Interreg

Co-funded by the European Union

Latvia – Lithuania

LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS

ICEREG

PROJECT OBJECTIVES AND RESULTS

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PROJECT FINAL CONFERENCE, 21.012026.

GENERAL INFORMATION

Ice-jam flood risk management in Latvian and Lithuanian regions with respect to climate change, ICEREG LL-00136

Project duration – 24 monthes (01.02.2024. – 31.01.2026.)

Budget: 654.082,50 EUR (**ERDF:** 523.266,00 EUR)

Project partners: Latvian Environment, Geology and Meteorology Centre(LP),
Lithuanian Energy Institute (PP2),
Lithuanian Hydrometeorological Service (PP3)

GENERAL INFORMATION

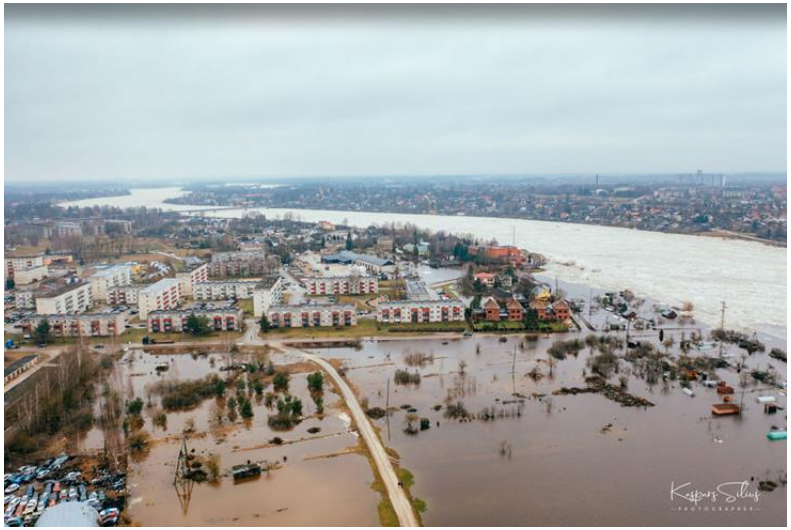
Main objective of project - to perform ice-jam flood risk modelling and mapping for the vulnerable territories in Latvia and Lithuania. The developed model will update the existing early warning system with the ice-jam flood information.

Main results:

- The jointly developed solution for the improved management of ice-jam flood risk using **corresponding flood maps** and the **conceptual model of ice-jam flood formation** with respect to climate change;
- Cooperation of organisations across borders in the field of ice-jam flood management.

WHY IS THIS PROJECT?

The very big ice flood on Daugava River at Jekabpils city in winter 2023 shows an importance of special ice flood risk maps for the vulnerable areas and public awareness about potential flood risk as well as a list of the special measures to mitigate this risk.



WHY IS THIS PROJECT?

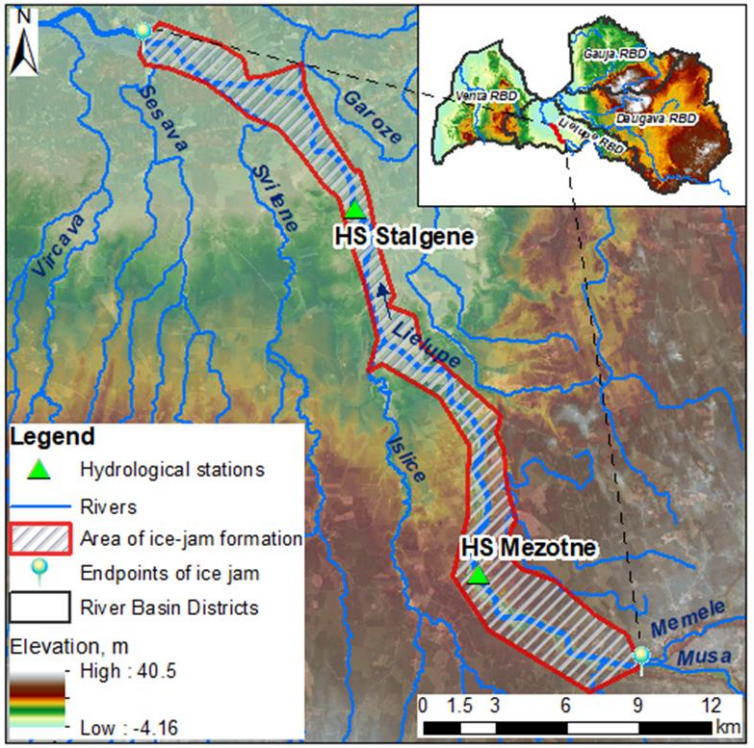
LEGMC is responsible for providing of hydromorphological monitoring, weather forecast and warning, flood modelling and mapping as well as Latvian Flood Risk Management Plans preparing and reporting to European Commission.

