Floods August 2005 in Switzerland

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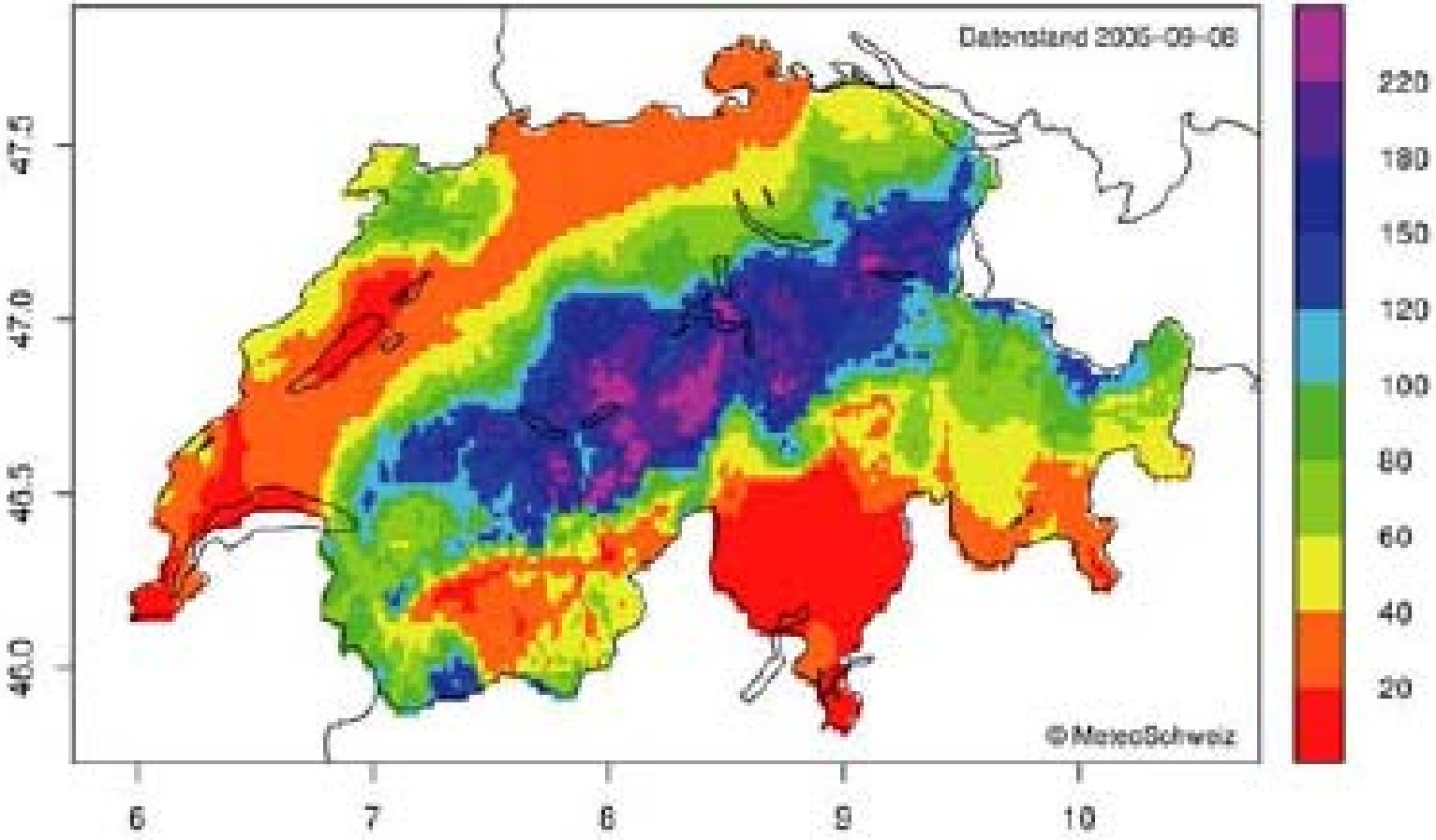
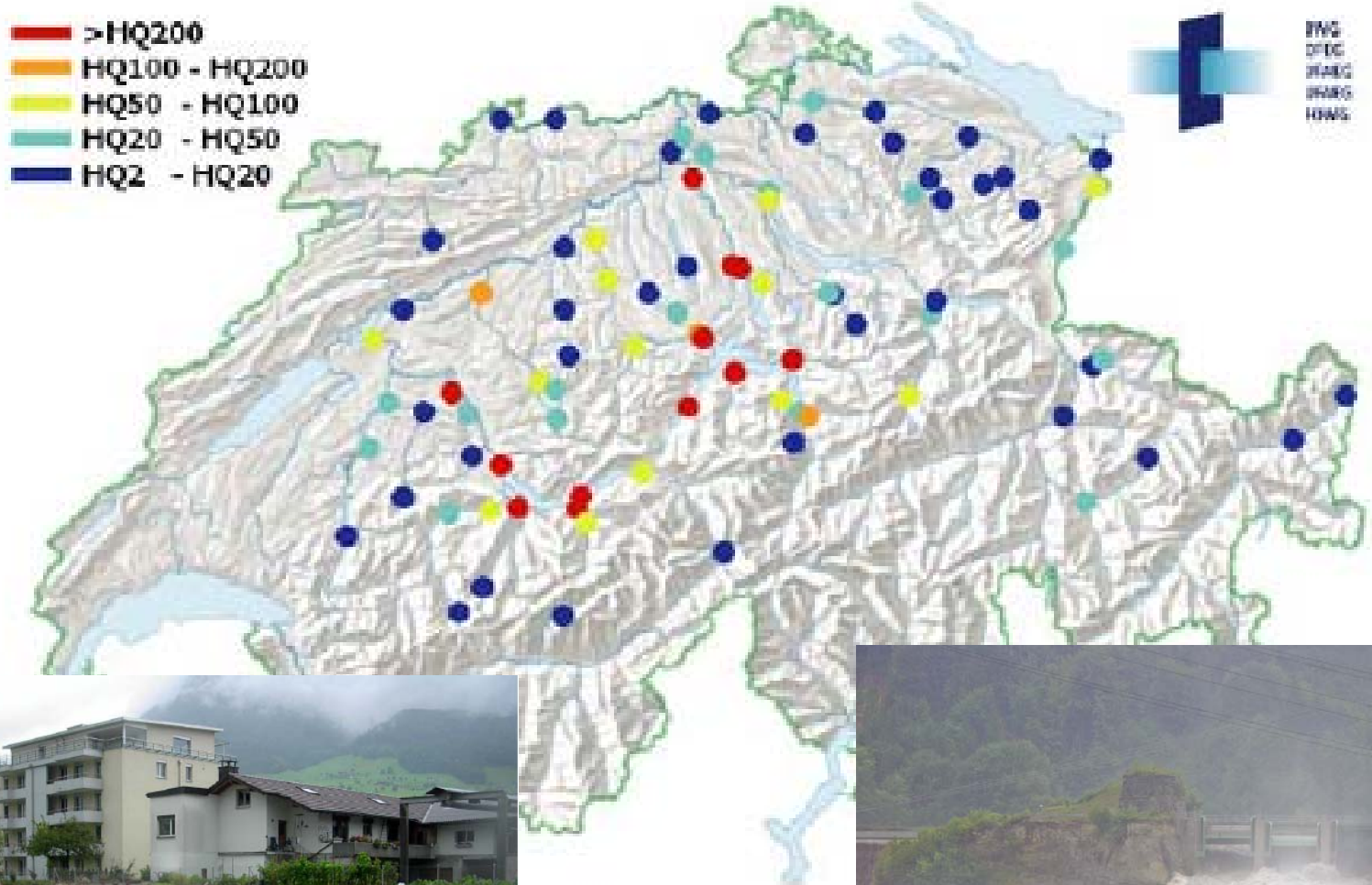
Bern 2005

