



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Federal Department of the Environment, Transport,  
Energy and Communications DETEC  
**Federal Office for the Environment FOEN**  
Hazard Prevention Division

# Symposium on flood and integrated catchment management

## **Lessons learned and remaining challenges**

## **in flood risk prevention in Switzerland**

**Stéphane Losey**

Swiss Federal Office for the Environment (FOEN)  
Landslides, Avalanches and Protection Forest Section



# Flood July 2021 - Switzerland



Foto: Nau

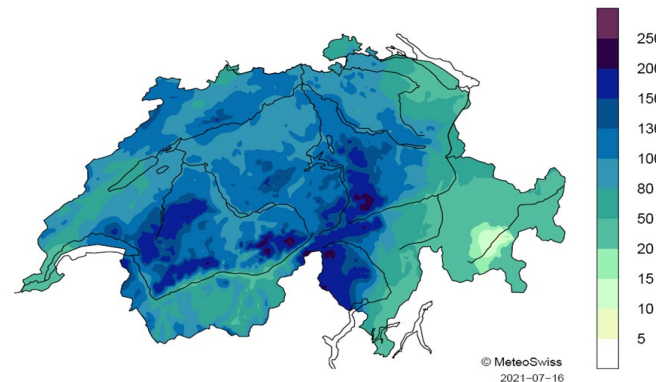


Foto: Kanton Schaffhausen

Local heavy precipitation,  
which mainly affected streams  
and smaller rivers  
→ water and debris flow



Foto: Philippe Gyarmati

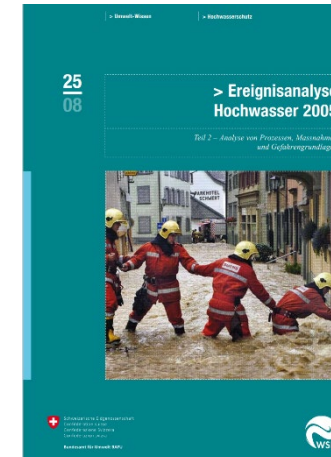
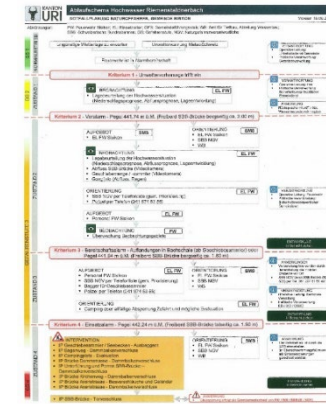
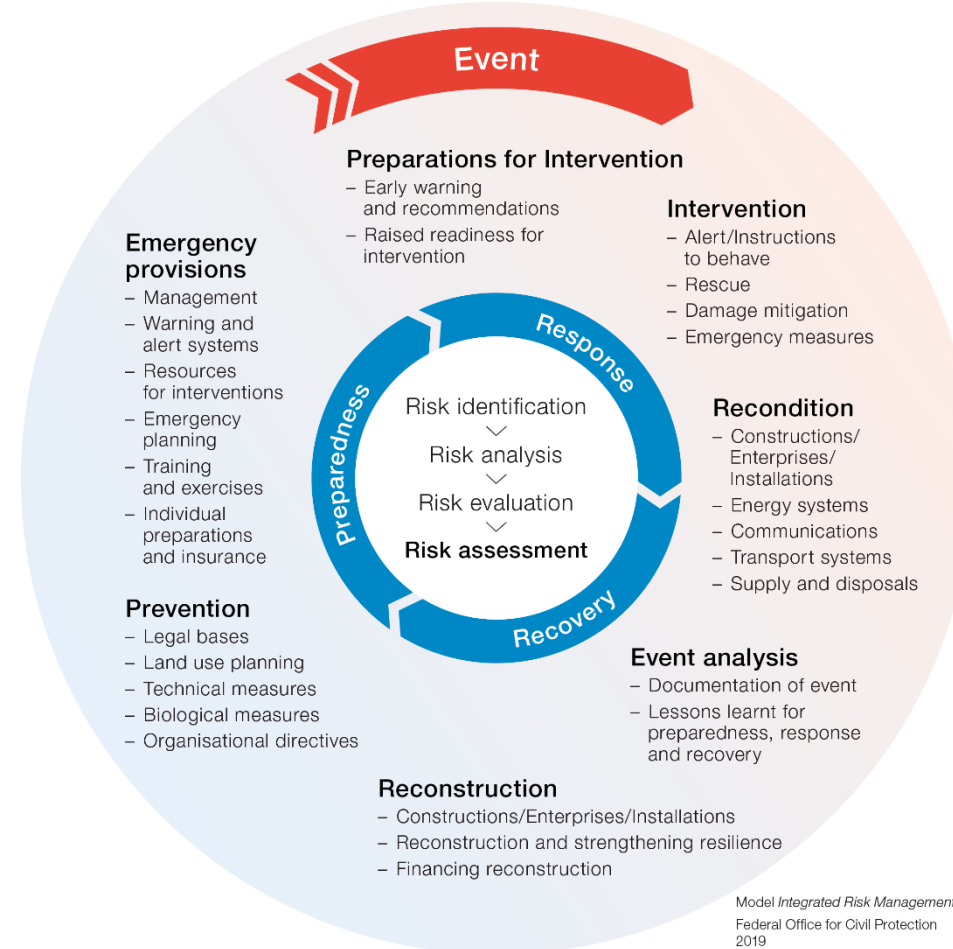
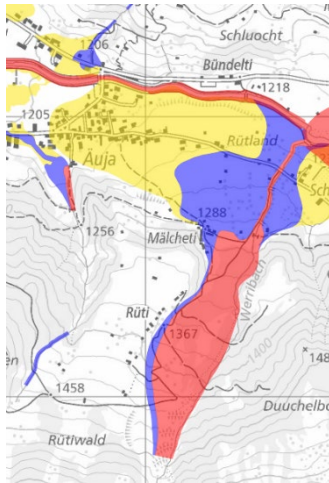
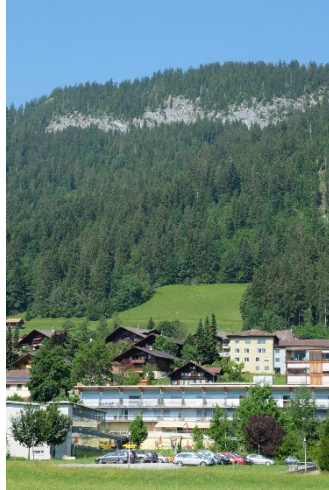


