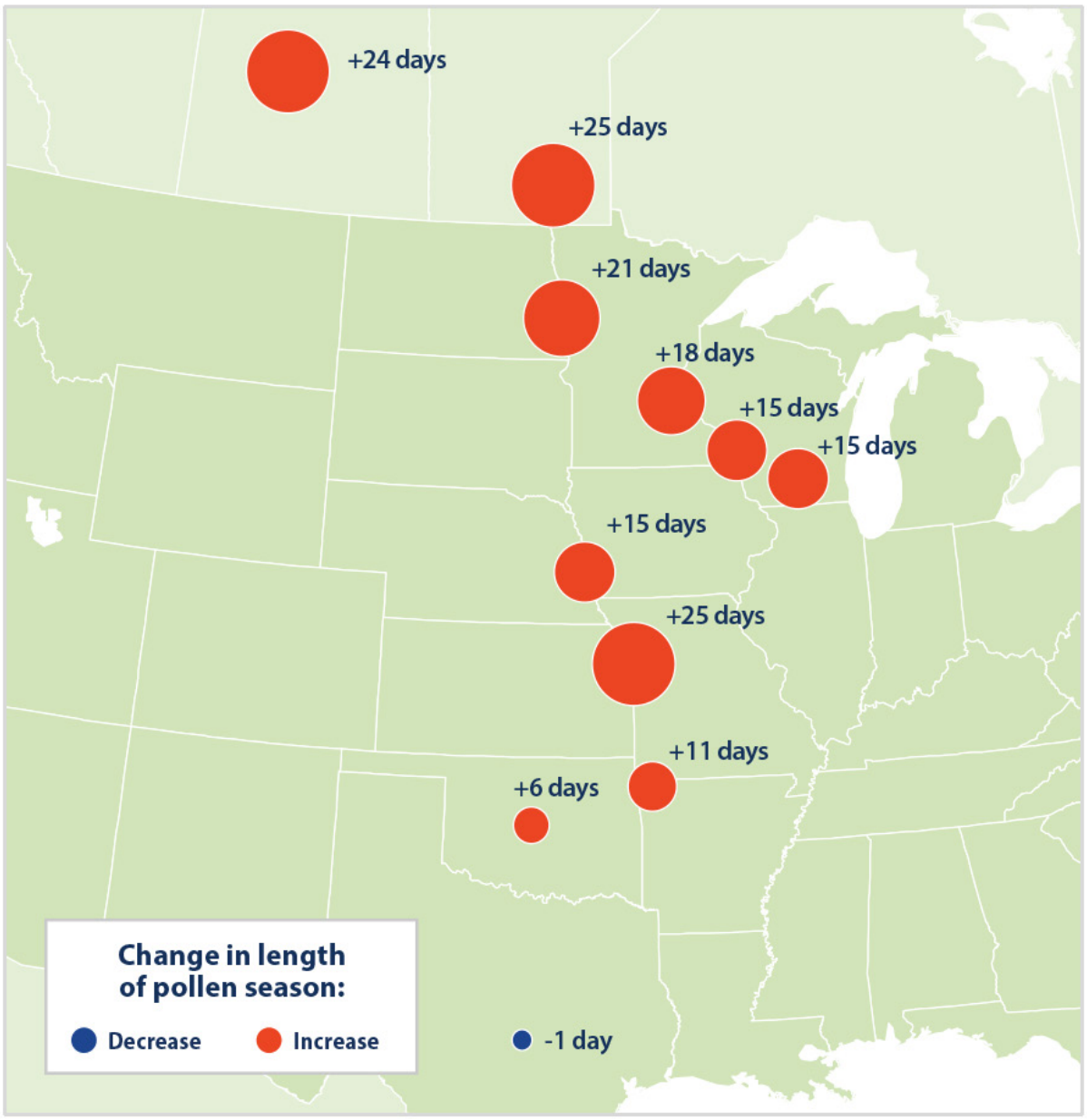
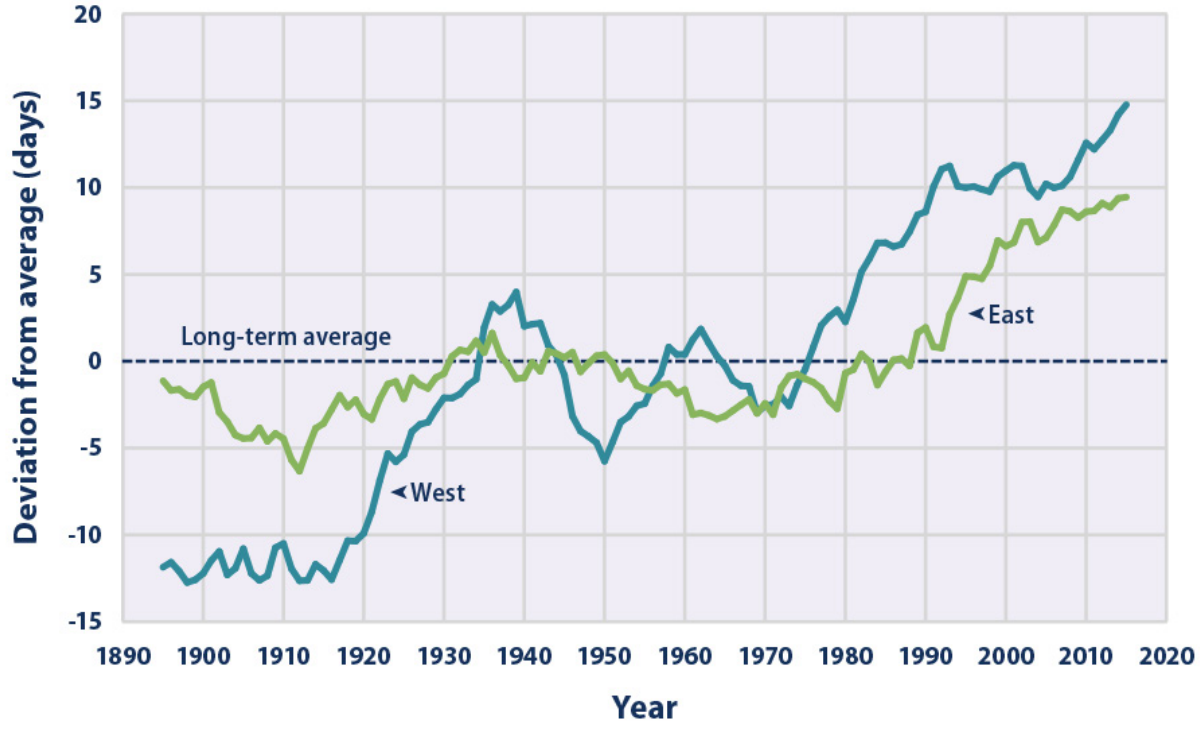
Figure 1. Change in Ragweed Pollen Season, 1995–2015



