

The USDA Plant Hardiness Map

2003
EDITION

The updated USDA hardiness zone map reveals warmer zones for many gardeners and new zones for the subtropical regions. Here's an introduction to the new map and guidelines for using it in combination with the AHS Plant Heat Zone map.

BY DAVID J. ELLIS



IT'S CLEAR at first glance that the draft version of the 2003 USDA Plant Hardiness Zone Map bears little resemblance to its most recent predecessor, the 1990 map. For starters, it has more zones, 15 rather than 11, each of which represents a 10 degree Fahrenheit (F) difference in average annual minimum temperature. And all the zones bear colorful plant names like "Apple," "Cornflower," and "Papaya" to help recognize them.

The "a" and "b" intra-zone divisions used on the 1990 map have been dropped, so each zone is broader and easier to follow as your eye moves westward and the mountains make climatic gradients more complex. West of the Rocky Mountains, more discrete, rounded divisions have replaced the crazy tangle of zones that marked the 1990 map. And although the draft map printed on pages 33 and 34 has had county names removed to make it easier to read, the digital version of the 2003 map includes county boundaries and county names to help gardeners identify

their precise zone. If you can't tell from this map exactly what zone you live in, don't despair; you can find your zone through a database on the American Horticultural Society (AHS) Web site (www.ahs.org) that is searchable by zip code.

Unlike previous maps, the 2003 map was created digitally. "It has a higher level of resolution and shows smaller areas of change called microclimates," says AHS President Emeritus Dr. H. Marc Cathey, who coordinated development of the updated map. "These microclimates include warmer areas around major cities, which tend to hold more heat because they have a high density of buildings and large areas of concrete and blacktop. You can also see cooler areas that may indicate higher elevations."

The map has also been improved because it does not include Canada or Mexico, as the 1990 version did. "By concentrating on the United States," says Dr.

Cathey, "we are able to make the map easier to read and reproduce on the Web."

And thanks to the updated temperature records that were used to create the 2003 map, it reflects regional variances in temperature that have occurred in the last 20 years. "In North America, the ranges of temperature and moisture for the past decade were much wider than those recorded for the 1940s through the 1960s," says Dr. Cathey, "and we have been losing from our landscapes plants that apparently thrived in the zones they were assigned during that time period, including gardenias, crape myrtles, and azaleas."

HAS MY ZONE CHANGED?

The major questions everyone has been asking as the release date for the map approached have been, "Has my zone changed and, if so, what does that mean for the way I garden." The answers are: maybe and probably not much.

That's not to say that the map doesn't show changes—it does. The map is based on temperature information collected between July 1986 and March 2002, which corresponded to a period of warmer temperatures in many areas of the United States. As a result, many areas have experienced zone creep, with zones edging northward slightly (see chart on page 35 for a list of some cities that are in new zones).

Even if the new map indicates your zone has changed, experts advise against making radical changes in your plant

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THE 2003 USDA PLANT HARDINESS ZONE MAP

The American Horticultural Society is pleased to be able to offer you an early peek at a draft version of the 2003 edition of the USDA Plant Hardiness Zone Map in this special pullout section of *The American Gardener* magazine. The four central pages of this issue of the magazine are designed as a self-contained unit that can be used as a reference to the updated USDA hardiness map and the AHS Plant Heat Zone map.

WHAT'S NEW WITH THE MAP?

The updated USDA hardiness map shows in detail the lowest temperatures that can be expected each year in the United States. These temperatures—referred to as “average annual minimum temperatures”—are based on the average of the lowest temperatures recorded for each of the winter seasons from 1986/1987 to 2001/2002.

The 2003 edition of the USDA hardiness map has 15 zones (four more than the 1990 version of the map), each of which represents a 10 degree Fahrenheit (F) difference in average annual minimum temperature. The expansion of the map to 15 zones is making it possible for the first time to assign hardiness codes to sub-tropical and tropical plants, which previously had to be listed by the minimum temperatures at which they would survive.