Niederschlagssumme vom 12. – 15. Juli 2021

High precipitation events on a  
larger scale have filled larger  
rivers and lakes.  
→ high runoff  
→ flood management



# Integral Risk Management





# Hazard maps

Dynamic flooding



Static flooding



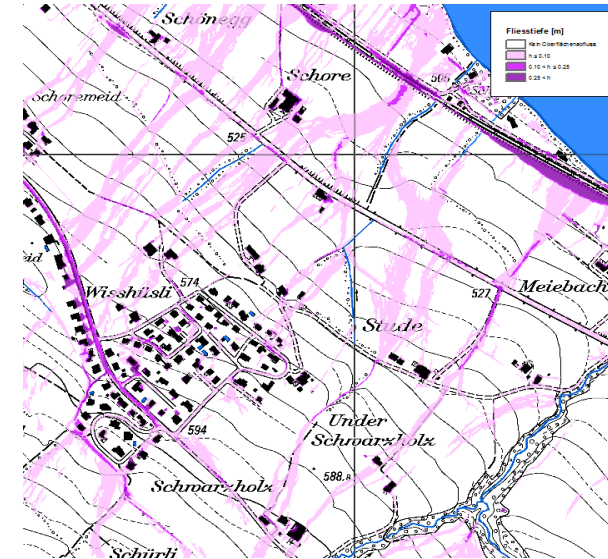
Pluvial flooding



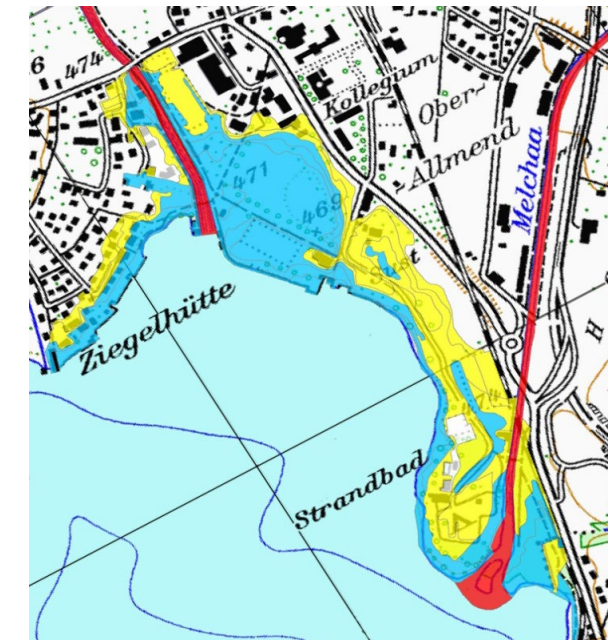
Debris + mud flows



Landslides



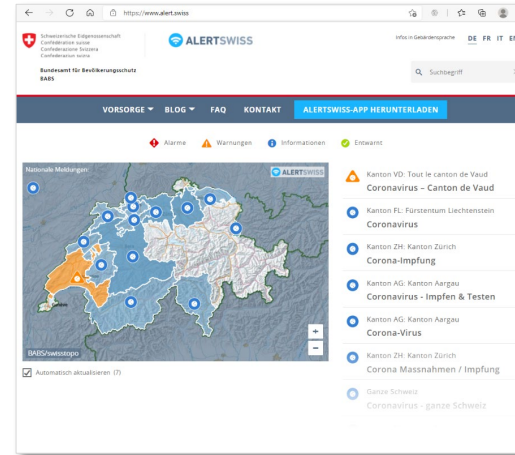
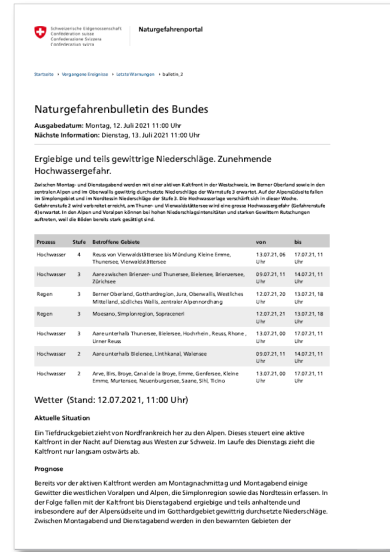
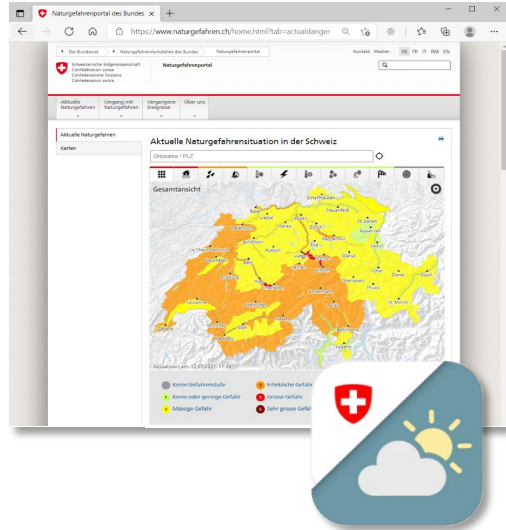
Surface runoff risk map



Hazard map Sarnen, OW



# Organisational measures: forecast, warning, intervention



Forecast, warning: federal offices

Alerting, intervention: cantons and communities



Foto: Feuerwehr Koniz

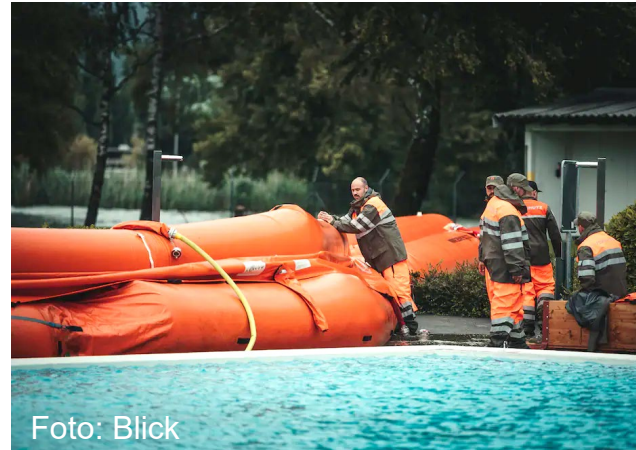


Foto: Blick





# Technical Measures

High diversity of measures. As many different options as possible should be considered in the variant study.



