



Enabling river restoration : the French experience, with a focus on the Rhône-Mediterranean basin

Managing aquatic environments and flood prevention

Dr Benoit TERRIER

Project Leader at the Rhone-Mediterranean and Corsica river basin agency



Layout of the presentation

1. Some background on the French organization for river management
2. French experience in river restoration and linking river restoration and flood management
3. Examples of projects from the Rhône river basin
4. Conclusions - Lessons learned and challenges



A NEW TYPE OF RIVER MANAGEMENT IS COMING

A new type of river management is coming!

68 563 vues • 24 oct. 2016

991 11 PARTAGER ENREGISTRER ...

Sauvons l'eau
1,85 k abonnés

S'ABONNER

The story behind this video...in a few minutes



1) The 1964 French water law

26 regions (at the time)

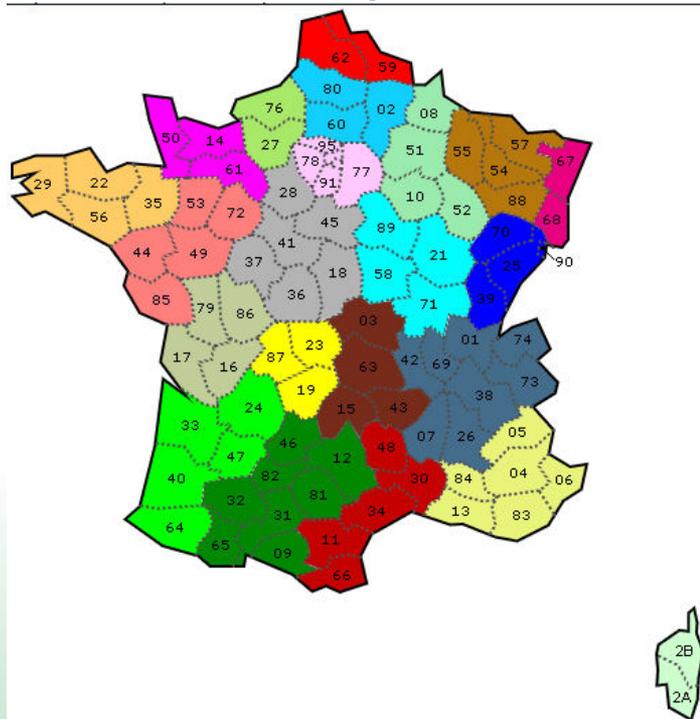
101 “departements”

36700 municipalities

7 river basins (including Corsica)

