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UrbanBlueHealth

Urban Bathing Water Action Plan
The Stefański Ponds, Łódź, Poland

Final version

Contents

1. Introduction

In Poland, similarly to other countries of Central Europe, natural water reservoirs such as ponds, lakes, and rivers serve a recreational function for urban residents. This situation is not new; recreation by water has been a permanent element of Polish culture; however, the increase in summer temperatures, particularly heat waves in cities, has significantly increased the frequency of using this form of recreation. Under conditions of intensifying heat and urbanization pressure, natural urban and suburban bathing sites are gaining importance as an element of adaptation to climate change. The use of natural bathing sites contributes to the improvement of physical condition and psychological well-being of urban residents, while simultaneously supporting the preservation of freshwater ecosystem functions that mitigate the effects of climate change.

However, natural urban bathing sites are increasingly perceived as hot spots in the context of public health threats, and the quality of recreational waters constitutes one of the pieces in the puzzle referred to as public health. Current climate change leads to increasingly frequent extreme events, including intense rainfall and prolonged periods of drought. Heavy precipitation causes overloading of sewage systems, increased runoff of pollutants from agricultural and urban areas, and an increase in the load of fecal bacteria in rivers and lakes. Consequently, episodic contamination of recreational waters occurs, which may result in temporary closures of bathing sites and restrictions on the use of water reservoirs. The sanitary safety of recreational waters depends on effective monitoring, appropriate management of environmental pressures, and the efficient functioning of the institutional and legal system in Poland.

2. Local spatial context and key challenges

Łódź, as a typically industrial city, is characterized by compact building development and narrow arterial roads, which during periods of heat waves additionally intensify thermal discomfort for residents. Parks in Łódź with ponds, where urban bathing sites have been organized that function as publicly accessible "blue spaces," provide residents with opportunities for active recreation, contact with nature, and cooling during periods of high temperatures. The increasing frequency of heat waves causes natural urban bathing sites to become an increasingly important element of recreational infrastructure. Their maintenance in good sanitary and ecological condition is therefore crucial both from the perspective of public health and sustainable urban development.

Climate change, including primarily temperature increase and hydrological drought affecting the Łódź region, results in a reduced volume of surface waters. Therefore, in natural water reservoirs, including urban ponds used for recreational purposes, the concentration of chemical and microbiological pollutants increases. Contact with water of reduced microbiological or chemical quality may lead to the occurrence of diseases of the gastrointestinal system, skin, eyes, ears, and respiratory system. The greatest threat is posed by pathogenic microorganisms (bacteria, viruses, and parasites), whose abundance increases as a result of inflows of municipal wastewater, runoff from agricultural and urbanized areas, and sewer overflows during intense precipitation events (such as torrential rains). From the perspective of public health, the more direct and frequent the contact with water is (e.g., swimming, diving), the higher the requirements that should be imposed on its quality. Therefore, a key challenge is ensuring the health safety of urban residents who engage in active recreation at natural urban bathing sites.

According to the "Environmental Protection Program for the City of Łódź for the years 2024–2027 with a perspective until 2031," Łódź is located on a first-order watershed dividing the drainage basins of the two largest rivers in Poland: the Vistula and the Oder. Within the Oder River basin lies 75% of the city's area, which is drained by the Ner River and its tributaries (including the Gadka River). Since the mid-nineteenth century, the surface waters of Łódź have undergone extensive transformations. Many areas within individual catchments are paved and sealed, which translates into a reduction in retention capacity and an acceleration of surface runoff from these areas. Consequently, a significant decrease in natural flows in rivers has occurred (long periods of low water levels). Watercourses in Łódź primarily serve as receivers of stormwater, and after torrential rainfall events, rapid peak flows appear, causing inundation of areas located in valleys. Such conditions favour high levels of chemical and microbiological contamination of these waters. The largest water body in Łódź is the Stefański Ponds, supplied by the Ner and Gadka rivers, where,

within the framework of UrbanBlueHealth, a Pilot Action was implemented to improve bathing water quality. The Stefański Ponds, similarly to other urban ponds, play a significant role in the water management of Łódź, including, inter alia, limiting the occurrence of inundations and floods through the retention of rainwater, as well as constituting a recreational base and contributing to favourable shaping of the microclimate.

