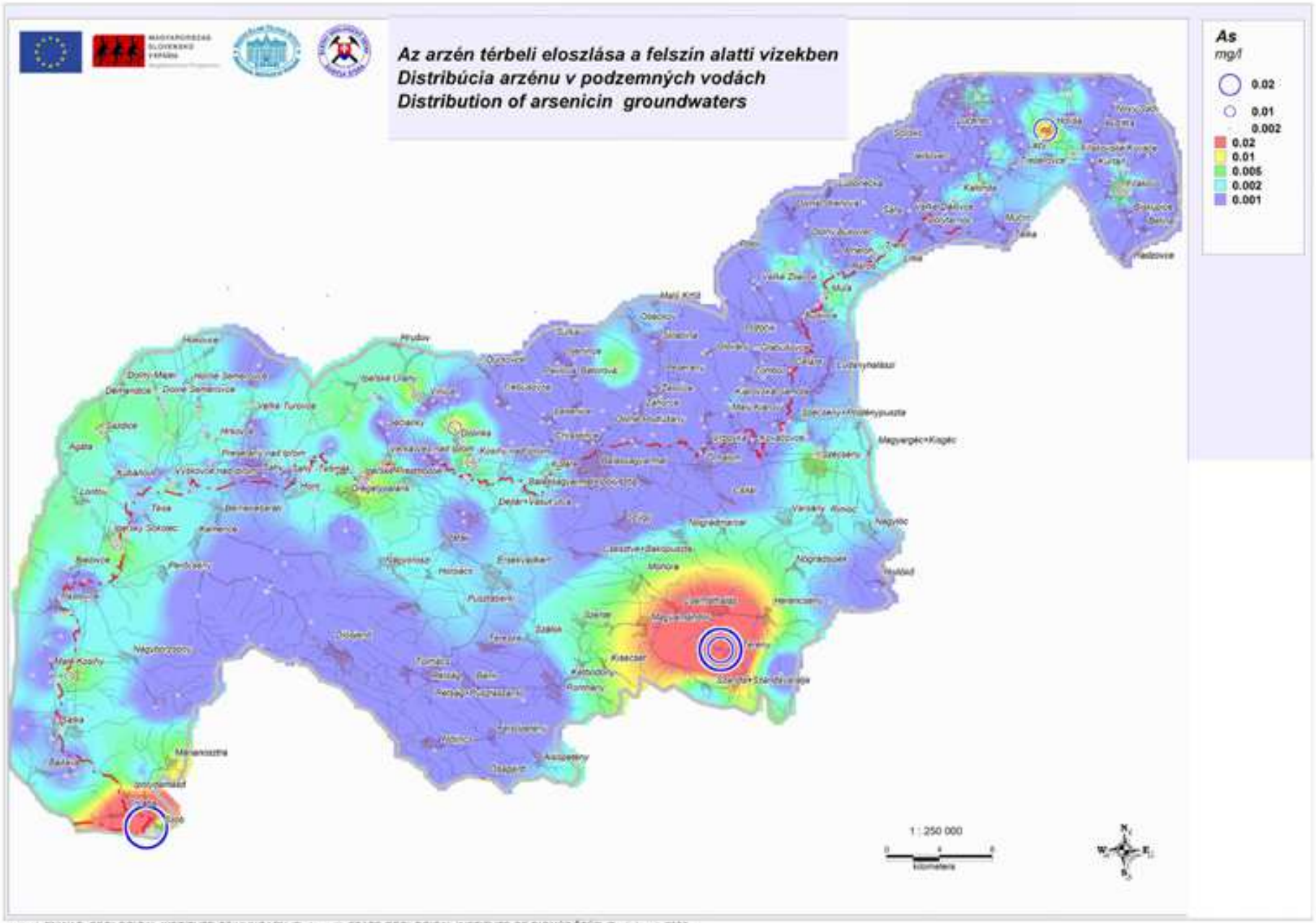

Kis Csalomia
Kovar
Balassa Gyarm
Schiefsstätte
Riba
Fekete tó
Dubina


Szlovenszké Gyarmoti.
IPELJ (IPOLY)
Ipoly
Szikvíz
Kertgazd.
Strand
Kolári
Újkóvár
Gyakorlótér
Vásártér
Előre-TSz
(Szobók-psz.)
Nyíres-psz.
Halgazd.
Ipolyszög
Ótk.
V.m.
Kincsem-tp.
BALASSAGY
Kórh.

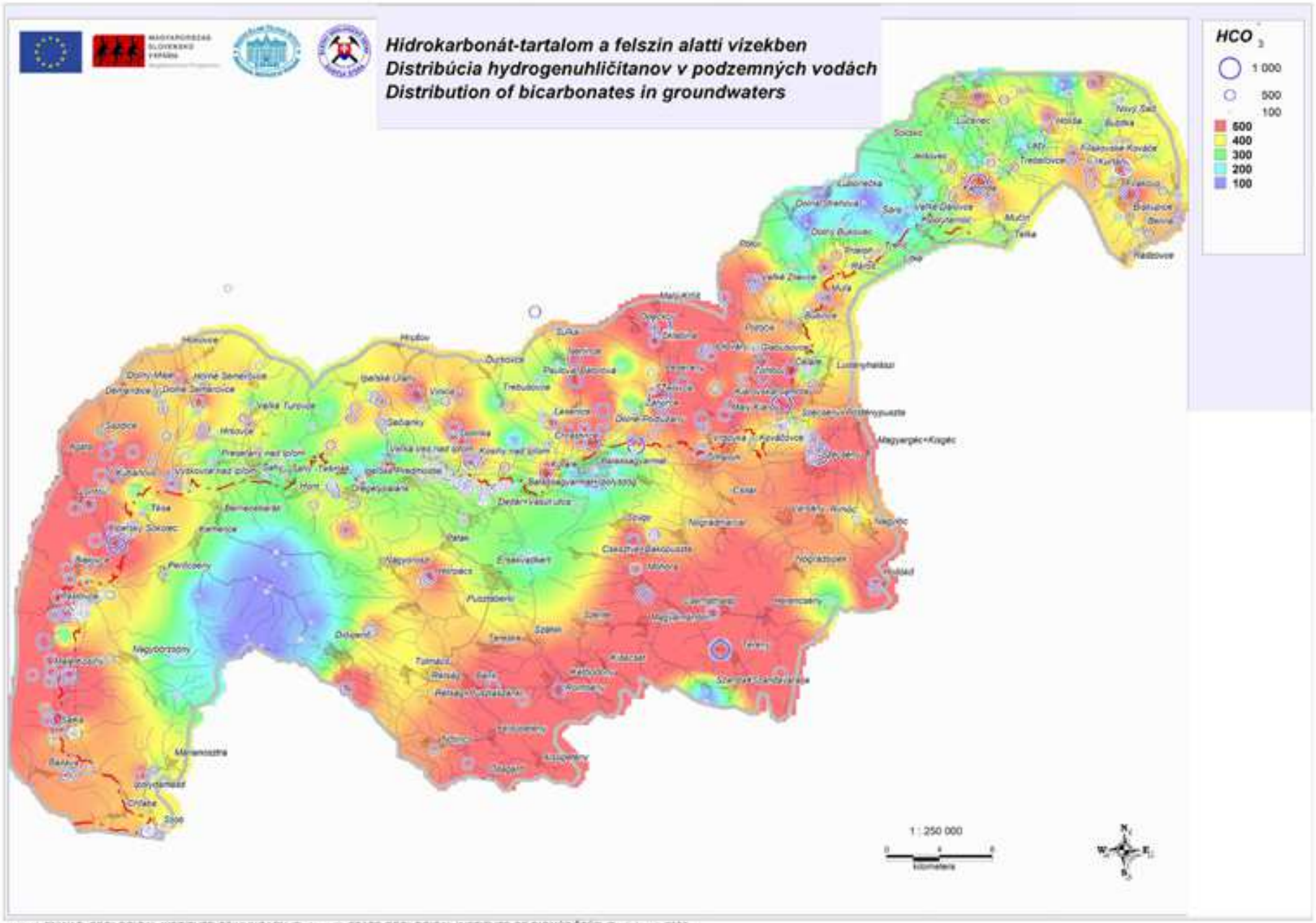

BALASSAGYARMAT
Kolári
Ipolyszög



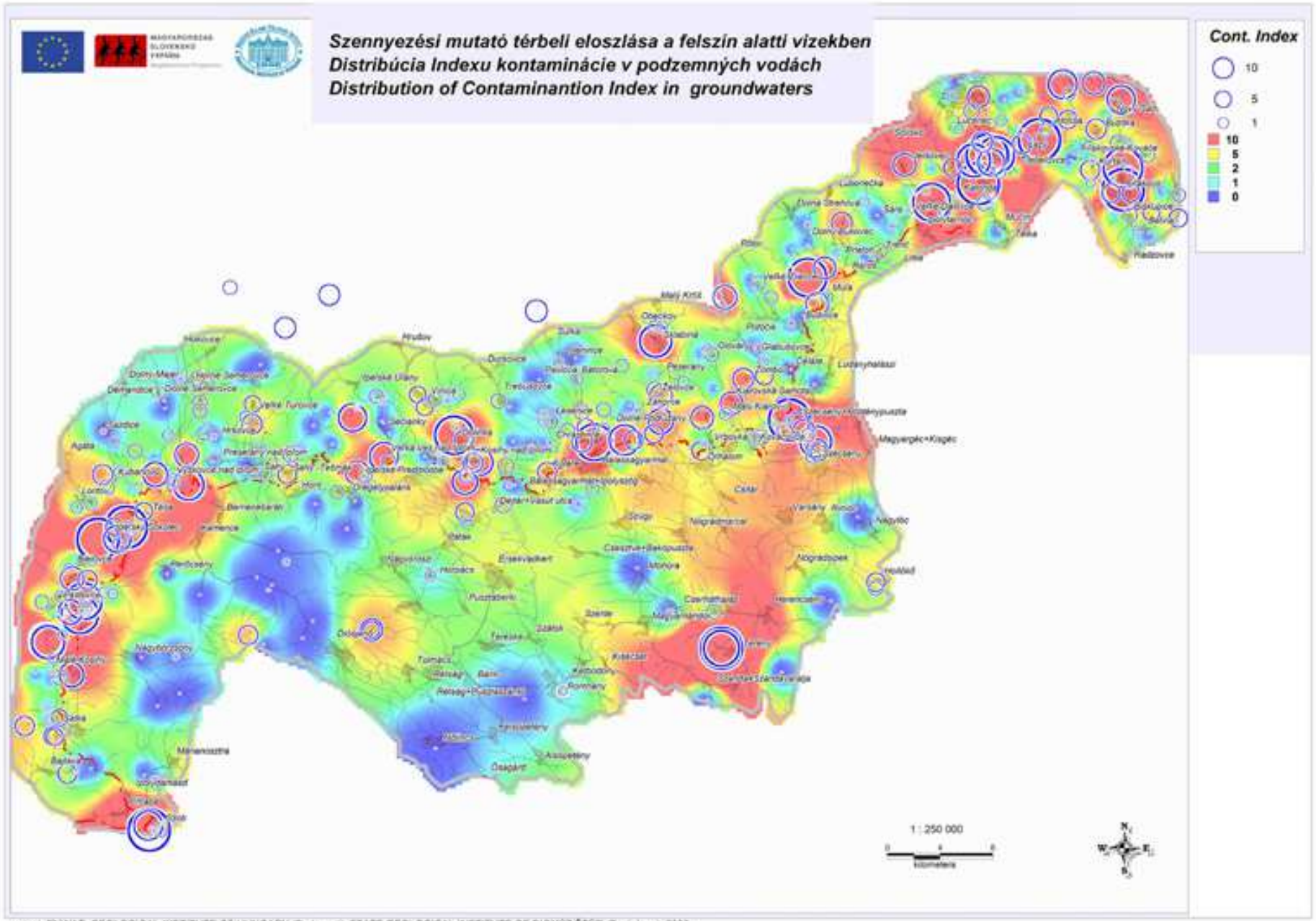
Hálik
Koláre
Ráztoka
Ipel'
Ipoly
ÚJKOVÁR
BALASSA
Homoki szőlők
Kábel
Kerámia
Cipő
Ruha
Szobokpuszta
Üdülőtelep
Nyírjespuszta
Gázátadó
Madách tanya
Kincsempuszta
Második-N
Alsó tag
Elektron
Fém
Gép
Beton
35 kV
527
22
X=300 000



project: ENWAT, GEOLOGICAL INSTITUTE OF HUNGARY (Budapest), STATE GEOLOGICAL INSTITUTE OF DIONÝZ ŠTÚR (Bratislava), 2008

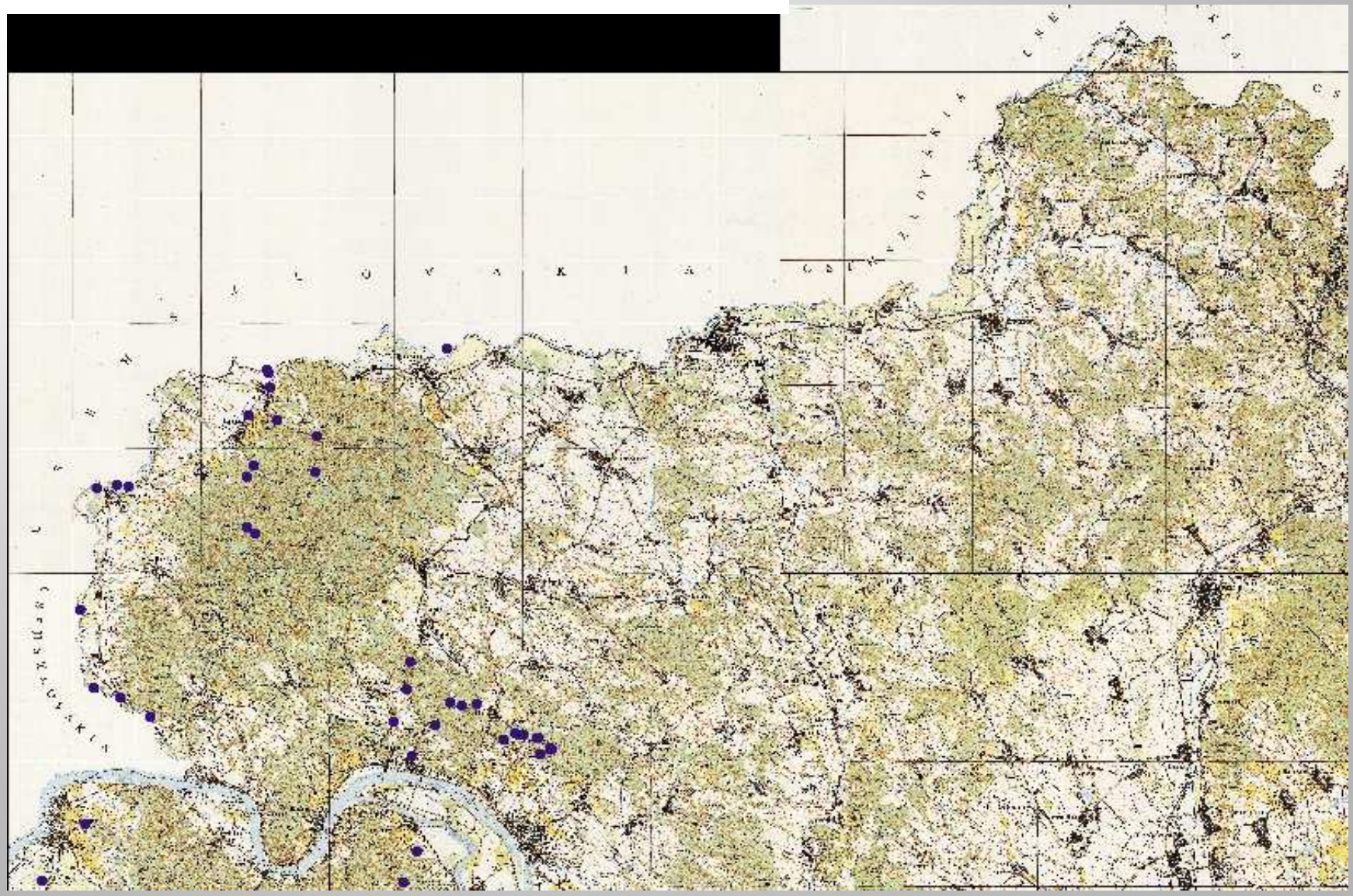


project: ENWAT, GEOLOGICAL INSTITUTE OF HUNGARY (Budapest), STATE GEOLOGICAL INSTITUTE OF DIONÝZ ŠTÚR (Bratislava), 2008