The draft map is currently under review by the USDA's Agricultural Research Service. A digital version of the new map can be seen on the AHS Web site (www.ahs.org).

HOW THE MAP CAME ABOUT

The American Horticultural Society was awarded a grant from the USDA's Agricultural Research Service (ARS) to update the cold hardiness map. AHS President Emeritus Dr. H. Marc Cathey coordinated development of the map, which was compiled by Meteorological Evaluation Service Co, Inc. (MES) of Amityville, New York, using temperature data from the archives of the National Climatic Data Center.

The revised USDA hardiness map will complement the AHS heat map, which was introduced by AHS and Dr. Cathey in 1997 to help gardeners select plants based on their tolerance of, and requirements for, high temperatures.

STANDARDIZED CODING SYSTEM

Used in combination with the AHS heat map, the updated USDA hardiness map now allows plants to be assigned four codes—two hardiness codes and two heat

codes. “The four-number code can be applied to all plants,” says Dr. Cathey, “including many that have never been coded before, such as vegetables, annuals, aquatic plants, and even turf grasses.”


The first two numbers in the series indicate hardiness: the initial number is the coldest zone to which the plant is rated and the second number is the “least” cold zone in which a plant will thrive—this often reflects how intense a period of “chilling” or dormancy a plant such as an apple tree or daffodil needs in order to grow successfully.

The second set of numbers indicate heat tolerance and requirement: The initial number in the series indicates the hottest zone in which a plant will thrive, while the second number reflects the “least heat” zone in which the plant will grow—this is often an indication of the minimum number of warm days a plant needs to fruit or flower successfully.

The zone ratings have always been intended to indicate excellent adaptability of the plants. Many plants may survive in warmer or colder zones, but survival alone is not considered satisfactory garden performance. The zones also assume that plants will be provided with the other essential needs for plant growth—compatible soil type and pH, adequate water, proper exposure to sun or shade, nutrients, etc.

HOW TO USE THE CODES

Start by determining your own zone numbers for hardiness and heat by looking at the maps. If it's difficult to determine your zones from the printed maps, databases of both hardiness and heat codes, searchable by zip code, are available on the AHS Web site (www.ahs.org).

Then look for publications that contain the four-zone coding system, such as AHS books published by DK publishing and magazines such as *The American Gardener*. Many nurseries are now using the four-number zone system in their catalogs and plant labels. 

ABOUT THE REVISED MAP

Here are answers to some of the most common questions about the 2003 USDA Hardiness map.

How can I get a copy of the map?

For the time being, the draft map published in this issue of *The American Gardener* is the only printed version of the map. The map can also be seen on the AHS Web site and a digital version of the map is expected to be eventually available through the U.S. Department of Agriculture Web site.