The system for managing the quality of surface waters, including recreational waters, in Poland is based on national legislation and regulations of the European Union. The primary legal act regulating water management is the Act of 20 July 2017, the Water Law (consolidated text: Journal of Laws 2025, item 960), which implements the EU Water Framework Directive. As part of the implementation of this legal act, the Water and Environmental Program of the Country operates in Poland, along with the river basin management plans derived from it. These documents define environmental objectives and remedial action programs that have an indirect but significant impact on the quality of waters used for recreational purposes.

The State Sanitary Inspection exercises direct supervision over water quality in Polish bathing sites. Monitoring of recreational water quality, meeting the requirements of the EU Water Framework Directive and national legislation, includes laboratory analyses of water samples for the presence of indicator bacteria (*Escherichia coli* and enterococci), visual assessment of water (including cyanobacterial blooms), and periodic classification of bathing water quality. Monitoring results are published on an ongoing basis on the information portal (Bathing Service), operated by the Chief Sanitary Inspectorate. Despite an extensive legal and institutional framework, the management of recreational water quality in Poland and in the Łódź region faces a number of challenges, including in particular:

- limited financial resources for the development of modern water quality monitoring systems,
- insufficient consideration of the impacts of climate change in local water quality management,
- urbanization pressure in river catchments,
- illegal household sewage discharges;
- an increase in the scale of livestock farming (so-called industrial farming),
- the emergence of new pollutants, including those of pharmaceutical origin, microplastics, and so-called persistent chemicals (per- and polyfluoroalkyl substances, PFAS), as well as
- insufficient interinstitutional coordination.

Moreover, intensifying climate change increases the frequency of harmful algal blooms, enhances pollution from agricultural and urban runoff, and promotes the proliferation of pathogens. In response to the problem of algal blooms and high concentrations of fecal bacteria, within the framework of the UrbanBlueHealth project, an action consisting of the installation of a water aeration device in the Stefański Ponds in Łódź was tested; the device supplied oxygen to deeper water layers and prevented the formation of water stagnation zones. The 2025 bathing season, during which the intervention was tested, was the first since the beginning of the operation of the bathing site in its current location (the northern side of the pond) without any temporary closure of this bathing site.

3. Synergies of the Action Plan

In the document entitled *Strategy for the Development of the City of Łódź 2030+*, the Green Transformation of the City has been included in the list of strategic initiatives. The actions planned within this area include, among others, the creation of multifunctional, open public spaces eliminating heat islands, as well as educational activities for residents and entrepreneurs concerning the city's green transformation in the field of adaptation to climate change. The expected effects of these actions include, among others, an increase in the quality of and the creation of new places for recreation, leisure, and other activities in the city, as well as an improvement in the quality of public space in the city.

4. Objectives of the Action Plan

The Action Plan for the Quality of Water in Urban Natural Bathing Sites applies to Stefański Ponds, one of the three natural bathing sites operating in the city of Łódź. Of the remaining two, one has previously undergone ecohydrological restoration in order to improve water quality, while the other is a pond with different characteristics (standing water, without river inflow), and therefore requires a different approach. The objectives listed in the points below are primarily intended to ensure a safe bathing site and to improve the quality of the bathing water.

The objectives listed below can be achieved in both the short-term and the long-term perspective, partly through municipal funds and partly through funds originating from European Union projects. Furthermore, the actions include the implementation of cooperation, integration with urban planning processes, and technical development.

The specific actions proposed in this document respond to the internal weaknesses and external threats identified in the SWOT analysis concerning bathing water quality in urban natural water bodies in Poland. In addition, this document implements an important transnational document entitled “Joint International Strategy on Bathing Water”, which is the result of the implementation of the UrbanBlueHealth project. The strategy defines common objectives concerning the improvement of safety, resilience, and water management in urban bathing sites in Central Europe, while the Action Plan translates these strategic objectives into specific actions adapted to local conditions.