7 river basin Committees

6 Water agencies





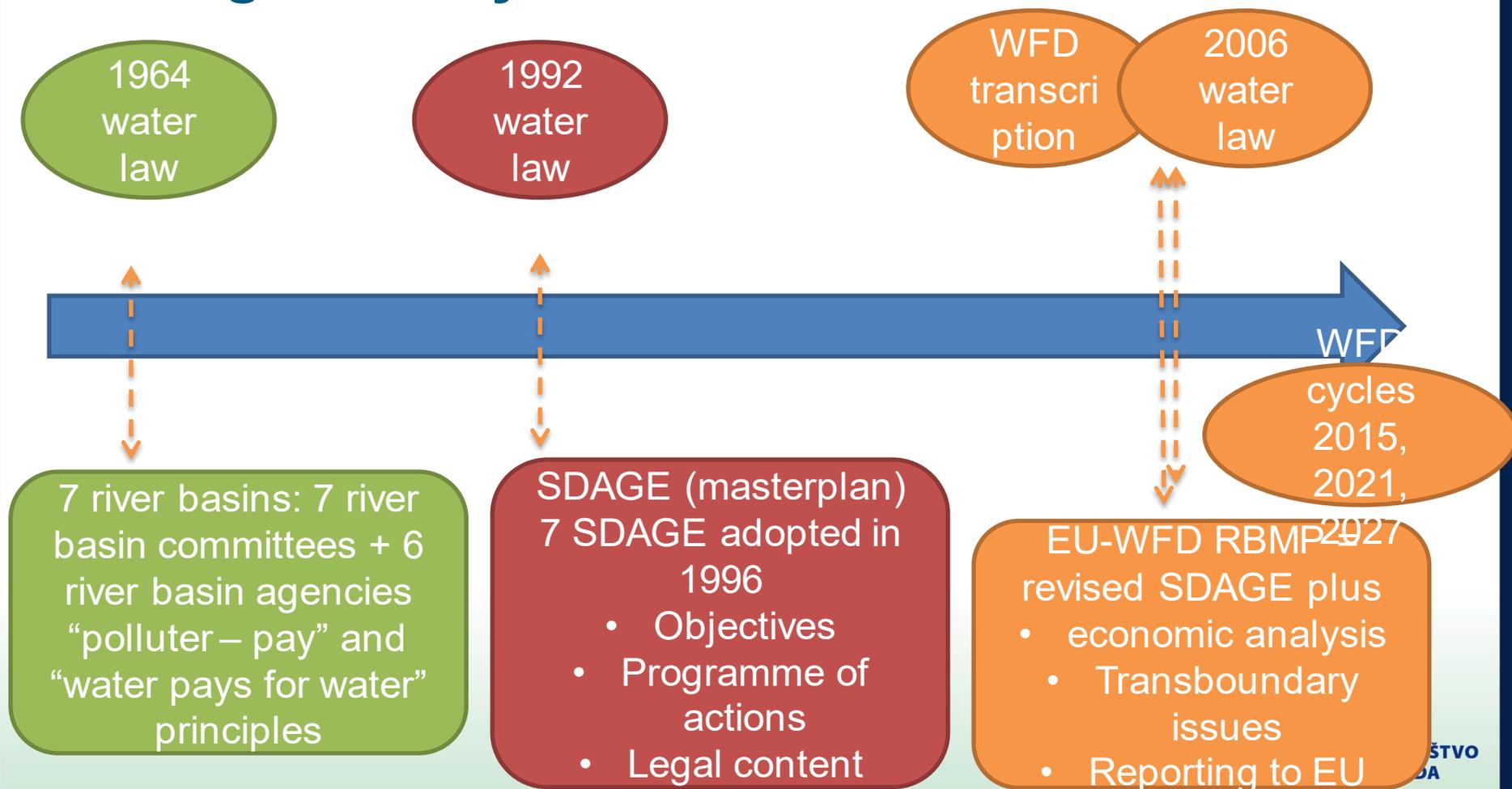
1) The main missions of the Water Agencies

To implement the water policy, according to national guidance but designed at basin level, by:

- **Collecting environmental taxes** - “water pays for water” or “polluter pays” principles
- Giving subsidies to **finance projects dealing with the reduction of pollution** (e.g. waste water treatment plant...), **river restoration** (weir removal, remeandering...), etc.
- Providing **technical assistance**, provide information on water quality, monitor aquatic ecosystems
- **Preparing River Basin Management Plan** (RBMP, SDAGE in French) according to EU Directives



