

Ecosystem functioning and water quality in freshwater and transitional waters quality (catchment scale)



ABOUT

This pilot investigates ecosystem functioning and water quality across freshwater catchments by integrating Earth Observation data with field observations and biodiversity datasets. The main study area is the Kokemäenjoki drainage basin in Finland, which includes lakes, rivers, and surrounding terrestrial ecosystems.

CURRENT PROGRESS

The pilot has been working on joint use of eDNA sampling and satellite observations on lake ecosystems to build enhanced EBVs. Dedicated field sampling has been made over pilot area lakes (Kokemäenjoki drainage basin). Presently preparations are being made for the field works towards summer 2026. Studies related to freshwater ecosystem functioning and biological dynamics focuses on EBVs on chl a and algae blooms. Method development for Detection Attribution Modelling (DAM) and collection of EO landcover and bird community data have been carried out. The objective is to connect bird community and EO data in DAM framework to assess the relative importance of habitat and climate change on avian community composition and diversity.



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SCOPE & BACKGROUND

Monitoring biodiversity at catchment scale requires integrating information about aquatic ecosystems with the surrounding terrestrial landscape. Environmental changes occurring upstream in a watershed can influence water quality and biodiversity downstream. Understanding these interactions requires integrated monitoring approaches combining remote sensing data with in-situ observations and biodiversity measurements such as eDNA sampling.

OBSGESSION'S CONTRIBUTION

Within OBSGESSION, this pilot combines satellite observations with detailed in-situ data on water quality, biological communities, and habitat structure. Environmental DNA sampling is used to detect species present in freshwater ecosystems, while satellite data provide spatially continuous information about environmental conditions. The pilot also applies the Detection-Attribution-Modelling framework to identify drivers of ecosystem change and support biodiversity monitoring at catchment scale.

EXPECTED RESULTS

The pilot will produce Earth Observation-based habitat maps and biodiversity indicators for freshwater and terrestrialecosystemswithin the catchment. The integration of remote sensing data with field observations will enable improved monitoring of ecosystem functioning and water quality. These results will support ecosystem restoration and management efforts in freshwater catchments.

STAKEHOLDERS

Key stakeholders include national water authorities, environmental agencies responsible for water management and biodiversity protection, and policymakers implementing European environmental strategies. Local and regional stakeholders involved in ecosystem restoration and catchment management also benefit from the pilot's results.



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