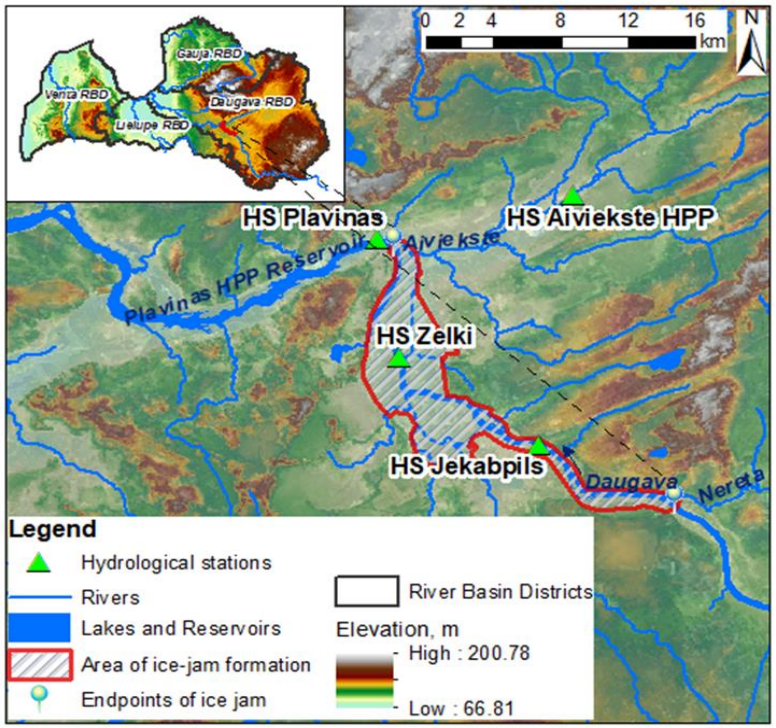
Questions for the project:

- What's about ice regime in future climate conditions?
- Is it possible to predict the ice-jam floods?
- How to be prepared for the ice flood?

PROJECT PILOT TERRITORIES

The most sensitive area for the formation of ice jams in the Lielupe River is the upper reaches from the confluence of the Musa and Memele rivers to the confluence of the Lielupe and Sessava rivers. The length of this section of the river is about 40 km.



