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RIVER UNIVERSITY

Hydromorphological Assessment As A Basis
For River Restoration And Integrated Basin
Management:

*Lessons From The Prut-Siret River Basin,
Ukraine*

Mykola Pasichnyk,
Yuriy Fedkovych Chernivtsi National University,
UKRAINE

1

25 Aug 2026



Our research background: Hydrometeorology and Water Resources

EDITION 2026



150 років зростання:
мудрість традицій,
смівлівість інновацій



Scientific tradition since 1946

Former **Department of Hydrometeorology and Water Resources**

Since 2022 — integrated into the **Department of Geography of Ukraine and Regional Studies**

Main research focus in recent years:

River-channel and floodplain landscapes of the south-eastern Precarpathians: condition, conflicts, risks and optimisation

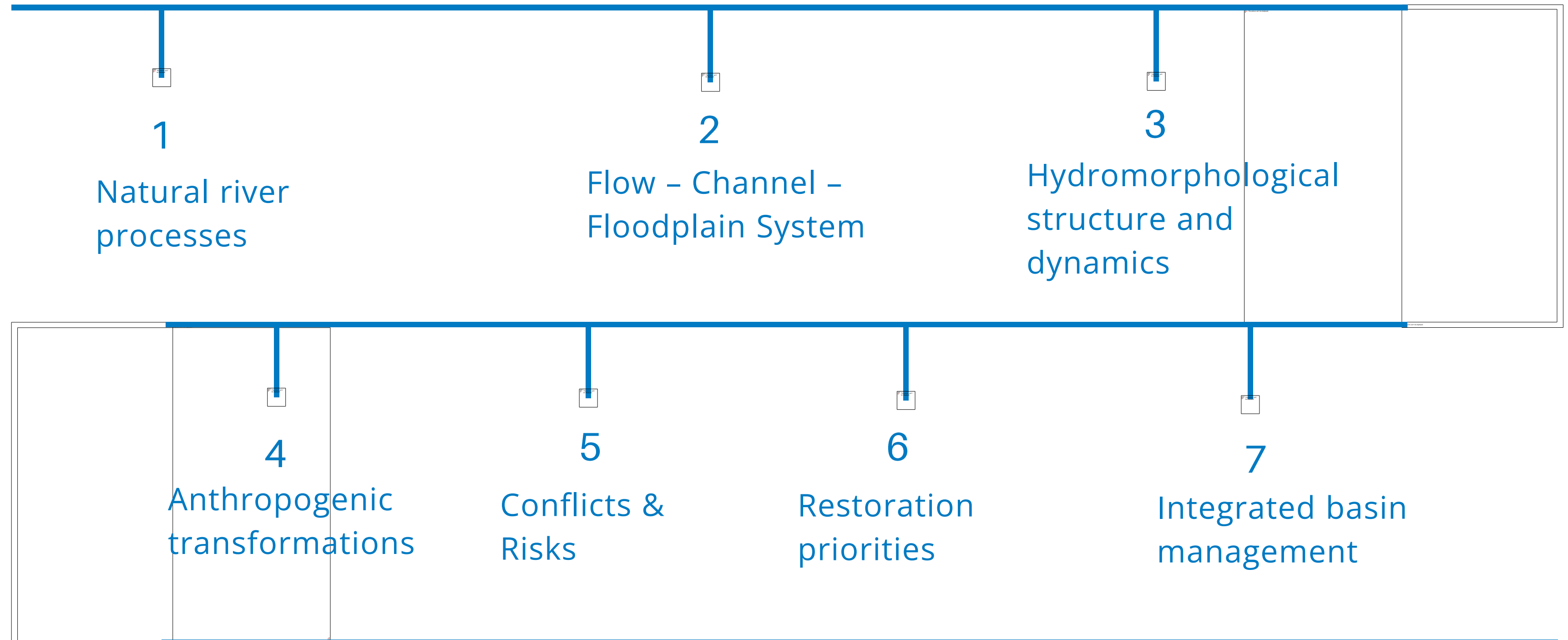
Hydrology • Channel processes • Hydromorphology • River landscapes • GIS & Remote Sensing • Water resources • Basin management



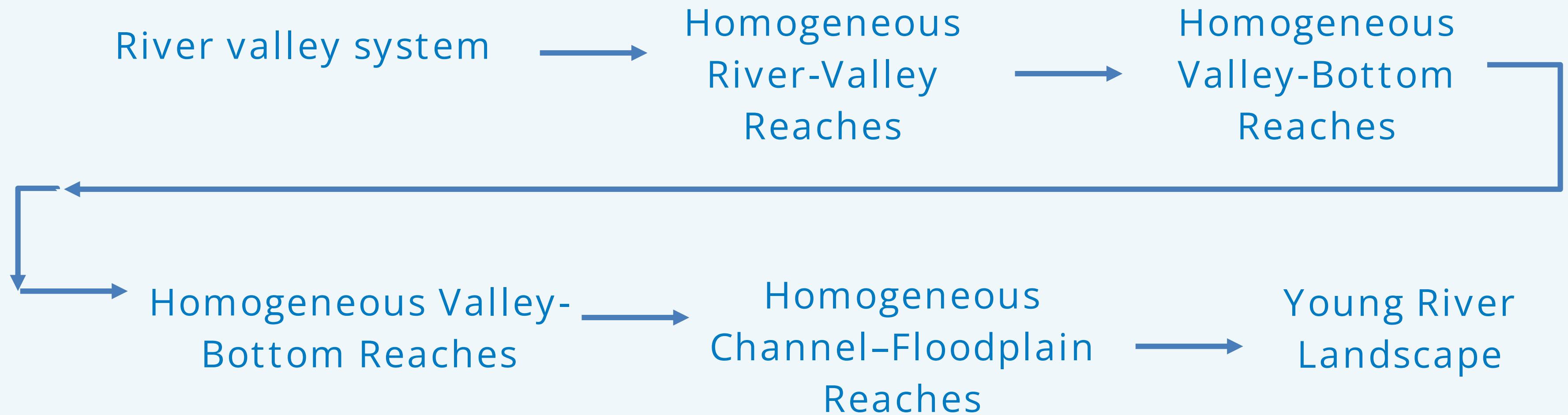
**Department of Hydrometeorology
and Water Resources**

WHY HYDROMORPHOLOGY?

