

# Introduction of the selected pilot basin model

## 1<sup>st</sup> Stakeholders Workshop

Dávid Béla Vizi

Hydrology referent – Middle Tisza District Water Directorate

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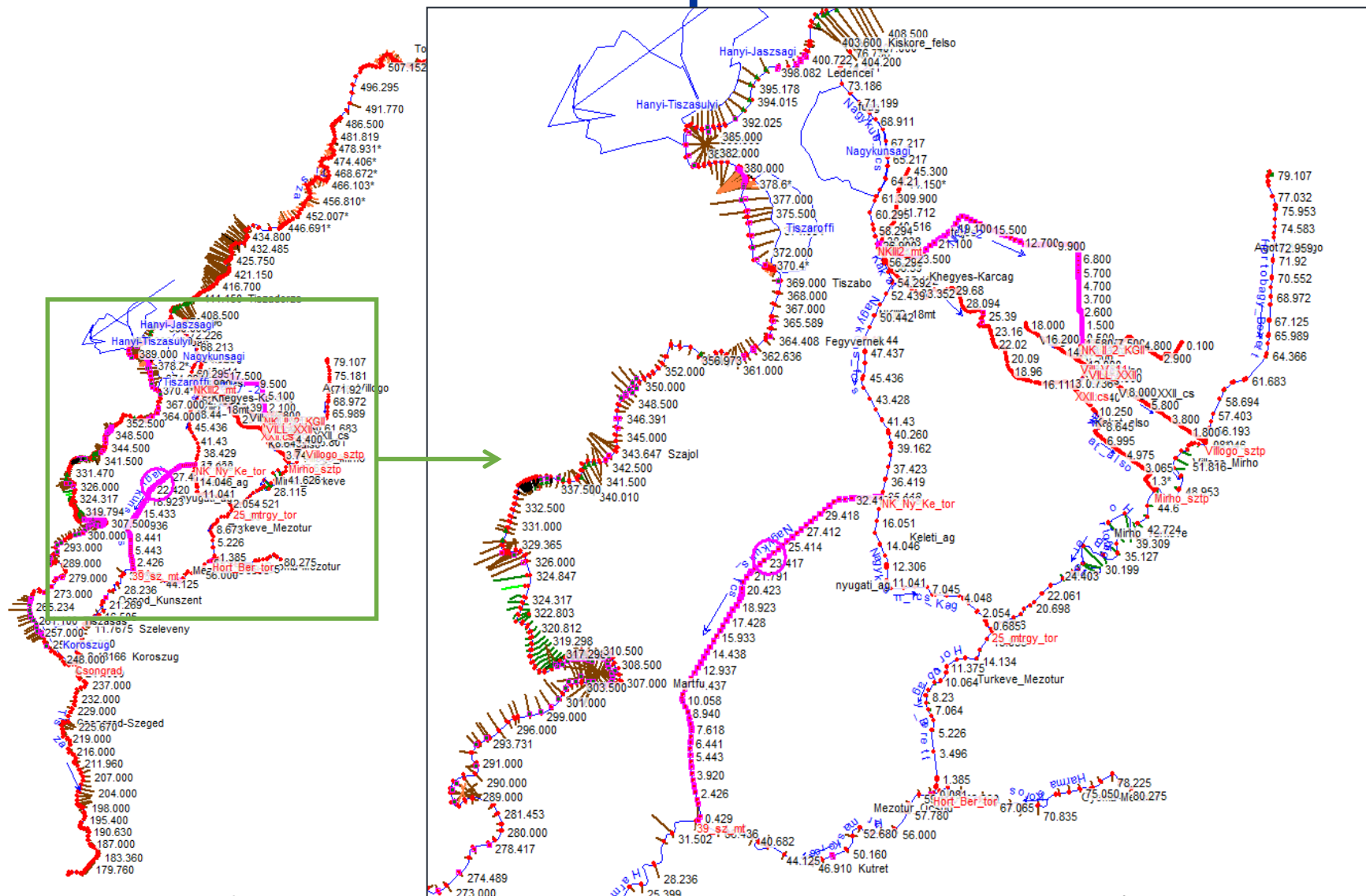
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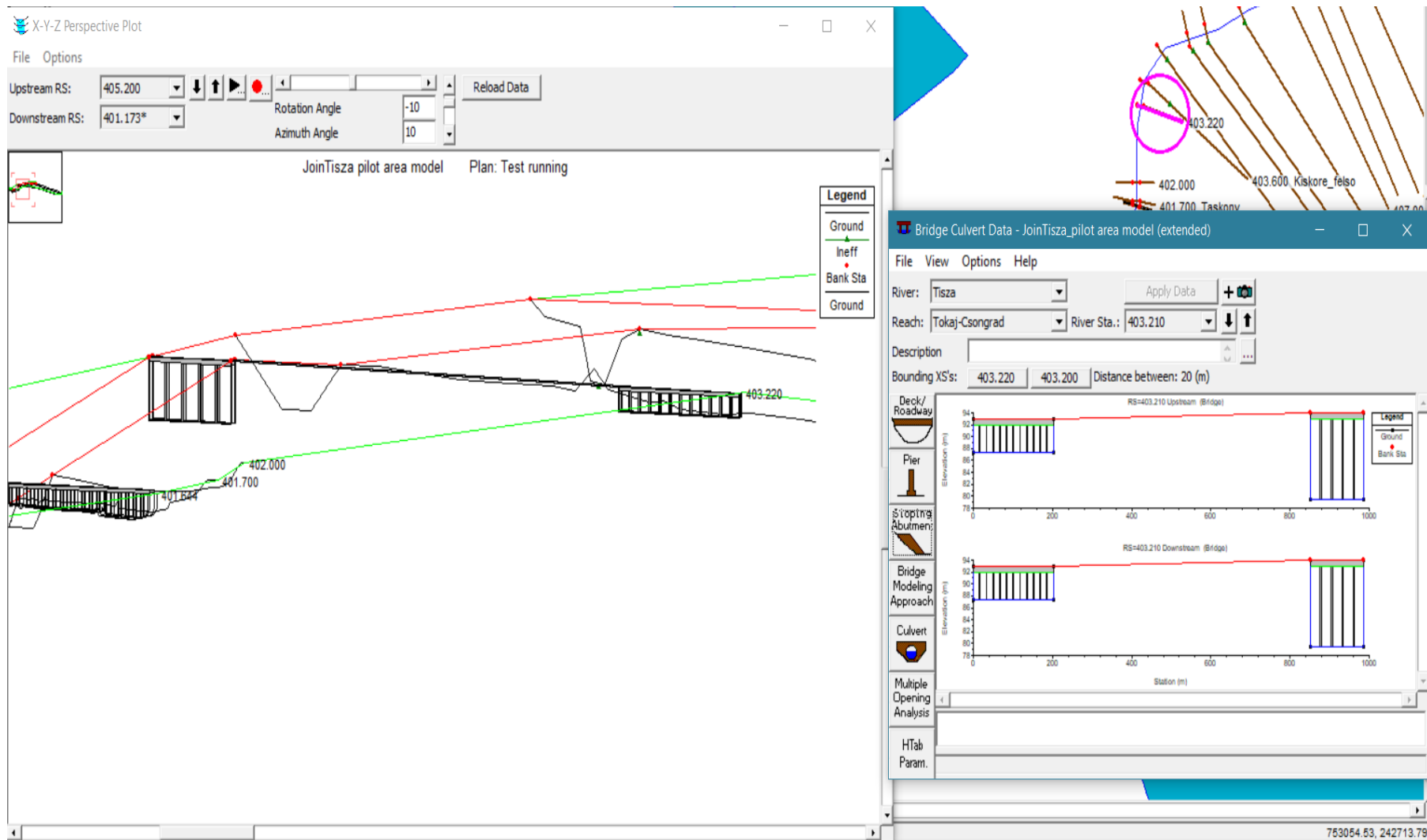
# Why HEC-RAS 1D?

