

# Integrated water resources management in Geneva canton : River renaturation and transboundary river agreements

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REPUBLIQUE  
ET CANTON  
DE GENEVE

POST TENEBRAS LUX

Department of Territory  
Water Unit

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# Geneva Canton



500 000  
INHABITANTS

1870  
PERS./KM<sup>2</sup>

280 KM<sup>2</sup>  
SURFACE

45%  
AGRICULTURE

25%  
URBAN  
AREA

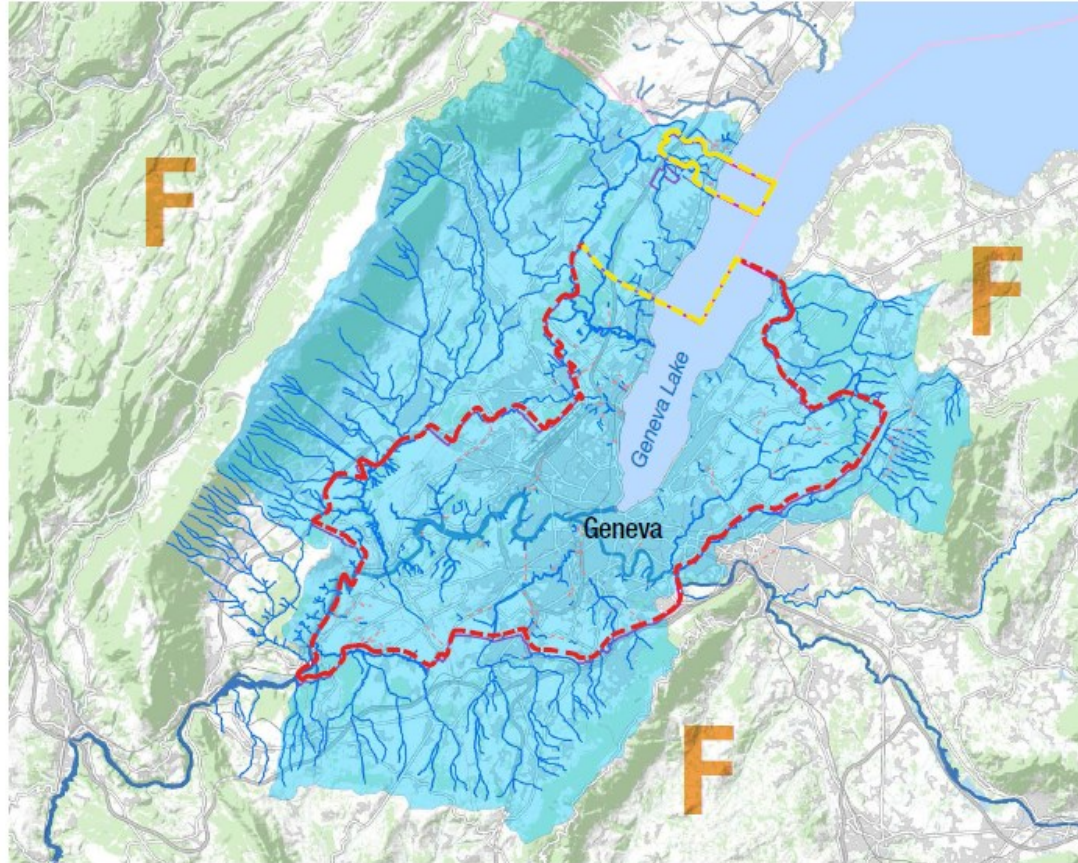
15%  
LAKE

15%  
FOREST  
AND RIVERS

93%  
OF THE BORDERS  
WITH FRANCE



# Administrative limits $\neq$ hydrological limits!



- > Geneva is surrounded by mountains, concentrating water flows towards city center.

# Population growth and urbanisation

People need more space to build houses and infrastructures and to cultivate the land (use of drainage, rivers and streams are channelised)



*Geneva old town (500 years ago)*

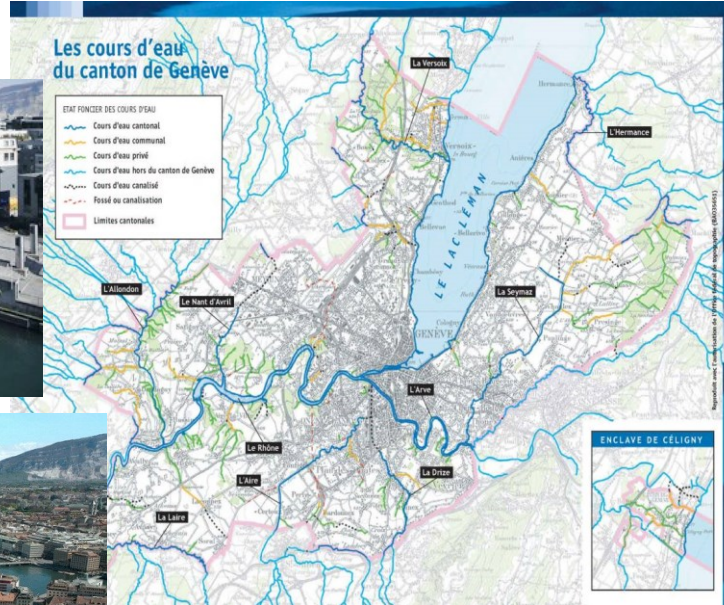


*Geneva city center (nowadays)*

Less and less space for the rivers  
Loss of natural ecomorphology  
Modified hydrology



# Water resources under pressure and water management get more and more complex



- > Densely populated territory.
- > High expectations for water quality and quantity (industry, hydroelectric plants, drinking water supply, swimming, fishing, sailing, etc.).
- > Variety of infrastructures and constructions close to water.

1958

Geneva launches its water sanitation program

1975

Program completed:  
> 120 km of pipes laid  
> 15 wastewater treatment plants built  
> 27 pumping stations built

**250** MILLION CHF



**GOAL OF THE PROGRAM ACHIEVED:**  
**99%** OF POPULATION  
**CONNECTED TO WASTEWATER  
TREATMENT PLANTS**

1993

## INTEGRATED WATER RESOURCE MANAGEMENT

In spite of large financial investments in the sewer system and wastewater treatment plants, we still had:



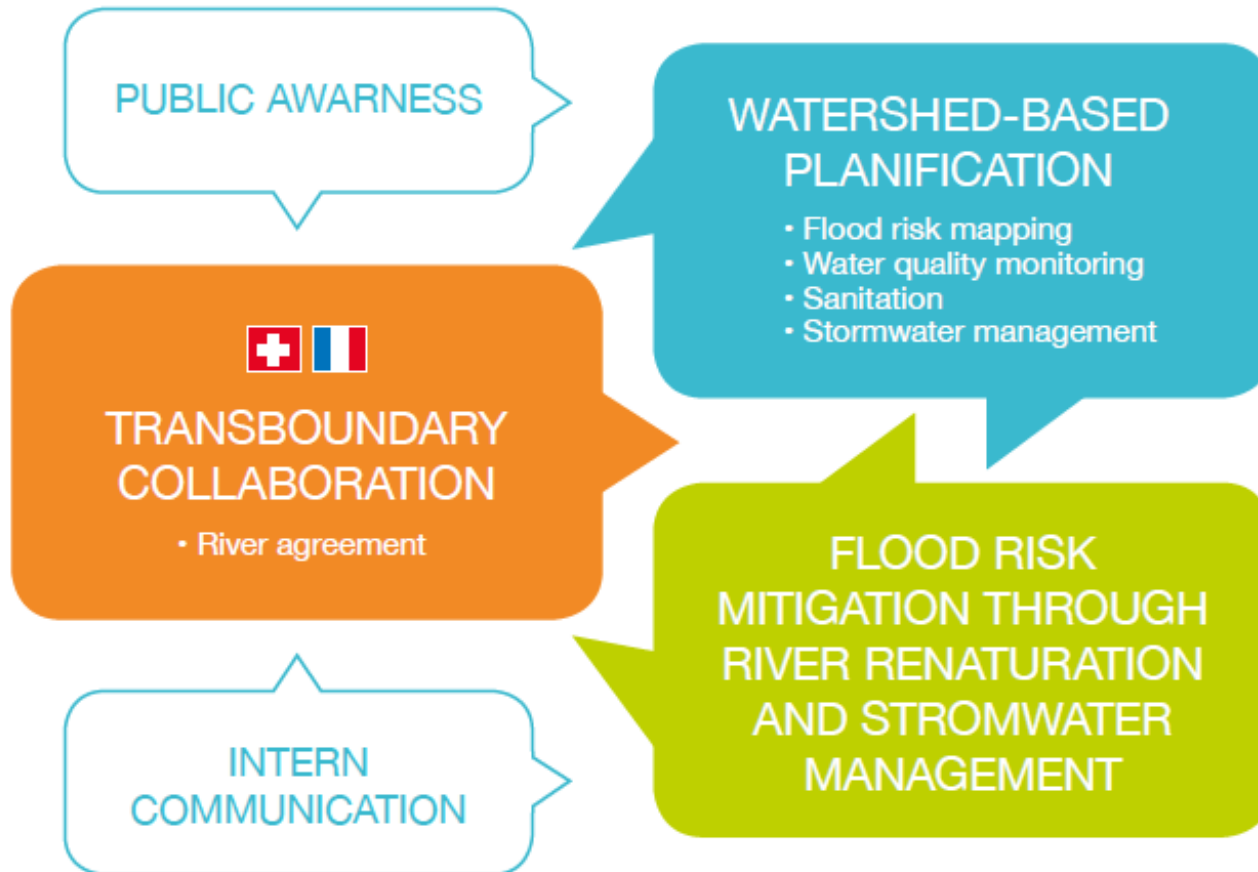
-  Very damaged river ecomorphology
-  > **RIVER RENATURATION PROGRAM**
-  Persisting flood risk
-  > **FLOOD RISK MAPPING AND MITIGATION**
-  Lack of transboundary coordination
-  > **TRANSBOUNDARY RIVER AGREEMENT**
-  Problematic stormwater runoff due to an increased impervious land cover
-  > **ESTABLISHMENT OF STORMWATER MANAGEMENT**

### THE CHALLENGE FOR GENEVA CANTON AUTHORITIES

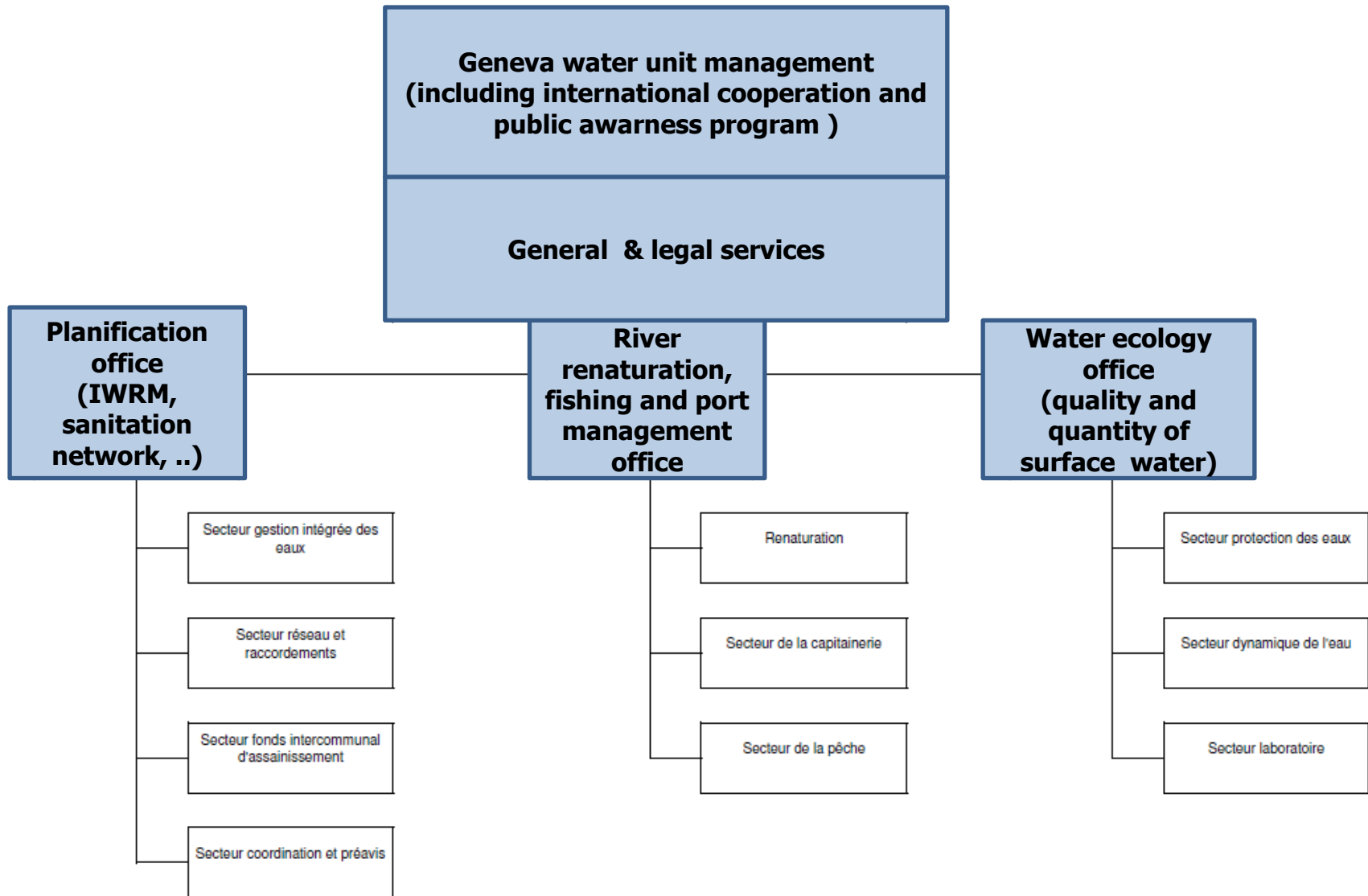
Maintain and enhance natural resources, as well as biodiversity, and mitigate flood risk, despite growing population, urbanisation and industrialisation while:

- > Cooperating in transboundary watersheds
- > Taking into account all stakeholders interests

