



## **Evaluation of Past Land Use Practices in Peatlands Using Aerial Photos**

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Drainage, peat mining, agriculture and forestry have all negatively affected peatlands in much of Northern Europe. Information on past peatland change is needed to assess the consequences of intensive peatland use on catchment hydrology, runoff and water quality. However, comprehensive knowledge of historical development of peatland uses in Nordic countries is largely unknown at catchment scale. Aerial photos and remote sensing images enlarge the possibilities for identifying past land use changes in peatlands, by offering better spatial and temporal resolution. With this framework, our main objective is (1) to use aerial photos to demonstrate how historical land use changes are reflected in hydrology and water quality in Nordic watercourses. We aim (2) to make time series of historical land use changes that focus on drainage patterns and timing in peatlands and (3) to develop methodologies for using aerial photos to analyze past environmental change in peatland dominated catchments. The Simojoki river catchment (3160 sq.km), a forest dominated catchment having high peatland cover and intensive land use in peatlands in northern Finland, is used for studying historical land use changes. We analyze aerial photos of Simojoki catchment from 1952 to 2017 and combine analysis by using existing GIS databases. We mainly focus on peat areas (both shallow and deep), peatland uses and forestry practices in peatlands. We use this as initial platform and compare the current situation to past conditions using historical aerial photos. Analysis of these aerial photos lead to new insights about temporal patterns in peatland drainage and effects of historical land use changes on catchment hydrology. In addition, we focus on developing methods to evaluate different land use practices in peatlands from aerial photos. Recently “time since initial drainage” has been observed to effect on long-term trends in nitrogen (TN), phosphorus (TP) and dissolved organic carbon (DOC) in rivers and we further test this hypothesis. To conclude, analysis of historical peatland use changes by using aerial photos can explain historical variations in catchment hydrology, not only for specified catchment but also for larger scales.