The list of objectives is as follows:

1. Identification of areas and types of actions whose implementation may improve the quality of recreational water in the context of ensuring health safety for users of these facilities.
2. Improvement of the scope and frequency of monitoring in order to achieve a better understanding of threats to health and the environment.
3. Strengthening preparedness for short-term pollution events through the identification of sources and the development of early warning methods.
4. Enhancing the resilience of bathing sites to climate change through predictive tools and the management of weather-related risks.

5. Reducing risks through the control of pollution sources, strengthening cooperation and communication between institutions, stakeholders and decision-makers, and improving information provided to the public.
6. Supporting long-term sustainability through capacity building and the gradual integration of elements of risk-based management.

5. Action areas and measures

The improvement of bathing water quality in natural water bodies may be achieved through appropriate management of these facilities, including the monitoring of water quality and the implementation of organisational and technical measures based on the work of the personnel responsible for maintaining these facilities or requiring the investment of financial resources. In each activity is pointed type of them, basic activity covered under the annual budget of bathing site operator or additional activity needing the additional funding together with the estimation of purchases or services costs. For the purposes of this document, the summary of Chapter 5 identifies the institutions responsible for the Action Plan, the timeframes, and the sources of additional activities funding for its implementation.

5.1. Improved monitoring and risk Identification

Activities:

- Visually monitor the water for the presence of pollution, cyanobacterial blooms, changes in the colour of the water, the occurrence of an unnatural odour of the water, and other factors indicating an increase in chemical or microbiological contamination of the water (basic activity, MOSiR in Łódź).
- Conduct monitoring of the microbiological quality of the water with regard to the presence of faecal bacteria. Where possible and necessary, commission additional tests of the concentration of *E. coli* and enterococci (basic activity, MOSiR in Łódź).
- Increase the frequency of sampling (every 2 weeks) for microbiological testing within the framework of monitoring resulting from the applicable legal regulations (enterococci and *E. coli*) in order to better capture the variability of water quality (additional activity, in 2026 the Nofer Insitute of Occupational Medicine – NIOM, in the following years for consideration by MOSiR in Łódź; costs vary depending on methods from PLN 220 – PLN 500 / 50 EUR – 120 EUR per one sample analysed for of *E. coli* and enterococci).

5.2. Strengthening preparedness for short-term pollution event

Activities:

- No later than at the beginning of the bathing season in 2026, install recorders of water conductivity, temperature and dissolved oxygen (HOBO U24 and HOBO U26 probes) in the water at the inlets of the Ner and Gadka rivers in order to further observe the relationship between the values of these parameters and water pollution (on the basis of the increased frequency of microbiological monitoring in 2026) (additional activity, MOSiR in Łódź, probes were bought under UrbanBlueHealth project by NIOM; costs PLN 11,500 – PLN 12,500 / 2,700 EUR – 2,940 EUR per set of two sondes: HOBO U24 and HOBO U26).
- On the basis of the results of observations of the relationship between the physico-chemical parameters of water (water conductivity, water temperature and dissolved oxygen in water) and the microbiological contamination of water (results of measurements and tests from the 2026 bathing season), undertake an attempt to determine the threshold values of these parameters indicating an increase in the level of contamination of bathing water (additional activity, MOSiR in Łódź in cooperation with NIOM under the UrbanBlueHealth project, without additional costs).
- If the threshold values of physico-chemical parameters indicating water contamination in the pond with the bathing site will be determined, consider the purchase and installation of recorders of physico-chemical water parameters enabling the remote reading of results in real time (additional activity, MOSiR in Łódź; costs vary depending on device, from PLN 15,000 to PLN 70,000 / 3,520 EUR to 16,430 EUR)

5.3. Strenghtening climate resilience

Activities:

- Prepare and implement a procedure for closing the bathing site (hoisting a red flag) after extreme meteorological events such as heavy rainfall or storms with strong winds, until the effects of the event have been removed (basic activity, MOSiR in Łódź).
- Monitor precipitation in the region within the framework of risk management, as an element of the plan for preparedness for climate-dependent events (basic activity, MOSiR in Łódź).
- On the basis of the results of the Pilot Action carried out in 2025 at Stefański Ponds, in 2026, before the beginning of the bathing season, start the ORKA MAX aeration device in order to introduce oxygen into the deeper layers of the water and improve water

circulation in the zone around the bathing site, so as to prevent water stagnation and cyanobacterial blooms. If the results in 2026 are positive, consider the installation of aeration devices at all natural bathing sites in Łódź (additional activity, MOSiR in Łódź, aeration device was bought under UrbanBlueHealth project by NIOM; cost of aeration device PLN 24,000 – PLN 25,000 / 5,630 EUR – 5,870 EUR and cost of electrical elements for installation of the aeration device in site of operation PLN 8,000 / 1,880 EUR).

