The Hungarian-Ukrainian joint Upper-Tisa flood development program, hydrologic and hydraulic modeling

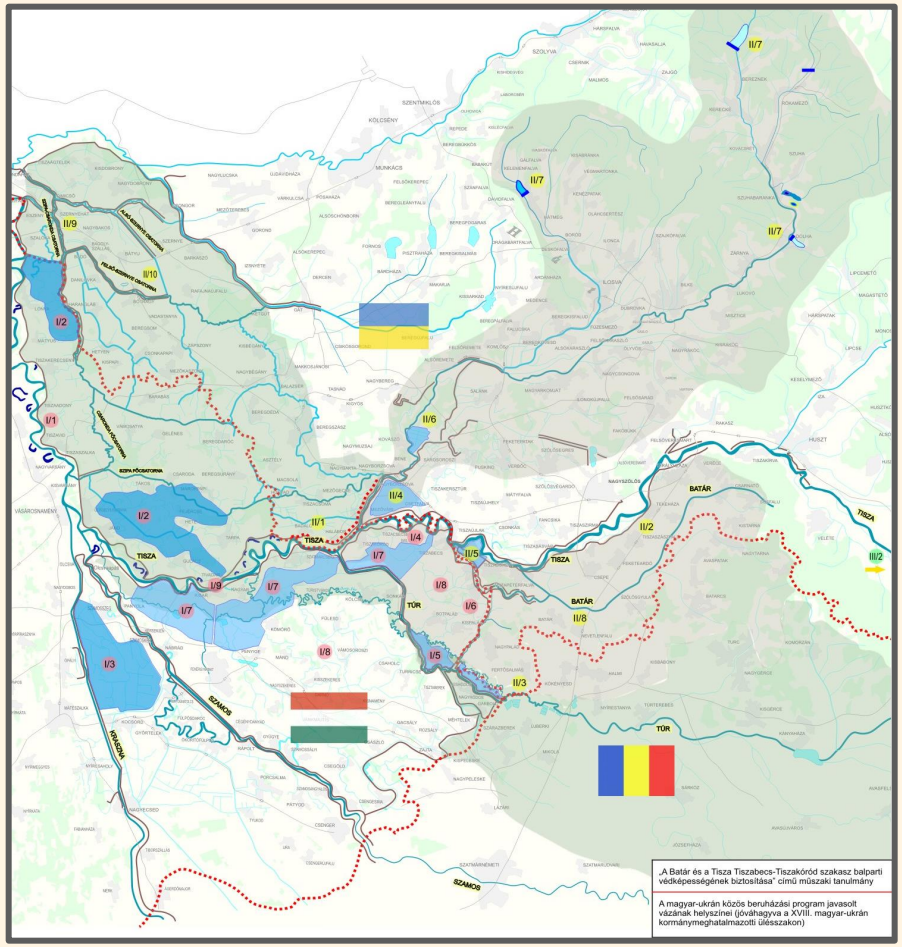
Experts of the joined program on Hungarian side:

Lajos Illés, project Manager, Viziterv Environ
János Szabó, leader of modeling, Hydroinform
Gábor Réti, engineer, Hydroinform
Zoltán Tóth, leader of monitoring
Márton Bálint, engineer, Viziterv Environ

Experts of the joined program on Ukrainean side:

Dubljak Vitalij, project Manager, Ukrvodprojekt
Velicsko Szvetlana, engineer, Ukrvodprojekt

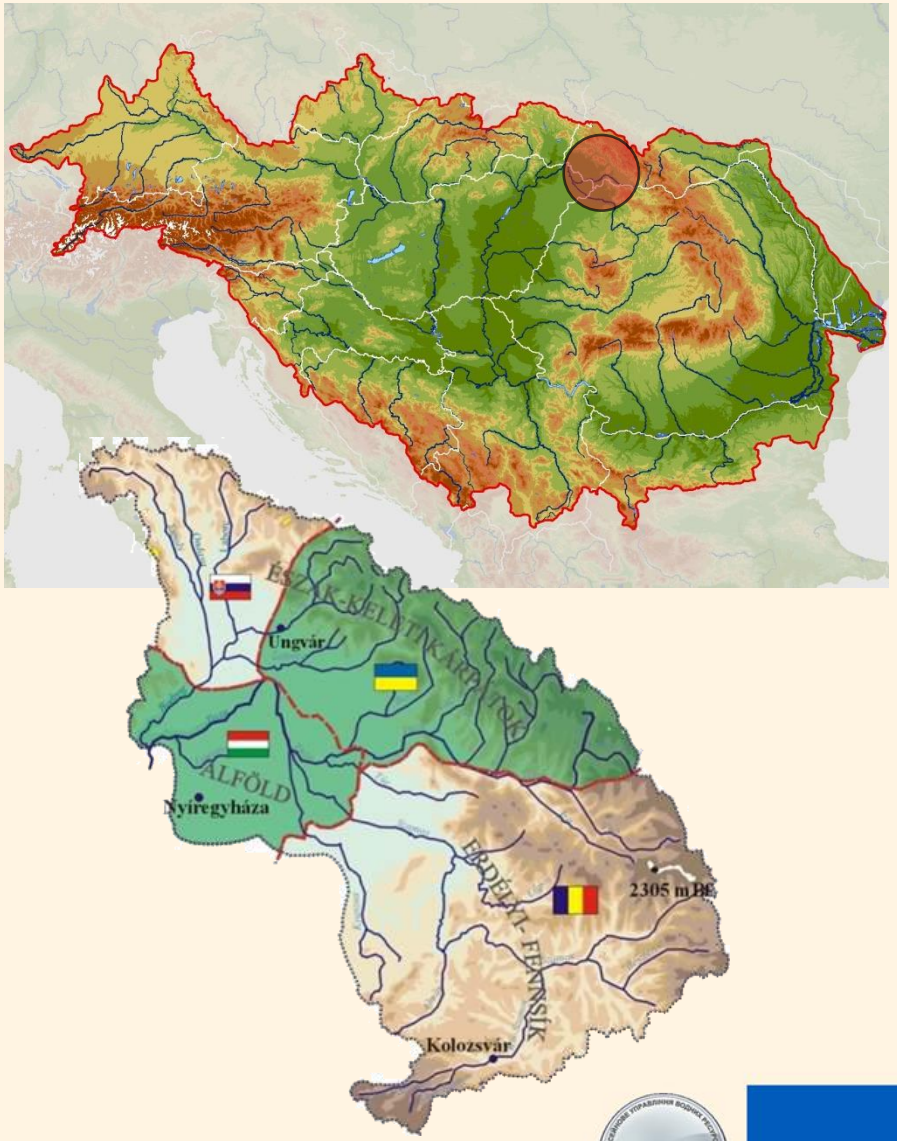
The Hungarian-Ukrainian joint Upper-Tisa flood development program, hydrologic and hydraulic modeling



