

Water management strategy and climate change

Case of the Rhone-Mediterranean basin

Jacky COTTET

President of the board

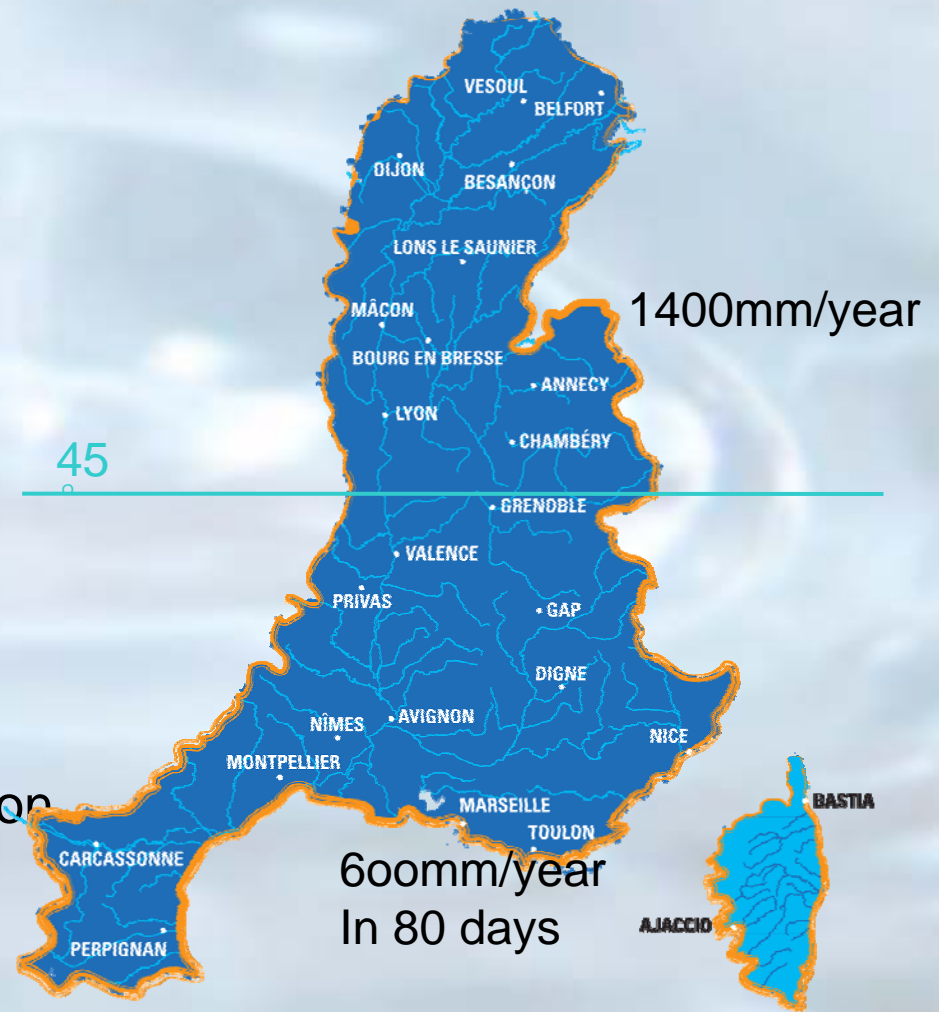
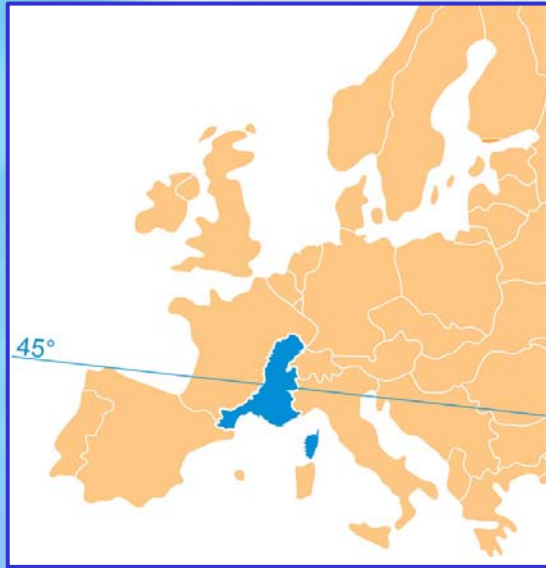
Rhone – Mediterranean – Corsica water agency