Causes of the floods was heavy rainfall in central Switzerland



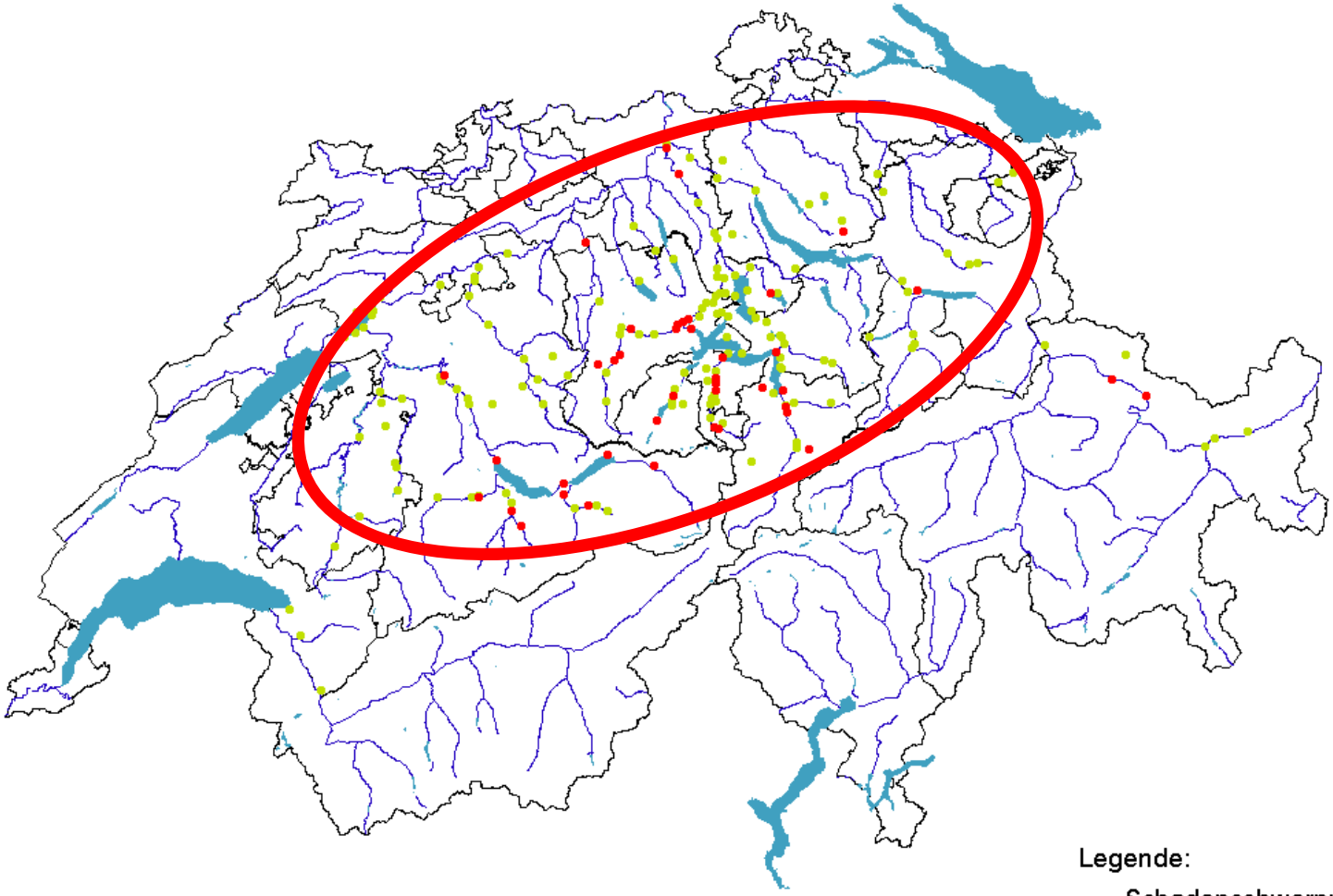
Niederschlagssumme (in l/m^2) für die zwei Tage, 21./22. August 2005. Einzelne Stationen haben bis zu 300 l/m^2 gemessen.
Quelle: MeteoSchweiz

The rainfall caused extreme discharges in rivers of the densely populated regions



Damage Areas 2005

Unwetter August 2005: Schadengebiete



Legende:

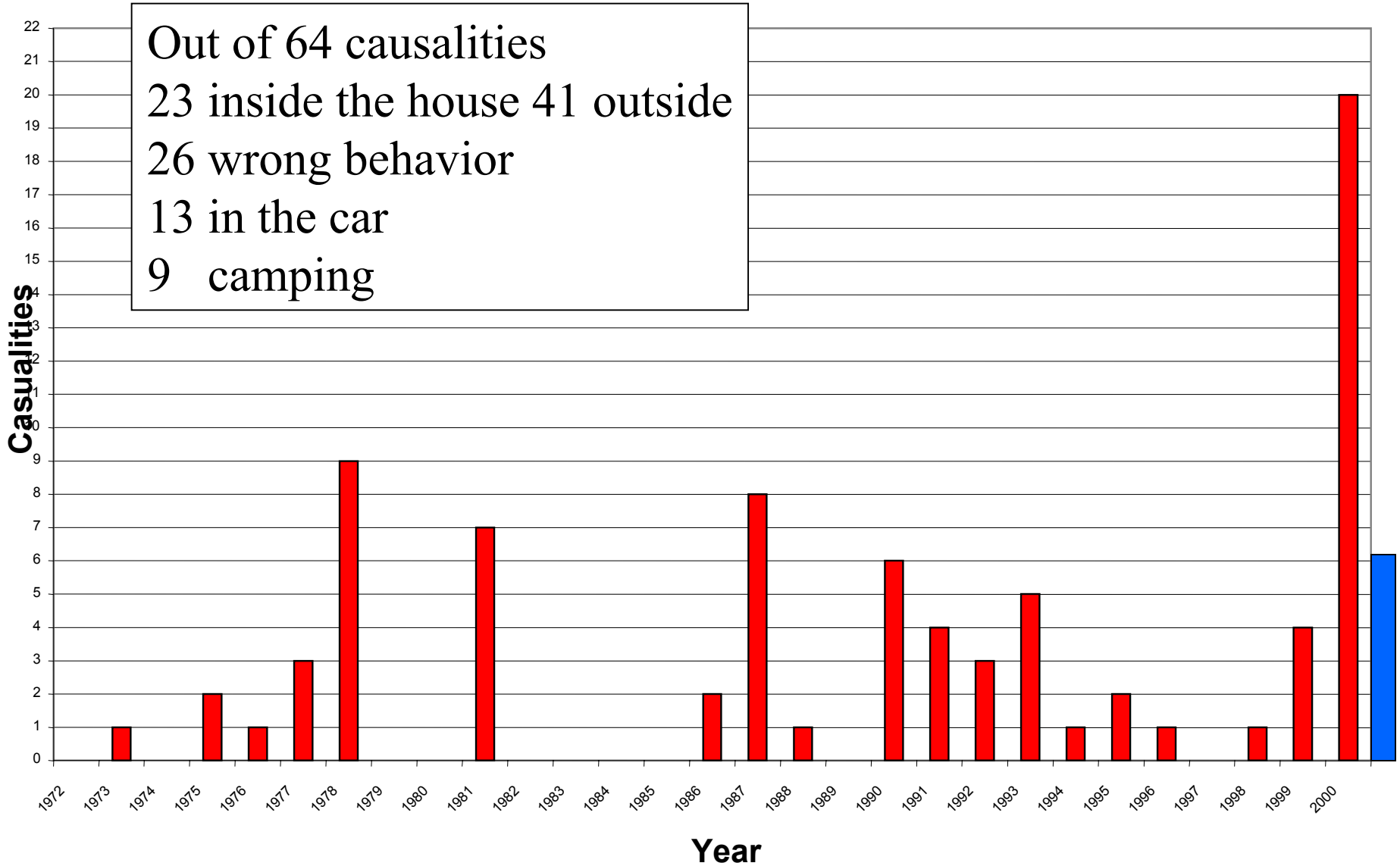
- Schadenschwerpunkte
- weitere Schadengebiete

Quelle WSL, Stand 02.09.2005
Die Karte entspricht dem aktuellen Wissensstand und garantiert keine Vollständigkeit

