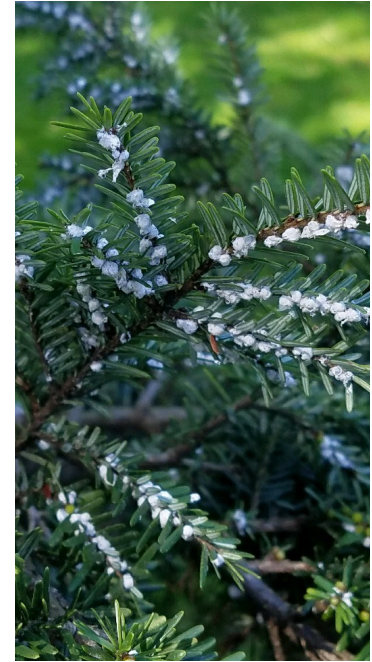


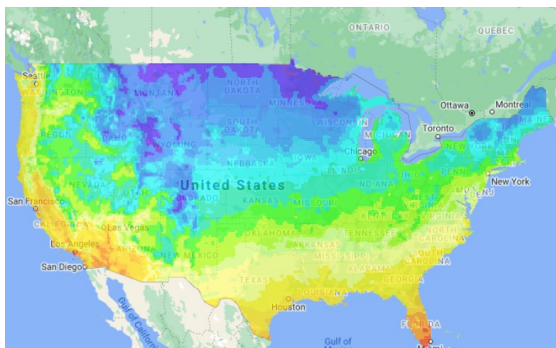
# Davey Climate Change Projections for the US: Executive Summary

The Davey Institute has produced The Davey Climate Change Fact Sheet Series that summarize effects of climate change projected to impact our industry over the next 30-70 years. The average surface temperature of Earth has increased 2°F since the beginning of the 20<sup>th</sup> century with most of that warming occurring over the past 40 years. The impacts of this warming are readily apparent including effects of climate change on temperature, precipitation, sea level, storm intensity, tree health, pest pressure, wildfire, and worker safety. The nature and magnitude of these impacts vary across the country. Hence, these fact sheets are regionally based, summarizing projected impacts of climate change for seven regions of the U.S..

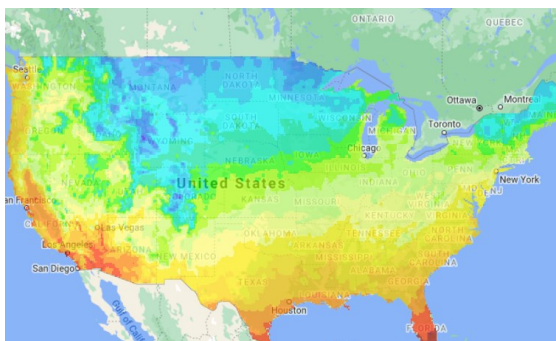


**See below for links to each fact sheet:**

- [Northeast](#) (ME, NH,VT, MA, RI, CT, NY, NJ, DE, PA, MD, DC, WV)
- [Southeast](#) (VA, KY, NC, SC, GA, FL, TN, AL, MS, AR, LA)
- [Midwest](#) (OH, IN, MI, IL, WI, MO, IA, MN)
- [Northern Great Plains](#) (NE, ND, SD, WY, MT)
- [Southern Great Plains](#) (TX, OK, KS)
- [Northwest](#) (WA, OR, ID)
- [Southwest](#) (CA, NV, UT, AZ, CO, NM)