France

WORLD WATER FORUM ISTANBUL – MARCH 2009

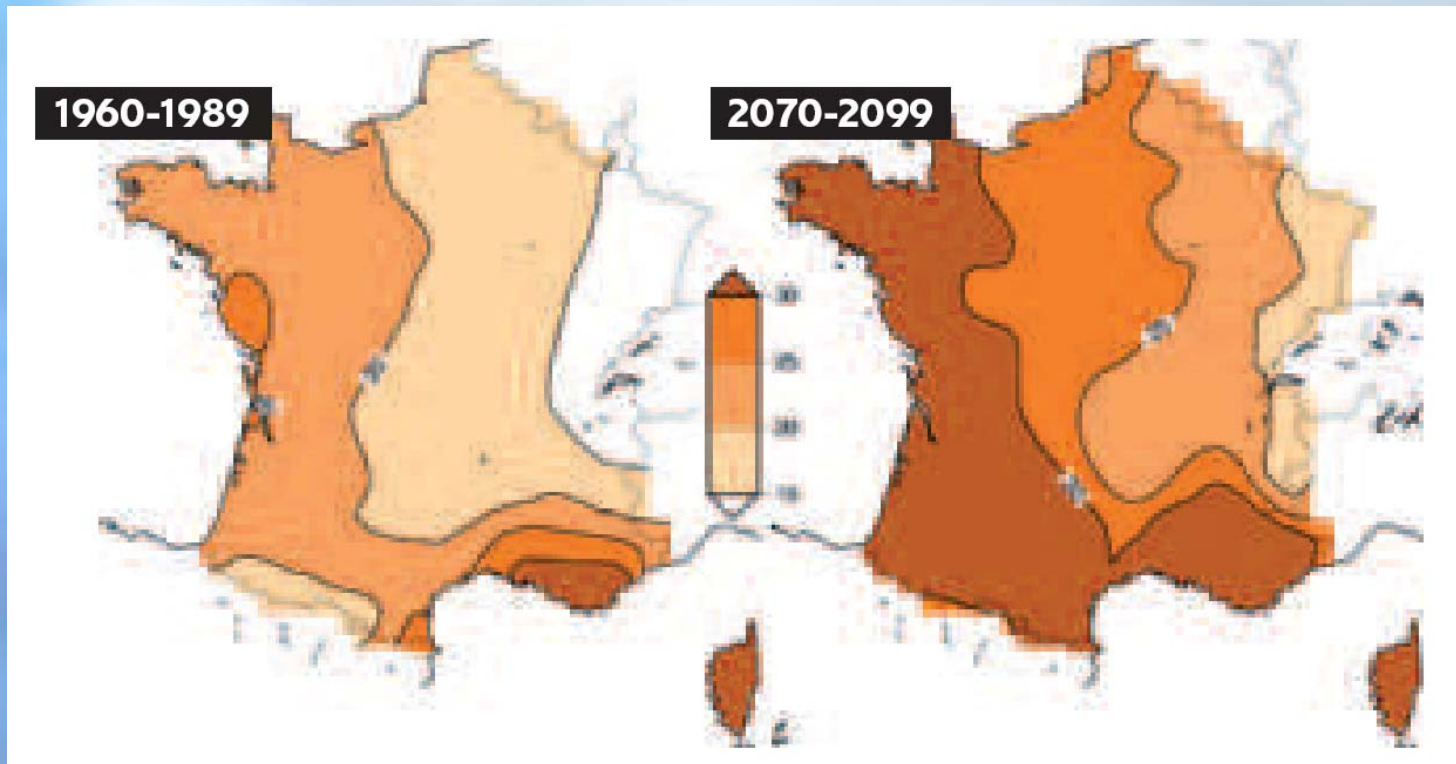


The Rhone- Mediterranean – Corsica Basin

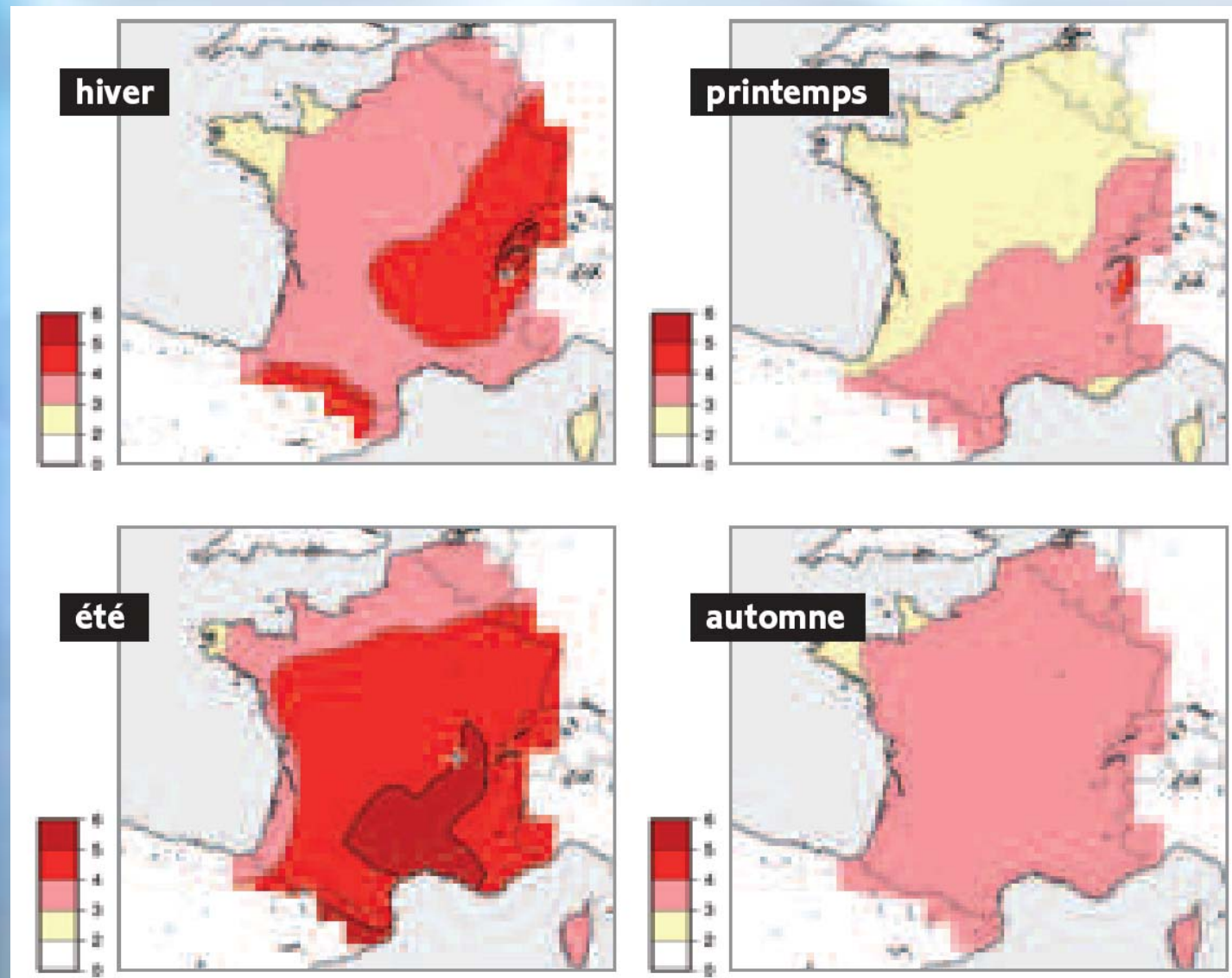


- ❖ Latitude 45° N
- ❖ Alps mountains and Mediterranean region
- ❖ 15 millions inhabitants
- ❖ 50 % tourism activity of France
- ❖ The Rhone (1000 to 13000 m³/s)

