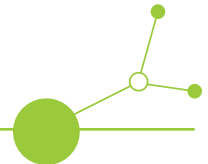


Urban Bathing Water Action Plan Vienna, Austria



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1. Introduction

The primary objective of the UrbanBlueHealth project is to assess health impacts and create new solutions for improving the quality of urban bathing waters.

The Danube River—Europe’s second largest—traverses the urban area of Vienna, Austria. Given its enormous catchment area, its water quality is shaped by a complex combination of upstream environmental pressures and local urban influences. Vienna’s current Danube landscape is defined by engineered flood protection and channel management. The “Alte Donau” (Old Danube) is a former Danube arm that became largely separated from the main river and functions today as a calm, lake-like water body. The “Neue Donau” (New Danube) was built as a flood-relief channel to safely carry high flows, and the excavated material formed the “Donauinsel” (Danube island), which also serves as a major recreational corridor between the relief channel and the main Danube.

This infrastructure directly shapes Vienna’s bathing geography and water-quality governance. The city maintains 17 officially designated bathing sites under the EU bathing-water framework, assigned to three bathing waters: seven sites on the Alte Donau, nine sites on the Neue Donau, and one site on Mühlwasser (Strandbad Stadlau). While the Donauinsel is not itself a bathing water body in the monitoring designation, it is the key landform that provides access to large parts of the Neue Donau shoreline and many of the maintained bathing areas. These sites are systematically monitored and publicly reported during the bathing season using standard microbiological indicators, and they are supported by ongoing management measures aimed at maintaining suitability for swimming. Water quality is typically high across the official sites, although short-term variability can occur, for example following heavy rainfall or other episodic influences on microbial loads.

Against this broader Danube setting, the “Donaukanal” (Danube Canal) represents a different kind of surface water: a historic Danube branch running through dense inner-city districts, shaped by navigation requirements, flood-control infrastructure, bank reinforcement, and continuous waterfront development. In contrast to the Old and New Danube bathing landscapes—where regulation and morphology favor calm waters and formal bathing designations—recreational use of the Donaukanal is predominantly canal-bank-oriented and embedded in an intensely urban activities.

Where natural bathing options are limited man-made bathing ponds are gaining popularity. These man-made ponds are designed to mimic natural environments and are operated without the use of chemical disinfectants. There is a lack of EU-wide harmonized regulations.



2. Local context and key challenges

Despite Vienna's many officially designated bathing waters (alongside an extensive network of public swimming pools) public interest in swimming closer to the city centre has increased, particularly in and around the Vienna Danube Canal. As summers become hotter and heat stress in dense urban areas intensifies, demand for easily accessible cooling opportunities, especially in central locations, can be expected to grow. The canal's banks are already intensively used public spaces, supporting leisure and sport activities and hosting numerous recreational facilities.

The Vienna Danube canal is a side branch of the main river Danube, which is the receiving water of the effluent of manifold wastewater treatment plants. As a consequence, the water quality of this type of urban surface water is hardly manageable due to many non-controllable pollution sources. From a research and public-health perspective swimming in the Danube Canal must be viewed critically. For these reasons the Vienna Danube canal is not an official bathing site, even though swimming is not explicitly prohibited. The only preventive measure to protect the health of swimmers is implementation of an early warning system for water quality.

A further source of pollution is the Wienfluss (Vienna River) which flows into the Danube canal directly before the most prominent swimming route. During storm events the Wienfluss catchment can be affected by combined sewer overflows, implying that microbiological water quality in the canal is likely to be strongly rainfall-dependent with potentially rapid, short-term deterioration following precipitation. These characteristics – together with the canal's engineered banks, limited safe access points, and urban hydraulic dynamics – contradict designation as an official EU bathing water under Directive 2006/7/EC.

Unlike bathing waters, there are no water quality standards for urban surface waters. An assessment can only be made based on epidemiological studies.

Nevertheless, initiatives inspired by the global Swimmable Cities movement, such as the recently established Schwimmverein Donaukanal (Danube Canal Swimming Club, SVDK), have contributed to increased public attention and a growing number of members. This emerging use underscores the need for evidence-based assessment of hazards and event-driven water quality variability in a dense inner-city setting.

