



Quality assessment of a storm overflow, by using different frequency monitoring (northern France)

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The Heron lake is a storm-water pond of 30 hectare constructed in the 70's to avoid the flooding in the city of Villeneuve d'Ascq (Lille urban area in Northern France). This facility could also receive some untreated urban wastewaters during high rainfall events. The water level is regulated by automatic pumps, which periodically discharge the overflow into a natural watercourse, the Marque River. Located in an urban area, the lake is qualified as eutrophic because of the high nutrients concentration, which stimulates the presence of cyanobacteria. Recently, the invasive macrophyte *Elodea nuttallii* colonized the lake. This proliferation causes ecological troubles like anoxic events or even obstruction of the pumps, thereby increasing the risk of flooding.

Two types of monitoring (low and high frequencies) were implemented to assess the functioning of this lake and to estimate its impact to the river. The low frequency monitoring consisted on punctual screenings on the dissolved phase and monthly grab samplings from February 2014 to February 2015. Physicochemical parameters (oxygen, temperature, conductivity, pH, solid particulate matter, dissolved organic carbon) and nutrients (NO_3^- , NH_4^+ and PO_4^{3-}) were recorded. Additionally, a high frequency monitoring was undertaken (with measurements every 10 minutes) was performed by using a buoy equipped with different sensors for measuring oxygen, turbidity, temperature, conductivity, pH and phytoplankton pigments. Furthermore, both the discharge lake flow and the pluviometry were recorded at the scale of the day.

Although all the data are not yet fully interpreted, several key points have already been evidenced: (i) at the entrance of the lake, the water is enriched in urban sewage; (ii) some significant differences of oxygenation exist between the entrance and the rest of the lake due to both waste waters inputs in the entrance channel and atmosphere-water interactions; (iii) eutrophication occurs at the beginning of the spring with an oxygen oversaturation (up to 200 %) and a pH increase up to 10-11; (iv) and the macrophytes senescence at the end of the summer resulting in anoxic events and in the same time, the development of cyanobacteria.