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Legacy of drained northern landscapes: consequences of rewetting and ditch cleaning on hydrology and water quality .

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Drainage for forestry has created ~1 million km of artificial waterways in Sweden, making it one of the largest human-induced environmental disturbances in the country. These extensive modifications of both peatland and mineral soil dominated landscapes still carry largely unknown, but potentially enormous environmental legacy effects. However, the consequences of contemporary ditch management strategies, such as hydrological restoration via ditch blocking or enhancing forest drainage to promote biomass production via ditch cleaning, on water resources are unclear. To close the gap between science and management, we have developed a unique field research platform to experimentally evaluate key environmental strategies for drained northern landscapes with the aim to avoid further environmental degeneration. The Trollberget Experimental Area (TEA) includes replicated and controlled treatments applied at the catchment scale based on a BACI approach (before-after and control-impact). The treatments represent the dominant ecosystem types impacted by ditching in Sweden and the boreal zone: 1) rewetting of a drained peatland, 2) ditch cleaning in productive upland forests and 3) leaving these ditches unmanaged. Here we describe the TEA platform, report initial results, suggest ways forward for how to best manage this historical large-scale alteration of the boreal landscape, as well as warn against applying these treatments broadly before more long-term results are reported.