

*The resilience of water supply in
the face of climate change*

The case of recharging aquifer in Paris Region

*Metropolitan C.A.R.E. Management Challenges facing Extreme Events
CILE, Liège - Nov. 6, 2019*



Climate Change Impacts



TOO MUCH WATER

**NOT ENOUGH WATER
(OR OF UNSUITABLE
QUALITY) WHEN
NEEDED**



France, Summer 2019



How to act ?

No universal solution...

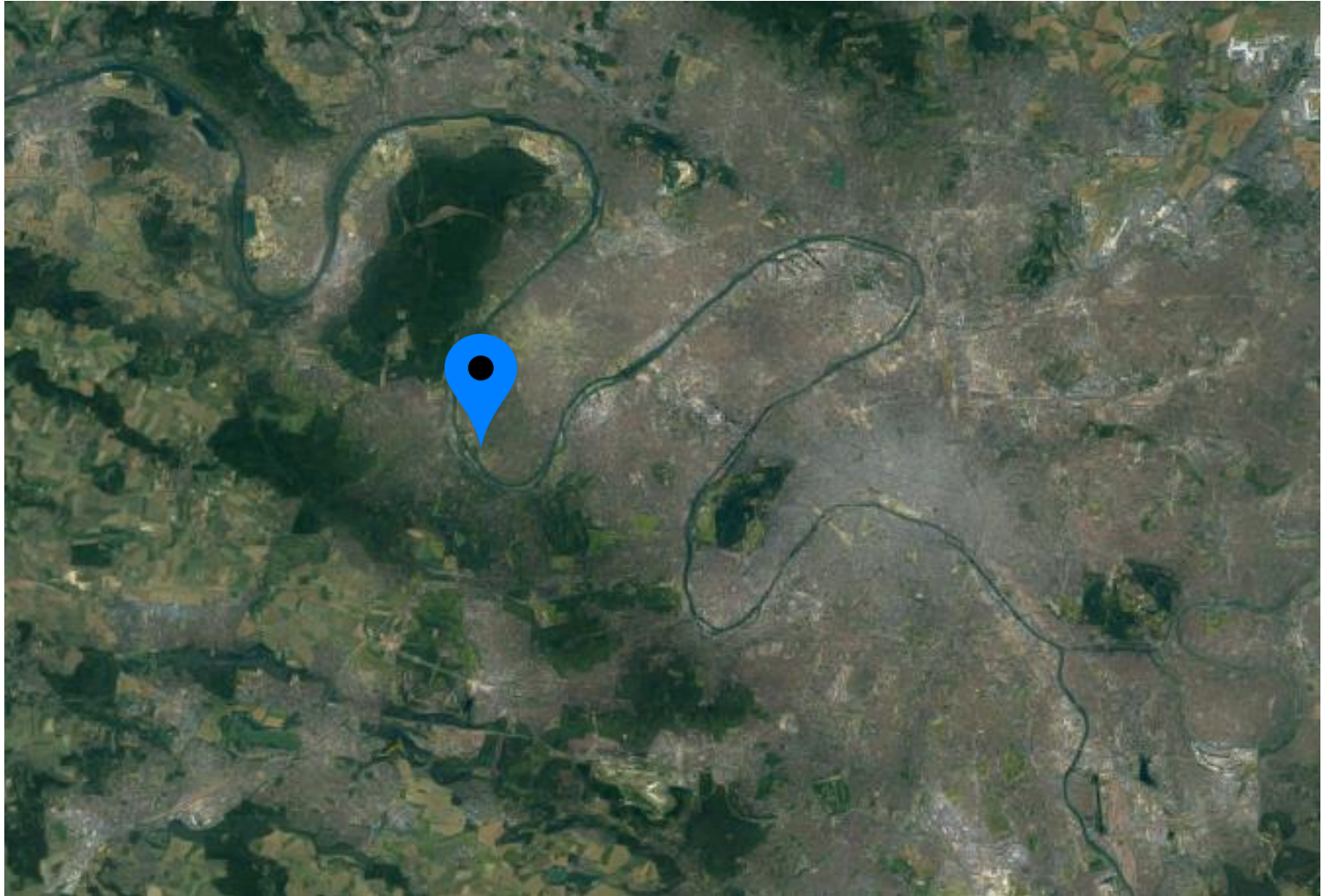
Several actions can be taken, depending on the context:

Acting on demand (where and when)	Acting on offer
Burst reduction on water distribution networks	Interconnections between networks
Education in the good use of water	Reuse of treated waste water
Early warning on water leaks	Nature based solutions: Facilitate Aquifer recharge
Incentive pricing of water rates	...



