



Microbiome recovery in rewetted fens

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Many peatlands have been affected by water table drawdown and carbon loss. Rewetting may push a drained peatland back towards its pre-degradation state and may result in renewed carbon accumulation, but there is little consensus on its effectiveness. Moreover, rewetting typically leads to a spike in methane emissions. Whether rewetting suffices to restore drained peatlands hinges to a large extent on whether microbial communities, and the functions they perform, are able to recover. We studied prokaryote communities in fens across temperate Europe using high-throughput amplicon sequencing of 16S rRNA, within the framework of RePeat (REstoration and prognosis of PEAT formation in fens - linking diversity in plant functional traits to soil biological and biogeochemical processes 2016-2019; BiodiVERSA). We included undrained, drained and rewetted fens to evaluate the effects of fen rewetting on microbial recovery. Prokaryote communities were highly stratified with depth, and there was a clear division between communities of drained and undrained fens. Prokaryote communities in rewetted fens were largely similar to those of undrained fens, but only where soil organic matter contents and bulk densities were respectively still high and low. Our results suggest that altered physio-chemical peat properties following drainage may hamper complete prokaryote recovery after rewetting, at least in the short term.