

Competence Center for Climate Change Digital Twin for Earth Forecasts and Societal Redressement: DTECLIMATE"

SP2: ACT4D-EUTROPHICATION SITE VISIT TO BICAZ LAKE



Lake Bicaz, is one of Romania's most important reservoir lakes, created to harness the hydropower potential of the Bistrița River. Built between 1950 and 1960, the dam supplies a major hydroelectric plant with an installed capacity of 210 MW, making the lake a strategic energy asset for the region.

The lake has a surface area of **32.6 km²** and a maximum volume of **1.25 billion cubic meters**, it ranks as Romania's **second-largest dam lake by volume**.

The lake reaches a maximum depth of **97 meters**, with water levels fluctuating between **434 m and 516 m altitude**, depending on operational needs. These variations—often **25–30 meters annually**—expose nearly **1,500 hectares of shoreline**, influencing both ecological dynamics and local land use.

From a hydrological perspective, Lake Izvorul Muntelui falls within the **eutrophic-oligotrophic category**, reflecting a mix of nutrient conditions that shape biological productivity. Its thermal regime corresponds to a moderately warm mountain climate, with average annual temperatures between **7 and 7.5°C**, snowy winters around **-4 to -5°C**, and mild summers reaching **16.5–17°C** in July.



Pollution monitoring of Bicaz Lake is carried out by Romanian environmental authorities through regular water sampling and laboratory analysis. They track physical, chemical, and biological indicators, as oxygen levels, nutrients, and algae to assess water quality.

Monitoring also includes emergency response to incidents like fish deaths, where rapid testing determines whether pollution is present. In many cases, results show water quality remains within normal limits.

A major issue identified is solid waste accumulation (plastics, wood, debris), especially after floods, requiring ongoing cleanup and measurement of collected waste.

The main pollution sources are upstream rivers, illegal dumping, and flood runoff, rather than just local activity.

Overall, monitoring combines continuous observation, lab testing, and cleanup efforts, with the biggest challenge being managing waste and pollution coming from upstream areas.

Main types of pollution at Bicaz Lake:

1. Solid waste (plastics, wood, household debris)

Large quantities of PET bottles, plastic, and mixed waste regularly accumulate on the lake surface.

Waste is often carried downstream by the Bistrița River from upstream towns and villages.

During floods, the situation becomes extreme:

- Hundreds of tons of debris (wood, plastic, even appliances) can end up in the lake.
- Cleanup operations in 2025 removed hundreds of cubic meters of waste and plastics.

2. Pollution spikes after floods

Flooding events are a major trigger for sudden pollution.

In 2025, floods brought:

- 50+ tons of debris in a single day
- Animal carcasses and organic waste, creating potential sanitary risks

These events temporarily degrade water quality and can affect ecosystems.

3. Organic and biological pollution

Floodwaters can carry dead animals and decomposing organic matter into the lake.

This can:

- Reduce oxygen levels
- Affect fish and aquatic life
- Create short-term health concerns

There have also been incidents of fish deaths linked to suspected contamination in the Bicaz river system.

4. Local human impact (tourism & settlements)

Tourism infrastructure (boats, cabins, pontoons) may contribute:

Waste leakage

Poor sewage handling (in some cases, debated locally—evidence is mixed)



Proposed Monitoring Points for Bicaz Lake

Satellite data analysis can be carried out using the same methodology applied in the case of Lake Siutghiol.

For validation, the same types of analyses are required, focusing on identifying the species present in the water column—species that play a role in the eutrophication process.

However, considering the length and shape of the lake, a larger number of sampling points would be necessary, especially in the bays where eutrophication is likely to develop as temperatures rise. Samples may be collected either from the lake surface or from the shore in the designated areas, according to the attached map.

