River Restoration in France

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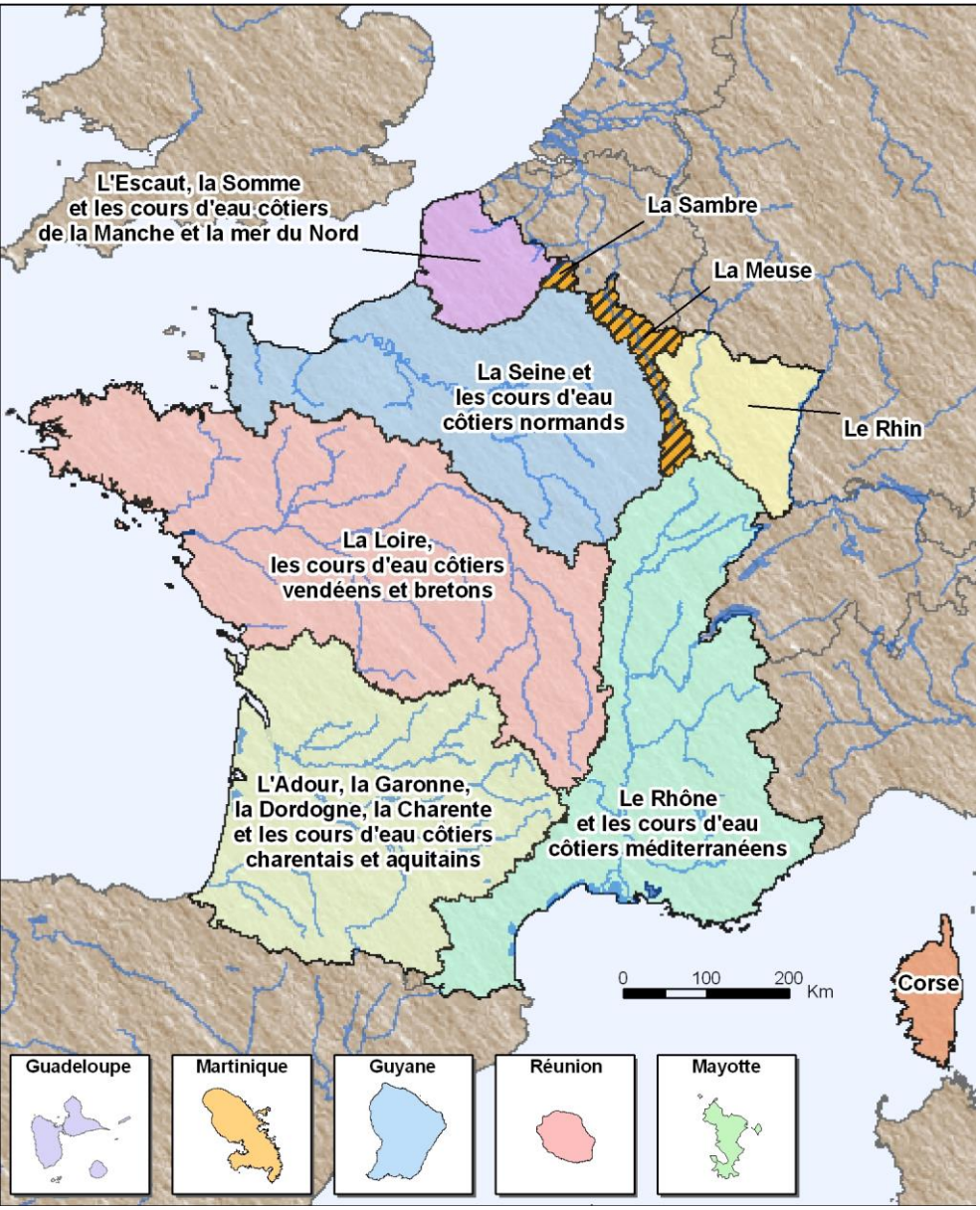
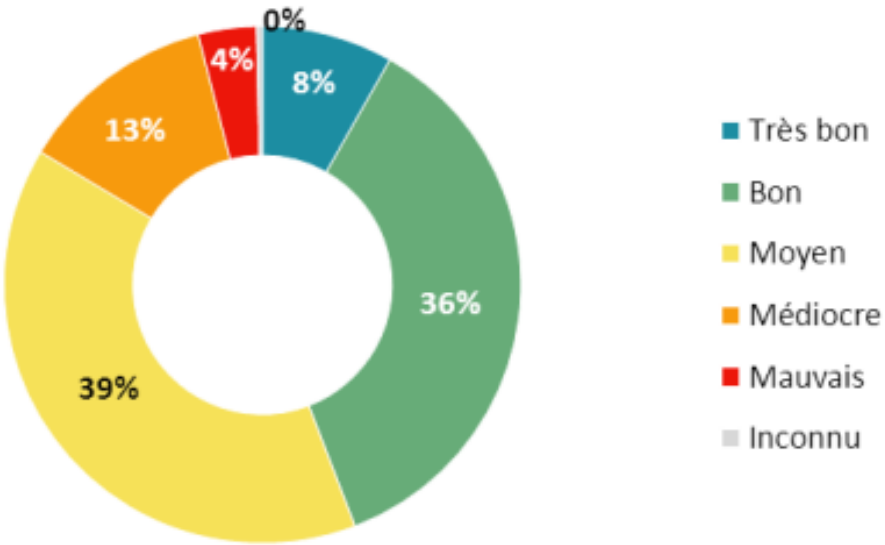
1.Ecological river status and pressures in France



