2030-SIAAP Master Plan Facing Climate Change Impacts

WSmart – Jean-Pierre Tabuchi
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SIAAP
Service public de l'assainissement francilien
www.siaap.fr

Climate Studies

- **GICC-Seine (2004, coord. Univ. Paris 6)**
  - **Hydrological and biogeochemical impacts of climate change on the Seine River**

- **RExHySS (2009, coord. Univ. Paris 6)**
  - **Impacts of climate change on Seine and Somme rivers**

- **Explore2070 (2012, coord. MEDDE)**
  - **Adaptation to climate change in France**

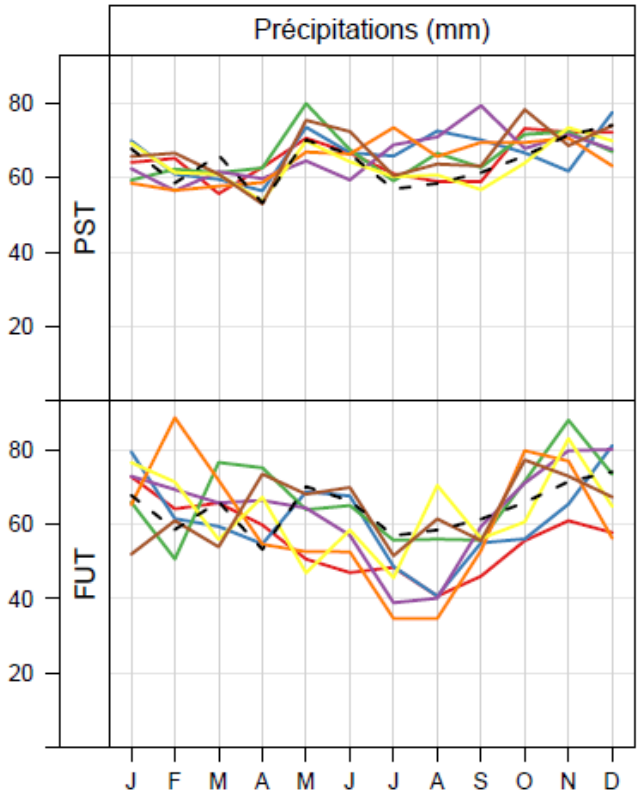
- **Climaware (2013, coord. Irstea / Seine Grands Lacs)**
  - **Impacts of climate change on *Seine Grand Lacs* storage facilities management**