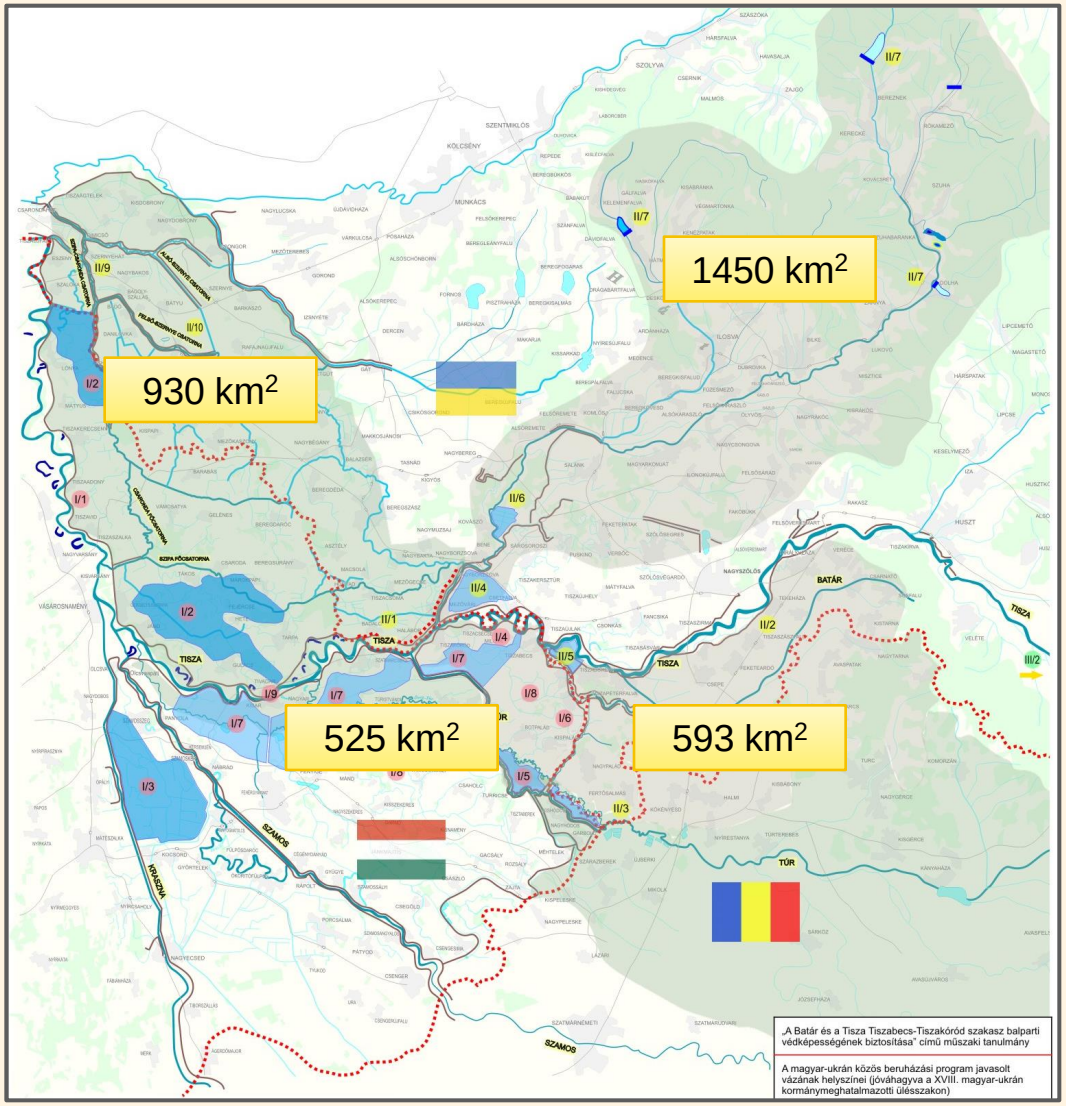
12 September 2013, Budapest

Location of the development program

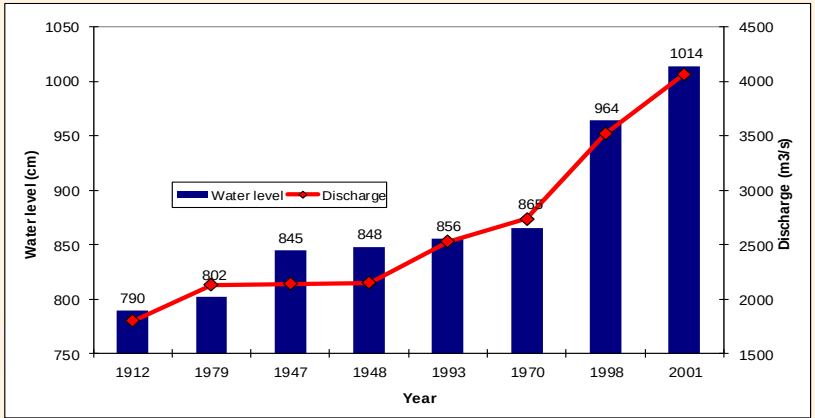
(border region of 4 countries)



Area affected by the development program



Hydrological reasons for the joined development program



The main topics of the presentation:

- Results of hydrologic-hydraulic modeling methods serving as basis to the joint Hungarian-Ukrainian flood management development program
- Brief summary of the joint Hungarian-Ukrainian flood management development project
- Further hydrologic monitoring development planned within the development program
- How to go on in the Danube strategy

Diverse primer surveys in the past 5-10 years

- Changing of forestation,
- Impacts of foreign water storage and embankment development,
- Complex evaluation of the 1995, 1998, 2001 floods (Changes of the river bed and foreshore)
- Hungarian Academy of Sciences models
- Hydrologic analysis of specific designing work

Analysis of Design Flood Level methodology, specific calculations

(Charged on the Swiss Hungarian cooperation fund, within the frame of the ENPI joint Hungarian-Ukrainian project)

- Weather generator Complex Hec-ras Díwa modelling
- Conventional hydrologic statistical analysis
- Using Abscissa methodology

Joint Hungarian-Ukrainian technical planning activities (within the ENPI joint Hungarian-Ukrainian project)

(Charged on the Swiss Hungarian cooperation fund, within the frame of the ENPI joint Hungarian-Ukrainian project)

Working out, harmonization and coordination of structural solutions

Joined Hungarian-Ukrainean flood development concept

Basic principles and concepts of the joined Hungarian-Ukrainean flood protection developments