Foto: Alessandro Della Bella





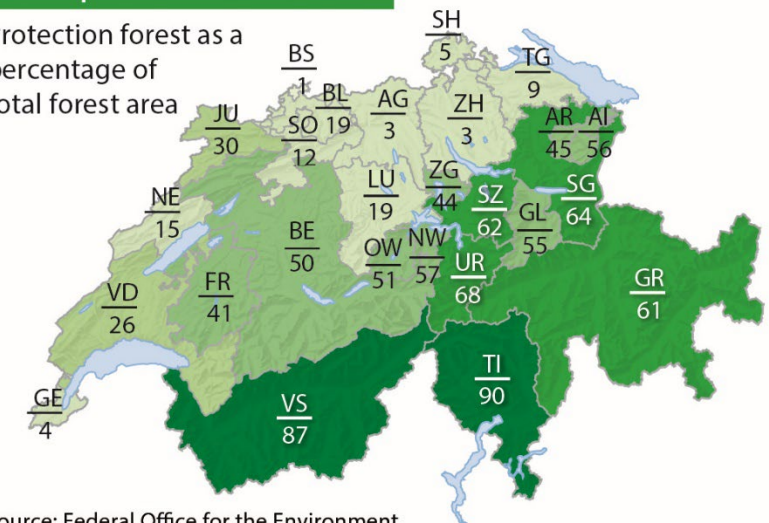
# Biological Measures



Foto: S. Margreth

## Swiss protection forests

Protection forest as a percentage of total forest area






Source: Federal Office for the Environment  
Graphic: Ringier Infographics



# Optimal combination of measures

Distinction of three different types of measures. A good project includes several measures of all types.

## Spacial-planning and organisational measures

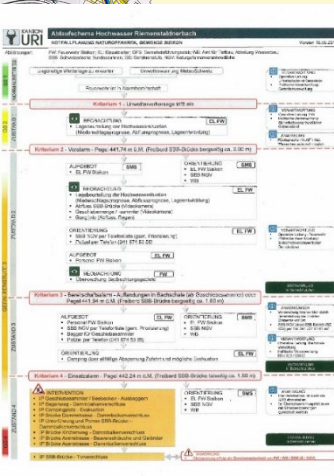
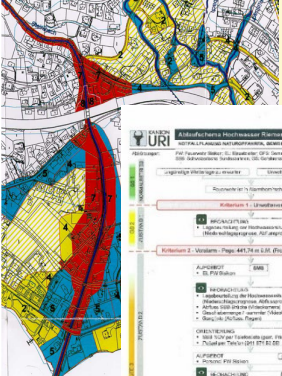


**red zone**  
substantial danger for constructions and people inside houses  
• no new constructions allowed

**blue zone**  
medium danger  
• constructions allowed with restrictions

**yellow zone**  
low danger  
• informations for the land-owners

**cross-hatched yellow-white zone**  
remaining danger  
• pay attention in case of special objects / planning of emergency measures



## Technical measures



## Biological measures

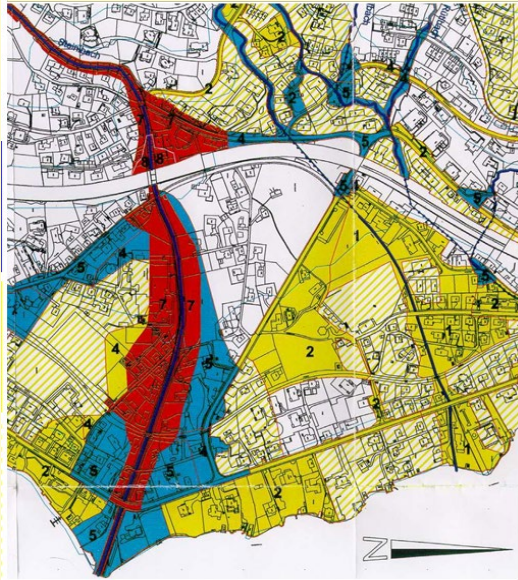




# Consider the unthinkable – overload case

The overload case is not a measure, but a scenario that must be taken into account in the measure concept.