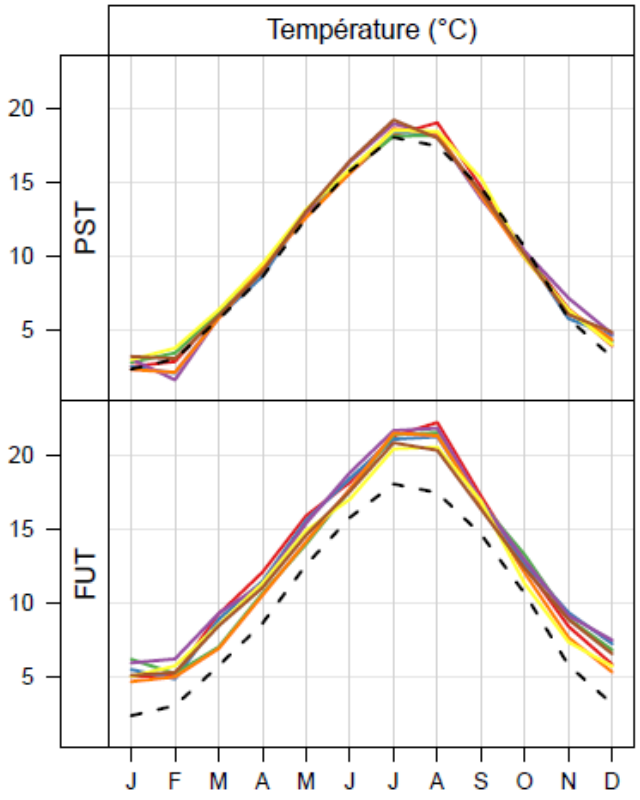
Climate impact on Seine basin

A1B IPCC scenario

Présent 1961-1990

Futur 2046-2065





Pobs PST
Tobs PST
C1
C2
C3
C4
C5
C6
C7

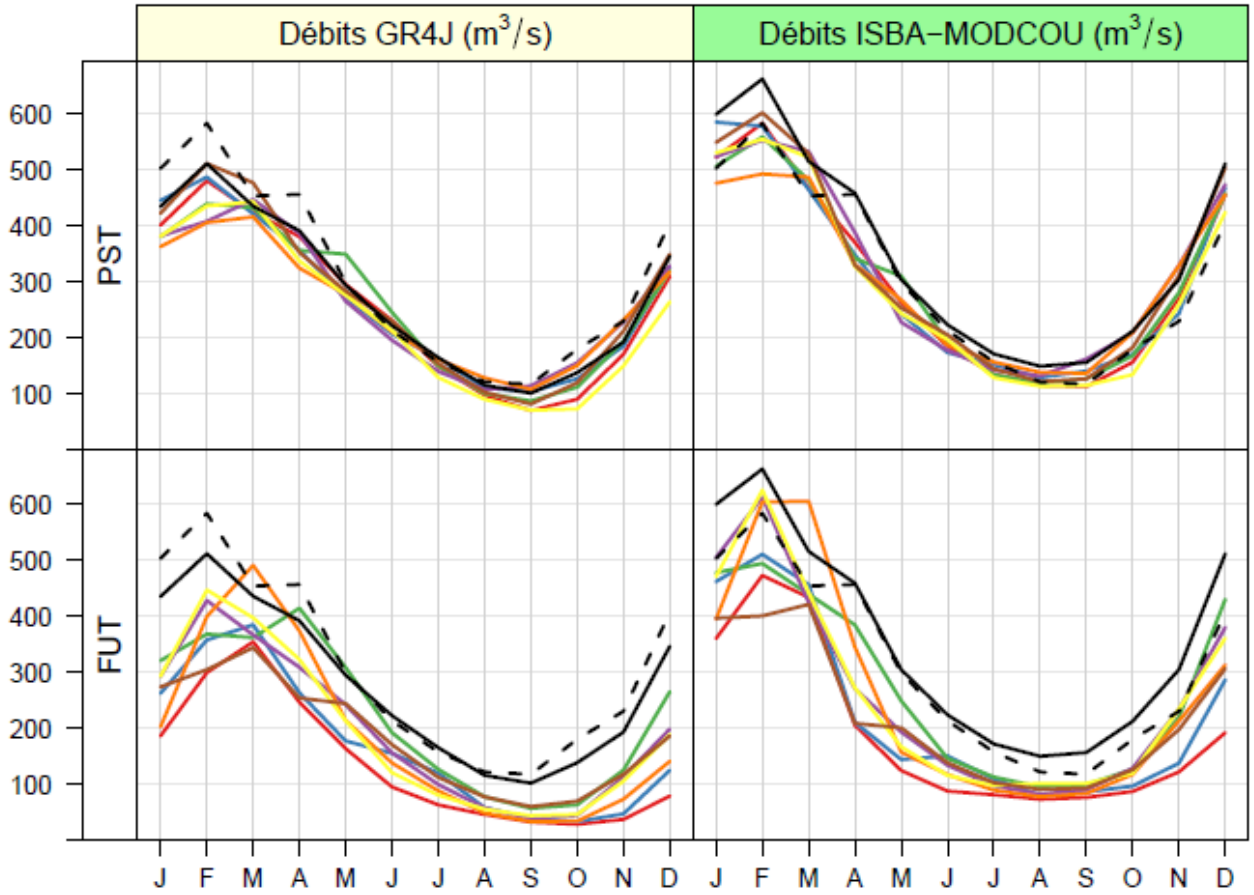
(Source : Projet Explore2070)

Climate impact on Seine basin

Monthly average flow

Présent 1961-1990

Futur 2046-2065



(Source : Projet Explore2070)

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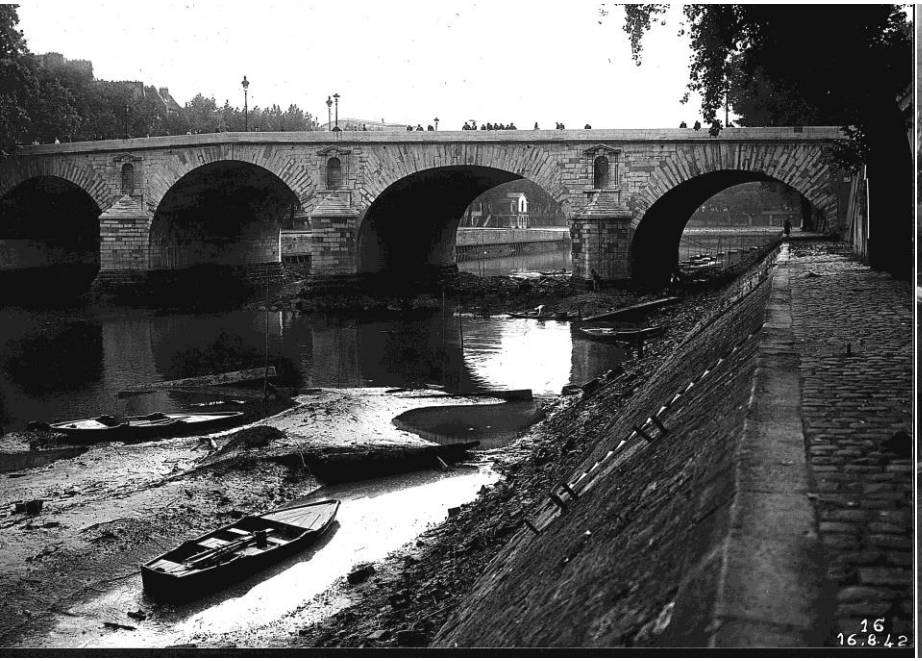
Seine Grands Lacs