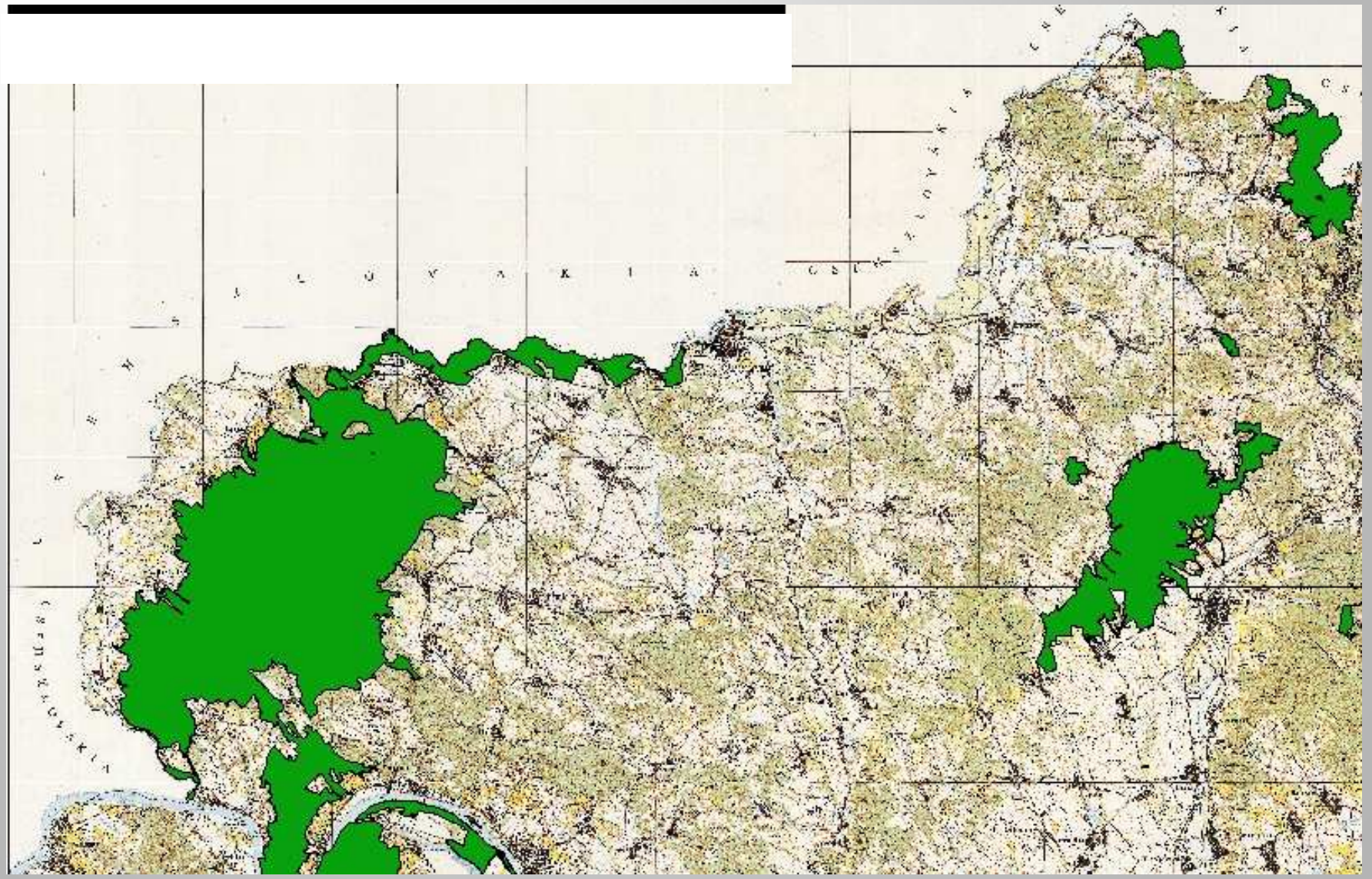


project: ENWAT, GEOLOGICAL INSTITUTE OF HUNGARY (Budapest), STATE GEOLOGICAL INSTITUTE OF DIONÝZ ŠTÚR (Bratislava), 2008

