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Introduction

- Water pollution has a significant impact on the natural renewal of water resources.
- The anthropogenic effect can be divided into two groups: direct and indirect human impacts. The indirect human impacts influence the catchment and the water- and sediment regime (by modifying the runoff), while direct impacts aim to alter the channel and the floodplain.
- Contamination from any foreign source can spell trouble for streams and rivers, but sources that unbalance nutrient levels in the water often have specially far-reaching effects.

Aim of the study

The most significant aim of this project (HU-HR/1901/2.2.1/0128 - Monitoring of surface and underground water in Medimurje and Zala County) was (among others) the determination of the of main pollution sites along the Mura river that crosses the Croatian-Hungarian border (approximately 30 km along the Mura river and its environs, including the Croatian and Hungarian territories), which can be determined as a pilot area that can be adaptable for another polluted areas.

The main sources of pollution

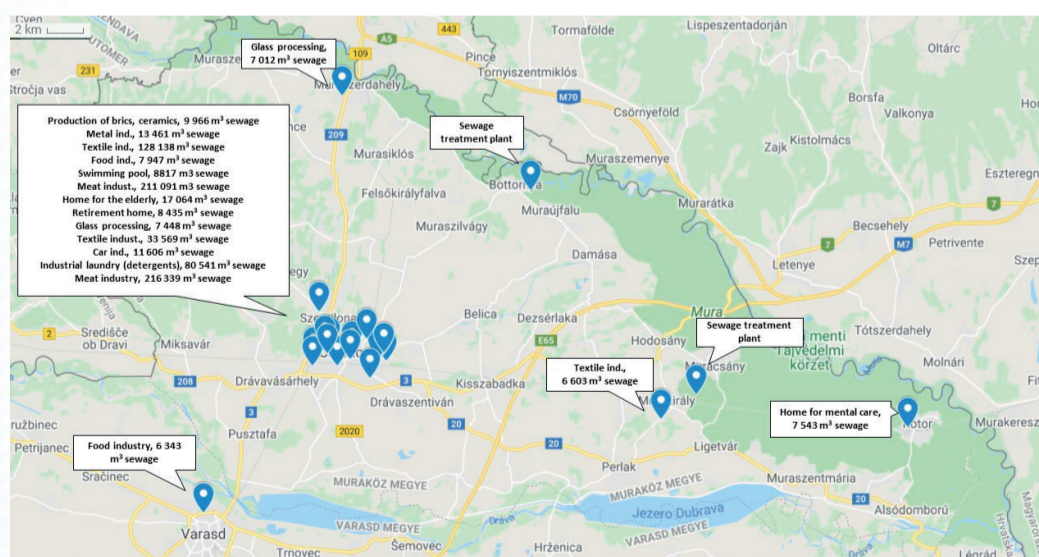
There are various companies operating in the area affected by the project, which can be sources of pollution in terms of surface water and groundwater, as well as from the presumably polluted areas. The main sources of pollution are to be considered in the project area of Hungary, broken down by settlements are presented in Table 1.

In the investigated area, in Croatia, the most important companies in sewage consumption, are the following:

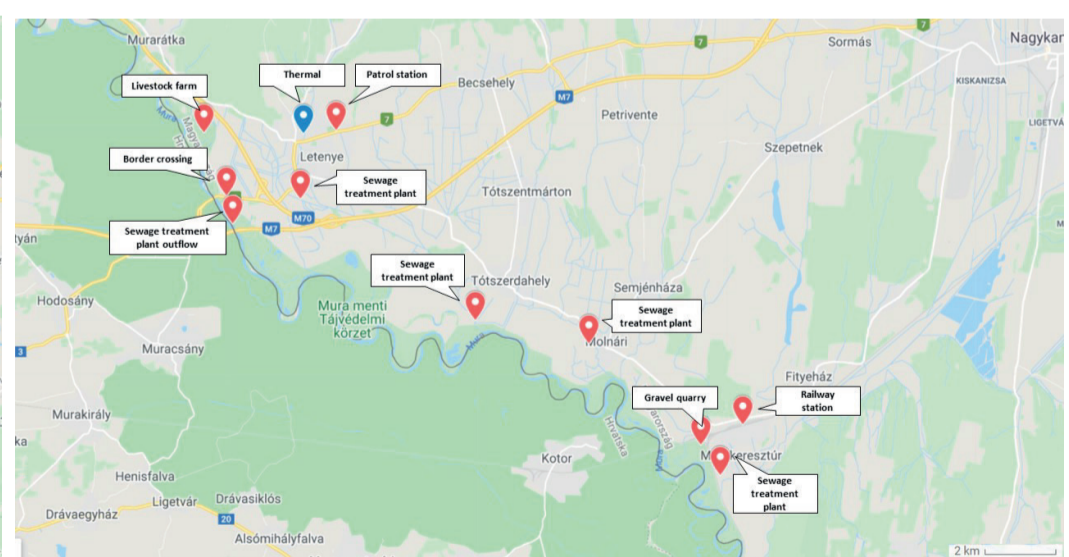
- Meat industry - fat
- Textile industry - dye
- Industrial laundry - detergents
- Hospital – chemicals, pharmaceuticals, citotoxines
- Wagon maintenance – oil
- Metal industry
- Car
- Food
- Production of bricks, ceramics, glass

The main sources of pollution are to be considered in the project area of Hungary, broken down by settlements

Tótszerdahely	Molnári	Murakeresztúr	Letenye	In addition, the following may pose a potential threat to the quality of surface water and groundwater in all settlements
abandoned gravel mine (south-east of the settlement)	plants on the site of a former producer cooperative, petrol station there (about 1 km to the east of the settlement)	plants on the site of former producer cooperatives (northeast of the municipality)	livestock farm (gray cattle major)	abandoned illegal landfills (one or two within each settlement)
plants on the site of a former producer cooperative site (on the western edge of the settlement, towards Letenye)	abandoned brick factory, clay pond lakes (on the eastern edge of the settlement)	railway lines passing through the settlement, the total area of railway station	Letenye thermal (inflow into Béci stream)	illegally drilled wells (there are many of them in every settlement, there are no usable records of them, although they are problematic in several respects)
municipal sewage treatment plant	waterworks	operating gravel quarry (west of the settlement)	patrol station	diffuse pollution of intensively farmed areas involving the application of fertilizers and pesticides (typical everywhere in the project area, it may even has a great impact on surface water and groundwater quality for certain parameters)
	municipal sewage treatment plant	the part of the village without a public sewerage system	municipal sewage treatment plant	
		municipal sewage treatment plant	Letenye border crossing	



The main pollution sources of Mura River in Hungary



The main pollution sources of Mura River in Croatia