Planted discharge areas: analysis of their implementation in France. First results

Catherine Boutin, S. Prost Boucle

PLANTED DISCHARGE AREAS:
ANALYSIS OF THEIR IMPLEMENTATION IN FRANCE - FIRST RESULTS

In France, the number of PDA quickly increases in order to better protect receiving surface water bodies. Setting up design rules and maintenance guidelines is now urgent.

What is a Planted Discharge Area?

Planted Discharge Areas (PDA) are placed between the outlet of the Waste Water Treatment Plant (WWTP) and the receiving water body. Today, the French Authorities don't assign any efficiency requirements to PDAs.

The expected objectives of such landscape layout are various:

- reduction of the volumes discharged into the river,
- qualitative improvement of some parameters (N, P, micro-pollutants, fecal contamination),
- buffer zone in case of WWTP failure,
- production of biomass,
- landscape integration and environmental benefits, …

It explains the large variety of design.

Exemple of a « land » PDA

Exemple of a « basin » PDA

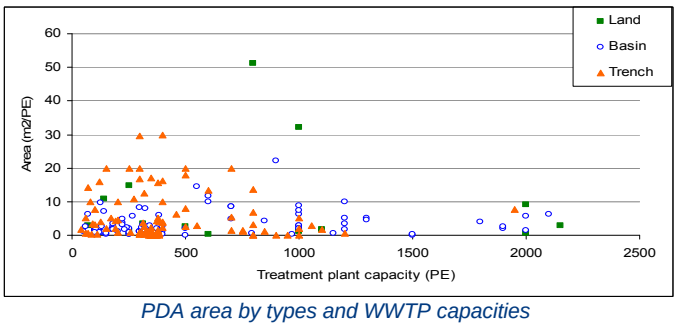
Exemple of a « trench» PDA

Elements issued from a national survey led in 2011

There are approximately 400 PDAs built in France. The survey underlines the diversity of the situations (areas, hydraulic loads, types of PDA,…). However there is no clear correlation between the various parameters.

PDA area by types in m²/PE

	all PDA	land	basin	trench	other	association
mean	4,1	6,4	3,3	5,0	2,8	5,0
median	2,0	1,6	2,1	2,0	1,0	3,1
min	0,004	0,167	0,056	0,004	0,010	0,04
max	51	51	22	30	15	17
nb values	**307**	**22**	**120**	**103**	**47**	**20**

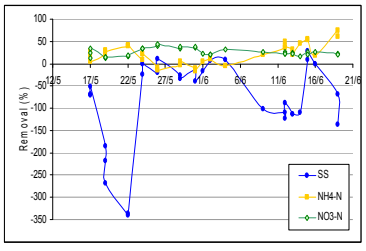


PDA area by types and WWTP capacities

First results

NH_4^+, NO_3^-, SS and daily flow are continuously monitored on a small trench PDA. Removal efficiencies are negative for SS and about 20% for NO_3^-. PDA tends to smooth outflow peaks.

However, we also observed visual water quality degradation and the erosion of some banks.



Removal of a small trench PDA, measures during May-June 2011

Example of water quality degradation because of PDA

Conclusion

Today, it is not possible to assert that PDAs always have a beneficial effect regarding the protection of the receiving surface water body. A new research program, based on balance in the 3 compartments will be engaged in the 2013-2017 period.

CLASSIFICATION of PDA

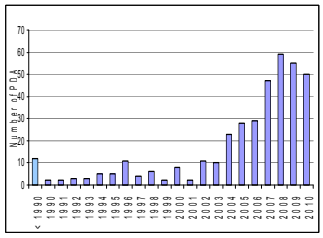
This classification only focuses on the constitutive element of PDAs whatever the vegetation.

There are 4 types of PDA :

- 3 types with existing soil
  - « **land** » without excavation
  - « **basin** » with excavation, length and width are similar
  - « **trench** » with excavation, length is much larger than width
- 1 type with new filter media named « **miscellaneous**»

Exemple of a « miscellaneous» PDA

Their number of PDA explodes with an increase of about 50 units/y over the last 5 years.



Evolution of PDA implantation in France

MAJORS MECANISMS

They concern 3 compartments:

- free surface water,
- soil and
- vegetation.

The "soil" compartment is the most important and needs to be studied (pedological, geological and hydrogeological properties).

Freshwater systems, ecology and pollution research unit – **Irstea Lyon Center**

Contacts :

Catherine Boutin ; catherine.boutin@irstea.fr

Stéphanie Prost-Boucle ; stephanie.prost-boucle@irstea.fr

www.irstea.fr

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