

# Regional Highlights from Global Climate Change Impacts in the United States

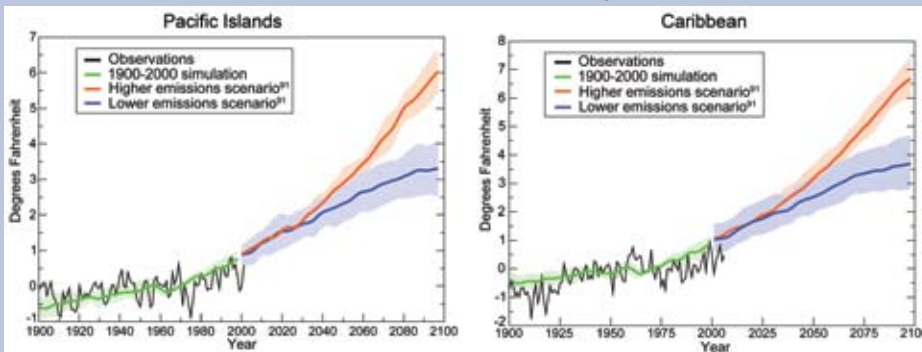
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## Islands

Climate change presents U.S.-affiliated islands with unique challenges. Small islands are vulnerable to sea-level rise, coastal erosion, extreme weather events, coral reef bleaching, ocean acidification, and contamination of freshwater resources with saltwater. The

islands have experienced rising temperatures and sea level in recent decades. Projections for the rest of this century suggest continued increases in air and ocean surface temperatures in both the Pacific and Caribbean, an overall decrease in rainfall in the Caribbean, an increased frequency of heavy downpours nearly everywhere, and increased rainfall during the summer months (rather than the normal rainy season in the winter months) for the Pacific islands. Hurricane wind speeds and rainfall rates are likely to

Air Temperature Change, Observed and Projected, 1900 to 2100 relative to 1960-1979 average



Air temperatures have increased and larger increases are projected in the future, with higher emissions scenarios producing considerably greater increases. The shaded areas show the likely ranges while the lines show the central projections from a set of climate models.

increase with continued warming. Island coasts will be at increased risk of inundation due to sea-level rise and storm surge with major implications for coastal communities, infrastructure, natural habitats, and resources.

**A note on the emissions scenarios:** None of the emissions scenarios used in this report include any policies specifically designed to address climate change. All, including the lower emissions scenario, lead to increases in heat-trapping gas emissions for at least the next few decades, though at different rates.

## Key Issues

**Island communities, infrastructure, and ecosystems are vulnerable to coastal inundation due to sea-level rise and coastal storms.**

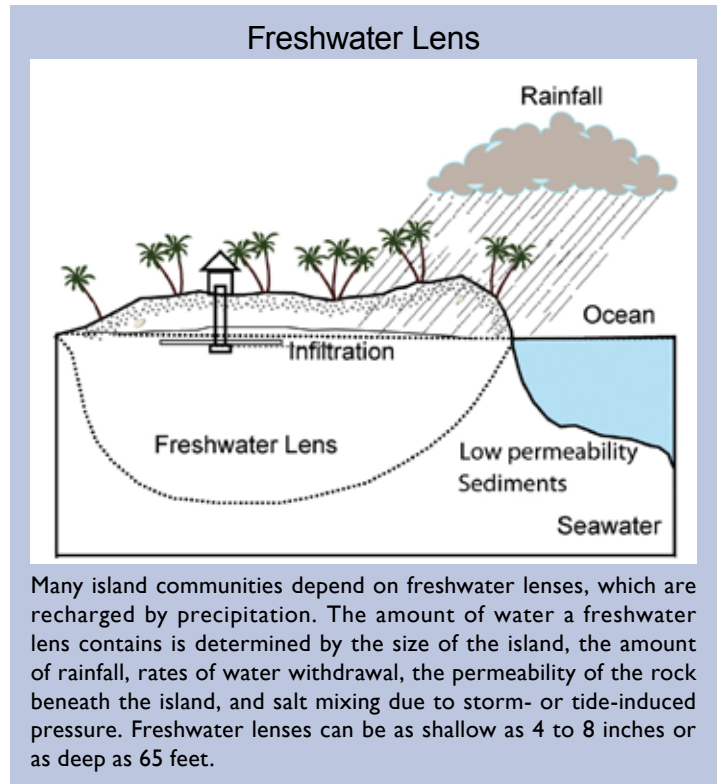
Flooding will become more frequent and coastal land will be permanently lost as the sea inundates low-lying areas and the shorelines erode. Loss of land will affect living things in coastal ecosystems. For example, the Northwestern Hawaiian Islands, which are low-lying and therefore at great risk from rising sea level, have a high concentration of threatened and endangered species, some of which exist nowhere else. Hurricanes and other storm events cause major impacts to island communities including loss of life, damage to infrastructure and other property, and contamination of freshwater supplies. With further warming, hurricane and typhoon peak wind intensities and rainfall are likely to increase, which, combined with sea-level rise, would cause higher storm surge levels.



