Mapping and analysis of the riparian zone of the Indus River Basin, Pakistan

M. Ali and Q. Shahzad
National University of Science and Technology, Islamabad, Pakistan
mehreen13@igis.nust.edu.pk

Abstract

Riparian zones are one of the fifteen terrestrial biomes of the Earth. Riparian belts are found between land and a river acting as an interface between the two regions. These zones serve important ecological and environmental functions by preventing soil erosion, maintaining habitat biodiversity, creating a bio-filter for pollutant runoff into rivers and reducing flood damage. Riparian buffer zones act as transition areas between land and water which not only create wildlife corridors but also stabilize river banks and control water speed. Water temperature changes are minimized by the shade provided by the riparian vegetation. The vegetation in a riparian zone consists of forest woodland or wetlands mainly characterized by hydrophilic plants. Since riparian zones play a critical role in reducing flood damage and have several other environmental benefits, it is important to analyze the health of riparian belts along the Indus River in Pakistan following the recent floods of 2005 and 2010. The objectives of this research were to (1) analyze quantitatively the health of riparian vegetation, (2) study the wetland condition and (3) channel sinuosity. The research utilized digital image processing techniques to generate land cover maps from Landsat 7 and Landsat 8 imagery of the Indus between 2000 and 2010 and geographic information system (GIS) techniques to quantify the land cover that would fall within the buffer zones. The data was overlayed on topographic data obtained from Vmap to identify the surrounding settlements that could be at a greater risk of flood inundation in the absence of a healthy riparian belt.