- We have experience making 1D hydraulic model for water management purpose
- It is good for modeling complex systems → running fast, and easy to handle
- We have data for making scenarios

# Introduction of the pilot area model



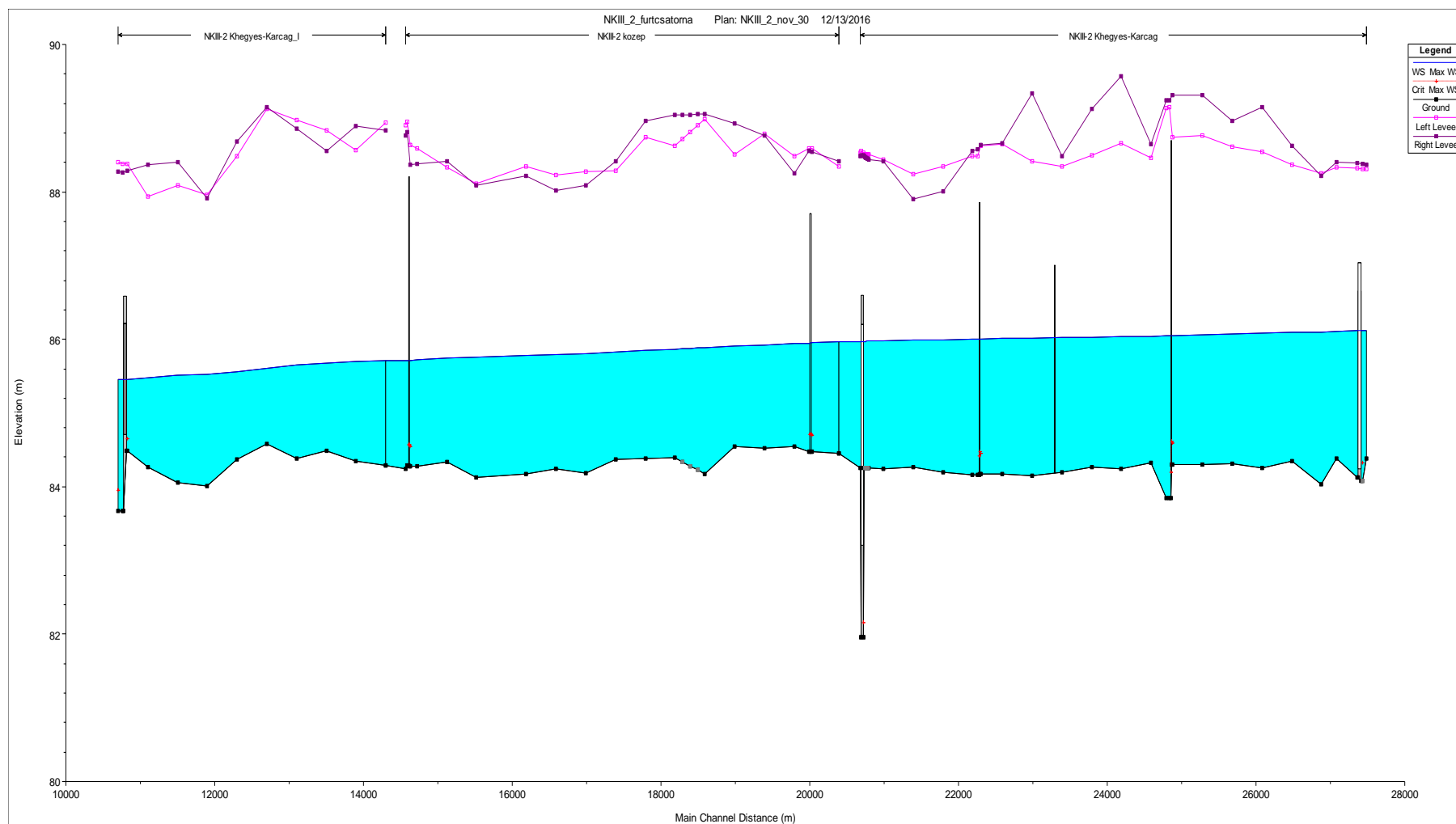
# Kisköre Dam in the pilot basin model



# Kisköre Dam in reality



# Longitudinal profile of the NK-III-2. irrigation channel



# Model inputs and parameters

- Flow timeseries
  - At Tokaj (Tisza), at Gyoma (Hármas-Körös), at Ágota (Hortobágy-Berettyó)
- Stage timeseries
  - At Szeged (Tisza)
- Operation of gates, dams, pump stations
- We used last year's summer data for testing and calibration