West Paris Region

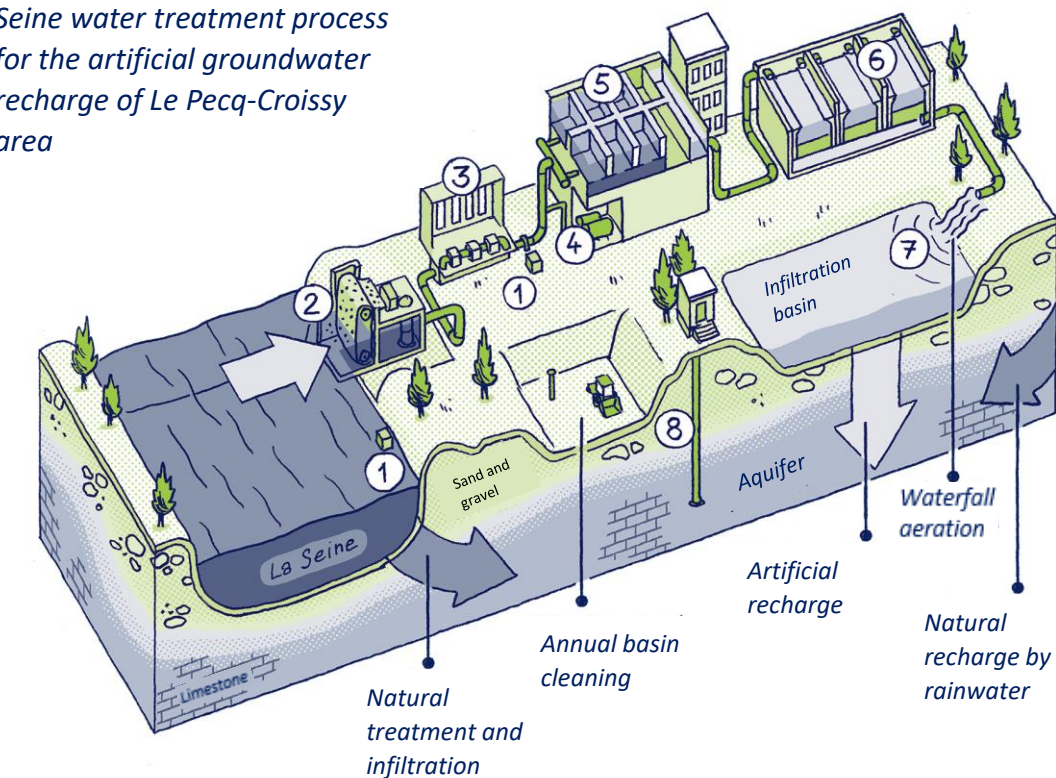
Artificial aquifer recharge in the West Paris Region





Artificial groundwater recharge process

Seine water treatment process
for the artificial groundwater
recharge of Le Pecq-Croissy
area



- | | | | |
|---------------------------|---------------------------------------|-------------------|---|
| ① Contamination sensor | ③ Pumping station | ⑤ Settling tank | ⑦ Biological treatment and groundwater infiltration |
| ② Seine catchment-sieving | ④ Powdered activated carbon treatment | ⑥ Sand filtration | ⑧ Water well |

3 levels of water treatment

- Water treatment plant : Seine intake
- Natural filtration in the recharge basins
- Drinking water treatment plants

Hydraulic Residence Time

Process 2 hrs

Bassin 2 days

Aquifer 20 days

A collaborative program to prevent contamination

Municipal authorities



No pesticide on public space and roads

No pesticide use by private individuals

Farmers



Industrial companies



Risks management process

No pesticide use

Development of organic farming

Farm advisory

The « Coulée Verte »: a learning path

Created in **2006**, the Coulée Verte has been designed for drinking water education.

Children and adults alike can follow a learning path to discover the water cycle, the flora and bird species along the Seine river.

Visitors can have an overview of the **15 hectares** of the artificial recharge area and its fauna. On this site **70 species of birds** has been counted (other 400 for the whole country) as well as a wide variety of mammals (such as rabbits, foxes, coypus...).



Chardonneret élégant

Cet oiseau au plumage d'arlequin n'a pas son pareil pour attraper les petites graines des chardons et des cardères. Dérangés, les groupes de chardonnerets s'envolent en poussant des cris d'alarme et vont se réfugier dans le couvert des arbres.



Faucon crécerelle

Le faucon le plus répandu de France recherche des terrains de chasse ouverts, propices à la capture des mulots ou des campagnols. Il adopte alors un vol battu sur place, que l'on appelle dans le langage populaire « vol en Saint-Esprit ».



CLASSES AND SITE VISITS FOR OVER 3,000 PUPILS A YEAR

Our learning facilitator conducts learning sessions in classrooms and site visits on the request of teachers.