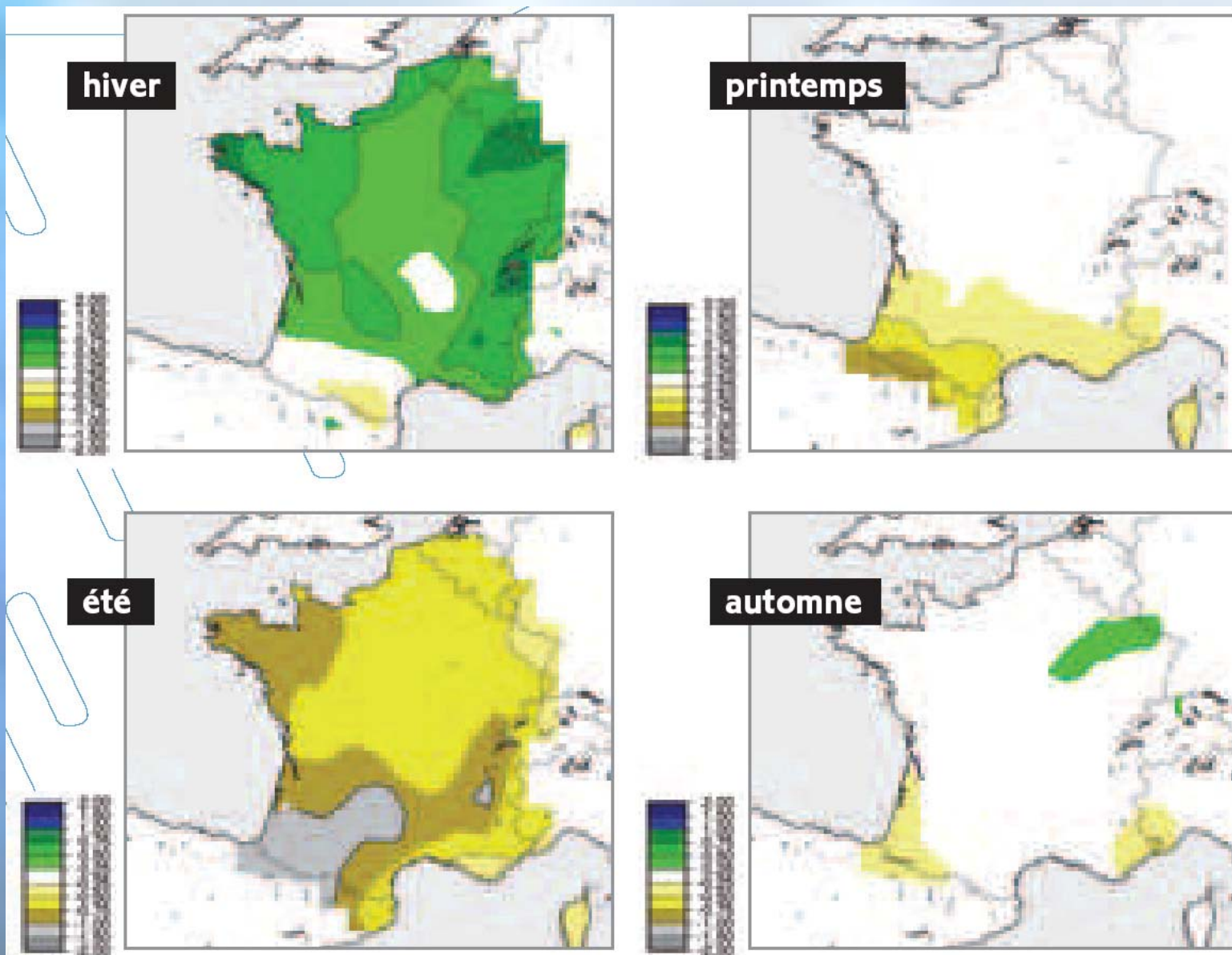
Nombre de jours secs consécutifs en été ($p < 1\text{mm}$) (Modèle Arpège, scénario A2)



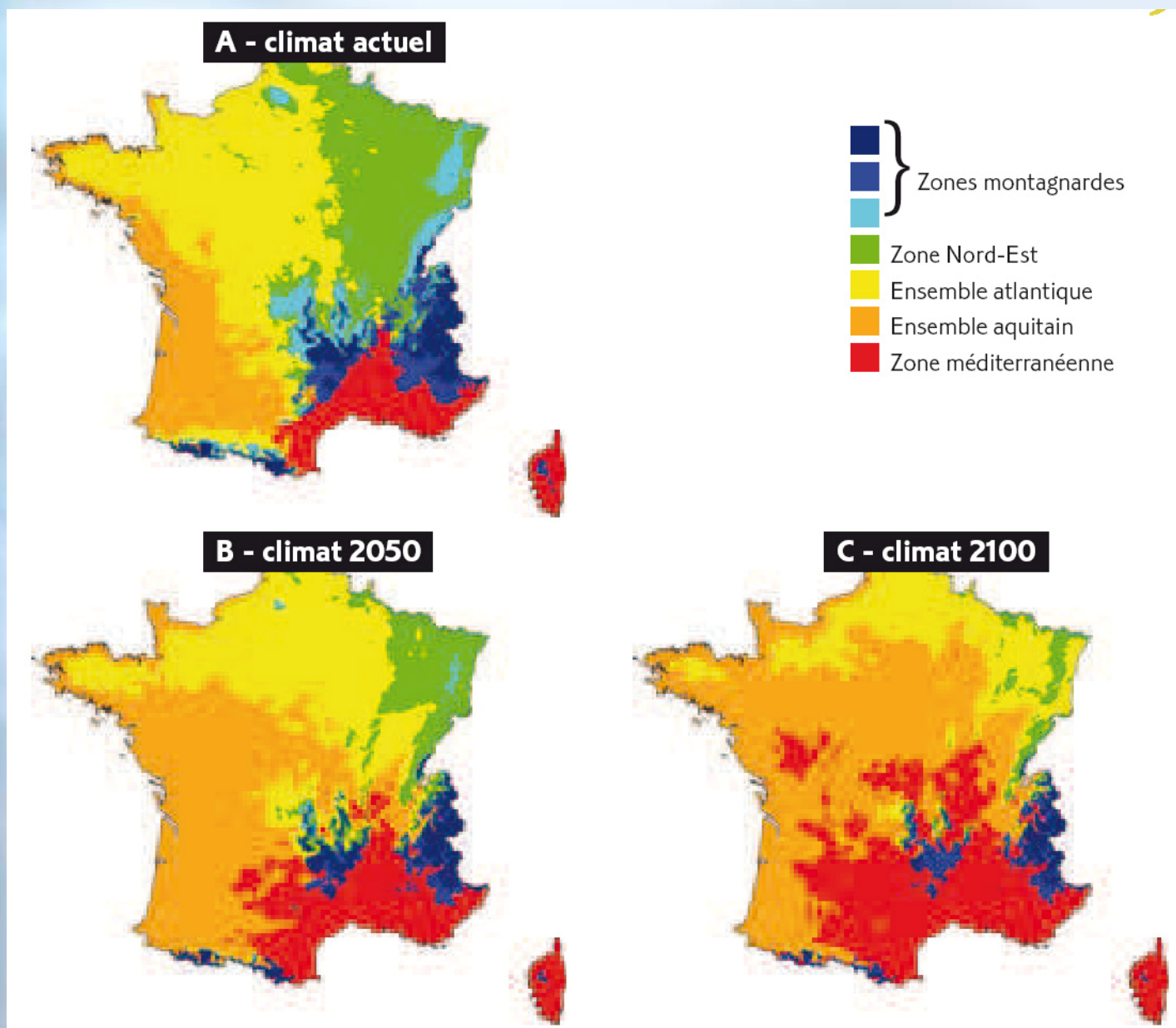
Différence de températures (C°) entre la période 2070-2099
et la période 1960-1989 (Modèle Arpège, scénario A2)

