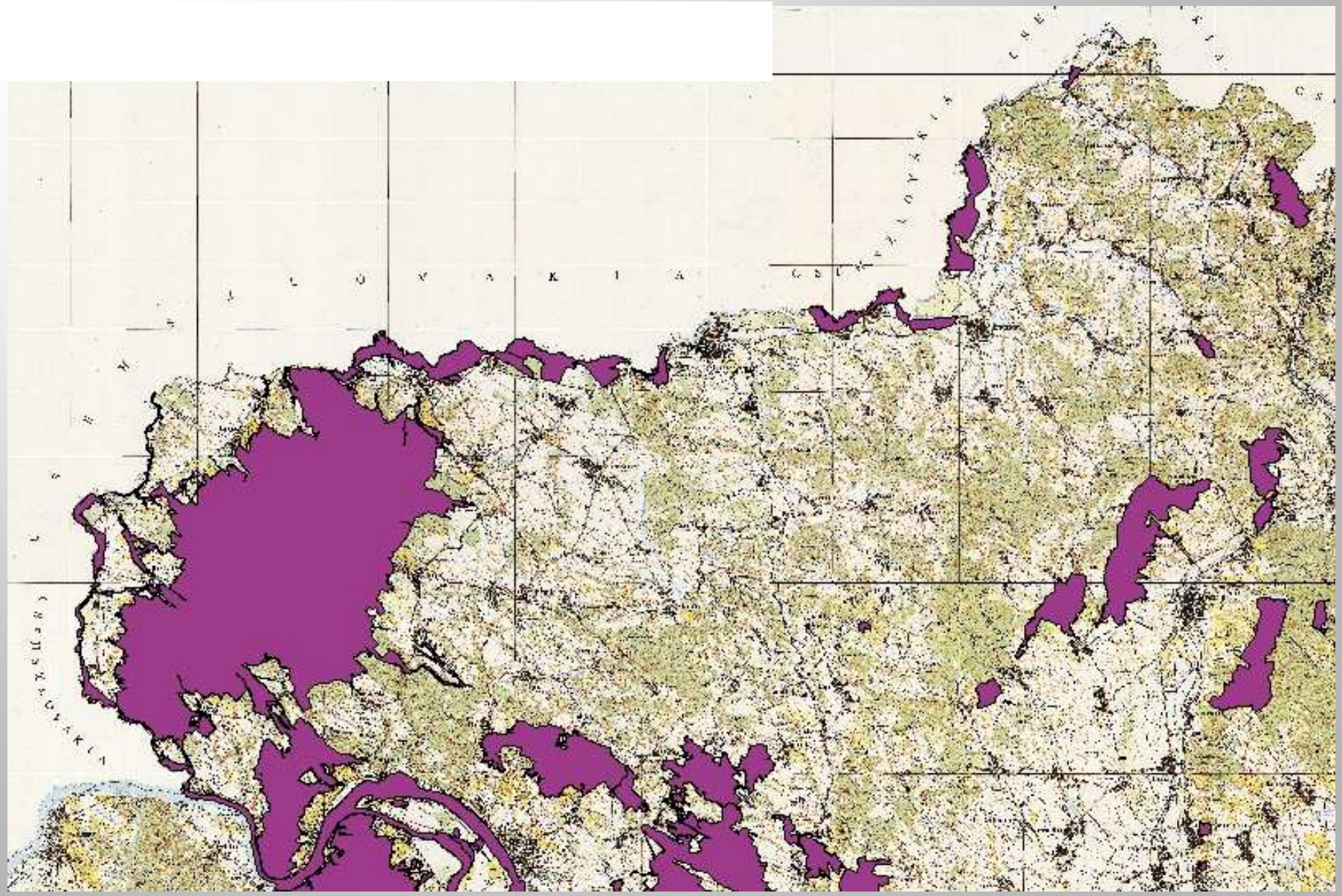
Habitats of protected species of animal



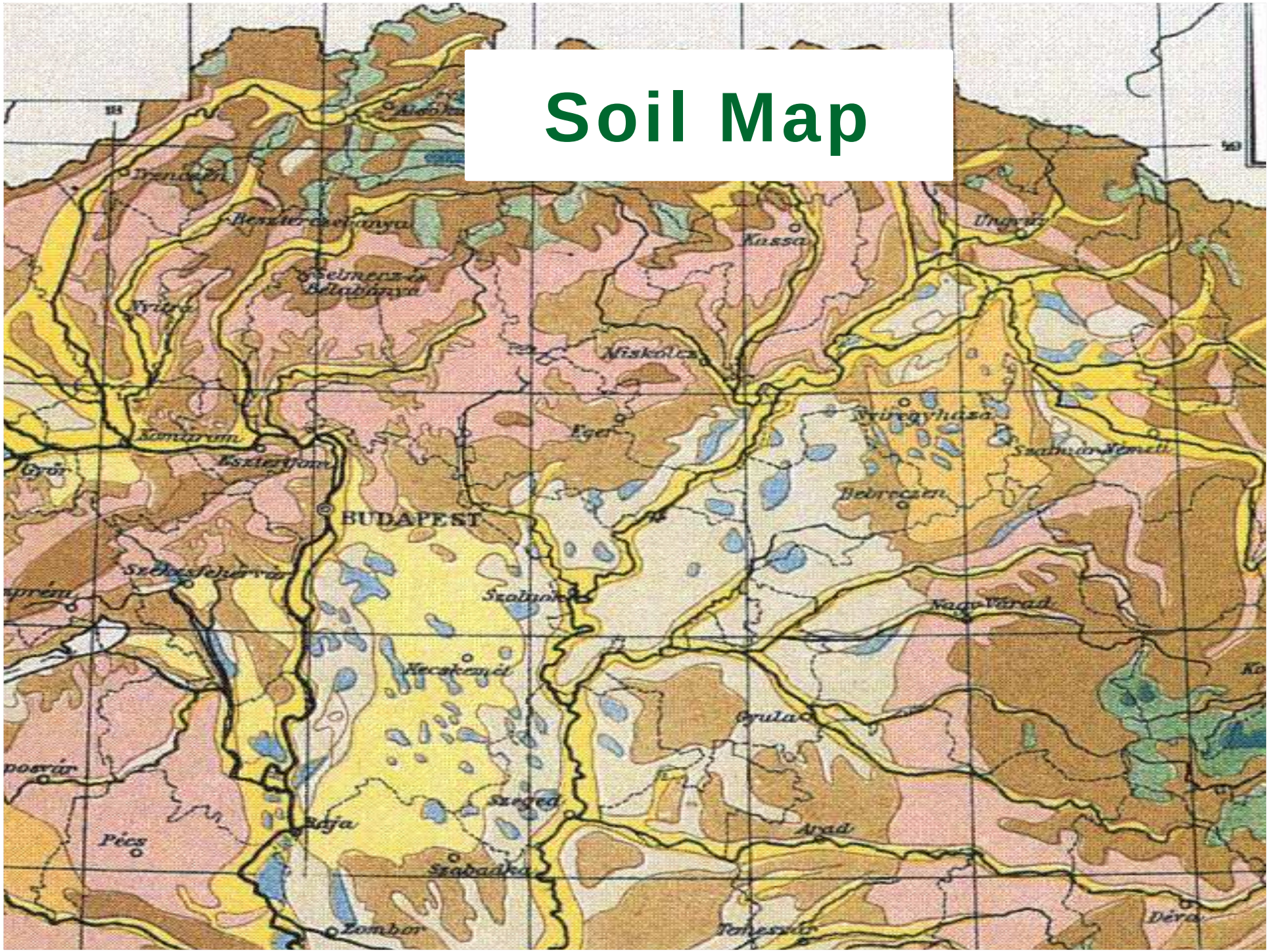
Nationally protected areas



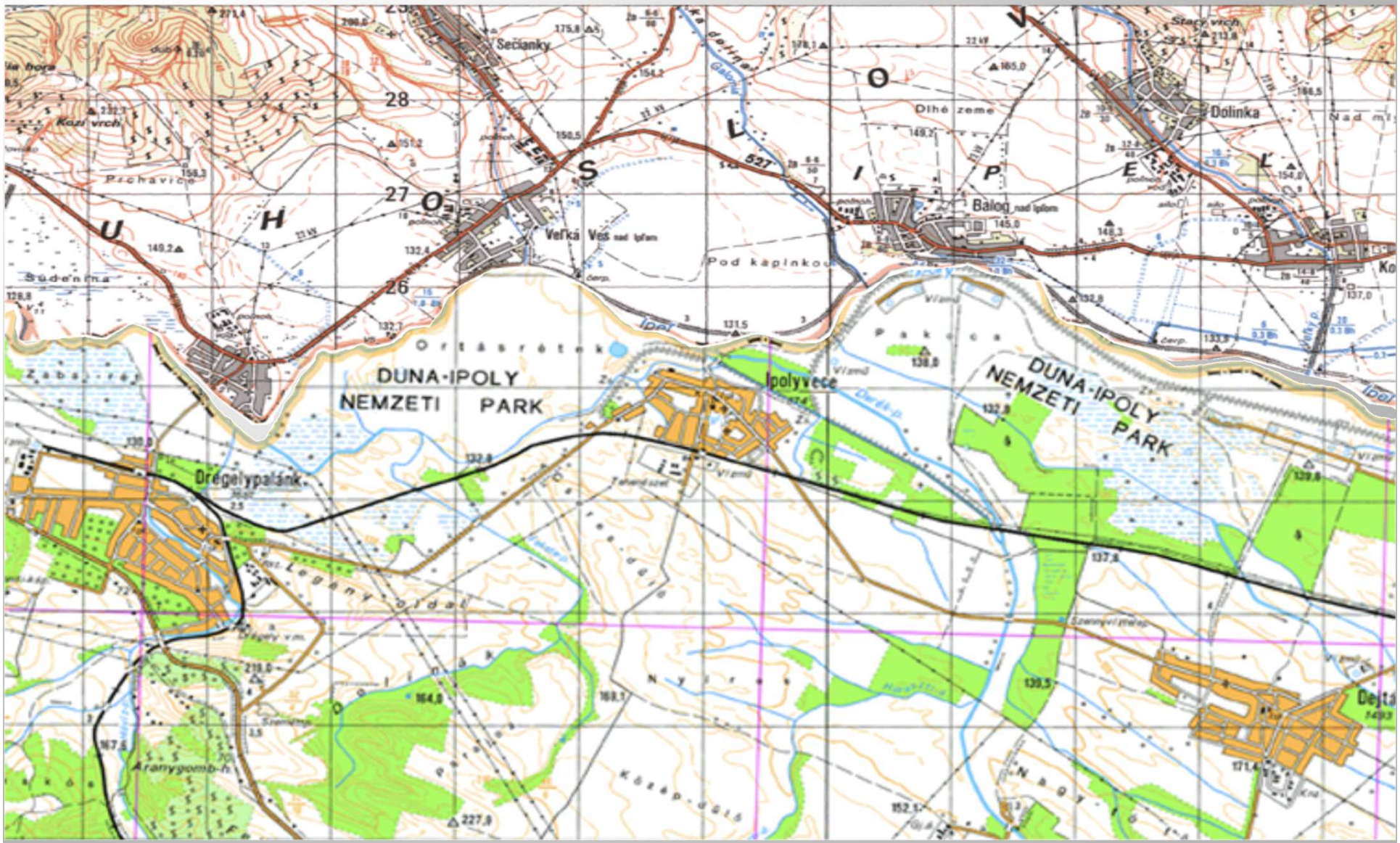
Natura 2000 SCI areas



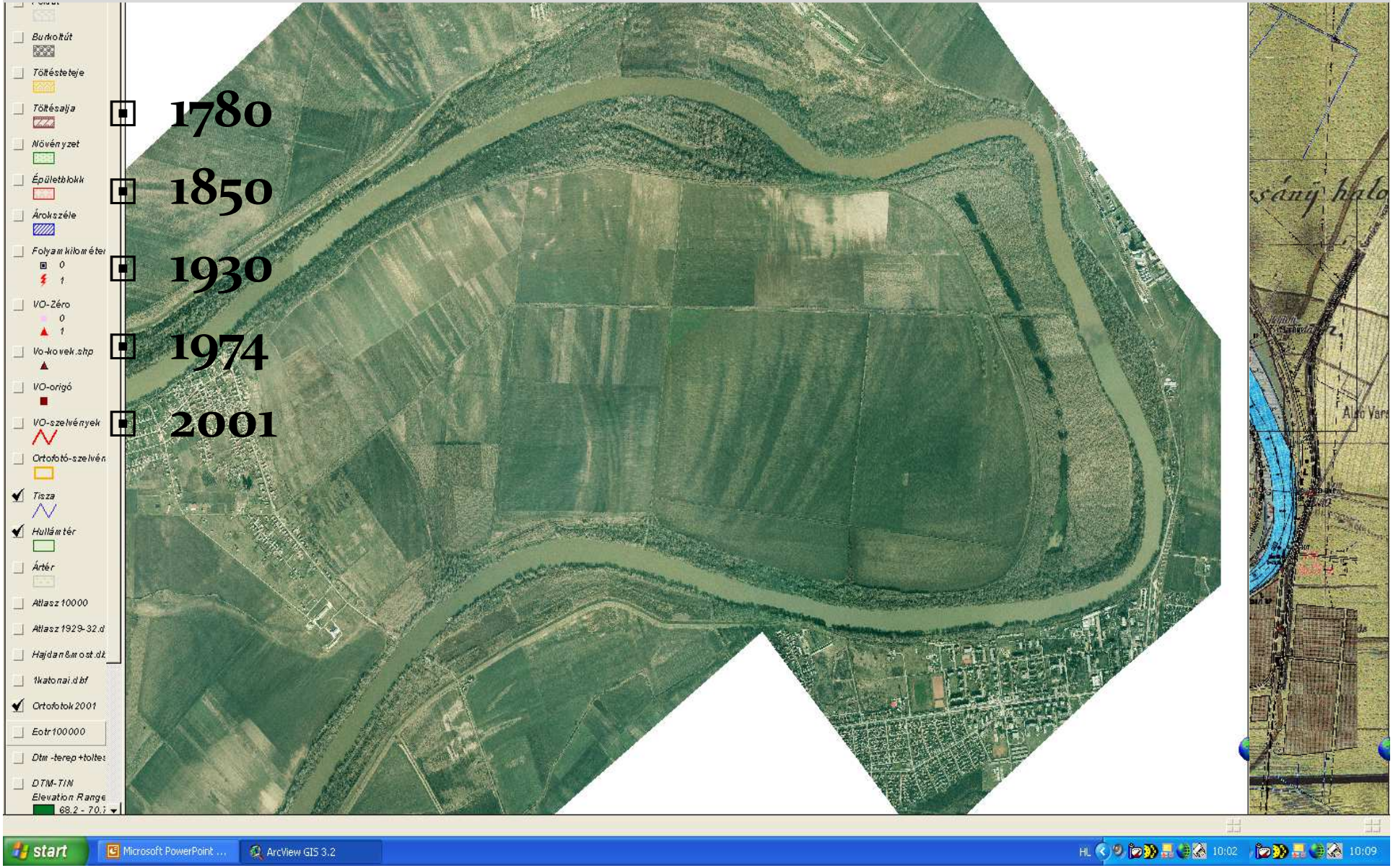
Soil Map


BUDAPEST
Miskolc
Eger
Debrecen
Szeged
Arad
Pécs
Győr
Esztergom
Szolnok
Gyula
Zombor

