WETLAND LOSS - AN ARTIFICIAL ENVIRONMENTAL DISASTER: A CASE STUDY OF OKEFENOKEE SWAMP

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The Okefenokee Swamp, located in the southeastern corner of Georgia, encompassing most of Charlton and Ware counties and parts of Brantley and Clinch counties, is the largest swamp in North America, and covers about 700 square miles. The swamp has more than 1,400 square miles of watershed, and about "85 percent of the water leaving the Okefenokee is carried by the Suwannee River to the Gulf Coast of Florida. The St. Mary's River, which flows into the Atlantic, drains the remainder of the swamp. Eroded soil moving out of the catchment area is deposited in the swamp converting the wetland into uplands. As wetlands are considered the kidney of the earth, its shrinking size is alarming for the earth's sustainable management. The Okefenokee Swamp's wetland has been receding in size over the past forty years. As a consequence of this lowland to upland conversion, several major fires have broken out in the swamp recently. In 2002, three fires collectively known as the Blackjack Bay Complex Fires burned more than 95,000 acres. The fire started by lightning and was allowed to burn in order to revitalize the swamp. Again, in 2007 a massive fire known as The Big Turnaround was raging in the swamp. The goal of the study was to analyze the wetland loss of the swamp over the years, determine the land cover changes inside the study area, and decipher the reasoning behind such dramatic changes to the wetland. Georgia GLUT and NLCD classified imageries were obtained for the years 1974, 1985, 1992, 2001, 2005, and 2011. The images were extracted to the study area mask. They were reclassified to obtained the wetland, agriculture, forest, water, and pasture classes. National Agricultural Imagery Program (NAIP) image tiles were obtained, mosaicked, masked to study area, and classified using unsupervised classification process. Reclassification and Plus tool of ArcGIS was used to complete multi-temporal change analysis of the study area over the years. The spatial land cover changes were mathematically calculated. It was observed that over the last 41 years, the swamp has lost more than 20% of its wetland. Most of them were converted to upland forest or pasture. Therefore, lighting induced wildfire has become a norm in the swamp. We also analyzed the total soil being eroded to the swamp through the development of a RUSLE based soil erosion model. It was found that the wetland conversion to upland is the consequence of severe soil erosion in the agricultural watershed that drains water into it. It became clear that human-induced cause along with some natural activities is diminishing the wetland coverage in this largest swamp in North America. This study would be a warning for environmental managers who deals with the swamp up-keeping.

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