# Water management purpose

- Operation of locks, pumping stations can be modeled
- Water extractions can be installed as well

Unsteady Flow Data - Test data

File Options Help

Boundary Conditions Initial Conditions Apply Data

**Boundary Condition Types**

Stage Hydrograph	Flow Hydrograph	Stage/Flow Hydr.	Rating Curve
Normal Depth	Lateral Inflow Hydr.	Uniform Lateral Inflow	Groundwater Interflow
T.S. Gate Openings	Elev Controlled Gates	Navigation Dams	IB Stage/Flow
Rules	Precipitation		

**Add Boundary Condition Location**

Add RS ... Add SA/2D Flow Area ... Add SA Connection ... Add Pump Station ...

Select Location in table then select Boundary Condition Type

River	Reach	RS	Boundary Condition
1 Harmas-Koros	Gyoma-Mezotur	80.275	Flow Hydrograph
2 Hortobagy_Berett	Agota_Villago	79.107	Flow Hydrograph
3 Hortobagy_Berett	Turkeve_Mezotur	0.563 IS	T.S. Gate Openings
4 Kakat	telles	45.300	Flow Hydrograph

**Gate Openings**

River: Hortobagy\_Berett Reach: Turkeve\_Mezotur RS: 0.563

Gate Group: Gate #1

☐ Read from DSS before simulation Select DSS file and Path

File: Path:

☒ Enter Table Data time interval: 1 Hour

Select/Enter the Data's Starting Time Reference

☒ Use Simulation Time: Date: 01AUG2016 Time: 0900

☐ Fixed Start Time: Date: Time:

No. Ordinates Interpolate Missing Values Del Row Ins Row

**Hydrograph Data**

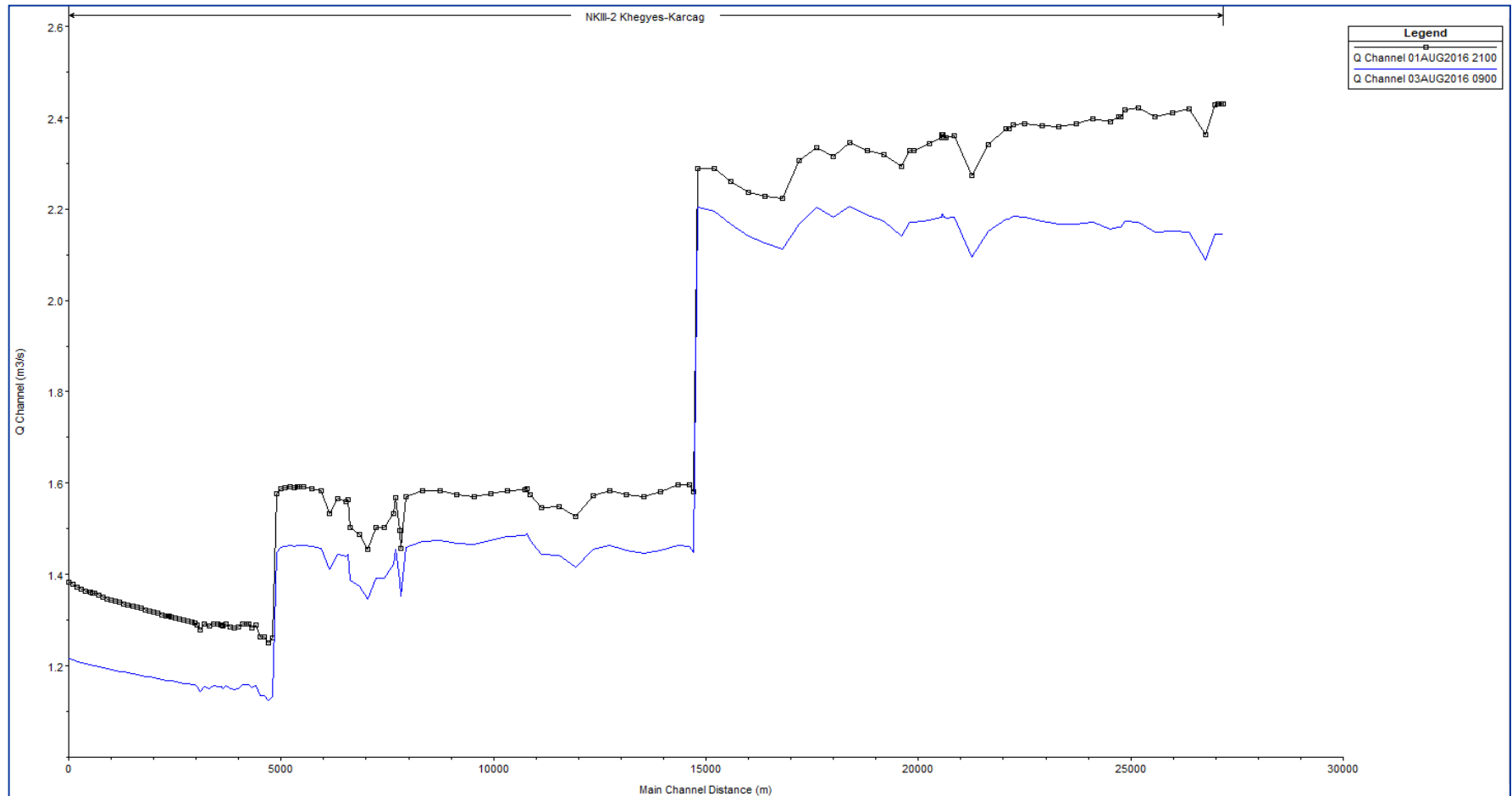
	Date	Simulation Time (hours)	Gate Opening Height (m)
1	01Aug2016 0900	00:00	9.
2	01Aug2016 1000	01:00	9.
3	01Aug2016 1100	02:00	9.
4	01Aug2016 1200	03:00	9.
5	01Aug2016 1300	04:00	9.
6	01Aug2016 1400	05:00	9.
7	01Aug2016 1500	06:00	9.
8	01Aug2016 1600	07:00	9.
9	01Aug2016 1700	08:00	9.
10	01Aug2016 1800	09:00	9.
11	01Aug2016 1900	10:00	9.
12	01Aug2016 2000	11:00	9.