# The main lines of integrated water management in Geneva



# Organisation chart of Geneva canton water unit





# Transboundary collaboration between Geneva and France

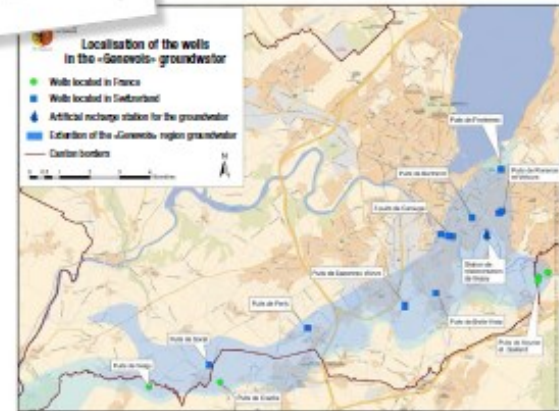
## 1962 International Commission for the protection of Geneva lake

A scientific tool



## 1978 Management and protection of French and Geneva ground- water of "Genevois"

An operational tool



## 1997

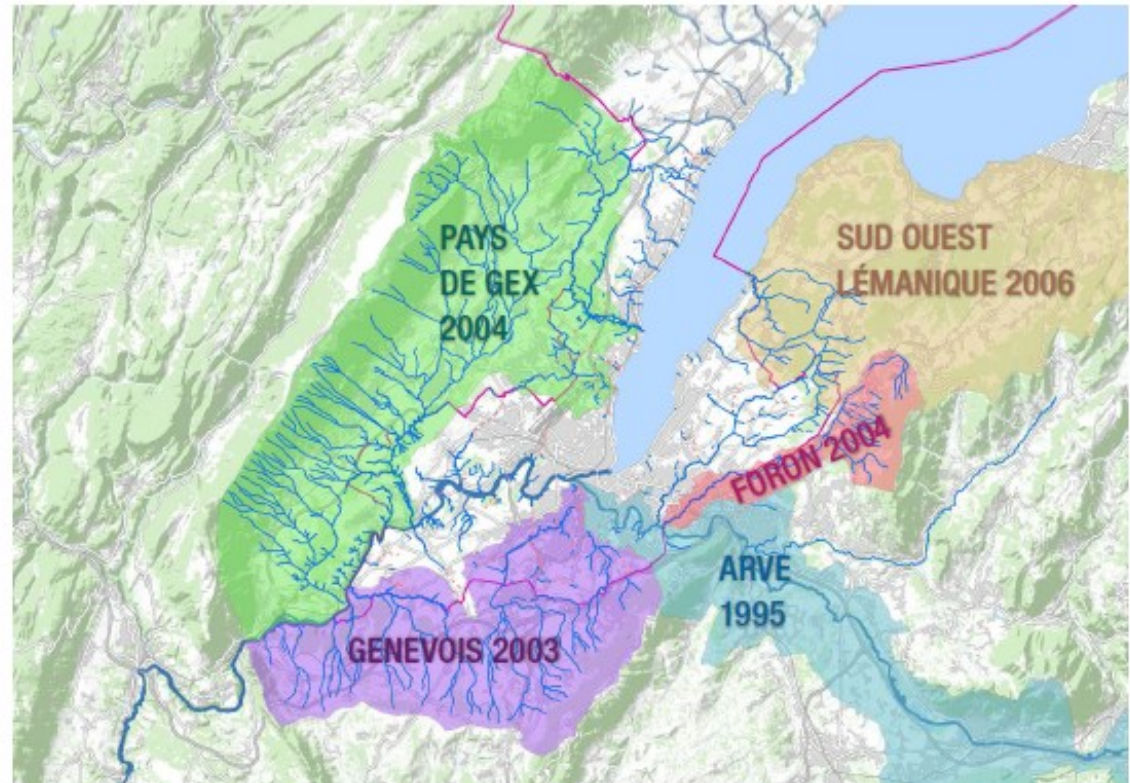
Signature of the 1st transboundary agreement protocol for the restauration of Geneva rivers

## TRANSBOUNDARY RIVER AGREEMENTS BETWEEN GENEVA CANTON AND FRANCE

## What ?

- > A technical and financial tool covering the entire watershed
- > Many partners
- > Action plan with French and Swiss funding
- > Action are Swiss / French / Swiss-French

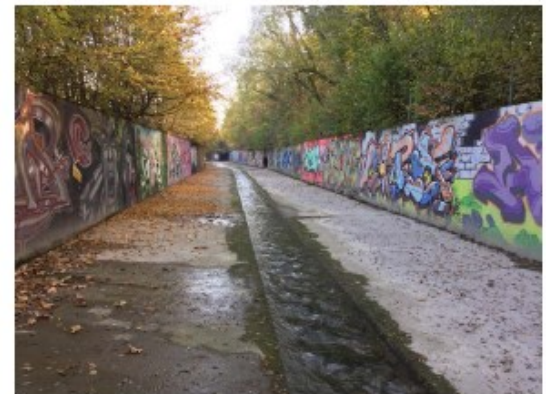
## TRANSBOUNDARY RIVER AGREEMENTS BETWEEN GENEVA CANTON AND FRANCE



# Objectives

- > Improve the water quality
- > Restore and maintain the river banks and riverbeds
- > Prevent floods
- > Increase the surface dedicated to rivers
- > Raise public awareness

## TRANSBOUNDARY RIVER AGREEMENTS BETWEEN GENEVA CANTON AND FRANCE



## Life of a river agreement

**1 YEAR**

Diagnoses  
(inventories, conclusion)

**6 MONTHS**

Draft proposal  
(primary objectives, studies  
to launch, proposed actions)