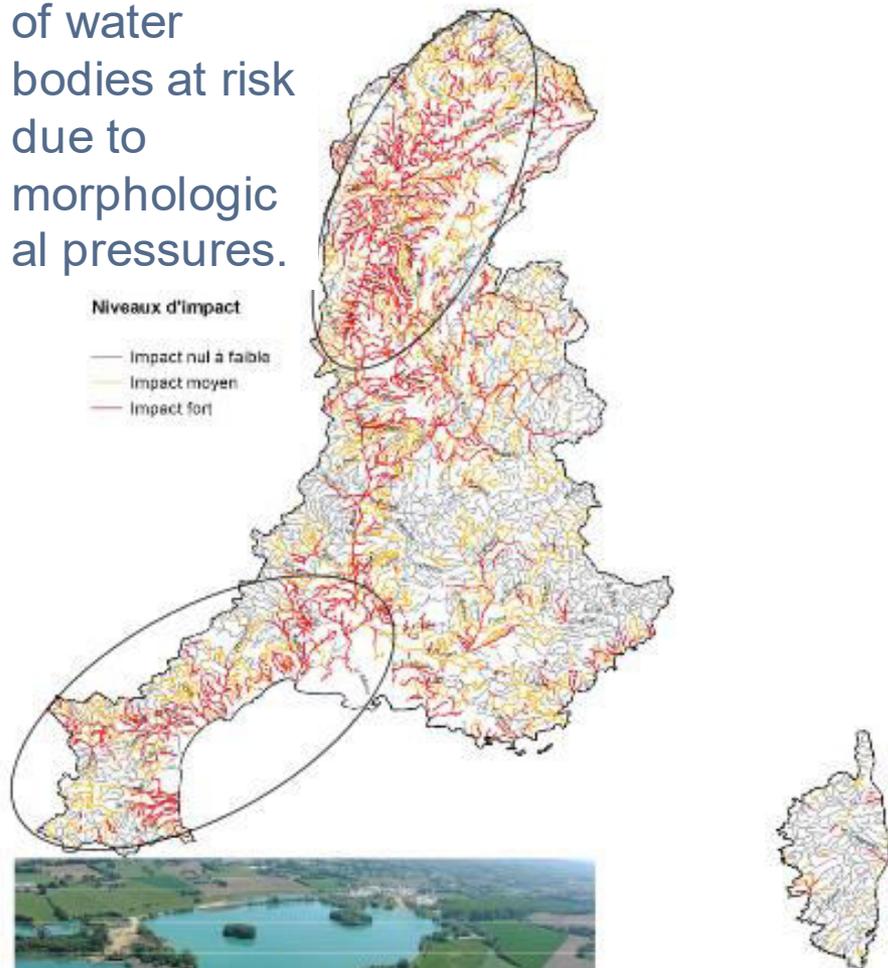
1) Organization of the French water and river management system



