

# Thermographic imaging of water bodies to identify pollution

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**1. Introduction** - Contribution in the form of a poster presentation focuses on the lessons learned from the application of the principle of thermal imaging in the field of water management. The main area of interest is the identification of potential sources of pollution entering watercourses or reservoirs. Identification is based on temperature differences between the main stream and the discharge object. The second area of interest focuses on the identification of drainage outlets.

**2. Experimental** - The poster presents the used equipment for each campaign, achieved results and their comparison. Four thermographic surveying campaigns are introduced. Three campaigns were focused on the identification of contamination of aquatic ecosystems. Fourth campaign was aimed at identifying the drainage outlets. Individual campaign thermographic surveys were conducted by different methods. One of the objectives of the project is to test the thermographic imaging application for remote sensing. This was done by the pilot and unmanned aircraft. Furthermore, the application of remote sensing supplemented by ground application of thermal imaging. The main objective of the research is to provide an alternative way of identifying potential sources of pollution.

**3. Results and Discussion** - The results of the measurement campaigns conducted so far have shown that thermal imaging can effectively be used to identify pollution. However, all the methods tested (ground-based, from a drone and an airplane) have their own advantages and limitations. In the case of a drone measurement from the height of 50 m, a detailed analysis of the thermogram was carried out at the outlets of the wastewater treatment plant Tábor site, which studied heat diffusion throughout the water surface. (image1,2).

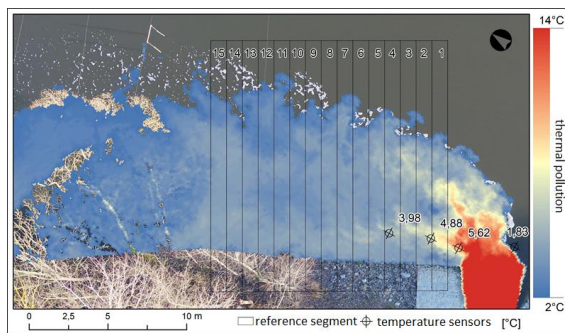


Image 1. Detailed thermogram analysis.

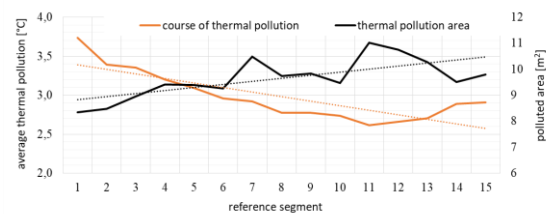


Image 2. Course of thermal pollution versus thermal pollution area

Focusing on Image 1,2, it is apparent that thermal pollution decreases in proportion to the distance from the outlet. This phenomenon takes place especially as a result of the discharge from wastewater treatment plant Tábor being mixed with the surrounding water from the watercourse. An interesting feature of Image 2 is the correlation of two variables, where increasing the size of the thermally polluted area means decreasing the mean thermal pollution value and vice versa, notably in reference segments 11 to 15.

**4. Conclusions** - Aerial thermography is an evolving discipline that offers an effective tool for water management, namely for preventive diagnostics and the identification of water pollution sources.

## Acknowledgements

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