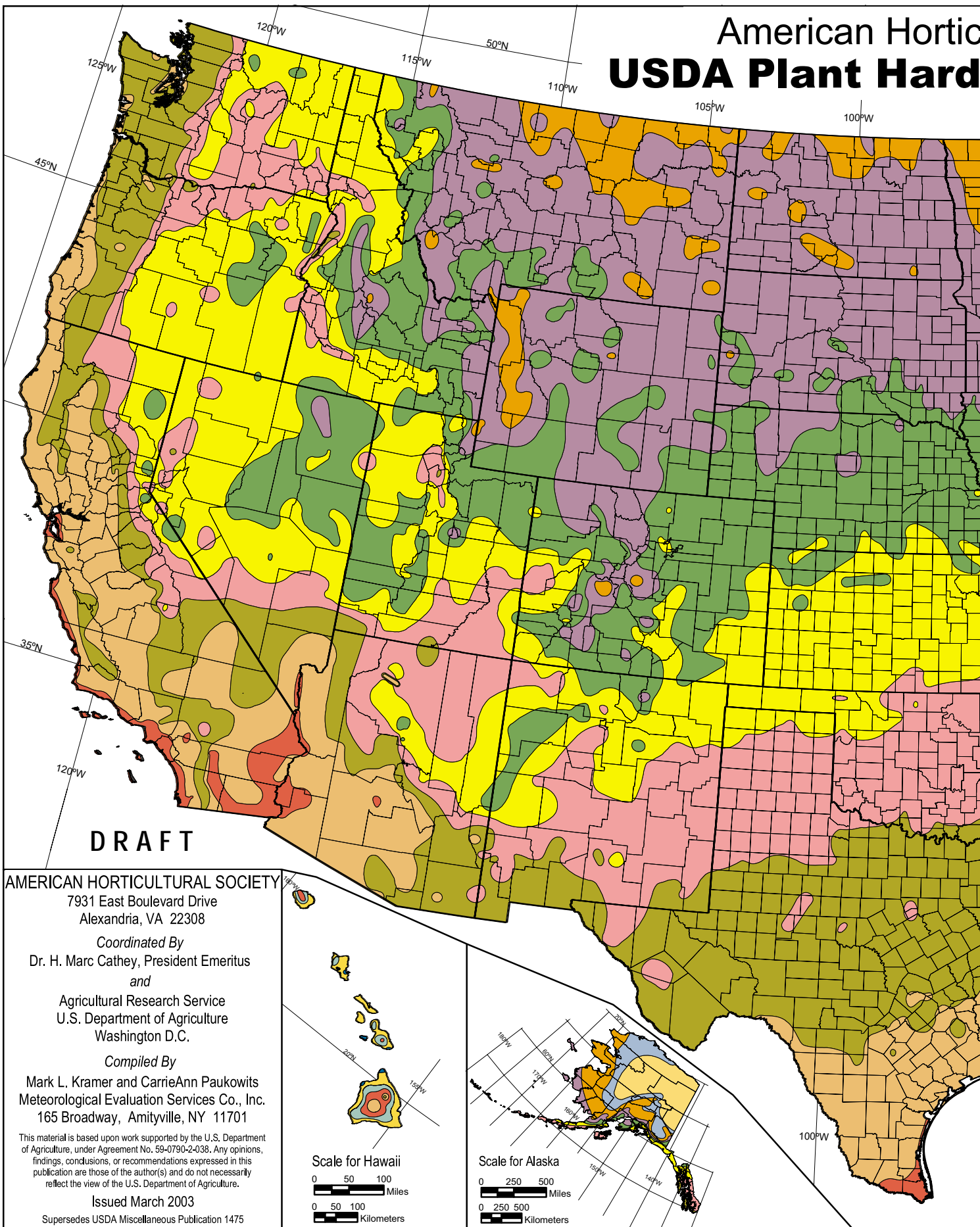
What happened to the a and b zone divisions?

The zones in the 1990 edition of the hardiness map were subdivided into a and b sections that indicated 5-degree Fahrenheit increments in average annual minimum temperatures. “Given the year-to-year fluctuations in average annual minimum temperature,” says AHS President Emeritus H. Marc Cathey, “we believe zones divided into 10-degree increments will be more consistent and useful to gardeners.”

