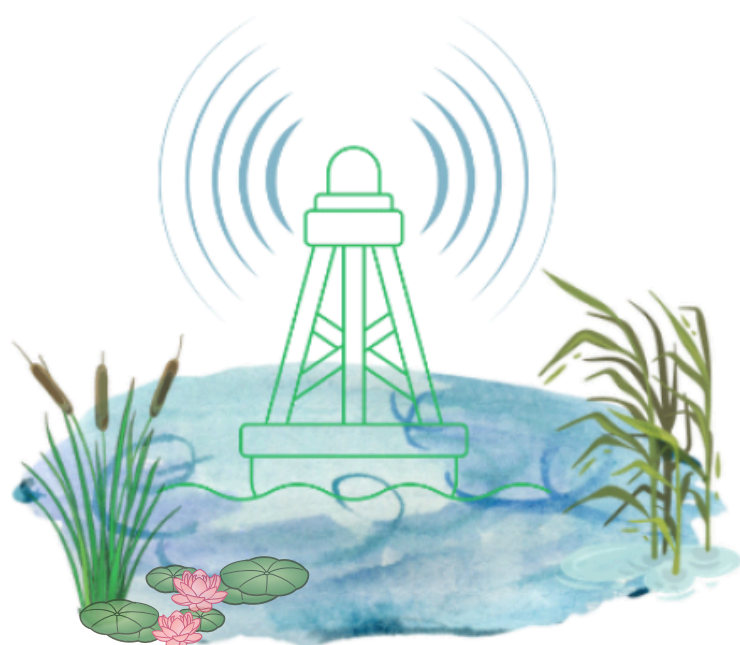


Latvia – Lithuania

Newsletter

Project Lakes Go Digital

nr.3



Discovering the Hidden Life of Lakes.

Beneath the calm water surface, thousands of living organisms continuously filter water, regulate local climate, support biodiversity and create places where people can swim, fish, relax and connect with nature. These invisible processes known as ecosystem services make healthy lakes essential for both nature and society.

In this edition of the Lakes Go Digital Newsletter, discover how innovative smart buoy technology, scientific research and cross-border cooperation are helping us better understand our lakes through real-time monitoring.

Follow project's latest achievements, from the successful deployment of all six smart buoys to 24-hour calibration campaign, educational activities and citizen science initiatives that bring environmental research closer to communities.

TOPIC 01

The Invisible Work of a Lake

Discover how healthy lakes quietly provide clean water, regulate climate, support biodiversity and improve our everyday lives through essential ecosystem services.

TOPIC 02

Smart Monitoring in Action

Follow the deployment of all six smart buoys, the 24-hour calibration campaign and the latest scientific fieldwork across Latvia and Lithuania.

TOPIC 03

Science for Everyone

See how education, citizen science and community engagement are helping people understand, protect and value freshwater ecosystems.



THE INVISIBLE WORK OF A LAKE

When we look at a lake, we often see only a calm water surface. Yet beneath it, **an entire ecosystem is constantly at work.**

Every hour of every day, every season of the year, thousands of living organisms are performing countless natural processes that make our lives healthier, safer and more enjoyable.

Scientists call these benefits ecosystem services - the many ways healthy ecosystems support people and nature.

Some of these services are easy to recognise. Lakes provide freshwater, support fish populations, and produce natural resources such as reeds that can be used for traditional roofing, insulation and even renewable heating.

These are known **as provisioning services** because they provide materials we use directly.

Many other services are much less visible but equally important.

Healthy lakes naturally filter water, helping to improve its quality before it reaches rivers and groundwater. They regulate water flows, reducing the impacts of floods and heavy rainfall, while their surrounding wetlands help prevent erosion and retain nutrients that would otherwise pollute downstream ecosystems.

Lakes also play an important role in climate regulation.

During hot summer days they help cool the surrounding landscape, creating a more comfortable local climate for people, wildlife and agriculture. At the same time, healthy freshwater ecosystems contribute to carbon cycling and help maintain regional environmental balance.