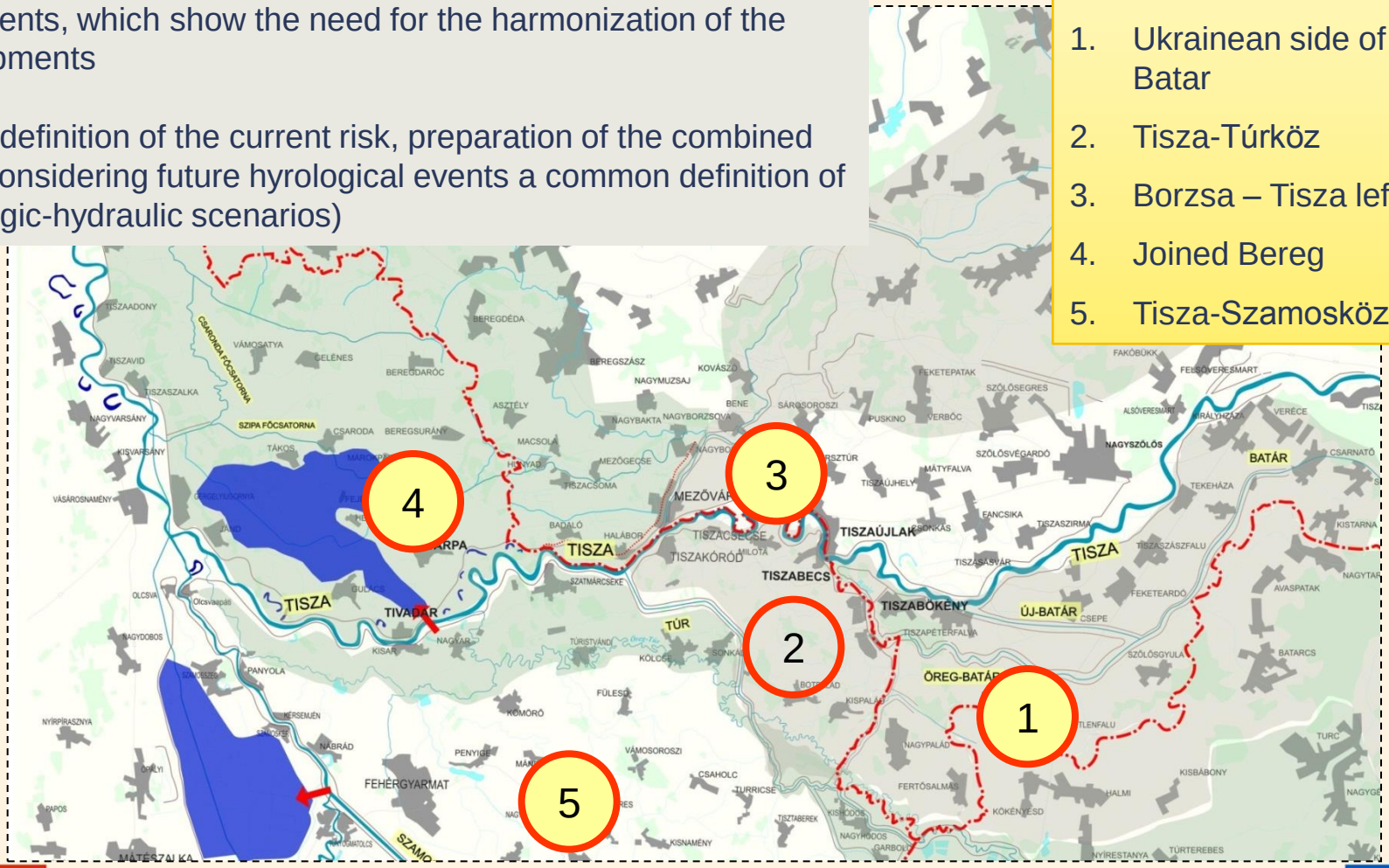
1. To be in line with the EU Flood Directive (based on trans-boundary hazard mapping)
2. To be fitted to the Hungarian and Ukrainian national flood development strategies and programs
3. To follow a complex approach (using structural, non-structural methods)
4. To integrate into regional development ideas
5. To take advantages of current state of the art methods

Taking into account the Eu Flood directive guidelines: common hazard mapping was implemented for the transboundary catchments, which show the need for the harmonization of the developments

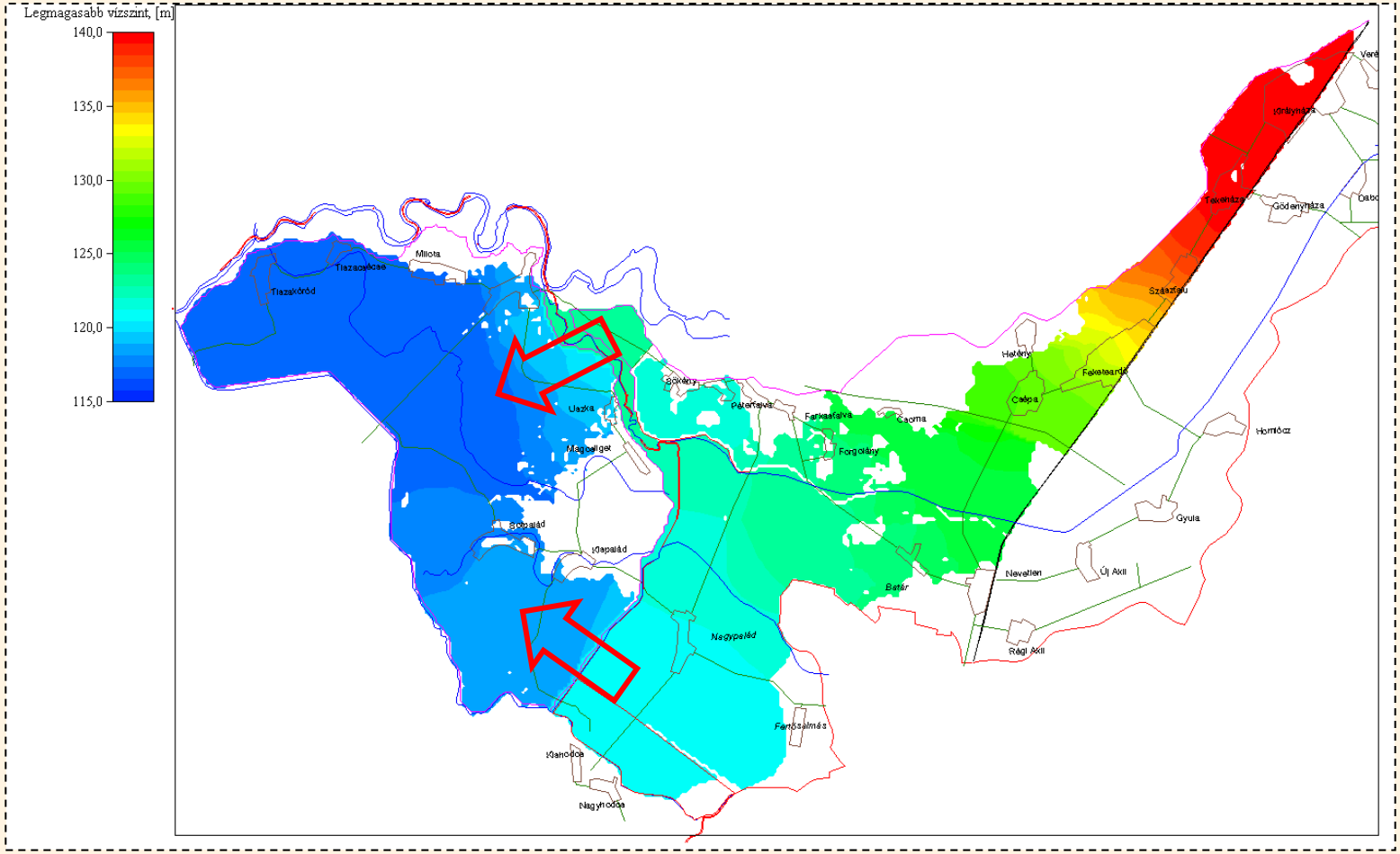
(joined definition of the current risk, preparation of the combined DTM, considering future hyrological events a common definition of hydrologic-hydraulic scenarios)