525 000 km of river stretches (> 1 km)
More than **11 000 surface water bodies**

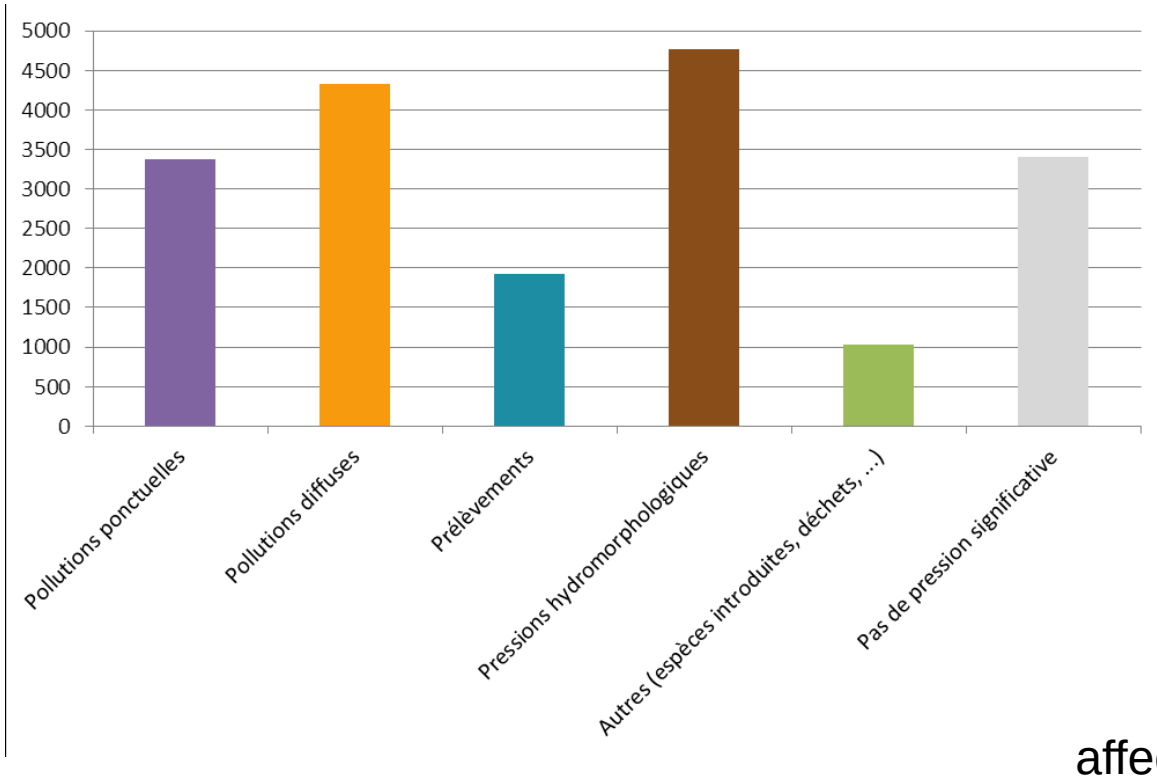
12 River Basin districts in France



surface Water bodies Ecological status (%) in France in 2015 (AFB, 2018)

44% of the surface water bodies are at least in good ecological status

Number of surface WBs in France, in 2015 (AFB, 2018)



affected by **type of pressure** (AFB, 2018)

In 2015 : 42% surface WB are affected by **hydromophological pressures**
38% of Surface water bodies are affected by **diffuse pollution**

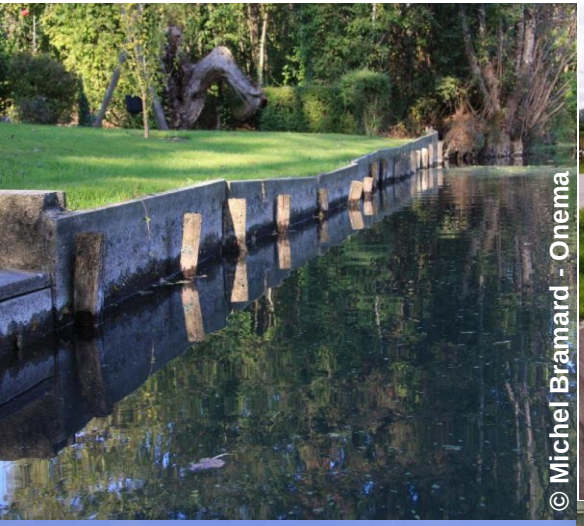
40% SWB present **hydromorphological alteration** of their habitat
37% SWB present chimical pollution due to pesticide, heavy metal and detergent

WFD objectives

Hydromorphological alteration and diffuse pollution:
Main causes for not reaching good ecological status WFD (blue print 2013 Wise 2018)

Need to act as prioritiy on hydromorphology and land management of the catchment

Pressure and alteration
on river bed and its floodplain: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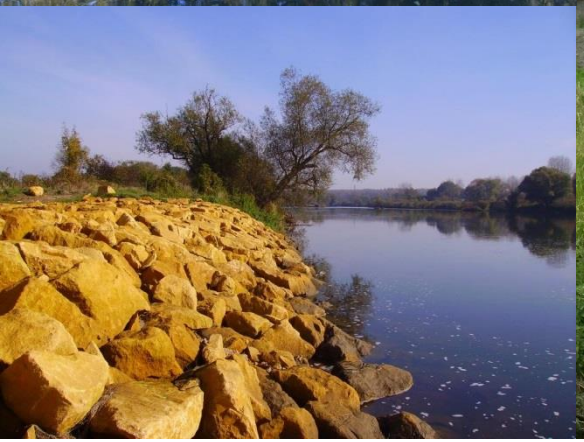