FROM RIVER PROCESSES TO MANAGEMENT DECISIONS



HIERARCHICAL HYDROMORPHOLOGICAL FRAMEWORK



HOW DO WE IDENTIFY Homogeneous River-Valley Reaches AND Homogeneous Valley-Bottom Reaches?

FROM REGIONAL STRUCTURE TO VALLEY-BOTTOM MORPHOLOGY

Homogeneous River-Valley Reaches

Main controls:

- geological and tectonic structure;
- geomorphological regions;
- valley orientation and configuration;
- major valley widening and narrowing;
- major tributary confluences;
- changes in longitudinal valley morphology.

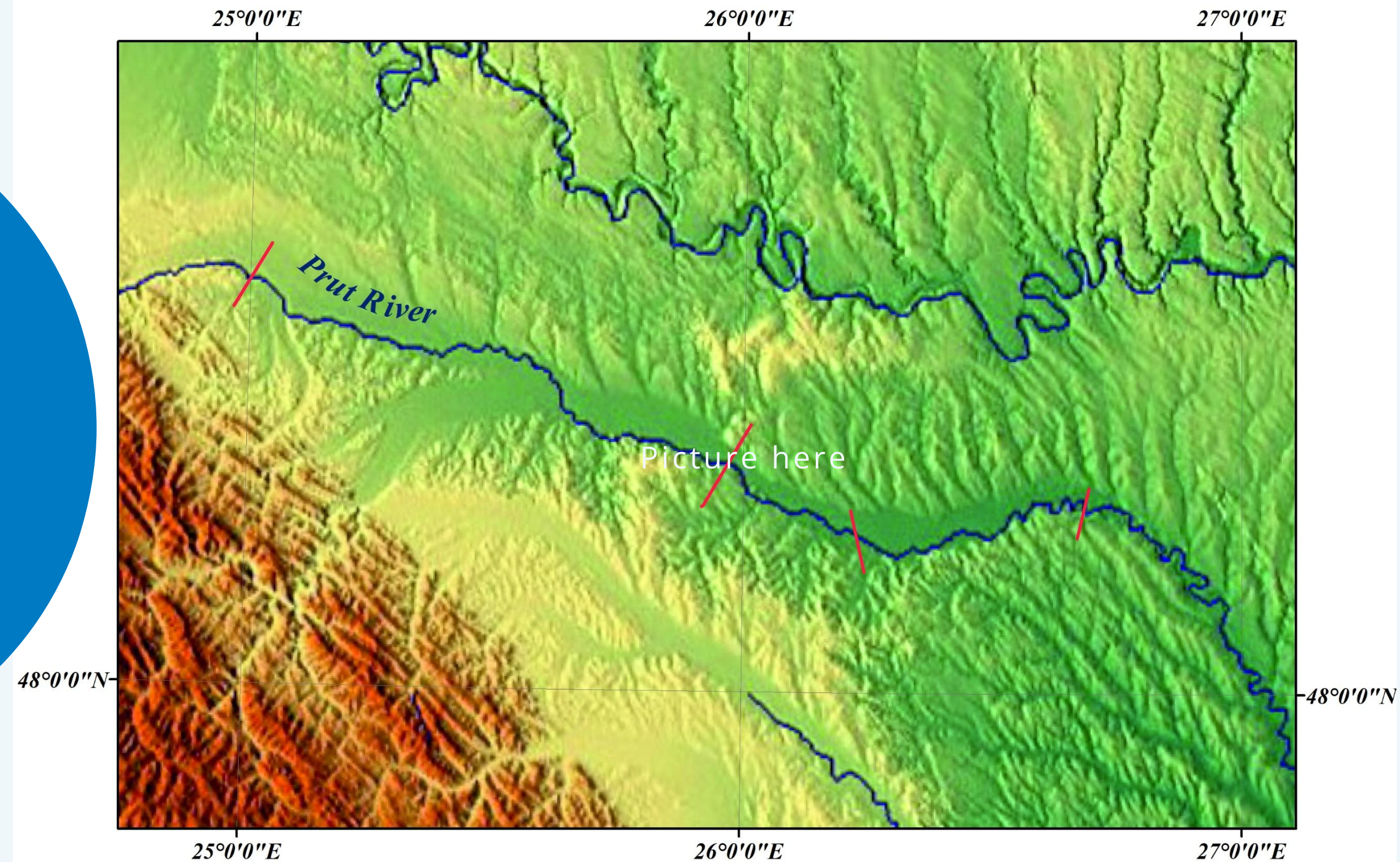
Homogeneous Valley-Bottom Reaches

Main controls:

- configuration and orientation of the valley bottom;
- valley-bottom relief and hydrographic network;
- position of the river channel within the valley bottom;
- valley-bottom asymmetry;
- relationship with geomorphological regionalisation.