Five examined shared subcatchments

1. Ukrainean side of Batar
2. Tisza-Túrköz
3. Borzsa – Tisza left dike
4. Joined Bereg
5. Tisza-Szamosköz

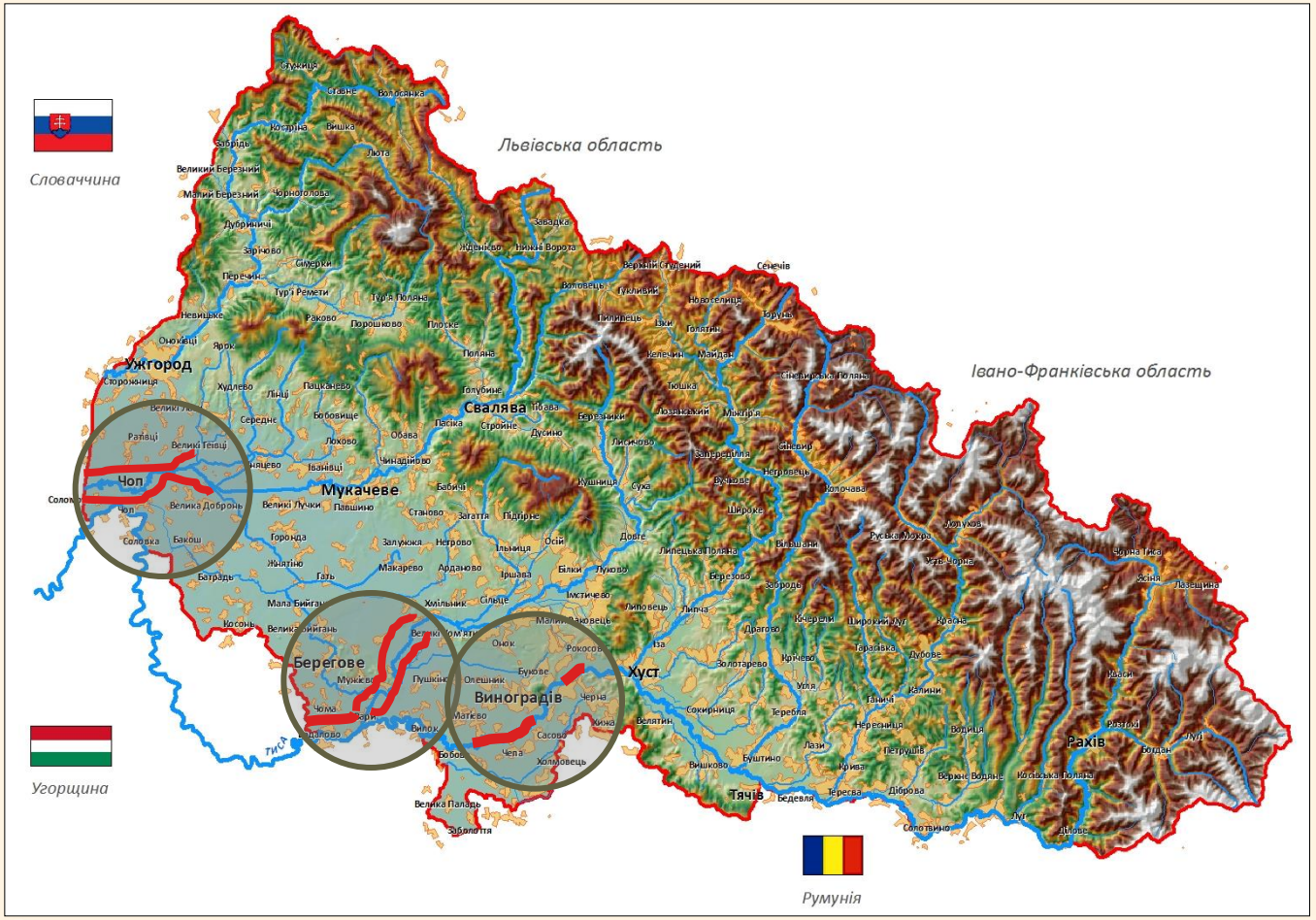


Example: Preliminary hazard maps for the Tisza-Batár-Túr

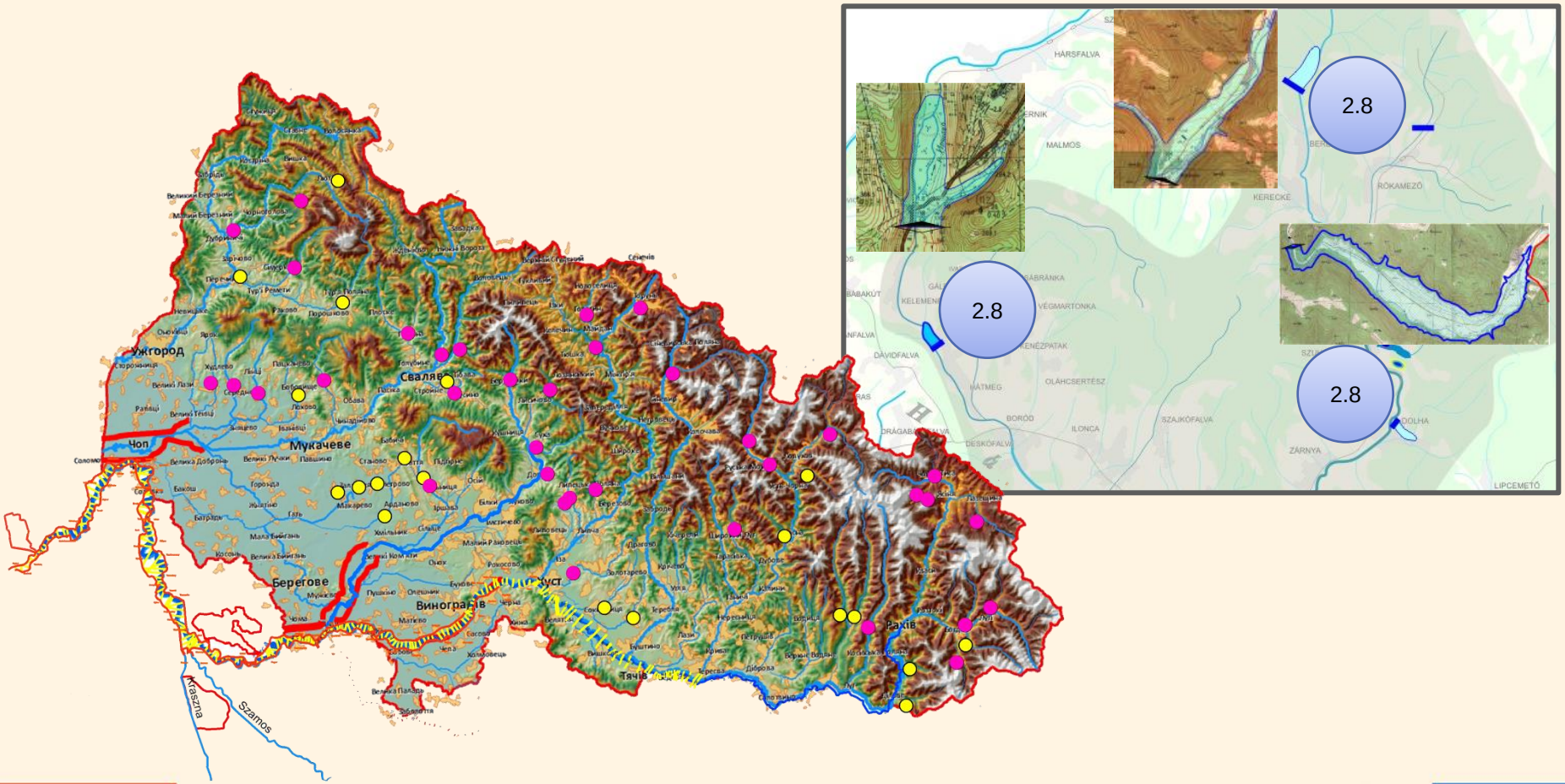


Ukrainean elements of the joined flood development program
(The foundations were laid in 2011-12 in the frame of a joined ENPI project, where the flood protection development concept of 2011 was examined)