This figure shows how the length of ragweed pollen season changed at 11 locations in the central United States and Canada between 1995 and 2015. Red circles represent a longer pollen season; the blue circle represents a shorter season. Larger circles indicate larger changes.

Data source: Ziska et al., 2016[8]

Figure 2. Length of Growing Season in the Contiguous 48 States, 1895–2015: 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. For each year, the line represents the number of days shorter or longer than average. The lines were smoothed using an 11-year moving average. Choosing a different long-term average for comparison would not change the shape of the data over time.

Data source: Kunkel, 2016[3]

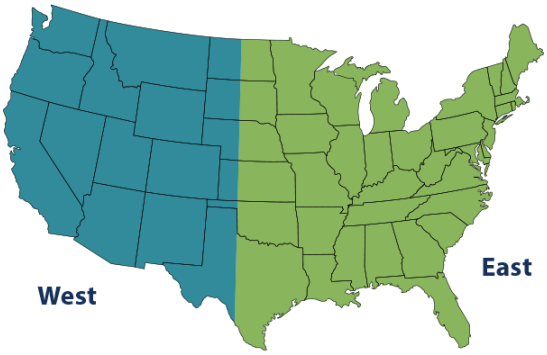
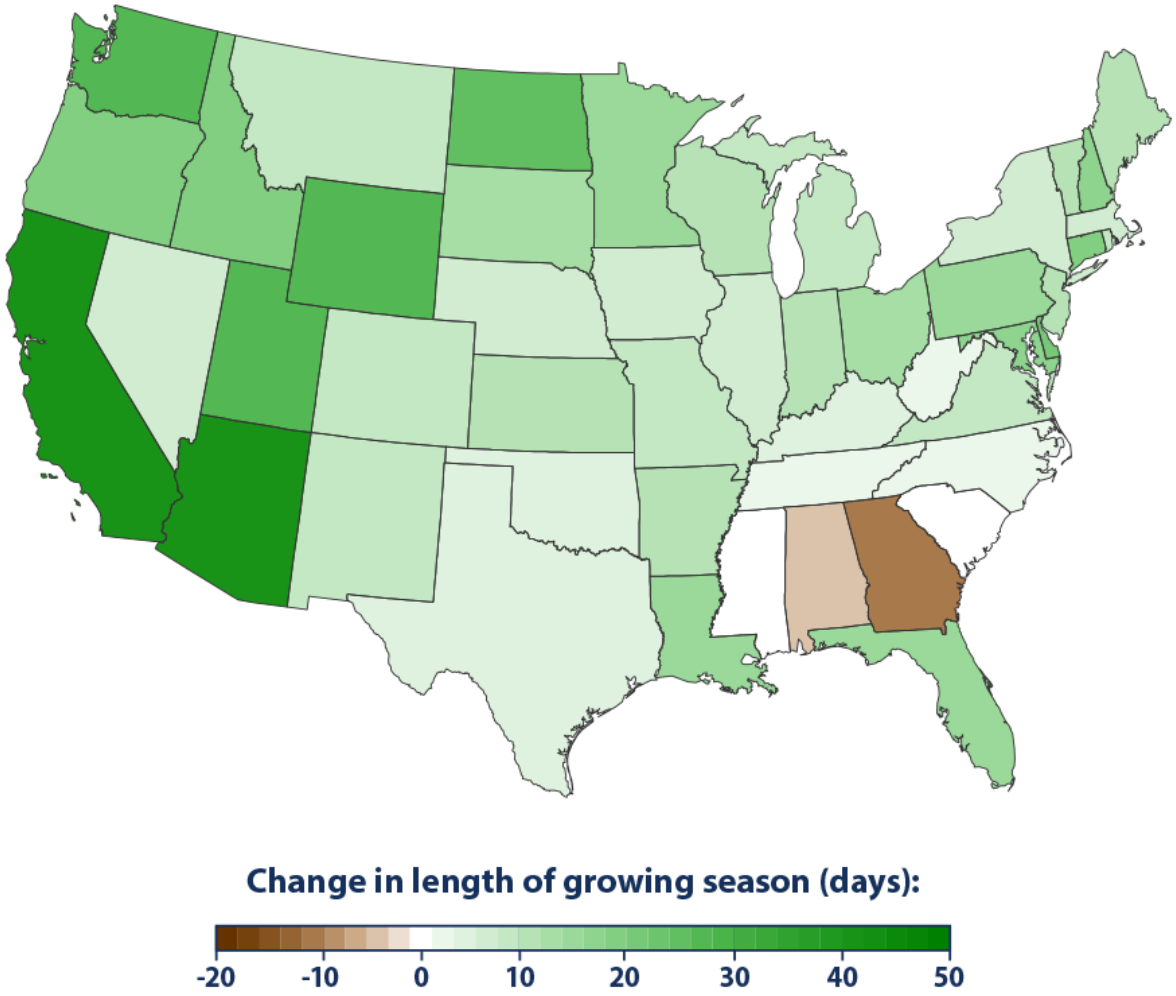