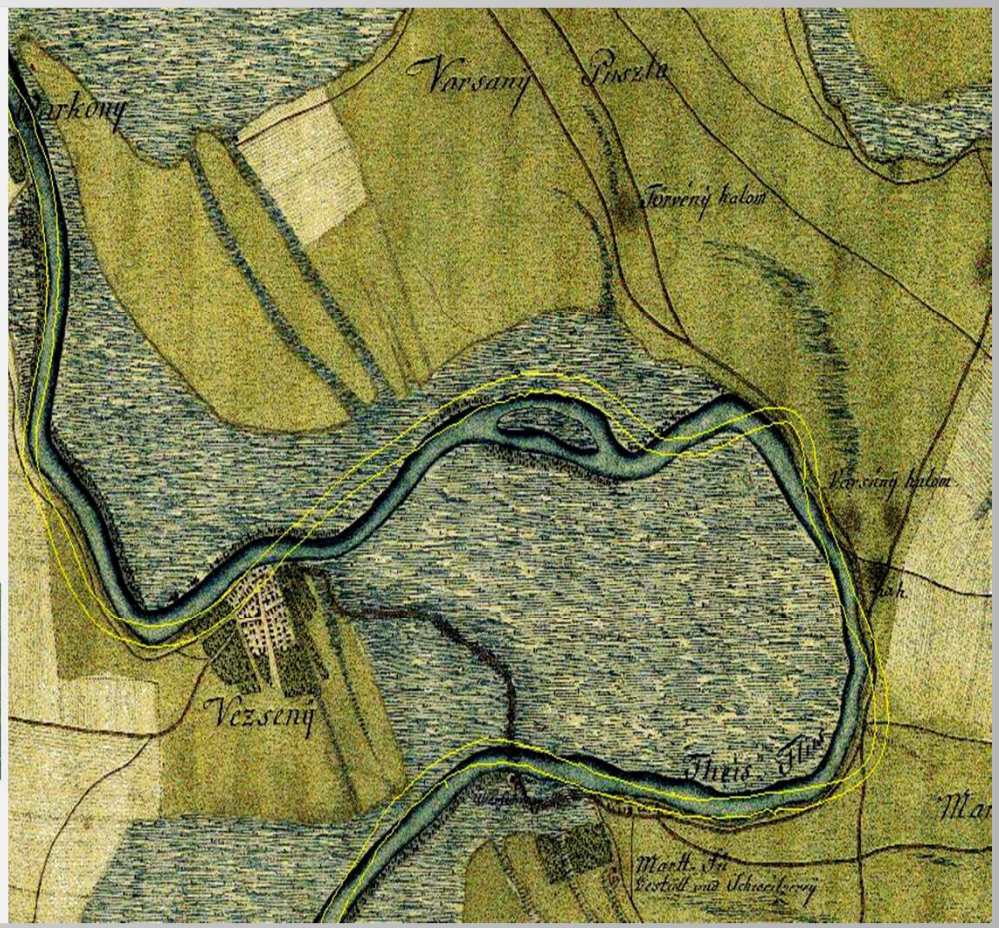
JOINING THE MILITARY MAPS



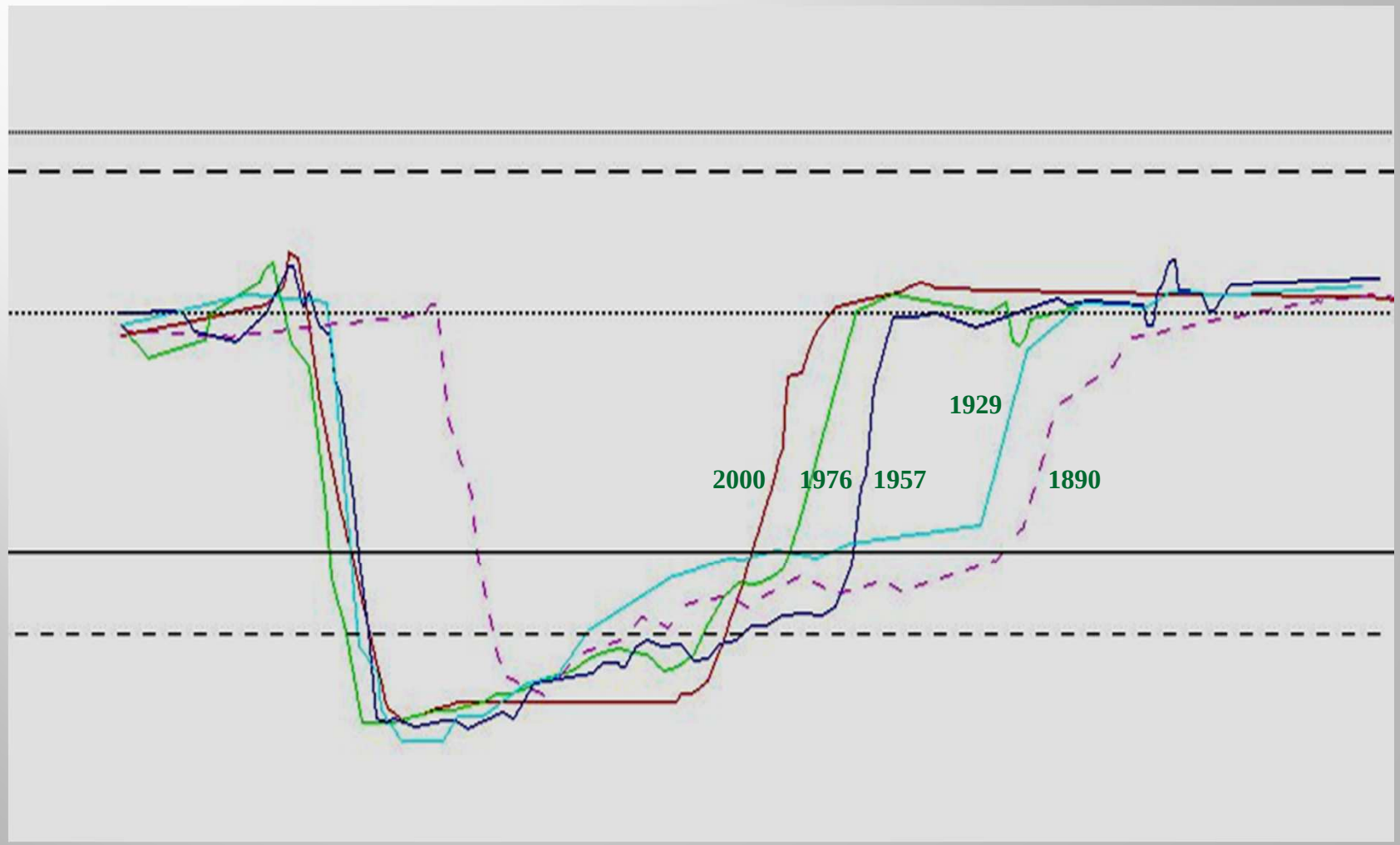
The river bed changes over time



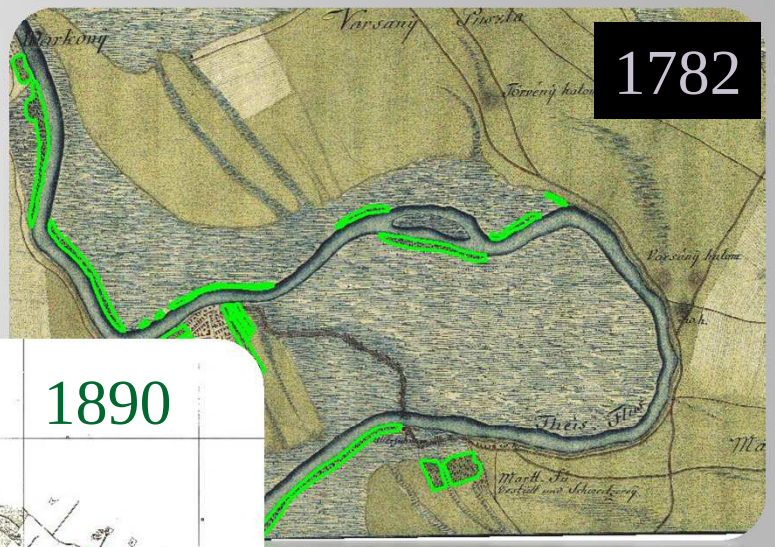
Changes in the river bed

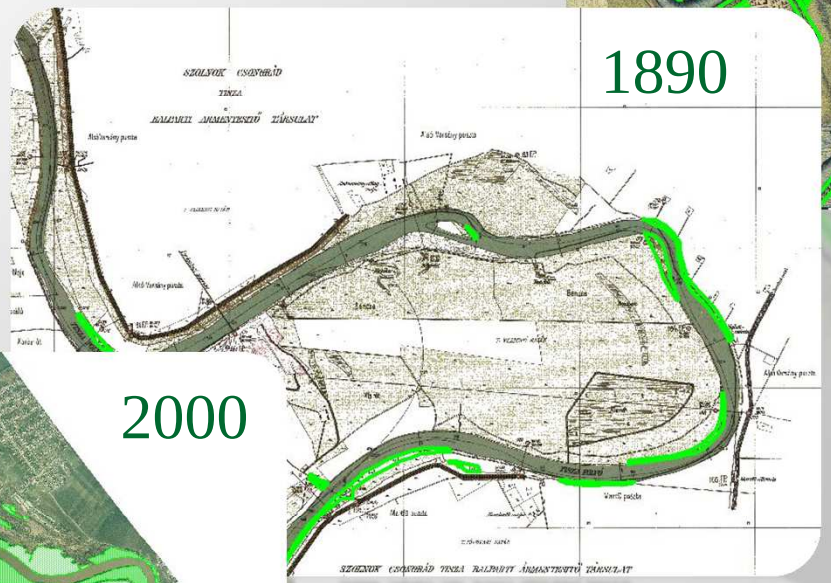


Cross section changes



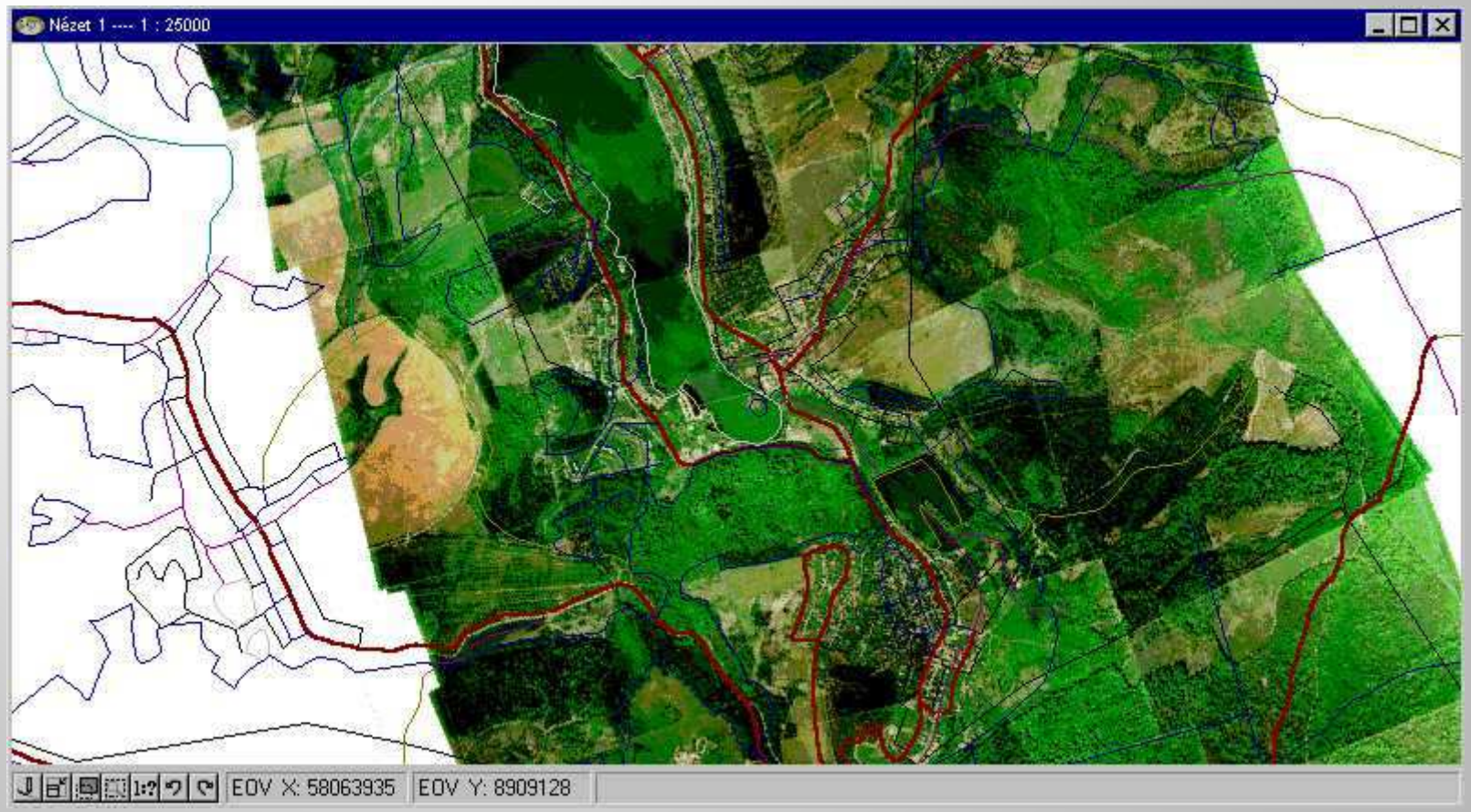
Changes in forest



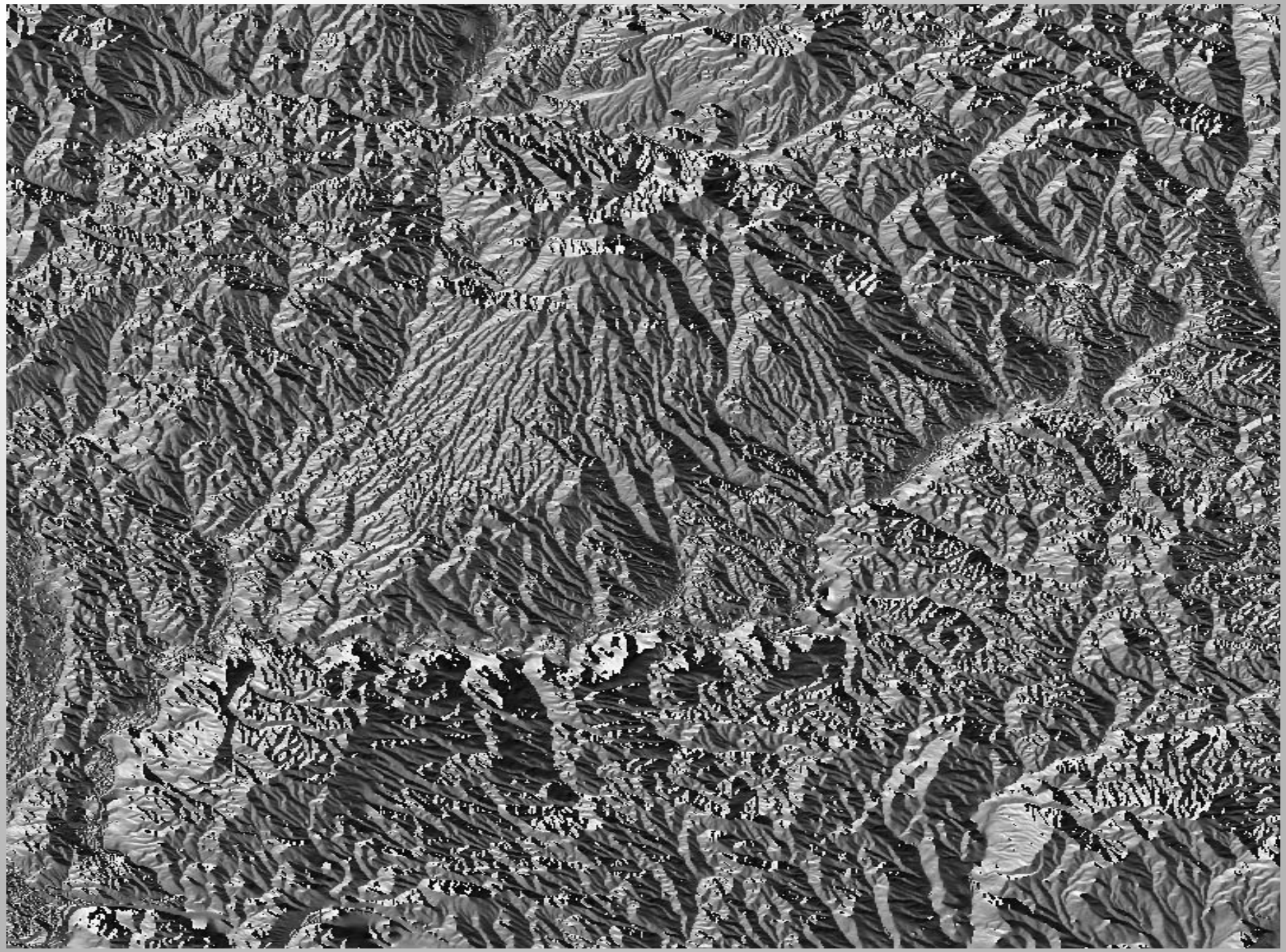


Using of floodplain

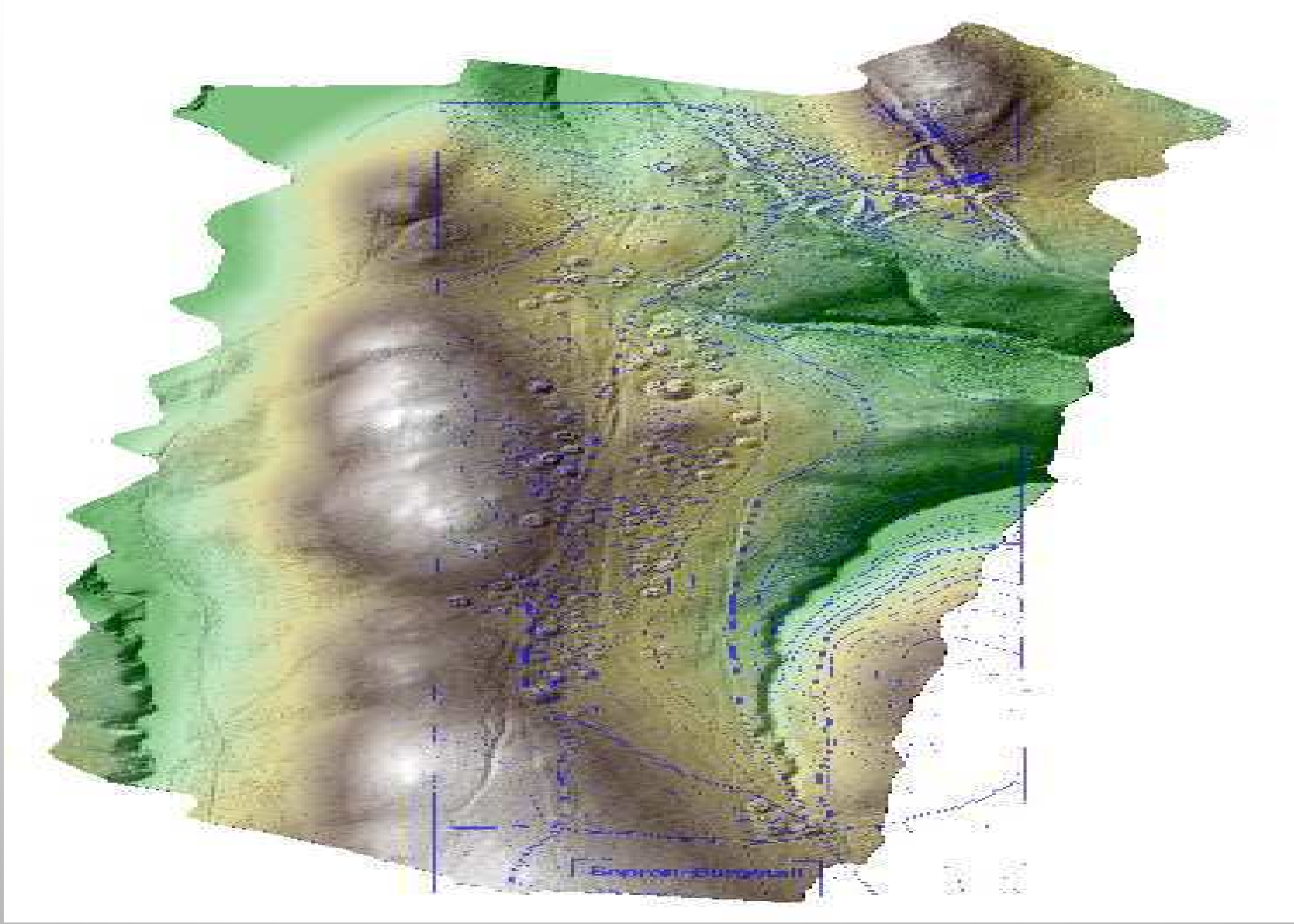
Presentation Area



Joint management of ortophoto and maps



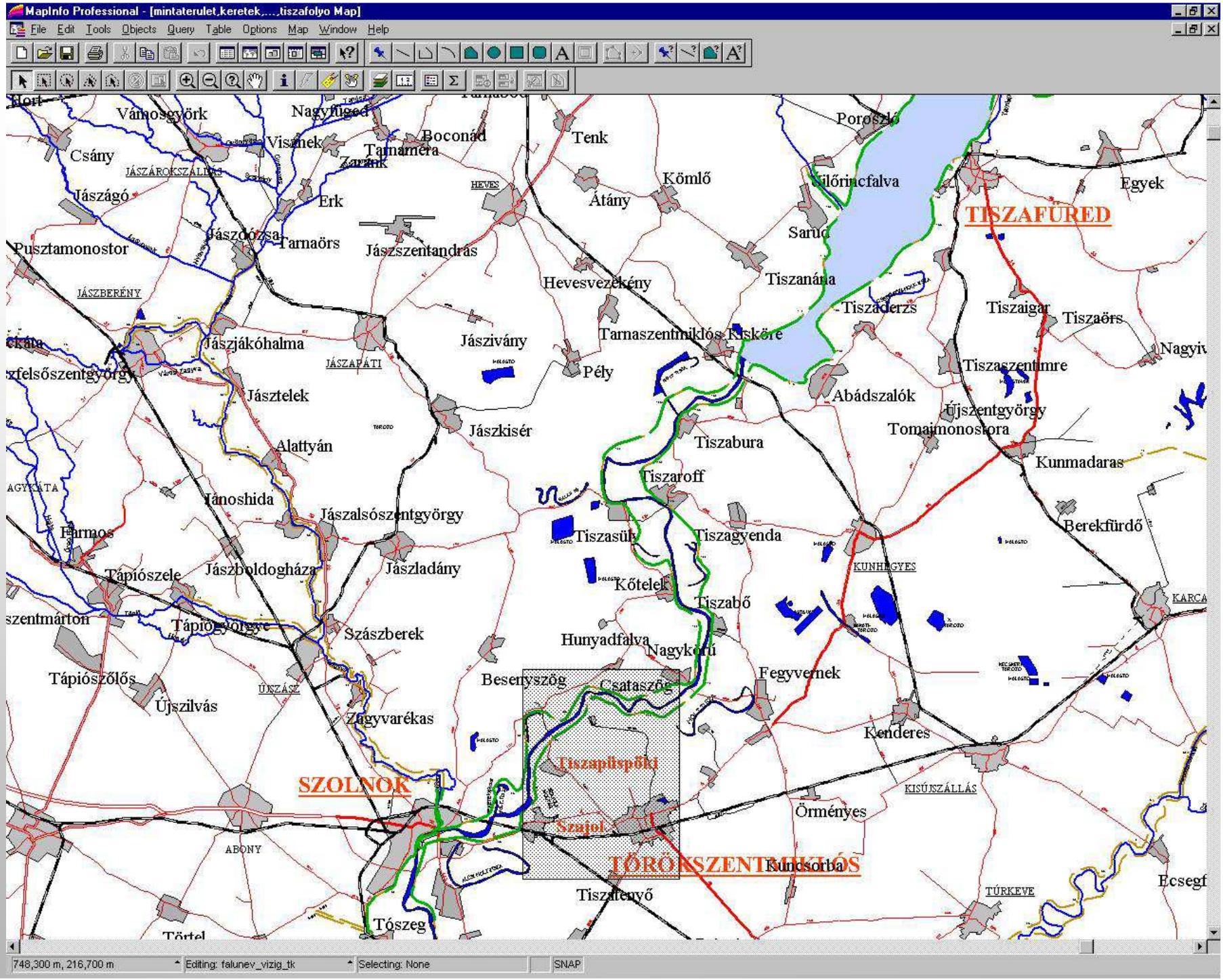
Terrain Evaluation



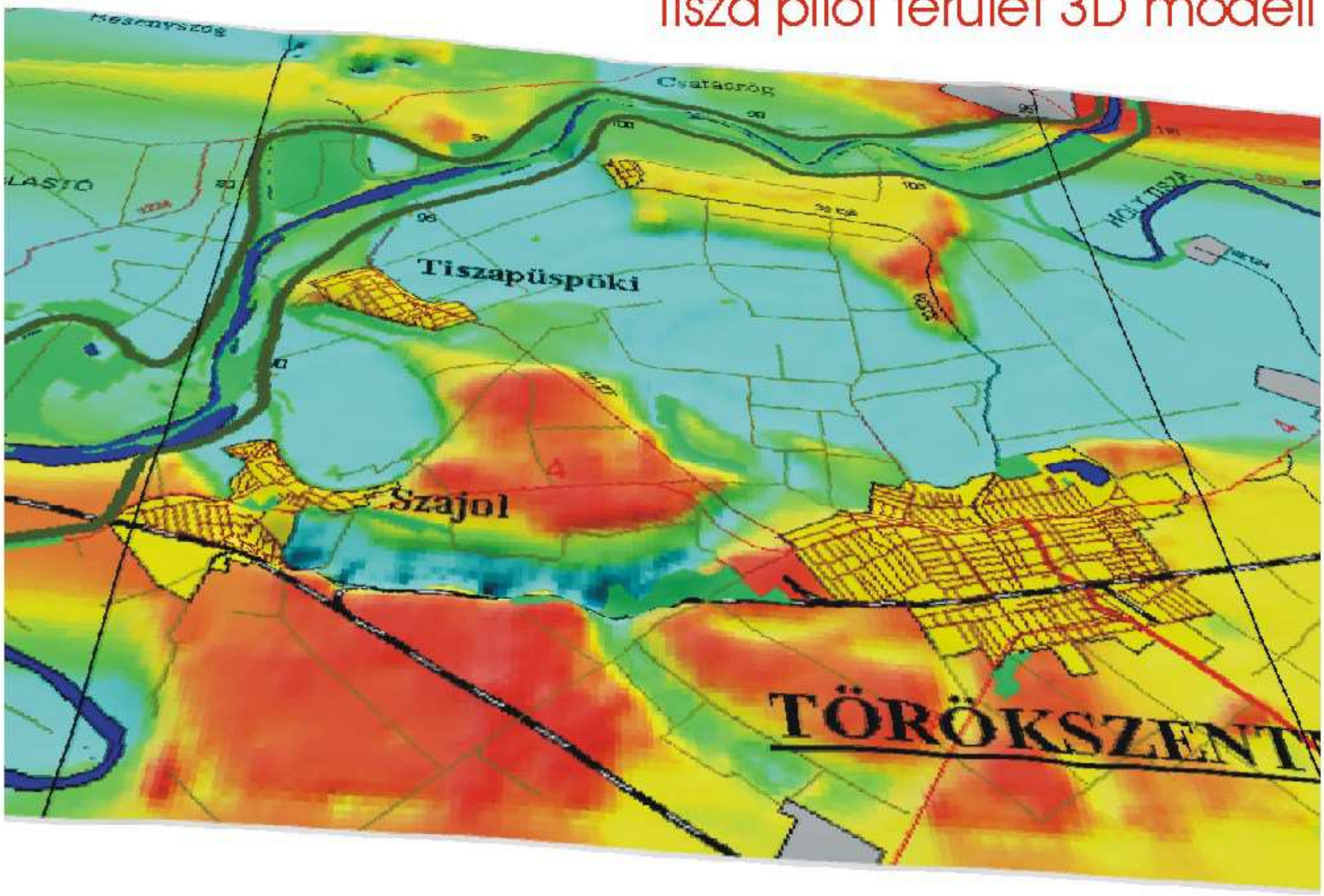
The flood disaster's matematics model have 8-10 base alternate.

