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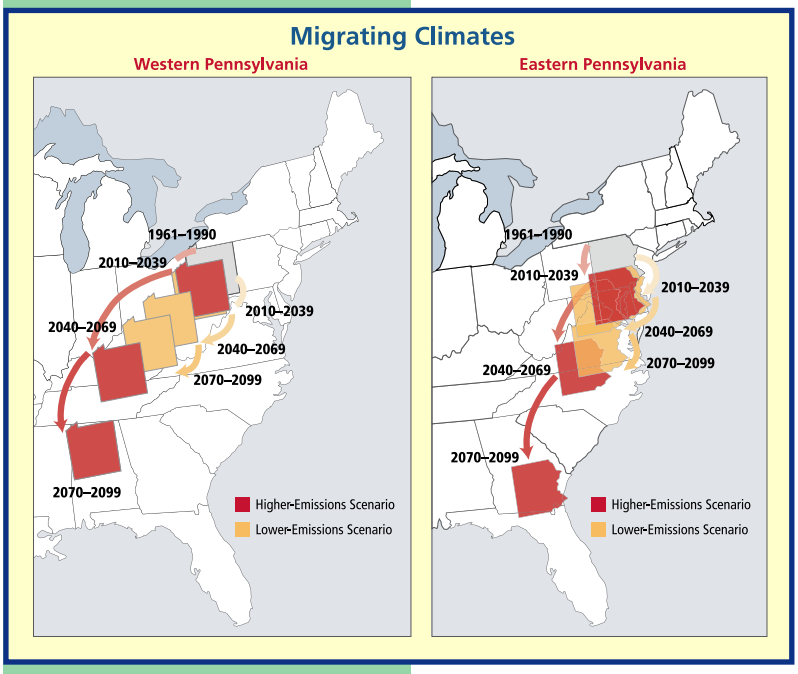
Climate Change & Natural Resources in Pennsylvania

Observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide-ranging consequences for human societies and ecosystems (IPCC 2007).

Map courtesy of Union of Concerned Scientists, 2008.



Changes in average summer "heat index" — a measure of how hot it actually feels with a given combination of temperature and humidity — could strongly affect quality of life for residents of Pennsylvania in the future. Red arrows track what summers could feel like over the course of the century in western and eastern Pennsylvania under the higher-emissions scenario. Yellow arrows track what the summers could feel like under the lower-emissions scenario.

Photo courtesy of Pennsylvania Department of Environmental Protection.

What is Climate Change?

The Earth's climate has changed naturally throughout history. But a new type of climate change is altering the environment at an alarming rate. The climate is now warming so rapidly that some of its effects can be noticed within a single human lifetime. Scientists are largely convinced that human activity, primarily the burning of fossil fuels, is responsible. Gasses such as water vapor and carbon dioxide (CO_2) act like blankets, trapping heat and keeping the earth warm. These gasses can persist in the atmosphere for decades or even centuries. Global warming is already making a mark on the landscape, livelihoods, and traditions of Pennsylvania, and these impacts are expected to grow more substantial over the next several decades.

Climate Changes in Pennsylvania

Weather

Temperature

In general, Pennsylvania's climate will grow warmer and drier. Average daily temperature is expected to increase about 2.5°F across Pennsylvania over the next several decades (2010 – 2039). A typical Pennsylvania winter may become increasingly rare. Historically, three-quarters of Pennsylvania experiences 30 or more days of snow in the winter season. These areas with such snow cover are projected to shrink by roughly half as winter temperatures increase 8-12 degrees by the end of the 21st century (Union of Concerned Scientists 2008).

Precipitation

Precipitation is expected to increase statewide by more than five percent; however, while there will be an increase in the frequency of extreme events such as heavy rainstorms, the state may grow drier overall and experience more drought because rainfall will not compensate for the drying effects of a warmer climate (Union of Concerned Scientists 2008). Precipitation will also change seasonally, with less precipitation in the summer and more in the winter.

Water Supply & Pollution

Pennsylvania depends on groundwater, freshwater from Lake Erie, and on rainfall for agriculture, drinking water supply, mining, and industry. Lake levels, including Lake Erie and inland lakes are expected to decline as more moisture evaporates due to warmer temperatures and less ice cover. Reduced rainfall is likely to diminish the recharge of groundwater as well as cause small streams to dry up, reducing the area of wetlands, resulting in poorer water quality and fewer habitats for wildlife. Pennsylvania's wetlands are threatened by earlier spring runoff, more intense flooding, and lower summer water levels. Climate change along with development may also alter the flood-absorbing capacities of natural wetlands and floodplains. This could result in increased erosion, flooding, and runoff polluted with nutrients and pesticides.

Climate Change

Photo courtesy of NOAA.

Native & Invasive Species

Climate change will have several effects on native species in Pennsylvania. The range of warm-water fish such as smallmouth bass or bluegill is likely to expand, while cold-water species including brook trout, the state fish, may disappear from some parts of the region. Altered stream flows, higher water temperatures, and diminished shade along stream banks may cause populations which are sensitive to changes, such as brook trout and smallmouth bass to decline. Native species shifting in range also bear the risk of becoming invasive in new locations.

The effects of climate change on invasive species are not well understood and will vary regionally. Warmer climates may create opportunities for invasion in some areas, and make habitat unsuitable in other areas. Species that were once restricted by colder temperatures may shift in range as winter temperatures become milder allowing overwintering.

Human Health

Statewide, there will be increases in the number of extremely hot days over the coming century, especially if emissions of greenhouse gasses remain high. These warmer temperatures increase the risk for some waterborne infectious diseases to become more widespread. Future changes in temperatures and rainfall could also encourage greater reproduction and survival of disease-carrying insects.

The Economy

More frequent rain events could threaten Pennsylvania infrastructure, forcing municipalities to upgrade water-related structures such as wastewater treatment plants. Pennsylvania's forests, hills, lakes, rivers, and streams offer a wide range of recreational and tourist attractions. Anglers on Lake Erie and inland lakes will be negatively impacted by loss of habitat and decreases of their preferred catch, and winter sports enthusiasts will see decreases in snowfall for activities such as skiing and snowmobiling.

Tips to Reduce your Emissions

- Drive less and walk, bike, take the bus, or carpool more often
- Use energy more efficiently at home
- Buy locally grown and produced foods
- Recycle

Photo courtesy of Ohio Sea Grant.

Photo courtesy of Sara Grisé, Pennsylvania Sea Grant.

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