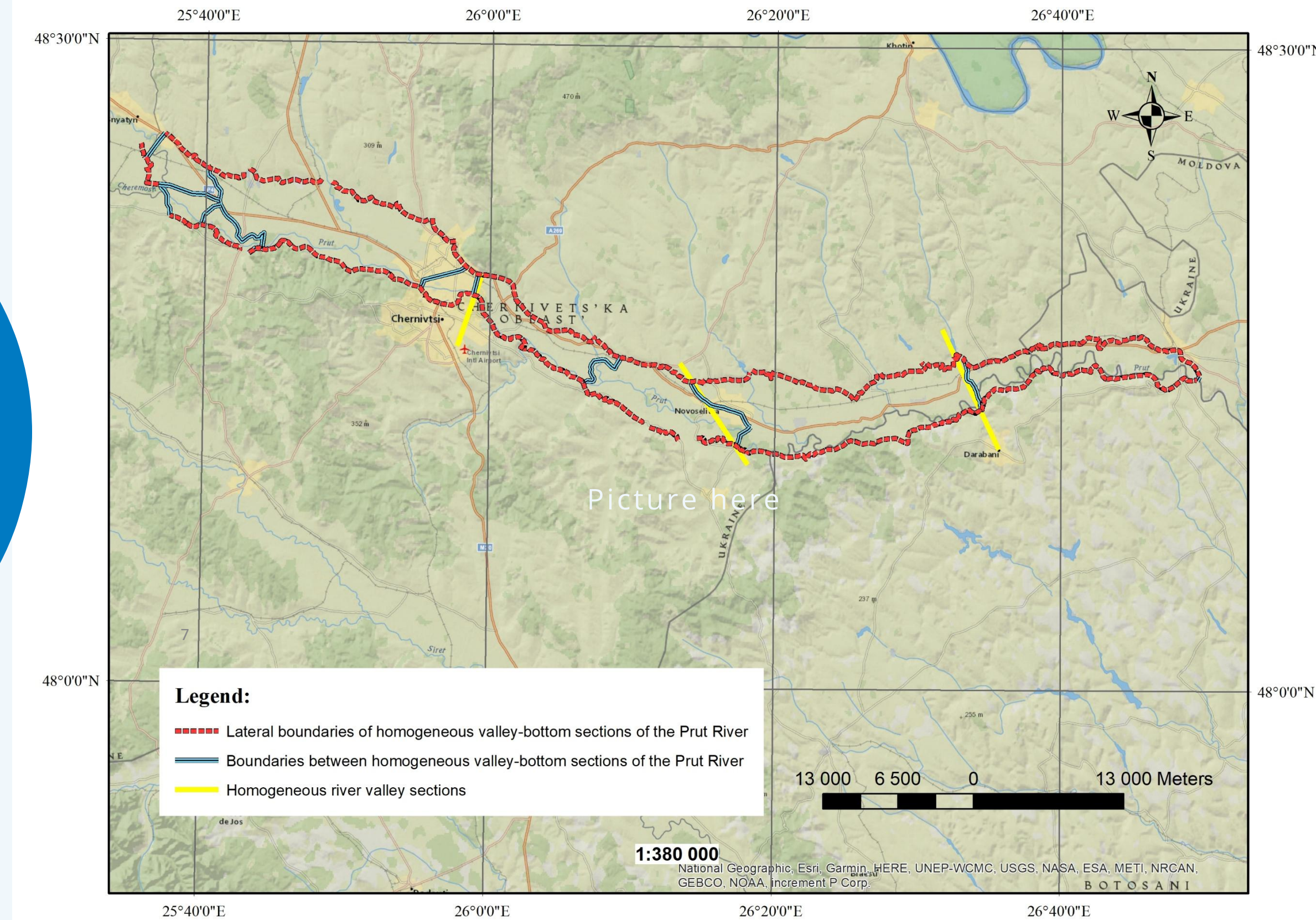
Homogeneous River-Valley Reaches

As an example, the main structural units of the Prut River valley within Chernivtsi Region, Ukraine, are presented. From a geomorphological perspective, three main structural units of the river valley are distinguished: the Kolomyia–Chernivtsi alluvial plain, the transitional section from Chernivtsi to Tsuren, and the Novoselytsia Depression.



Homogeneous Valley-Bottom Reaches

The valley bottom of the Prut River within Chernivtsi Region was divided into seven homogeneous valley-bottom sections, reflecting differences in valley morphology, local geomorphological conditions, and channel-floodplain development.



HOW DO WE IDENTIFY Homogeneous Channel–Floodplain Reaches ?