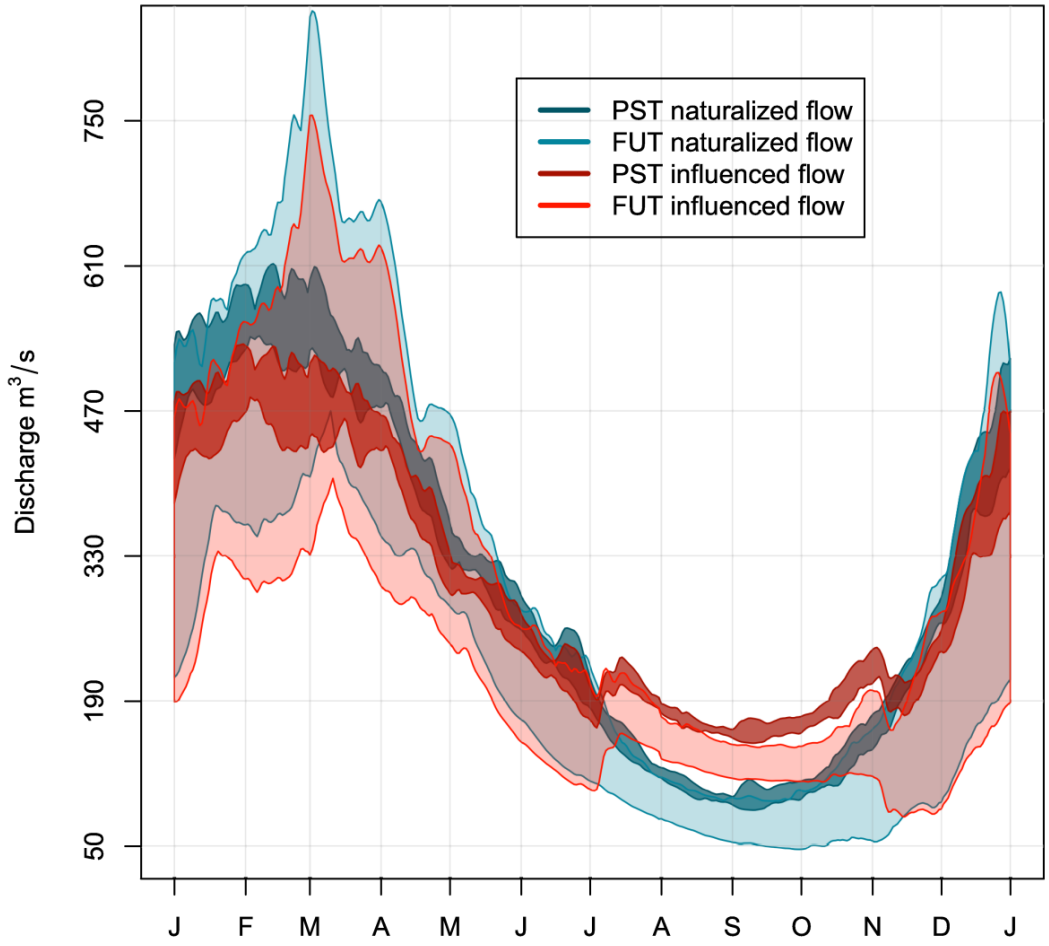
Total storage capacity: 850 000 000 m^3

Low-Flow alleviation



Flood control