Beyond these practical benefits, lakes also provide something that cannot easily be measured. They are places where people swim, fish, paddle, walk, photograph wildlife, spend time with family and simply enjoy moments of peace.

Many lakes are closely connected with local traditions, cultural heritage and community identity. These cultural ecosystem services improve our physical and mental well-being and strengthen the relationship between people and nature.

"Because lakes work continuously for us, they also depend on us."





Naturally, lakes change very slowly over thousands of years. Sediments gradually accumulate on the lake bottom, eventually transforming lakes into wetlands. However, human activities can dramatically accelerate this process. Excess nutrients from agriculture, pollution, plastic waste and climate change contribute to eutrophication, harmful algal blooms and declining biodiversity.

Protecting water quality, reducing pollution and understanding environmental changes are essential to keeping these ecosystems healthy. This is one of the main goals of the Lakes Go Digital project. By introducing smart buoy technology capable of monitoring water quality in real time, researchers can better understand how lakes function, detect changes earlier, and provide municipalities with reliable information for sustainable lake management.

The better we understand our lakes, the better we can protect the countless invisible services they provide not only for today's communities, but also for future generations.



"In order to have all those ecosystem services we need to look at the lake as a system. It is not just a very nice scenery but also an entire world that lives under the surface and provides all those services that do those little jobs every day without no pay."

— Eglė Baltranaite, Senior Researcher at Mykolas Romeris University

FIRST SMART BUOY SUCCESSFULLY INSTALLED IN LAKE MASTIS

The Lakes Go Digital project has reached **an important milestone with the successful installation of its first smart monitoring buoy** in Lake Mastis, Lithuania.

The official launch brought together municipal representatives, local residents, scientists and the media.

The Mayor of Telšiai Municipality Tomas Katkus symbolically inaugurated the monitoring system, marking the beginning of a new era in data-driven lake management. He also showed great support for using technology for smart monitoring systems and better water management programmes.

Visitors also had the opportunity to participate in educational activities introducing ecosystem services, water quality monitoring and scientific sampling methods. Researchers from Mykolas Romeris University showed visitors how using drones can help in ecosystem services research.

They also introduced methods of determining value of the lake Mastis. Scientists from Latvian Institute of Aquatic Ecology showed water sampling methods and explained how smart monitoring systems will decrease time for reasonable action taking in case of changes in water quality.

The buoy installed in Lake Mastis is the first of six smart monitoring stations that was deployed across Latvia and Lithuania.

Each buoy continuously measures key environmental indicators. Together, these monitoring stations will create a shared cross-border knowledge base supporting sustainable freshwater management in both countries.



SMART BUOYS IN ALL 6 LAKES



The smart buoys are now operating in Mastis and Germantas lakes in Lithuania, as well as Lukna, Lielais Ludzas, Mičurīnietis and Ciecere lakes in Latvia, forming a cross-border real-time monitoring network designed to improve the management of urban lakes.

Developed by the **Institute of Solid State Physics, University of Latvia**, in close cooperation with environmental scientists and project partners, the autonomous buoy systems continuously collect environmental data in lakes.

Every minute, the buoys measure a range of key water quality indicators, including water temperature, electrical conductivity, chlorophyll, cyanobacteria, water level and other parameters that provide valuable insight into the ecological condition of each lake.

Unlike traditional monitoring, which often relies on periodic sampling, the smart buoy system enables researchers and municipalities to observe changes as they happen. **Continuous monitoring makes it possible to detect environmental changes much earlier, respond more quickly to potential pollution events and better understand how lakes react to seasonal changes and weather conditions.**

To ensure the highest possible accuracy, the deployment of each buoy has been accompanied by extensive scientific fieldwork. Researchers have collected water samples, carried out measurements using multiparameter probes and compared these observations with the data transmitted by the buoys. **These calibration activities provide confidence that the information delivered by the monitoring system is reliable and scientifically robust.**

As the monitoring network continues to collect data over the coming months, researchers will build one of the first shared cross-border datasets for urban lakes in Latvia and Lithuania. This information will help identify long-term environmental trends, improve scientific understanding of freshwater ecosystems and support evidence-based lake management.