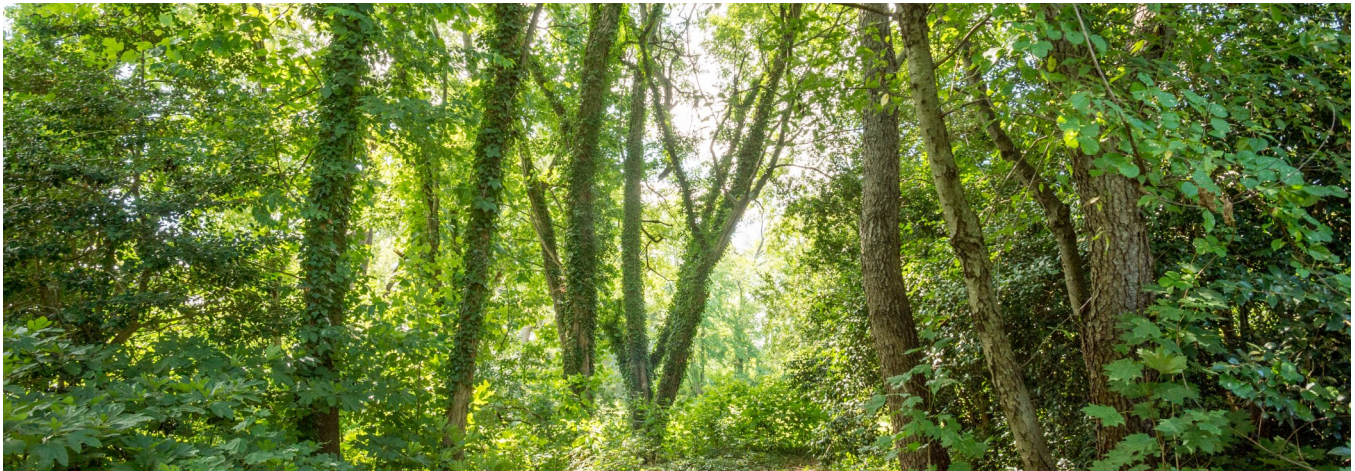
Current winter hardiness zones



Winter hardiness zones projected for end of century under the lower emissions scenario

Climate models published in the first report of the Intergovernmental Panel on Climate Change (IPCC) in 1990 accurately predicted the warming that has occurred over the past three decades. These models, which are now much more powerful because of substantial advances in supercomputing power and scientific understanding of the climate system, project temperatures across the U.S. to increase by another 3-11°F by the end of this century, with the largest source of uncertainty being future patterns of greenhouse gas emissions. Models project future climate outcomes based on different emissions scenarios, called "Representative Concentration Pathways (RCPs)." More information on RCPs can be found at this [link](#). The Davey Climate Change Fast Sheet Series projects a range of impacts based on lower (RCP4.5) and higher (RCP8.5) emission scenarios. Currently, global patterns of greenhouse gas emissions correspond most closely with the high emission scenario, while the lower emission scenario will require significant mitigation measures yet to be implemented .

As winters have warmed across the country over the past few decades, plant hardiness zones have shifted northward. This trend is projected to continue as winters continue to warm with hardiness zones of most states predicted to increase by one to two zones by the middle and end of the century, respectively. As hardiness zones continue to shift, plant species that thrive in each area will also shift causing a change in the palette of planting options. Davey Tree has collaborated with the Arbor Day Foundation to generate [this interactive website](#) (based on zip code) that projects how hardiness zones will shift throughout the United States over the next 30-70 years. The data used to generate the website are derived from [this U.S. Forest Service publication](#). The projections are intended to increase awareness about the magnitude of climate change at specific locations, and to inform decisions about what trees to plant for the changing climate. Warming temperatures will also increase tree stress in many areas of the country due to changes in distribution of important insect pests and diseases, as well as more frequent drought.



Trees are green infrastructure that contribute to climate change resilience through the important ecosystem services they provide. For example, trees sequester and provide long-term storage of carbon, decrease storm water runoff, conserve energy through shading and reduction in urban heat, and filter air pollutants. Services provided by the tree care industry including tree planting, health care, and preservation are important adaptations that contribute to climate change resilience. The magnitude and economic value of the ecosystem services generated by an individual tree, or an entire urban or natural forest, can be easily quantified using [i-Tree](#), which is a suite of software tools developed through a collaboration of the U.S. Forest Service, Davey Tree, Arbor Day Foundation, and other partners.



This series summarizes the changes that will affect our operations in different ways across the country as we continue to address our clients' present and future objectives. They are intended to inform strategic management decisions in the face of opportunities and threats posed by impacts of climate change on tree distributions, tree health, pest pressures, storm intensity and frequency, drought, wildfire, and worker safety.