Vulnerability: Danger for life

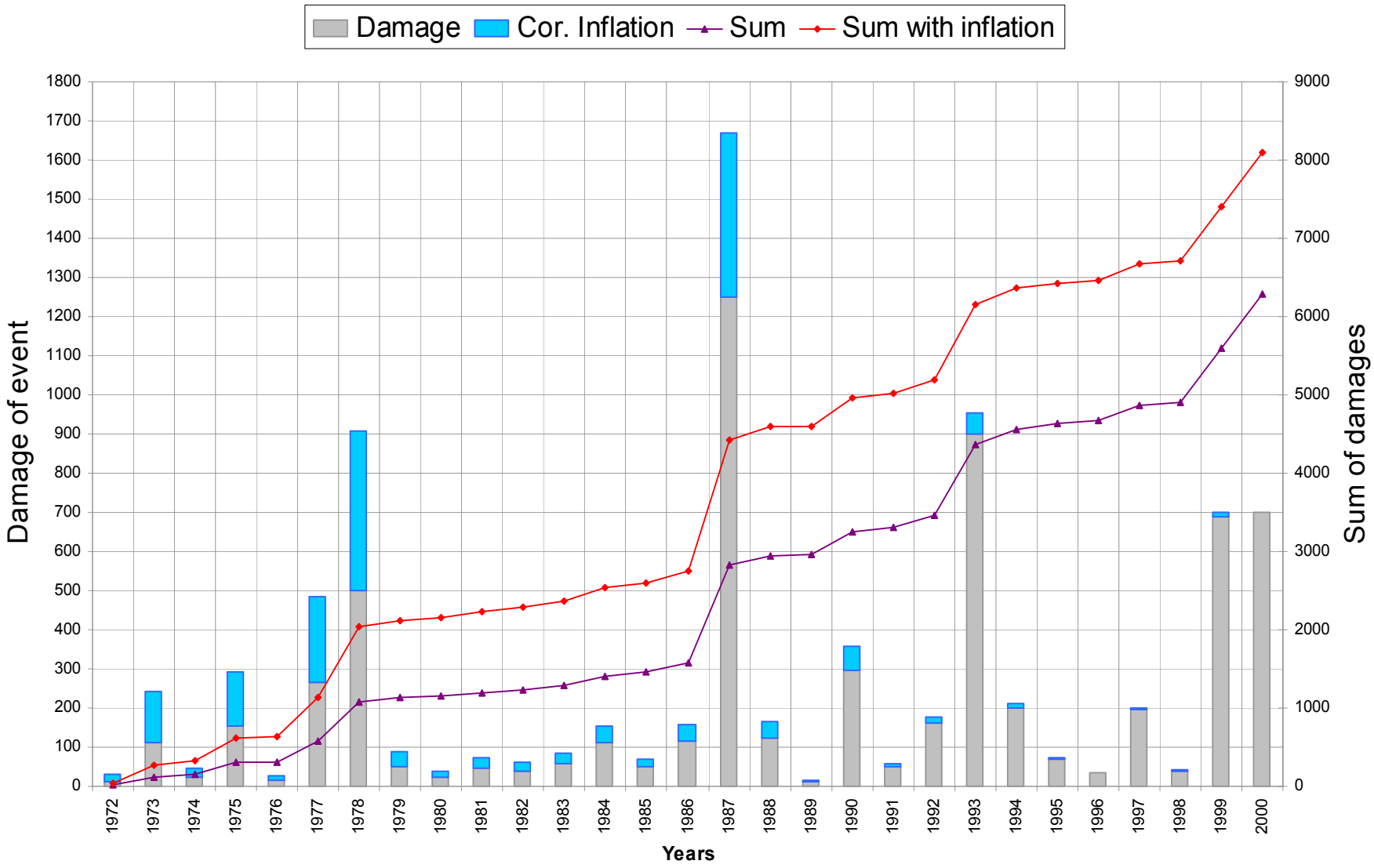
Flood Statistics of Switzerland

Aug. 2005 6 victims
Average. 2 Victims/year

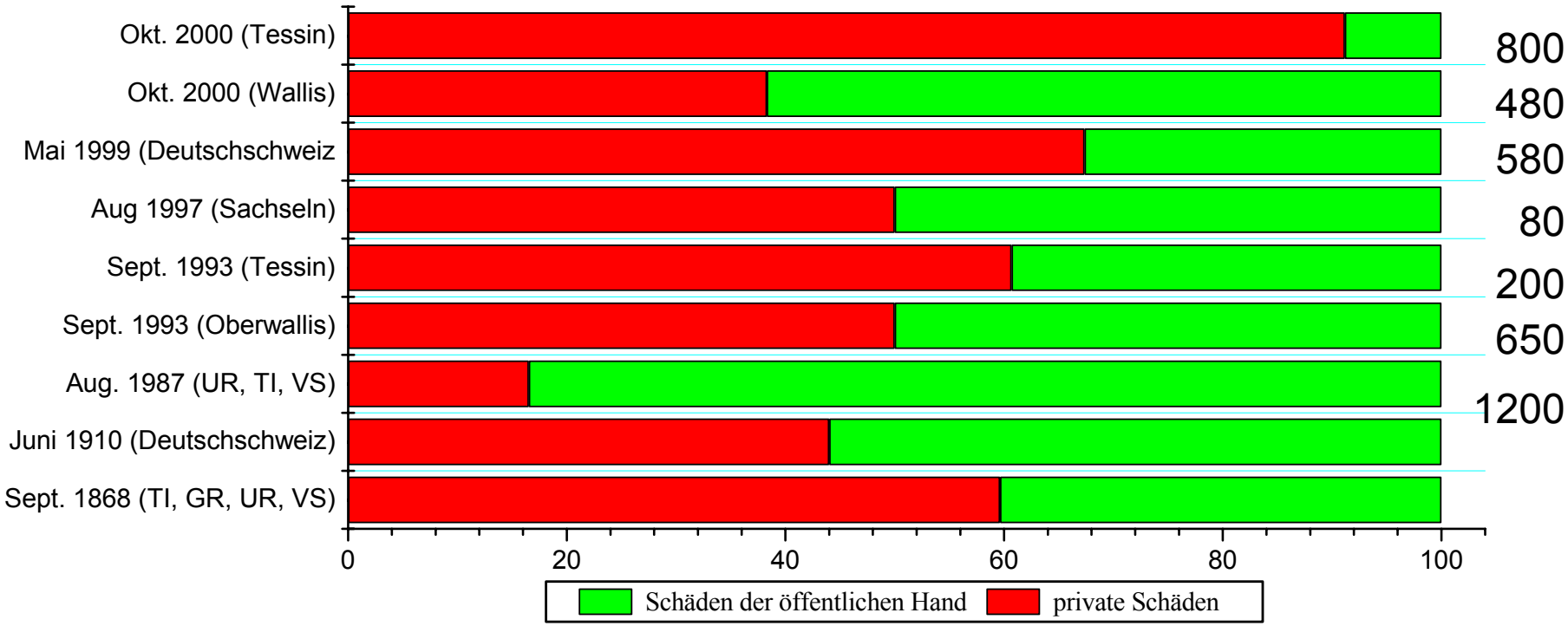


Swiss Flood Damage Statistic

Aug. 2005
2500 Mio. CHF



Comparison of damages



August 2005

Private

Public

Type of Impact

Static Flooding

Damage parameter:
water depth

Large areas affected

Type of Impact

Static Flooding

High damage potential because of numerous cases but low risk for live

Type of Impact

Static Flooding

Related damages:

Furniture, machinery

Walls, especially if oil is involved

Bern, Matte (BE), Raumtrocknung

Type of Impact

Static Flooding

Luzern (LU), linkes Reussufer

Defence by emergency barriers

Type of Impact

Dynamic Flooding

Damage parameter:
Velocity and depth

High danger for live

Type of Impact

Dynamic Flooding

Wood, sand and stones are transported by the water

Type of Impact

Dynamic Flooding

Damages are increased by the dynamic forces. The impact of floating debris or stones or the erosion of fundaments may damage the structure

Oey (BE), Schulhaus, Anprall Treibholz

Bern, Matte (BE), Wand herausgedrückt

Kien (BE), Wohnhaus, Setzung und Verkippung der Grundmauern

Type of Impact

Dynamic Flooding

Defence by

Locating on high ground,
Permanent barriers or
Prepared solid mobile elements

Thun (BE), Wohnhaus, Anschüttung

Stansstad (NW), Mehrfamilienhaus, Umgrenzungsmauer

Luzern (LU), Dienstleistungsbetrieb, mobile Elemente

Type of Impact

River bank erosion

During large flood events the river can start to meander.

Type of Impact

River bank erosion

High damage: Leads to destruction

Defence: River training measures
Deep foundations

Type of Impact

Slides and mudflow

Damage parameter:
Depth of slide
Volume of movement

Type of Impact

Slides and mudflow

Damage

In many cases complete destruction of the house

Entlebuch (LU), Tiefgründige Rutschung

Schüpfheim (LU), Wohnhaus, Totalschaden

Type of Impact

Slides and mudflow

Defence

For deep slides stabilization measures for the slide must be applied

Alpnachstad (OW), Wohnhaus, verstärkte Rückwand

Wohlhusen (LU), Wohnhaus, temporäre Schutzwand

For mudflows a reinforced wall on the backside can give good protection. Sometimes even temporary walls can keep the mud away from the building.