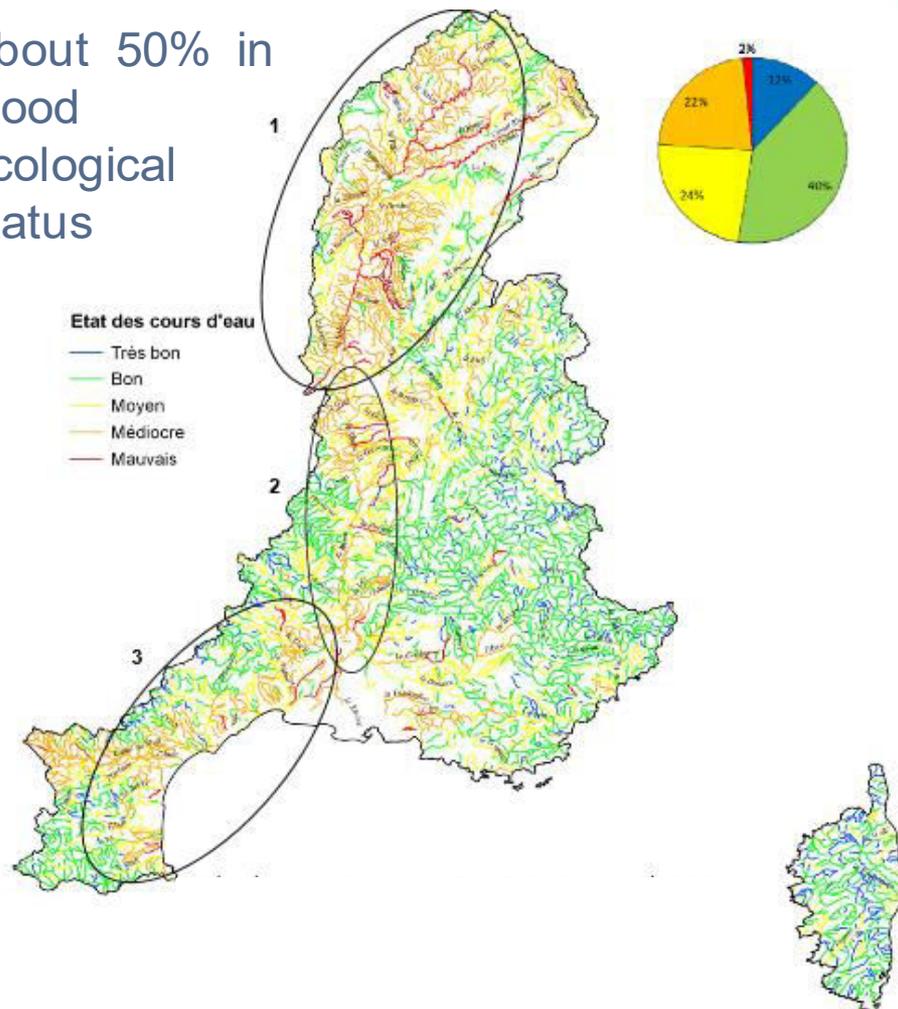


Good ecological status on the Rhône Mediterranean and Corsican basins

About 50% of water bodies at risk due to morphological pressures.



About 50% in Good ecological status





Flood risk in France and in the Rhone Mediterranean river basin

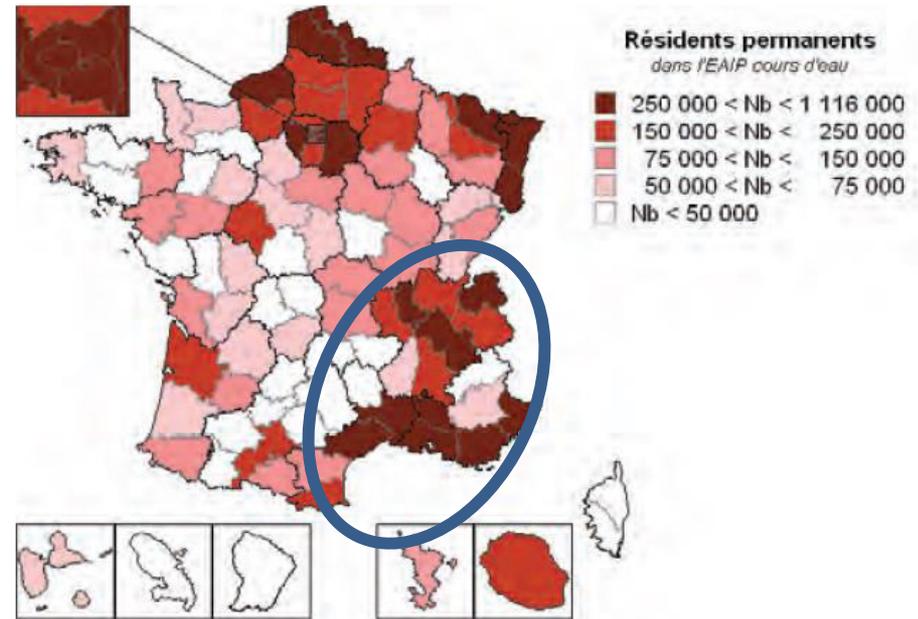
In France:

- **One in four inhabitant** exposed to flood risk in France
- **9 million jobs** exposed to flood risk
- **19000 towns** at risk
- **Annual damages** due to flooding: between **650 and 800 M€**

In the Rhône Mediterranean river basin :

⇒ The river basin **the most exposed** to flood risk in France

basin



Evaluation préliminaire nationale des risques d'inondation - 2012

National preliminary flood risk assessment (2012)





Why a new law on managing aquatic environment and flood risk ?