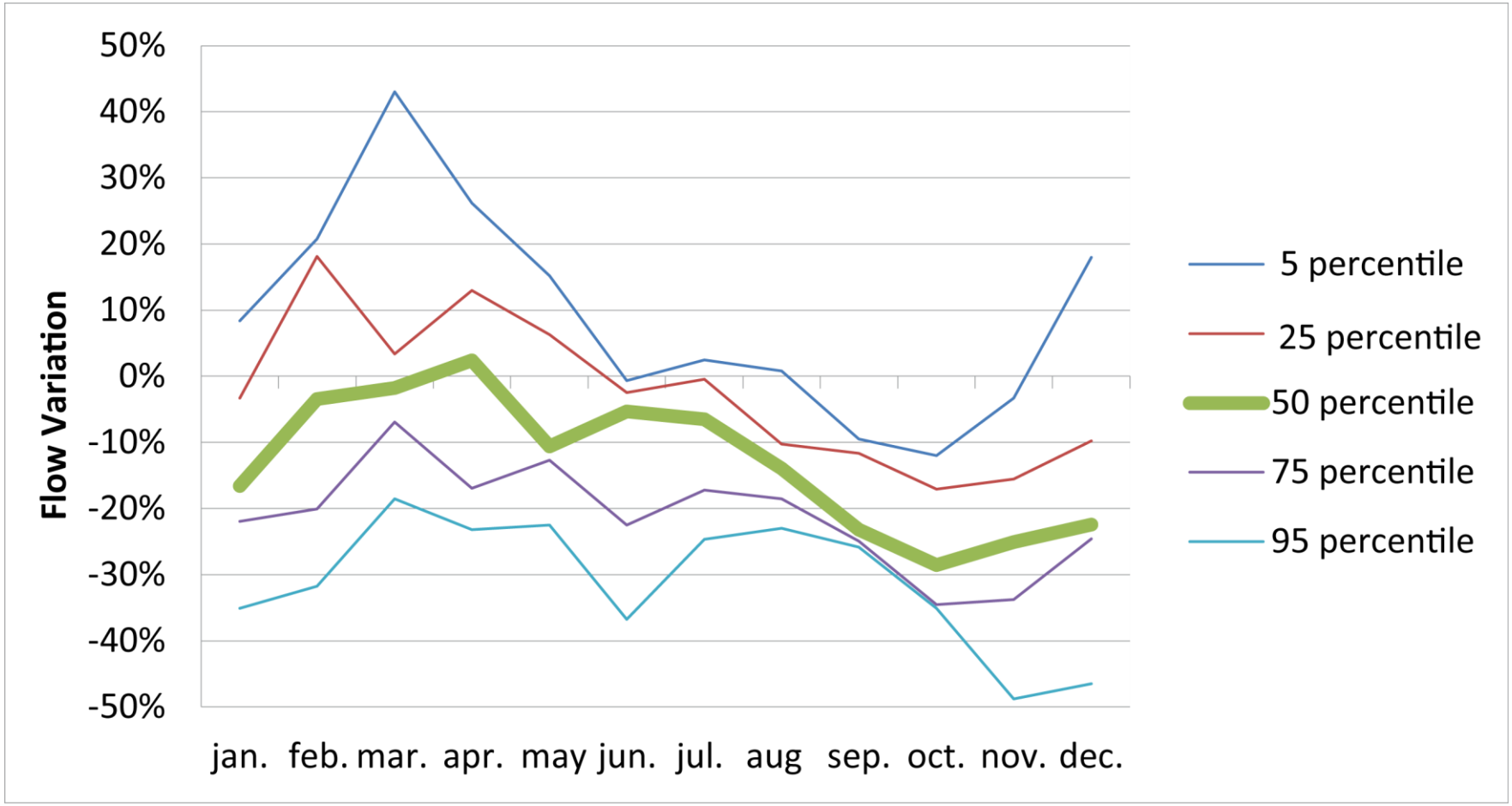
Impact on flow alleviation



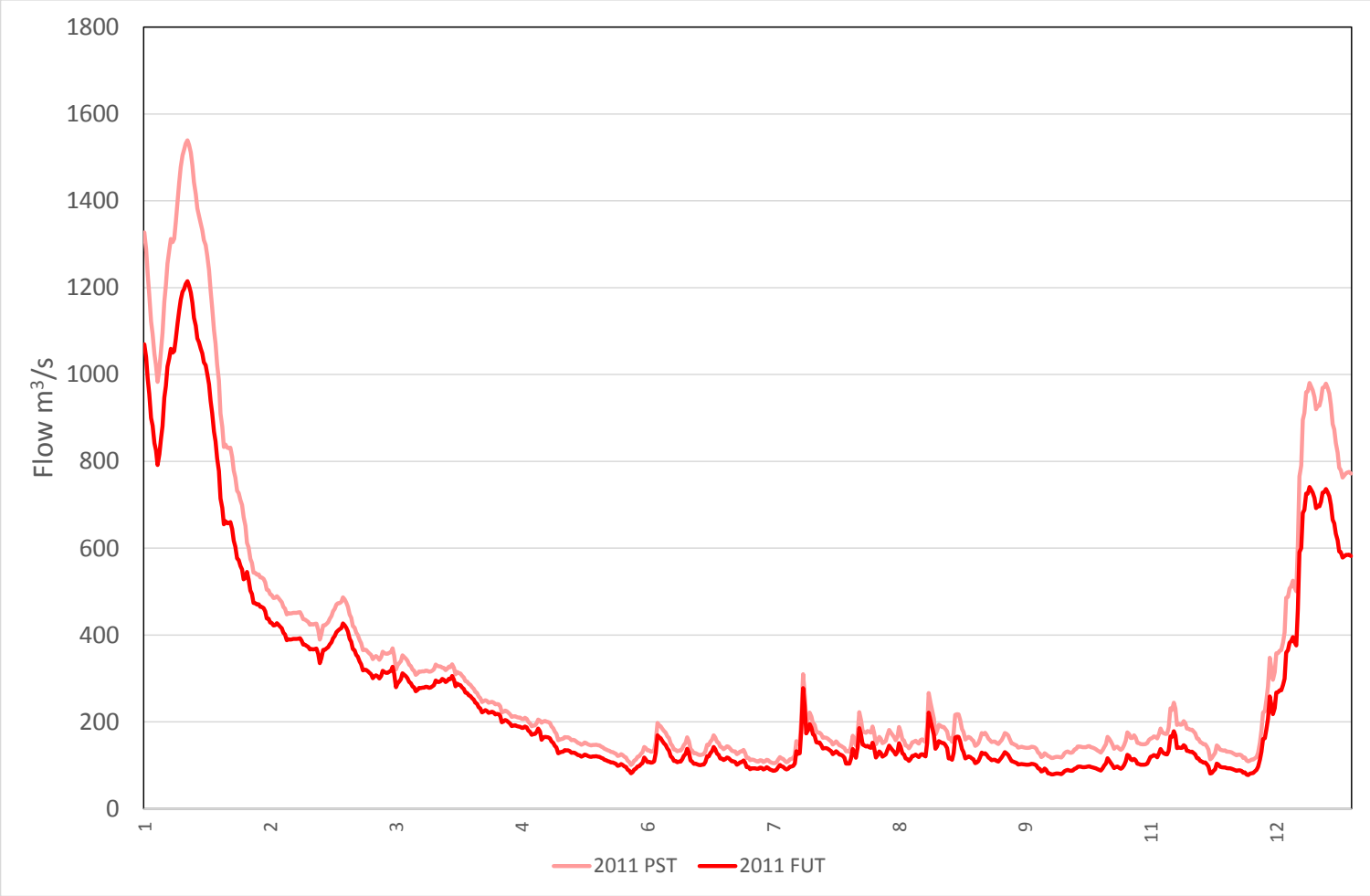
(Source : Projet Explore2070)

