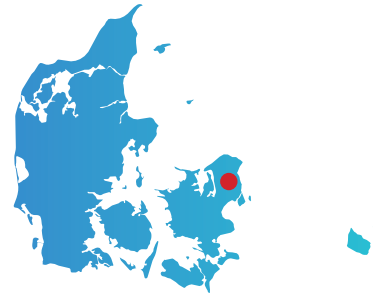




LAKE FURESØ

Theis Kragh

Photo by: Stig Nygaard | Wikimedia commons



Country: Denmark

Name of the site: Lake Furesø

Ecosystem type: Agricultural fields

SITE DESCRIPTION

Lake Furesø is located approximately 15 km north of Copenhagen, in the municipalities of Rudersdal, Lyngby-Taarbæk, and Furesø, surrounded by extensive woodland and residential areas. It is the largest and deepest lake in the Moelleaa river system and, at a maximum depth of 37.7 m, the deepest natural lake in Denmark. The lake is divided into two morphologically distinct basins: the deep, stratifying main basin, and the shallow, flat-bottomed Store Kalv. The catchment comprises a mix of forest, residential areas, agricultural land, and smaller water bodies. The lake is part of the EU Natura 2000 network, designated as a naturally eutrophic lake with Magnopotamion or Hydrocharition type vegetation and as a Special Protection Area for birds. These designations impose a legal obligation on authorities to protect and enhance the lake's ecological status.

CHALLENGES

Continued reduction of stormwater overflows and diffuse agricultural run-off in the catchment is essential. Additionally, a high concentrations of iron-bound phosphorus (P) in surface sediments represent a substantial releasable P pool. Sonar-based mapping is needed to identify priority areas for targeted in-lake treatment. Climate vulnerability: warm summers drive early and intense cyanobacterial blooms, rapidly suppressing light availability and reversing macrophyte recovery. Long-term fate of hypolimnetic oxygenation: maintenance of aerobic sediment-water interface conditions after oxygenation may cease will depend on future organic matter accumulation rates. Macrophyte recovery: light attenuation by phytoplankton remains a primary limiting factor. Full recovery of the historic macrophyte community (e.g., charophytes to a depth of 11 m) will require both reduced internal P loading and improved surface water clarity.



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CURRENTLY USED RESTORATION MEASURES

Currently, restoration of Lake Furesø primarily relies on hypolimnetic oxygenation, which maintains aerobic conditions near the sediment–water interface and limits the release of phosphorus from sediments into the water column. The system uses three diffuser arrays to supply oxygen to the hypolimnion, thereby reducing anoxia and helping to prevent acute internal phosphorus loading and associated ecological impacts such as fish kills. However, this measure does not remove phosphorus from the lake; instead, it temporarily immobilises phosphorus in the sediments while external phosphorus inputs, estimated at around 1.6 tonnes per year, continue to contribute to the lake's phosphorus burden. In parallel, sediment surveys are being used to better understand the spatial distribution of phosphorus-rich sediments and internal loading processes. Overall, the current approach is therefore focused mainly on containing phosphorus release through oxygenation, while the proposed next step is to transition towards direct removal and potential recovery of phosphorus from hypolimnetic water.



STAKEHOLDERS

The main stakeholders involved in the restoration of Lake Furesø are the municipalities of Rudersdal, Lyngby-Taarbæk, Furesø, and Gladsaxe, which play an active role in both the scientific and administrative management of the lake and the wider Mølleå system. They support long-term water quality monitoring, including biweekly sampling and continuous measurements through a dedicated monitoring buoy, while also co-financing research into phosphorus cycling and internal loading. The municipalities work closely with SDU to optimise restoration measures, particularly hypolimnetic oxygenation, and coordinate management through a joint steering committee covering the connected lakes. They also facilitate the implementation of restoration actions in downstream lakes such as Bagsværd Sø and support the regulatory and permitting processes required for interventions in the Natura 2000-protected Furesø.