Différence de précipitations (mm/j) entre la période 2070-2099
et la période 1960-1989 (Modèle Arpège, scénario A2)



Evolution des aires climatiques potentielles (Modèle Arpège, scénario B2)



Observations and prospects

observations	Future trends	impact/water
Local overuses of resources		Water shortages Déterioration of aquatic ecosystems
 air temperature		 Water temperature
 drought periods		environmental quality Biodiversity
Rainfall :  in summer in winter  acute flooding		more acute low-waterlevels floods
Glacier shrinkage		 current low flow rates future low flow rates 
Decrease in snow cover		Changes in hydrological regime
Rise in sea level		Coastline erosion Risks of flood destruction of lagoons salination of aquifers

A strategy to meet today's challenges,while preparing for the future!



**Principles of integrated water
resource management EWFD**

A strategy for balanced resource management...

- ❖ Save water
- ❖ prevention and management of drought and water shortages
- ❖ Mobilization of new resources
- ❖ Higher aspirations with regards to water quality
- ❖ Prevention of flood related -risks

SAVE WATER ...

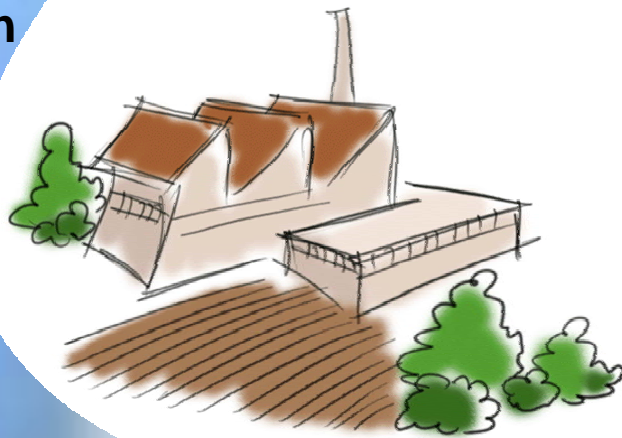
information..