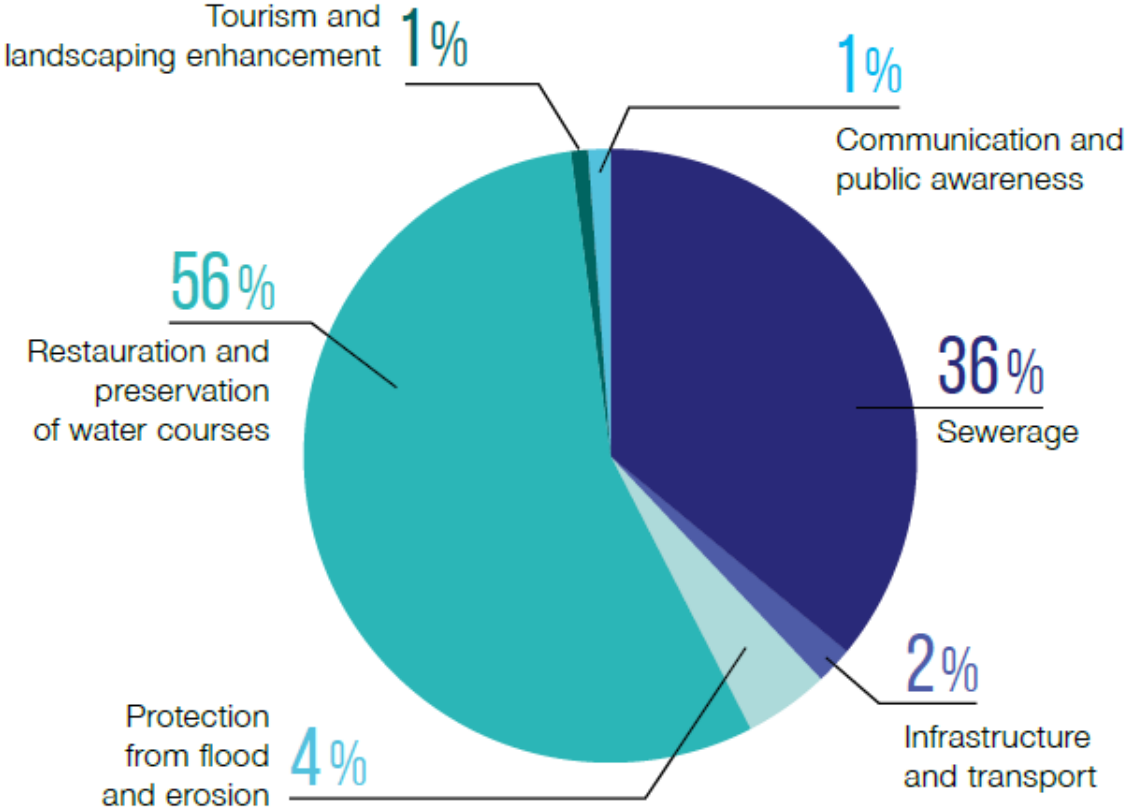
**6 MONTHS**

Final version  
(fixed objectives and  
actions, program)

**2-5 YEARS**

Implementation  
(work commitment, mid-term  
assessment, final assessment)

# Example: «Genevois» river agreement (2003-2011)

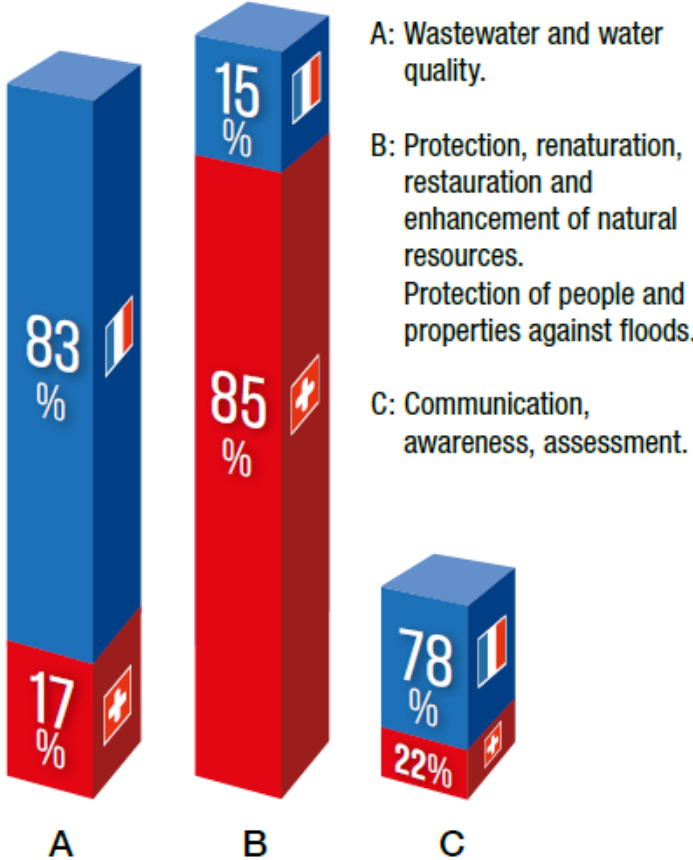
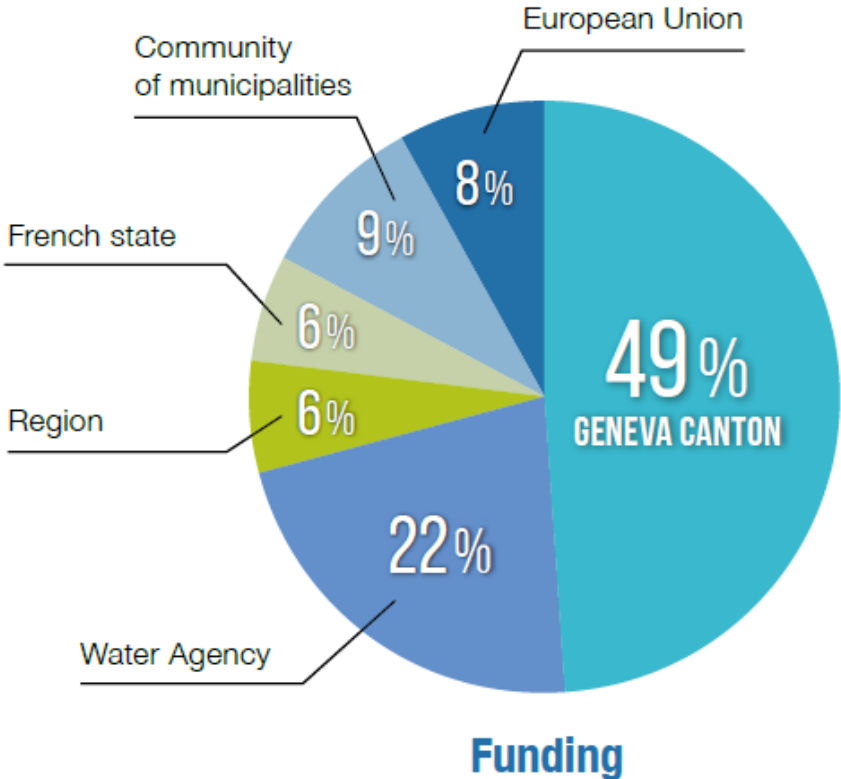


## Distribution of expenses

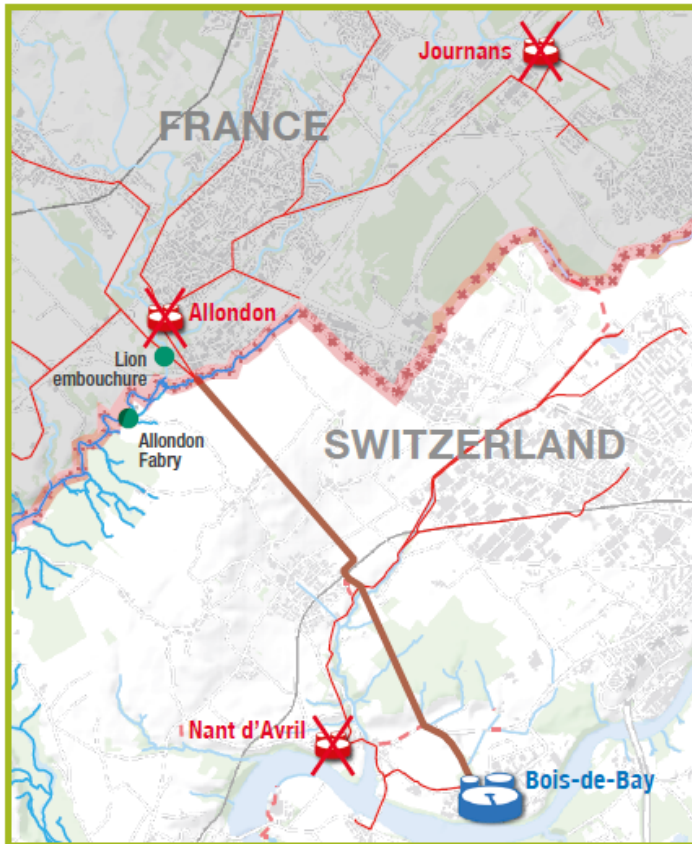
Total of 98 actions for a global budget of 56 million:  
65 French actions  
+ 14 Swiss actions  
+ 19 transboundary actions

# Example: «Genevois» river agreement (2003-2011)

## Distribution of actions



# Example of actions



## Context:

3 defective wastewater treatment plants (2 in France and 1 in Geneva) were polluting the Allondon River.