## Spacial-planning measures



cross-hatched yellow-white zone  
remaining danger

- pay attention in case of special objects / planning of emergency measures

## Organisational measures



Foto: Kanton Schaffhausen

## Technical measures

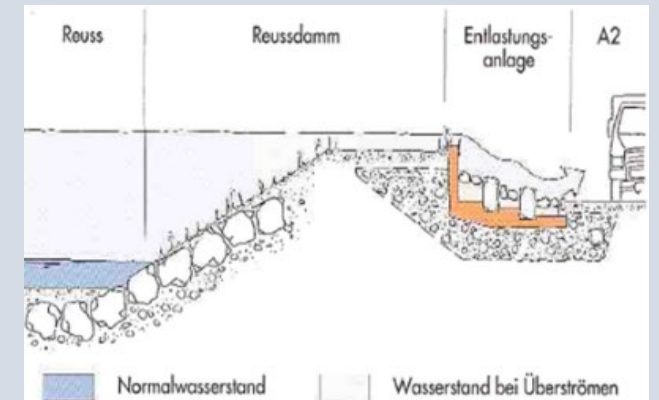
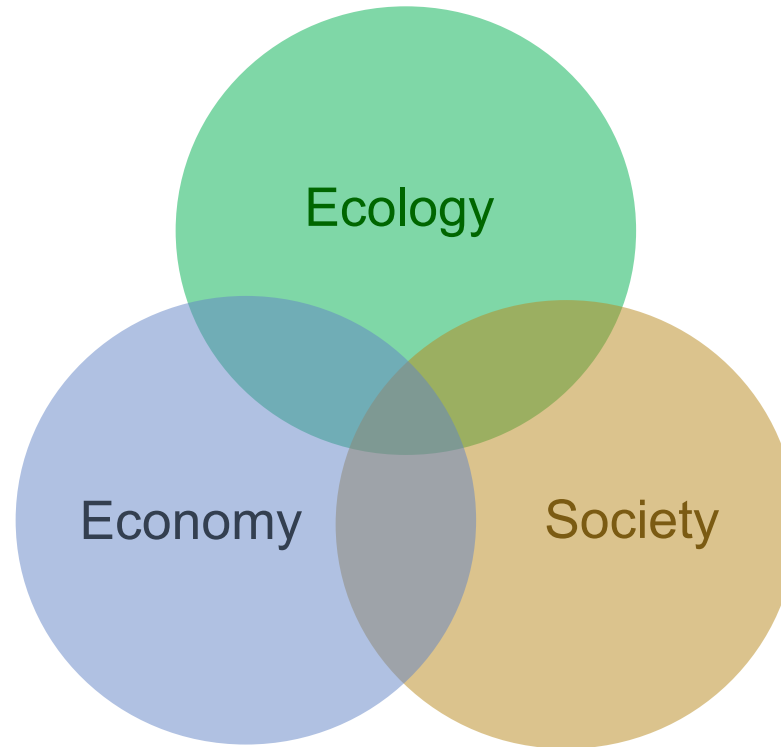


