

ICE JAMS

MONITORING, FORECASTING, AND WARNINGS

Ice jams usually form during transitional freeze-up and thaw periods, marking the beginning and end of the ice season. In temperate climates, they may also occur in mid-winter.

MONITORING

To identify flood risk in time and ensure public awareness, continuous monitoring of ice conditions is carried out, including several key components:

1 FORECASTING

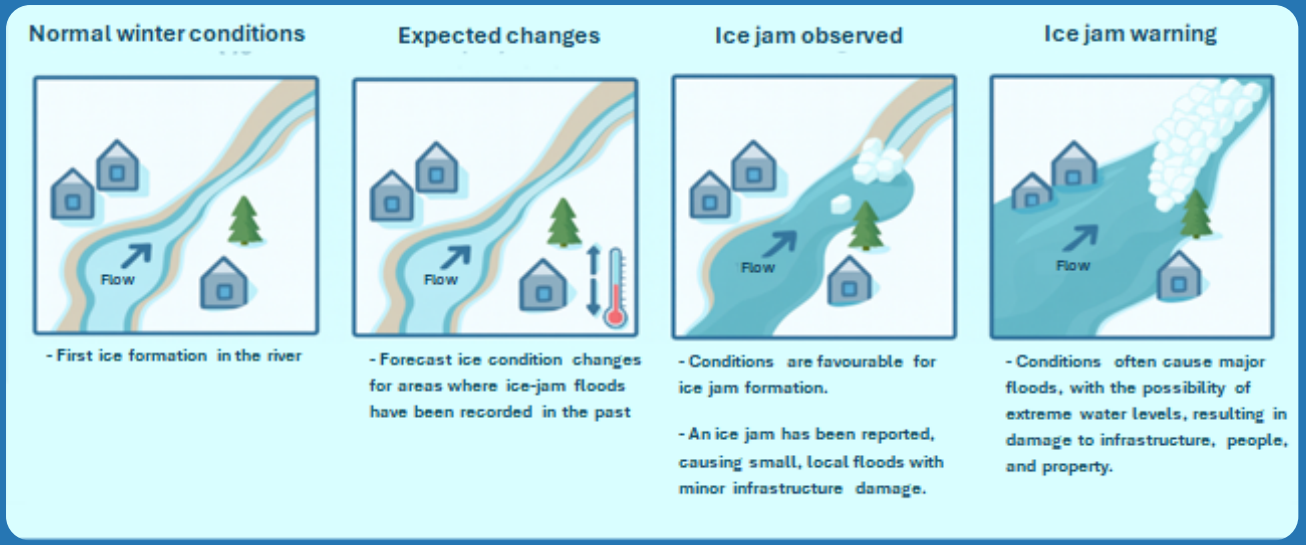


Ice jams are difficult to predict, therefore continuous observation and analysis of all factors influencing their formation are essential for risk assessment.

2 MONITORING OF ICE DYNAMICS



The formation of ice, frazil ice drift, ice breakup, and river clearing are recorded, together with changes in water level and temperature, to assess potential hazards in advance. Data are collected using remote monitoring tools such as video cameras, satellite imagery, and automatic hydrological stations.



3 ANALYSIS OF HISTORICAL DATA



River sections where ice jams have most frequently formed in the past are identified. This information is used for hydrodynamic modelling and for planning preventive measures, including regular maintenance and temporary engineering solutions such as barriers or ice control structures.

4 MODELLING



Based on historical ice-jam flood data, flood-prone area maps are developed to inform residents about flood risk zones. Risk is assessed according to flood return periods, such as events expected once every 10, 50, or 100 years.



TYPES OF FORECAST ICE JAMS

Based on the season of formation, causes, flow conditions, and hazard level, ice jams are classified into two main types:

	Ice jams forming during frazil ice development	**Ice jams forming during ice breakup (ice drift)**
Season	Early winter (beginning of river freeze-up).	Late winter or early spring.
Cause of formation	Rapid cooling that leads to the formation of ice crust, frazil ice, and slush, which accumulate in certain locations.	Rising air temperatures, rainfall, and increased runoff. The ice is broken up and set in motion.
Type of ice	Ice crust, slush, anchor ice, and newly forming surface ice (frazil ice)	Thick, compacted ice floes and fragments of the former continuous ice cover
Flow conditions	Low water levels typical of cold winter conditions, with limited discharge	High river discharge due to snowmelt and/or precipitation
Hazard level	Most often they cause small, localized floods, with possible minor damage to infrastructure.	They most often cause major floods, with the possibility of extreme water levels, resulting in damage to infrastructure, people, and property

Interreg
Bendrai finansuoja EUROPOS SĄJUNGA
Latvija – Lietuva
ICEREG

This information was prepared as part of the implementation of the project “Management of Ice-Jam Flood Risk in Latvian and Lithuanian Regions under Climate Change (ICEREG).”

The implementation of the project is supported by the Interreg VI-A Latvia–Lithuania Programme 2021–2027.

WARNINGS ABOUT EXTREME HYDROLOGICAL EVENTS

Low hazard level – ice formation warning. Issued when conditions are favorable for ice phenomena that may lead to ice jams and flooding.

Recommendation: Follow hydrological information and check whether your location lies within a flood-risk zone.