## Action (2009):

The defective wastewater treatment plants were dismantled. The French and Swiss wastewater of this region are collected and treated together in a new larger wastewater plant built in Geneva. The discharge of this new plant goes to the Rhone River, which is much larger than the Allondon River.

## Transboundary collaboration to build and use a shared water sanitation system

*“Pays de Gex” river agreement*

# Example of actions

## Transboundary collaboration to realise a river renaturation and flood protection action

### *“Genevois” river agreement*

#### Context:

The Drize River was flowing in an narrow bed, with artificial banks. An industrial area by the Drize River was at high risk of being flooded.

#### Action (2003):

The riverbed and banks have been renatured. The riverbed has been widened and the river benefits from more space.





# Example of actions



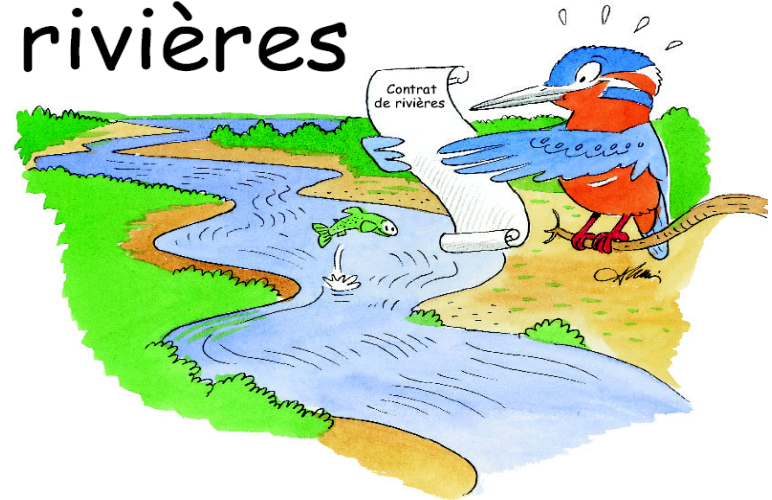
# Example of actions : Common educational tool



2004

Dossier  
pédagogique

## Contrat de rivières



Edité par:



# 1997

## Revision of the law on water management: **RIVER RENATURATION**



### Goal

Mitigate flood risk.  
Improve biodiversity  
and rivers quality.  
Provide the population  
with access to quality  
natural spaces.



### Program

Geneva state authorities establish a river renaturation program and define an order of priority depending on risk management (flooding) and the potential gain in biodiversity, ecomorphology and hydrology.



### Funding

Funding is assured by taxes collected on water usage of the hydroelectric plants & from pumping authorisation.  
«Cantonal renaturation fund» is supervised by Geneva state parliament.