FROM REGIONAL STRUCTURE TO VALLEY-BOTTOM MORPHOLOGY

Homogeneous
Valley-Bottom
Reaches



Analysis of the
flow–channel–
floodplain system



Homogeneous
Channel–Floodplain
Reaches

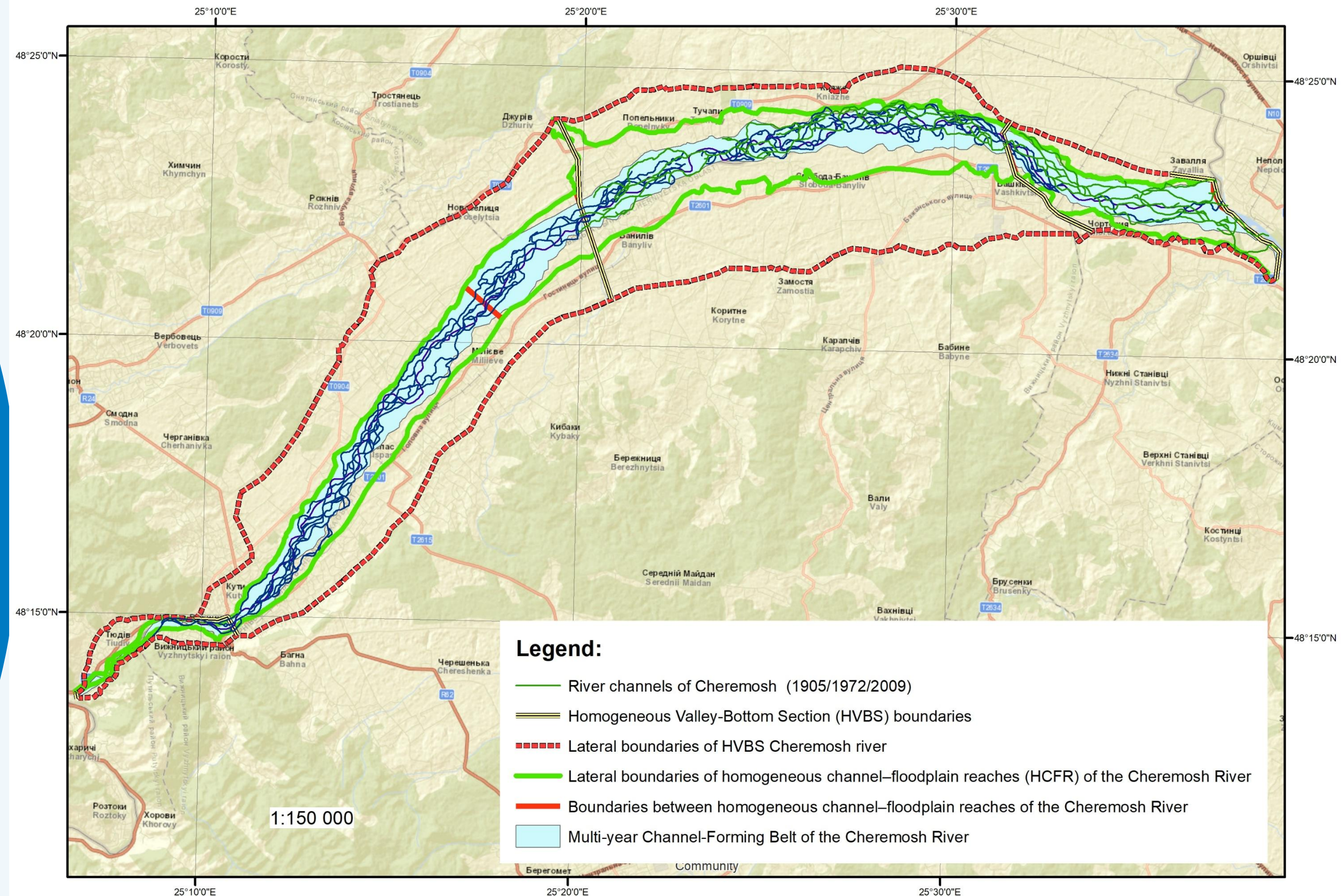
Homogeneous Valley-Bottom Reaches

Main controls:

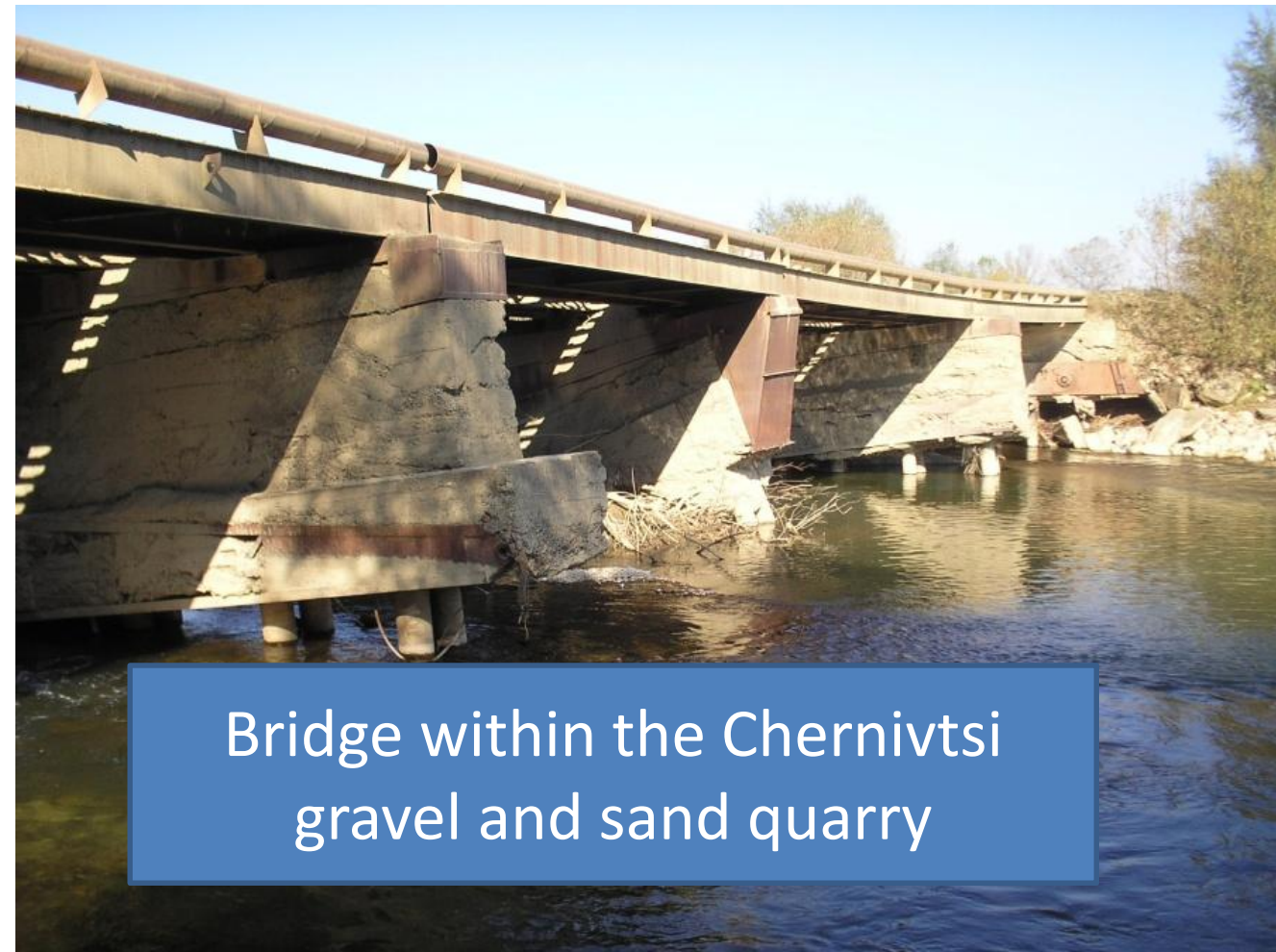
- channel pattern and morphology;
- floodplain structure;
- channel migration (Historical / Multi-decadal Channel Migration Belt);
- sediment transport conditions;
- local constraints on channel development;
- confluences and sediment inputs;
- anthropogenic modifications.