Sanitation master plan

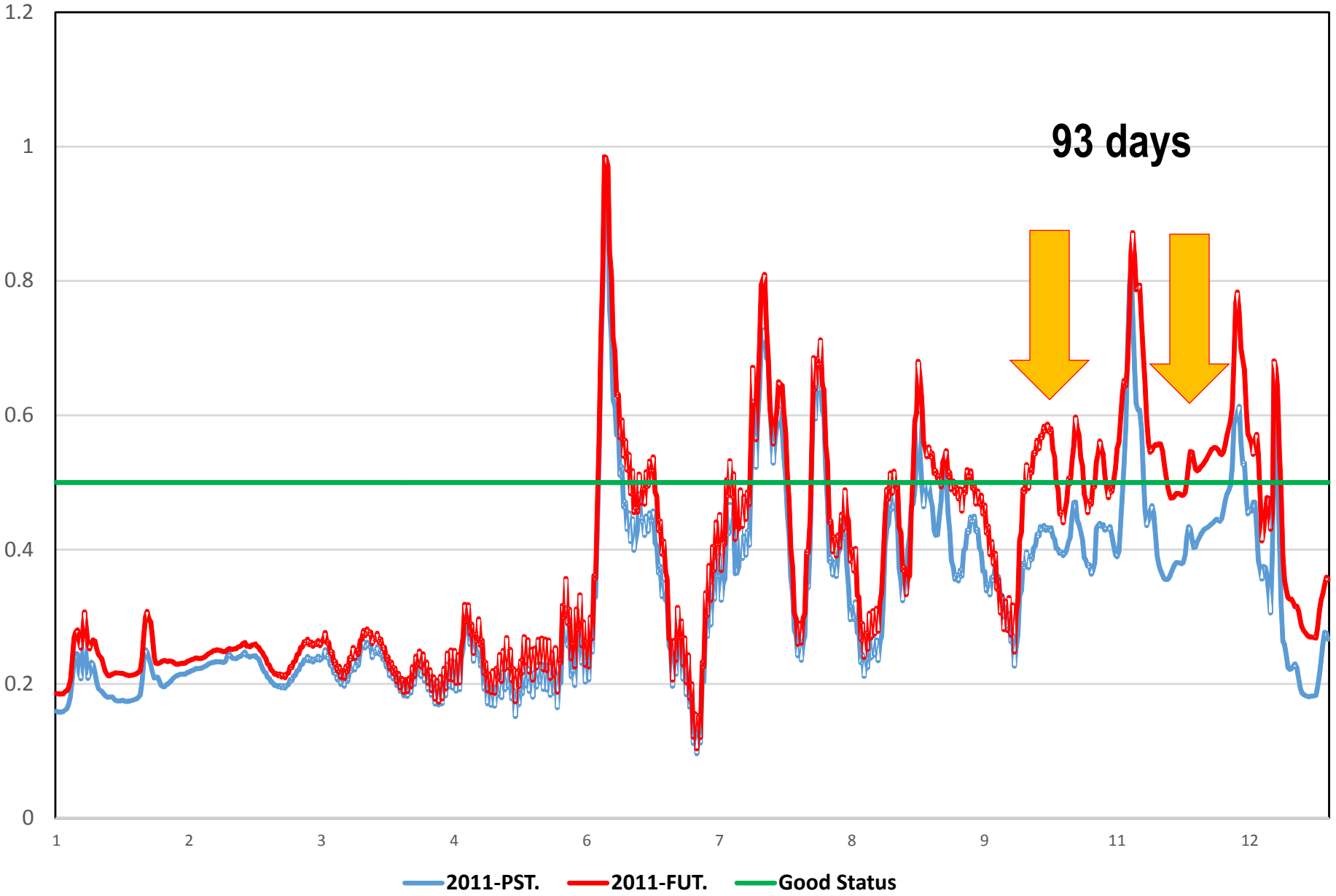
- **Last upgrade of SIAAP's sanitation masterplan : approved in February 2017**
- **A large use of numerical modelling**
  - **10 years of time series of rainfalls on hydraulics model and Seine river quality model**
- **The most performing scenario has been tested under climate change conditions**
- **Robustness testing on 2 reference years 2010 and 2011 under new climate conditions**


Flow Variation
50%
40%
30%
20%
10%
0%
-10%
-20%
-30%
-40%
-50%
jan.
feb.
mar.
apr.
may
jun.
jul.
aug
sep.
oct.
nov.
dec.
5 percentile
25 percentile
50 percentile
75 percentile
95 percentile