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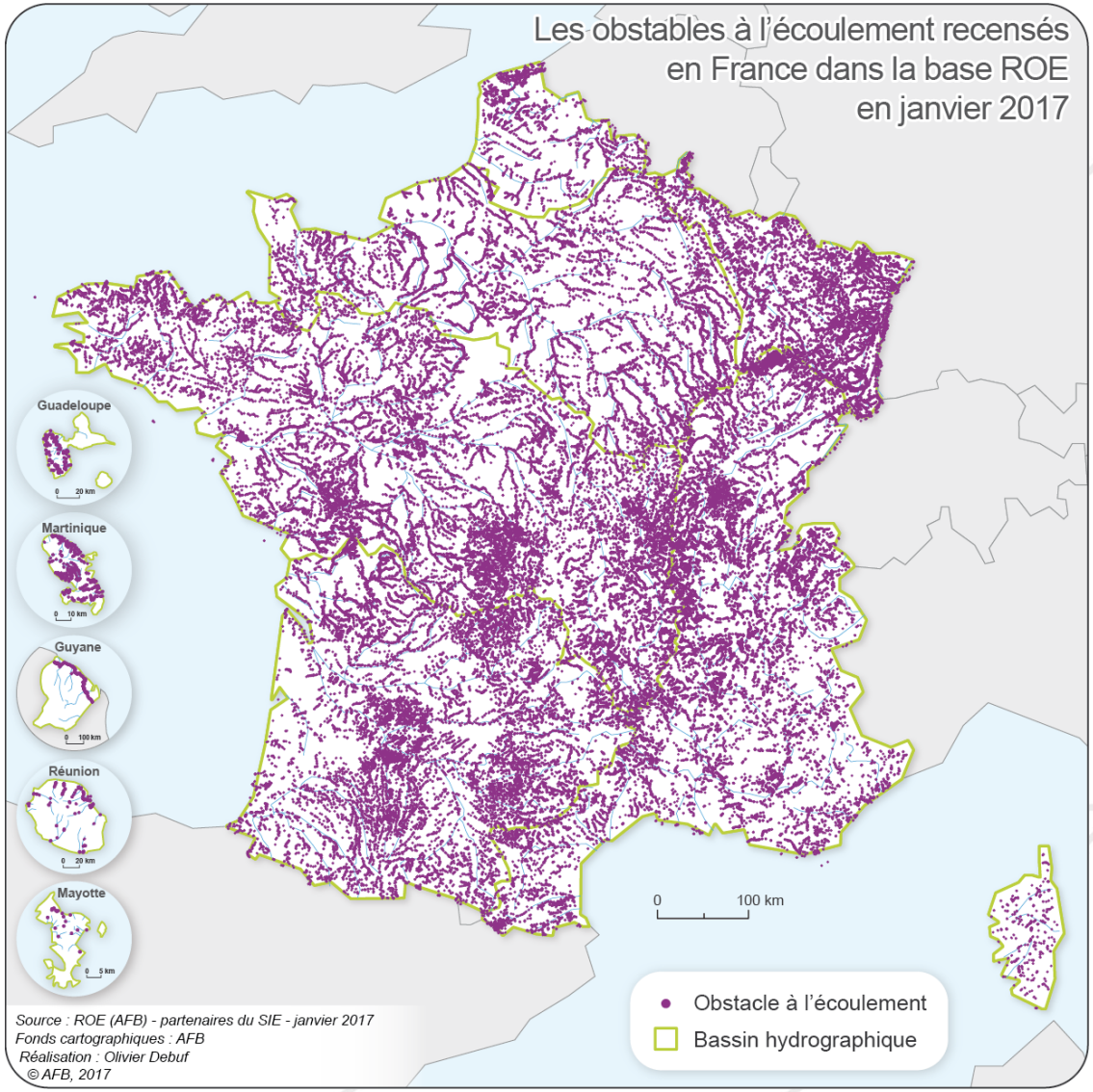
Example: transversal structures

in France (AFB):
more than 90 000 structures
1 every 2 km

30 % obsolete (AMBER)



Pressure and alteration
on river bed and its floodplain:

artificial riparian vegetation or removed: reduced habitat diversity

Pressure and alteration
on river bed and its floodplain

Water abstraction:
reduced flow and
habitat avaibility

Pressure and alteration
on the drainage basin

Artificialisation of catchment or poor land management : soil erosion, surface run off , diffuse pollution

altering river’s flow regime, morphology and water quality

2.National framework

WFD implementation : Law on Water and Aquatic Environments of 30 December 2006 (**text of the law**)

River classification in France:

Regarding transversal structures , rivers are now classified in:

- **LISTE 1**: **rivers to preserve the river continuity**: it includes high ecological status rivers and rivers acting as biological reservoirs: **30 % of river stretches**;

- **LISTE 2 : rivers to restore the river continuity**: where sediment transport and fish migration have to be ensured: 11% of rivers stretches , **24% of transversal structures**

3. Main public bodies involved

At national level

- Ministry of ecology (MTES)
- French biodiversity Agency (OFB)

