



Length of Growing

This indicator measures the length of the growing season in the lower 48 states.

Background

The length of the growing season in any given region represents the number of days when plant growth takes place. The growing season often determines which crops can be grown in an area, as some crops require long growing seasons, while others mature rapidly. Growing season length is limited by many different factors. Depending on the region and the climate, the growing season is influenced by air temperatures, frost days, rainfall, or daylight hours.

Changes in the length of the growing season can have both positive and negative effects. Moderate warming can benefit crop and pasture yields in mid- to high-latitude regions, yet even slight warming decreases yields in seasonally dry and low-latitude regions.⁴ A longer growing season could allow farmers to diversify crops or have multiple harvests from the same plot. However, it could also limit the types of crops grown, encourage invasive species or weed growth, or strain water supplies. A longer growing season could also disrupt the function and structure of a region's ecosystems, and could, for example, alter the range and types of animal species in the area.

About the Indicator

This indicator looks at the length of the growing season in the lower 48 states, as well as trends in the timing of spring and fall frosts. For this indicator, the length of the growing season is defined as the period of time between the last frost of spring and the first frost of fall, when the air temperature drops below the freezing point of 32°F.

Trends in the growing season were calculated using temperature data from 794 weather stations throughout the lower 48 states. These data were obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center. Growing season length and the timing of spring and fall frosts were averaged spatially, then compared with a long-term average to determine the deviation from "normal" in any given year.

Figure 1. Length of Growing Season in the Lower 48 States, 1900–2002

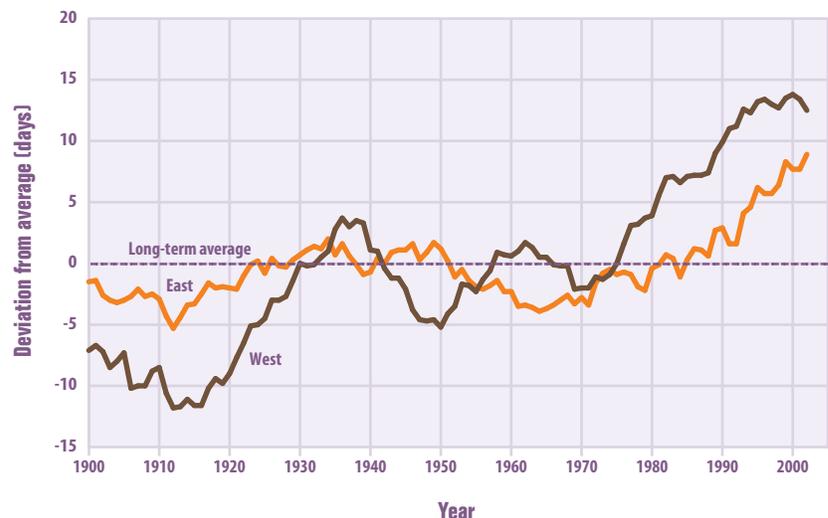
This figure shows the length of the growing season in the lower 48 states compared with a long-term average. For each year, the line represents the number of days shorter or longer than average. The trend line was smoothed using an 11-year moving average. Choosing a different long-term average for comparison would not change the shape of the trend.



Data source: Kunkel, 2009⁵

Figure 2. Length of Growing Season in the Lower 48 States, 1900–2002: West Versus East

This figure shows the length of the growing season in the western and eastern United States compared with a long-term average. The trend line was smoothed using an 11-year moving average. Choosing a different long-term average for comparison would not change the shape of the trends.



Data source: Kunkel, 2009⁶

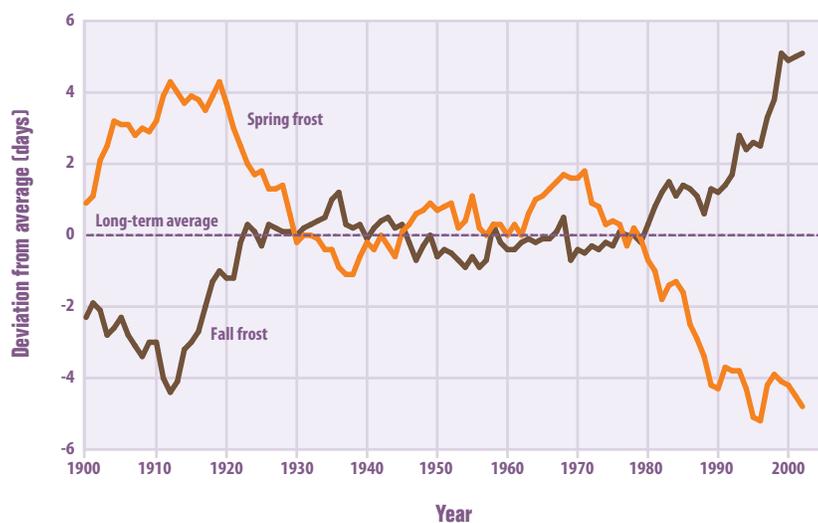
Season

Key Points

- The average length of the growing season in the lower 48 states has increased by about two weeks since the beginning of the 20th century. A particularly large and steady increase occurred over the last 30 years (see Figure 1).
- The length of the growing season has increased more rapidly in the West than in the East. In the West, the length of the growing season has increased at an average rate of about 20 days per century since 1900, compared with a rate of about six days per century in the East (see Figure 2).
- The final spring frost is now occurring earlier than at any point since 1900, and the first fall frosts are arriving later. Since 1985, the last spring frost has arrived an average of about four days earlier than the long-term average, and the first fall frost has arrived about three days later (see Figure 3).

Figure 3. Timing of Last Spring Frost and First Fall Frost in the Lower 48 States, 1900–2002

This figure shows the timing of the last spring frost and the first fall frost in the lower 48 states compared with a long-term average. Positive values indicate that the frost occurred later in the year, and negative values indicate that the frost occurred earlier in the year. The trend lines were smoothed using an 11-year moving average. Choosing a different long-term average for comparison would not change the shape of the trends.



Data source: Kunkel, 2009⁷

Indicator Limitations

Changes in measurement techniques and instruments over time can affect trends. However, these data were carefully reviewed for quality, and values that appeared invalid were not included in the indicator. This indicator only includes weather stations that did not have many missing data points.

Data Sources

All three figures are based on data compiled by the National Oceanic and Atmospheric Administration's National Climatic Data Center, and these data are available online at: www.ncdc.noaa.gov/oa/ncdc.html. Trends were analyzed by Kunkel (2009).⁸