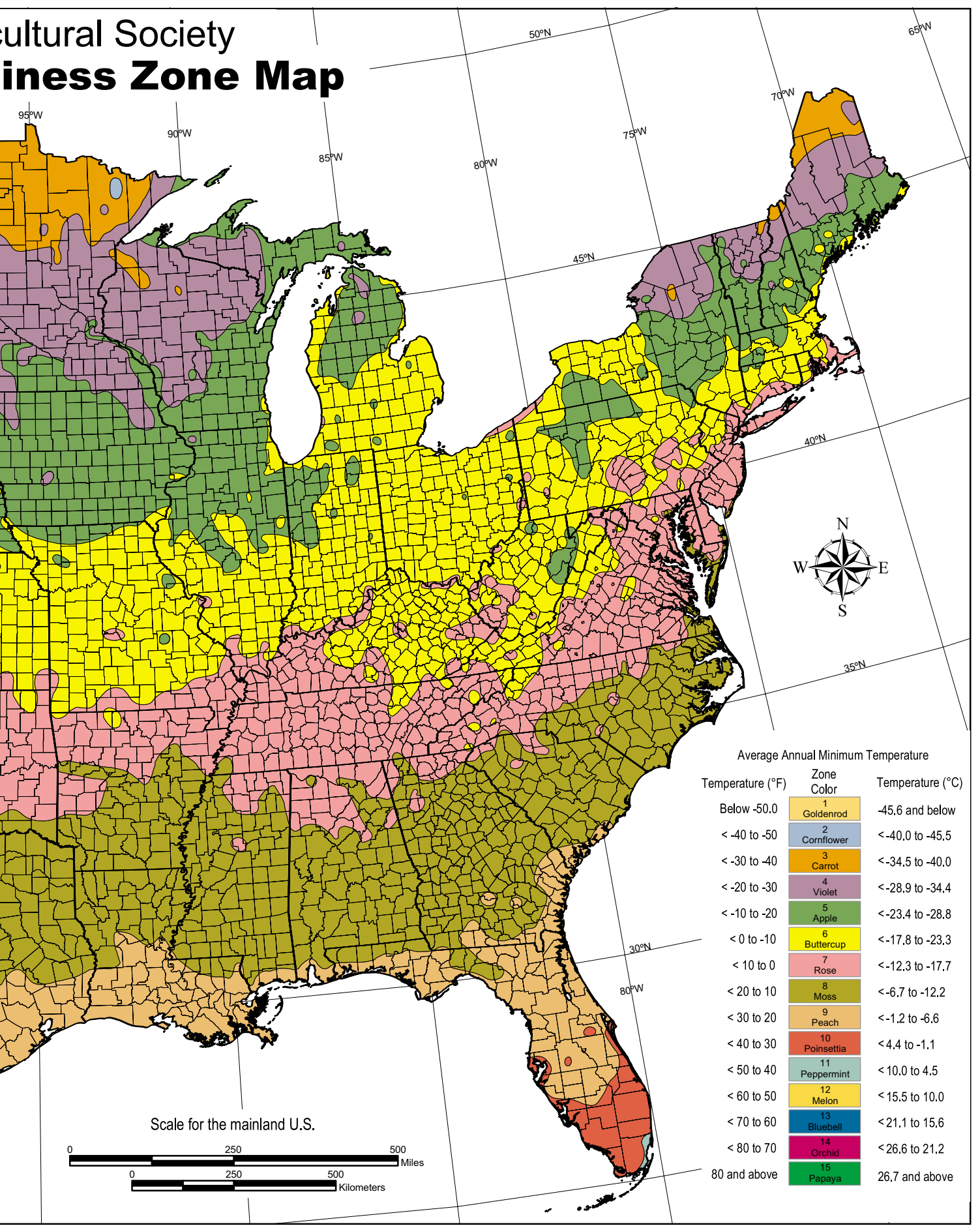
According to the revised map, the region I live in has changed zones. How does this affect the way I should garden?

The change of zones should not have a major effect on your gardening practices. It may be fun to experiment with plants rated to your new zone, but don't start radically changing your plantings.