At basin level

- 6 water agencies

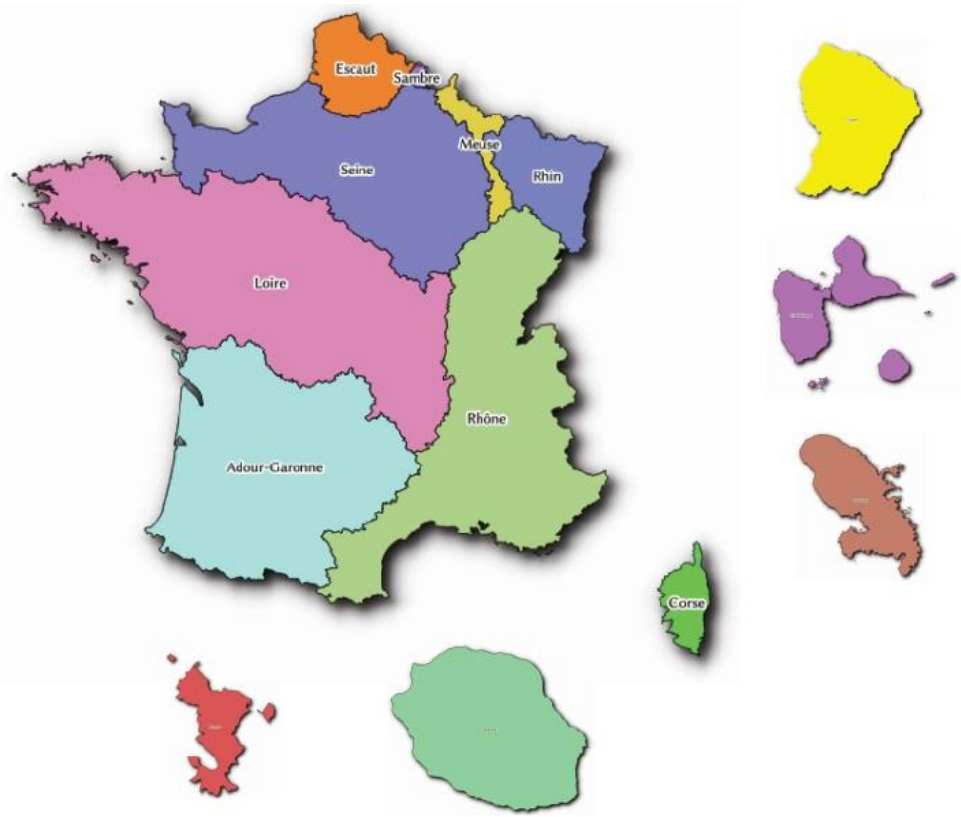
3.Main public bodies involved

at local level

- Departmental Territorial Directorate (DDT)
- Local authorities (region, department, town..)

more info on website

4.Organisation for WFD implemention: A decentralized management, by watersheds

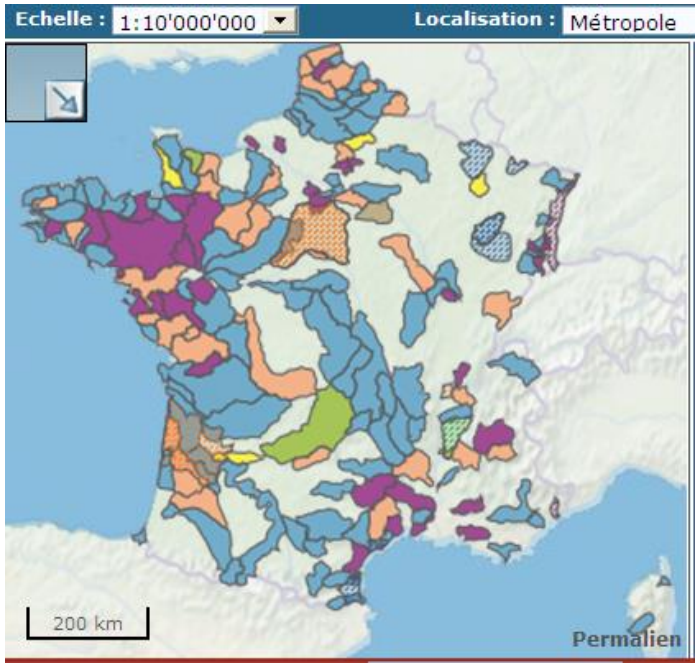


12 watersheds/river basins

12 basin committees responsible for :

- Assessing the state of the watershed
- Establishing the 6-years management plan, RBMPs (SDAGE) and Programme measures

- SBMPs or “SAGE”: local management plans



Status of SBMPs in France

Progress of existing contracts in France is available on the Gest’eau website

- Territorial contracts or and local or regional environmental contracts (funded by WA)