Reduction
of losses

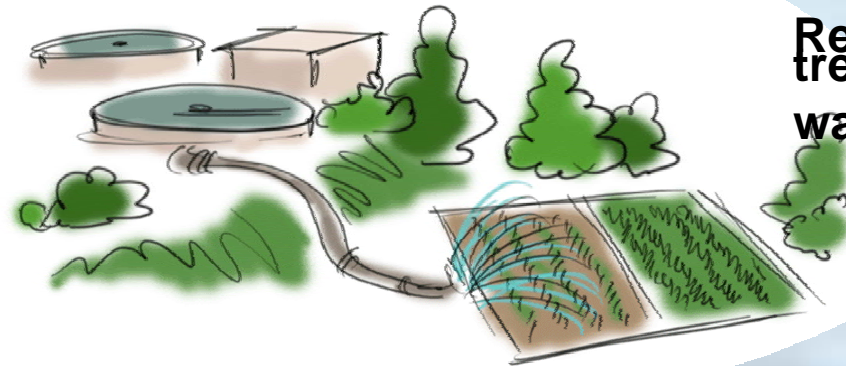


Collecting
rainwater



irrigation

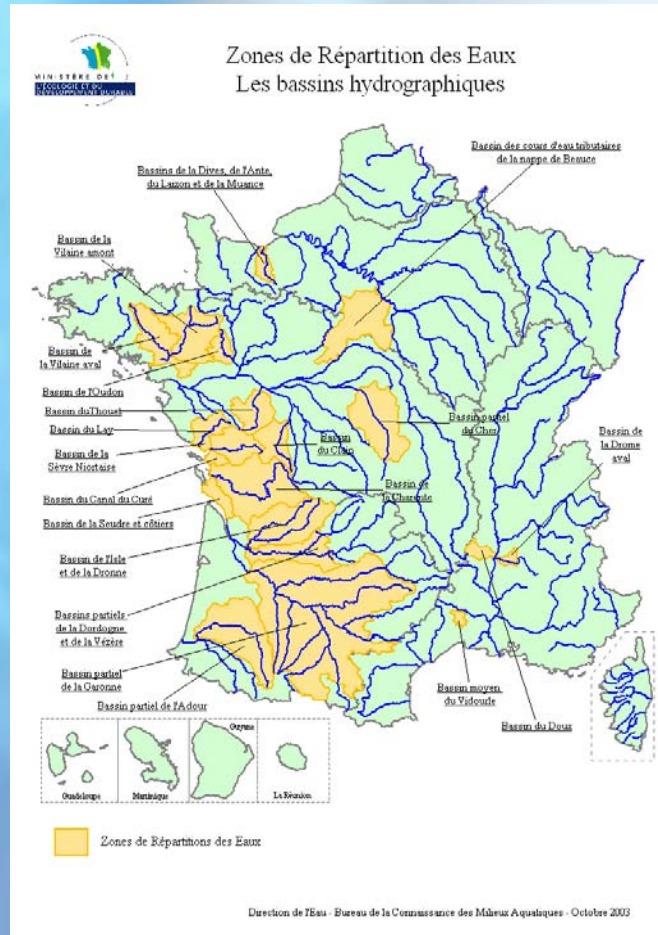
Reuse of
treated
waste water



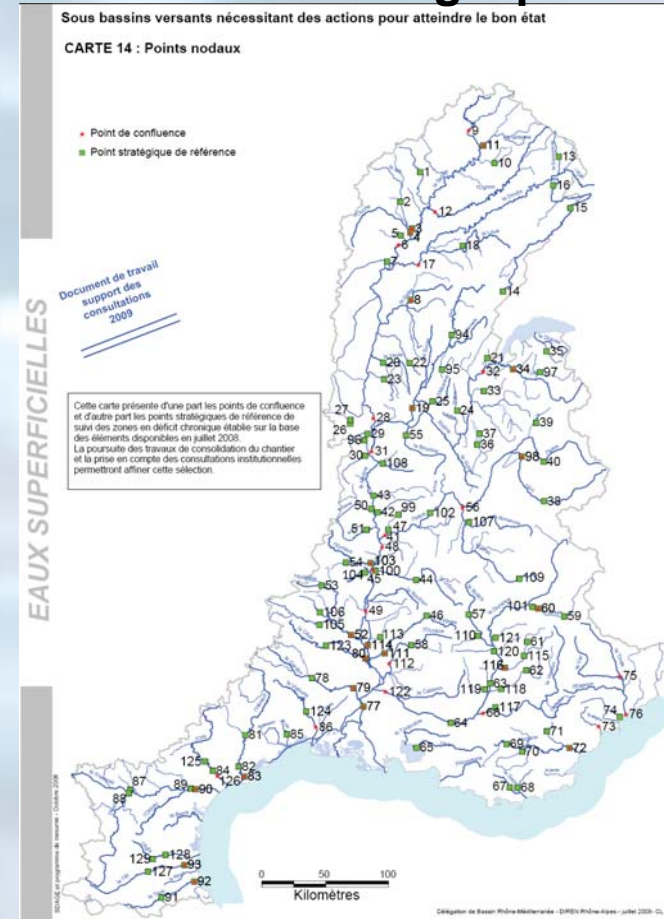
Recharge of
aquifer

(1) at regulatory level

Definition of « water distribution areas »



Setting of a »critical « flow rate to be maintained at 200 strategic points



Critical flow rate allowing to meet priority requirements:

- drinking water supply
- public safety and security
- quality of aquatic hydrosystem

Prevention and management of drought and water shortages.. (2) at operational level



Example of Drought plan at local level



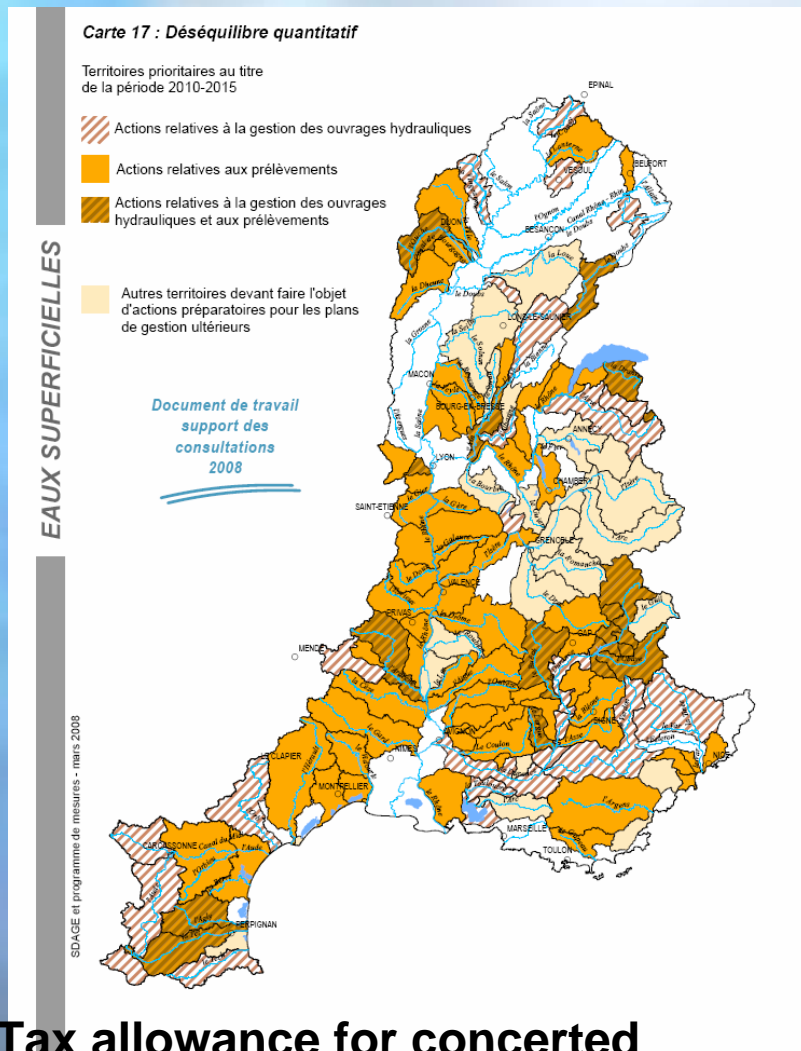
1. **Continuous consultation led by the state representative**
2. **Anticipation-monitoring :regular and on-going sharing out of water data between all the stakeholders**
3. **Water abstractions distribution plan for each use**
4. **Collective Organisation of irrigation management**

