

## AVERAGES DEPEND ON DECADE

Plant-hardiness zones are based on a single number: the average of the lowest temperature recorded each winter for a period of time.

But that number depends upon what time period you're averaging. The 1970s was a cold decade, the 1980s was warmer, and the 1990s was one of the warmest on record.

So an average that includes the 1970s would make most areas look colder than an average based only on the 1990s.

That's where the controversy comes in. During the past two decades, three versions of the map that shows 11 major plant-hardiness zones have been prepared for the Department of Agriculture: the 1990 official version that remains in effect; the 2003 update the agency rejected that reflected a warming trend; and a new map that the USDA says is coming within a year.

Zones for each map shift, depending on the years of weather data upon which it is based.

To explain the confusion, USA TODAY used weather data from the National Climatic Data Center and calculated average annual minimum temperatures for 11 U.S. cities. That average changes a lot depending on the time span used in the calculation.

For example, the average annual low temperature for Columbia, S.C., based on the 1990 map (1974-1986) is 10 degrees. The 2003 draft map (1986-2002) is 16 degrees. The new map is based on data from 1976-2005. Using data from those years, the average is 13.5 degrees.

(For data on the other 10 cities, visit [usatoday.com](#)).

*By Elizabeth Weise and Anthony DeBarros, USA TODAY*

# Warming shifts gardeners' maps

By Elizabeth Weise, USA TODAY

Every gardener is familiar with the multicolor U.S. map of climate zones on the back of seed packets. It's the Department of Agriculture's indicator of whether a flower, bush or tree will survive the winters in a given region.

It's also 18 years old. A growing number of meteorologists and horticulturists say that because of the warming climate, the 1990 map doesn't reflect a trend that home gardeners have noticed for more than a decade: a gradual shift northward of growing zones for many plants.

The map doesn't show, for example, that the Southern magnolia, once limited largely to growing zones ranging from Florida to Virginia, now can thrive as far north as Pennsylvania. Or that kiwis, long hardy only as far north as Oklahoma, now might give fruit in St. Louis.

Such shifts have put the USDA's map at the center of a new chapter in the debate over how government should respond to climate changes that were described in a report last year by a United Nations-backed panel of scientists. The panel said there was "unequivocal" evidence of global warming fueled by carbon dioxide emissions, which have created an excess of the greenhouse gases that warm the Earth.

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Climate change is reshaping how people garden. Across the agricultural industry, the issue is driving a dispute over climate maps that involves economics, politics and meteorological standards.

At nurseries across the nation, it has become common knowledge that the government's climate map is out of date. And yet the nursery industry, which had \$16.9 billion in wholesale sales in 2006, has joined the USDA in taking a conservative approach to changing the map.

A big reason: money.

Nurseries commonly offer money-back guarantees on plants. Analysts say many in the industry are worried that adjusting the climate maps would encourage customers in cooler areas to increasingly buy tender, warm-weather plants unlikely to survive a cold snap.

And growers are worried that their losses won't be sufficiently covered by the Federal Crop Insurance Corp.'s Nursery Crop Insurance Program, which covers them for losses caused by weather-related events such as flooding. If growing zones move north because of warming there is still a possibility of cold snaps, and it's unclear exactly how insurance programs would deal with that risk.


The USA's climate zone map designates 11 major belts for growing plants, from the relative cold of Zone 1 — which includes Fairbanks, Alaska — to midrange temperatures of Zone 6 (which includes parts of Missouri, Tennessee and southern Pennsylvania) to the heat of Zones 10 and 11, which include Hawaii and southern Florida.

Changing zone boundaries to reflect warming could "have a significant impact on certain growers of certain plant species," says Dave Hall of National Crop Insurance Services, which represents insurance companies.

Economic factors shouldn't be placed above the science of climate change, says meteorologist Mark Kramer, who worked on the 1990 USDA map that remains in effect, as well as a proposed update in 2003 that showed a warming trend. The USDA rejected the 2003 map.

"If nature changes, industry should change with it," Kramer says. "If the weather changes, we shouldn't operate with zones and systems that aren't appropriate."

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What polls, activists reveal

USDA officials reject suggestions that the agency's resistance to changing the 1990 map reflects a reluctance to acknowledge the potential impact of climate change. They say the agency wants its next map to reflect a 30-year period that gives a fuller picture of the world's climate than the 16-year examination Kramer conducted for his rejected map.

"The majority of the scientific community thought 30 years of credible data made the most sense," says Kim Kaplan of the USDA's Agricultural Research Service.

Kramer and other skeptics say the USDA's tactic will lead to an analysis that mutes the effect of warming trends during the past decade.

The agency's delay in releasing an updated map has led another group to release its own climate map. In 2006, the Arbor Day Foundation put out a map based on data from 1991 to 2005 that shows a significant northward movement of warm zones for plants and crops.

"Everyone's entitled to their opinion," Arbor Day Foundation's Woodrow Nelson says of the USDA map. But he says his group, which provides low-cost trees, was seeing trends that it wanted reflected in a map for growers.

"With the millions of trees that we're putting into the hands of people across the country, the most recent data available is important. Data from 30, 40 years ago is really kind of irrelevant in the life of a young tree."

Avid gardener Toni Riley, who lives on a small farm in Hopkinsville, Ky., with her family and a cadre of dogs, cats, sheep, goats and a horse, also values the most up-to-date information. "What I plant depends on the weather," she says. "I personally am very concerned about climate change."