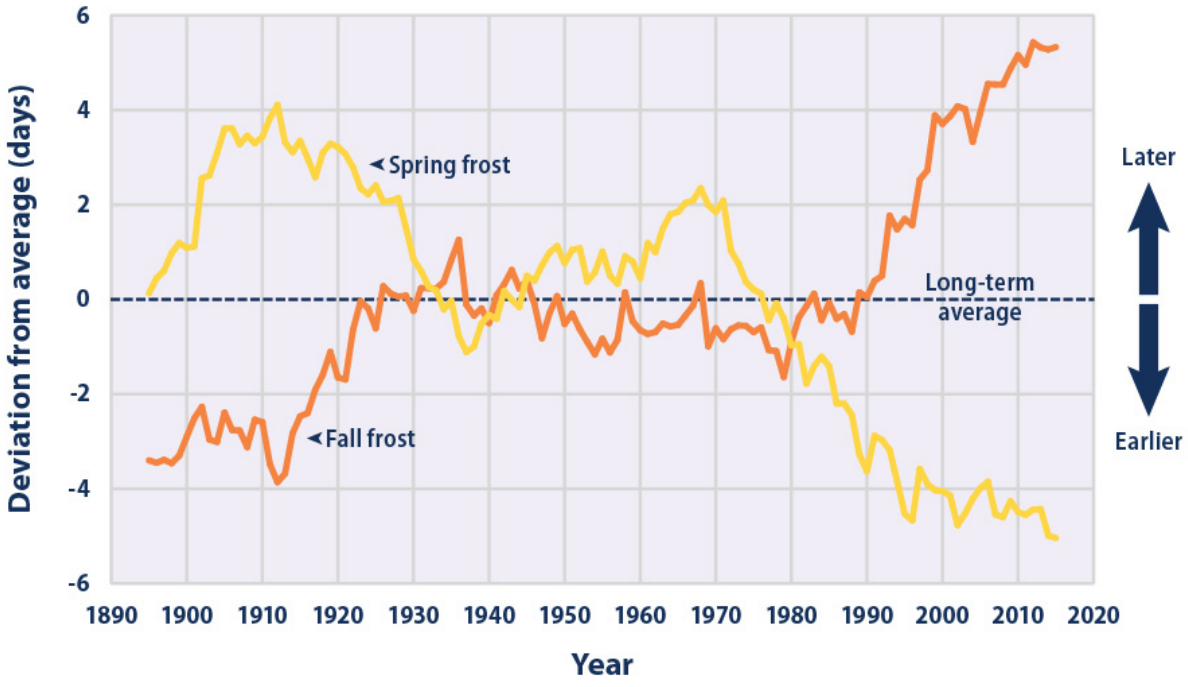
Figure 3. Change in Length of Growing Season by State, 1895–2015



This map shows the total change in length of the growing season from 1895 to 2015 for each of the contiguous 48 states.

Data source: Kunkel, 2016[4]

Figure 4. Timing of Last Spring Frost and First Fall Frost in the Contiguous 48 States, 1895–2015



This figure shows the timing of the last spring frost and the first fall frost in the contiguous 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 lines were smoothed using an 11-year moving average. Choosing a different long-term average for comparison would not change the shape of the data over time.

Data source: Kunkel, 2016[5]

Community Connection: Cherry Blossom Bloom Dates in Washington, D.C.

In Washington, D.C., the arrival of spring brings a splash of color as the city's iconic cherry trees burst into bloom. The city has enjoyed cherry blossoms each year dating back to 1912, when Japan gave about 3,000 cherry trees to the United States as a gift of friendship. These trees surround Washington's Tidal Basin, and the beautiful blooms set against the backdrop of the national monuments bring more than 1.5 million visitors to the area every year during the National Cherry Blossom Festival. Not surprisingly, the festival is planned to coincide with the peak bloom of the cherry trees.

The exact timing of peak bloom varies from year to year, and it is largely driven by local temperatures during the winter and early spring. As the Leaf and Bloom Dates indicator explains, scientists have very high confidence that recent warming trends in global climate are causing spring events such as leaf growth and flower blooms to happen earlier.[1] In the case of Washington's cherry blossoms, earlier bloom dates could affect tourism and the local economy.