Type of Impact

Debris Flow

Type of Impact

Debris Flow

Damage

Brienz, (BE), verfrachtete Blöcke

High dynamic impact can cause complete destruction

Brienz, (BE), Wohnhaus, Zerstörung Erdgeschoss

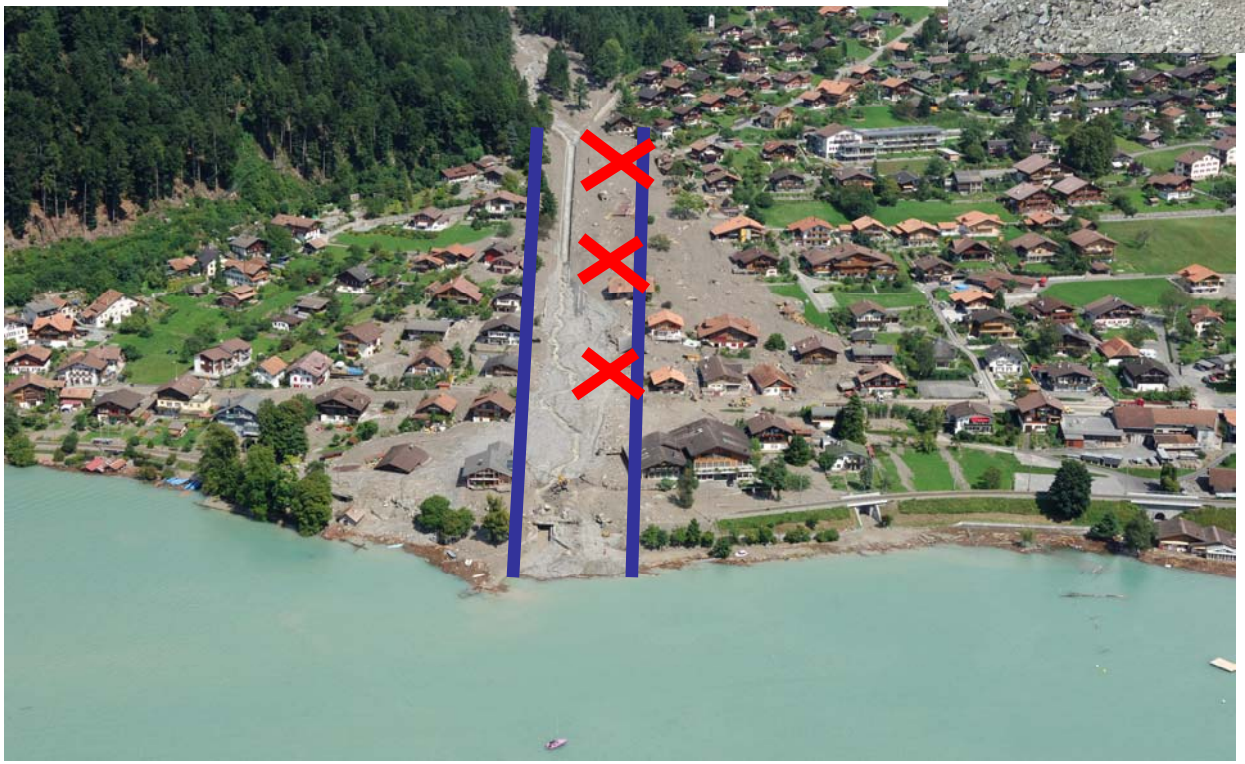
Type of Impact

Debris Flow

Defence

Keep space for the torrent

No reconstruction of destroyed buildings

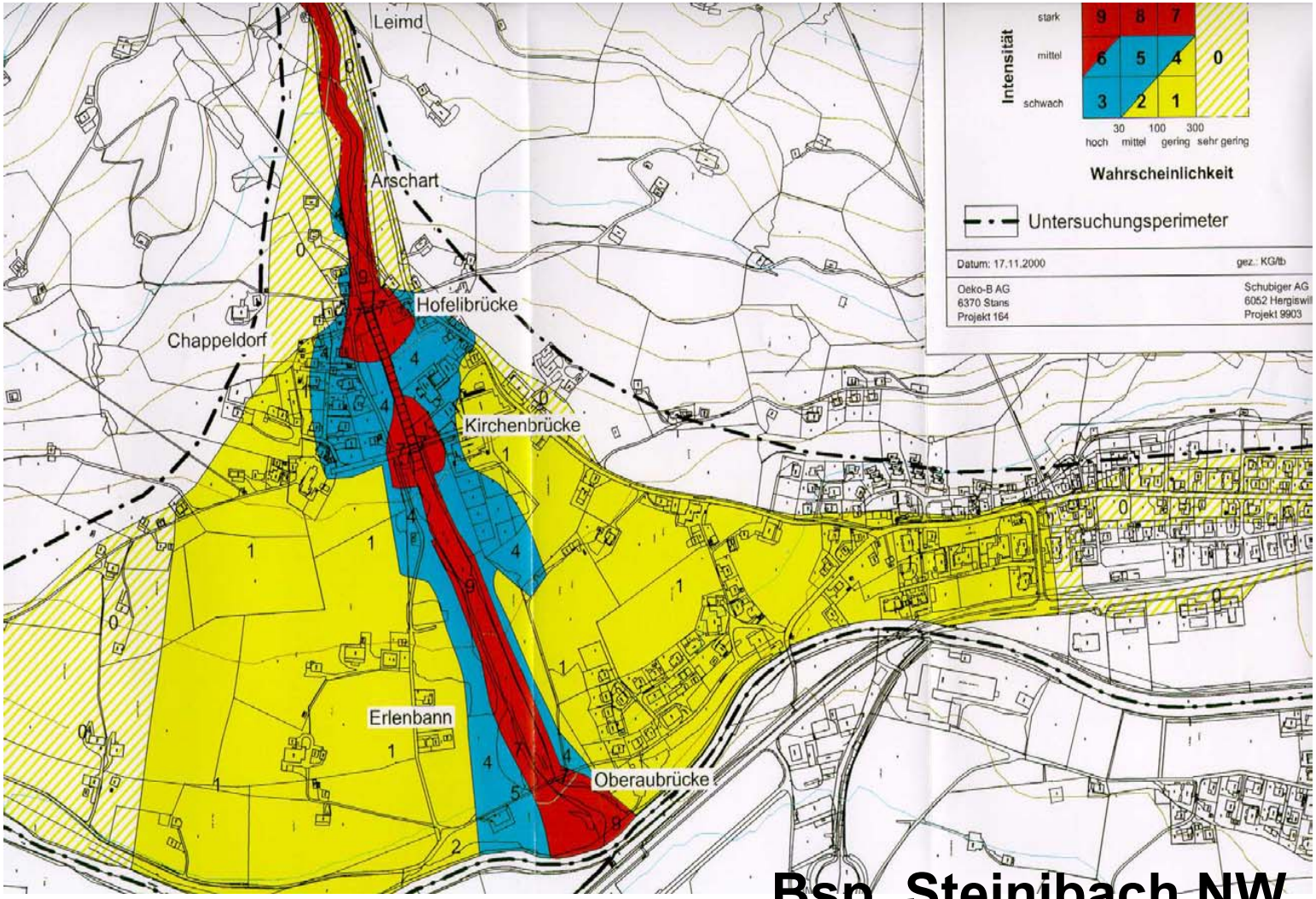


