

Beaches and Wetlands

Beaches, dunes, islands and marshes line Rhode Island's 420-miles of shoreline. From urban marshes to undeveloped beaches, the shoreline is subject to changes, both natural and human-caused. These coastal features provide numerous benefits to the Ocean State, including tourism, recreation, fish and wildlife habitat, and storm buffers.

Habitat Vulnerability: Impacts of Climate Change

Tidal marshes, beaches and dunes are already under great pressure from human development and activity. Climate change is an added stressor with potential for greater impacts.

Intertidal habitats appear to be highly sensitive to even relatively modest sea level rise scenarios. The long-term effects of sea level rise may result in the conversion of habitat types. These changes are projected to increase in magnitude under higher sea level rise scenarios, where Rhode Island may experience three-to-five feet of sea level rise by 2100. Different habitat types are projected to have varying rates of change with some expanding in extent and others shrinking. It is likely that in the absence of human intervention, land that is currently intertidal will become sub-tidal as sea levels rises, resulting in an increase in open water and loss of tidal flats. Salt marshes could move inland replacing brackish marshes as inundation and salinity gradients shift landward. There are also indications that sea level rise could result in a conversion of salt marsh to open water where rising sea level rapidly alters marsh drainage patterns and the rate of sea level rise outpaces marsh accretion rates.

Beaches and dunes on coastal barriers naturally move landward (if unimpeded by development) as sea level rise and storms cause overwash of sediments. These areas are highly susceptible to erosion and may be more significantly impacted as the frequency and intensity of storms increase. This would further impact a number of state and federally threatened plant, bird and turtle species in Rhode Island, as well as the economic and recreational value of the state's beaches. Beachfront development will be more susceptible to damage as erosion increases.

Summary of Climate Sensitivity:

Beaches, dunes, offshore islands, intertidal flats and tidal marshes are very sensitive to the impacts of sea level rise, inundation and erosion. As sea level increases, certain habitats will shift and migrate landward. Habitats will tend to convert to adjacent forms (intertidal flats become sub-tidal, freshwater marsh becomes brackish or salt marsh). Tidal marshes will come under increasing stress with sea level rise; if the upland areas are developed or unsuitable for marshes to migrate will be lost. If the rate of sea level rise is too rapid or sediment sources are cut off, accretion on the marsh may not be able to keep up with the change. Beaches and dunes are vulnerable to storm surge inundation and erosion associated with increased storm intensity causing changes in profile and may impact its role as a natural protection for the back shore.



Varied shoreland habitats at Napatree Point