Foto: Valentin Luthiger



# Integral Risk Management and sustainability

Triangle of sustainability: ecology, economy and society

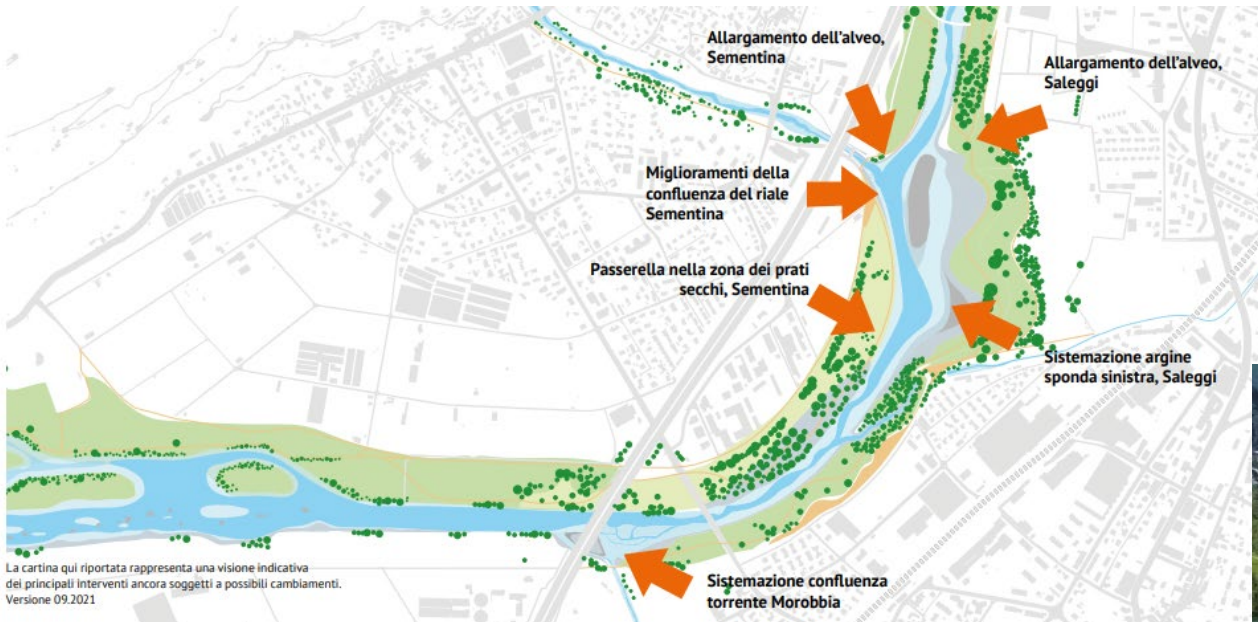
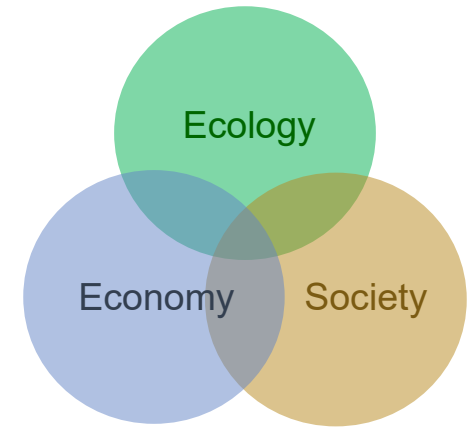




# IRM and sustainability

## Ecology

Preservation and restoration of the ecological functions of water bodies are anchored in the Hydraulic Engineering Act.



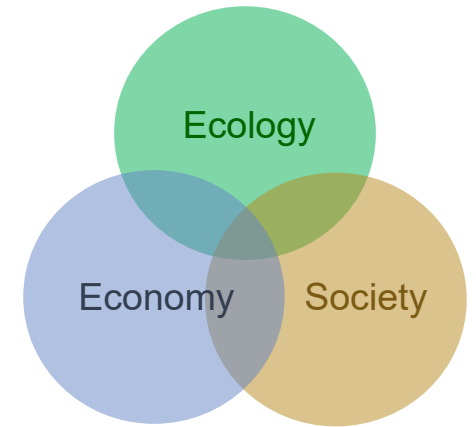
## Parco fluviale Saleggi-Boschetti

A flood protection and river restoration project in canton Ticino





# IRM and sustainability



## Economy

Economic efficiency is a key requirement for federal subsidies

→ EconoMe tool

→ most effective and cost-effective combination of measures

Schweizerische Eidgenossenschaft  
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EconoMe 5.1  
Wirkung und Wirtschaftlichkeit von Schutzmassnahmen gegen Naturgefahren

Über EconoMe Projektantrag Dokumentation EconoMe intern Projektbearbeitung **Projekt 27-704-3419**

Projektmü  
Projektgrundlagen  
Systembeschreibung  
Gefahrenanalyse  
Massnahmendefinition  
Schadenpotential  
Konsequenzenanalyse  
Risiken und Kosten  
Projektdokumentation