Moderate hazard level – ice jam formation likely. Frazil ice or ice drift is observed, and ice jams may begin to form.

Recommendation: Continuously follow updated hydrological information, move equipment and valuables away from the riverbank, and prepare for possible evacuation.

High hazard level – ice jam have formed There is a high risk of severe flooding.

Recommendation: Follow official hydrological updates, comply with instructions from responsible authorities, and prepare for evacuation.

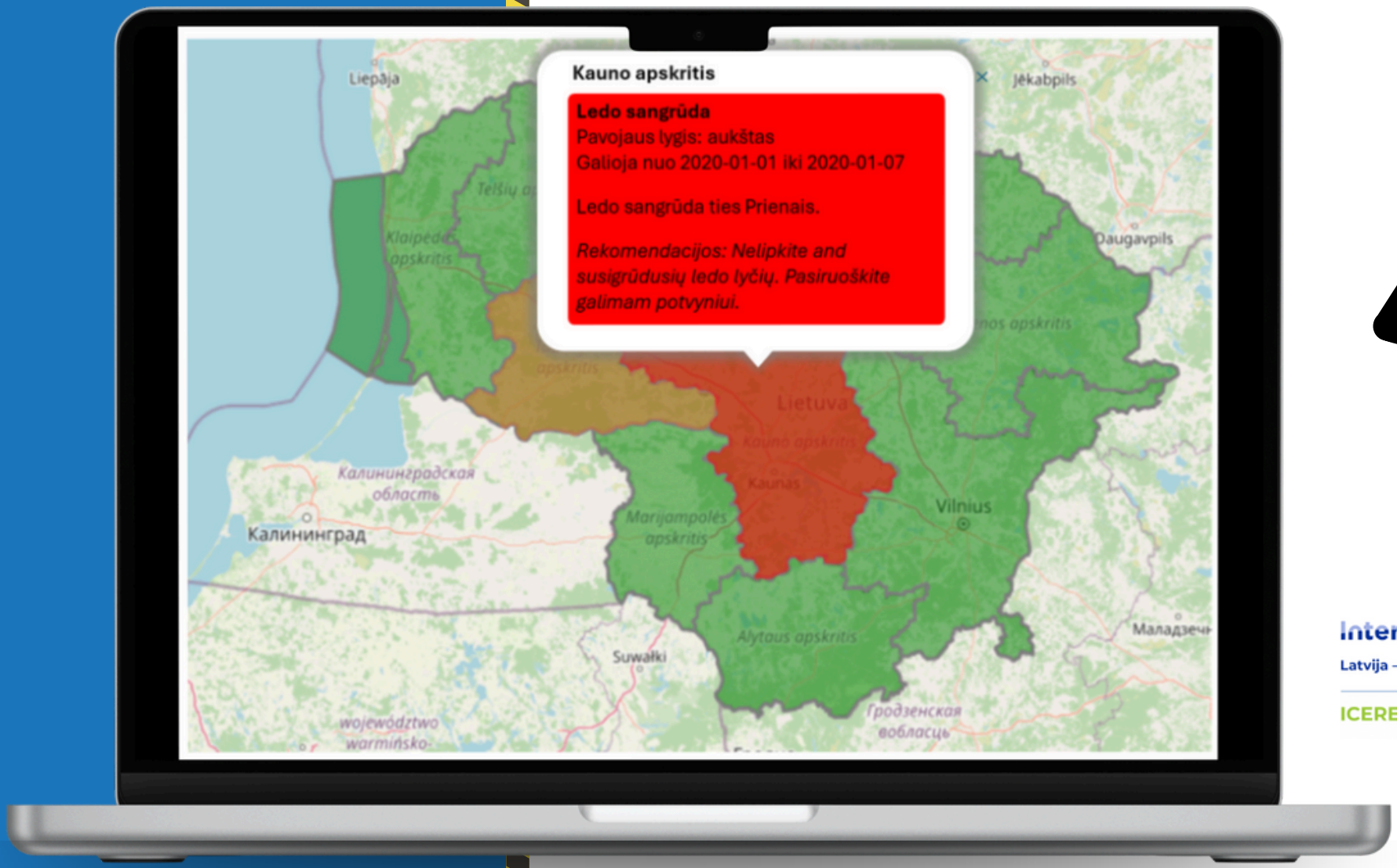


WARNING LEVELS

Hydrological event	Recommendations
Ice formation	Do not walk on the ice. Thin ice can break
Ice drift	Do not walk on the ice. Do not stand near the riverbank during ice movement
Ice jam	Do not step onto piled-up ice. Prepare for possible flooding
High river water level	Do not swim in rivers. Prepare for possible flooding
Flood	Be ready to protect yourself and your property. Flooding may affect buildings and roads. Power, communication, and water supply disruptions are possible. Evacuation may be required. Follow instructions from authorities.
Flood	Be ready to protect yourself and your property. Flooding may affect buildings and roads. Power, communication, and water supply disruptions are possible. Evacuation may be required. Follow instructions from authorities.

EXAMPLE OF AN ICE-JAM WARNING

Major damage and/or casualties over a large area, posing a threat to life)



Interreg
Bendrai finansuoja EUROPOS SĄJUNGA
Latvija – Lietuva
ICEREG