



Serra do Xistral Peatlands

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Country: Spain

Region: Galicia

Type of Sponge territory: Peatland

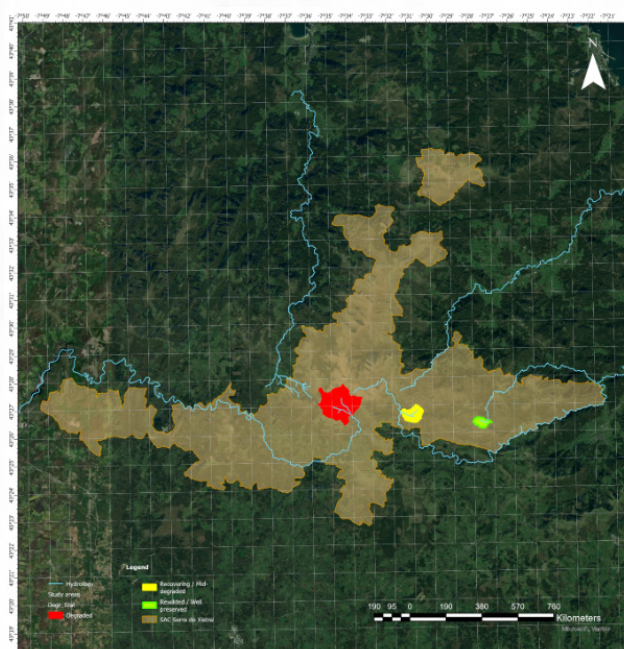
Geographic coordinates of the site centroid point:

43.4627, -7.57231 (ETRS 1989)

Northern Spain may not be the first place where one expects to find peatlands, yet in Galicia, the climatic and topographic conditions make them possible. Studies estimate that mountain peatlands in the region cover about 10,000 hectares, 80% of which are found in Serra do Xistral and surrounding mountain ranges (Pontevedra-Pombal et al., 2004). Therefore, this area constitutes the southernmost continental peatlands landscape in Europe, and it's protected under the Natura 2000 Network.

The importance of this area lies in both its hydrological role, as it forms the headwaters of many regional rivers, and its ecological value, as it hosts distinctive habitats such as blanket bogs, exemplifying very well their value as a sponge landscape. However, what makes these peatlands particularly unique is their water source: fog, which can contribute up to 16,000 mm annually, due to the orientation of the valleys that channel moist ocean air and force it to rise and condense around 600–800 m.a.s where most of the peatlands are found (Fohen Effect I. - Orographic condensation). From the scientific perspective, it's a valuable area because of the presence of well-preserved and degraded peatlands that allow for studying and testing different conservation approaches in the framework of the SpongeBoost project.

This habitat was long understudied and little known, largely because it was considered to have limited



exploitable value. Recent substantial efforts have enabled a systematic inventory and classification of the area, laying the groundwork for effective conservation and management strategies. Today, these peatlands face threats from overgrazing and wind turbine installations, although measures are being taken to prevent such developments and mitigate their potential impacts. Within SpongeBoost, research on these peatlands aims to support the creation of a sustainable management plan in close collaboration with local stakeholders.



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Site characteristics

Climate

- ❧ Cool oceanic climate influenced by the Cantabrian Sea, with frequent precipitation, persistent cloud cover, low temperatures, and occasional snowfall at higher elevations.
- ❧ The mountain range creates persistent orographic fog by forcing moist sea air to rise and condense; this fog is especially common in spring and summer, even as rainfall decreases.
- ❧ Fog is a major water source, with annual inputs possibly exceeding 16,000 mm, often surpassing rainfall during dry periods and helping maintain the hydrological balance of peatland ecosystems.

Soil

- ❧ Soil development is shaped by geological history and long-term climate, with acidic, nutrient-poor metamorphic rocks leading to shallow, poorly drained soils through prolonged weathering and past periglacial processes.
- ❧ Water saturation promotes hydromorphic and peat soils with high organic matter accumulation; processes like paludification and the movement of iron and aluminium with organic matter create poorly permeable layers that restrict drainage.
- ❧ Flat summits, gentle slopes, and poorly drained depressions favor peat formation, supporting extensive blanket bogs and other peat-forming environments, especially on high plateaus and watershed divides.

Hydrology

The Serra do Xistral forms a major watershed divide between the Cantabrian and Atlantic basins. Rivers such as the Landro, Ouro and Masma drain northwards into the Cantabrian Sea, while others, including the Miño and the Eume, originate in the southern and western slopes and flow towards the Atlantic.

Many of these rivers originate within peatland systems located in headwater areas. Peat soils store water within their organic layers and release it slowly over time, buffering hydrological extremes, sustaining base flows and contributing to downstream water quality.

The hydrological functioning of these landscapes depends strongly on the maintenance of high groundwater levels and hydrological connectivity within the catchment.

Natural protected area

The Serra do Xistral Special Area of Conservation (SAC) spans 22,963 ha and hosts 20 different habitats of community interest (HIC), with 7130 blanket bogs and 4020 temperate Atlantic wet heaths. At least 4,600 ha of the protected area are covered by hygroturbous environments or peatlands, including active raised bogs, blanket bogs, transition mires, and quaking bogs.

Terras do Miño–Serra do Xistral has been recognised by Wetlands International as the only European Global Flagship Landscape, reflecting its unique ecological, hydrological and cultural values, and its potential to build resilient landscapes that benefit both nature and society.



Eriophorum angustifolium



Erica mackaiana



Drosera spp

RESTORATION EFFORTS

Restoration program

There is a European Life project called LIFE in Common Land that has implemented targeted restoration and conservation actions with the support of the common land communities.

- 🌿 **Focus areas:** habitat structure, hydrology, and invasive species
- 🌿 **Key outcomes:** heathland restoration, erosion control, peatland protection, and large-scale removal of invasive trees
- 🌿 **Impact:** hundreds of hectares of habitat improved and restored

Conservation program

Serra do Xistral lacks a specific conservation plan. Although it is part of the Biosphere Reserve of Terras do Miño, there are no targeted measures for the conservation of its peatlands. The ongoing rewilding processes are primarily driven by rural abandonment and the reduction of human impact.

Economic investment

The study area has benefited from an economic investment of €2 million, co-financed through LIFE projects and the local administration (Lugo's Deputation).



SPONGEBOOST'S ROLE

The specific objective for the Serrado Xistral Peatlands case study area is to understand the impacts of the conservation status on the hydrological functioning of the peatlands.

Monitoring program

September 2024

- Field visits to assess sites and select monitoring locations
- Installation of monitoring stations across peatlands with different conservation states






Since late February 2025

- Continuous hydrological monitoring initiated
- Water levels, weather, and soil conditions recorded with sensors and stations
- Early results show strong fog influence on soil moisture
- Drone LiDAR and Sentinel-2 data integrated with field measurements
- Data supports multi-scale analysis and hydrological model development

Interpretation and analysis

The data collected in the study area is being integrated into the WP3 assessment framework of the SpongeBoost project to analyse sponge functioning in Atlantic peatland headwaters. Observed hydroclimatic events are being studied considering antecedent moisture conditions – including dry, normal and wet states – to examine how sponge functioning is expressed under real hydrological settings and different conservation trajectories in peatland catchments, providing an evidence-based foundation for sustainable management strategies aimed at restoring and preserving the sponge function of this landscape.



Technique	
 Rainfall	Rain gauge, data in mm
 Soil moisture	Sensors installed in 4 different depths
 Soil temperature	Sensors installed in 4 different depths
 Water flow	Flow indirect estimation, water level measurements and the discharge curve calibration
 Surface elevation	Drone flights