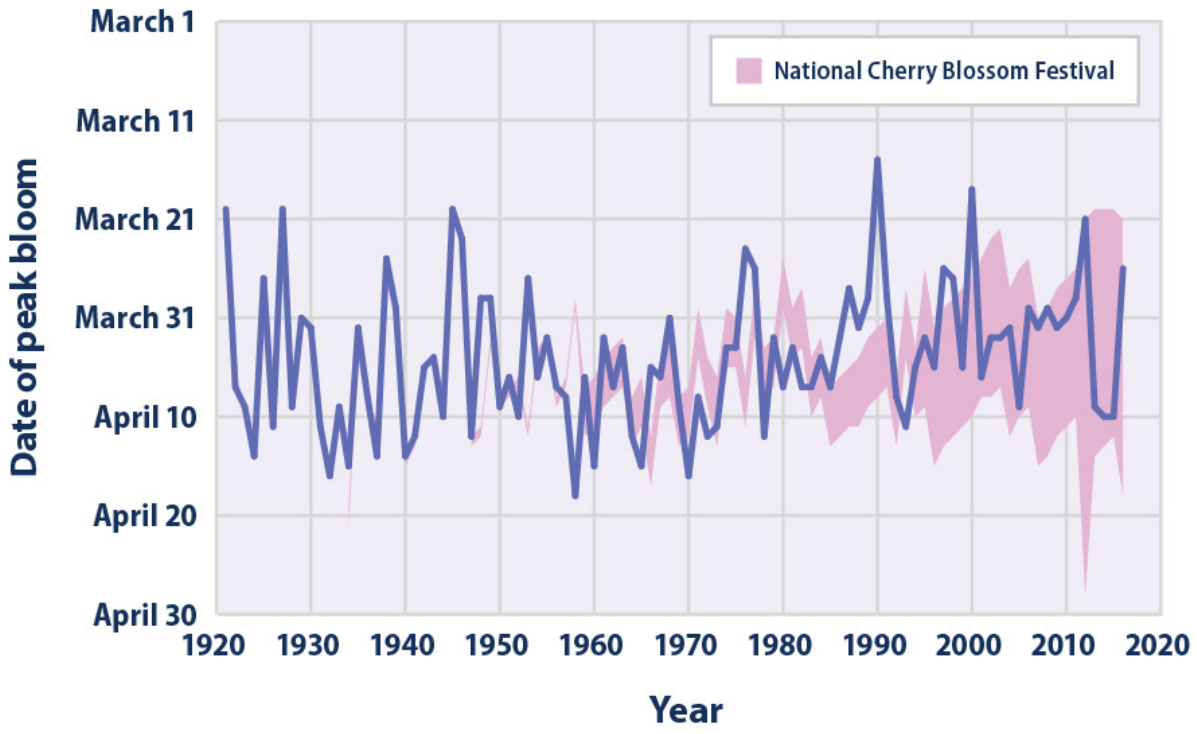
The peak bloom date for the most common type of cherry tree around Washington's Tidal Basin—the Yoshino variety—has been carefully estimated and recorded since 1921 by the National Park Service. The peak bloom date is defined as the day when 70 percent of the blossoms are in full bloom.

Figure 1 shows how the peak bloom date of the Yoshino cherry trees has changed since 1921. It also shows the dates of the National Cherry Blossom Festival, which has grown to several weeks as its popularity has expanded. There is considerable variability in the peak bloom date, which makes predicting the exact timing difficult. Anticipation of the peak bloom captivates meteorologists, city planners, the National Park Service, residents, and tourists each year.

Key Points

- Based on the entire 96 years of data in Figure 1, Washington's cherry blossoms reach their peak on April 4 in an average year. By comparison, the peak bloom date in 2016 was March 25.
- Peak bloom date for the cherry trees is occurring earlier than it did in the past. Since 1921, peak bloom dates have shifted earlier by approximately five days.
- While the length of the National Cherry Blossom Festival has continued to expand, the Yoshino cherry trees have bloomed near the beginning of the festival in recent years. During some years, the festival missed the peak bloom date entirely.

Figure 1. Peak Bloom Date for Cherry Trees Around Washington, D.C.'s Tidal Basin, 1921–2016



This figure shows the peak bloom date each year for the main type of cherry tree around the Tidal Basin in Washington, D.C. The peak bloom date occurs when 70 percent of the blossoms are in full bloom. The shaded band shows the timing of the annual National Cherry Blossom Festival. The festival began in 1934 but was not held during World War II.