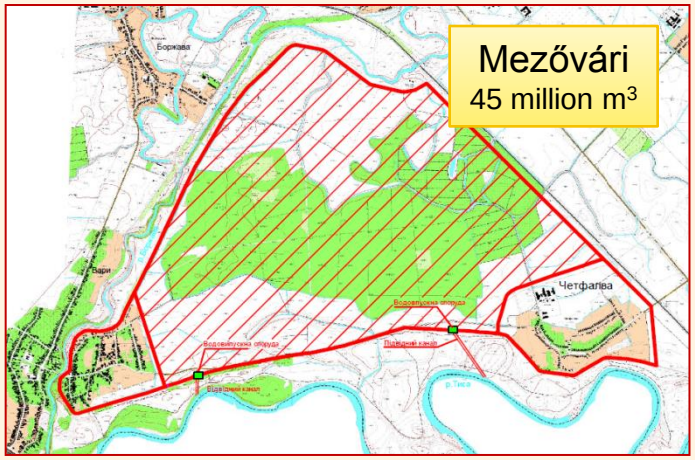
Flood protection embankment improvements on the Ukrainean side, but of common interest

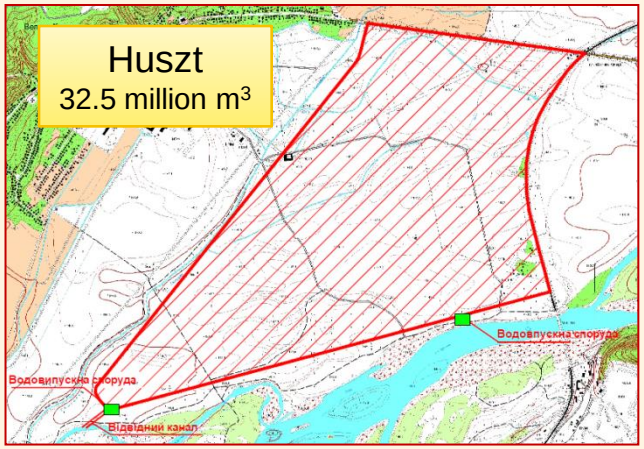


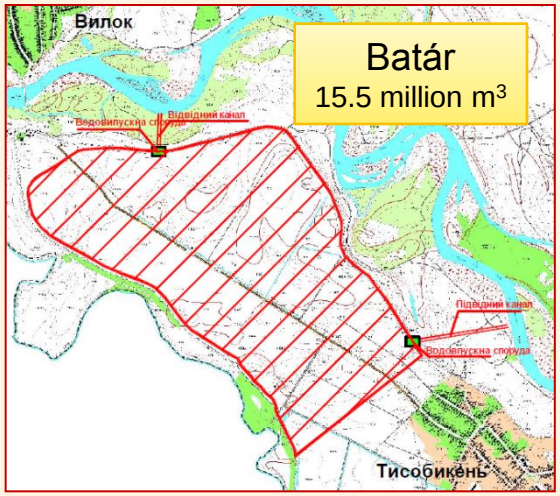
Elaboration of plans for mountain flood retenetion reservoirs in the Brozsa catchment (Zagattya /Hátmeg/, Bereznyiki /Bereznek/, Bronyka /Szuhabaranka/)