5.4. Risk mitigation through pollution control

Activities:

- Limit surface runoff from the area surrounding the reservoir by:
  - maintaining cleanliness in the area surrounding the reservoir (beach, paths, lawns);
  - regularly removing the contents of waste bins;
  - regularly removing broken or drying branches and limbs of shrubs and trees (basic activities, MOSiR in Łódź).
- Parking areas for users of the bathing site at Stefański Ponds have already been located at an appropriate distance from the bathing site, which protects the reservoir from urban runoff during heavy rainfall and flash floods. Every case of a car parked in the surroundings of the water reservoir in a place other than the designated parking area should be reported to the appropriate services (basic activity, MOSiR in Łódź).
- A stormwater retention basin has already been constructed, which effectively prevents urban runoff during heavy rainfall and flash floods in the surroundings of the bathing site. Communication should be maintained with the appropriate services responsible for technical inspections as well as cleaning and maintenance in order to ensure the continued proper functioning of this basin (basic activity, MOSiR in Łódź).
- Systematically inspect the reservoir and the area surrounding the bathing site for the presence of dead fish, dead birds and the carcasses of other animals. If dead fish, dead birds or the carcasses of other animals are detected in the reservoir or in the surrounding area, a response procedure should be implemented covering the method of disposal of dead animals and the criteria for events requiring notification of the appropriate services (Regional Veterinary Inspector, Environmental Department of the City of Łódź Office, and the District State Sanitary Inspector) (basic activity, MOSiR in Łódź).

- Systematically carry out maintenance measures to keep the vegetation and tree stands surrounding the reservoir in good condition (basic activity, MOSiR in Łódź).
- At the water reservoir there is an information board indicating the harmful effects of feeding waterfowl with bread. A vending machine installed earlier enables visitors to Stefański Ponds to purchase feed dedicated to waterfowl, which in the long term limits water contamination caused by excessive droppings of birds fed with bread. The purchase of a second information board should be considered in order to install it on the beach at the bathing site, and information about the harmful effects of feeding waterfowl with bread should be included in the information campaign addressed to the residents of Łódź (additional activity, MOSiR in Łódź, NIOM; costs of a board including installation vary depending on type and producer PLN 3,000 – PLN 6,500 / 700 EUR – 1,530 EUR; costs of a vending machine including installation vary PLN 5,000 – PLN 10,000 / 1,170 EUR – 2,350 EUR).
- Waste bins for dog excrement are located around the entire reservoir. Information about the obligation to clean up after one's dogs and to dispose of the waste in appropriate containers should be included in the information campaign addressed to the residents of Łódź (additional activity, MOSiR in Łódź; costs including installation vary from PLN 300 – PLN 1,500 / 70 EUR – 350 EUR).
- If the installation of nesting boxes for waterfowl is planned, they should be located downstream of the bathing site (additional activity, MOSiR in Łódź).
- Portable public toilets for users of the bathing site operate on the premises of the bathing site. In the future, the installation of showers should be considered, enabling users to wash cosmetics off their bodies before entering the water reservoir and to rinse their bodies after leaving the water (additional activity, MOSiR in Łódź; costs of portable toilet vary PLN 700 – PLN 1,500 / 160 EUR – 350 EUR; Costs of showers installing varies from PLN 100,000 – PLN 300,000 / 23,470 EUR – 70,420 EUR).

5.5. Communication and public awareness

Activities:

- Inform users of the bathing site about the provisions of the regulations for the use of the municipal bathing site Stefański Ponds, in particular concerning:
  - the rules for the safe use of the bathing site;

- the prohibition on bringing dogs into the bathing site area;
- refraining from bathing in the case of persons experiencing certain diseases or certain symptoms of illness (basic activity, MOSiR in Łódź in cooperation with NIOM).

