

KEY FINDINGS

1. Global warming is unequivocal and primarily human-induced.

Global temperature has increased over the past 50 years. This observed increase is due primarily to human-induced emissions of heat-trapping gases.

2. Climate changes are underway in the United States and are projected to grow.

Climate-related changes are already observed in the United States and its coastal waters. These include increases in heavy downpours, rising temperature and sea level, rapidly retreating glaciers, thawing permafrost, lengthening growing seasons, lengthening ice-free seasons in the ocean and on lakes and rivers, earlier snowmelt, and alterations in river flows. These changes are projected to grow.

3. Widespread climate-related impacts are occurring now and are expected to increase.

Climate changes are already affecting water, energy, transportation, agriculture, ecosystems, and health. These impacts are different from region to region and will grow under projected climate change.

4. Climate change will stress water resources.

Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many regions, especially in the West. Floods and water quality problems are likely to be amplified by climate change in most regions. Declines

in mountain snowpack are important in the West and Alaska where snowpack provides vital natural water storage.

5. Crop and livestock production will be increasingly challenged.

Agriculture is considered one of the sectors most adaptable to changes in climate. However, increased heat, pests, water stress, diseases, and weather extremes will pose adaptation challenges for crop and livestock production.

6. Coastal areas are at increasing risk from sea-level rise and storm surge.

Sea-level rise and storm surge place many U.S. coastal areas at increasing risk of erosion and flooding, especially along the Atlantic and Gulf Coasts, Pacific Islands, and parts of Alaska. Energy and transportation infrastructure and other property in coastal areas are very likely to be adversely affected.

7. Threats to human health will increase.

Health impacts of climate change are related to heat stress, waterborne diseases, poor air quality, extreme weather events, and diseases transmitted by insects and rodents. Robust public health infrastructure can reduce the potential for negative impacts.

8. Climate change will interact with many social and environmental stresses.

Climate change will combine with pollution, population growth, overuse of resources, urbanization, and other social, economic, and environmental stresses to create larger

impacts than from any of these factors alone.

9. Thresholds will be crossed, leading to large changes in climate and ecosystems.

There are a variety of thresholds in the climate system and ecosystems. These thresholds determine, for example, the presence of sea ice and permafrost, and the survival of species, from fish to insect pests, with implications for society. With further climate change, the crossing of additional thresholds is expected.

10. Future climate change and its impacts depend on choices made today.

The amount and rate of future climate change depend primarily on current and future human-caused emissions of heat-trapping gases and airborne particles. Responses involve reducing emissions to limit future warming, and adapting to the changes that are unavoidable.