In Austria the trend of toward building and operating man-made small bathing ponds became so widespread that the Ministry of Health had to address the issue and incorporated it into the Austrian bathing waters law (Bäderhygienegesetz - BHygG, BGBl. Nr. 254/1976). Since, from a technical standpoint, the hygienic assessment of a bath without chemical disinfection is not clearly defined, the stakeholders do not share a consistent opinion, and a revision of the regulation is necessary.



3. Synergies of the Action Plan

A prominent zone for swimming in the Vienna Danube canal is influenced by the Wien River, which is subject to combined sewer overflow during heavy rainfall events. The city of Vienna is currently working on a major project to reduce CSO by building a storage tunnel with an approximate storage capacity of 60,000 m³. The Wiental Kanal's construction - extending approximately nine kilometres along six districts of Vienna - directly addresses key challenges related to CSO impacts. This construction project is anticipated to *reduce* CSO discharge into the Wienfluss, which subsequently flows into the Danube Canal. Construction work will be completed by 2027. Full operation is scheduled for 2028.

Within the UrbanBlueHealth project we monitor changes in water parameters of the Vienna Danube canal - including those affected by altered water level and precipitation patterns - allowing for a more precise evaluation of water quality of the Danube canal. This serves for the benefit of the Danube Canal Swimming Club and the events organized by them, in particular the annual swim parade which has already reached international attention.

With respect to man-made ponds which are designed to mimic natural environments and are operated without the use of chemical disinfectants the consultations of the National Bathing Water Group and the Austrian Health Ministry, conducted as part of the UrbanBlueHealth project are contributing to the development of new regulations.



4. Objectives of the Action Plan

The primary objectives of this national Action Plan are to establish a robust understanding of the dynamics governing water quality of urban surface waters such as the Vienna Danube Canal and man-made small bathing ponds. These types of urban surface waters are not manageable by conventional measures.

The list of objectives is as follows:

1. **Comprehensive Water Quality Assessment:** To conduct a thorough assessment of microbiological water quality within the Vienna Danube Canal during the summer season, alongside key physical and chemical parameters including pH, turbidity, conductivity, UV-transmission as well as precipitation levels, and water level data from representative monitoring stations. In addition, high frequency monitoring of beta-glucuronidase activity is performed. This data is overlaid with relevant geo-spatial information to provide understanding of potential influencing factors.
2. **Proxy Identification & Validation:** To identify and rigorously evaluate suitable, easy-assessable proxies for predicting microbiological water quality - focusing on metrics that offer practical utility for monitoring.
3. **Community Engagement & Awareness Raising:** To achieve long-term sustainability interested people and members of the Danube Canal Swimming Club are proactively informed regarding the key findings and insights generated through this Action Plan, fostering a shared understanding of water quality dynamics.
4. **Reducing public health risks:** To develop and implement strategies to minimize potential health risks for swimmers of the Danube Canal, including promoting conscious behavior, providing clear information about water quality issues.
5. **Proposal of future implementation of an early warning system:** To protect swimmers from polluted water an early warning system is proposed based on precipitation and water-level data, and our site-specific project results. In addition, a system is to be put in place that makes it possible to determine when water quality has returned to normal following a pollution incident.
6. **Participation in the revision of the Austrian regulation** from the Ministry of Health for man-made small bathing ponds



5. Action Areas and Measures

This action plan focuses on the water quality of urban surface waters such as the Vienna Danube canal and man-made small bathing ponds. Acknowledging the inherent challenges related to recreational use.

Driven by the public demand for expanding recreational water bodies within the city our primary objective is a detailed scientific assessment of the Danube canal's microbiological water quality to provide broader understanding of canal dynamics. A key element of this plan involves collaboration on the installation and operation of high-frequency enzymatic monitoring equipment, providing targeted beta-glucuronidase activity measurements alongside our established monthly sampling program.