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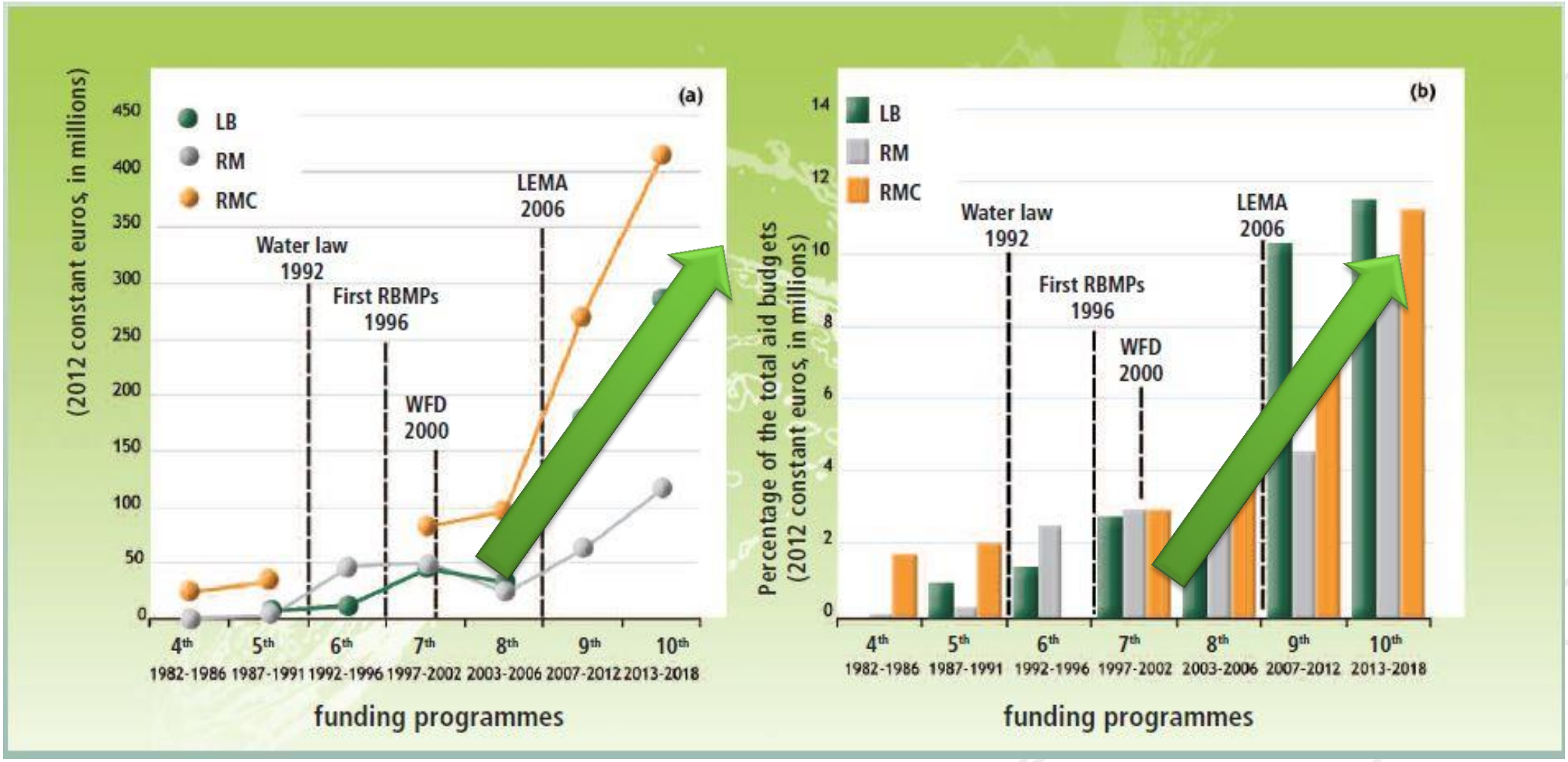
5.Funding for river aquatic environment

- Public funding for a project: up to 80 %
- from the Water agency, regional, departmental, local authorities, Europe, …

Funding for aquatic environment per management cycle: M euros and %



Morandi and Piegay 2017

6.Solutions: Restore river hydromorphology

To restore river processes:

- remandering
- embankment removal
- pond removal or bypass
- weir or dam removal
- opening buried watercourse
- gravel input

