

# Alps

## Aim

Provide stakeholders with tools to manage the potential cascading and compounding effects of cross-border transportation disruptions.

## Why

Small events can have far-reaching consequences, often unpredictably threatening the stability of critical infrastructure.

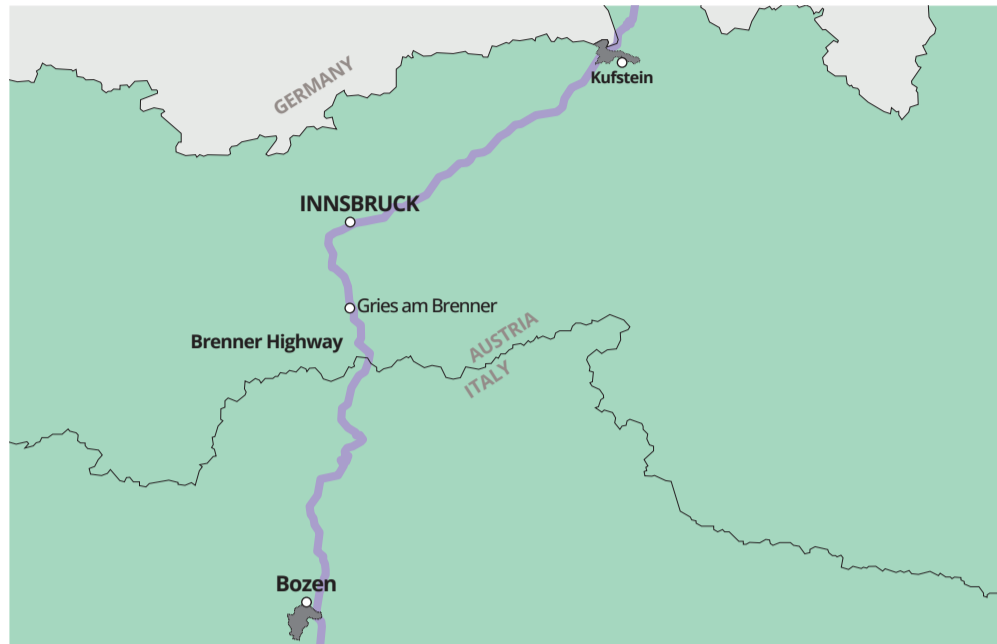
## Why Alps

Infrastructure across the Alps linking northern and southern Europe is essential for local communities and cross-border transportation. Global environmental change is already more pronounced in mountainous areas, with scenarios predicting more extreme events.

## Where do we want to go

Understand the linkages between hazard events and the impacts they trigger, integrating both qualitative expert input and quantitative data-driven analysis.