- **River restoration projects** and **flood risk projects** could sometimes be managed by different organisations, with contradictory objectives.
- A **cultural gap** between people working on river restoration project and people working on flood risk.
- The **2014 law** on the **modernization of public action** established a targeted, mandatory competence for the **management of aquatic environments and flood prevention**, entrusting it to **municipalities and groups of municipalities**.
- In 2018, responsibility for the maintenance and restoration of watercourses and flood-protection structures will belong exclusively to municipalities and **their public inter-municipalities cooperation structures with taxation powers**



In order to promote this new law and a change in river management

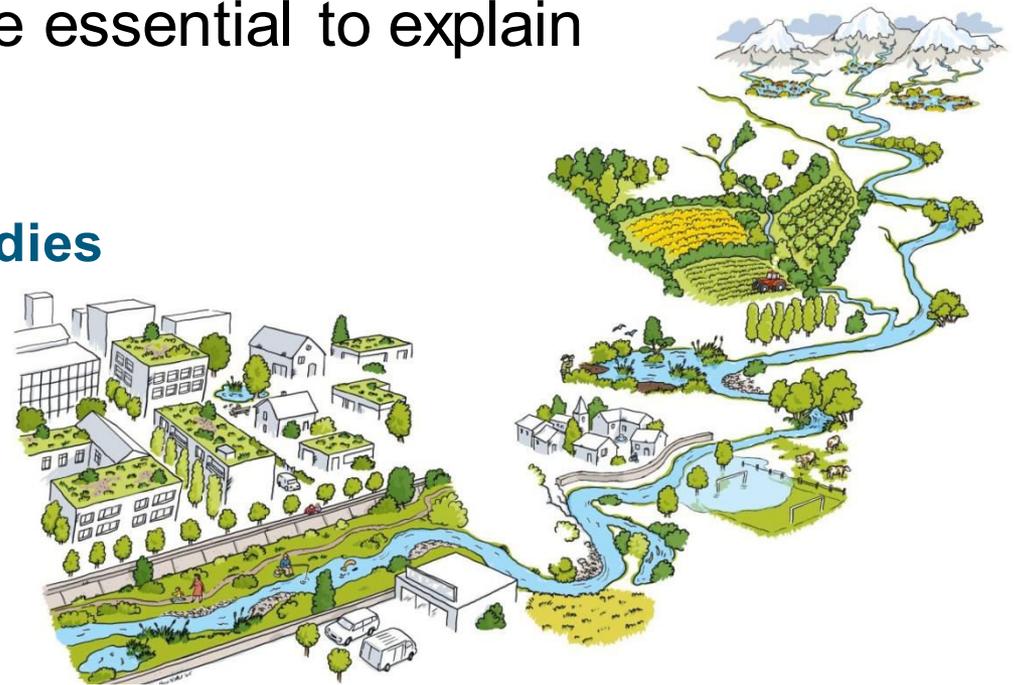
Communication tools are essential to explain and give sense

Video clip, synthesis, case studies



**POUR UNE NOUVELLE
GESTION DES RIVIÈRES**
LES ACTIONS À L'HEURE
DE LA GEMAPI

Rivières et fondations



To promote nature based solutions at a catchment scale :

- Give more space to river
- Slow down the flow by restoring rivers, etc.



On the Rhone and Mediterranean river basin:

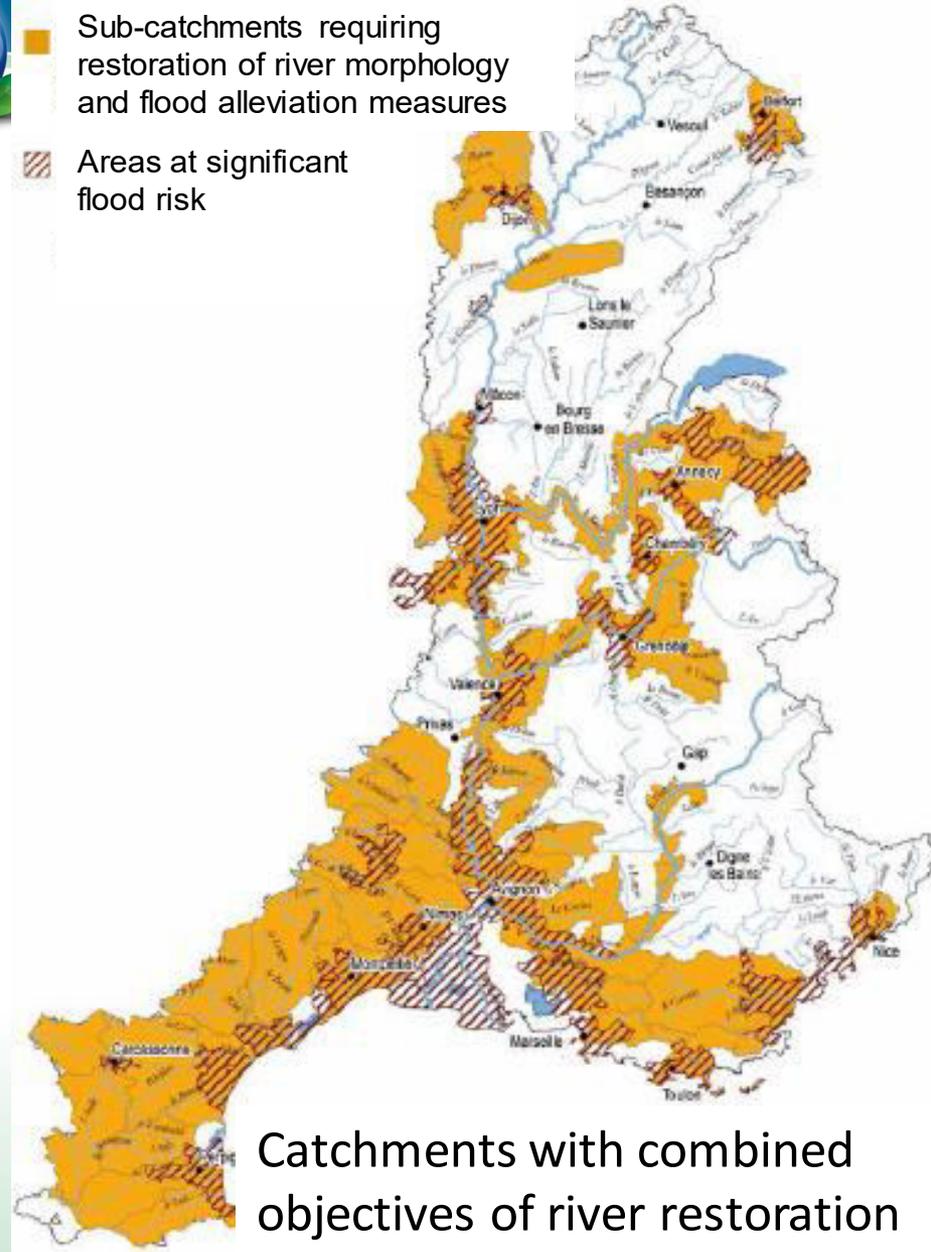
- 35% of rivers have an **altered hydrological regime**
- 45% among them have their ecological **continuity** disrupted
- 49% have an altered **morphology** (channelization etc...)

Serious flood issues

=> **Flood risk management plans** and **river basin management plans**

have common chapters

- Sub-catchments requiring restoration of river morphology and flood alleviation measures
- ▨ Areas at significant flood risk



Catchments with combined objectives of river restoration and flood alleviation



On the Rhone and Mediterranean river basin:

- Ecological river restoration through NBS is a **top priority**. The **river basin agency spent 420M€** spent on **NBS projects** between 2013 and 2018
- Similar budget is planned for the next 6 years
- **Ecological continuity restored on 150 to 200 weirs / dams every year** (1009 weirs between 2013 and 2018)
- **Nature based solutions through substantial morphological river restoration** carried out on **100km-120km every year** (about **500km of rivers between 2013 and 2018**)