6.Solutions: reduce impact

Implementing fish passage to reduce impact of weir and dam on fish mouvements

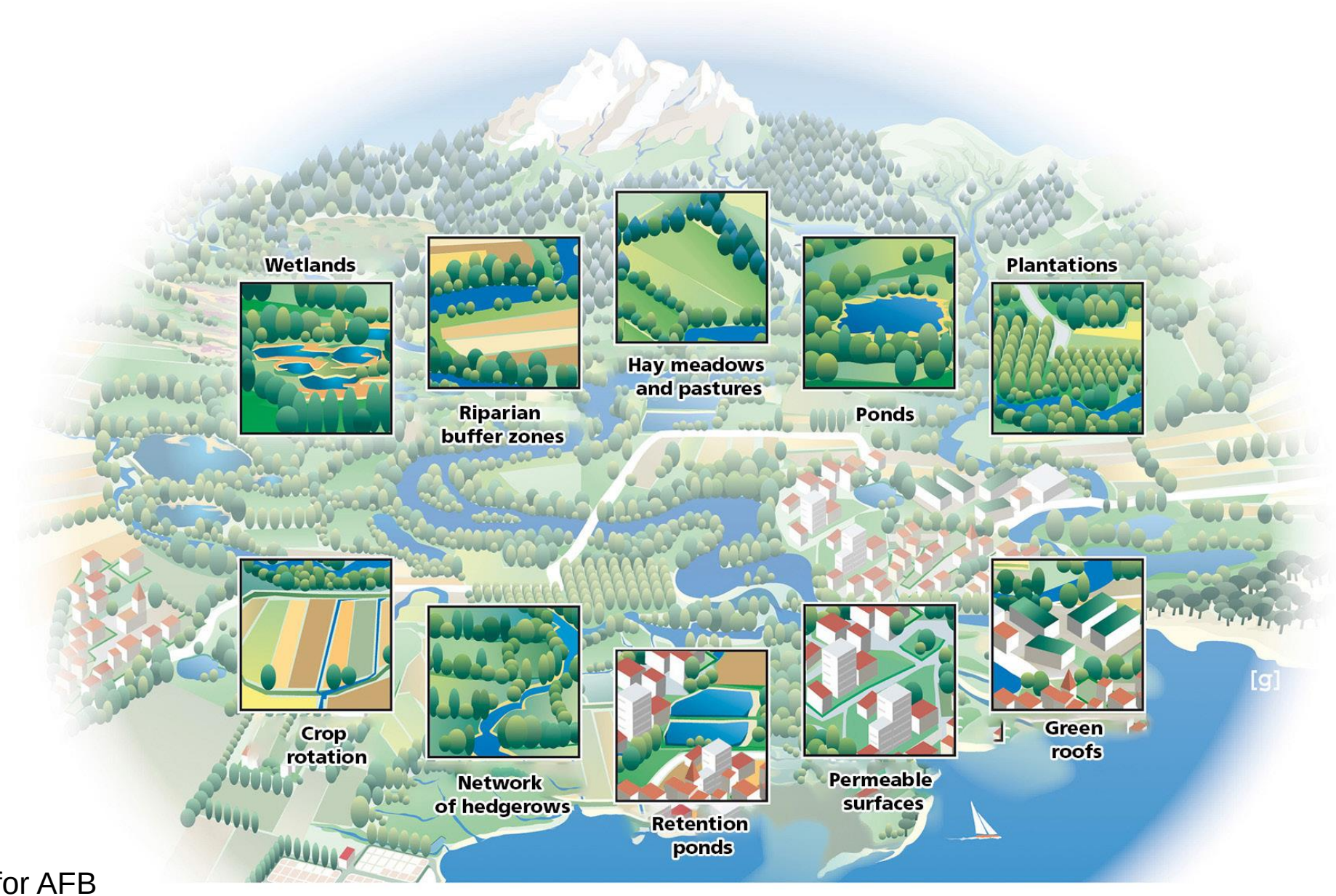
6.Solutions reduce impact : **Plant based engineering**

To improve ecological features of modified rivers

bank protection with sheet pile

2 years after removal of sheet pile and plantation

6.Solutions:preserve rivers by improving land management of the catchment



Graphies for AFB

To reduce water surface runoff and increase water infiltration and water quality

Restored wetland

Atificial wetland to retain temporarly water

artificial permeable surfaces

Natural Water Retention Measures:

http://nwrm.eu/

Levers to river restoration/improvement and preservation:

funding, national legislation and public organisation

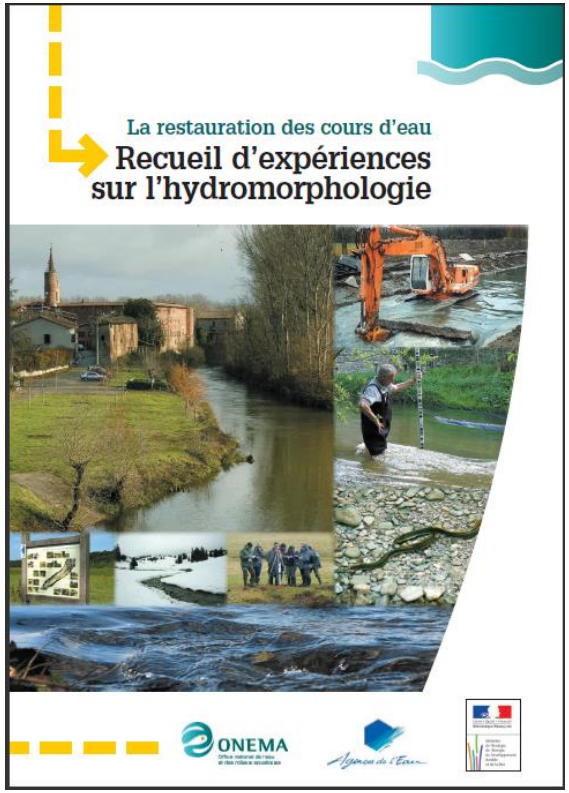
Need for improvement:

Projects result changes in economical or recreative uses and living environment

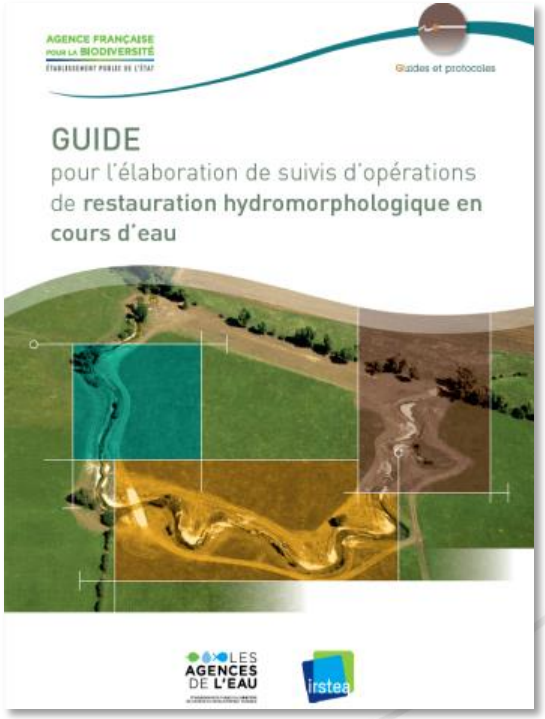
need to obtain local population support and to promote the multiple benefits of healthy rivers