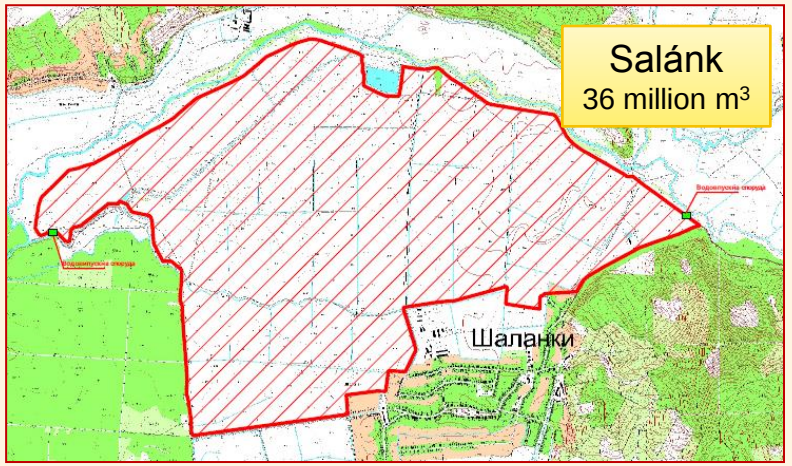


Possible Ukrainean flood retention reservoirs



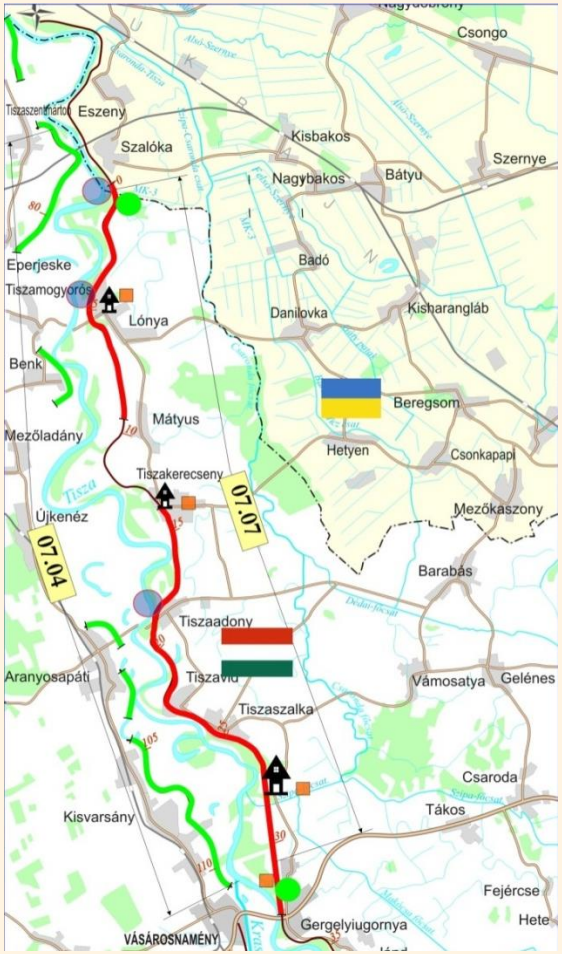


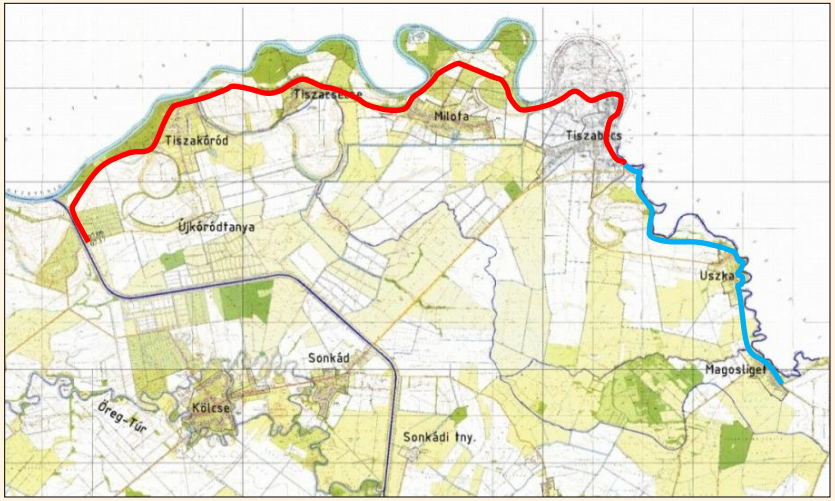


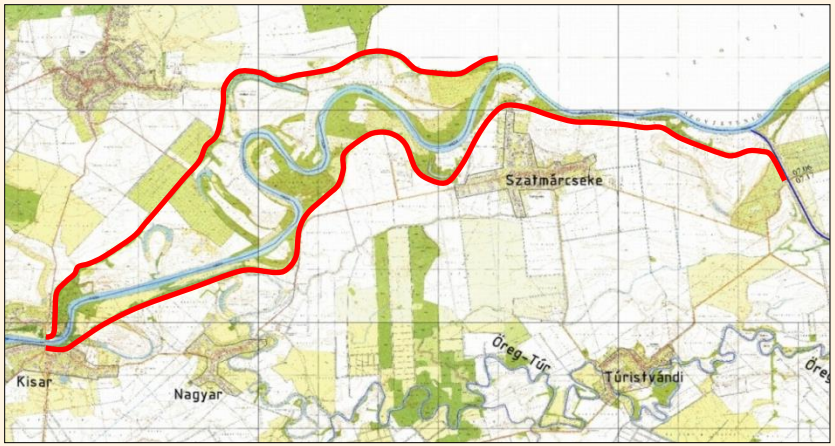


Hungarian elements of the joined flood development program

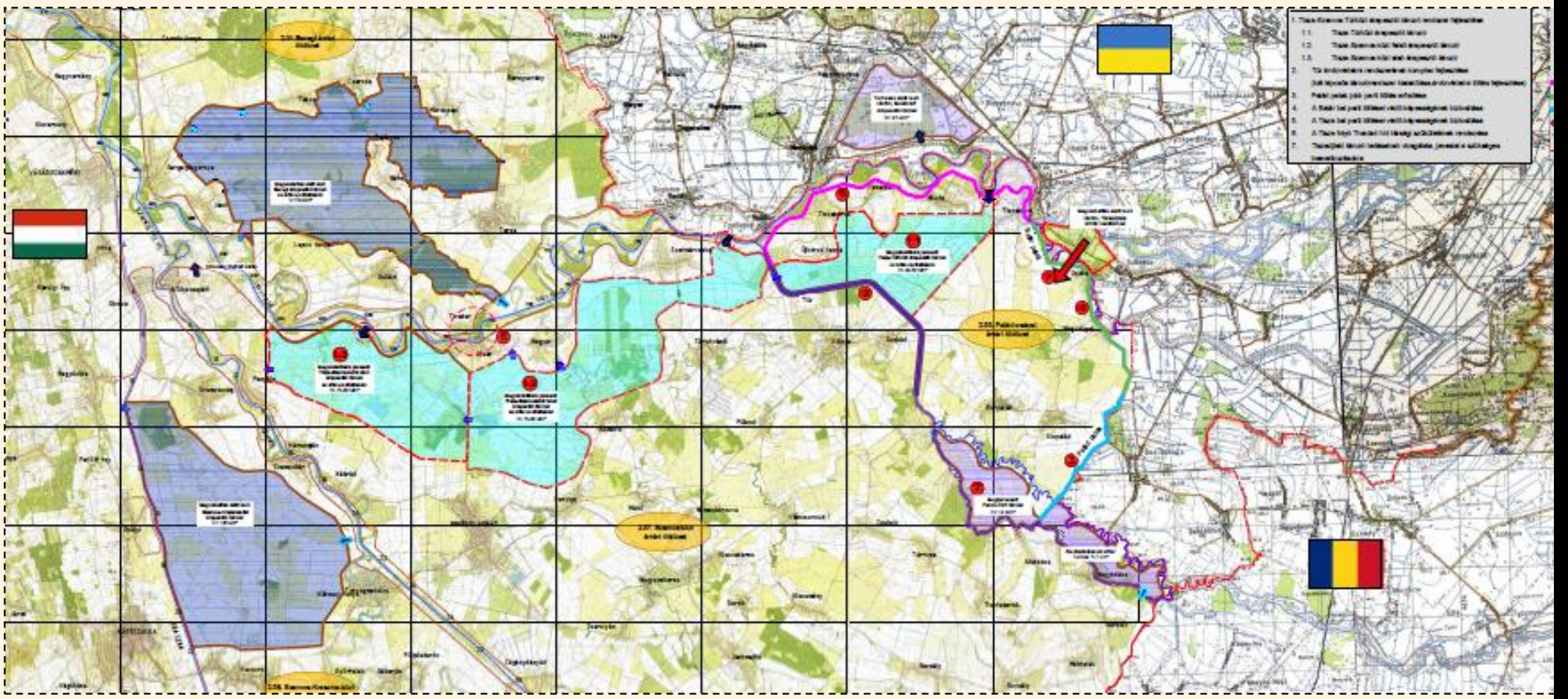
Development of the existing embankments



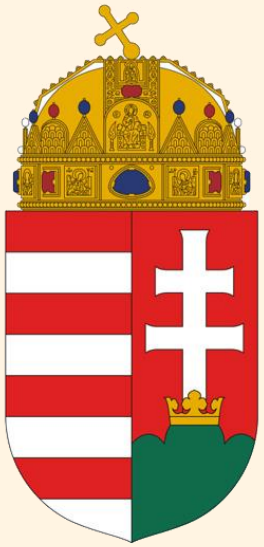




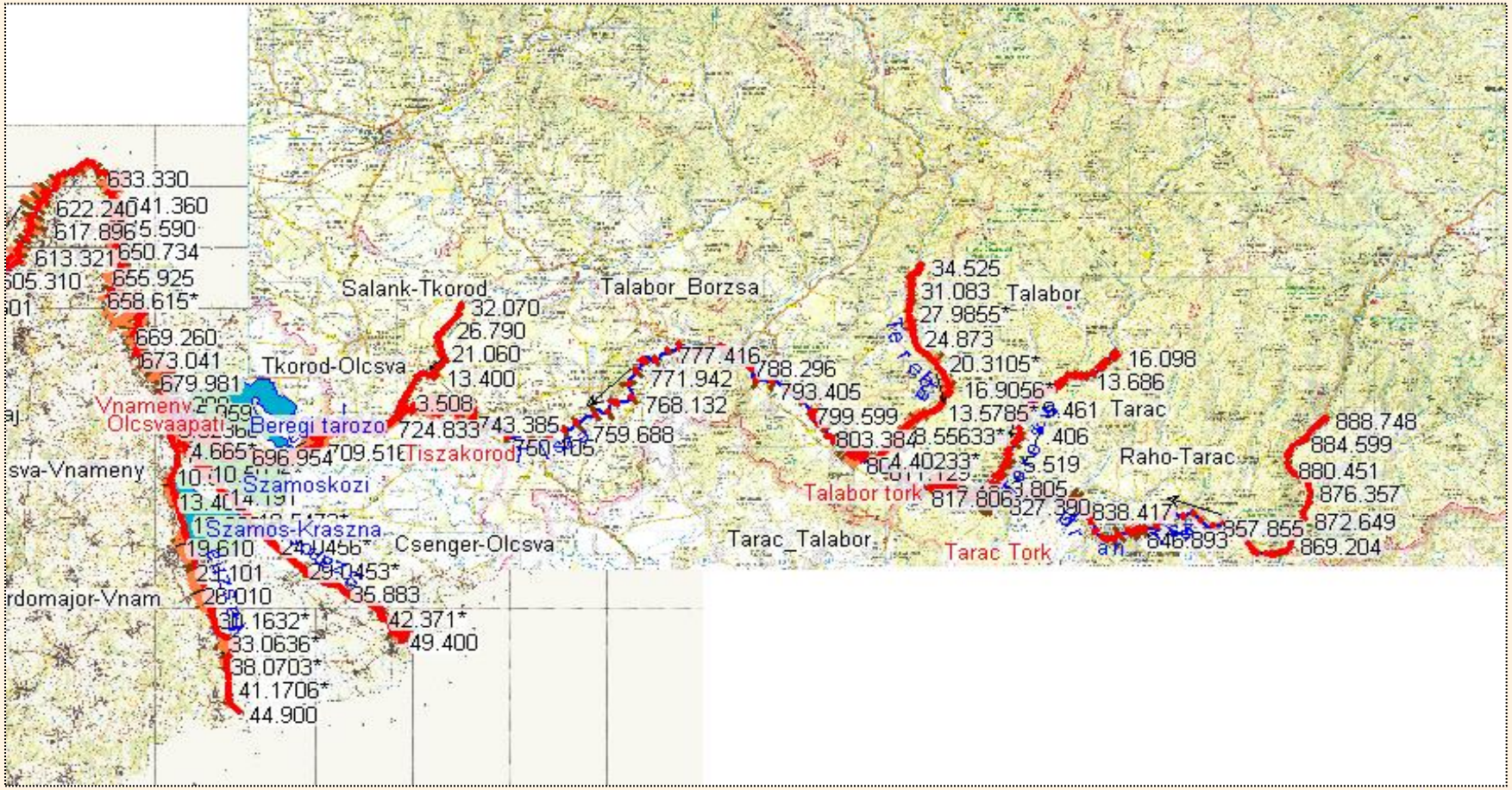
Tisza-Szamos-Túr interregional flood retention reservoir system, and flood plain revitalization, with a total volume of 150-180 million m^3

