

Greenhouse gas emissions during rewetting of formerly drained peat soil

AIM OF THE PROJECT

The Örebro Municipality is embarking on a groundbreaking mission to rewet a previously cultivated peat soil (Fig 1). Our primary objective is to investigate the subsequent impact on greenhouse gas (GHG) emissions and variations in water table levels. We will undertake systematic measurements before, during, and following the rewetting process to ensure accurate results over a longer interval.

BACKGROUND

GHG emissions from drained peat have received significant attention in recent years. Emissions from agricultural land on drained peat soil are considerably higher than most forested drained peatlands.

Additionally, much of the agricultural land on drained peat soil is still highly productive farmland. By rewetting this old agricultural peatland (Fig. 2), we expect the emissions of greenhouse gases from the area to significantly decrease. At the same time, an ecologically valuable environment will be created.

METHOD

Utilizing historical and contemporary GIS maps, we pinpointed the site previously used as agricultural land, specifically seeking abandoned peat fields. Before the 2024 rewetting, we conducted measurements 2022 to establish baseline data for GHG emissions and water table levels (Fig. 3). The ditch will be blocked (Fig. 4), and the water will be pumped into the area shown in Fig. (5).

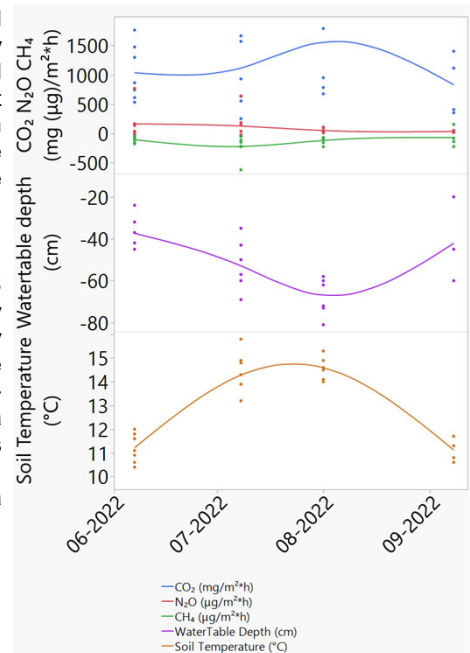


Figure 3. CO₂, N₂O and CH₄ emissions, water table depth and soil temperature 2022 before rewetting.



Figure 2. Historical orthophoto from 1975. The area is used as agricultural land.

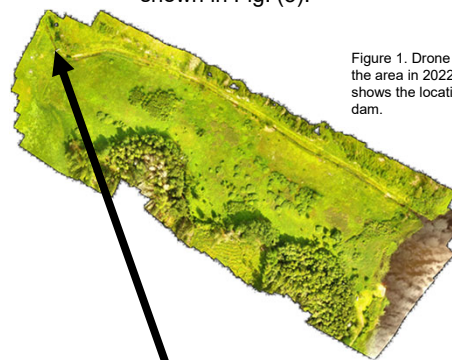


Figure 1. Drone photo over the area in 2022. Arrow shows the location of the dam.

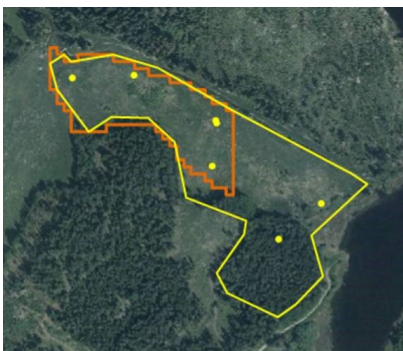


Figure 5. The area that will be rewetted (yellow line). The yellow dots show our measurement locations, and the orange line is the area found in the GIS analysis.



Figure 4. Dam to block the ditch and raise the water table.

RESULTS

The CO₂ emissions are comparable to actively cultivated peatlands and are highest during warm and dry periods in summer. N₂O is highest during the wet period, and CH₄ emissions are low or negative. After the rewetting, we can calculate the effect on GHG emissions.



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