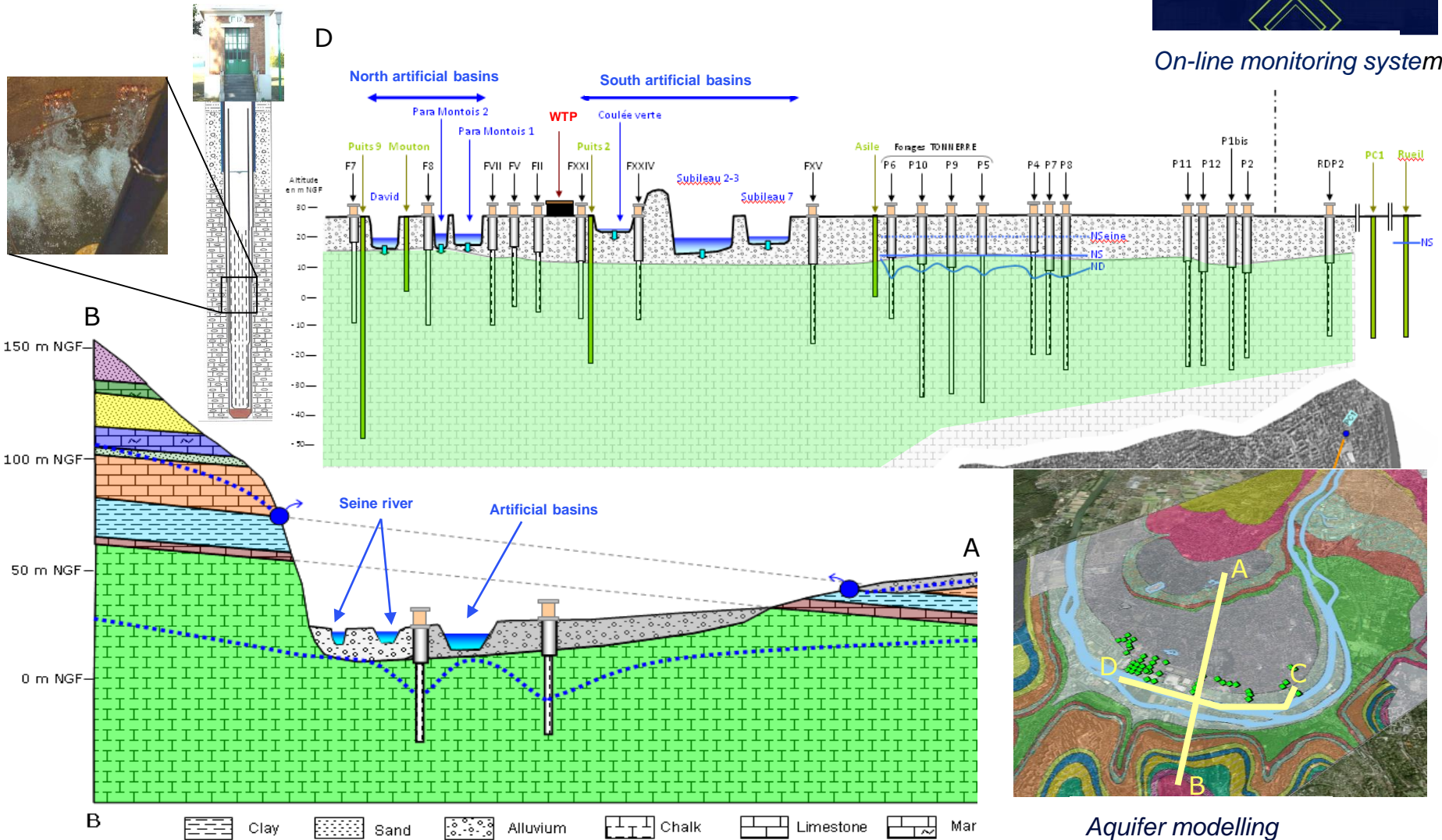


Local associations are among our preferred partners, in particular the **Ligue de Protection des Oiseaux**, **Seine vivante** and **Ecolonia**.

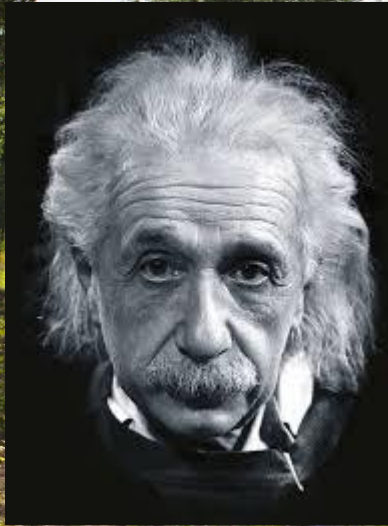
Hydrogeological context and operation



On-line monitoring system



Aquifer modelling



Look deep,
deep into nature,
and then you
will understand
everything
better.

Albert Einstein
Physician

Observe nature,
for it is your future.

Leonardo da Vinci
Italian artist and scientist