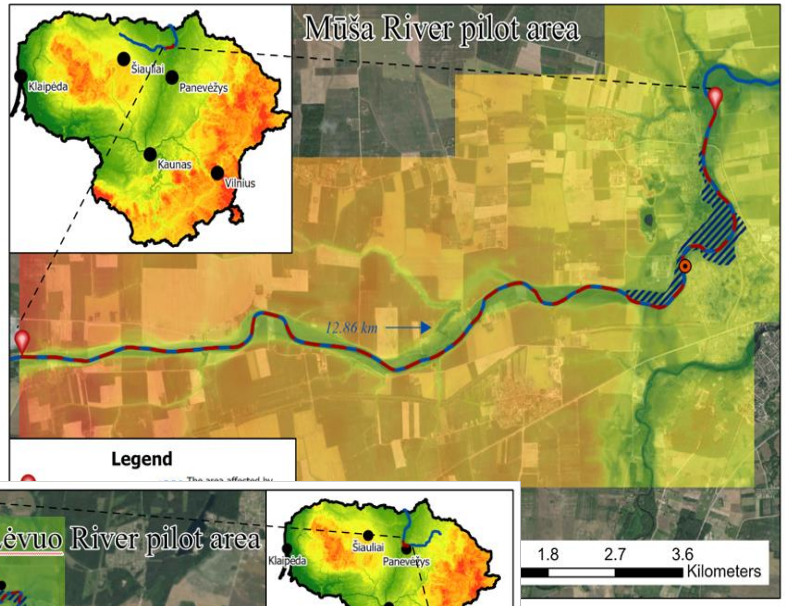


The pilot territory of the Daugava River is from the Nereta River to the Aiviekste River. The length of this section of the river is about 29 km. It includes the territory of the city of Jekabpils.

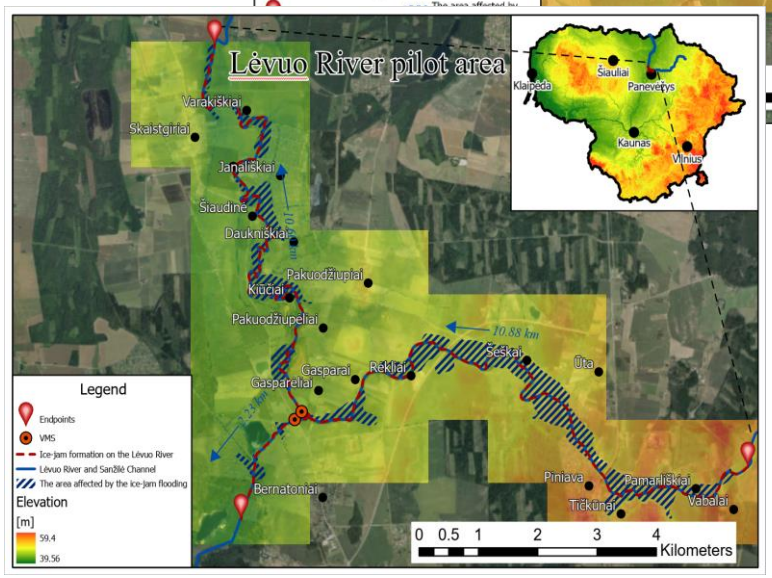
PROJECT PILOT TERRITORIES

The Mūša River stretch of 15 km long from Gustoniai to Ustukiai is characterised by a smooth flow with a small number of sharp bends.

Ice jams were the most common at some sharp bends of the river near Pasvalis and at the location of an important logistical bridge over the river at Ustukiai.