River restoration is complex

need to facilitate sharing of knowledge and to monitore and assess projects



Collection of river hydromorphology restoration examples:
https://professionnels.ofb.fr/en/node/654



Guide to monitore hydromorphology restoration project

Web version (may 2019) :
https://professionnels.afbiodiversite.fr/fr/doc-guides-protocoles/guide-lelaboration-suivis-doperations-restauration-hydromorphologique-en

9.New Poutes dam project on Allier, Loire catchment

Barrage de Poutès aujourd'hui

Le nouveau Poutès, une fois le projet réalisé

ACTUAL BEFORE WORKS

PROJECT

Poutes Dam

- Built for electricity 1941

- 17 m high, 85 m large, 3.2 km impoundment

- impacting 60 % salmonid spawning habitats

- main cause of verge extinction Loire salmon

- More than 20 years conflict between NGOs and EDF to remove the dam

- Comprimise was agreed in 2011

New Poutes

- Dam lowered to 7m with 400 m reservoir
- 2 central sluice gates opened for sediment transport during floods (100 M3/s) and for upstream migration during 3 months
- Fish lift associated with a new fish pass
- Stop in electricity production 3 months /year
- Downstream migration optimized with screen 12 mm space grids

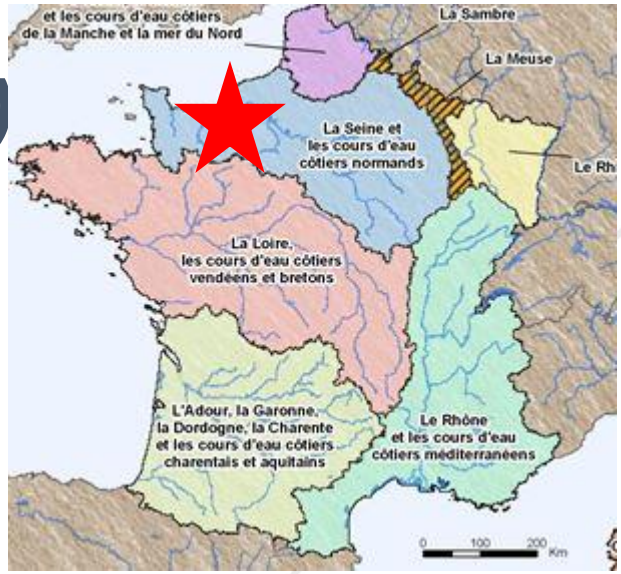
Works 2019 -2021

R. Epple

R. Epple

2019 dismantling the existing sluices
reservoir totaly empty

10.Vezins and La roche qui Boit removal on Selune



Vezins dam (built between 1929- 32)

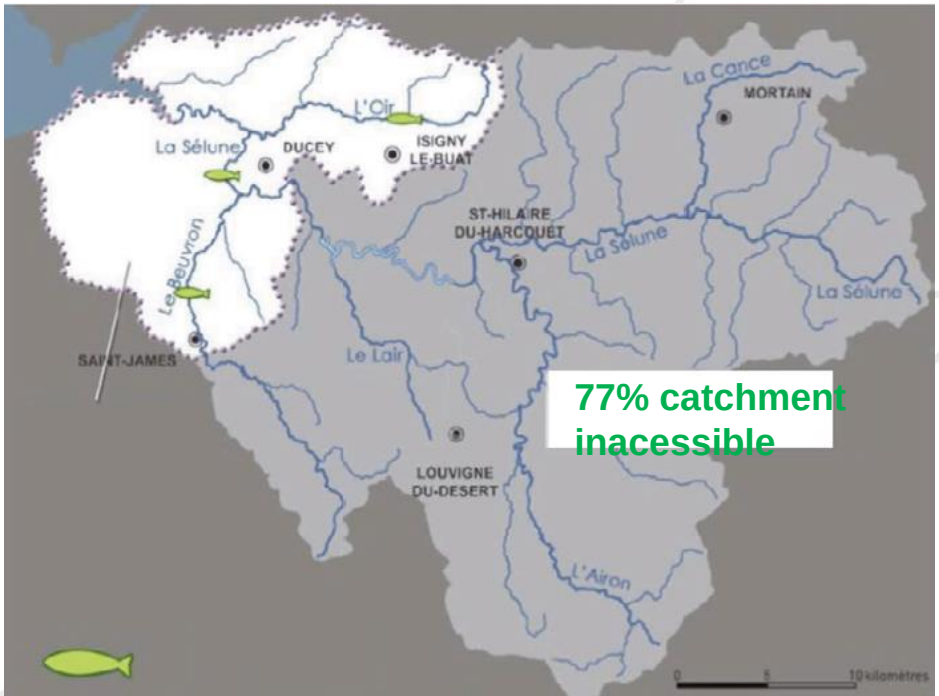
– 17 km from the sea
– Height : 36 m
– Width : 278 m
– Volume of the reservoir : 19 millions m3
– Length : 19 km

La-Roche-qui-Boit dam (built 1916 - 1919)

–12 km from the sea
– Height : 16 m
– Width : 129 m
– Volume of the reservoir : 1,4 millions m3
– Length : 4 km