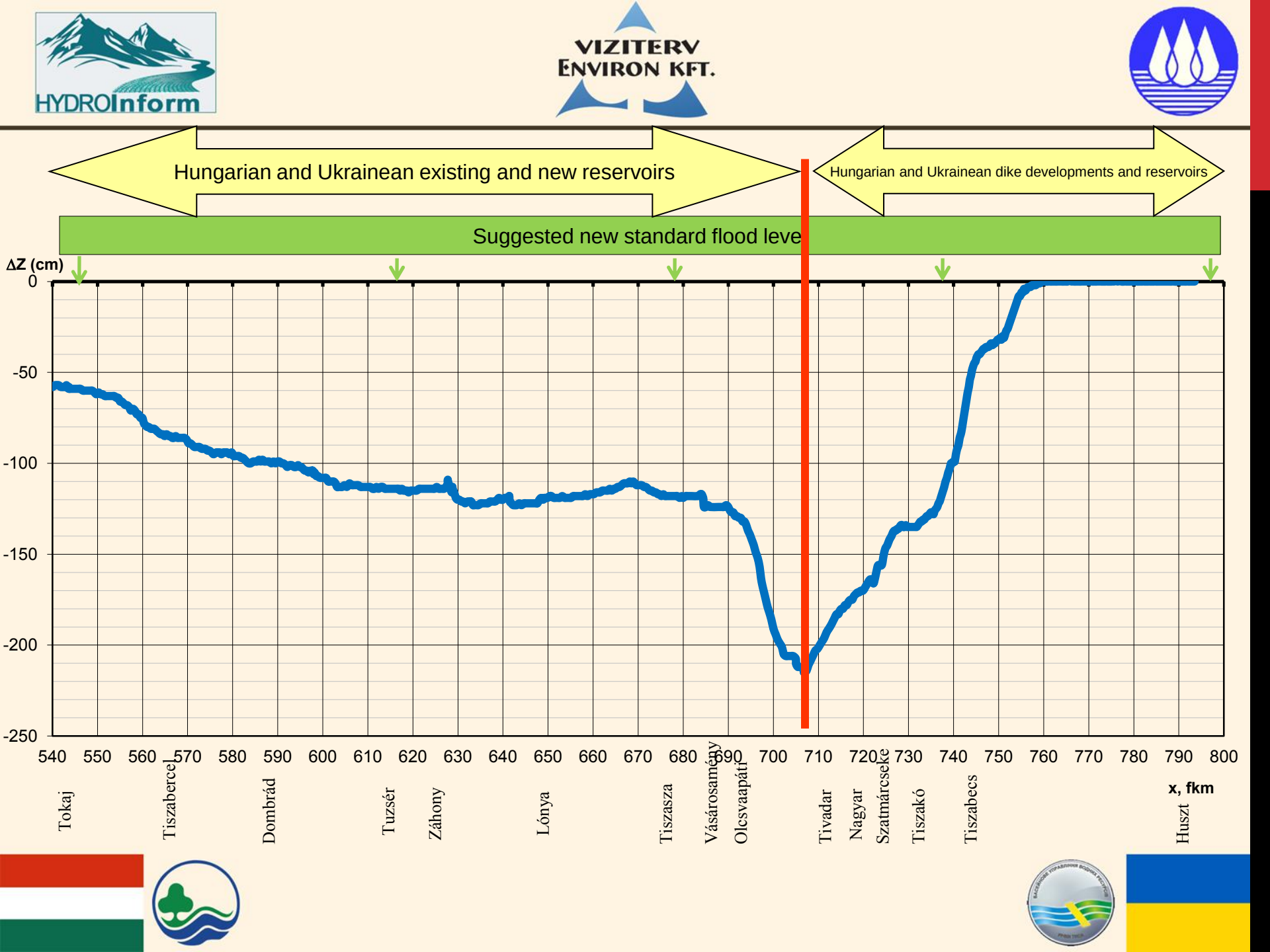


Hydrological monitoring developments, affecting both countries



For the impact analysis of the flood retention reservoirs, we created a joined, complex river database




Hungarian and Ukrainean existing and new reservoirs
Hungarian and Ukrainean dike developments and reservoirs
Suggested new standard flood leve
ΔZ (cm)
0
-50
-100
-150
-200
-250
540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800
x, fkm
Tokaj
Tiszabercel
Dombrád
Tuzsér
Záhony
Lónya
Tiszasza
Vásárosamény
Olcsvaapáti
Tivadar
Nagyar
Szatmárcseke
Tiszakó
Tiszabecs
Huszt