Homogeneous Channel-Floodplain Reaches

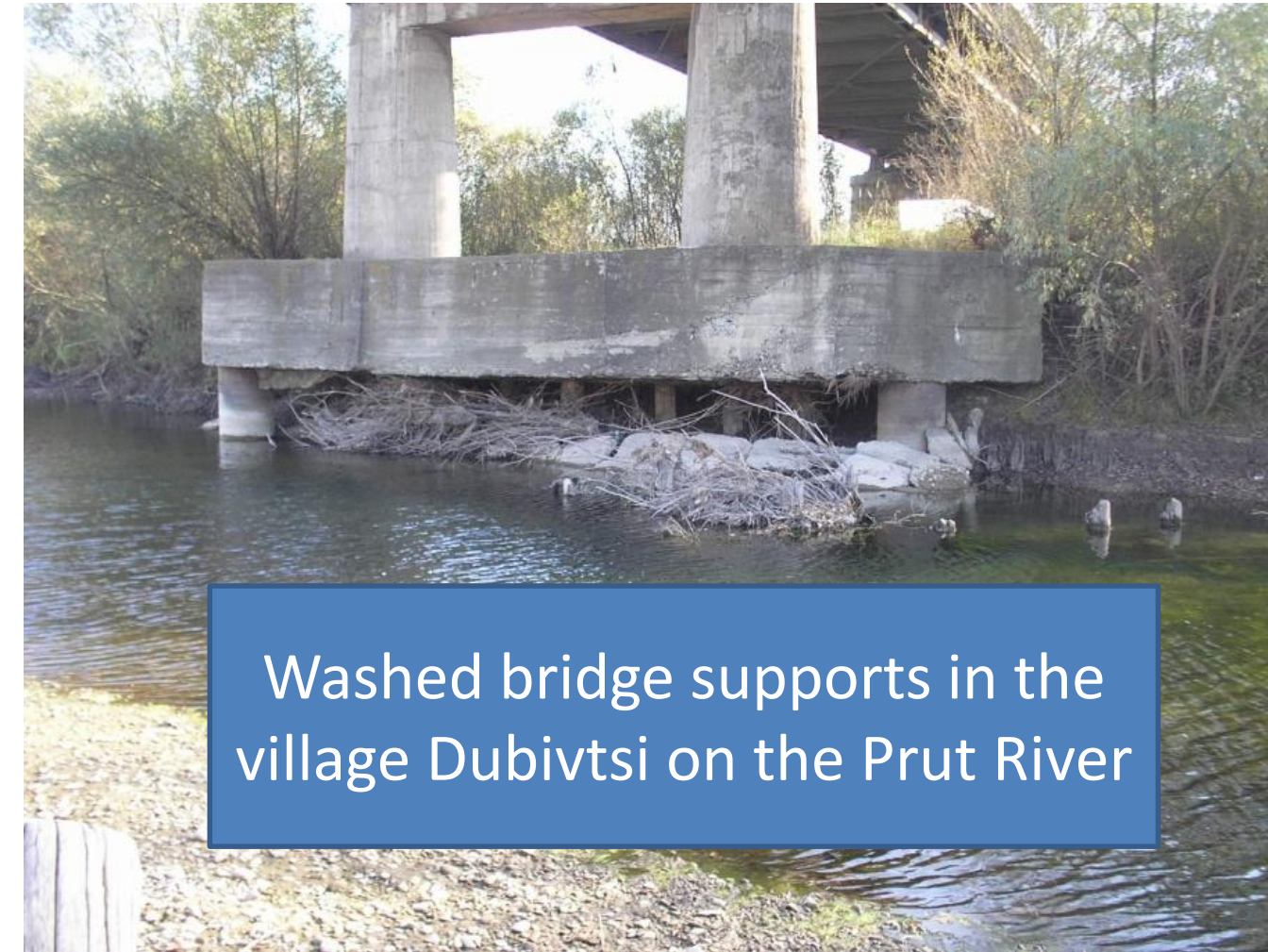
Example: Cheremosh River, Ukrainian Precarpathians. The river-valley system was hierarchically subdivided using geomorphological structure, historical channel positions and the spatial pattern of channel-floodplain processes



The problem of rivers downcutting



Bridge within the Chernivtsi gravel and sand quarry



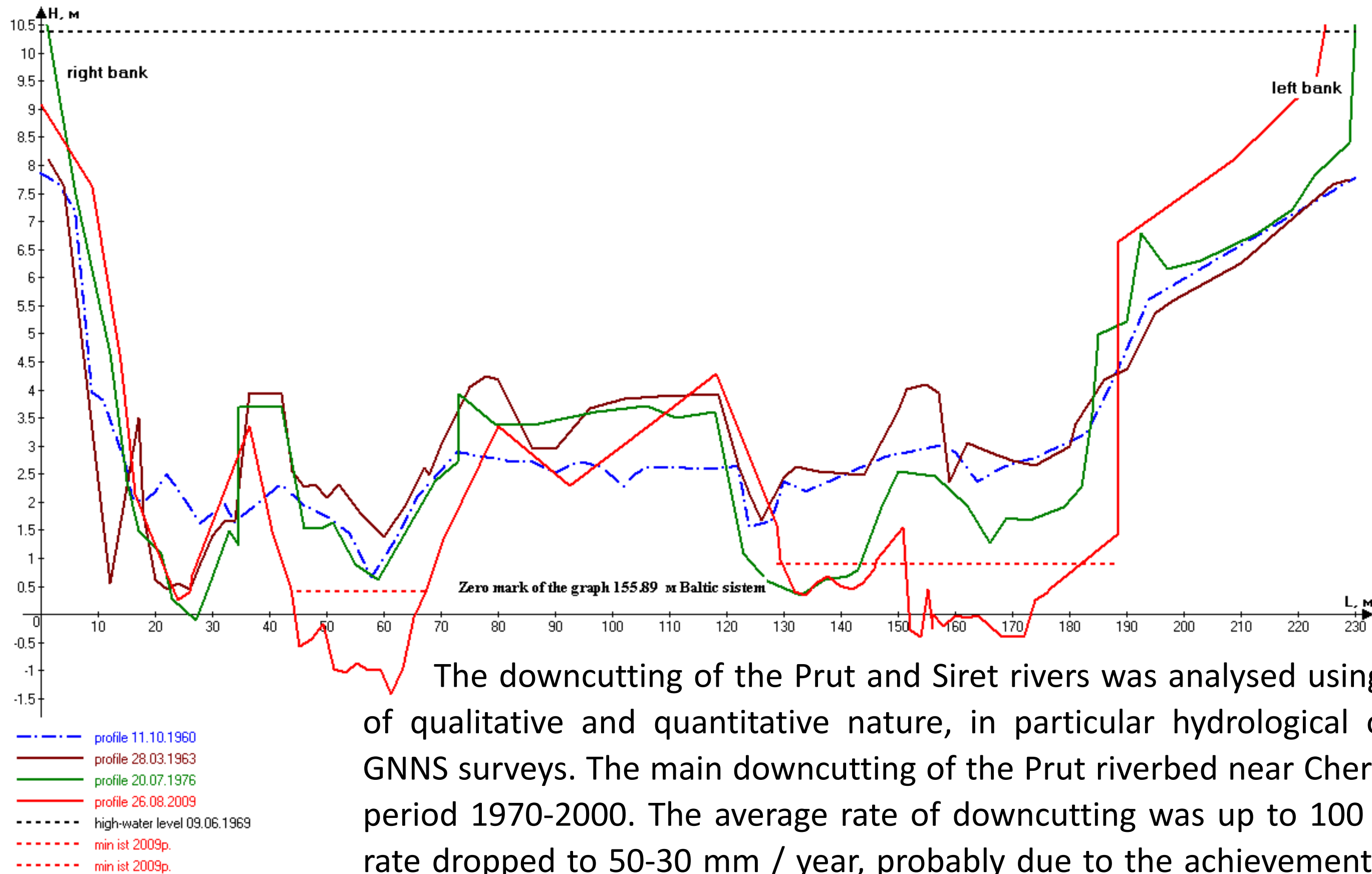
Washed bridge supports in the village Dubivtsi on the Prut River



