

Climate Change and Water Extraction Impacts on North Australian Wetlands

Abstract

Wetlands provide vital ecosystem services at both local and regional scales. However, these environments are increasingly threatened by the effects of climate change and anthropogenic disturbances, i.e., through water extraction and changes to the hydrological cycle. We analyse the impacts of climate change and water extraction on wetlands and evaluate future changes through remote sensing time series and in-situ observations in northern Australia. The study will utilise random forest image classification and numerical modelling to quantify wetlands' dynamics and future connectivity conditions. The anticipated outcomes include a four-decade time-series analysis of wetland types, extent changes, and comparison with climatic variables in the Daly River basin, and to upscale this approach, to study 31 tropical savanna river basins in the Northern Territory. Results will be compared with existing regional-scale datasets. In a second step, the study aims to forecast connectivity changes in the wetland environments and flow conditions of three ecologically and culturally significant sites within the Daly River basin. This research will provide valuable insights into past, present, and future wetland dynamics and associated impacts on biodiversity and ecosystem services. These insights will be crucial for conveying and revising policies depending on climate change and water extraction intended to conserve and restore the Northern Territory's wetlands.