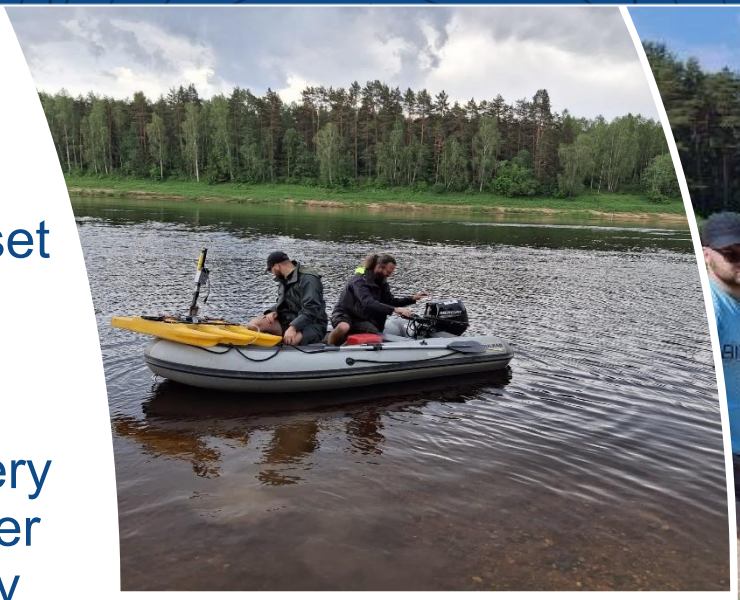


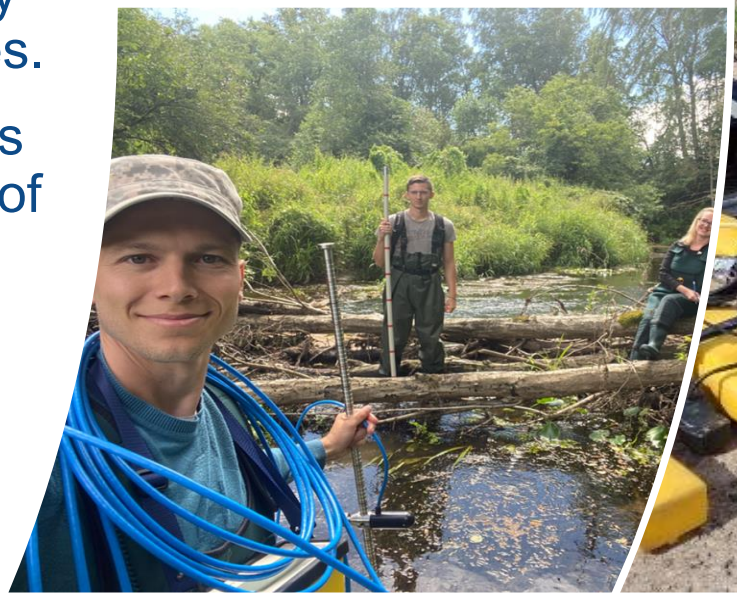
In the Lėvuo River, the most sensitive area for ice-jam formation is from Pamarliškiai to Skaistgiriai. The ice-jams here is caused by sharp meanders and the abundant bridges. The length of this section of the river is about 20 km.



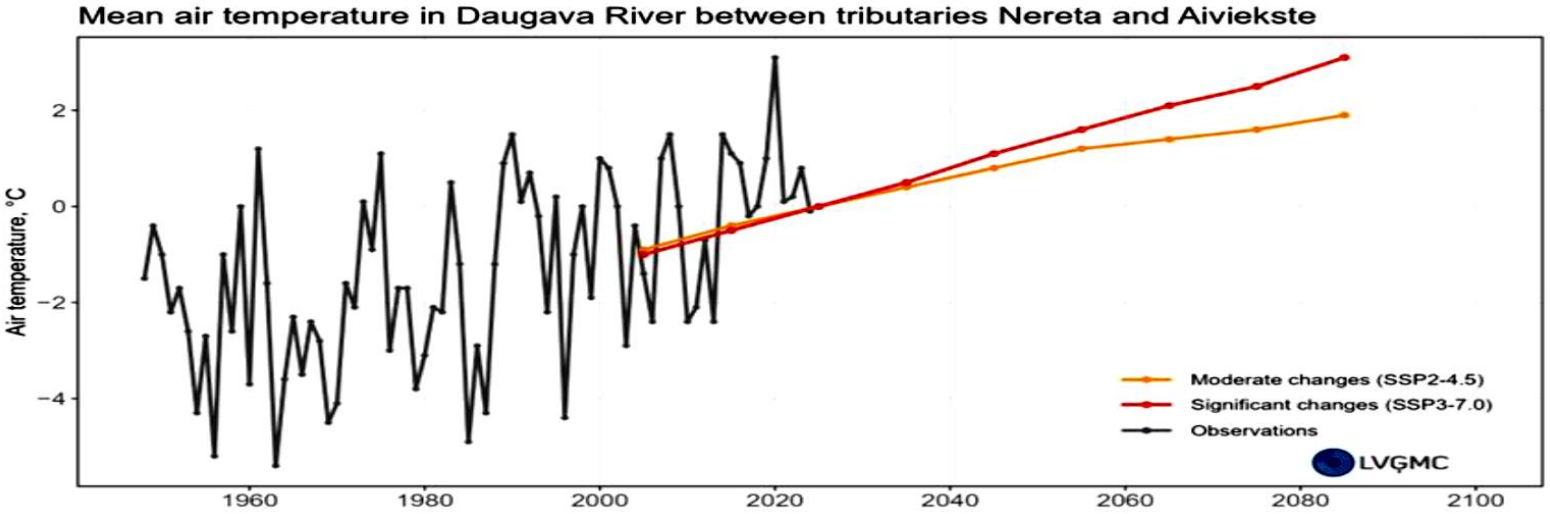
FIELD MEASUREMENTS

- Four experts from LEI and four experts from LEGMC measured a set of parameters on the pilot rivers. The measurements were performed at least every 1000 meters of the river length (and even every 500 meters within cities.
- The field survey results was used for creating of the pilot rivers' "geometry" and for the calibration of the hydrodynamic model.