## Geographical area

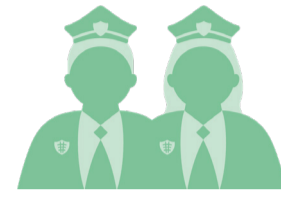


Gries am Brenner, Austria 47.0593 N, 11.48245 E

## Stakeholders involved



Regional Warning Centre



Road & rail authorities



Geological/meteorological services



Insurance companies

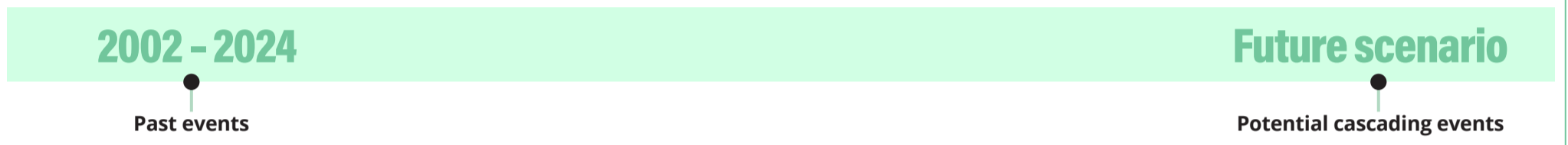


Policy makers



Civil protection

## Timeline of impact chains



## Sectors



Transport and mobility



First responders

## Hazards



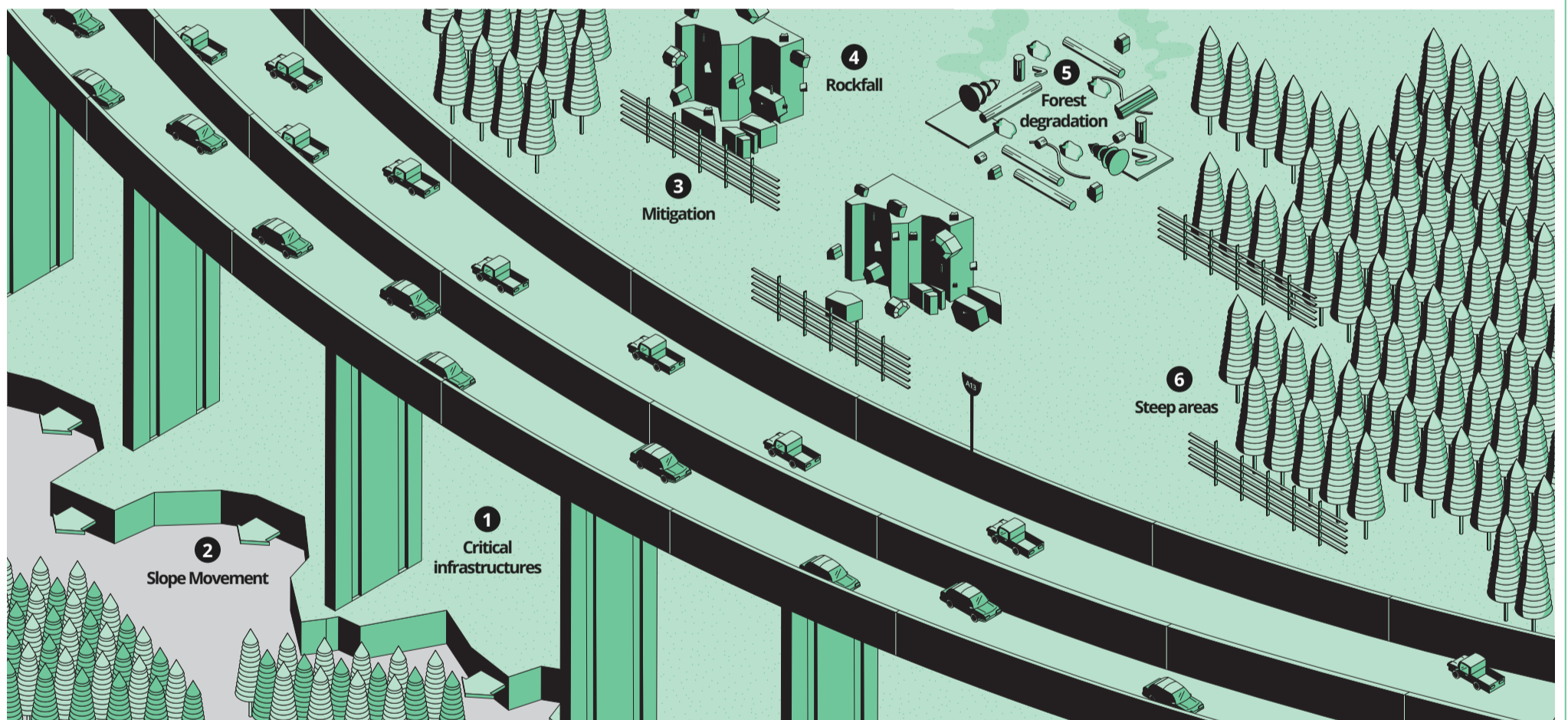
Extreme weather events



Geomorphic hazards



Human-induced hazards



## Research Methodology

Based on the concept of impact chains, **the impact of cascading hazards** will be analysed with a **comprehensive literature review of past hazardous events** in the study area, and current susceptibility maps.

**Multi-hazard risk approaches** to critical road infrastructure will be reviewed and, where applicable, evaluated for dynamic geomorphic hazard modelling.

A conceptual framework **combining both practitioner's knowledge and data analysis with susceptibility assessments** will be developed into impact chain models to combine qualitative expert input and quantitative data.

**Hazard forensic and co-development of scenarios is carried out by ASFINAG**, responsible for the national operational management of motorways and expressways in Austria, together with its Italian counterpart and with several other partners.

Regional economic impact will be projected for various scenarios related to the **interruption of cross-border transportation due to compounding events**. Also, another focus will be on local communities, focusing on a wider range of natural hazards, including drought, windstorms, and flash floods.

A **variety of stakeholders** from different sectors will be involved, such as **Geosphere Austria** (former Geological Survey and Meteorological Service), and **WLV** (torrent and avalanche control).

## Expected Results

**The changing climate**  
The changing climate affects natural processes in many ways and leads to an associated increase in natural hazards.

**Interruption of cross-border**  
The Alpine Application Case Study focuses on the impact of the interruption of cross-border transportation by extreme and compounding events in a mountainous environment:

**01**  
To show that certain hazards are currently not anticipated but may be changing in their processes, e.g. from avalanche hazard to landslide hazard, due to climate change e.g. changing temporal precipitation patterns.

**02**  
To provide a framework for assessing these interlinked hazard processes and implementing sustainable mitigation measures within the risk pathway.



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