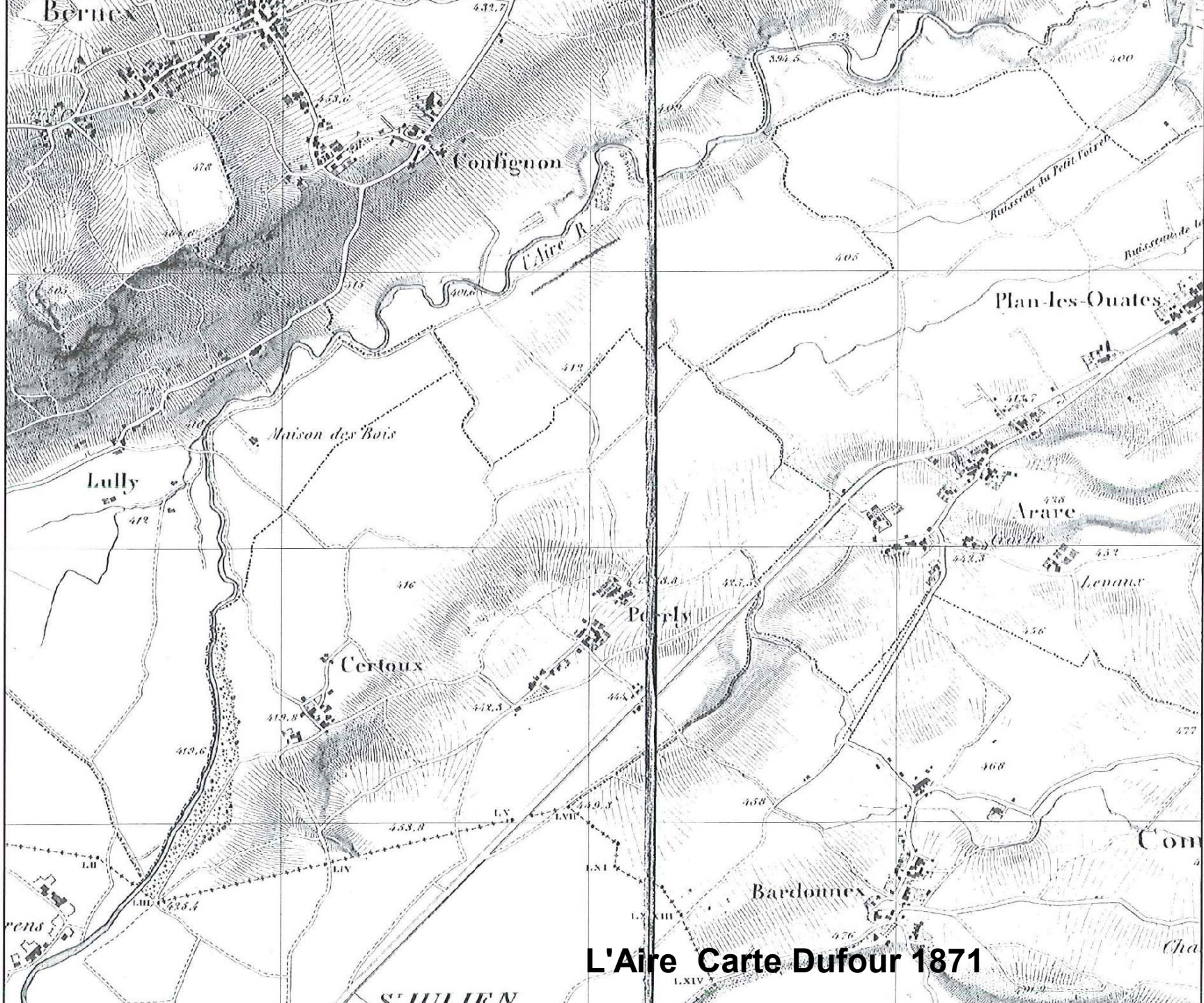
**Aire River :**

**A river with many  
problems**



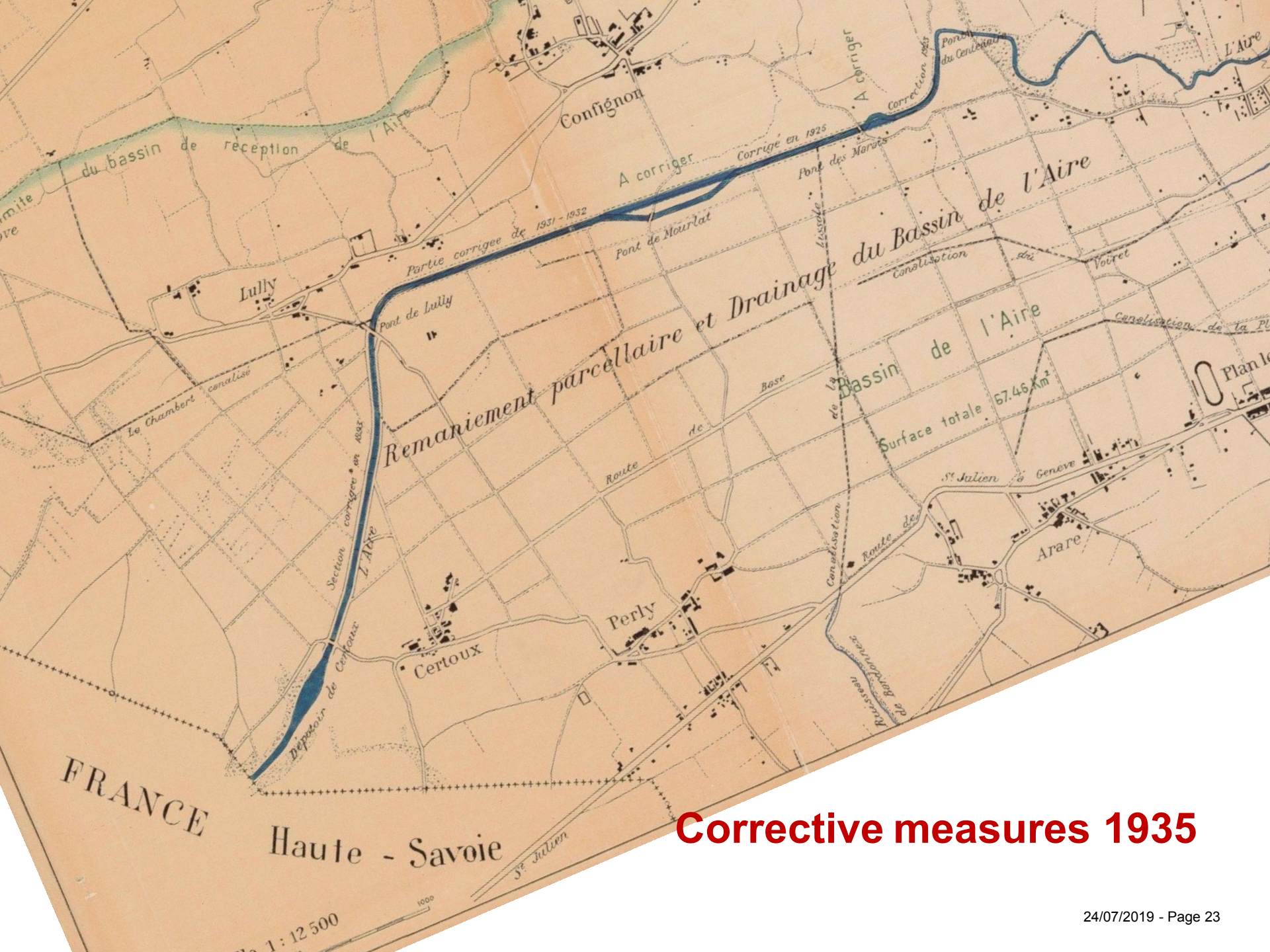


**November 1935**



L'Aire Carte Dufour 1871

SCHLIEFEN



**Corrective measures 1935**

Avril 1935





2002 : inondation of the village of Lully



2003 : Six months of drought

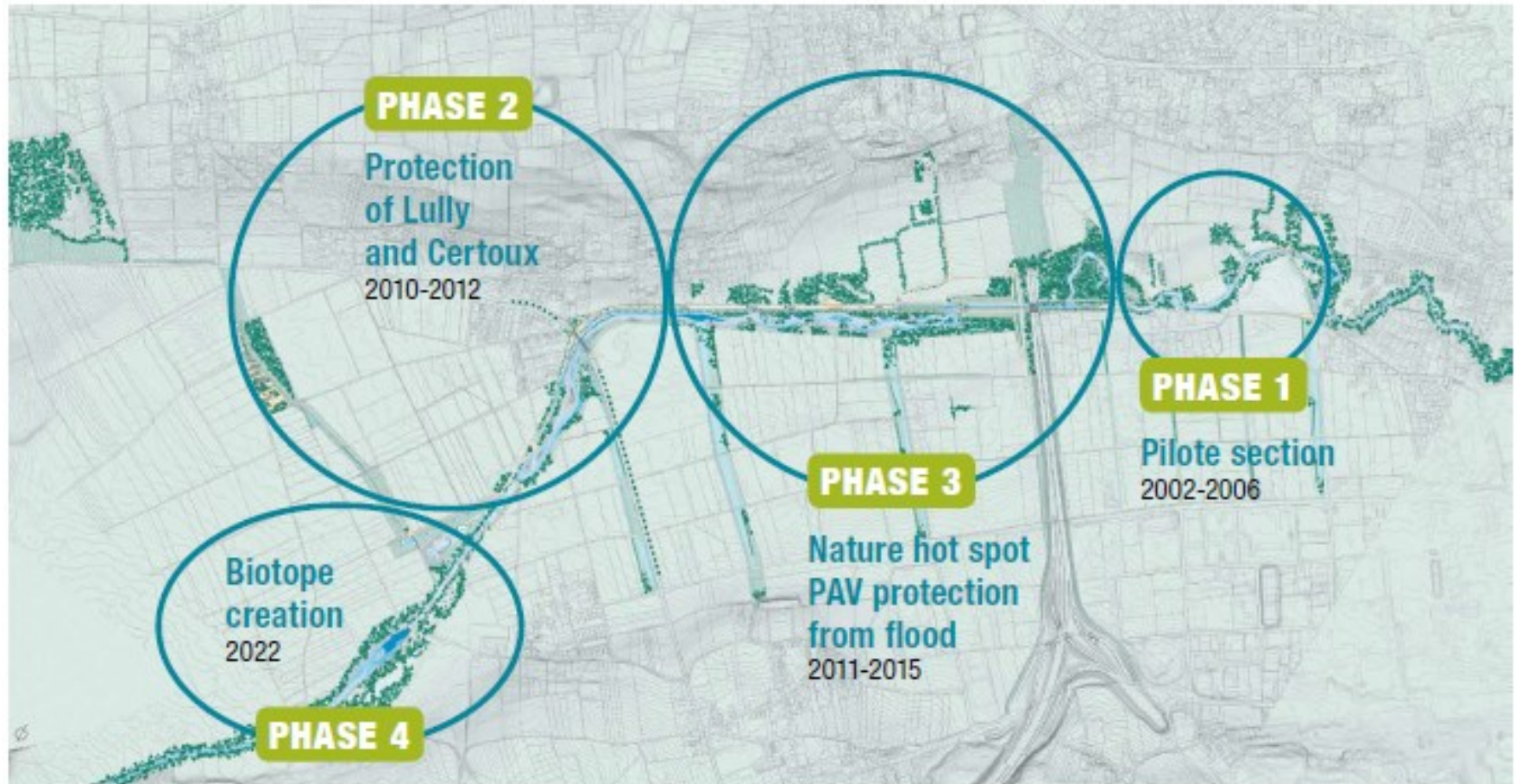


Polluted water / Fishing prohibited

Sterile riverbed

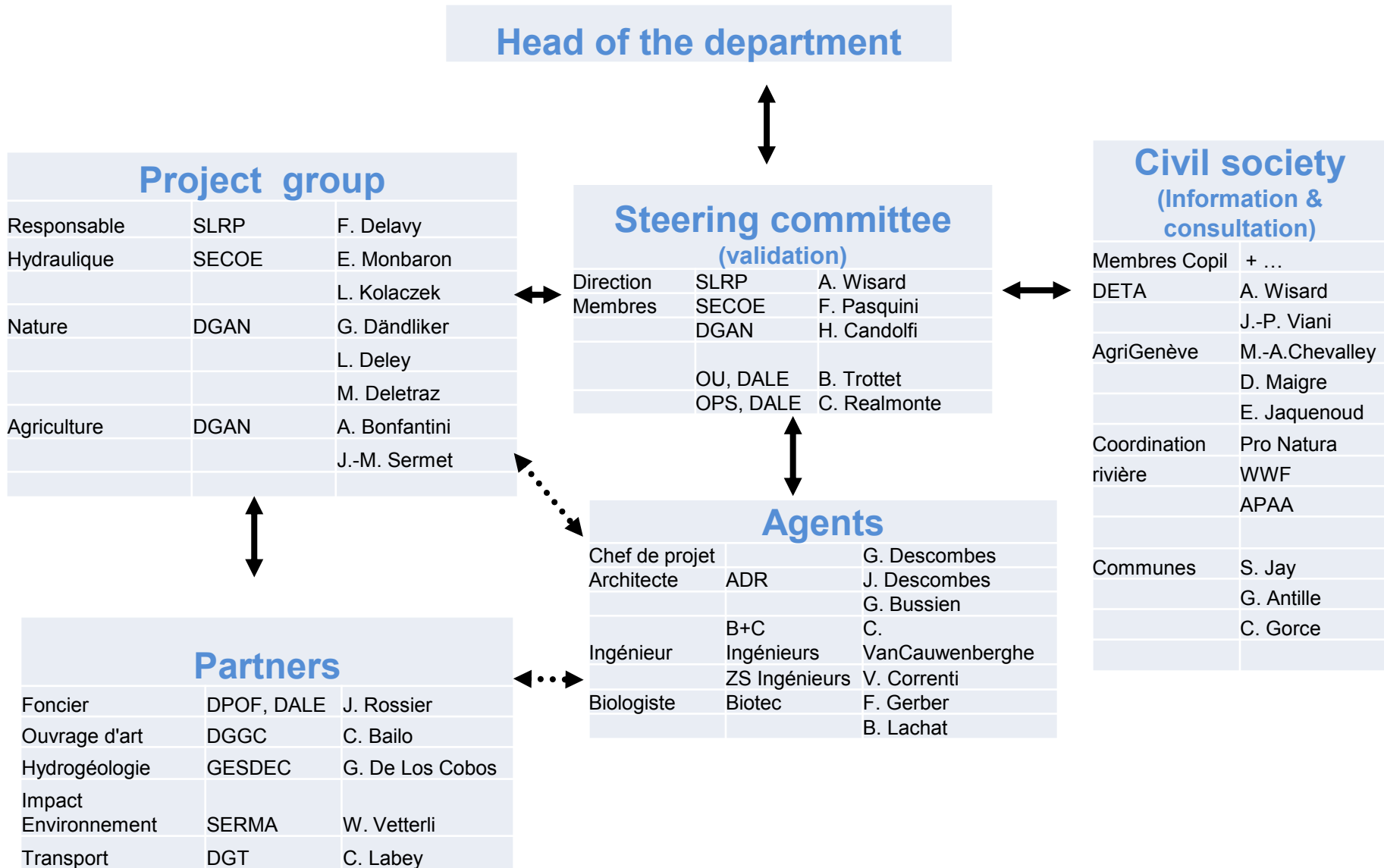


# Implementation program



| OVER **20** YEARS OF WORK | **5 KM** OF RIVER RENATURATION | **66 MILLION** CHF |

# organisation chart of the project



# Renaturation of Aire River



**Before**



**After**



**Before**



**After**

# Renaturation of Aire River





Before



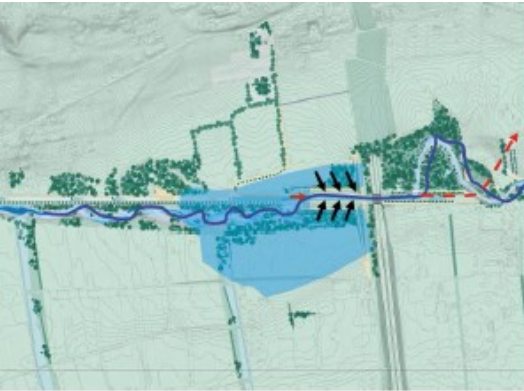
After







# Conclusion



River renaturation is based on the 3 axes of sustainable development:

## Economical

... by preventing material damage and loss of human life caused by flood

## Environmental

... by improving the biodiversity and water quality

## Social

... by creating pleasant recreational sites to give more natural green spaces to the population