Remains of the old railway bridge in Chernivtsi

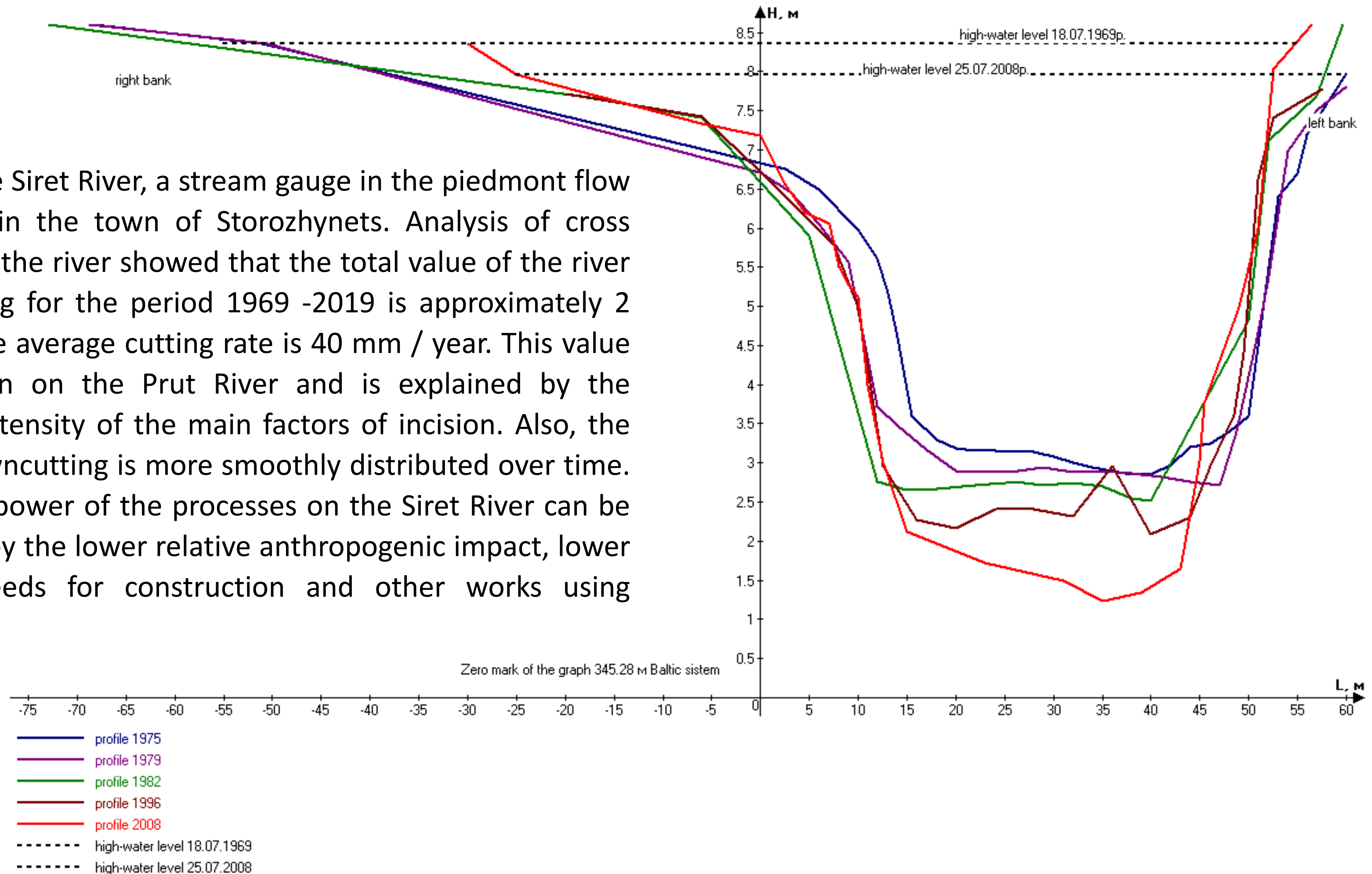
The problem of the influence of river channel alluvium extraction on the condition of rivers, namely on their downcutting, lowering of the channel position is known from the 70-80s of the XX century. It had a wide resonance due to the negative impact of so-called "riverbed quarries" on engineering structures. In particular, the bridge crossings were being destroyed.