Prevention and management of drought and water shortage

(3)financial level

Higher charge on water taken from deficit sub-basins

Price of water



Tax allowance for concerted management of irrigation

Mobilization of new resources

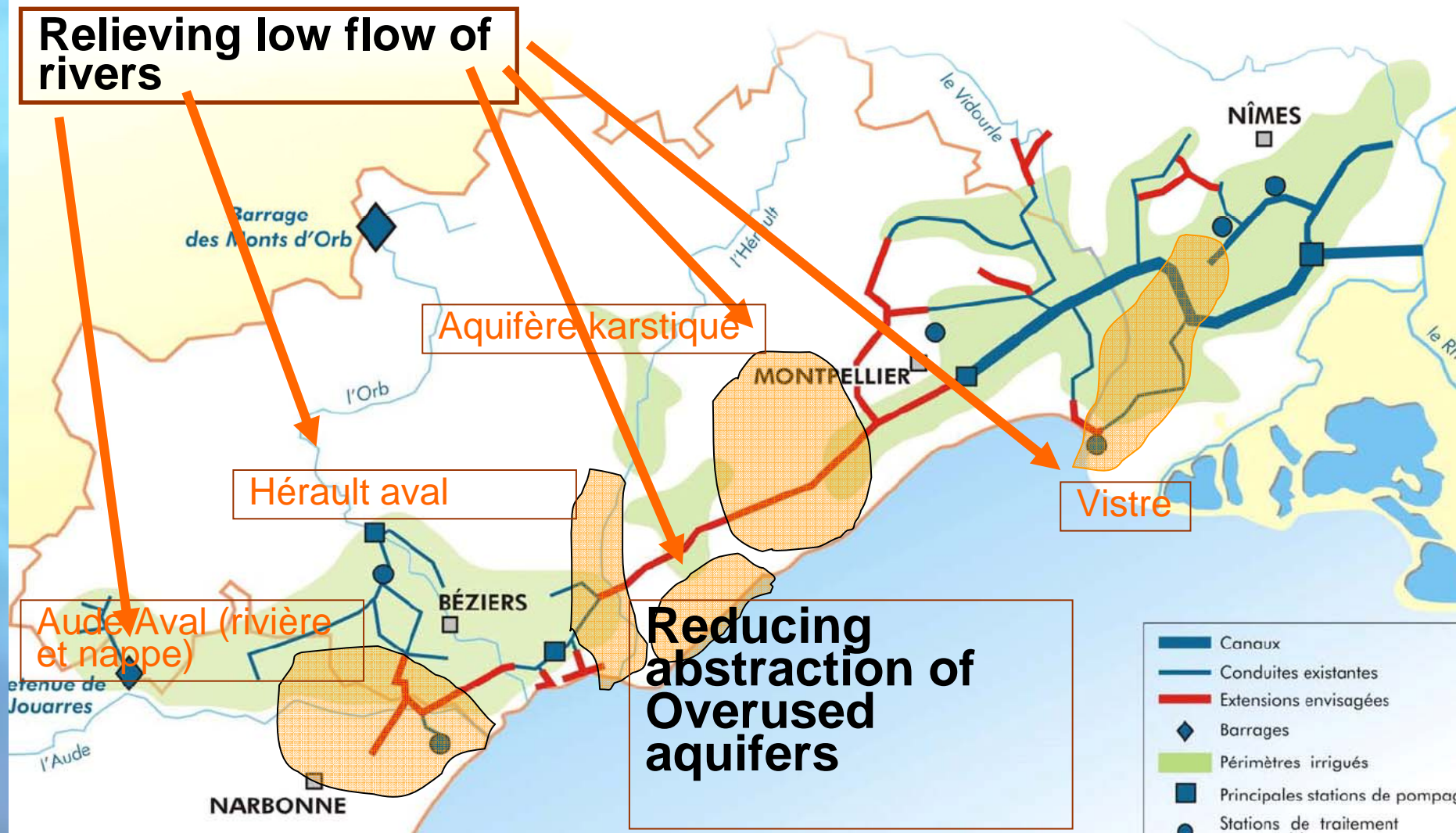
Two main principles:

- last resort after a proactive policy to save water

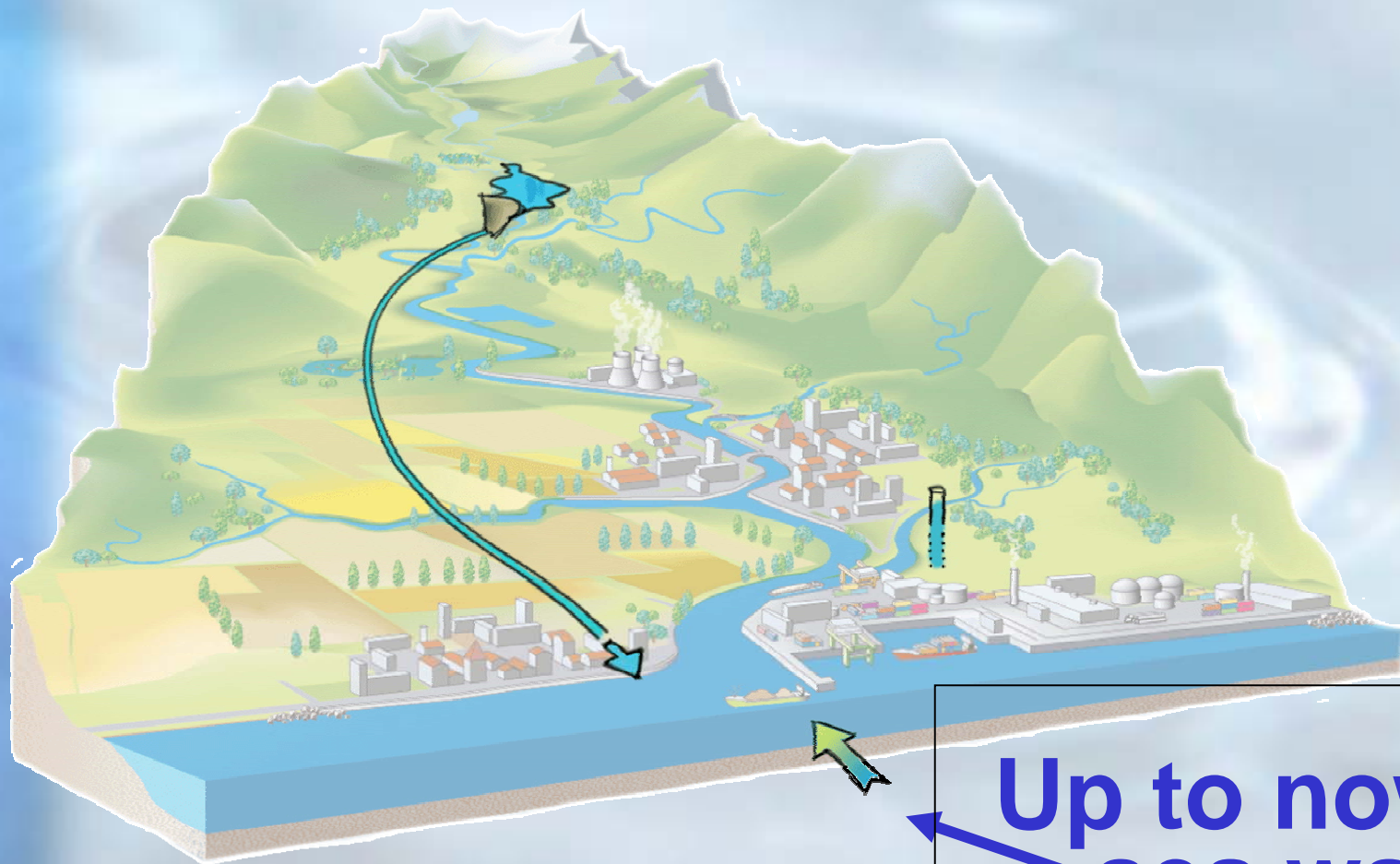
- Environmentally and economically sound projects



Proposition de programme 2007-2016



Mobilization of new resources ...



**Up to now no
sea water
desalination !...**

The quantity question .. but also ...