Meteorological (rain, wind, etc)
Hidrology,
Geology,
Vegetation, flora,
Evapotranspiration,
Bleed, etc.

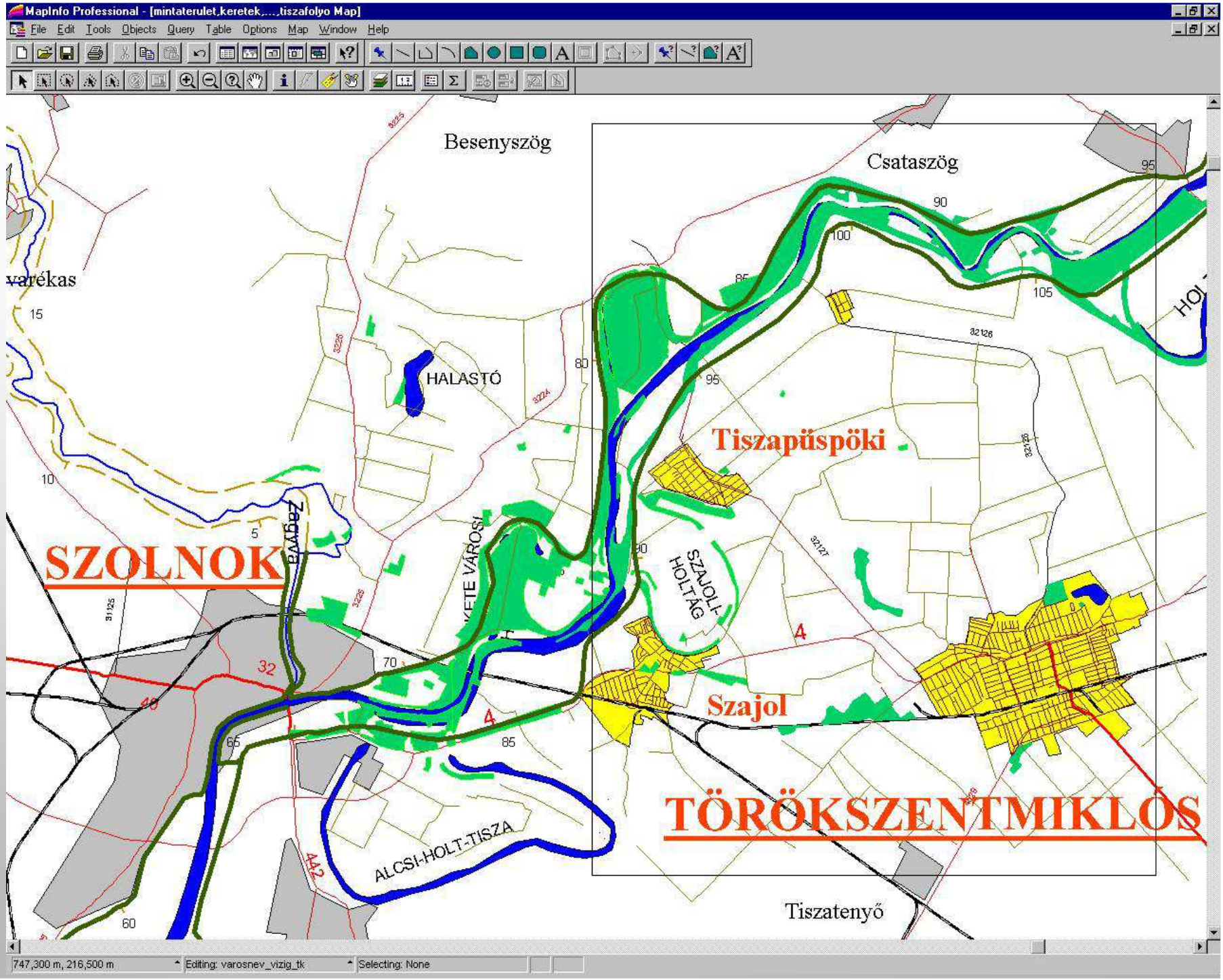
Map of the pilot area



Tisza pilot terület 3D modell



Pilot area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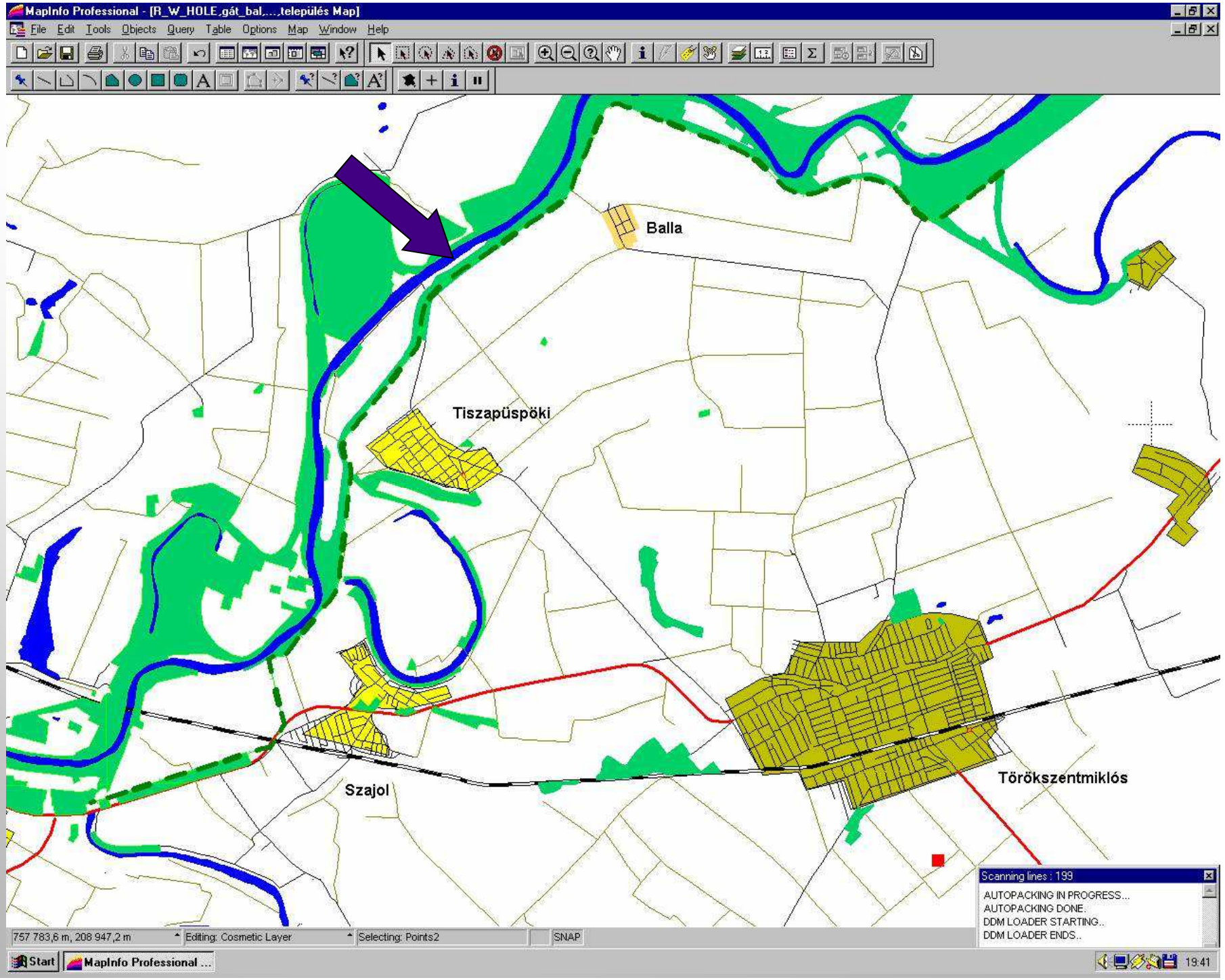
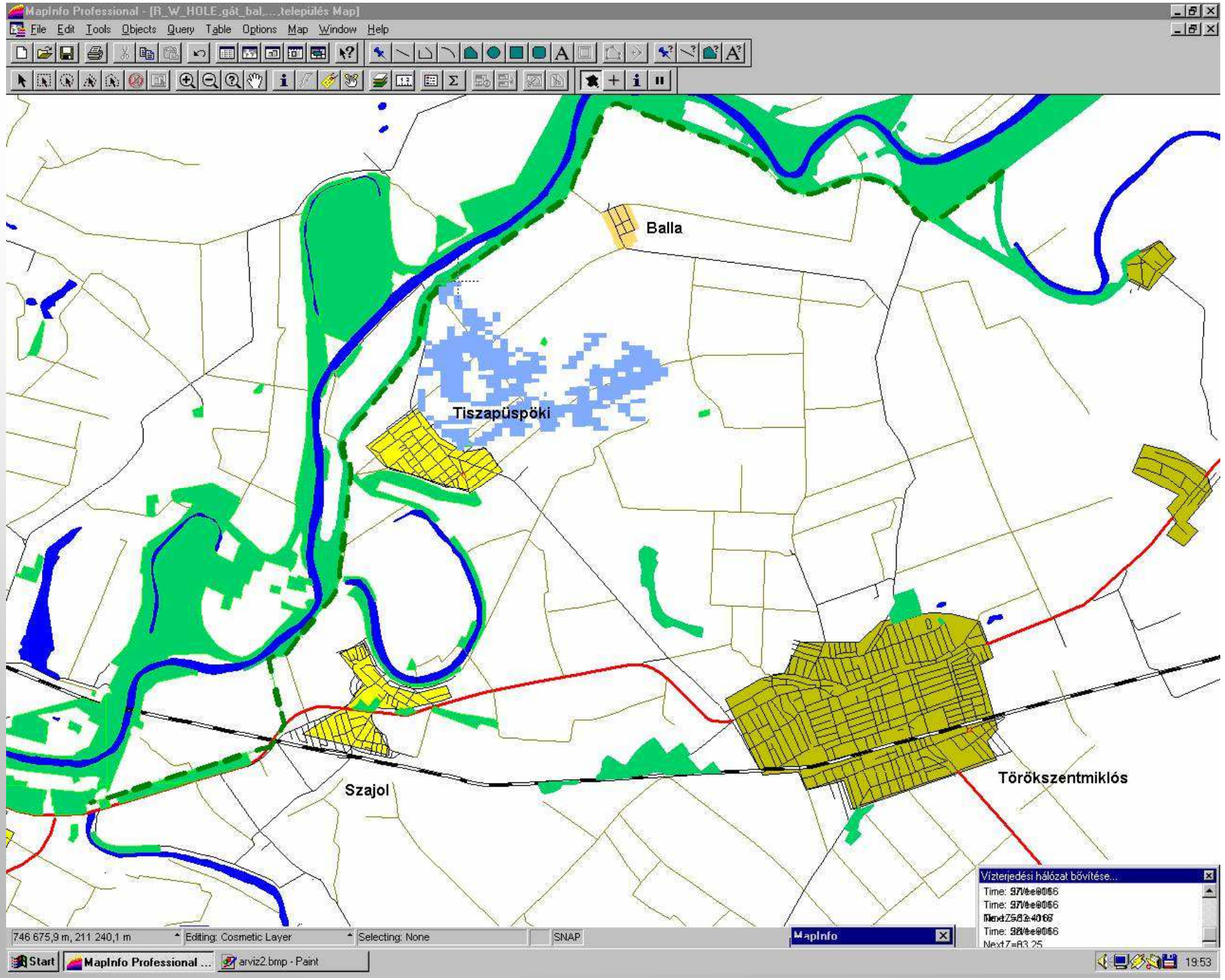
File Edit Tools Objects Query Table Options Map Window Help
Besenyszög
Csataszög
varékas
HALASTÓ
Tiszapüspöki
SZOLNOK
Szajol
TÖRÖKSZENTMIKLÓS
Tiszatenyő
ALCSI-HOLT-TISZA
SZAJOLI-HOLTÁG
KETE VÁROS!
Zagyva
747,300 m, 216,500 m
Editing: varosnev_vizig_tk
Selecting: None