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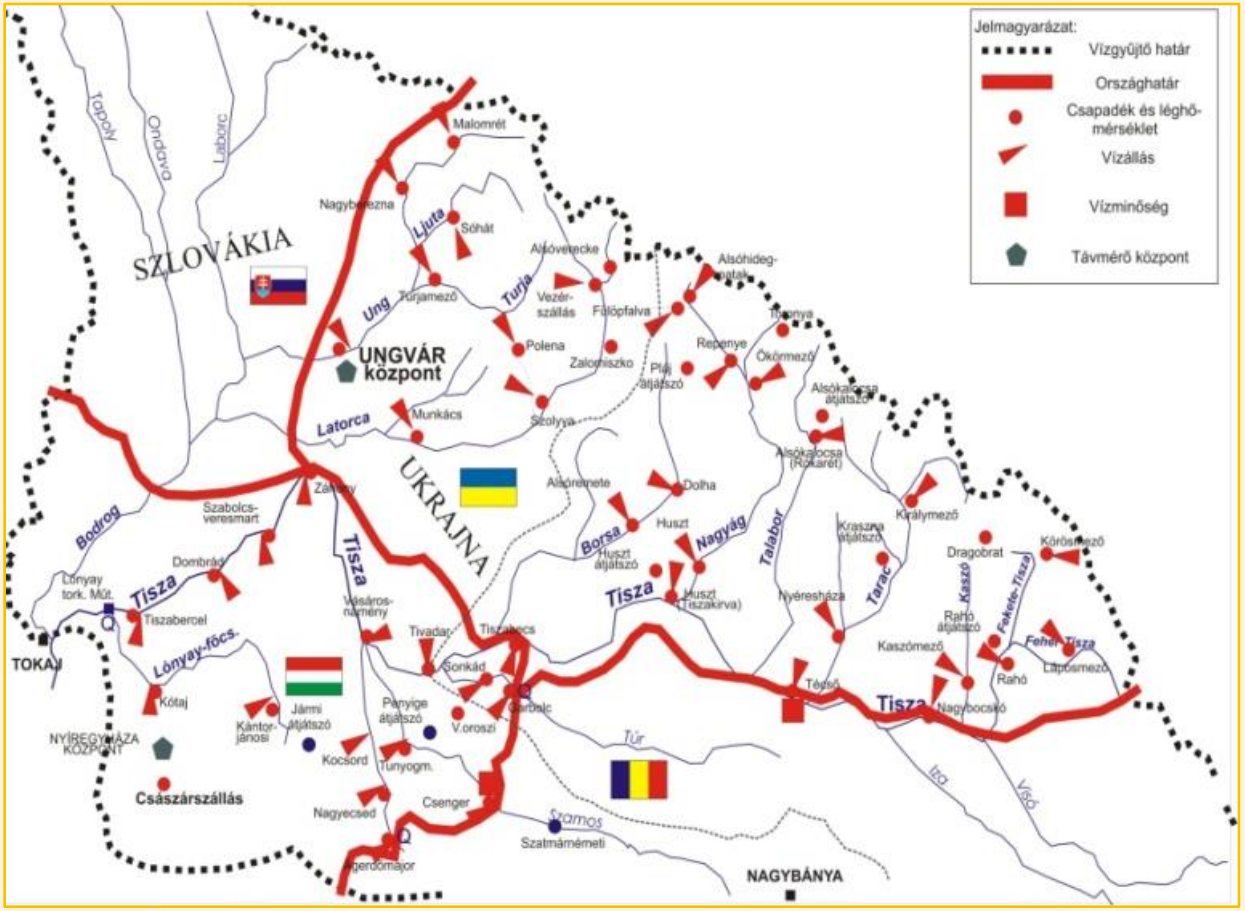
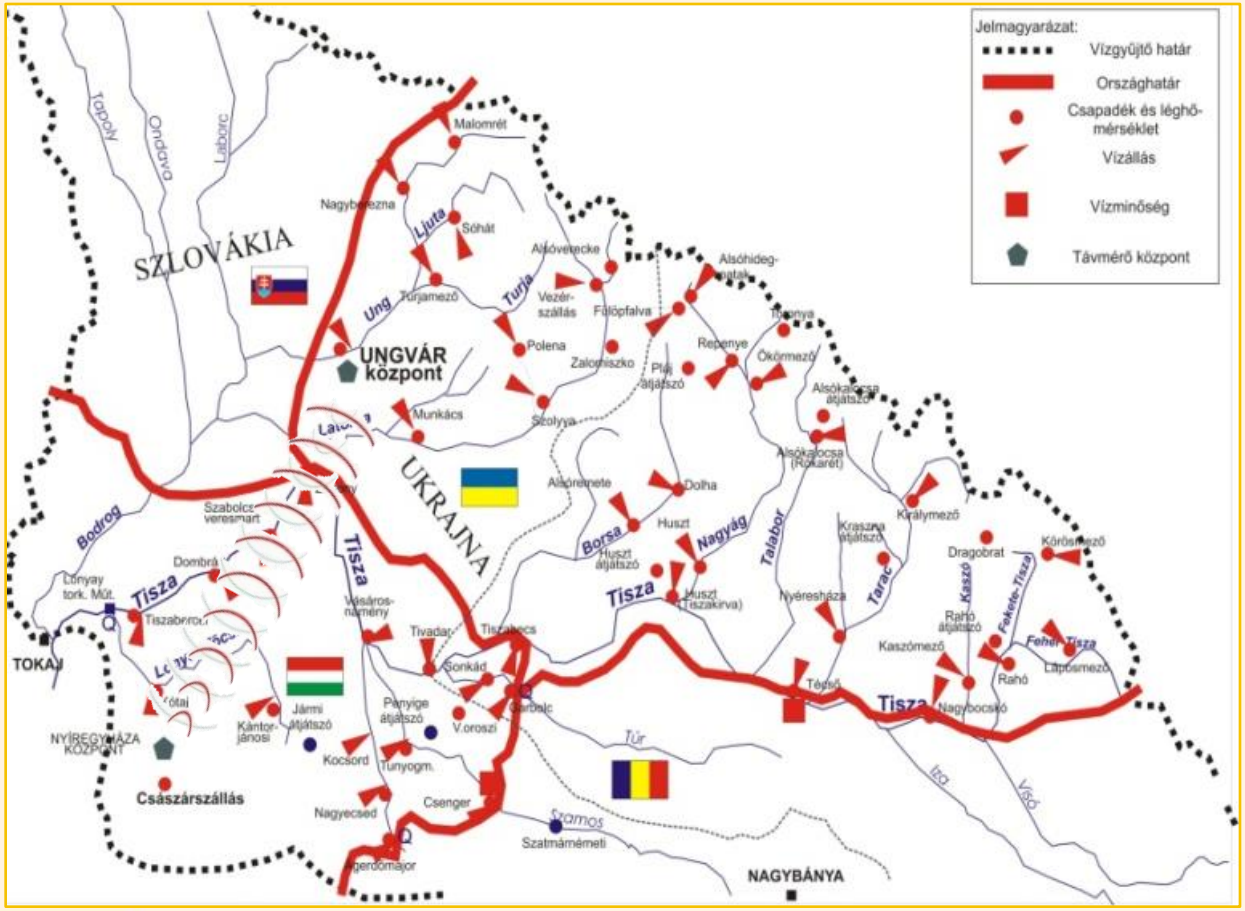
The joined development of the Upper Tisa joined hydrologic monitoring and flood warning system, a constantly developed 15 year old system



Characteristics:

- Planned and implemented based on strict guidelines
- 43 Hungarian and 46 Ukrainean stations
- Common interconnected microwaved based data transfer system
- Constand, shared operation
- Identical operations rules and quality control system
- Direct linkage to the early warning system (as of 2012 developments)

The joined development of the Upper Tisa hydological monitoring and flood warning system, as an important element of the joined program



Further development:

- 30-40 Ukrainean mountain station (alert system, increasing time lead, supporting runoff models)
- Further development of the common interconnected data transfer system,
- Extension of the radarmeteorological network to Ukrainean areas

In context of the Danube Strategy

- The Danube Strategy requires a transbountary approach
- Complex multilateral system
- Opportunity for accessing funds
- Multilateral approach needed to achieve larger scale results
- Professional content accepted in june 2013
- Approved by both of the Governments june 2012

Thank you for your attention!