Plot Data OK Cancel

38 V-11 IV-11 I 1.570 IS IT.S. Gate Openinas

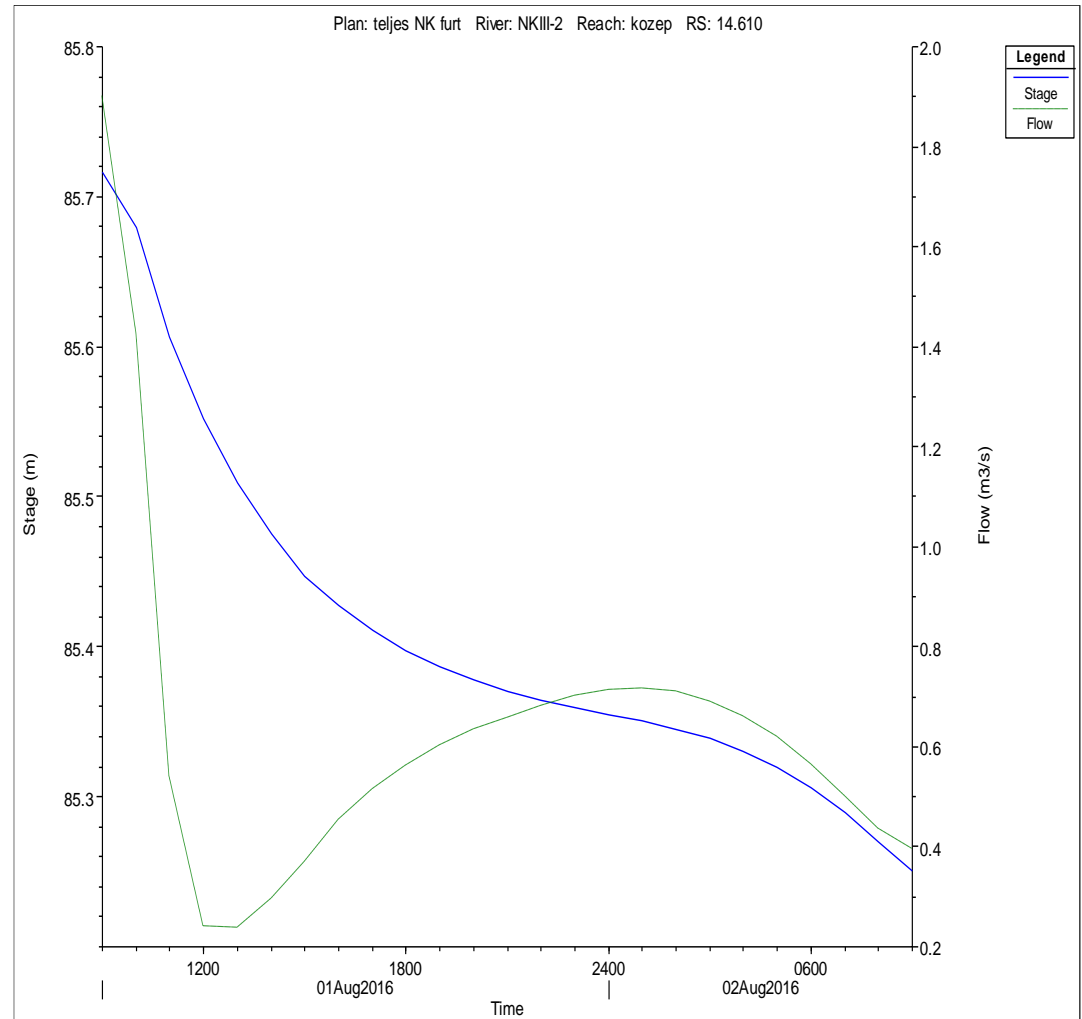
# Water management purpose

- At a longitudinal profile, the distribution of the discharge can be shown:

