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CLIMATE CHANGE, ENERGY SCARCITY, AND MISSISSIPPI DELTA RESTORATION

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ABSTRACT The Mississippi delta is the largest contiguous coastal ecosystem in the U.S. During the 20th century, there was a high rate of coastal wetland loss (up to 100 km2/yr) that was mainly attributable to levee construction along the Mississippi River, resulting in elimination of riverine input to most coastal wetlands, and pervasive hydrologic alterations within the delta due to navigation, drainage, canal construction for energy development-related infrastructure, and impoundments. These hydrologic changes resulted in saltwater intrusion, reduction of sheet flow hydrology, increased flooding of wetlands, and reduction of sediment input to marshes. Historically, the river and delta were managed mainly for navigation and flood control under a complicated array of federal, state, local government regulations. This often resulted in disorganized, contradictory, and ineffective management. Recognition of the severity of the wetland loss problem led to a growing effort to restore the delta. Initially, restoration efforts were focused on small scale, and often unrelated projects. More recently, there has been a realization that restoration must be a comprehensive, integrated effort based on natural functioning of the coast that fundamentally alters the way that people live and work in the coast. Hurricanes Katrina and Rita caused widespread damage to natural ecosystems and human infrastructure and led to the conclusion that effective storm protection is not possible without a restored coast. The Mississippi delta and other deltas worldwide began forming after sea level rise stabilized after the last glacial period. Sea level stabilization led to a massive increase in coastal margin productivity. The first development of civilizations worldwide occurred in the coastal margin, generally near large deltas like the Mississippi, within a millennia after sea level stabilization and seems to be related to high coastal margin productivity. During the 21st century, it is likely that climate will become more extreme and that energy will become scarce and expensive. Before the industrial revolution, human society was based on natural ecosystem productivity for thousands of years. During the coming period of energy scarcity, natural ecosystem productivity will again become relatively more important in supporting the human economy. The primary role of ecology during this period will be the restoration and sustainable management of natural ecosystems.

Keywords: Mississippi delta, Climate change, Energy.