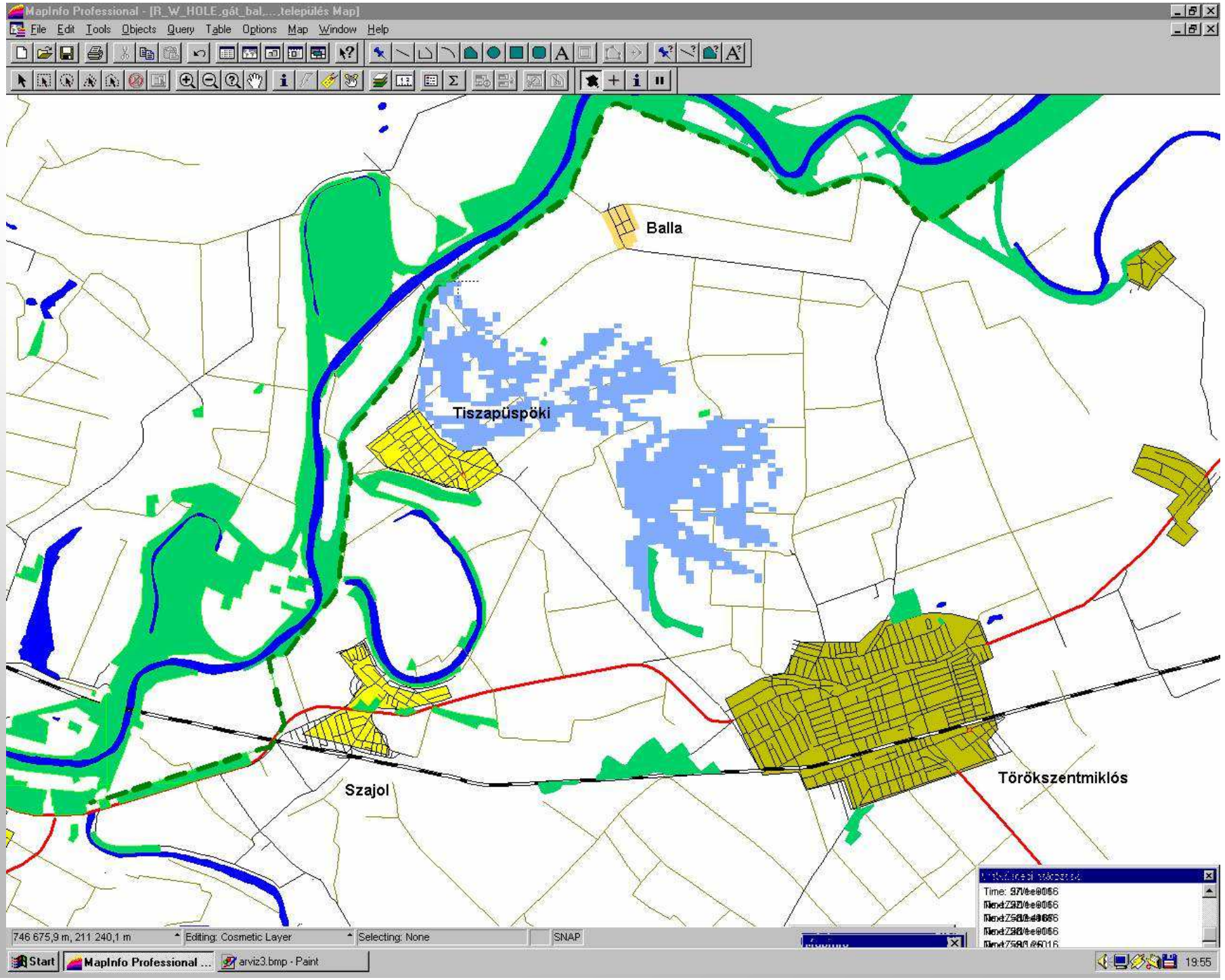
Cut- off point



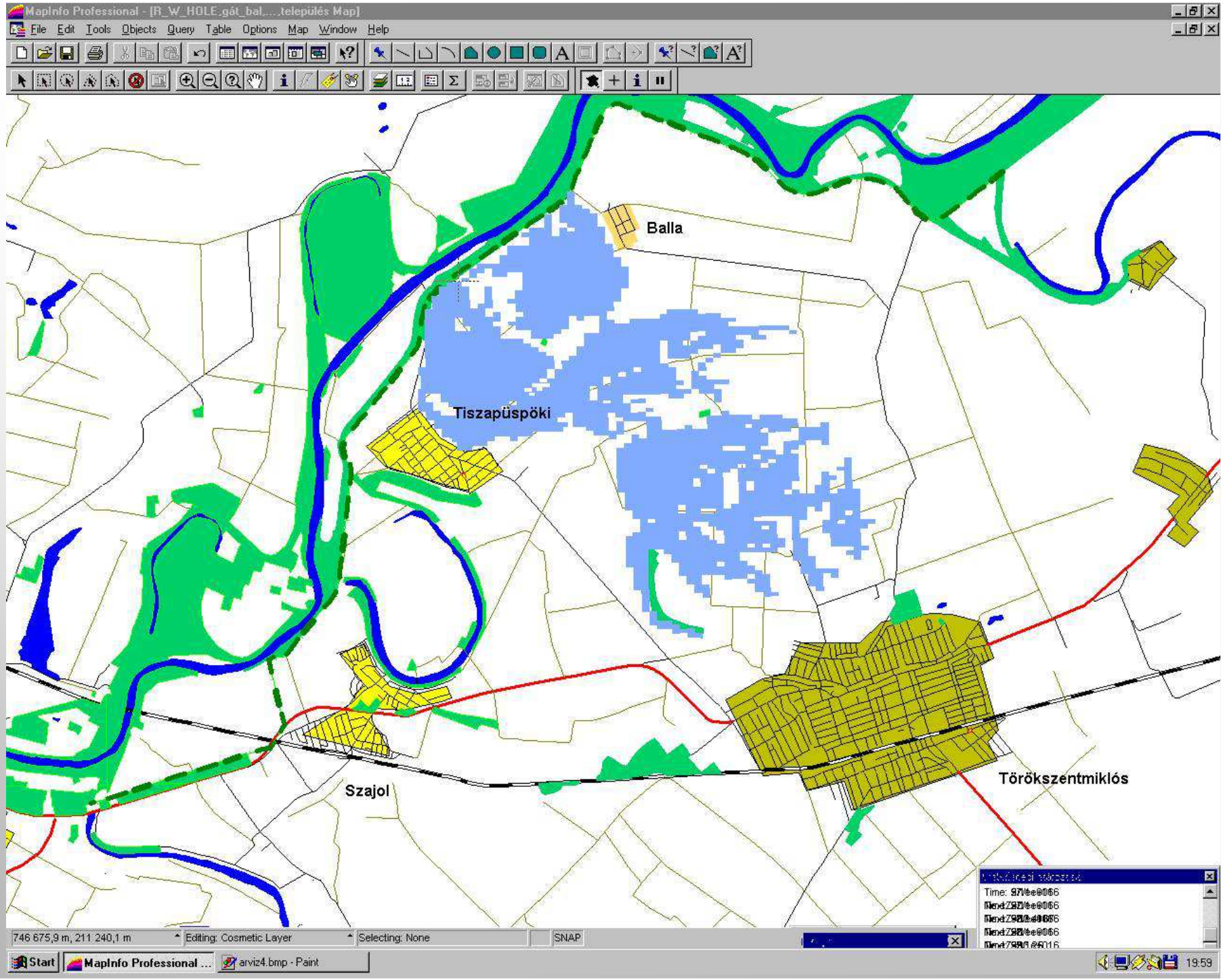
A 60th min


MapInfo Professional - [R_W_HOLE,gát_bal,...,település Map]
File Edit Tools Objects Query Table Options Map Window Help
Balla
Tiszapüspöki
Szajol
Törökszentmiklós
Vízterjedési hálózat bővítése...
Time:
Time:
Time:
746 675,9 m, 211 240,1 m
Editing: Cosmetic Layer
Selecting: None
SNAP
MapInfo
Start
MapInfo Professional ...
arviz2.bmp - Paint
19:53

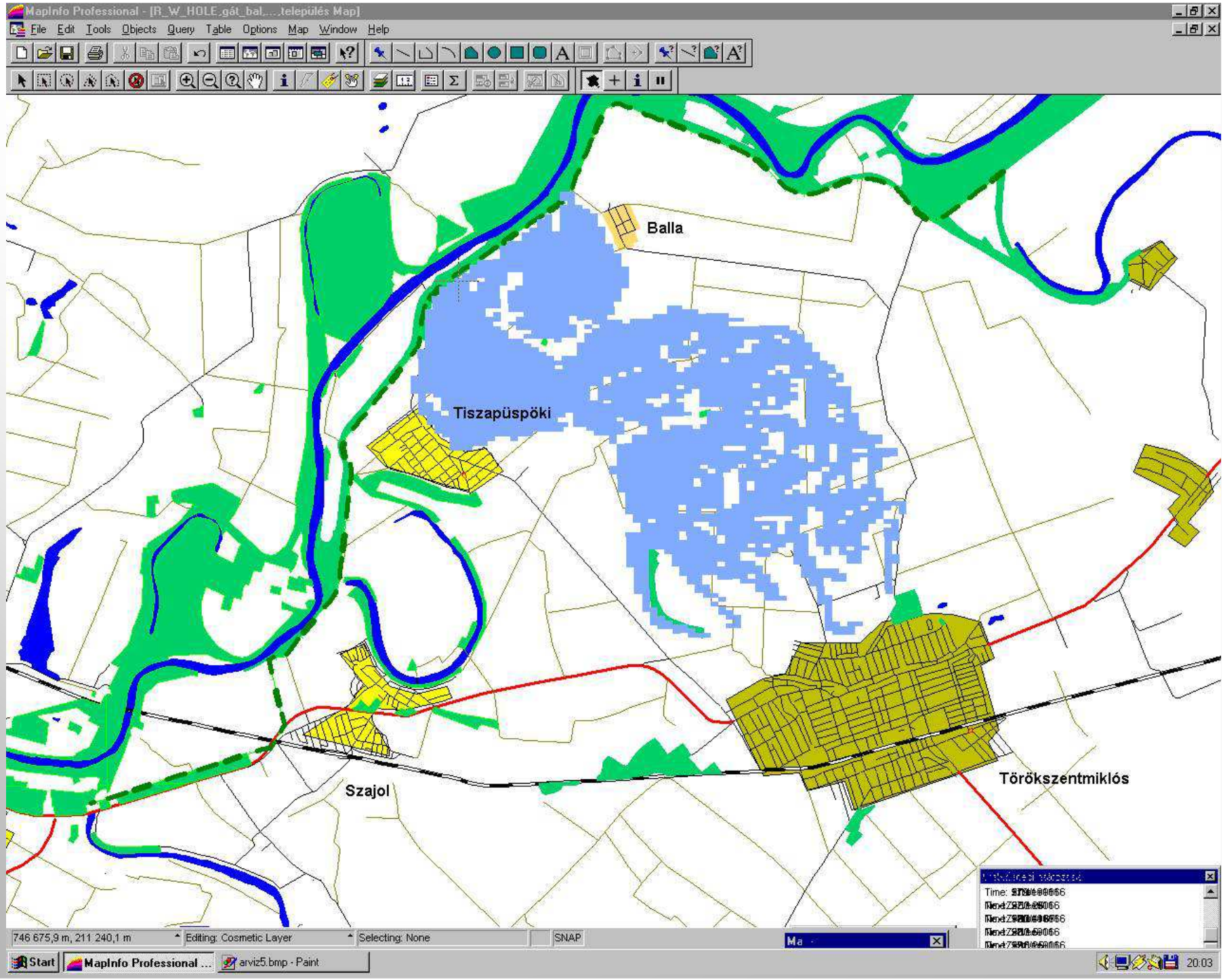
The third hours



The sixth hours



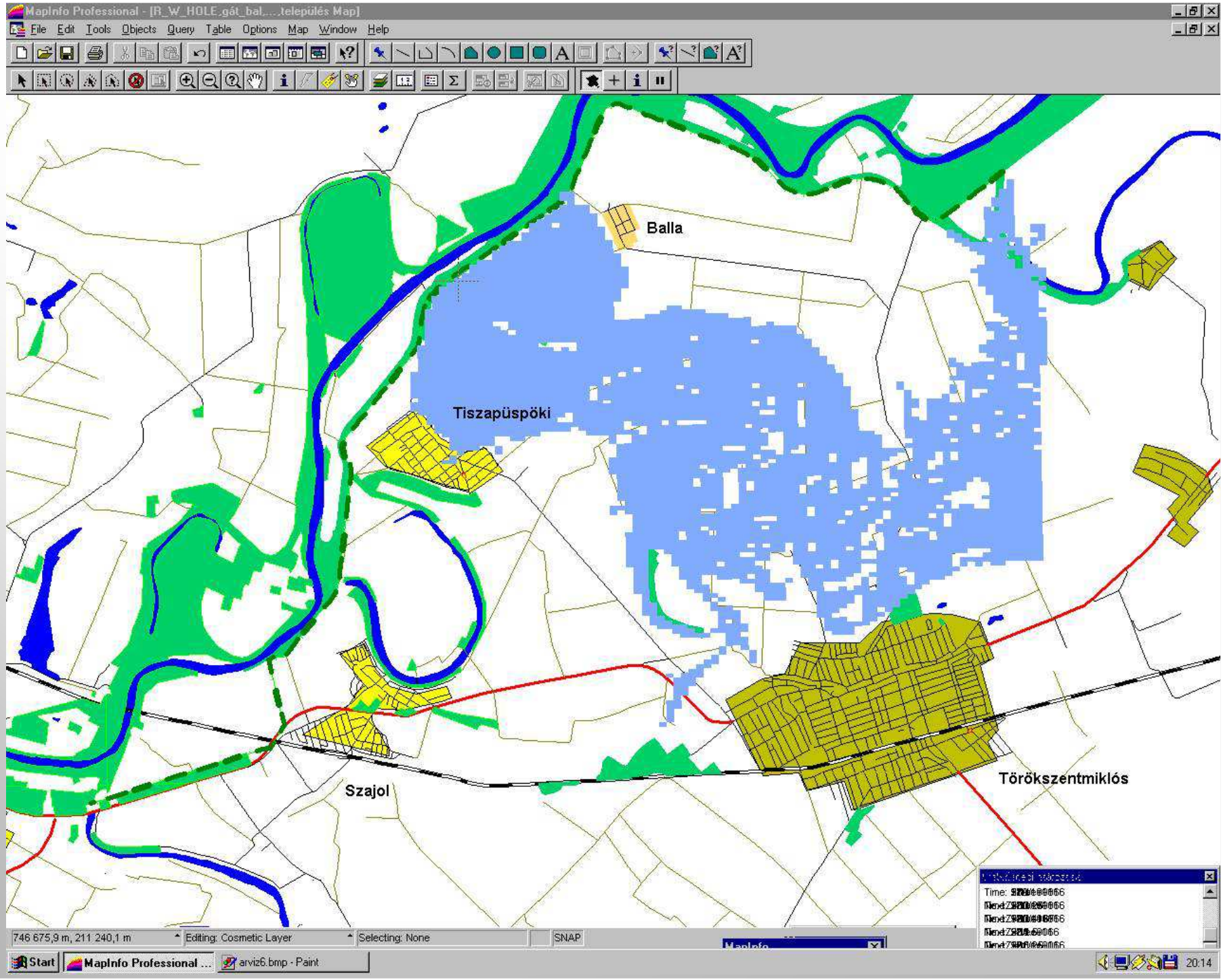
The twelfth hours



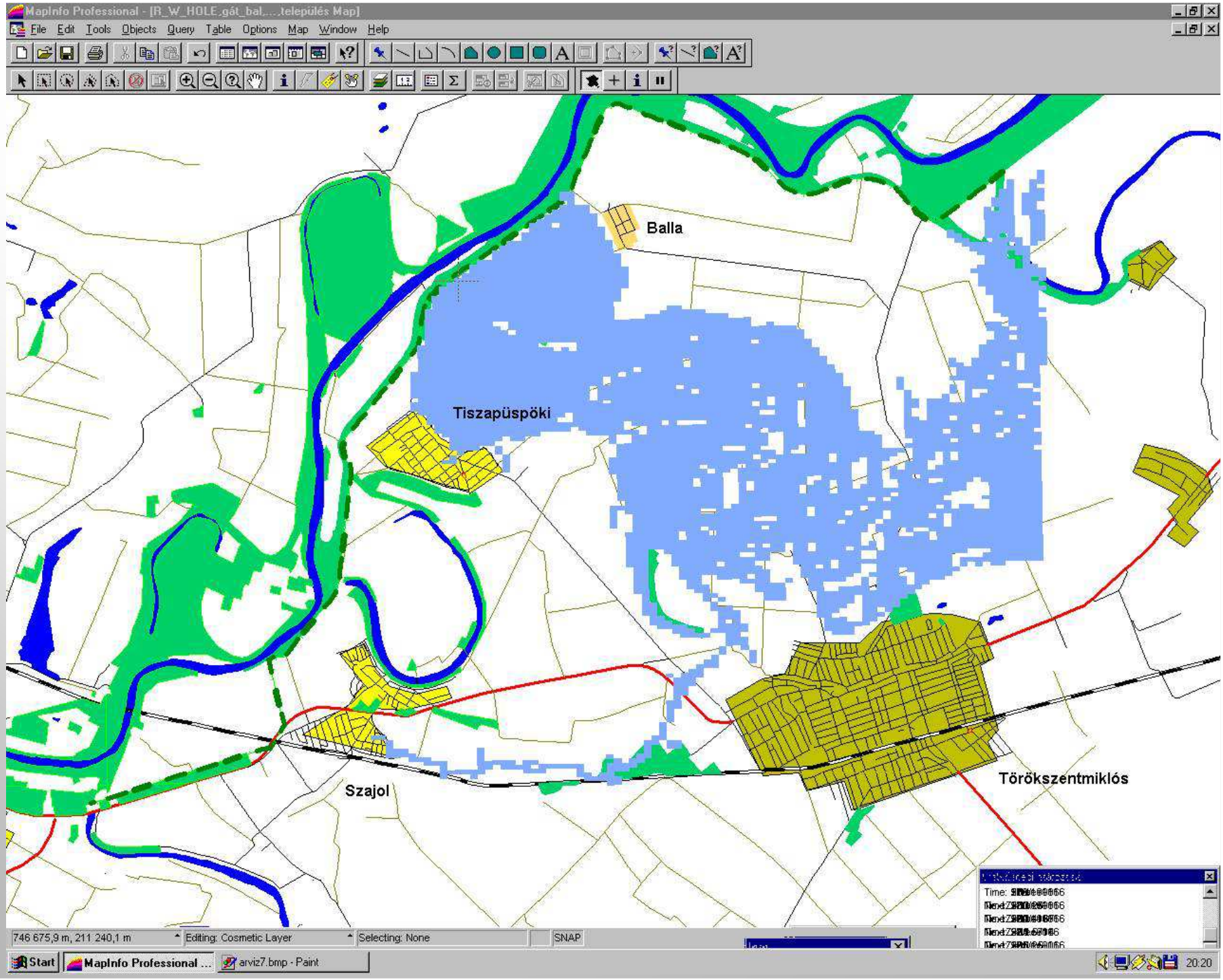
A pilot területen az árvízi modell program segítségével előállított információk