Cross section on Prut river - Chernivtsi



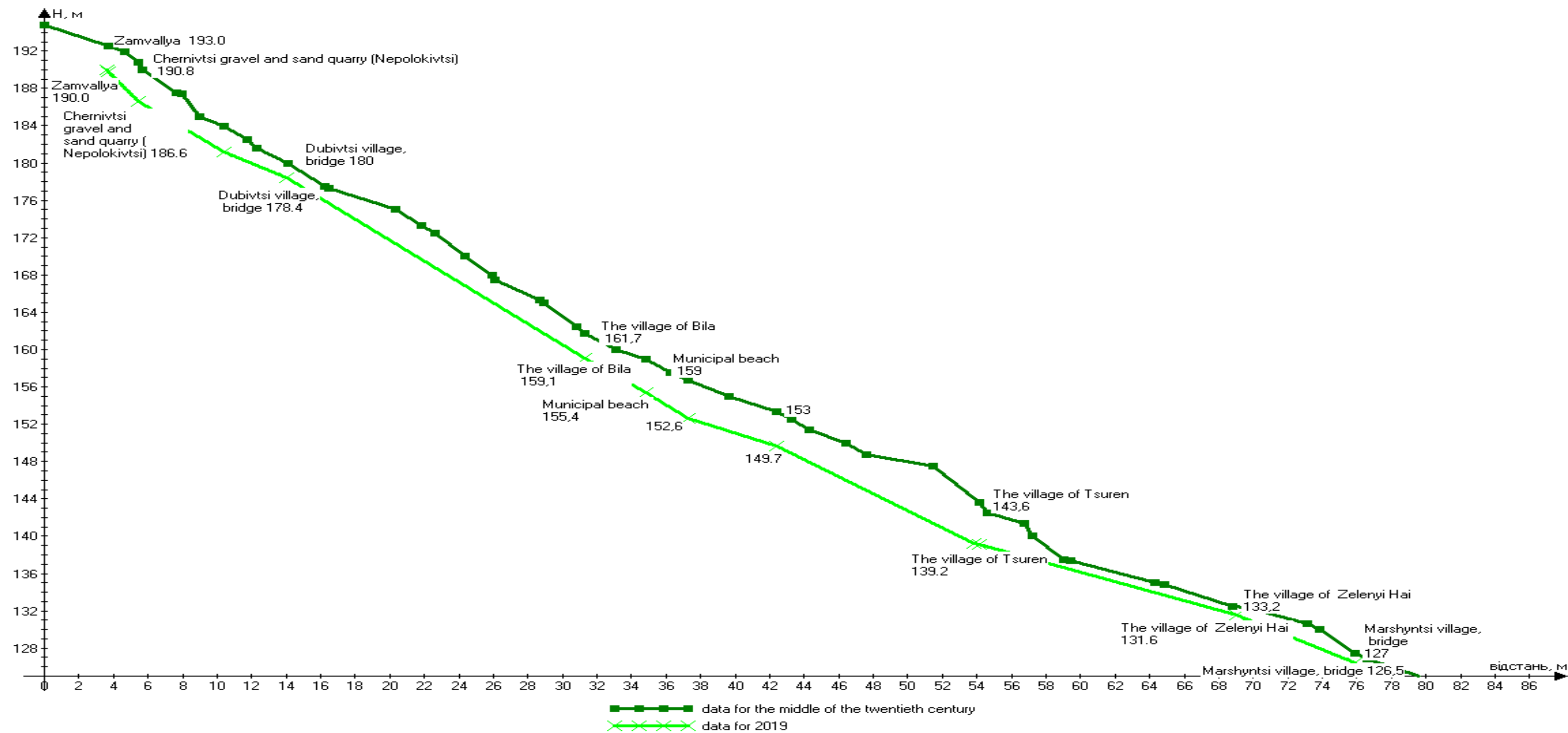
The downcutting of the Prut and Siret rivers was analysed using primary information of qualitative and quantitative nature, in particular hydrological observation data and GNSS surveys. The main downcutting of the Prut riverbed near Chernivtsi appeared in the period 1970-2000. The average rate of downcutting was up to 100 mm / year. Later, the rate dropped to 50-30 mm / year, probably due to the achievement of low-erosion rocks. The total size of the cut for the period from 1970 to 2017 is more than 3.5 m.

