

Understanding How Temperature and Precipitation Patterns Impact Coastal Wetland Ecosystems

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Coastal wetlands are one of the most economically valuable ecosystems in the world. In the United States, the ecosystem services provided by wetlands are worth billions of dollars and include flood protection, erosion control, seafood, water quality enhancement, carbon storage, recreation and wildlife habitat. Unfortunately, these ecosystems are also highly sensitive to changing climate conditions. Past research on climate impacts to coastal wetlands have concentrated primarily on

sea-level rise, largely ignoring the important influence of changing temperature and precipitation patterns. Understanding the impact of temperature and precipitation on coastal wetlands can help natural and cultural resource managers account for these factors when making decisions or developing adaptation plans.

This study, led by Dr. Michael Osland and colleagues at the USGS National Wetlands Research Center, advances our understanding of how temperature and precipitation influence coastal wetland ecosystems. It models the relationships between wetland plant community structure and climate in the northern Gulf of Mexico and identifies potential impacts of future climate conditions on these ecosystems. The researchers identify critical shifts are probable throughout the Gulf of Mexico within this century. In certain areas, small changes in temperature or rainfall are expected to trigger large ecological changes and affect certain ecosystem services. Because coastal wetland ecosystems in other parts of the world are also sensitive to changes in temperature and rainfall, the findings of this research have global implications, helping to inform the management of these highly valuable ecosystems into the future.

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