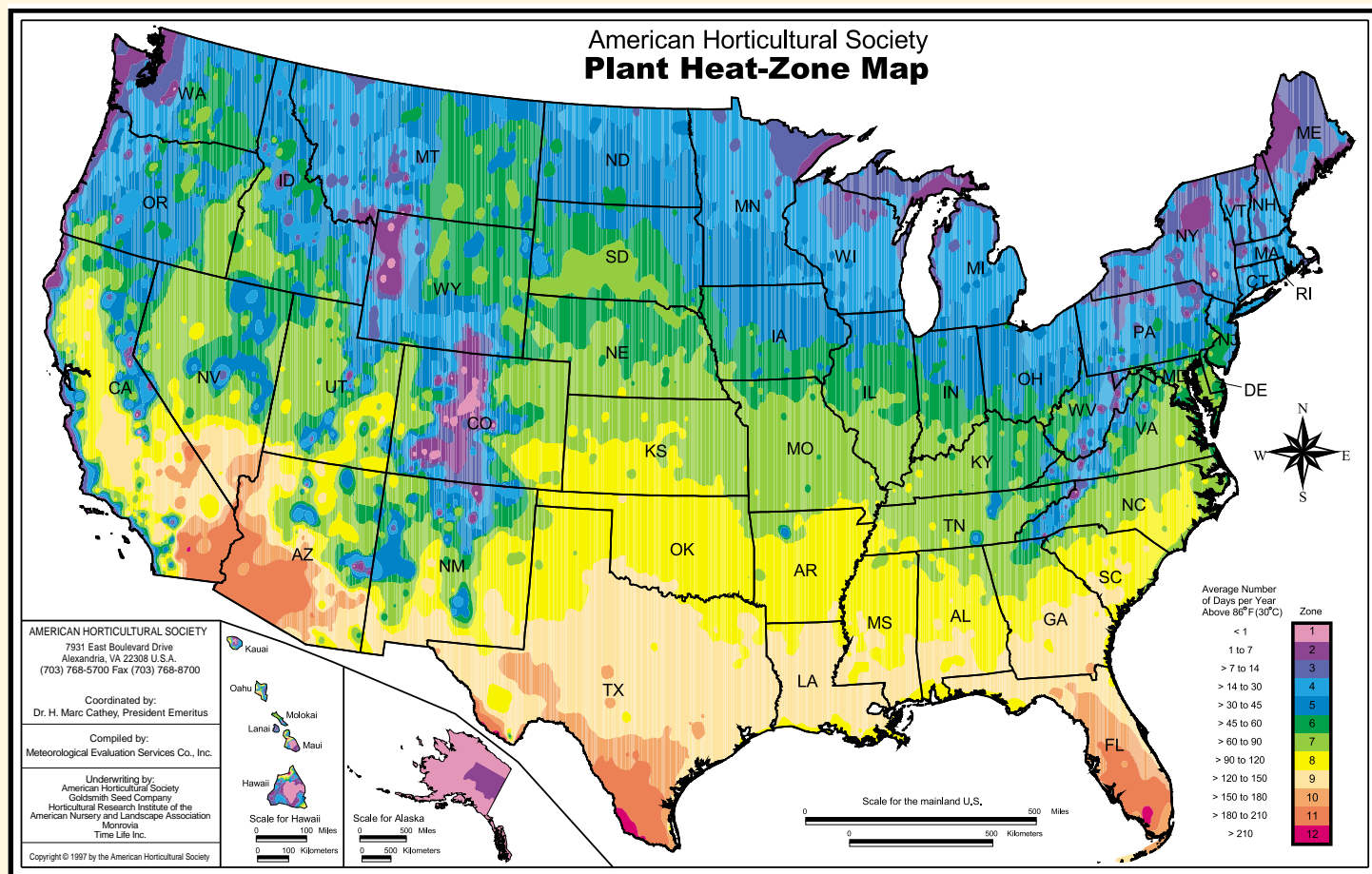
American Horticultural USDA Plant Hard



Cultural Society Business Zone Map



American Horticultural Society Plant Heat-Zone Map



THE AHS PLANT HEAT ZONE MAP

The American Horticultural Society Plant Heat Zone Map was developed in 1997 to provide gardeners with guidelines that would help them choose plants suited to the summer temperatures experienced in their region. Conceived by AHS President Emeritus Dr. H. Marc Cathey, the AHS heat map was designed to be used in conjunction with the USDA Plant Hardiness Zone Map so that gardeners could grow plants that would flourish year round in their gardens.

The AHS heat map divides the United States into 12 zones based on the average number of days in the year that daily high temperatures reach or exceed 86 degrees Fahrenheit (30 degrees Celsius). The 86-degree point was chosen because that is the temperature at which plants begin to suffer physiological damage from heat.

The AHS heat map was created by Meteorological Evaluations Services Co., Inc., in Amityville, New York, which analyzed

and compiled temperature data for the years 1974 to 1995 from the archives of the National Climatic Data Center.