CLIMATE CHANGE MODELLING

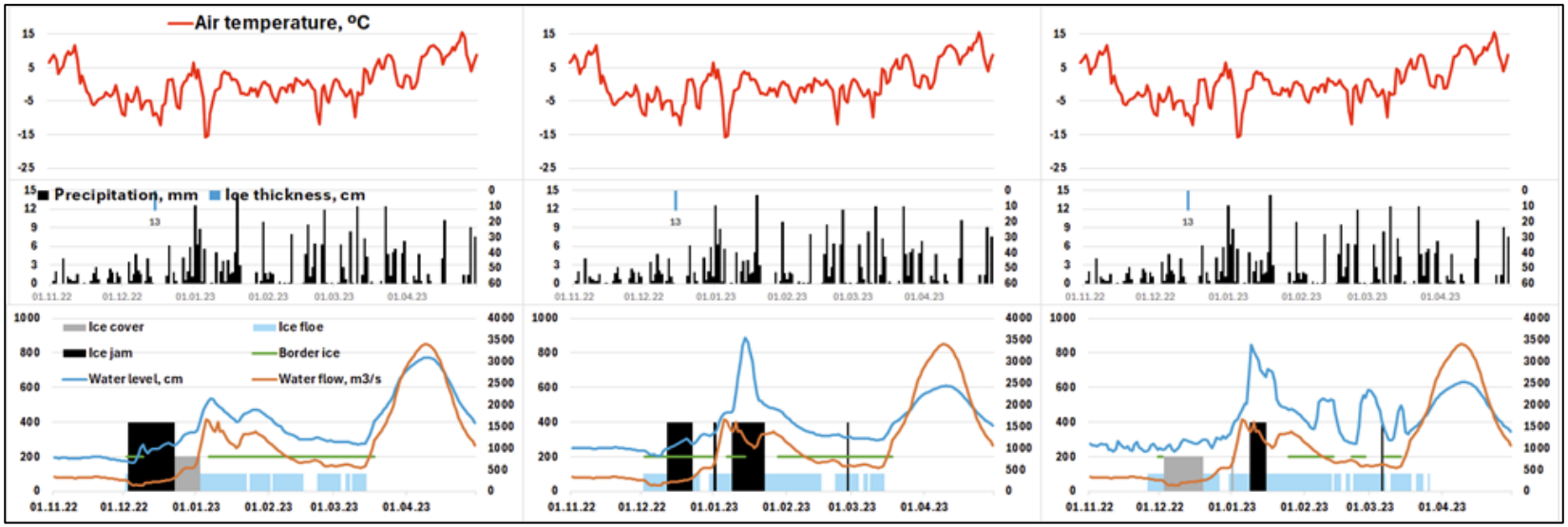


Average air temperature of period November-April in the pilot area of the Daugava River from 1948 (observation data) to 2100

Climate change modelling was carried out using SSP2-4.5 and SSP3-7.0 scenarios to determine the impact of climate change on the ice regime of rivers, in particular on ice jams. The report of the climate change modelling project in Latvia and Lithuania is available on the LEGMC website

:https://videscentrs.lvgmc.lv/files/Par_LVGMC/Projekti/ICEREG/D1.2.2_Climate_change_modelling.pdf)

