



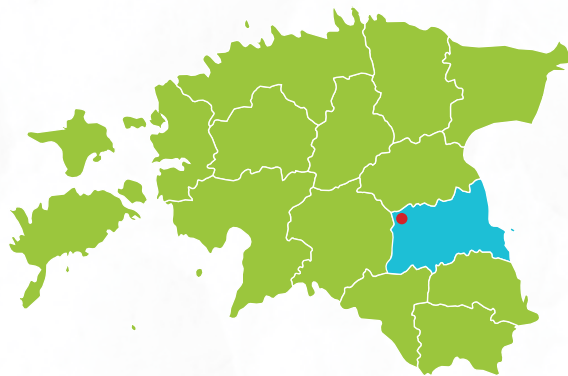
Alam-Pedja

Raul Paat, Edgar Karofeld

Organisation responsible for the site:

University of Tartu

Alam-Pedja Nature Reserve is one of the largest and most intact wetland landscapes in Estonia, covering approximately 342 km² in the lowlands northeast of Lake Võrtsjärv. The reserve consists of extensive peatlands, floodplain meadows, swamp forests, and unregulated river systems associated with the Emajõgi, Pedja, and Põltsamaa rivers. Wetlands and swamp forests dominate the landscape, forming a relatively natural hydrological system that has remained largely undisturbed by intensive human modification. The area is internationally recognised under the Ramsar Convention and is part of the Natura 2000 network. During major flood periods, the floodplain system



Country: Estonia

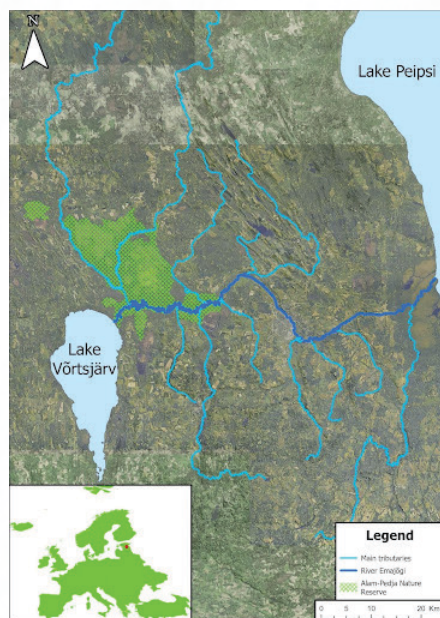
Region: Central-Southern Estonia

Type of Sponge territory: Floodplain with peatlands

Geographic coordinates of the site centroid point:

N 58.464 E 26.216

of Alam-Pedja can inundate more than 9,000 hectares, with up to one-third of the entire reserve temporarily under water. This makes it a natural large-scale “sponge landscape” and an exceptional real-world laboratory for the SpongeBoost project to investigate how wetlands and peatlands store, delay, and redistribute water across catchments. Although the area is among the least impacted landscapes in Estonia, drainage networks and regions influenced by drainage are still present. Current restoration efforts aim to reinstate the natural hydrological conditions of the remaining swamp forests and peatlands within Alam-Pedja, thereby supporting the renaturalization of the Nature Reserve as a whole.



A drone shot of the Pedja river and its floodplain in 2023.
Taken by: Marko Kohv (University of Tartu)



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Site characteristics

Climate

Humid temperate zone climate with distinct seasons and strong annual temperature variation.

Soil

The area is dominated by peat and alluvial soils.

Hydrology

The major component of the system is the Alam-Pedja floodplain. Areas experience strong seasonality, a major event is the spring melts and floods. Strong groundwater-surface water interactions.

RESTORATION EFFORTS

Conservation program

Alam-Pedja protection regulation, Alam-Pedja conservation management plan, Natura 2000, Ramsar

Restoration program

The restoration program is part of the Alam-Pedja conservation management plan.

Economic investment

Funding from several Estonian or European conservation/restoration programs. Projects such as LIFE Mires Estonia, LIFE IP ForEst&FarmLand, LIFE-SIP AdaptEST, and Restorations by Estonian Forest Management Center (using EU Cohesion Fund).

SPONGEBOOST'S ROLE

The specific objectives for the Alam-Pedja case study area are to:

1. Create a representative hydrological model over the area.
2. Model through changes in climate and land-use in the area.

Monitoring program

The monitoring in the Alam-Pedja Nature Reserve is held in accordance with the Alam-Pedja Conservation Management Plan. It includes the inventory of plant and animal species specific to the area. The program also includes the monitoring of the restoration effects on the wetland habitats in the area. No specific monitoring has been done during the SpongeBoost project. We use data available through the national monitoring program (discharges of major rivers), satellite products, and nationwide mapped data (land use, drainage, soil data). We use this data to construct a hydrological model over the whole Alam-Pedja Nature Reserve using the HYPE modelling code (created by SMHI).

Interpretation and analysis

The ongoing monitoring activities indicate that the relatively intact hydrological conditions of Alam-Pedja support extensive wetland and floodplain processes, while localised restoration measures may further improve hydrological connectivity and water retention in previously altered areas. However, modelling activities are still ongoing, and the catchment-scale implications of these processes are not yet fully understood. In particular, there remains uncertainty regarding the extent to which restoration measures in wetland systems can influence broader hydrological dynamics and downstream flow regimes. The modelling framework aims to provide a better understanding of the interactions between peatlands, floodplains, groundwater systems, and river networks, and to assess their potential role in enhancing landscape-scale water retention and climate resilience.



Ditch damming works in the northern part of Soosaare bog in 2018, on a former cut-over peatland. Taken by: Edgar Karofeld (University of Tartu)

