

Restoration of the Gironde estuary through reduction of urban impact: outputs of the ETIAGE program

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While the Gironde estuary had long been considered as preserved, it is now subject to several alarming reports (water, sediment and biota contamination, hypoxia, degraded ecological state, etc.). Considering that both global and local pressures (namely climate change and population growth) tend to increase, it became necessary to set up actions for its restoration. To do so, a consortium was set up between 2010 and 2014 around a program about an “Integrated study of the effects of upstream and local inputs on the functioning of the estuarine Garonne” called ETIAGE.

The goal was to characterize the contributions of the pressures originating from the upstream or from the metropolitan area of Bordeaux in order to trigger the most relevant actions. To be able to address together scientific issues and operational recommendations, the consortium was composed of research laboratories and managers. The inputs of macro- and micropollutants emitted by the city through wastewater treatment plant and combined sewer overflows were characterized. These local inputs were compared to the upstream inputs in terms of quantity and quality. Accumulation and synergistic toxic impact of the micropollutants was demonstrated. Moreover, the drivers of hypoxic episodes and their potential impacts during downstream migration of anadromous fish (*Alosa alosa*) were identified.

As a result, Bordeaux Metropole and SUEZ initiated numerous measures to contribute to the restoration of the estuary by reducing the urban footprint. Based on the already innovative real-time management system which aims at minimizing the volume of effluent discharged from the sanitation network through a dynamic optimization of its storage capacity, new steps have been engaged. Real time quality monitoring and modeling of the network and the aquatic ecosystem are in progress in order to drive the sanitation system based on sewage and receiving environment qualities. Moreover, micropollutants are addressed through a source reduction strategy.