

## Pilot location: Jouy-en-Josas Catchment, Paris area (France)

### Location and Environmental Setting

Jouy-en-Josas is a city located along the Bièvre River, a tributary of the Seine River in the South of Paris. This case study focuses on the 2.5 km<sup>2</sup> portion of the city located on the left bank of the river. The area can be divided into three parts: a river bank, a steep hillside and a plateau. Along the river, there is a rather flat area where most of the public facilities (station, city hall, shops, library, kinder garden, restaurants...) are located. It should be mentioned that the Bièvre River flows through Jouy-en-Josas mainly in underground pipes and in a highly artificial open air bed on few hundred meters. The hillside between the river bank and the plateau is very steep with an elevation change of roughly 100 m. This area is not highly urbanised with mainly woods and few houses. At the top of the studied area there is a plateau where there are some woods and a dense housing estate. The sewer system is a separate one in this catchment.

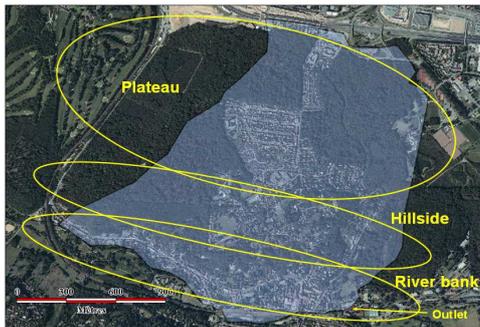


Figure 1: Picture of the Jouy-en-Josas catchment



Figure 2: (a) Shops near the river bed; (b) Bièvre river in Jouy-en-Josas; (c) Example of steep road

### Urban pluvial flood risk problems and management objectives

The Jouy-en-Josas catchment has experienced regular pluvial and fluvial flooding. The last major event occurred during the night of the 21<sup>st</sup> to the 22<sup>nd</sup> of July 1982: a rain gauge located few kilometres from it recorded 96.2 mm of rainfall during one hour and 115.5 mm during the 7 hours of this event. A significant portion of the city centre along the Bièvre River was flooded (Fig. 3 and 4) and some witnesses reported that there was a 20 cm deep flow of rapid water along the street Jean Bauvinon (on the East of the catchment).

#### Flooding mechanisms:

During heavy rainfall events a combination of pluvial and fluvial processes can affect the city centre. Indeed there is a rapid surface runoff through the steep hillside of the water coming from the urbanised plateau. This water then reaches an already overloaded Bièvre River in the valley. This is a complex situation to handle when both processes are triggered. The response time of the Jouy-en-Josas catchment is approximately 10-20 min which is very short. The response time of the Bièvre River catchment is few hours.

Figure 3: Weak spots of the Jouy-en-Josas catchment (blue=flooded area in 1982; red=flooded area in 1982 if there had been the basins)

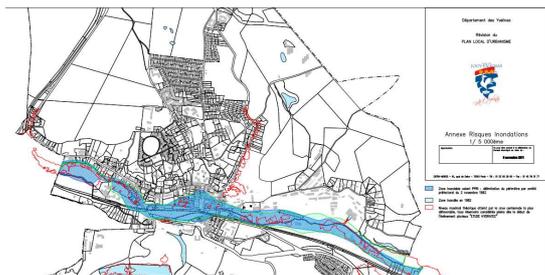


Figure 4: Floods in 1973 (left) and in 1982 (right)

#### Urban pluvial flood risk mitigation

The current solution to address fluvial flooding is implemented by the SIAVB (the local authority in charge of urban drainage) and relies on the optimal use of the Bièvre River bed and regulated artificial basins built along its path. There are 15 basins over the 110 km<sup>2</sup> catchment managed by the SIAVB with a total storage capacity of 642 000 m<sup>3</sup>. The Real Time Control (RTC) relies on the observation of water level at strategic points in the network, rainfall radar estimates and nowcasts (expected intensity and direction of the approaching storm), and a hydraulic representation of the river behaviour. One of the objectives of the RainGain project is to analyze how surface runoff can be mitigated and how RTC can be improved with the help of enhanced fine scale rainfall data.



Figure 5: Illustration of the use of the river bed during storms

Figure 6: Example of a remotely controlled basin

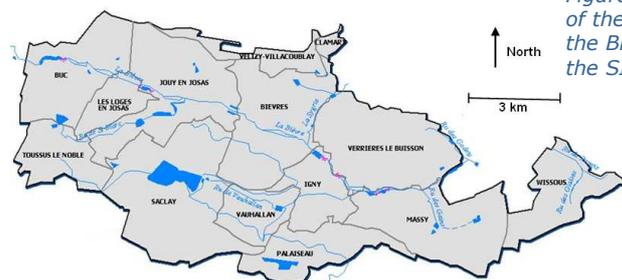


Figure 7: Location of the basins along the Bièvre River in the SIAVB