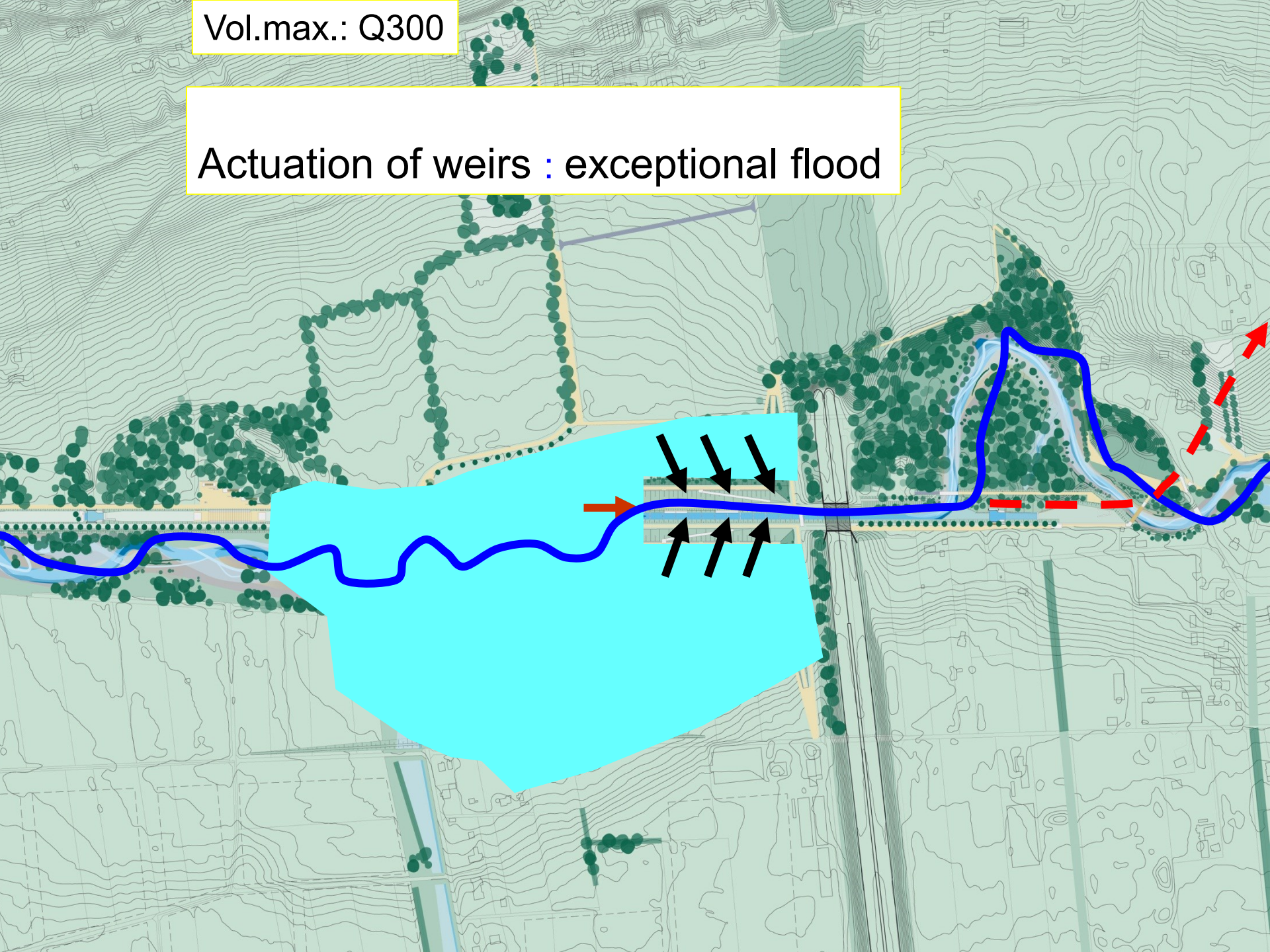
**Thank you for  
your attention!**

# The Project : 3rd phase



Vol.max.: Q300

Actuation of weirs : exceptional flood



# Danger moyen - faible > danger

**Diagnostic:**  
**Carte des inondations**  
**(situation 2009)**

**X**

Etat des cours d'eau

- tracé incertain
- A ciel ouvert
- Sous canalisation
- Sous pont ou voûtage

■ Etendue des inondations

# Few words on Agriculture in Geneva

For centuries the agriculture in Geneva has been supported by state subvention based only on quantity of production

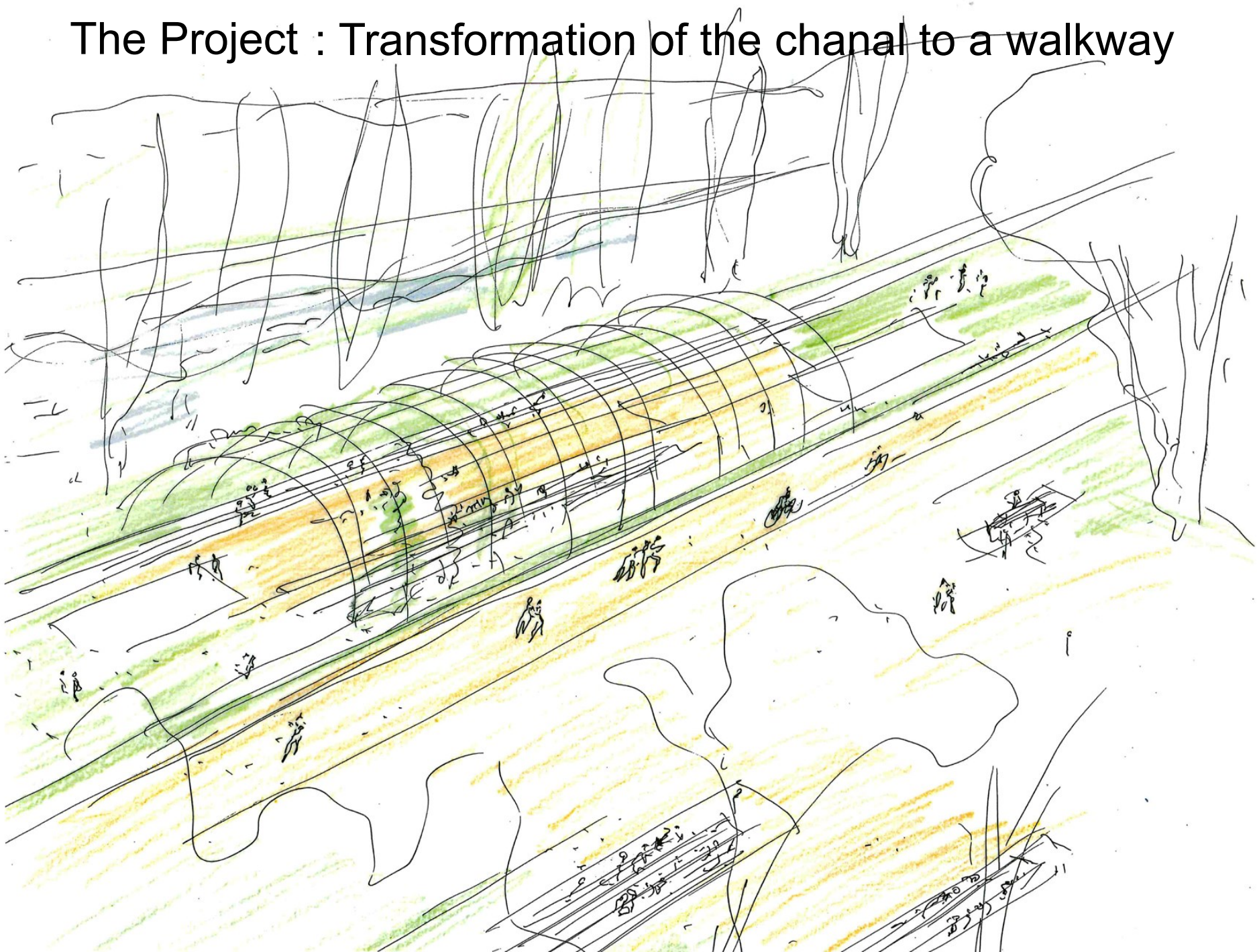
For the last 10 years new subventions based on the quality of the production, nature and landscape protection have been introduced

➤ Promoting a multifunctional agriculture

Minimum 7% of the agricultural surface is now dedicated to the promotion of the biodiversity : extensive meadows, hedges, fallow, etc.



# The Project : Transformation of the chanal to a walkway



# The Project : River bed in the shape of a chocolate bar