Data sources: National Cherry Blossom Festival, 2016;[2] National Park Service, 2015[3]

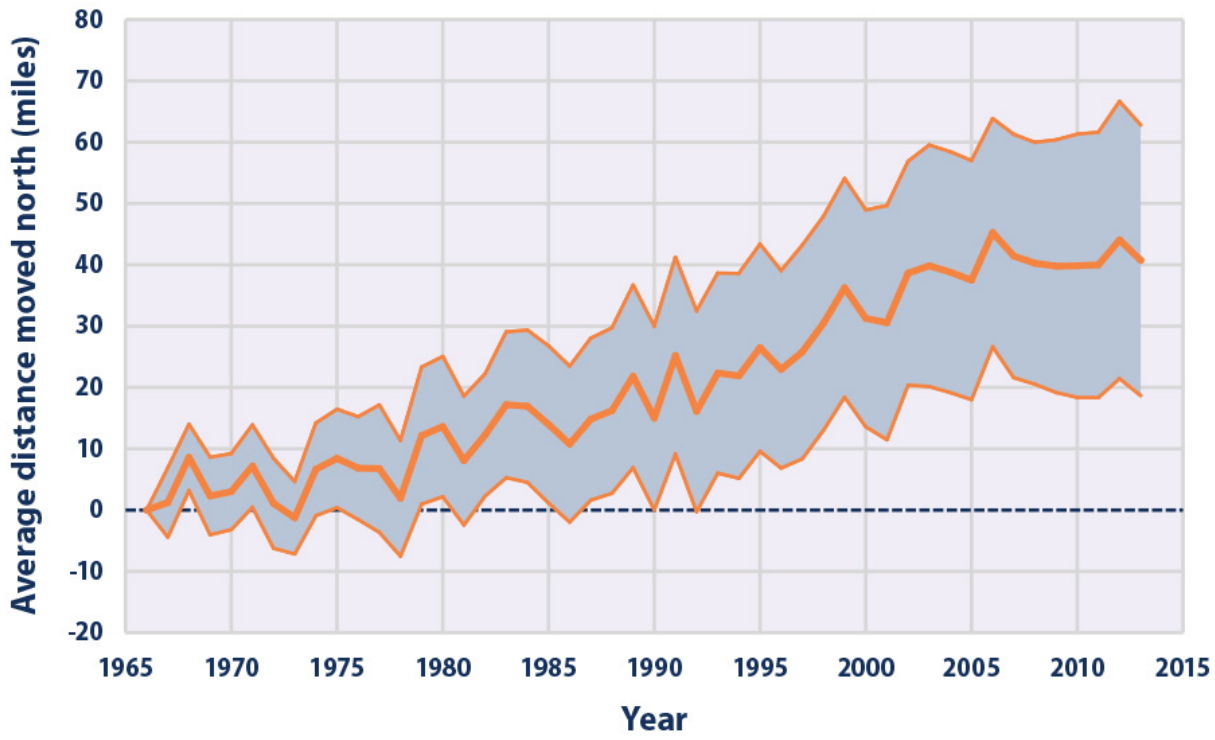
Notes

In addition to winter and early spring temperatures, the timing of the peak bloom for cherry trees can be affected by other weather, climate, and location factors. For example, extended growing periods and warmer autumns could affect bloom dates by altering other stages of cherry tree growth.[4]

Data Sources

Peak bloom dates and festival dates were provided by the National Park Service and organizers of the National Cherry Blossom Festival. Bloom dates and other information about Washington's cherry trees can be found online at: www.nationalcherryblossomfestival.org and: www.nps.gov/subjects/cherryblossom/index.htm.