ICE-JAM HISTORICAL DATA ANALYSIS



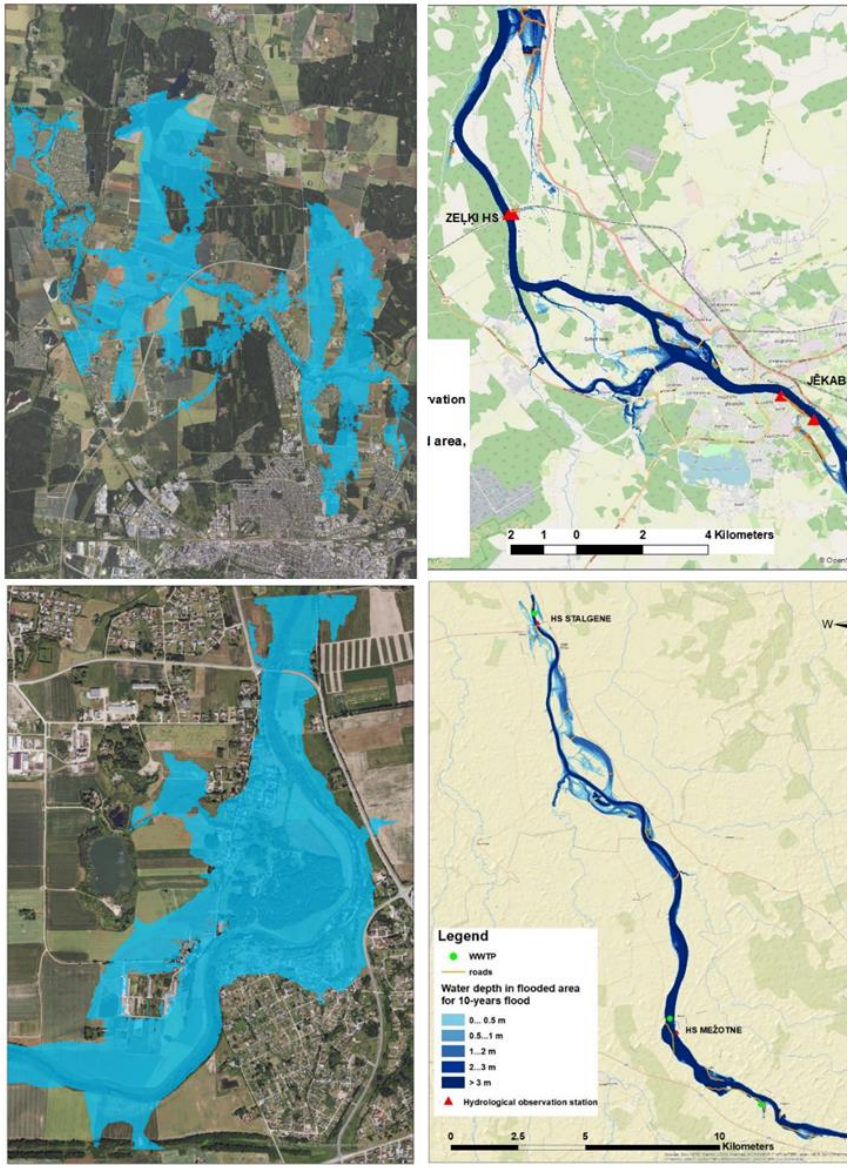
Complex graphs of meteorological (MS Zīlāni) and hydrological parameters (HS Jersika – left, HS Jēkabpils – centre and HS Zeļķi – right), 2023

The meteorological and hydrological parameters of the 1961-2023 winter season were analyzed to create a Conceptual Model of the formation of ice jams. As a result, for each section of rivers in pilot areas, the characteristic of the morphological and hydrometeorological conditions are described.

PROJECT RESULTS: FLOOD HAZARD AND RISK MAPS

One of the main results of the project is development of ice flood hazard and flood risk maps for pilot territories. Ice jam floods are modeled with a probability of 0.1% (LT), 0.5%, 1%, 10% as well as for 2050, 2070 and 2100, taking into account the impacts of climate change.

Flood risk was modelled for residents, properties, roads, WWTPs and special facilities (hospitals and schools).