Beyond scientific research, the project also aims to make environmental information more accessible to municipalities and local communities. Reliable real-time data can support decisions related to recreation, biodiversity conservation, water quality protection and climate adaptation, ultimately contributing to healthier lakes and more resilient communities. By combining environmental science, digital technologies and international cooperation, Lakes Go Digital demonstrates how innovation can strengthen freshwater management while helping to protect the many ecosystem services that healthy lakes provide to society.

24 HOUR CALIBRATION IN MASTIS LAKE

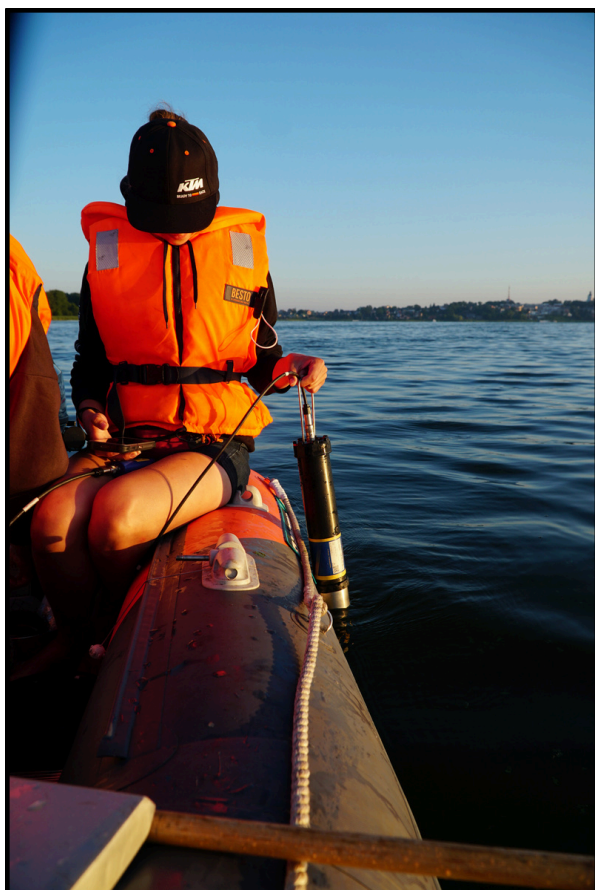
One of the most important technical milestones of the Lakes Go Digital project has successfully been completed at Lake Mastis in Lithuania, where project partners carried out an **intensive 24-hour smart buoy calibration campaign**.

To verify the accuracy of the monitoring system, researchers from the Latvian Institute of Aquatic Ecology (LIAE) collected water samples and performed field measurements every two hours throughout an entire day and every hour throughout the night.

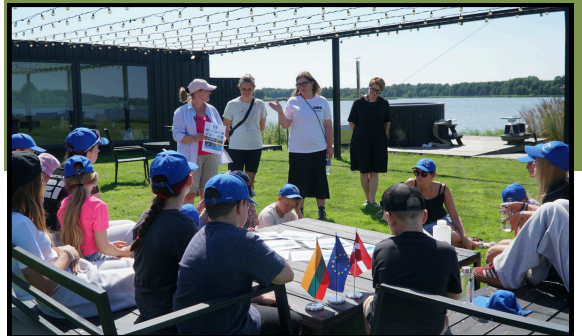
The methods for field sampling was using a multiparameter probe, Secchi disk, Manta net for collecting microplastic samples and others.

Scientists measured the same water quality indicators that continuously is monitored by the smart buoy, including temperature, electrical conductivity and other key environmental parameters.

The collected field data will now undergo laboratory analysis and be compared with the buoy's real-time measurements. **This process is essential for validating the monitoring system** and ensuring that municipalities and lake managers receive accurate, reliable information to support evidence-based environmental decision-making.