A TÖLTÉSSZAKADÁSTÓL ELTELT IDŐ	*12 Ó[illegible]*
A vízfelület nagysága	*[illegible] km²*
Átlagos vízmélység	*[illegible] cm*
Maximális vízmélység	*[illegible]15 cm*
Helye	*Tiszapüspöki észak*
GPS koordinátája	*47.22.53; 20.22.17*
Az elöntés által érintett objektumok száma	*17 db*
Lakóépületek száma	*14 db*
Címük: Tiszapüspöki Balogh O. [illegible] páratlan oldala	
Ko[illegible] páratlan oldala	
[illegible] F. u. 9, 11, 13	
Az érintett épületekbe[illegible]mmel rendelkező lakók száma	*62 fő*
Életkoruk 0 - 6 év	*5*
7 – 14 év	*5*
15 - 18 év	*8*
19 – 35 év	*17*
36 – 65 év	*16*
66 -	*11*
Veszélyeztetett objektumok száma	*1*
Helye: Tiszapüspöki Gróf F. u. 7.	
A kitelepítésre rendelkezésre álló idő (a modell számítása alapján)	*22.00 óra*
A kitelepítésre rendelkezésre álló idő (az Igazgatóságon rendelkezésre álló egyéb információk alapján)	*18.00 óra*

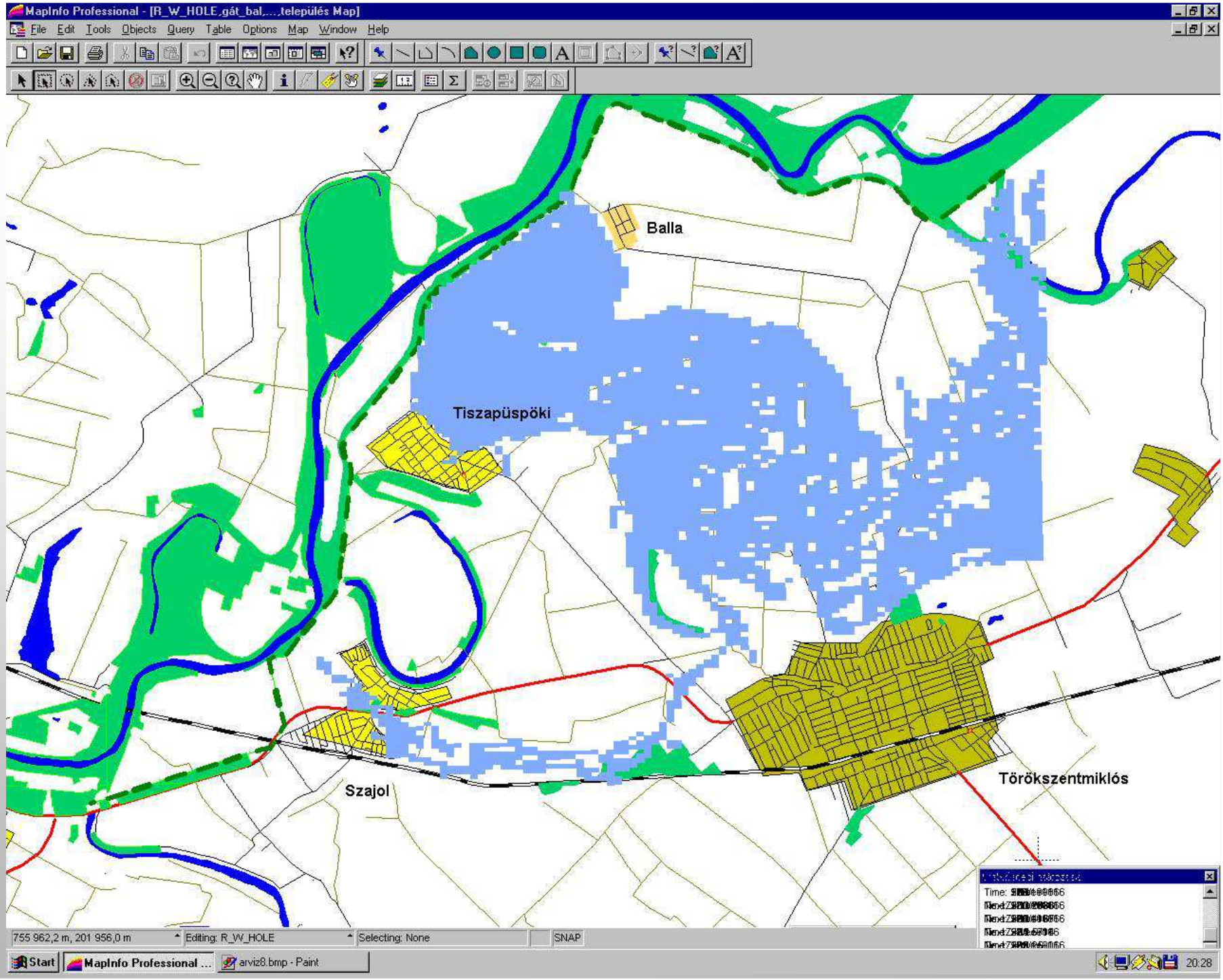
The 18th hours



The 24th hours



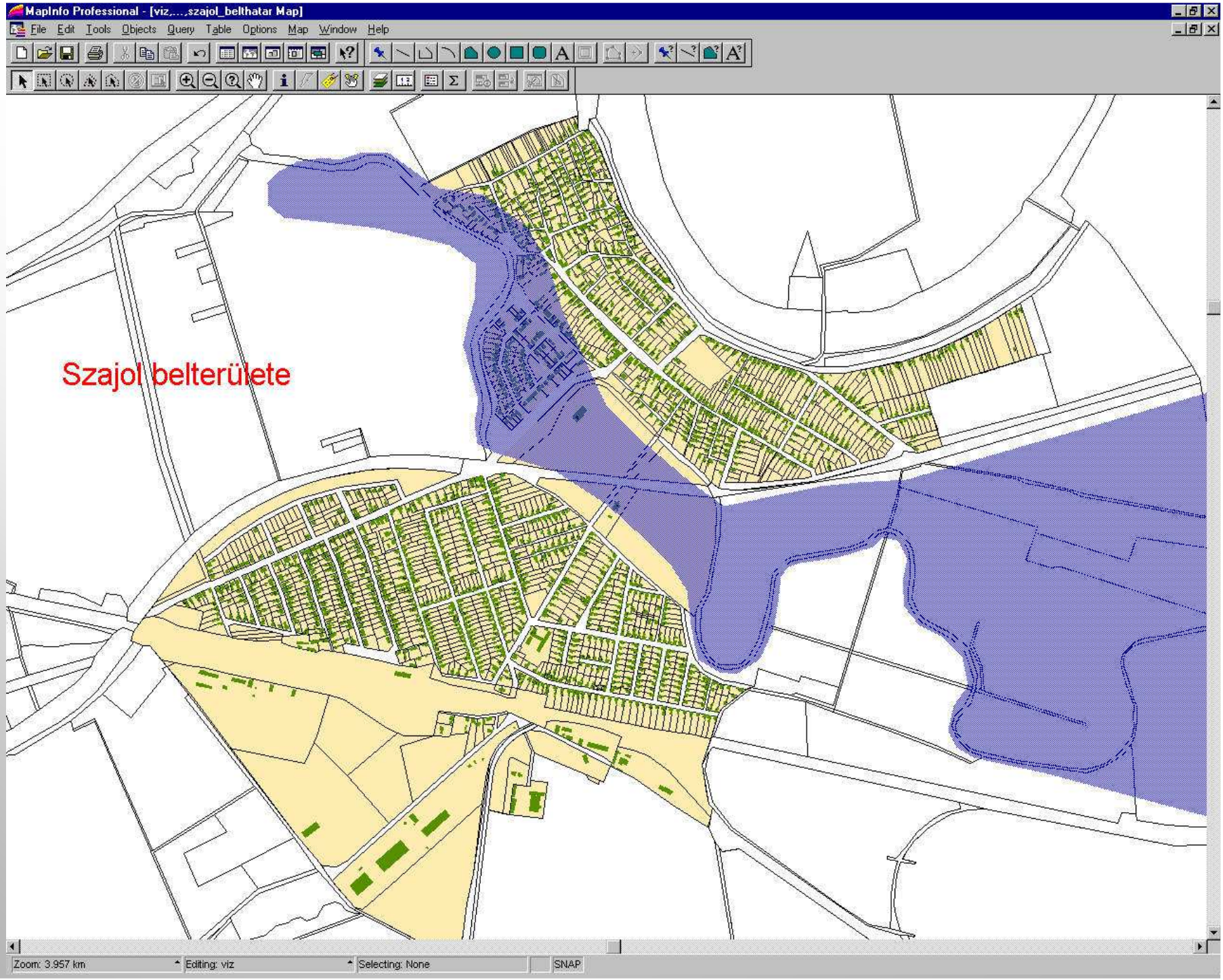
The 32th hours



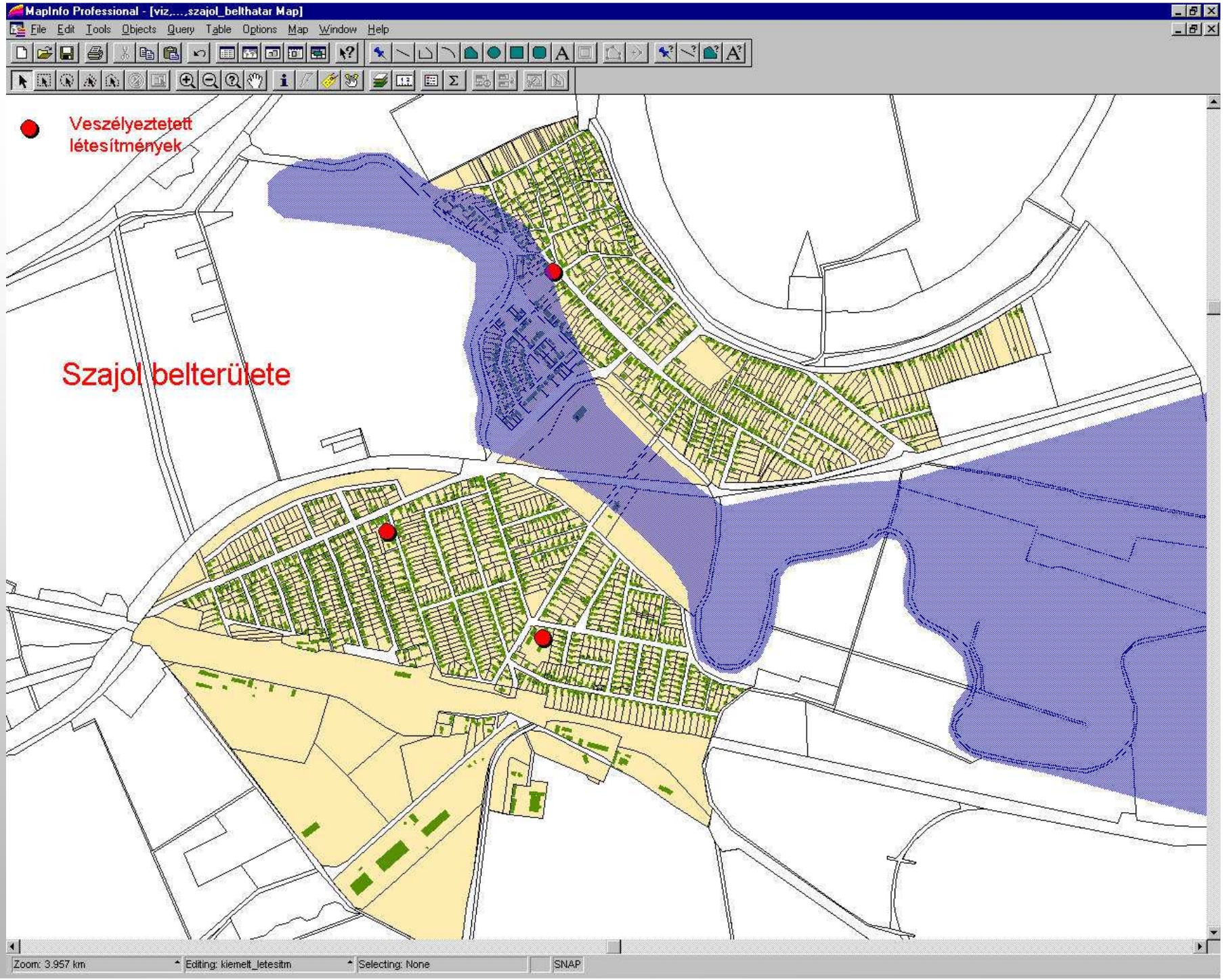
A pilot területen az árvízi modell program segítségével előállított információk

A töltésszakadástól eltelt idő		*32 ó*
A vízfelület nagysága		*1[illegible] k*
Az elöntött területen az átlagos vízmélység		*[illegible] cm*
Maximális vízmélység		*[illegible] cm*
Helye		*Nagypüspöki észak*
GPS koordinátája		*47.22.53; 20.22.17*
Az elöntés által érintett objektumok száma Szajolban		*39 db*
Lakóépületek száma		*36 db*
Címük: Szajol	*Kossuth L. u[illegible] páratlan oldala*	
	Petőfi S. u[illegible] páratlan oldala	
	Arany J[illegible] páratlan oldala	
Az érintett épületekben állandó lakcímmel rendelkező lakók száma		*153 fő*
Életkoruk	*0 – [illegible] év*	*13*
	[illegible]	*15*
	[illegible] 18 év	*11*
	19 – 35 év	*43*
	36 – 65 év	*48*
	66 -	*23*
Érintett objektumok száma		*3*
Helye: Szajol	*Kút út 7.*	
	Két utca 23.	
	Négyesi utca 17.	
A kitelepítésre rendelkezésre álló idő (a modell számítása alapján)		*7.00 óra*
A kitelepítésre rendelkezésre álló idő (az Igazgatóságon rendelkezésre álló egyéb információk alapján)		*5.30 óra*

