The River Seine ecosystem and the Greater Paris : modeling to manage a high environmental pressure

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The Greater Paris, with a population of 10 million people, is crossed by the River Seine. The River Seine discharge fall frequently and for long drought periods below 120 m3/s. The waste water produced by the whole urban area is treated in 5 main plants. The total discharge of treated water is around 25 m3/s during dry period. Such limited dilution capacity, 25 m3/s of treated waste waters diluted in a 120 m3/s River Seine discharge, induces a high environmental pressure on the River Seine. Moreover, the public institution in charge of collecting and cleaning the wastewaters (SIAAP, Syndicat Interdépartemental de l'Assainnissement de l'Agglomération Parisienne) has to face not only dry period situations but also summer storm events which generate discharge of polluted running waters partially entering into the sewage network. The instant peak value of the waste water discharge during a storm period might reach 100 m3/s. In such situations, the total treatment capacity is increased to approximately 70 m3/s and waste water is stored in the sewer network and in special underground reservoirs but significant overflows occurs several times a year. The design of the global system of sewer network and waste water treatment plants is permanently improved to minimize the occurrence of combined sewage overflow in the River Seine and to improve the water quality of the Seine River.

To relate the civil engineering investment and the level of waste water treatment to the environmental benefits, a water quality model has been designed in the framework of a long term research program (http://www.sisyphe.upmc.fr/piren/?q=presentation-piren-seine).

This model solves hydraulic and water quality equations describing the ecological behaviour of a 250 km river stretch from upstream of the Greater Paris to the entrance of the Seine estuary. Case studies will be used to illustrate the scientific challenge of such modelling tool and its capacity to be used for management purpose.