Sea-level rise in Miami-Dade County and its impact on urban and natural resources

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By 2100 projected sea level in Miami-Dade County will have: (1) inundated much of the barrier island and coastal wetlands, (2) seriously degraded freshwater availability in coastal counties, and (3) modified the coastal climate. This rise will also result in unique ecological problems as the region's natural resources respond to relatively rapid and widespread flooding.

In order to better understand the impact of sea-level rise in the Miami-Dade County area, detailed maps of the region's coastal topography were constructed and then "flooded" at one foot intervals to sea level heights projected by the Intergovernmental Panel on Climate Change. The impact of each flooding scenario on urban and natural resources was then evaluated.

Two sea-level elevations were identified as critical "nick points" that trigger rapid and widespread flooding. The first nick point is only +2 ft above present sea level and accompanied by a sequence of events which will ultimately result in the loss of the Miami Beach barrier island system. At a nick point of about +6 ft, a very plausible height under even the most conservative sea level-rise models, only the highest mainland elevations on the Atlantic Coastal Ridge will remain above sea level, while the vast majority of urbanized areas and associated ecosystems will be under water.

Coastal managers must acknowledge sea-level rise as eminent and formulate adaptive management strategies or strategic withdrawal strategies if adaptation is not possible. These management strategies must be implemented early to ensure the transition towards 2100 is economically and ecologically sound. Undoubtedly, attempts to implement these strategies will be complicated by local politics; a desire to save specific properties like exclusive beach developments, public landfills, nuclear power stations.