Left side: Levuo (above) and Mūša (below) rivers 1% probability ice flood hazard maps Right side: Mūsa (above) and Daugava rivers 10% probability ice flood hazard maps

PROJECT RESULTS:
ICE FLOOD WARNING SYSTEM

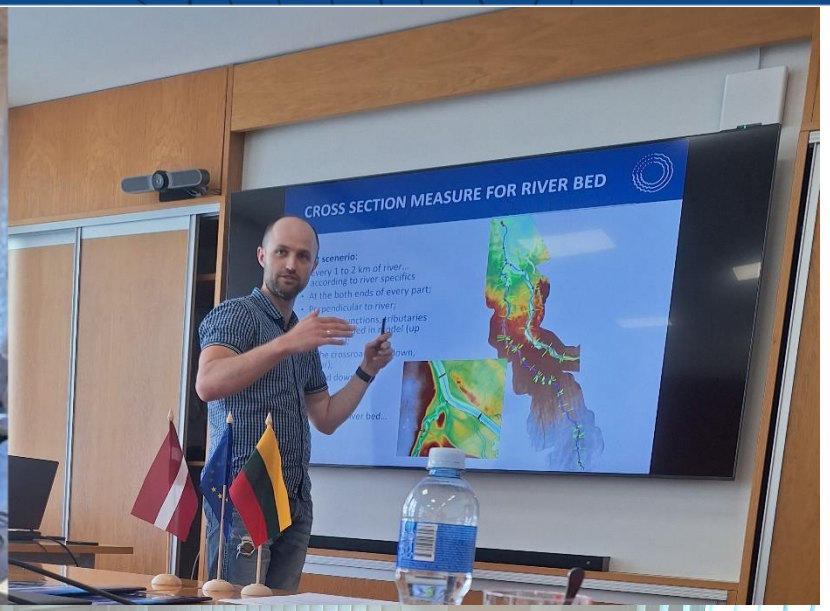
On the basis of the conceptual model of ice jam formation, "Ice Jam Flood Forecasts and Early Warning System Guidelines" were developed.

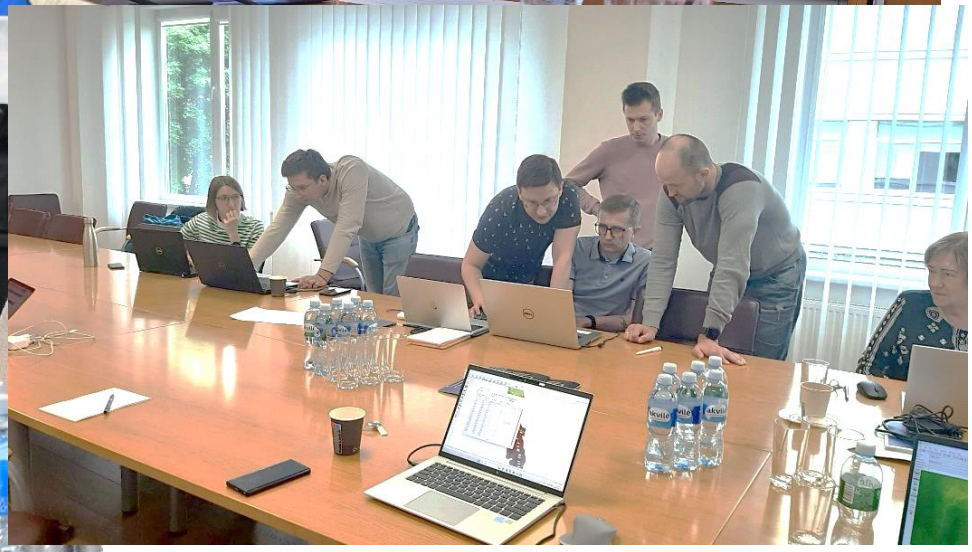
The data will be integrated into the Flood Risk Information System (LEGMC website: https://pris.lvgmc.lv/) and the Early Warning System (LHMS website: https://www.meteo.lt/prognozes/pavojingi-reiskiniai/).

PROJECT RESULTS: LIST OF MEASURES

The developed List of ice-jam flood risk management measures includes the most effective measures, such as ice breaking operation, natural based solutions, etc. This List of measures is available on the LEGMC webpage https://videscentrs.lvgmc.lv/lapas/icereg-ledus-pludu-parvaldiba-latvija-un-lietuva-klimata-parmainu-konteksta.

PROJECT MEETING AND TRAININGS





PROJECT MEETING AND TRAININGS

THANK YOU FOR ATTENTION!

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