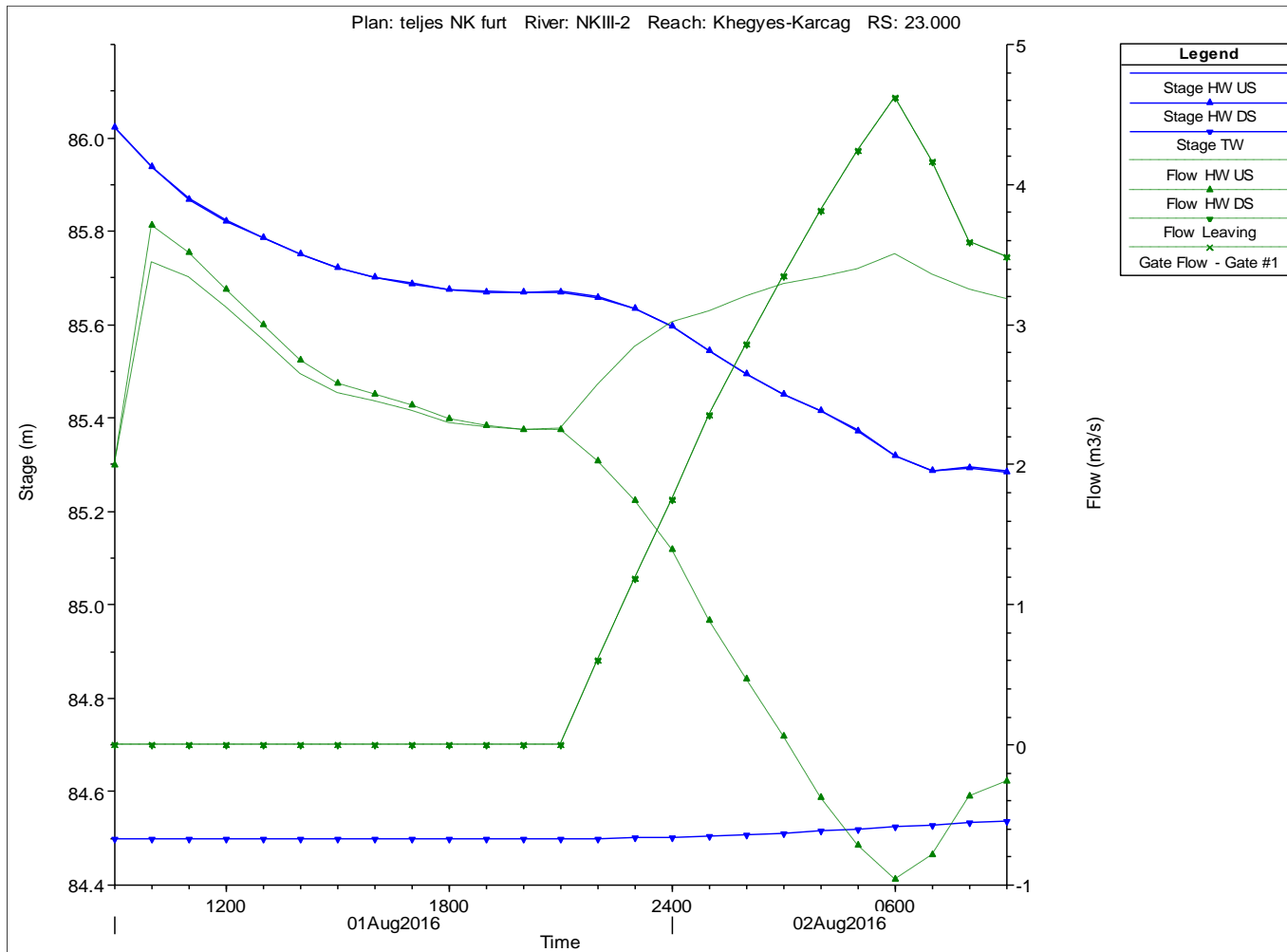


# Water management purpose

- We are able to make **flow** [ $\text{m}^3/\text{s}$ ] and/or **stage** [mBf.] timeseries at any cross-sections in the model.
- It is good for water management calculations



# Water management purpose



We can visualize how much water go through a gate in the model

We also have **flow** & **stage** time series there

# Summary

- HEC-RAS 1D is suitable for fast, simple modeling of complex water systems
- Quantifying the water resources in the pilot area can be done with a well-built 1D model
- By adjusting the operation of the locks, pumping stations, we are able to distribute water in different ways

# What is next for the model?

- Improving the model
  - **Modeling extreme drought periods**
  - **How we can manage / store the water sources**
  - **Groundwater impacts**
- Making climate change scenarios
- We are also here to listen your opinion, advice

# Thank you for your attention!

Project co-funded by the European Union (ERDF, IPA funds)

Partners: General Directorate of Water Management, Hungary | Global Water Partnership Central and Eastern Europe, Slovakia | International Commission for the Protection of the Danube River | Ministry of Water and Forests, Romania | Ministry of Foreign Affairs and Trade, Hungary | National Administration "Romanian Waters", Romania | National Institute of Hydrology and Water Management, Romania | Public Water Management Company "Vode Vojvodine", Serbia | Regional Environmental Center for Central and Eastern Europe, Hungary | The Jaroslav Černi Institute for the Development of Water Resources, Serbia | Water Research Institute, Slovakia | World Wide Fund for Nature Hungary

Associated Partners: Interior Ministry, Hungary | Republic of Serbia Ministry of Agriculture and Environmental Protection – Water Directorate | Secretariat of the Carpathian Convention (SCC), Austria | State Agency of Water Resources of Ukraine | Tisza River Basin Water Resources Directorate, Ukraine