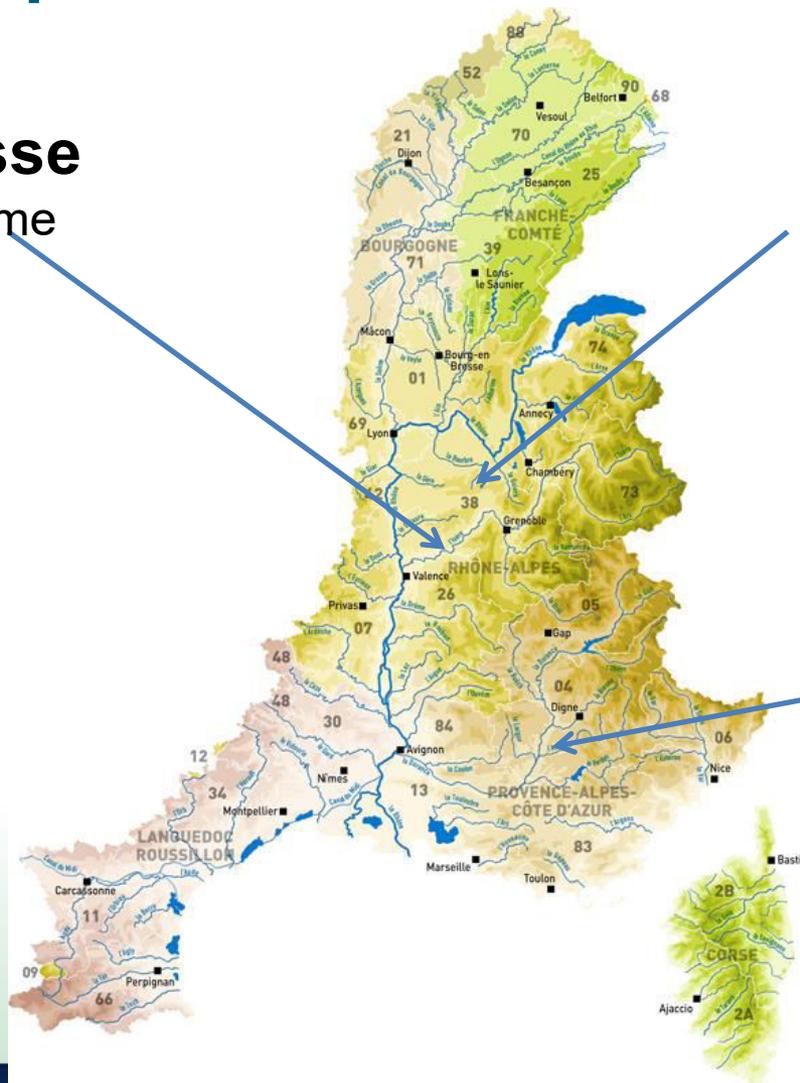
Examples of river restoration projects

River Herbasse

40km long, in Drôme and Isère
Catchment area:
187km²

River Guiers

50km long, in Isère and Savoie
Catchment area:
610km²



River Durance

320km long, in southwestern Alps
Catchment area:
14500km²



Example of the river Durance

- In 1997, after the 1994 flood event, **4km of dikes were setback** from 100m to 200m **to give more space to the river and provide flood alleviation** up to a 50yr flood event (Q50).
- => On average, the river has now widened from 240m to 350m and **protected species** prone to braided rivers ecosystems have come back



