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EPA United States Environmental Protection Agency

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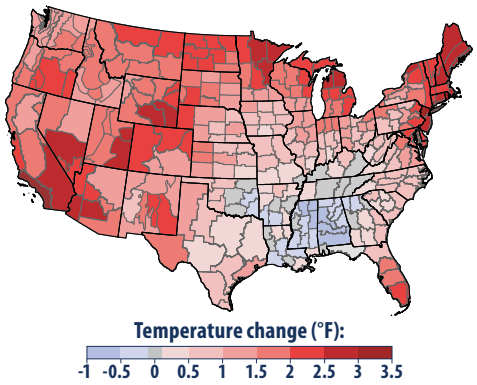
What Climate Change Means for Georgia

In the coming decades, **Georgia** will become warmer, and the state will probably experience more severe floods and drought. Even today, more rain is falling in heavy downpours, and sea level is rising about one inch every decade. Higher water levels are eroding beaches, submerging low lands, and exacerbating coastal flooding. Like other southeastern states, Georgia has warmed less than most of the nation during the last century. But during the next few decades, the changing climate is likely to harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40 percent since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree (F) during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years. Warming is causing snow to melt earlier in spring, and mountain glaciers are retreating. Even the great ice sheets on Greenland and Antarctica are shrinking. Thus the sea is rising at an increasing rate.



Rising temperatures in the last century. Georgia has warmed less than most of the United States. Source: EPA, Climate Change Indicators in the United States.

Rising Seas and Retreating Shores

Sea level is rising more rapidly in Georgia than along most coasts because the land is sinking. If the oceans and atmosphere continue to warm, sea level is likely to rise one to four feet in the next century along the coast of Georgia. Rising sea level submerges wetlands and dry land, erodes beaches, and exacerbates coastal flooding.

Coastal Storms, Homes, and Infrastructure

Tropical storms and hurricanes have become more intense during the past 20 years. Although warming oceans provide these storms with more potential energy, scientists are not sure whether the recent intensification reflects a long-term trend. Nevertheless, hurricane wind speeds and rainfall rates are likely to increase as the climate continues to warm.

Whether or not storms become more intense, coastal homes and infrastructure will flood more often as sea level rises, because storm surges will become higher as well. Rising sea level is likely to increase flood insurance rates, while more frequent storms could increase the deductible for wind damage in homeowner insurance policies. Parts of Savannah and Brunswick are vulnerable to coastal flooding, which is likely to become more severe as sea level rises.

Water Resources, Flooding, and Drought

Changing the climate is likely to increase the severity of both inland flooding and droughts. Since 1958, the amount of precipitation falling during heavy rainstorms has increased by 27 percent in the Southeast, and the trend toward increasingly heavy rainstorms is likely to continue.

Rising temperatures are likely to increase the demand for water but make it less available. Warmer temperatures increase the rate at which water evaporates (or transpires) into the air from soils, plants, and surface waters. Because irrigated farmland would need more water, the total demand for water is likely to increase 10 to 50 percent during the

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A drought in 2007 lowered water levels in Lake Lanier, which threatened metropolitan Atlanta's water supply and interfered with recreational activities. Droughts could become more severe as the climate warms. Credit: Bill Kinsland, National Weather Service.

next half century. But the amount of available water is likely to decrease, and soils are likely to become drier in most of the state, except along the coast.

As temperatures rise, less water is likely to flow into the Chattahoochee and other major rivers. Decreased river flows can lower the water level in Lake Lanier and other reservoirs, which may limit municipal water supplies for Atlanta and other cities. Lower water levels may also impair ecosystems, swimming, and other recreational activities, and reduce hydroelectric power generation.

Agriculture and Forest Resources

Changing the climate will have both harmful and beneficial effects on farming. Although hotter temperatures alone would tend to depress crop yields, higher concentrations of atmospheric carbon dioxide increase yields, and that fertilizing effect is likely to offset the harmful effects of heat on cotton, peanuts, soybeans, and wheat—if adequate water is available. More severe droughts, however, could cause crop failures. Higher temperatures are likely to reduce livestock productivity, because heat stress disrupts the animals' metabolism.

Warmer temperatures and changes in rainfall are unlikely to substantially reduce forest cover in Georgia, although the composition of trees in the forests may change. More droughts would reduce forest productivity, and climate change is also likely to increase the damage from insects and disease. But longer growing seasons and increased carbon dioxide concentrations could more than offset the losses from those factors. Forests cover about half of the state, with oak-pine forests common in the north, loblolly-shortleaf pine forests common in the center, and longleaf-slash pine forests common in the south. Changing the climate may enable oak-pine forests to become the most common forest type throughout the state.

Human Health

Hot days can be unhealthy—even dangerous. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. High air temperatures can cause heat stroke and dehydration and affect people's cardiovascular and nervous systems. Seventy years from now, most of Georgia is likely to have 45 to 75 days per year with temperatures above 95°F, compared with about 15 to 30 such days today.

Warmer air can also increase the formation of ground-level ozone, a key component of smog. Ozone has a variety of health effects, aggravates lung diseases such as asthma, and increases the risk of premature death from heart or lung disease. EPA and the Georgia Environmental Protection Division have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will be more difficult.

In large metropolitan areas like Atlanta, buildings and paved surfaces create an "urban heat island" that raises temperatures above surrounding areas and can worsen the health impacts of a heat wave. Stock photo.

The sources of information about climate and the impacts of climate change in this publication are: the national climate assessments by the U.S. Global Change Research Program, synthesis and assessment products by the U.S. Climate Change Science Program, assessment reports by the Intergovernmental Panel on Climate Change, and EPA's *Climate Change Indicators in the United States*. Mention of a particular season, location, species, or any other aspect of an impact does not imply anything about the likelihood or importance of aspects that are not mentioned. For more information about climate change science, impacts, responses, and what you can do, visit EPA's Climate Change website at www.epa.gov/climatechange.