

ASSATEAGUE ISLAND NATIONAL SEASHORE

Implications of Global Climate Change

The natural environment of Assateague Island National Seashore (ASIS) is expected to become less stable under most climate change projections. Driven by increasing rates of sea level rise, more intense and possibly more frequent storms, the island will experience an increased likelihood for erosion, overwash, inlet breaching, shoreline retreat and island narrowing. Should the highest rates of projected sea level rise occur, the island may exceed stability thresholds, resulting in rapid migration landward, segmentation, and possibly disintegration.

Accelerated landscape dynamics will drive changes in the biotic and abiotic factors influencing the distribution and abundance of existing island habitats. Habitat diversity is expected to decrease, with a trend towards plant species and communities able to tolerate greater and more frequent disturbance from stressors such as sediment movement and salt water inundation. Those community types requiring more stable conditions, such as the island's maritime forests, are likely to decline. Although systems are expected to simplify with a concurrent loss of overall biodiversity, some species will likely benefit, such as shorebirds and other beach-dwelling plants and wildlife.

The stresses from a more dynamic physical landscape will be exacerbated by anticipated changes in ambient temperature and precipitation patterns. Although projections regarding overall precipitation are mixed, most suggest that seasonal patterns of rainfall will change, that rainfall will occur in more intense events, and that summer droughts will become more frequent and long lived. In conjunction with potential impacts to the surficial aquifer from saltwater inundation and a loss of land mass, the island's freshwater systems will likely be affected; particularly during summer months. The resulting potential that freshwater habitats may deteriorate threatens a suite of dependant wildlife such as amphibians and waterfowl, and even the island's world famous horses.

Assateague's other dominant wetland habitat, tidal salt marsh, is also at significant risk from the effects of climate change. Increased rates of sea level rise coupled with a more dynamic landform has the potential to overwhelm the ability of intertidal marshes to maintain surface elevations and keep pace with rising seas. Significant loss of salt marsh will decrease primary productivity and reduce habitat availability for both terrestrial and aquatic species; some of which are important to regional commercial fisheries.

Rising temperatures and summer drought are also expected to worsen conditions in the estuary formed by Assateague Island by stimulating algal production and increasing anoxia. Estuarine resources already stressed by excess nutrient loading from land uses and development in the mainland watershed are particularly vulnerable. Temperature sensitive aquatic grass species like *Zostera maritima* are likely to decline; a loss that could stimulate wholesale ecological change.

From a visitor use perspective, the more dynamic barrier island landform expected under most climate change projections will challenge the ability of the NPS to provide recreational access and opportunities in traditional ways. Rapid rates of shore retreat and storm driven overwash will make fixed location infrastructure such as roads, parking lots and visitor use facilities increasingly more difficult and costly to maintain. New ways of providing sustainable access and infrastructure are needed to protect visitor use opportunities in the face of climate change. Some of these adaptive measures are currently being demonstrated at ASIS, including low impact road and parking lot construction techniques, and mobile visitor use facilities that can be easily removed from harms way prior to storms. Other potential options include the relocation of infrastructure such as parking lots and campgrounds to the adjacent mainland, and the use of alternative transportation systems.