Ortsangabe: Beispiele, Alpendorf Projekttitle: [Import] - Schutzmassnahmen SBB/ASTRA am Alpenbach Zuletzt bearbeitet: 26.01.2022

Projekt neu berechnen Projekt importieren Projektbenutzer Projektdateien Wiki Links

**Systembeschreibung**  
(\* = Pflichtfeld)

\* Projekttitle: [Import] - Schutzmassnahmen SBB/ASTRA am Alpenbach

\* Gemeinde: Alpendorf

\* Gebiet: Alpenbach

\* Perimeter: Kegelhals Alpenbach bis Seemündung

Vorhandene Massnahmen: bisher keine

\* Verantwortlicher im Kanton: Sara Muster

\* Verantwortlicher Gemeinde: Peter Musterli

Kurzbeschreibung: Murgang im Gerinne des Alpenbach bedroht eine Doppelspur und eine Kantonsstrasse.

Arbeitsschritt Systembeschreibung speichern

Bundesamt für Umwelt BAFU info@bafu.admin.ch Rechtliche Grundlagen

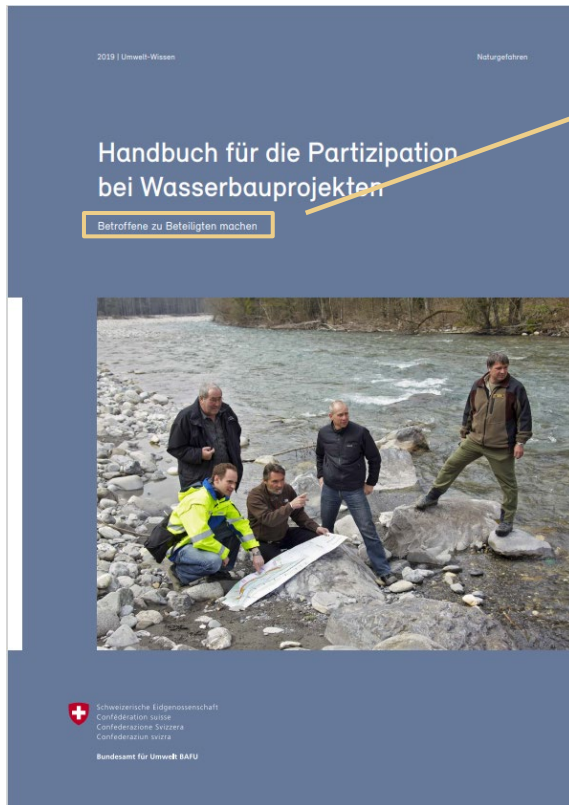
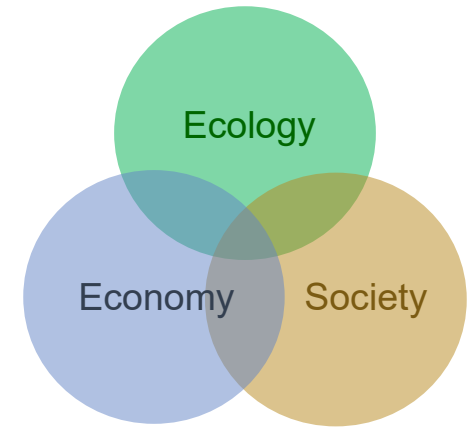
Basic information  
Description of the system  
Hazard analysis  
Definition of measures  
Damage potential  
Analysis of consequences  
Risks and costs  
Projekt documentation



# IRM and sustainability

## Society

Participation: Inclusion and consideration of all interests.



Turning those affected into participants

“A hydraulic engineering project should not be the result of a sum of constraints. It must identify the observations and expectations of users and residents, to bring out, through participation, the opportunities that will make it a quality project.”

Elise Riedo (Urbaplan sa)





# Conclusion

- Integral Risk Management is not only a saying but a time and money consulting process.
- We learned that Integral Risk Management must be pursued more strongly.
- The challenges are the implementations of Integral Risk Management .
- The Integral Risk Management has to consider the sustainability.



# THANK YOU FOR YOUR ATTENTION!!!



Foto: Markus Forte, Express