Strong retaining walls

Swiss strategy

1. Knowledge of hazard

Hazard maps show degree and extend

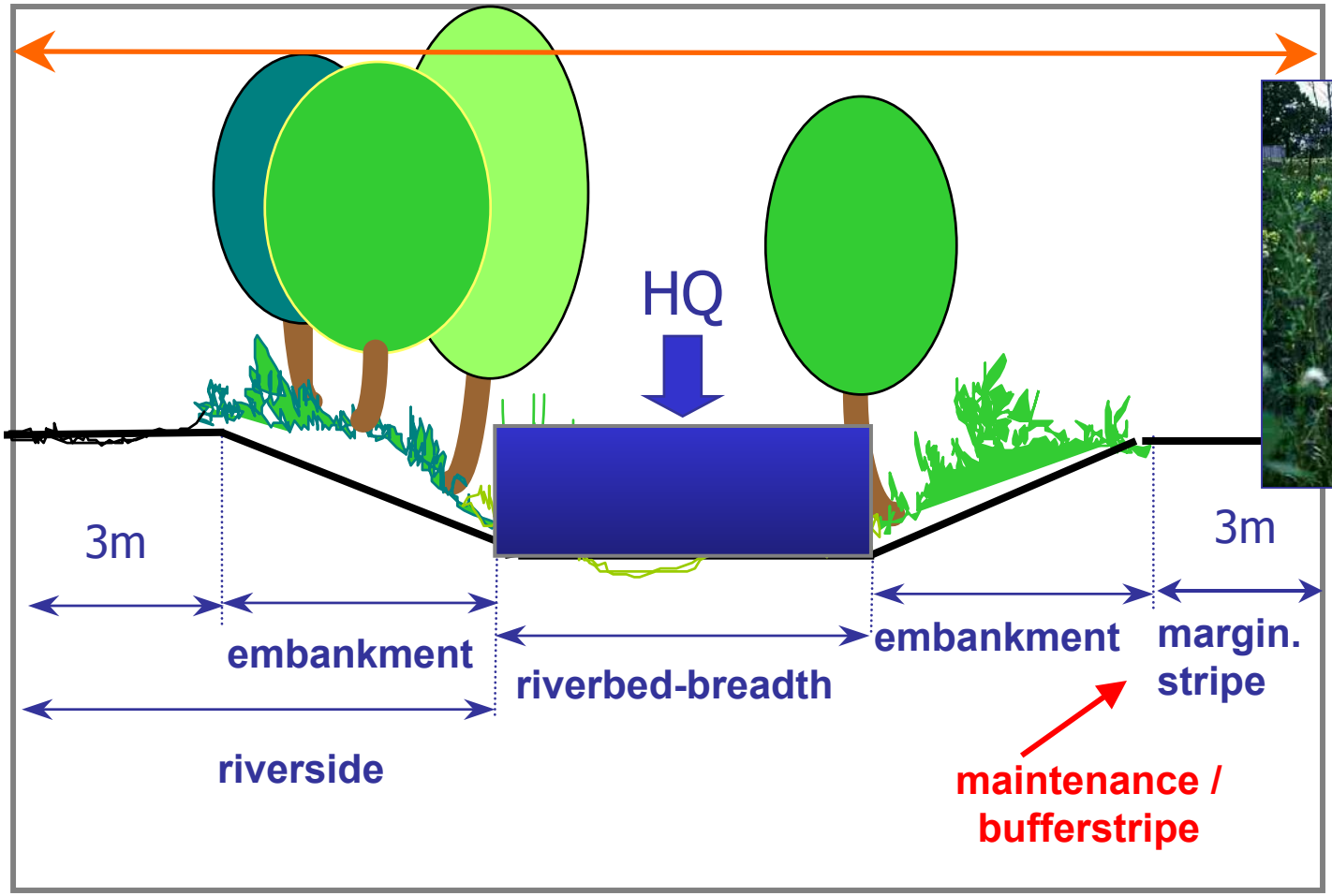


Bsp. Steinibach NW

Swiss strategy

2. Space for the river

Space enables increase of discharge capacity and ecological improvement



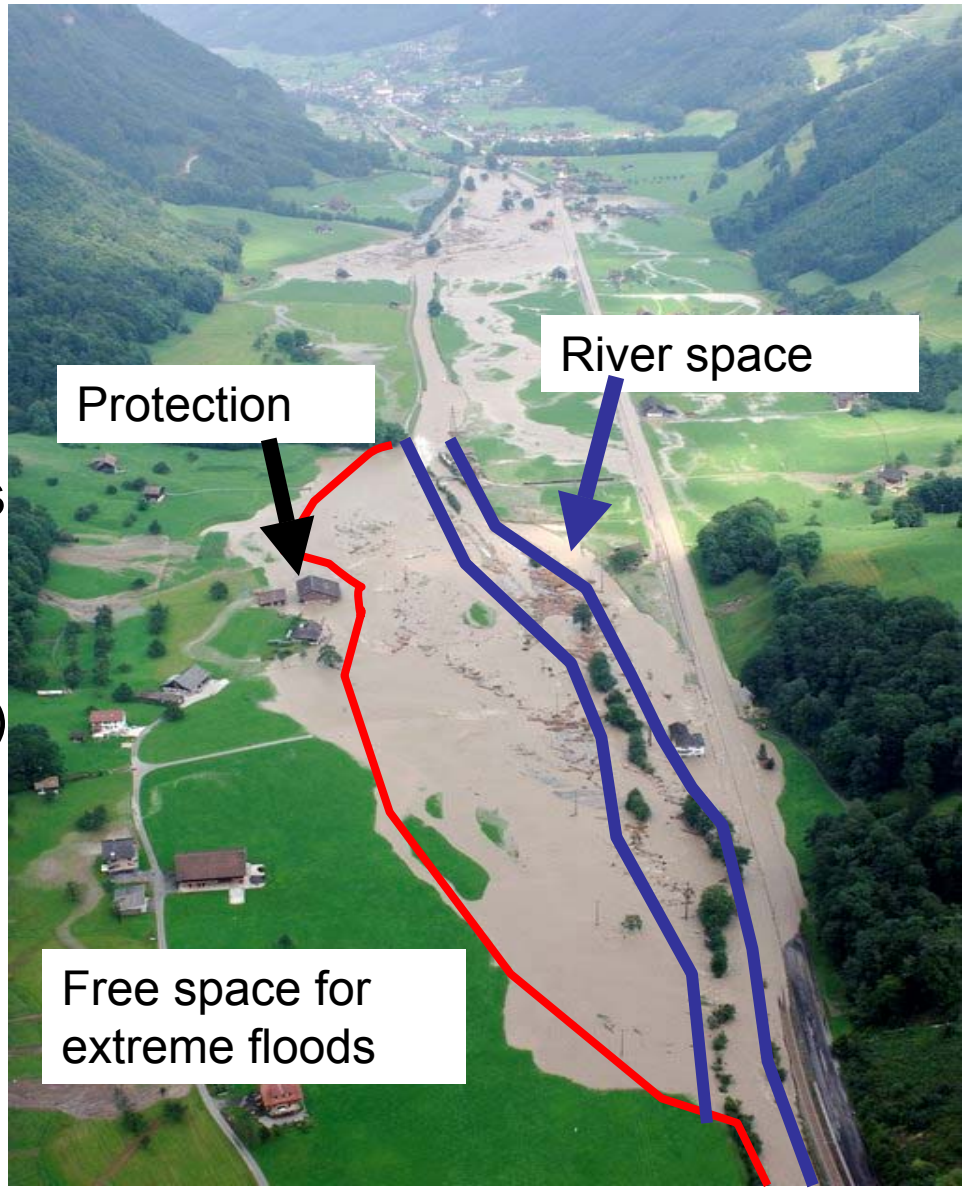
Swiss strategy

3. Reducing damages

3.1 Maintenance of rivers and protection structures *to keep present safety level*