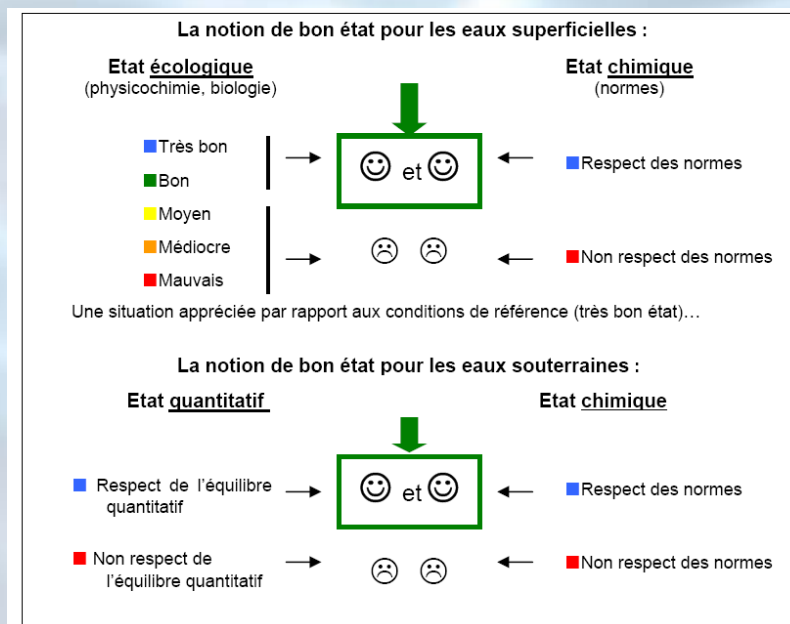
**Higher aspirations with regards to
water quality and biodiversity**

EWFD water Quality objective !



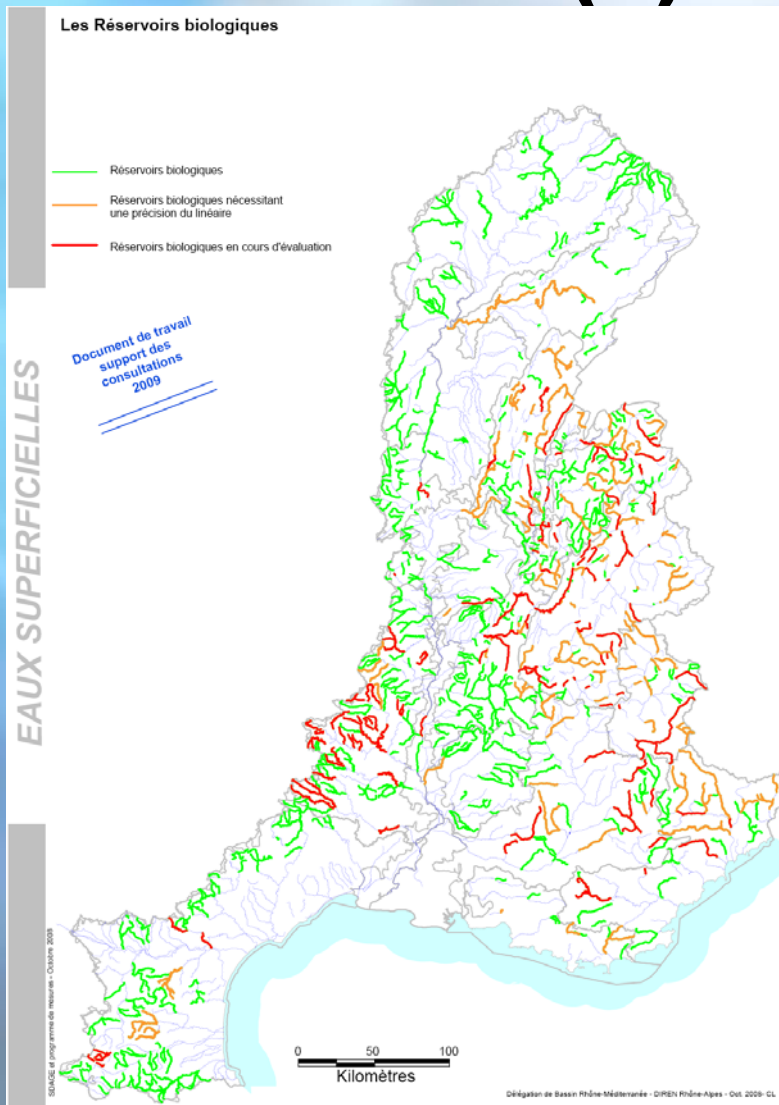
(1) Good status

2015 = good status of 66% of water bodies
« bon état » de tous les milieux aquatiques
(cours d'eau, plans d'eau, lacs, eaux souterraines, eaux côtières et étangs littoraux)



Higher aspirations with regards to quality and biodiversity

(2) Biological reserves



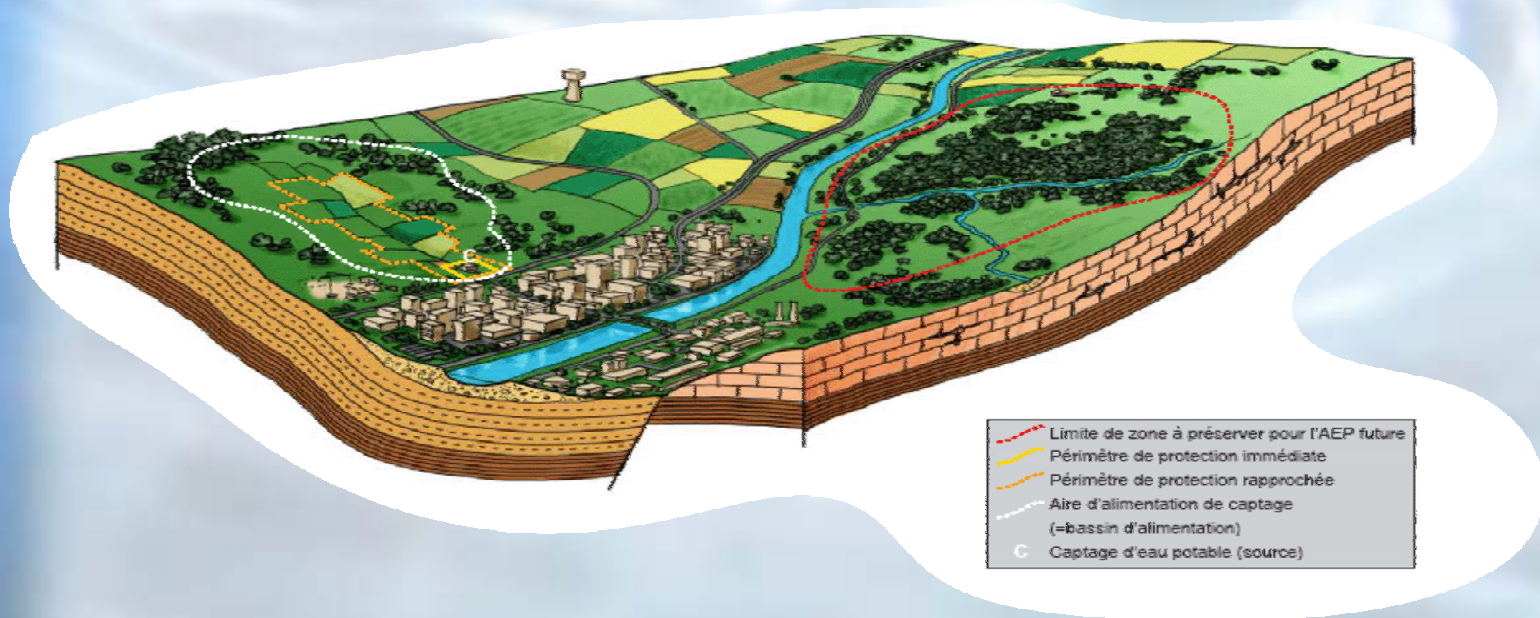
Higher aspirations with regards to water quality and biodiversity