- Educate and inform local communities about the advantages of this form of recreation and about good practices for using the bathing site. Engage local communities in the protection of water resources (additional activity, MOSiR in Łódź in cooperation with NIOM; without additional costs).
- Maintain ongoing cooperation with regional institutions and local government authorities responsible for public health in the city/municipality in the field of:
  - the exchange of information about the condition of the water in the bathing site;
  - informing about the epidemiological situation in the region, including outbreaks of infectious diseases among birds and other animals (e.g. avian influenza) (basic activity, MOSiR in Łódź).

5.6. Capacity building

Activities:

- Participate in the meeting of the Polish Bathing Water Group that will be organised in 2026 in the form of a webinar in order to discuss with other stakeholders the issues of bathing water quality management at Stefański Ponds in Łódź (additional activity, MOSiR in Łódź; without additional costs).
- Educate the operator staff by participating in training that will be organised by the NIOM under UrbanBlueHealth project in 2026 for public health authorities and operators of urban natural bathing sites in the field of risk-based management (additional activity, MOSiR in Łodź; without additional costs).
- Follow the international Bathing Water Platform, which will be established in 2026 under UrbanBlueHealth project to collect and provide knowledge on the quality of water in urban natural water bathing sites (additional activity, MOSiR in Łódź; without additional costs).
- Sign the Declaration of accession to the Urban Blue Health, as an institution operating within the framework of the City of Łódź Office (additional activity, MOSiR in Łódź; without additional costs).

Institutions engaged in the implementation of the activities described below in points from 5.1 to 5.6:

1. Municipal Sport and Recreation Centre (MOSiR) in Łódź (operator of the Stefański Ponds bathing site);
2. Nofer Institute of Occupational Medicine (NIOM) (Project Partner 3 in UrbanBlueHealth project).

Timeline (in details pointed in selected activities listed above in points 5.1 – 5.6):

- year 2026 (short term);
- from 2027+ (mid- and long term).

5.7. Resources

In 2026, resources for the implementing of activities that beyond the standard activities of the Stefański Ponds bathing site operator will come from the UrbanBlueHealth project. In subsequent years, should the implementation of additional measures become necessary, the associated costs will be incorporated into the budget by the operator of the Stefański Ponds bathing site with appropriate advance planning, no later than in the year preceding the planned implementation of such measures.

6. Expected results

The implementation of the Action Plan will be an important element of activities for public health in Łódź and will contribute to strengthening the city's adaptation to climate change. The implementation of the actions described in this document will prevent an increase in the level of pollutants present in bathing water and may significantly improve the quality of water in the main pond at the Stefański Ponds bathing site.

Increasing the frequency of water testing for faecal bacteria (*E. coli* and enterococci) will improve the sanitary safety of bathing waters in year 2026 and strengthen public health actions by preventing infections acquired by bathing site users, particularly children and other representatives of vulnerable groups, during water recreation. There is recommended to keep increased frequency of water testing in following years.

The implementation of educational and promotional programs will engage local communities in activities aimed at protecting their own health and safeguarding water resources. Social awareness will be strengthened with regard to both the benefits and the risks of water-based recreation. Improved communication tools and social campaigns will increase transparency, promote safer behaviour among bathers, and enhance overall trust in the quality of bathing waters. Capacity-building actions will ensure that local authorities, operators, and public health institutions possess the skills necessary to apply risk-based management in line with WHO guidelines.

Continuous cooperation with stakeholders in the field of public health will enrich the information resources of all parties within this network, strengthening their capacity to implement educational programs and information activities for local communities.

The expected final result of the implementation of the Action Plan under local conditions is the strengthening of the management system for natural bathing sites at the city level, which will improve the safety of the city's residents using these places of recreation.

As a result of the implementation of the Action Plan, the second largest recreational water body in Łódź will remain clean, safe for health, and accessible to present and future generations.

7. Abbreviation and acronyms

MOSiR .....Municipal Sport and Recreational Center