# LANDSAT TIME STACKS ENABLE DISCRIMINATION OF FORESTED WETLANDS AND UPLAND FORESTS

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**ABSTRACT:**

Successful conservation and management of wetlands requires up-to-date and accurate information on their properties and location. Forested wetlands are difficult to map because of their canopy cover, which prevents viewing of the soil saturation and topography beneath the canopy. Forested wetlands are extremely underrepresented in current wetland maps such as the National Wetland Inventory (NWI) in the United States, so improved detection is needed. A common approach in mapping wetlands is to compare a series of aerial photo or satellite images between seasons or across years. Time series data provide information on key aspects of hydrology and vegetation functions, such as seasonality, productivity and temporal variability that enhance discrimination between different land cover types. In this paper, we present a technique to characterize differences in spectro-temporal profile of forested uplands and wetlands using time series of Landsat data (1999-2012), multitemporal curve fitting, and Random forest classification. The results show that the temporal metrics derived from Landsat can accurately discriminate between forested upland and wetland (accuracy of 88.5%). The accuracy of temporal metrics derived from Normalized Difference Moisture Index (NDMI) was higher than the accuracy achieved by Normalized Difference Vegetation Index (NDVI) and Tasseled Cap Wetness index (TCW). Now that corrected Landsat data are available free of cost, the technique presented here can be easily implemented and tested in other areas.