Cross section on Siret river - Storozhynets town

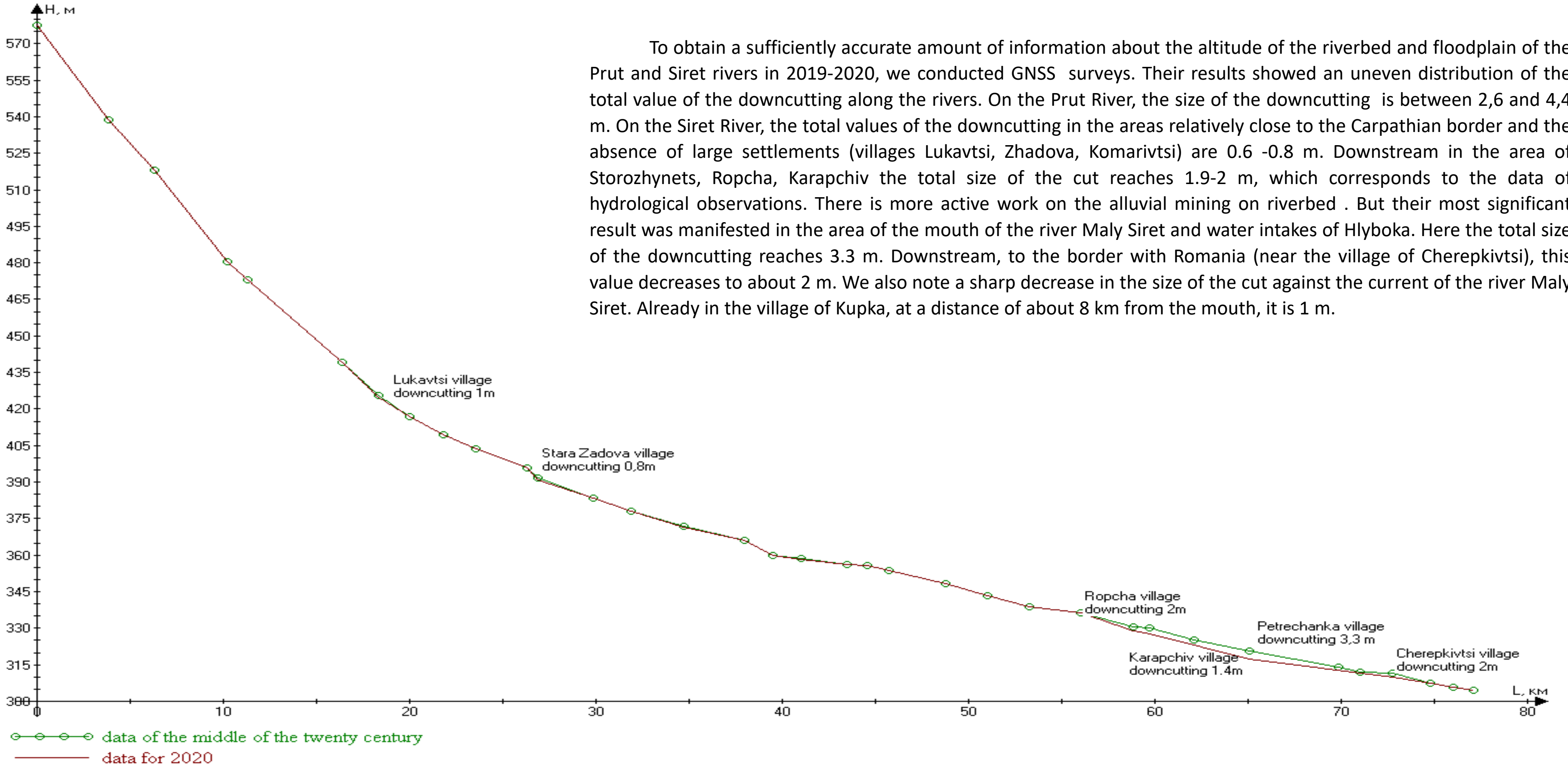


On the Siret River, a stream gauge in the piedmont flow is located in the town of Storozhynets. Analysis of cross sections of the river showed that the total value of the river downcutting for the period 1969 -2019 is approximately 2 meters. The average cutting rate is 40 mm / year. This value is less than on the Prut River and is explained by the different intensity of the main factors of incision. Also, the rate of downcutting is more smoothly distributed over time. The lower power of the processes on the Siret River can be explained by the lower relative anthropogenic impact, lower relative needs for construction and other works using alluvium.

Combined longitudinal profile of the Prut River with a sampling interval of 80 years



Combined longitudinal profile of the Siret River with a sampling interval of 80 years



FROM RIVER RESEARCH TO APPLIED BASIN MANAGEMENT

Applied research commissioned by the Chernivtsi Regional Authorities

2019 | PRUT RIVER

Scientific substantiation of principles for planning the sustainable qualitative development of the Prut River within Chernivtsi Region

2021 | SIRET RIVER

Scientific substantiation of principles for planning the sustainable qualitative development of channel and floodplain landscapes of the Siret River within Chernivtsi Region

2023 | CHEREMOSH RIVER

Scientific substantiation of principles for planning the sustainable qualitative development of the Cheremosh River within Chernivtsi Region

2023 | REGIONAL SPATIAL DATABASE

Development of cartographic models of the Nature Reserve Fund of Chernivtsi Region

Research → Assessment → Conflicts & Risks → Planning → Restoration & Management

FREE RIVER — Mapping Barriers in the Prut & Siret River Basins, Ukraine

The project was implemented by WWF-Ukraine with the participation of the Prut–Siret Basin Department of Water Resources and supported by the European Open Rivers Programme

PROJECT EXPERIENCE
IN RIVER
MANAGEMENT,
RESTORATION AND
SAFETY

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Контактні дані:
тел.: +380500569408
e-mail: agencyfid@gmail.com
<https://www.facebook.com/AgencyforLD/>
www.ro-ua.net

Європейський Союз складається з 27 країн-членів, які вирішили поступово об'єднати свої знання, ресурси, та долі. Спільно, протягом 50 років, вони збудували зону стабільності, демократії та сталого розвитку, зберігаючи культурне різноманіття, терпимість та свободу особистості.
Європейський Союз прагне поділитися своїми досягненнями та цінностями з країнами та народами за його межами.
Спільна Операційна Програма Румунія-Україна 2014-2020 фінансується Європейським Союзом через Європейський Інструмент Сусідства і співфінансується країнами, які беруть участь у Програмі.



СПІЛЬНА ОПЕРАЦІЙНА ПРОГРАМА
РУМУНІЯ-УКРАЇНА 2014-2020



250FT/4.2/18
«Безпека та захист –
спільний фактор транскордонного співробітництва»
«Загальна характеристика наводнень
на річках, зсувів та небезпек від них»



Open rivers programme: Catchment development

ВІДНОВЛЕННЯ ВІЛЬНОЇ ТЕЧІЇ РІЧКИ
семінар за результатами проекту



Реалізація основних заходів запланованих
проєктом "Картування бар'єрів у басейнах
річок Прут та Сірет в Україні"



Кляуза Мар'їна Гать р. Білий Черемош

SHIELD — School-based Hazard
Identification and Education for Local
Disasters

The ongoing cross-border project is
implemented within the **Interreg VI-A
NEXT Romania–Ukraine Programme
2021–2027**, Priority *Environmental Focus
Across Borders*.

Григорій Кікерчук
заступник начальника
БУВР Пруту та Сірету

26.05.2026
целня проекту

Interreg  Співфінансується
Європейським
Союзом
NEXT Румунія-Україна

398.727,63
Загальний бюджет в ЄВРО

358.854, 86
Грант ЄС в ЄВРО



Шкільна ідентифікація
небезпек і освіта
місцевих катастроф
(ROUA00270) SHIELD



Програма Interreg VI-A NEXT
Румунія-Україна 2021-2027

УПРАВЛІННЯ ЦИВІЛЬНОГО
ЗАХИСТУ НАСЕЛЕННЯ
ЧЕРНІВЕЦЬКОЇ ОБЛАСНОЇ
ВІЙСЬКОВОЇ АДМІНІСТРАЦІЇ



ІНСПЕКТОРАТ З НАДЗВИЧАЙНИХ
СИТУАЦІЙ «БУКОВИНА»
ПОВІТУ СУЧАВА



ГРОМАДСЬКА ОРГАНІЗАЦІЯ
«АГЕНЦІЯ ІННОВАЦІЙ ТА РОЗВИТКУ»

Контактна особа – Микола Пасічник,
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Європейського Союзу або структур управління.
Програма Interreg VI-A NEXT Румунія-Україна 2021-2027 фінансується
Європейським Союзом і співфінансується країнами, які беруть участь у Програмі.

SAFE PROT — Safety and Protection: A Common Factor in Cross-Border
Cooperation

The project was implemented under the **Romania–Ukraine ENI Cross-Border
Cooperation Programme 2014–2020** and focused on increasing the safety of
communities in the Suceava–Chernivtsi cross-border area

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MORE INFO HERE



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