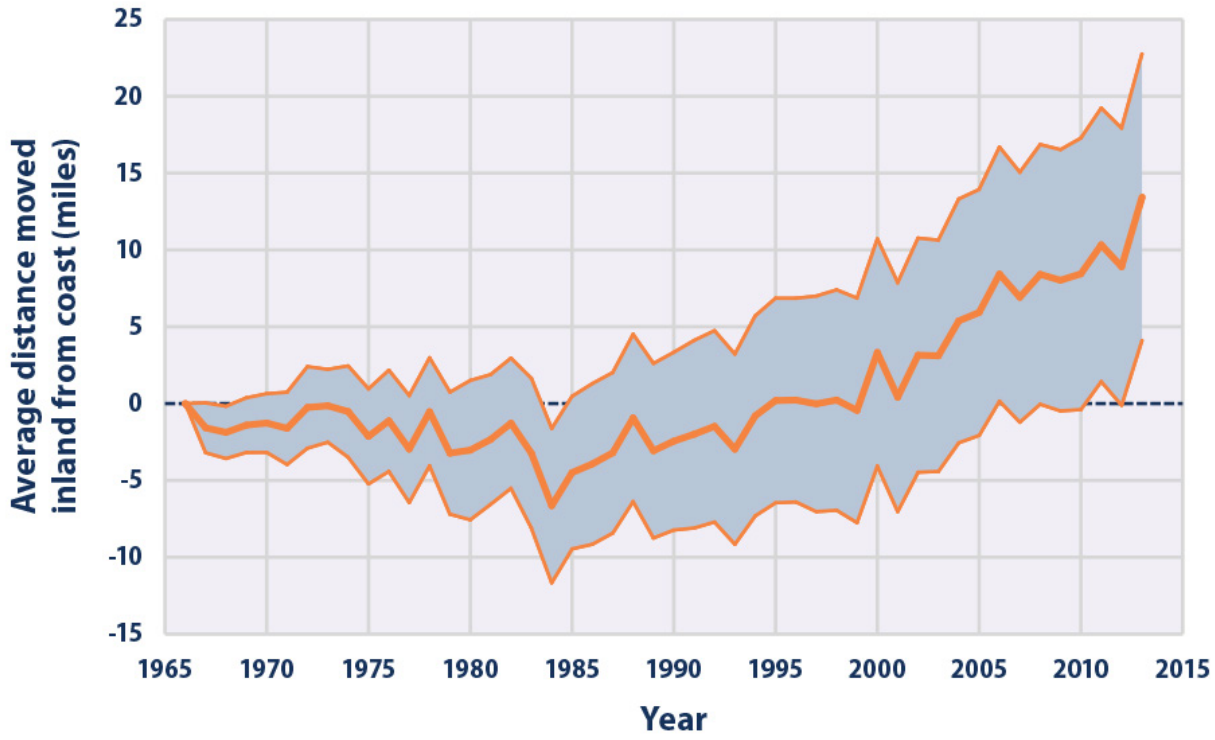
Figure 1. Change in Latitude of Bird Center of Abundance, 1966–2013



This figure shows annual change in latitude of bird center of abundance for 305 widespread bird species in North America from 1966 to 2013. Each winter is represented by the year in which it began (for example, winter 2013–2014 is shown as 2013). The shaded band shows the likely range of values, based on the number of measurements collected and the precision of the methods used.

Data source: National Audubon Society, 2014[4]

Figure 2. Change in Distance to Coast of Bird Center of Abundance, 1966–2013



This figure shows annual change in distance to the coast of bird center of abundance for 272 widespread bird species in North America from 1966 to 2013. This figure covers 272 species instead of the 305 species shown in Figure 1 because 33 of the species in Figure 1 need access to salt water, which means they cannot move inland. Each winter is represented by the year in which it began (for example, winter 2013–2014 is shown as 2013). The shaded band shows the likely range of values, based on the number of measurements collected and the precision of the methods used.

Data source: National Audubon Society, 2014[5]

Indicator Notes

Many factors can influence bird ranges, including food availability, habitat alteration, and interactions with other species. As a result, some of the birds included in this indicator might have moved north for reasons other than changing temperatures. This indicator does not show how responses to climate change vary among different types of birds. For example, a more detailed National Audubon Society analysis found large differences among coastal birds, grassland birds, and birds adapted to feeders, which all have different abilities to adapt to temperature changes.[6]

Some data variations can be caused by differences among count circles, such as inconsistent level of effort by volunteer observers, but these differences are carefully corrected in Audubon's statistical analysis.