

## Urban stormwater management in the Emscher region

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### Research question

What are the effects of an open rainwater drainage on the river Emscher and the people that are living in the Ruhrgebiet?

### Description of the area

The 84 km long river Emscher is located in the West of Germany where it crosses the Ruhr Area with its source in Holzwickede near by Dortmund flowing westwards into the Rhine by Dinslaken. Due to the growing industrialization in the area in the 19<sup>th</sup> century, population started to increase and the Emscher was converted into an open sewer channel. An underground sewer channel was not an appropriate solution to drain the wastewater: The large amount of mining activities left a high risk for damage on underground pipes which then would have caused expensive and difficult repairs. In 1991, after the decline of the mining industry and consequently lower risks of subsidence caused by mining, plans rose to bring the river back into his former, pre-industrial and natural shape by removing the concrete beds and straightened banks that both have been built to increase the hydraulic capacity of the river. It became possible to discharge the wastewater through an underground sewer system which runs parallel to the Emscher (compare Figure 1). The water that will then run through the river will be cleaned before it gets into the river so that it will be free from contamination and pollution. The flow regime of the river is highly influenced by rainwater, which –due to the high level of urbanization in the whole river area – does not infiltrate into the ground to feed to groundwater but runs off as surface water to finally end up in the river. Figure 1 shows the whole river and its catchment area as well as its feeding streams that are spread out over the whole Ruhrgebiet. The “Project 15/15” was therefore initiated to reduce runoff peak flows as well as the runoff volume by 15 %, which was constantly rising throughout the last decades (compare Figure 3).



Figure 1: The Emscher river (blue) and the new underground sewer the system (red) that runs parallel to it<sup>1</sup>.

### Results

At the end of the 1990's 17 projects related to open rainwater drainage had been realized in different cities all over the catchment area of the Emscher<sup>2</sup>. One of these project was the so called “rainwater route” and provides an example of how it is possible to decrease the risk of overflow and to separate rainwater from the

communal sewer underground system. One of the main objectives of this project was to create a surface water flow that is close to nature and naturally fits in the environment.



Figure 2: Left: Open rainwater sewage at Elisabeth-Hospital, Herten<sup>3</sup>; Right: Rainwaterpond with watergame in Dortmund

As visible in the pictures (Figure 2), it was also used to improve the quality of living and to create a more natural surrounding in this high-urbanized and formerly industrialized area.

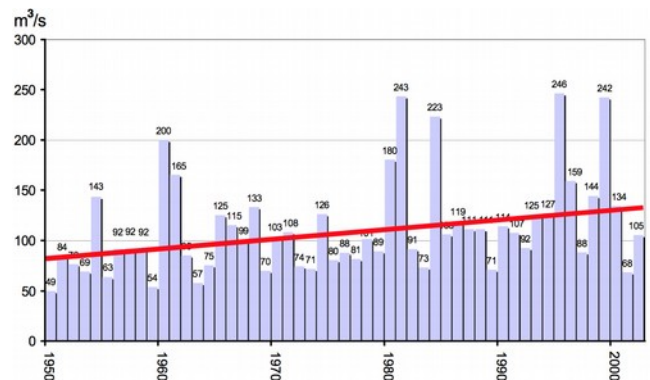


Figure 3: Increase of peak flow in the Emscher in the last 50 years (Becker, 2005)<sup>3</sup>

### Conclusion

Dealing with rainwater in a way that is more natural and closer to nature is a very different from how the local communities in the Emscher region used to deal with urban water strategies and planning in the past. It requires great effort to go on building up new projects and to make the next step towards a re-naturalized environment. But you can already see that the whole region is already benefitting from the efforts that were made to improve the quality of living and to overcome the structural change from a region that was formerly characterised by heavy industry into a modern service sector. This form of drainage – compared to a underground sewage system – could also be cheaper due to less service and maintenance that is needed.

### Referenties

1 Dr. Stefan Laarmann (2015) <http://www.webergarn.de/EMSCHER/emscher-klaer.jpg>

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3 Heiko Sieker, Stephan Bander mann

Michael Becker, Ulrike Raasch (2006): „Urban Stormwater Management Demonstration Projects in the Emscher Region“. First SWITCH Scientific Meeting University of Birmingham, UK, 9-10 Jan 2006