Important impacts

- Water quality problems led to prohibition of swimming
- Significant sedimentation 2 million m3
- Sediment release for maintenance led to pollution of river in1993
- Ecological impact on river habitat and salmonid migration



Decision of their removal

- low electricity productivity
- one the best river for salmon potential,
- Selune classified river under the water law
- adverse effect on water quality

→ removal annoncement by the minister in 2009 stopped in 2014 then relaunched in 2017

→ Strong local opposition

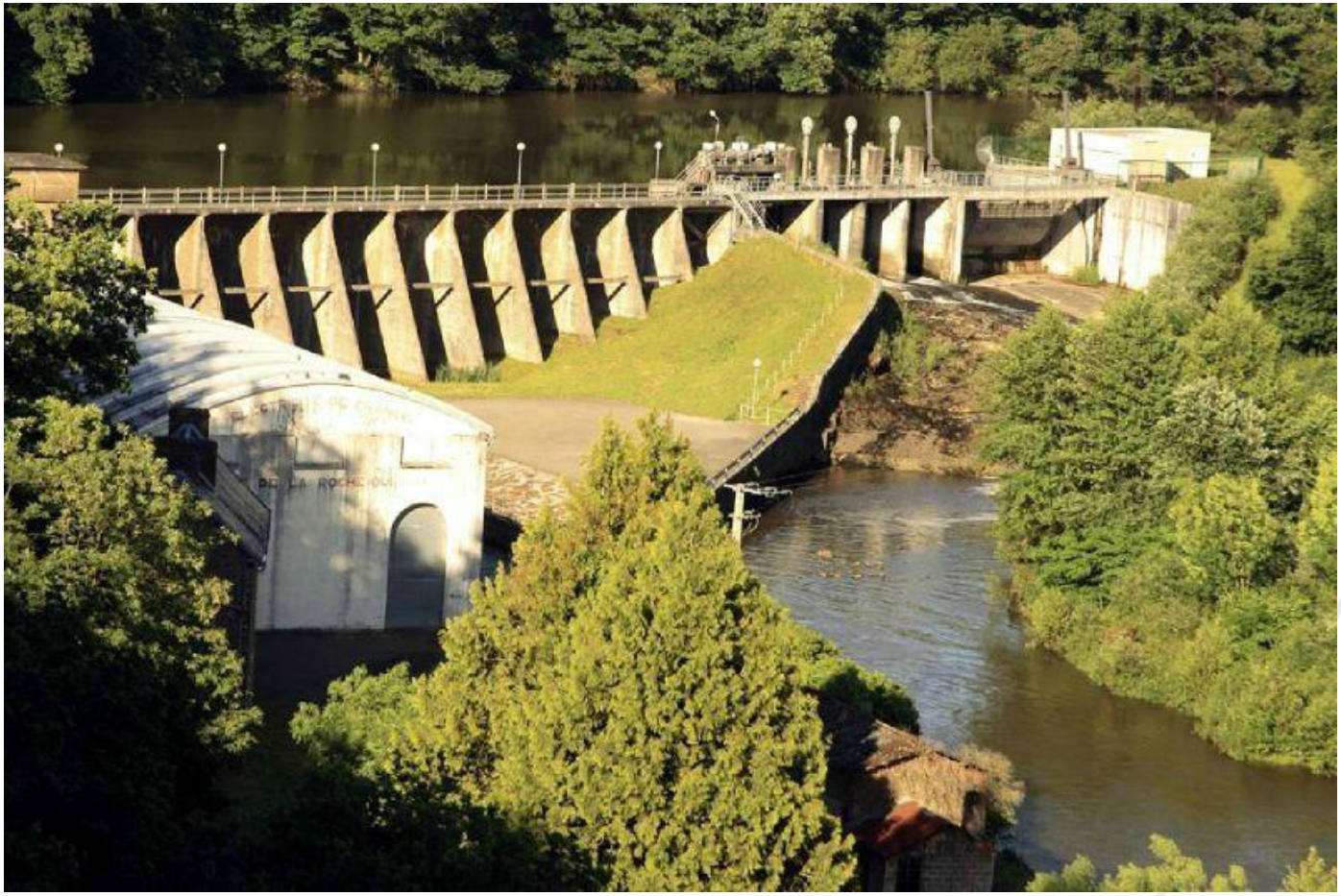
One of the largest dam removal

VEZINS

- 2017 start of drainage and sediment management
- 2019 dismantling of powerplant house and first breach
- 2020 end of removal in september

Vezins dam 13 january 2020 : 80 % of the 36 m high dam removed © DDTM50 in coop. with ERN

one of the largest dam removal



LA ROCHE QUI BOIT

2020 -2022: start of works in June, planned to end early 2022

Scientific monitoring programme

- started in 2012 and planned for 15 years
- pluridisciplinary studies: ecosystem functionning, river dynamics and water quality, social science
- coordinated by INRAE, funded by Seine Normandy WA
- seminar held in 2019

Selune

https://www.ern.org/en/colloque-international-selune/
https://programme-selune.com/en/

For more information:

Poutes and Vezin project:

https://vimeo.com/97903606

https://www.ern.org/en/

Restoration in France:

www.coursdeau.fr

http://www.river-restoration.onema.fr

River restoration Examples in English:

https://professionnels.ofb.fr/en/node/654

http://www.river-restoration.onema.fr/content/towards-restoration-rivers-and-aquatic-environments

Thank your attention

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