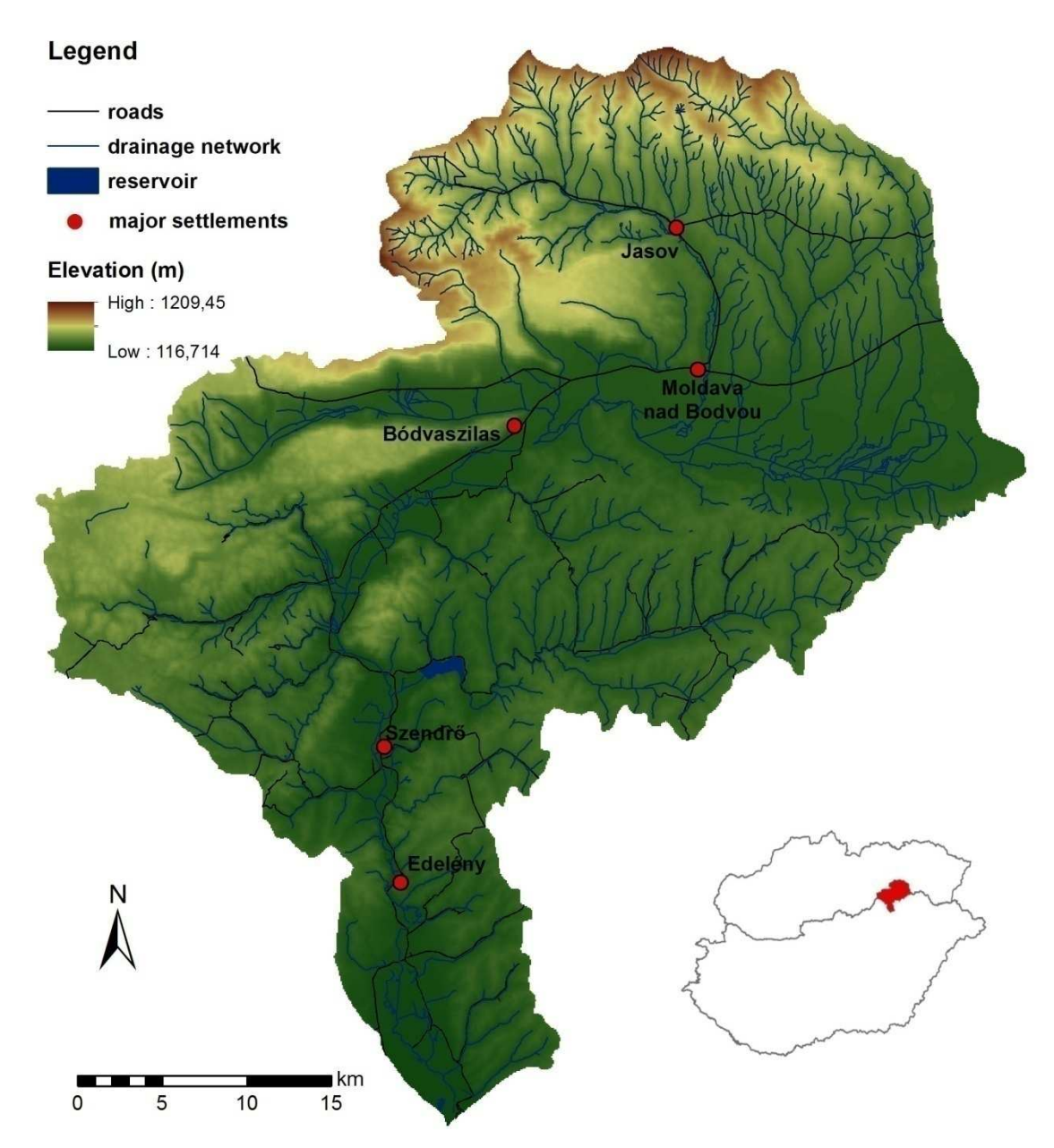
Szajol inside



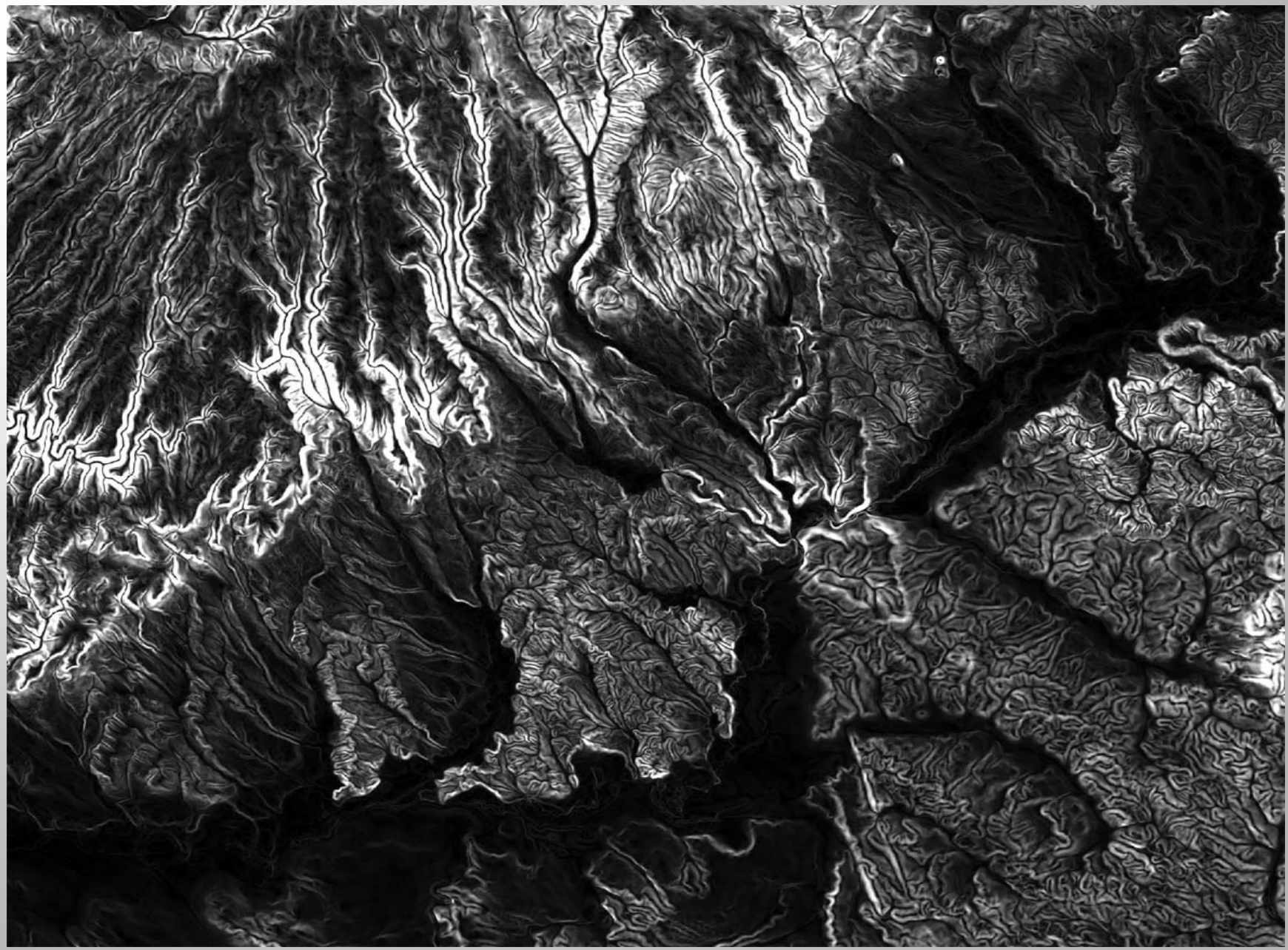
Special objects

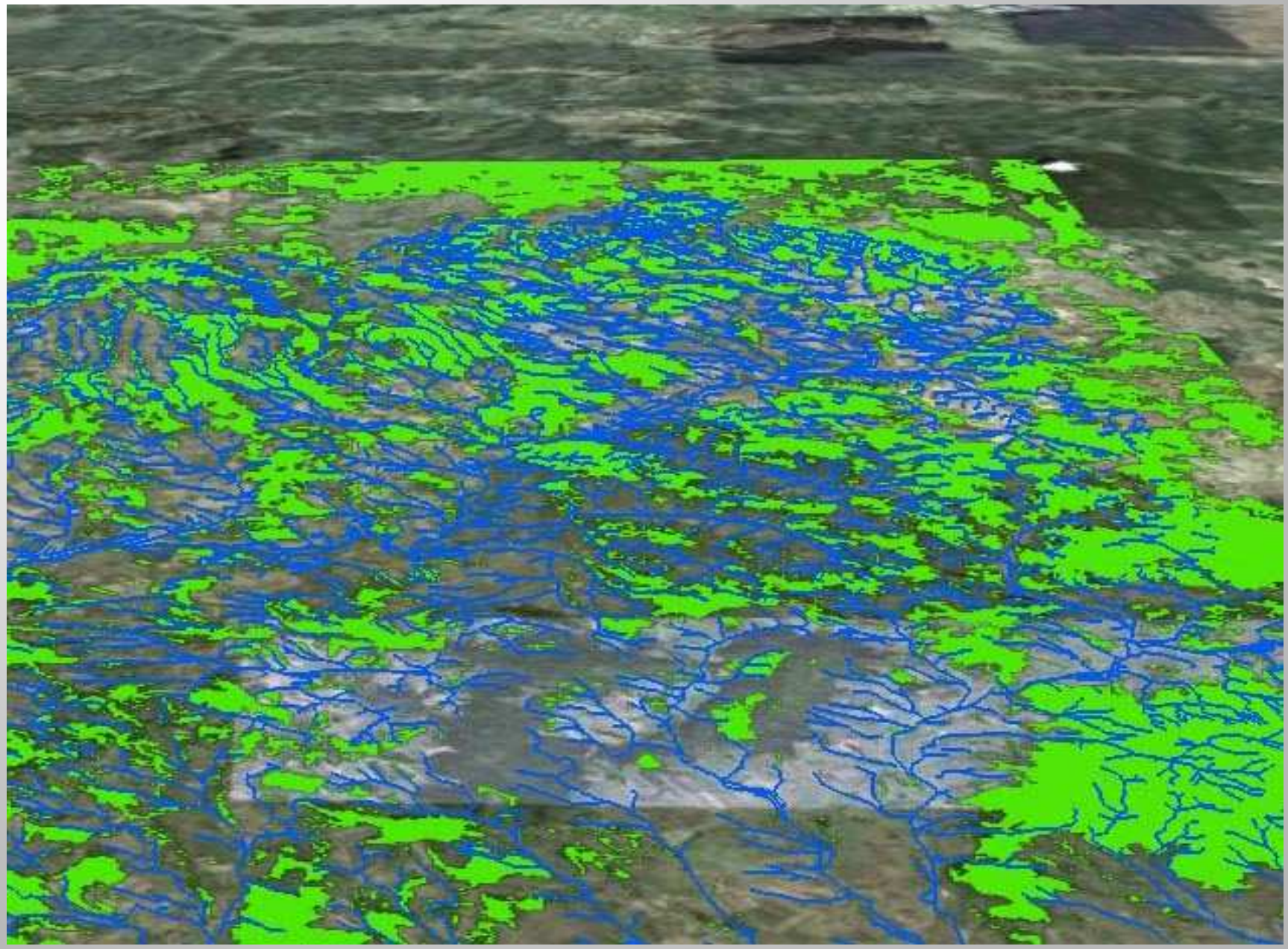


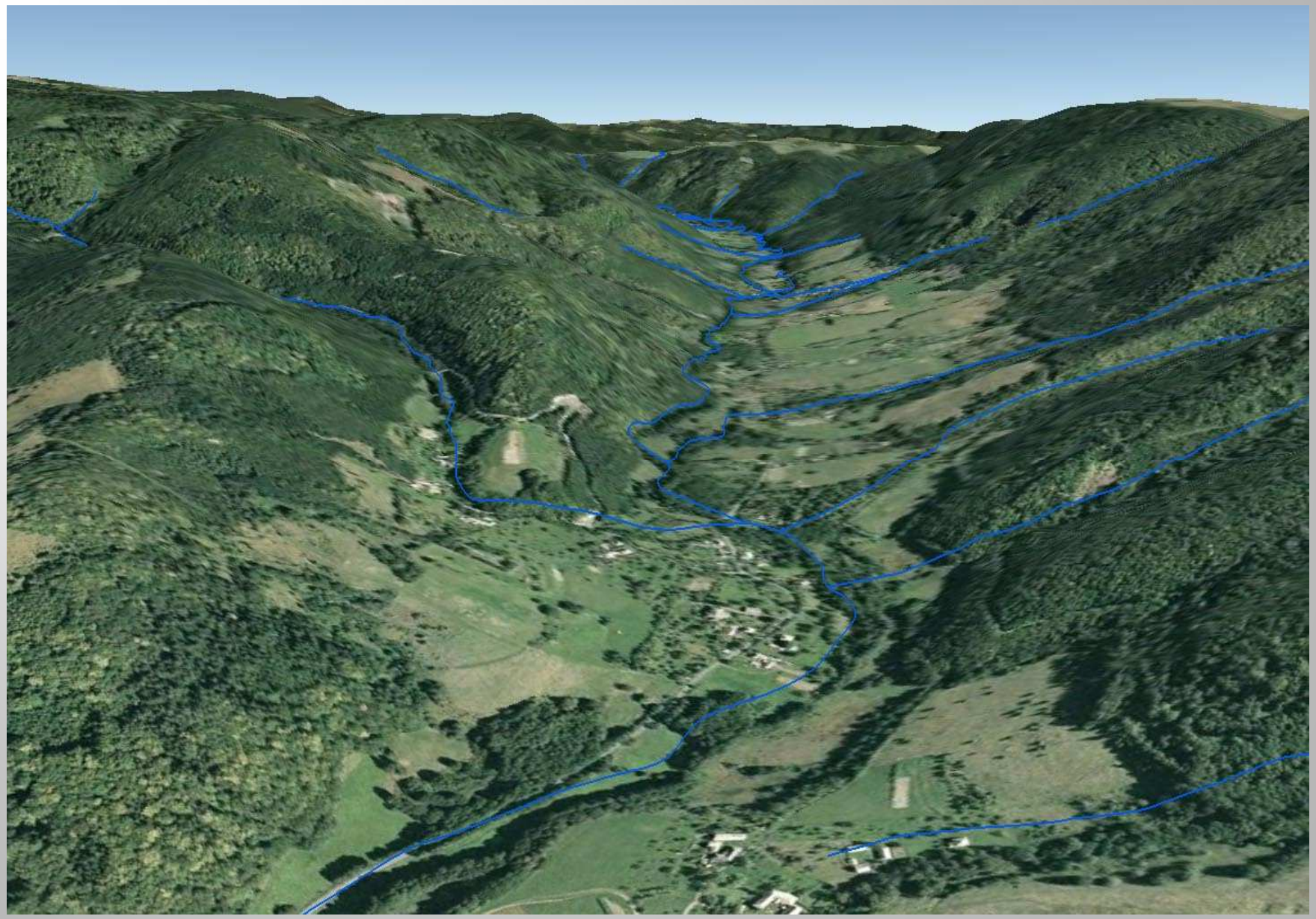
Location of the Bódva catchment




IPEL
IPOLY







Harmonize

- The mapping bases
- The test criterias
- The industry standards
- The datas, data systems

Activity – Interpretation

- Resources and potential environmental impacts
- The environment-oriented features found in the basic elements of re-evaluation
- Water quality assessment in accordance with aspects of the Water Framework Directive
- Characterization of protected areas

Activity – Analysis

- Fundamentals of the environmental characteristics of the collection and processing
- The test field and changes in land use analysis
- The test environment uses the characteristics of the area allowed the collection and processing

Effectiveness of the EU Framework

EU aspirations

Sustainable environment and economy

Related effort

- **Rural economic development**
- **Open planning processes (acceptance, financing)**

Thank you for your attention