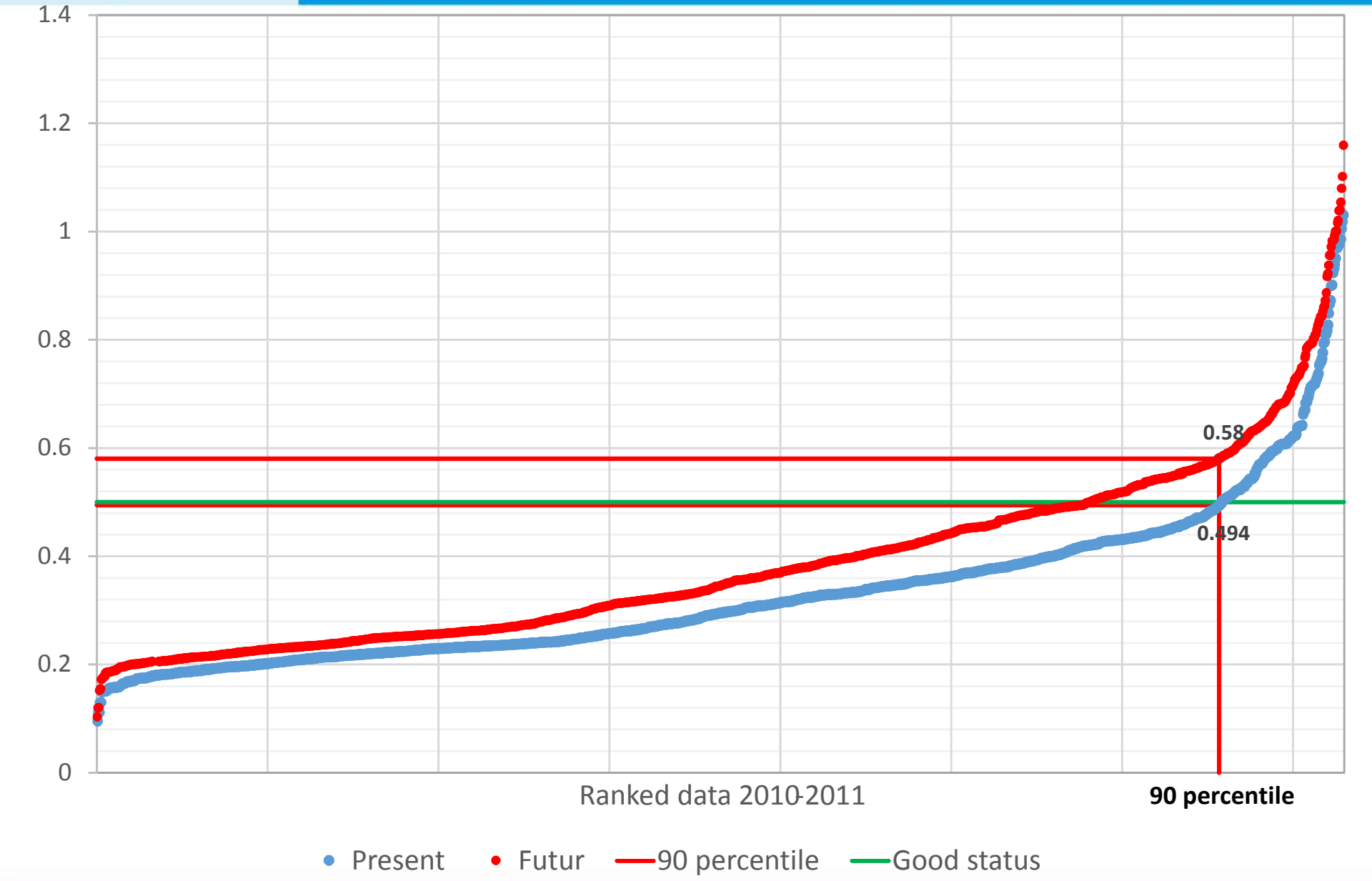
2011 Flow


1800
1600
1400
1200
1000
800
600
400
200
0
Flow m3/s
1
2
3
4
6
7
8
9
11
12
2011 PST
2011 FUT