3.2 Spatial planning measures *to avoid an increase of damage potential*

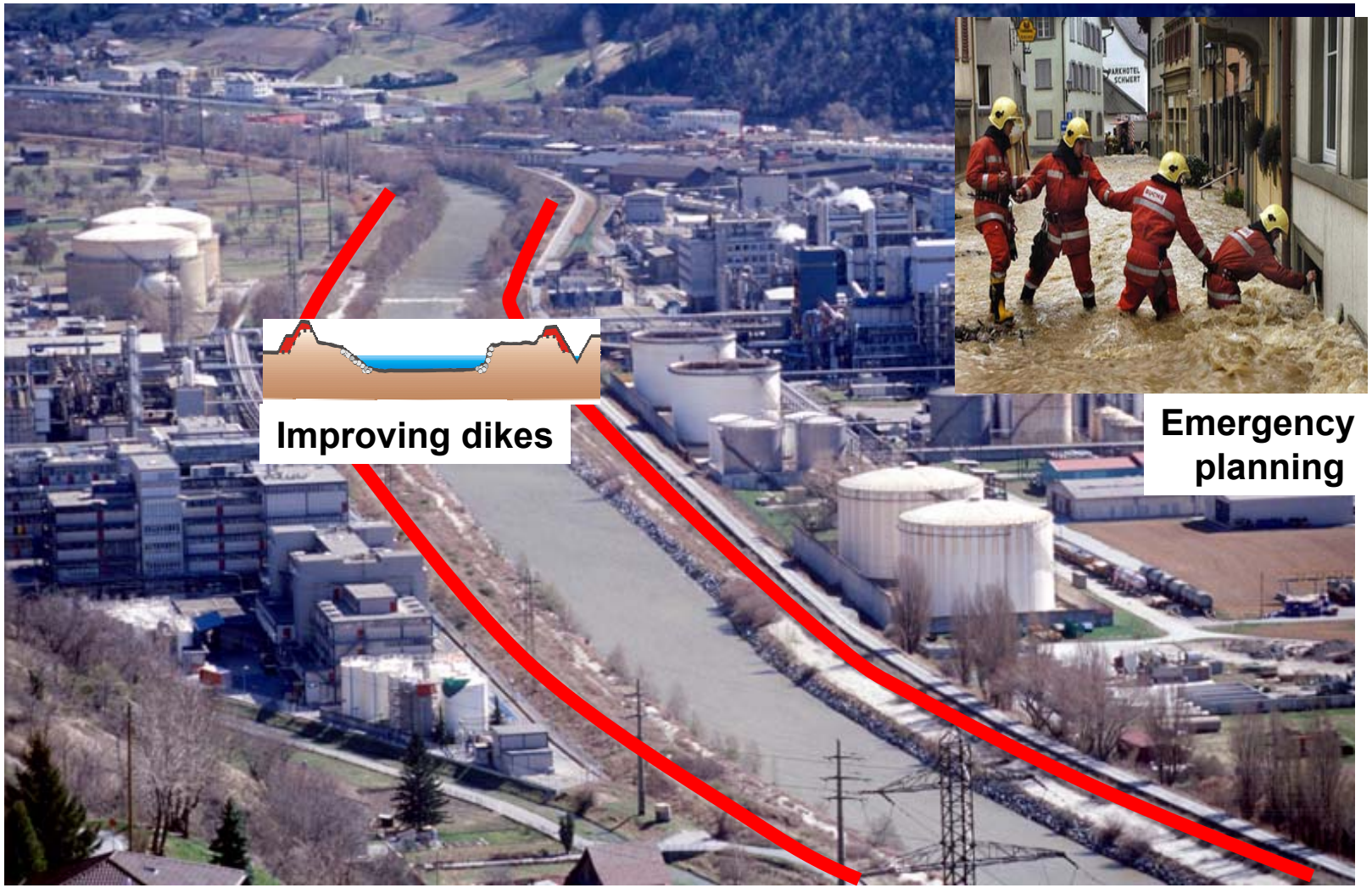
- keep free high endangered areas (red)
- adapted construction and local protection (permanent or mobile) in medium and low endangered areas (blue and yellow areas
- restricted land use in areas necessary for retention and emergency measures



