Implementing flood risk management plans in France while preserving and restoring our rivers – a new approach (Dr Benoît TERRIER, FRANCE)

Flood Risk Management Plans: International experiences in comparison

Venice, September 7th 2015
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

National preliminary flood risk assessment (2012)
Historical flood risk management

Typical measures to deal with flood risk:

- River widening
- River straightening
- Building embankments to constrain the flow within the river (over 8000km along French rivers)
- River culverting
- Building concrete channel...

⇒ This strategy led to many issues: environmental issues, aggravated risk of flooding, amenity issues, increased bed erosion/unstable river channel, high maintenance cost...

In 1856, the French emperor wrote in a letter: “Today, everyone would like to build an embankment, even though that means aggravated flood risk downstream. This way of dealing with flooding is a ruinously expensive palliative for the State, and unsuitable for the assets that are to be protected.”

The French emperor visiting a flooded area in 1856
The need to link the Flood Directive and the Water Framework Directive

- Joint statements on river management are in the flood management plan (FD) and the river basin management plan (WFD)
- Sensitive territories from a morphological AND flood risk viewpoint have been identified

=> particular attention to hydraulics AND ecological issues will be required
Typical measures to be implemented

http://www.youtube.com/watch?v=lzrwF4XKUBk

3 keys measures:

• Give more space to river
• Slow down the flow
• Manage rivers at a catchment scale
Give more space to the river – the case of the river Durance

- During the 1994 flood event, embankments breached and flooded in the area of La Roque d’Anthéron

- Embankments were set back in 1997 by 100m to 200m over 4 km. The active river bed width increased by 40% and the braided pattern came back.

- Flood levels decreased significantly up to the 50 year flood return period

Give more space to the river – the case of the river Giffre (Haute-Savoie)

• In 2013, a secondary river channel was reopened and a wild landfill was removed. The channel width increased from 40m to 90m and reduce the shear stress on the opposite reach. Coarse sediment material was reinjected downstream in the incised river bed.

• In Taninges, the cost for the scenario aiming to repair the embankment was estimated to be 3M€. The setting back of the embankment was estimated to be 1,2M€.

Restoring channel morphology by opening up a former secondary channel and removing a wild refuse.
Slow down the river flow – the case of the Yzeron river (Rhône)

- A catchment in a peri-urban area (near Lyon), very urbanized downstream.
Slow down the river flow – the case of the Yzeron river (near Lyon)


- Significant damages caused: roads and houses flooded above 1m in some areas with high velocity areas
Slow down the river flow – the case of the Yzeron river (near Lyon)
A “heavily modified water body” in the WFD

Intense urbanization over the past 20 years
Slow down the river flow – the case of the Yzeron river (near Lyon)

Giving space back to the river, removing concrete bed channel, bringing gravel back to the river

Before

After
Slow down the river flow – the case of the Yzeron river (near Lyon)

Giving space back to the river, removing concrete bed channel, bringing gravel back to the river

Before

After
Slow down the river flow – the case of the Yzeron river (near Lyon)

Giving space back to the river, removing concrete bed channel, bringing gravel back to the river

Example in Oullins

_Bringing the river back to the people_

Before work

Projected work
Slow down the river flow – the case of the Yzeron river (near Lyon)

How much did it cost?:

- **Total cost**: 43.5 M€

- Results of the cost benefits analysis:
  - Modelled flood event (Q15, Q30, Q100 and Q1000)
  - For the Q100: **benefits of 2,74€ per 1€ invested** with a “return of investment” of 18 years
  - This does not account for the environmental and social benefits for restoring a more natural river

Some lessons learned:

- Social studies were undertaken to assess how local people view the river => there was **a need for a better urban landscape and a more natural river**

- The river went from a state of a “endured burden” to that of being an **asset for the territory** => very **positive feedback** from local inhabitants
Finding innovative ways to make alternative solutions acceptable

The case of the River Isère – slowing down the flow

- The Q200 on the river Isère is estimated to be 1900 m$^3$/s at Pontacharra (1859 flood event). Some dikes are in a poor condition.

- Dikes were built along the river Isère in the 1860s. Today, those dikes cannot contain medium floods, the risk of breaching is real and the maintenance costs are high.

- Potential damages are estimated to be 1 billion € with 300,000 people affected.
- The work involved strengthening some existing dykes and setting back others.

⇒ **3600 Ha of agricultural land** over 50 km would become **controlled flooded fields** and would flood more often. Estimated cost: 135M€
Finding innovative ways to make alternative solutions acceptable

The case of the River Isère – slowing down the flow
Finding innovative ways to make alternative solutions acceptable

The case of the River Isère – slowing down the flow
The issue of land management in agricultural areas

How do you work with farmers whose land might become affected by flooding more often?

- **Discussions and negotiation** were conducted with the agricultural stakeholders and farmers.

- A **protocol to compensate farmers for damages to crops** was agreed.

- An expert will be appointed by the main agricultural stakeholder to evaluate the damages when they occur.

=> That protocol was pivotal for the project to be accepted.
How can those projects be financed?

3 cases:

For a flood related project:
The state can subsidize:
- **40 %** for protection work (embankments)
- **50 %** for prevention work (controlled flood field)

For a flood and ecological related project: the state and the water catchment agency can both subsidize the project (**up to 80%**)

For an ecological river restoration project: the water catchment agency can subsidize up to **50 %**
How to successfully implement the flood directive (and other directives, such as the water framework directive)

• Adopt an **integrated technical** approach AND a “**territorial**” approach

  ▪ **The technical approach** focuses on flooding AND hydromorphological analysis

  ▪ **The territorial approach** takes into account the socio political dimensions. It investigates the water uses on the catchment, the social perception of the river, possible expectations, economic benefits of the scenarios investigated

• **Public and stakeholders participation** and **dialog** is an essential component. It has to be built into the projects as a **bottom-up approach**.
Thank you for your attention

Benoit TERRIER
Agence de l’eau Rhône Méditerranée  Corse