(3) Protection and acquisition of wetlands



Une ambition renforcée pour la qualité de l'eau et la biodiversité

(4) Protection systems for the catchment areas of aquifers



Prevention of flood -related risks

Spatial development and city planning

Reinforcement of statutory tools

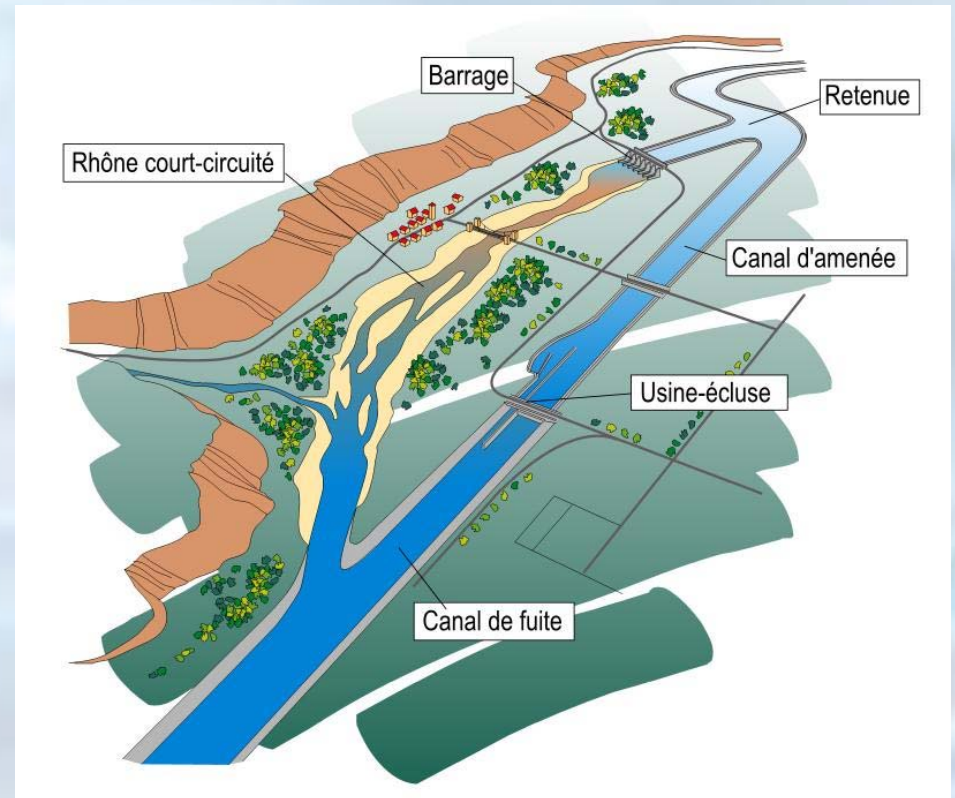
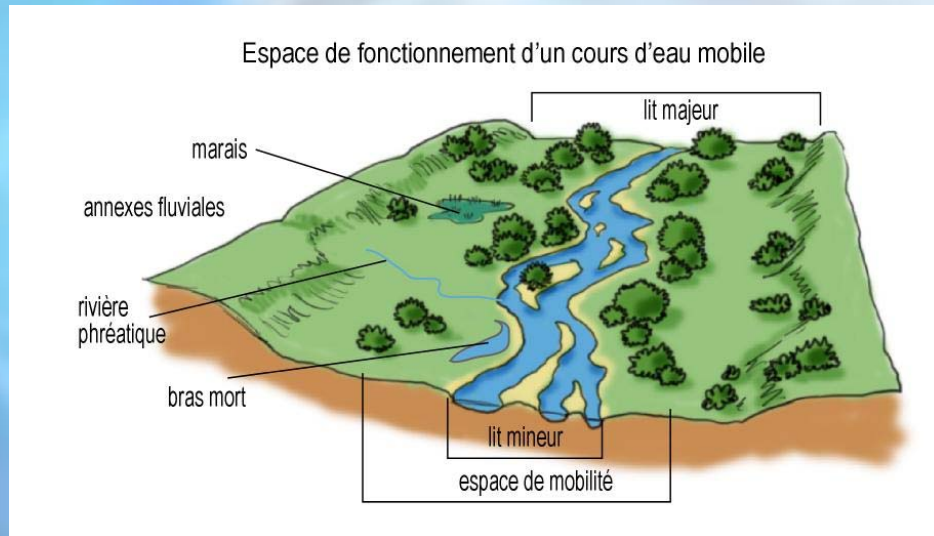
- ❖ **Widespread implementation of risk prevention plans**
- ❖ **information of citizens on risks**
- ❖ **Reorganization of flood forecast system**

Integrated approach to fighting floods

- ❖ **Dykes ..but also ;geomorphology,flood storage areas,reconnection with »dead river arms »,etc..**
- ❖ **example of “plan Rhone”**

Plan Rhone

reintroduction of flood storage areas, restoration of river width and natural diversions



A more forward-looking approach..

- ❖ **Contribution by water sector itself to reducing greenhouse gas emissions**
- ❖ **Advances in research , knowledge and technologies**
- ❖ **Setting up of an environmental observatory focusing on water /climate change**
- ❖ **Downward applications : regional atmospheric scenarios**

local images of possible forecasts

Help to decision-making :
- hydrology, agriculture, energy, society,...
-territorial climate plans