Impact on the receiving water

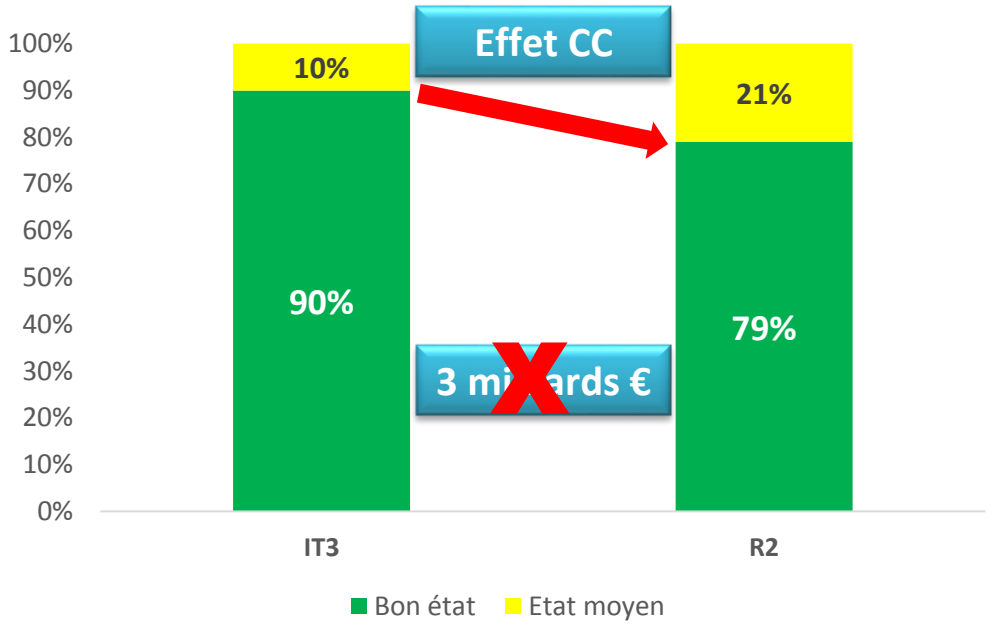


Impact on the receiving water



Test of sensitivity to climate change

Time spent by quality class for NH4 Seine in Poissy

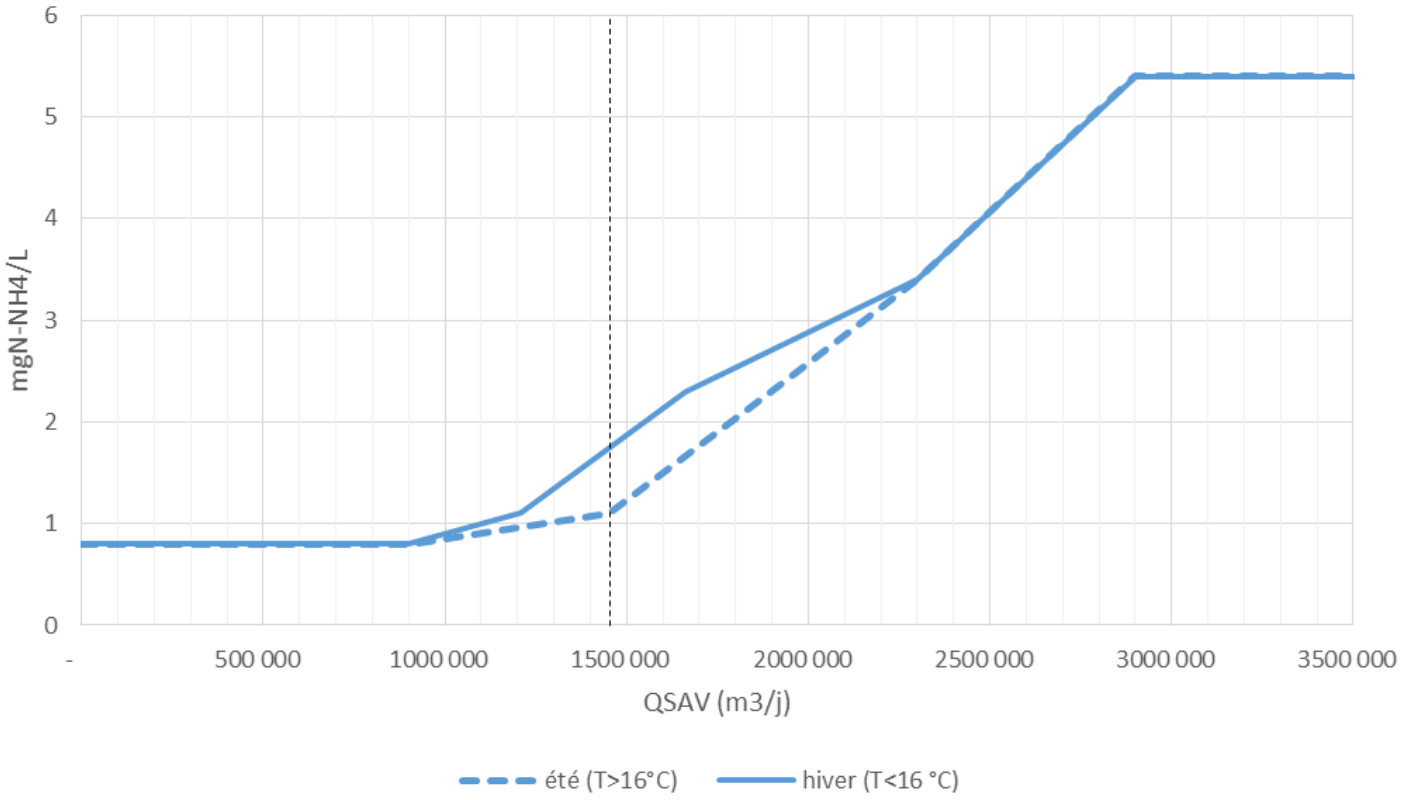


All the investments become insufficient to meet the good status

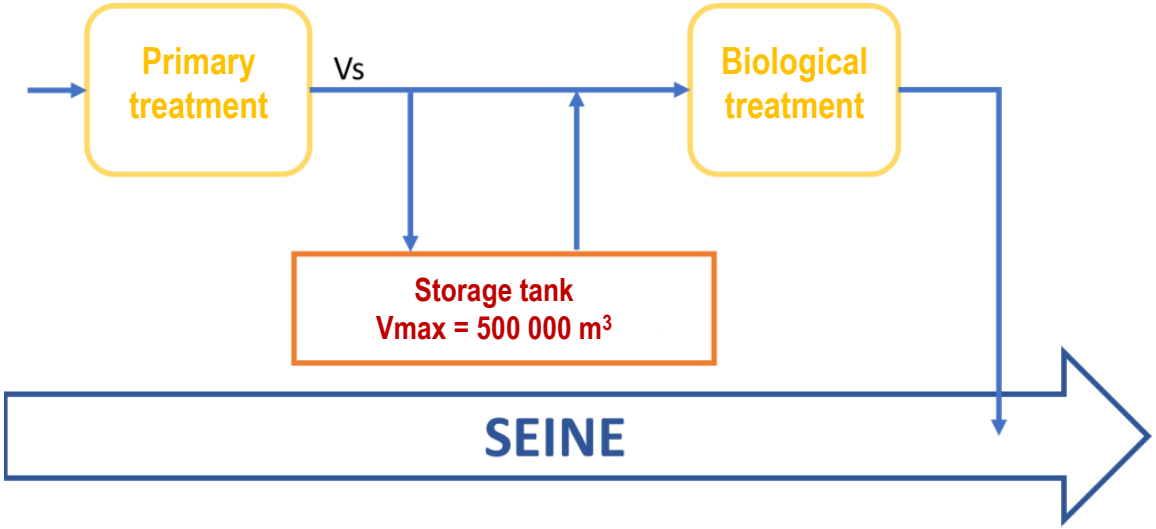
From today it is urgent to initiate additional actions: Green infrastructures, high reliability of the sanitation system