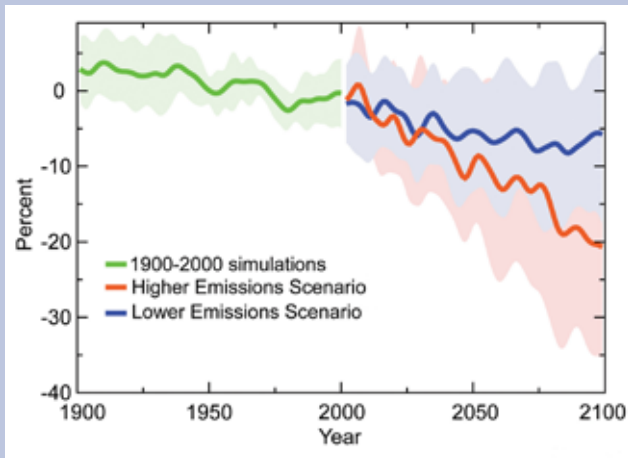
Coastal houses and an airport in the U.S.-affiliated Federated States of Micronesia rely on mangroves' protection from erosion and damage due to rising sea level, waves, storm surges, and wind.

**The availability of freshwater is likely to be reduced, with significant implications for island communities, economies, and resources.**

Most island communities in the Pacific and Caribbean have limited sources of freshwater. Many islands depend on freshwater lenses below the surface, which are recharged by precipitation. Changes in precipitation, such as the significant decreases projected for the Caribbean, are thus a cause of great concern. Sea-level rise also affects island water supplies by causing salt water to contaminate the freshwater lens and by causing an increased frequency of flooding due to storm high tides. Water pollution (such as from agriculture or sewage), exacerbated by storms and floods, can contaminate freshwater supplies, affecting public health.



**Caribbean Precipitation Change  
1900 to 2100**



Total annual precipitation has declined in the Caribbean and climate models project stronger declines in the future, particularly under higher emission scenarios. Such decreases threaten island communities that rely on rainfall for replenishing their freshwater supplies.

**Climate changes affecting coastal and marine ecosystems will have major implications for tourism and fisheries.**

Coral reefs are particularly sensitive to the impacts of climate change as even small increases in water temperature can cause coral bleaching. Ocean acidification due to rising carbon dioxide levels poses an additional threat to coral reefs and rich ecosystems they support. Fisheries feed island people and island economies. Nearly 70 percent of the world's annual tuna harvest comes from the Pacific Ocean. Climate change is projected to cause a decline in tuna stocks and an eastward shift in their location.



The full report, including references for the material above, can be found online at:  
[www.globalchange.gov/usimpacts](http://www.globalchange.gov/usimpacts)

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