BRINGING SCIENCE CLOSER TO COMMUNITIES



The deployment of smart buoys is not only a technological achievement, **it is also an opportunity to strengthen the connection between science and society.**

Throughout the project, visitors have had the opportunity to explore the smart buoy technology first-hand, observe live water quality monitoring demonstrations, examine aquatic organisms under a microscope and discover the many ecosystem services provided by healthy lakes. **These activities help transform scientific research into an engaging experience** that is accessible to people of all ages.

Public engagement is a fundamental part of the Lakes Go Digital project. Healthy lakes are valuable public spaces where people swim, fish, paddle, exercise and spend time with their families. Communities therefore have a direct interest in understanding the condition of their lakes and whether the water is safe for recreation. By making environmental monitoring more visible and easier to understand, the project encourages greater environmental awareness and helps people appreciate the importance of protecting freshwater ecosystems.

Citizen engagement also plays an important role in the long-term success of the project. The smart buoys installed in the six pilot lakes are scientific monitoring stations designed to collect continuous environmental data. **For the monitoring network to function reliably, it is essential that the equipment remains undisturbed and undamaged.** Informing local communities about the purpose of the buoys helps build understanding, encourages respect for the equipment and fosters a shared sense of responsibility for protecting these valuable scientific instruments.

Education and communication will continue throughout the project. By involving schools, residents, municipalities and lake visitors, Lakes Go Digital aims to build not only a network of smart monitoring technologies but also a community that values science, understands freshwater ecosystems and actively contributes to protecting lakes for future generations.

INSPIRING FUTURE

SCIENTISTS



Science came alive for 50 schoolchildren during educational activities organised at Lake Lukna as part of the State Fish Fund-supported project in cooperation with the Latvian Rural Advisory and Training Centre's programme "Mana Cope" ("My Fishing Experience").



Scientists from the Latvian Institute of Aquatic Ecology, **introduced school children to modern lake monitoring technologies and demonstrated how environmental scientists work in the field.**

Students learned how smart buoys continuously monitor water quality and why this technology is important for decision makers. They observed water quality measurements using a multiparameter probe, learned how much more time researchers need to collect field data compared to a smart buoy, collected microorganisms using scientific nets, and discovered the importance of aquatic plants and freshwater ecosystems for maintaining healthy waters.

They also explored the growing challenge of microplastic pollution and learned how environmental data support sustainable lake management. The most exciting moment for the children was looking at microorganisms through microscopes, revealing the hidden world of tiny organisms living in the water.

By combining hands-on activities with scientific demonstrations, the event encouraged young people to develop an interest in environmental sciences, digital technologies and freshwater importance.



WHAT'S NEXT IN THE PROJECT



Over the coming months, researchers will continue collecting and validating real-time environmental data, improving monitoring methods and working closely with municipalities to better understand the ecological status of urban lakes. As the monitoring network grows, it will provide valuable insights into water quality, ecosystem health and the environmental changes affecting freshwater ecosystems across Latvia and Lithuania.

At the same time, the project will continue engaging local communities through educational activities, public events and citizen science initiatives. By making environmental information more accessible and helping people understand how lakes function, **Lakes Go Digital** aims to strengthen the connection between science, decision-makers and society.

Healthy lakes benefit everyone. They provide clean water, regulate local climate, support biodiversity, create spaces for recreation and improve our quality of life. Protecting these ecosystems requires not only innovative technologies but also informed communities that value and care for their local environment. Together, through science, innovation and cross-border cooperation, we are building a future where better data leads to better decisions and healthier lakes for generations to come.

Lakes Go Digital is co-funded by the
Interreg VI-A Latvia-Lithuania Programme 2021–2027

This NewsLetter has been produced with the financial support of the European Union. Its contents are the sole responsibility of Agency of Daugavpils University “Latvian Institute of Aquatic Ecology” and Mykolas Romeris University, and do not necessarily reflect the views of the European Union.