5.1. Improved monitoring and risk identification

Activities:

- Identify and map key monitoring locations along the Vienna Danube Canal, considering accessibility and representative water quality conditions.
- Establish a baseline dataset of physical-chemical parameters (pH, turbidity, conductivity, UV-transmission) at each site.
- Set up a cooperation with a specialist company to install and maintain high-frequency enzymatic monitoring equipment at one key site. This provides targeted GUS activity measurements, complementing our monthly full sampling program.
- Establish a regular sampling schedule during the summer season complemented by a period of targeted, high-frequency measurements.
- Implement standardized protocols for sample collection and preservation to ensure data integrity.
- Conduct microbiological water quality analysis comprising of *E. coli* (ISO 9308-4), Intestinal Enterococci (ISO 7899-2), *Clostridium perfringens* (ISO 14189), *Pseudomonas aeruginosa* (ISO 16266), Somatic Coliphages (ISO 10705-2), Heterotrophic Plate Count at 37°C or 22°C incubation temperature (ISO 6222), beta-glucuronidase activity (GUS assay, high-frequency monitoring only)
- Secure access to local precipitation data (e.g., rainfall amounts, intensity) - ideally linked to the monitoring period.
- Correlating precipitation events with subsequent changes in water quality parameters. Conduct statistical analysis of collected data to identify trends, correlations, and significant factors influencing water quality.
- Correlate microbiological water quality data with physical-chemical data, precipitation and water level data - exploring potential relationships.



Responsibility: Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene

Timeframe: May - September 2026 and 2027 (monitoring)
June-August 2026 (high frequency monitoring)

Resources:

- 2026: UrbanBlueHealth project budget and project contribution (monitoring, high frequency monitoring)
- 2027: Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene (monitoring)

Indicative funding approx.: 10000 EUR (2026), 5000 EUR (2027), in case of installation of high frequency monitoring 60000 EUR (device including maintenance).

5.2. Communication and public awareness

Activities:

- Establish contact with Danube Canal Swimming Club, joining meetings, expert support for the main event organized by the Danube Canal Swimming Club - the swim parade.
- Precipitation-Related Risk Alert: Public awareness regarding heightened microbiological risk during and immediately following rainfall events.
- Educate and inform interested people and members of the Danube Canal Swimming Club about the water quality, interpretation of quality parameters, monitoring results, and public health risks
- Share relevant water quality data with the SVDK, acknowledging the inherent limitations related to recreational use.
- Dissemination of UrbanBlueHealth project background and goals within scientific community (e.g. IWA symposium on Health-Related Water Microbiology).
- Hold the Closing Symposium of the UrbanBlueHealth project with invitation of experts of the field

Responsibility: Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene

Timeframe: 2026

Resources: UrbanBlueHealth project budget (until Oct. 2026), Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene

Indicative funding approx.: 5000 EUR



5.3. Capacity building

Activities:

- Organising meetings with the Austrian national bathing water group and further stakeholders to introduce the UrbanBlueHealth project background and goals and discuss the action plan.
- Conducting a survey about water quality expectations among members of the Danube Canal Swimming Club.
- On site training session for members of the Danube Canal Swimming Club to deepening and expanding the knowledge on water hygiene.
- Consultations within the National Bathing Water Group and the Austrian Health Ministry, contributing to the development of new regulations.

Responsibility: Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene, National Bathing Water Group

Timeframe: 2026 and beyond

Resources: UrbanBlueHealth project budget (until Oct. 2026), Medical University of Vienna, Institute for Hygiene and Applied Immunology, Water Hygiene

Indicative funding approx.: 1000 EUR p.a.



6. Expected results

Implementation of the action plan provides measurable progress in improving the understanding and management of water quality issues within the Vienna Danube Canal.

The compiled baseline Dataset for the Danube canal water quality, comprising concentration levels of indicators for faecal pollution, relevant chemical, physical parameters will form the foundation for further analysis and decision-making.

Periodic monitoring of water quality for faecal indicators in summer 2026 will enhance the baseline dataset and strengthen the confidence in the relations and prediction of the parameters.

The use of meteorological parameters (precipitation and water level) and High-Frequency Monitoring of beta-glucuronidase activity will enhance the early warning capacity for pollution events.

Through targeted training and workshops, the expertise of the Schwimmverein Donaukanal (SVDK) in terms of water quality data interpretation and hazard assessment will be strengthened.

Further cooperation with officials and other experts in the field of water hygiene will enhance knowledge exchange and represents a benefit for all involved colleagues. This will help to develop education and information material.

The final result of implementation of the Action Plan under the local conditions will point out scientifically substantiated possibilities for an early warning strategy to protect swimmers from polluted water and prevent health impacts.

Implementation of the action plan results in the revision of the Austrian regulation for man-made small bathing ponds.



7. Abbreviation and acronyms

CSO	combined sewer overflow
GUS	genaral utility service
IWA	International Water Association
SVDK	Schwimmverein Donaukanal