Climate change adaptation

- **The context will become really more constrained**
- **Reaching a high level of performance :**
  - **Building new storage facilities**
  - **Developping green infrastructure for stormwater management**
  - **Improving of SIAAP's real time control system**
  - **Implementing of smart tools based on river quality forecast to adjust the waste water treatment plant performances and CSOs management**
- **New sanitation approach to reduce Nitrogen inputs ?**


6
5
4
3
2
1
0
mgN-NH4/L
-
500 000
1000 000
1500 000
2000 000
2500 000
3000 000
3500 000
QSAV (m3/j)
été (T>16°C)
hiver (T<16 °C)

Stormwater quality management



Or…
New paradigm

Conclusion

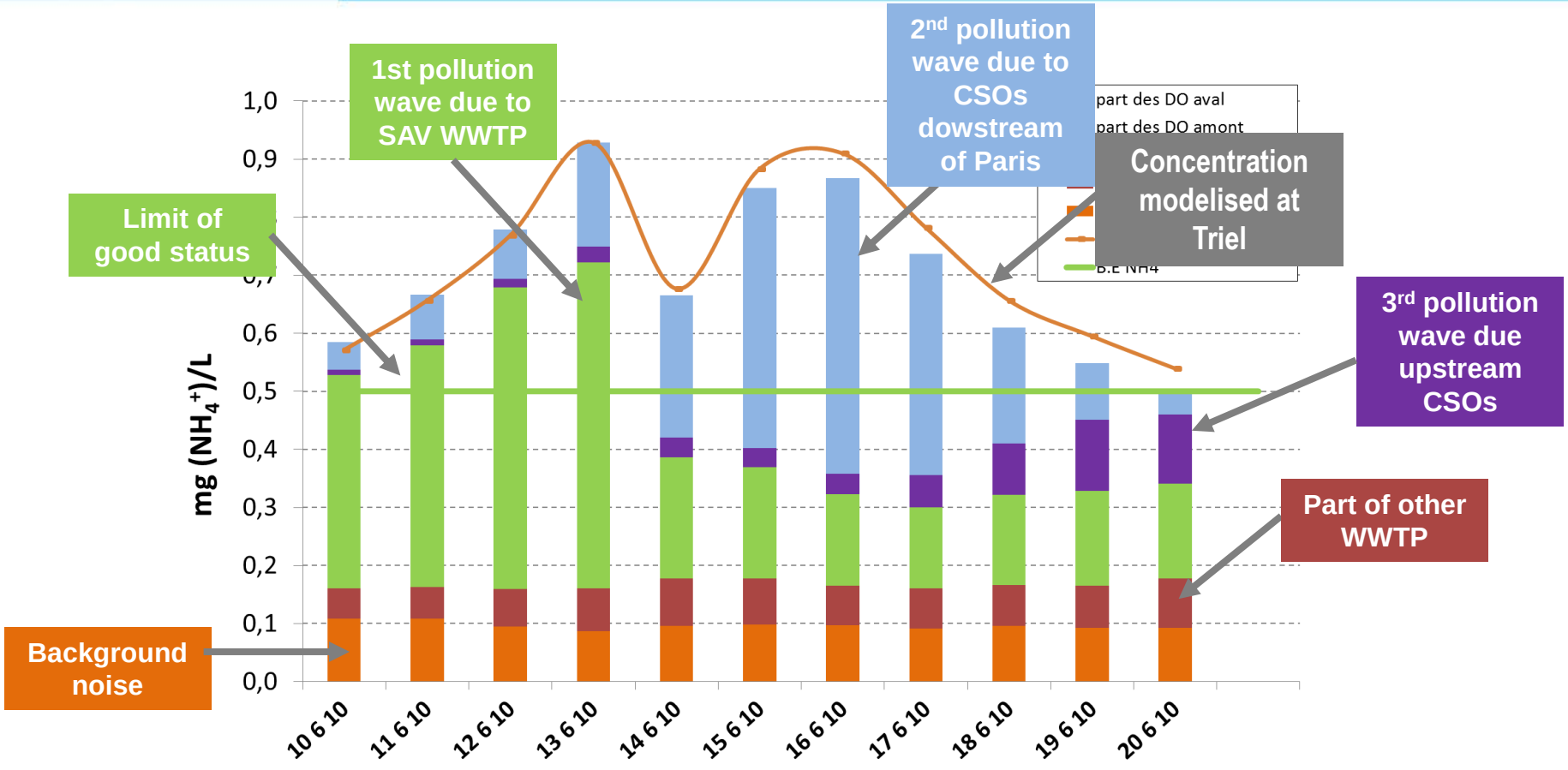
- **A step by step approach**
  1. **Finishing the undergoing projects**
  2. **Assessing their performances**
  3. **Launch a new step from the sanitation master plan**
  4. **Assessing their performances**
  5. **Etc.**

No regret measures Source control of stormwater

Compliance checking for separate collection system


Thank you for your attention

Identification of inputs
Focus on «déclassants» events -Triel



Two working ways: *Seine aval* WWTP and combined sewer overflow