Swiss strategy

3.3 Protection measures

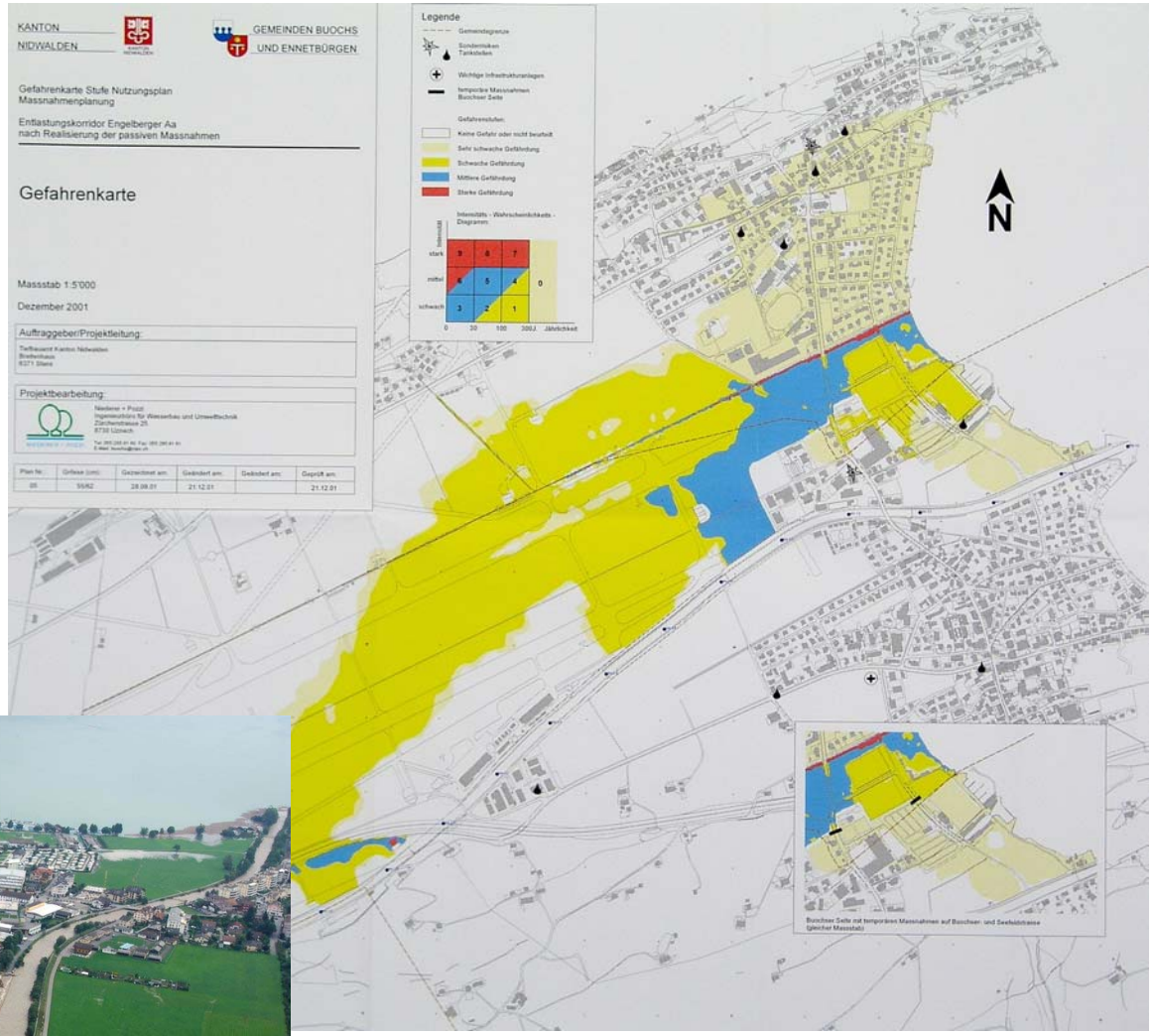
Increase safety where required,
Include all types of measures in your planning and consider extreme events



Swiss strategy

3.3 Protection measures

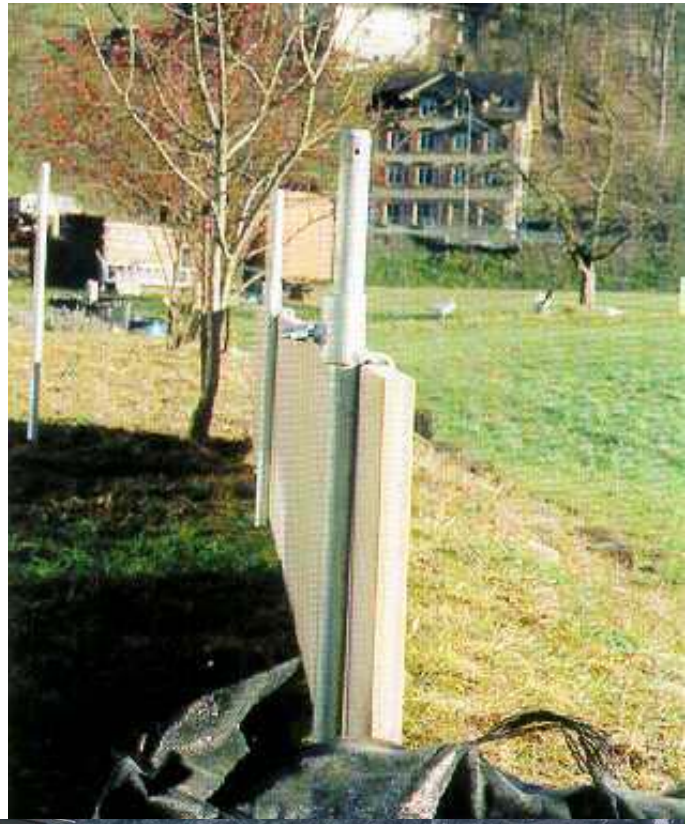
consider extreme events



Swiss strategy

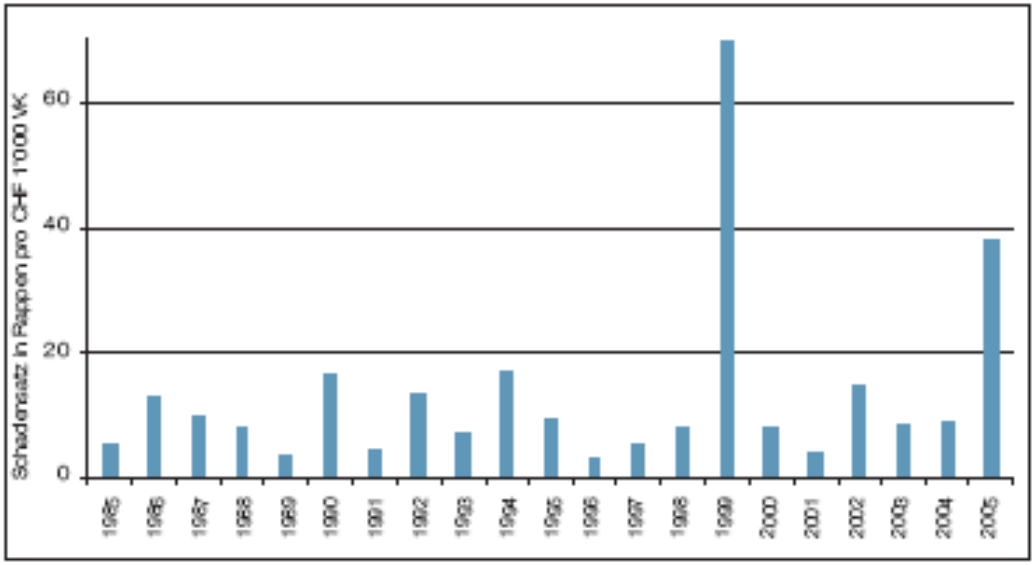
4. Emergency Planning

Be prepared for the unexpected

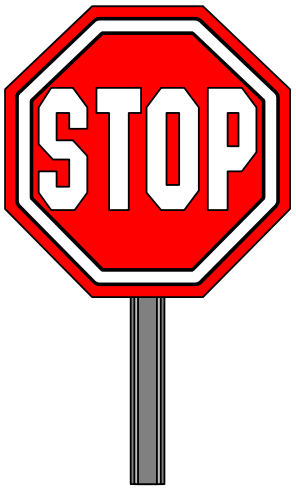


5. Insurance

To enable reconstruction if the damage occurs



Jahresschäden an Gebäuden der KGV von 1985 bis 2005. Die Jahresschä-



FLOODS

If you do not find the strong man, who stops the flood, ……

You have to live with floods