The data debate

There's no denying the warming trend and its increasing impact on plants, says David Ellis, editor of *The American Gardener*, published by the American Horticultural Society. "We don't really need a dramatic new map to show us this."

Perhaps, but there's been a fair amount of drama as plant, weather and agriculture specialists have wrangled over the climate map.

The debate is rooted in the type of analytical divide that separates scientists who disagree over whether enough data are available to show whether the Earth's warming trend of the past two decades is a long-term problem.

Weather patterns tend to run in cycles, usually 10 to 15 years. Among meteorologists, 30 years is widely considered to be a good indicator of the overall climate.

"It's been the custom in climatology for a long time to represent long-term averages or 'normals' by a 30-year average," says George Taylor, a state climatologist for Oregon. "When you have a 15-year period, you can get some squirrely numbers."

The United Nations World Meteorological Organization standard for assessing the climate is 30 years, says Kelly Redmond, a climatologist with the Desert Research Institute in Reno. But "that was before issues of climate change seriously put themselves on the plate."

The recent pace of climate change — the U.N. Intergovernmental Panel on Climate Change says 11 of the 12 warmest years since 1850 came between 1995 and 2006 — means gardeners must be more flexible, Redmond says.

"We could be heading into a time where the temperature is always above 'normal,' " he says. "If a plant has a short lifetime, what are the odds of that plant being killed by a climate event? If it's a tree or something that you want to live longer, you're probably a little more conservative (in choosing your plants) because even if the (climate) zones are slowly migrating, that doesn't mean there won't be cold spells."

Crop growers want the safest possible estimate of how cold it might get because they don't want to lose plants. Because the

TIME PERIOD AFFECTS TEMPERATURE ANALYSIS

Depending on the years studied, the average annual minimum temperature of a region on which hardiness-zone maps are based can vary up to 6 degrees. These are the average annual minimum temperatures for three time periods, reflecting the direction of three different hardiness-zone maps:

	1974-1986(a)	1986-2002(b)	1976-2005(c)
Columbia, S.C.	10.0	16.0	13.5
Redmond, Ore.	-6.3	-0.6	-3.1
Idaho Falls	-15.2	-11.0	-12.4
Abilene, Texas	8.9	13.1	11.5
Dayton, Ohio	-9.6	-5.9	-7.9
Paducah, Ky.	-0.3	3.1	1.0

Glasgow, Mont.	-28.4	-27.1	-28.5	USDA's constituency is farmers and growers, the agency decided to use a 30-year standard for data in putting together its new climate map, which could be released as soon as the fall, according to Kaplan.
Tucson	24.5	25.2	25.4	
Valentine, Neb.	-23.9	-23.4	-23.7	"The majority of the scientific community thought 30 years of credible data made the most sense," she says. "The conspiracy theorists think the reason we went to 30 years was that it would dilute the effects of global warming. That's flat-out wrong. No one has ever sat on the plant-hardiness map because they wanted to deny global warming."
Sacramento	26.7	26.5	26.8	
Caribou, Maine	-24.4	-24.9	-23.7	Even so, meteorologists and horticulturists say it is the USDA's duty to more accurately show how the climate affects plants and crops. They include those who devised the 1990 map: Kramer and Marc Cathey, then-president of the American Horticultural Society.
				<b>A question of accuracy</b>
a) 1990 USDA hardiness-zone map				The 1990 map was based on just 13 years of weather data, Kramer says. He and Cathey had hoped to do a new map every 10 years to reflect shifts in the weather.
b) 2003 draft map rejected by the USDA and posted online by American Horticultural Society				
c) Proposed updated USDA map				Kramer's 2003 map rejected by the USDA was based on data from 1986 to 2002 and showed a significant march northward of boundaries for warm-weather plants. For example, plants that for decades had frozen and died in Nebraska suddenly were doing just fine.
Source: National Climatic Data Center; USA TODAY analysis by Anthony DeBarros				
				Kramer isn't convinced the decades of data the USDA insists on having provide the most accurate picture of the climate that gardeners face now.

"If I was going to the garden center today, I'd want to have the most current, updated information. I don't want to know what happened 50 years ago."

Some see the changing horticultural landscape as a good thing.

"There are nurserymen who are excited about the new market" for plants in the northern half of the United States, Ellis says. "There are the ones who see ... it as a marketing opportunity."

That helps explain why, without fanfare, the horticultural society posted on its website the 2003 climate map rejected by USDA and dubbed it "The American Horticultural Society *draft* USDA plant hardiness zone map."

The map to be released soon by the USDA is being prepared by the Prism group at Oregon State University, known for doing sophisticated climate modeling. The 1990 map designated growing zones as small as counties; the new one will narrow the focus to square miles.

So what's a gardener supposed to do in the meantime?

Sometimes, says the National Arboretum's Scott Aker, the best thing to do is talk to someone who's really down in your local dirt. Nurseries and public gardens are good resources, he says.

Joan Pond Laisney of Carlsbad, Calif., consulted a garden-center expert before planting her tree-shaded garden. "We researched what grows well out here and what will live long-term," she says.

Aker says your neighbors can be a big help, too.

"Nobody is more familiar with soil and weather conditions in your yard than the person down the street with the beautiful garden," he says, "because usually what went into making that garden was a lot of mistakes and dead plants."

*Contributing: Anthony DeBarros*

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