⇒ **It avoided 10M€** if one had to rebuilt the dikes near the river

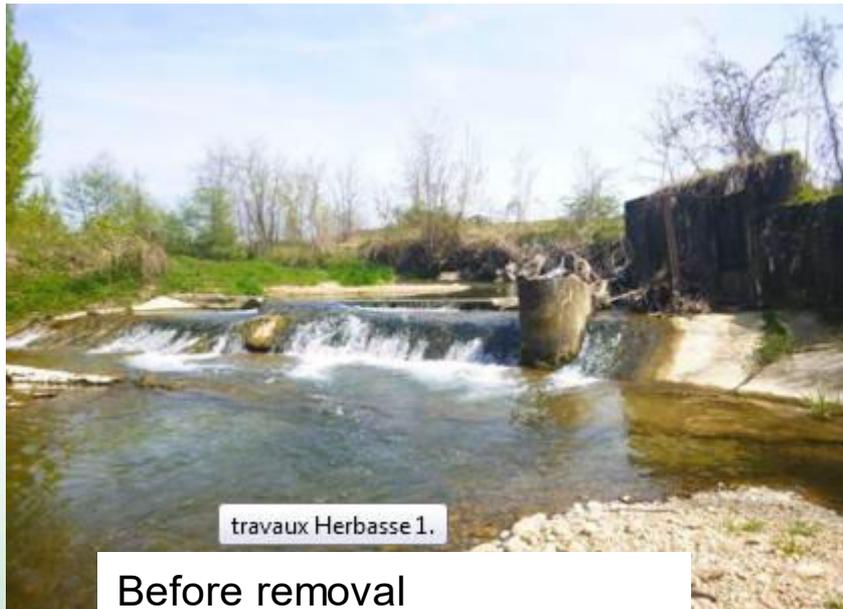


⇒ More restoration projects since and more to come



Example of the river Herbasse

- Between 2010 and 2020, 20 weirs have been either equipped with a fish pass or removed, **restoring ecological continuity over the whole 35km of river.**
- 2km of morphological restoring (total cost: 2M€)
- A river contract was signed with a “space for river” strategy, giving more room to the river to alleviate flooding up to Q50 and Q100 (1999, 2008 and 2013 floods).
- Land planning played a key role in the success of the project



travaux Herbasse 1.

Before removal



After removal (46k€, 1,8m high and 10m wide weir)

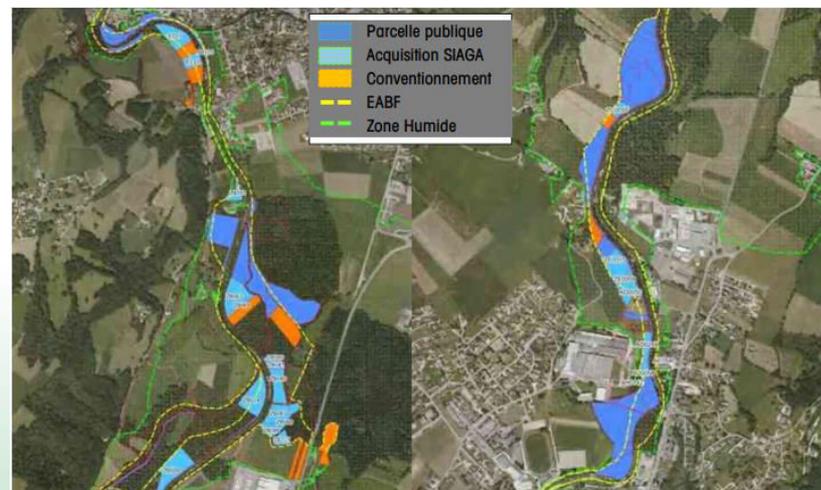


Example of the river Guiers

- **Space for river** defined on 31km, with **land planning** leading to the acquisition of 24Ha of land
- A slightly less than 1km of **embankments were removed** in Entre-Deux-Guiers to restore space for rivers (30 Ha gained), 22 000m³ of blocs were removed and replaced by **green engineering**
- **7 weirs were removed**
- **Remeandering, restoration of oxbows** carried out on 3km, for a Q100 protection design (2,4M€)



After restoration



Land planning (acquisition or agreement)



Challenge and successes

- There is still a **cultural gap** to bridge between hydraulicians and river restoration engineers
- Studies are still often dominated by **hydraulic perspective** but **ecological functioning** is better and better integrated into projects.
- One needs to bring a **cultural change in practices**, and it can be complicated. But the culture is changing: one has begun to demolish houses, sometimes neighbourhoods, poorly located.
- The **process to finance projects** that address both restoration and flooding can be complex (multiple financial instruments)



Challenge and successes

- **Stakeholders involvement** is key to **discuss the multiple benefits of nature based solutions and design truly integrated projects.**
- Projects should not be limited to a “technical” dimensions and should incorporate **human and social sciences analysis** (think of human health, water quality, adaptation to climate change, tourism, leisure etc.)
- River restoration is usually **more cost-effective** and safer than traditional “grey” engineering techniques to deal with flood risk
- **Climate change** has become a significant driver for river restoration and flood risk projects



Thank you for your attention



Benoit TERRIER

Agence de l'eau Rhône Méditerranée Corse, Lyon, France