HEAT CODES

To learn what AHS heat zone your garden is in, look at the map on this page. You can also determine your heat zone by using a database, searchable by zip code, located on the AHS Web site (www.ahs.org).

Once you have determined your zone, you can identify plants suited to your heat zone by looking for books, magazines, nursery catalogs, and plant labels that list AHS heat zone codes. Every issue of *The American Gardener* includes a page ("Pronunciations and Planting Zones") that provides the hardiness and heat zones for the plants covered in that issue's articles. Plants should be coded with a heat zone range; make sure plants you select for your garden include your heat zone number within their zone range.

The first number of the heat zone range indicates the southernmost or warmest zone in which that plant will thrive. The second number shows the "least" heat zone, which indicates plants that may have a minimum heat requirement to flower or fruit successfully. For example, some tomato and okra cultivars won't set fruit in northern regions of the United States, where the warm season is simply too short.

Coding of plants for heat tolerance has been going on since the AHS heat map's release in 1997. To date, thousands of plants have been coded by growers and plant scientists throughout the country, and the list continues to expand. As with the codes established for hardiness, assigned heat codes assume that each plant's standard cultural requirements are met, especially adequate watering during the growing season.

To order a two-by-three-foot poster of the AHS Plant Heat Zone Map for \$9.95, call (800) 777-7931 or visit www.ahs.org.

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choices. “Just as there are microclimates created by geographic features such as mountains or valleys, your garden may feature mini-microclimates,” says Dr. Cathey. “You may have pockets within your garden that are warmer or cooler than the general zone for your area.” So experiment with a few new plants if you like, but don’t replant your rock garden with banana trees just yet.

The draft map is currently under review by the USDA’s Agricultural Research Service (ARS). Eventually the map is expected to be available on the ARS Web site (www.usda.ars.gov) as well as on the AHS Web site (www.ahs.org).

HOW THE MAP CAME ABOUT

For more than 40 years, American gardeners have relied on the USDA hardiness map as a standard guide to plant cold tolerance. The 2003 update was coordinated by Dr. Cathey, who also spearheaded development of the 1990 version of the map during his tenure as director of the U.S. National Arboretum.

The American Horticultural Society was awarded a grant from the ARS to update the cold hardiness map. The data used to create the map came from the archives of the National Climatic Data Center in Asheville, North Carolina. The map shows in detail the expected lowest temperatures each year throughout the United States. These temperatures—referred to as “average annual minimum temperatures”—are based on the average of the lowest temperatures recorded for each of the winter seasons from 1986/1987 to 2001/2002.

The temperature information on which the map is based came from approximately 7,000 weather stations that could be identified by latitude and longitude. Of those stations, about 4,600 were able to provide a valid average annual minimum temperature based on at least 12 years of data. “The zone number is higher at approximately 40 percent of the weather stations used in the map,” says meteorologist CarrieAnn Paukowits of Meteorological Evaluation Service Co., Inc., (MES) of Amityville, New York. MES, the company that created the map, also created the AHS

HARDINESS ZONE CHANGES

City	Old USDA Zone	New USDA Zone
Chicago, Illinois	5	6
Columbus, Ohio	5	6
Nashville, Tennessee	6	7
Phoenix, Arizona	9	10
St. Petersburg, Florida	9	10
Tulsa, Oklahoma	6	7

Plant Heat Zone Map in 1997 (see page 35).

The revised USDA hardiness map will complement the AHS heat map, which was introduced by AHS and Dr. Cathey to help gardeners select plants based on their tolerance of, and requirements for, high temperatures.

STANDARDIZED CODING SYSTEM

The expansion of the map to 15 zones makes it possible for the first time to assign hardiness codes to subtropical and tropical plants, which previously had to be listed by the minimum temperatures at which they would survive. New zones 12 through 15 represent areas that have average annual minimum temperatures above 50, 60, 70, and 80 degrees Fahrenheit, respectively.

Used in combination with the AHS heat map, the updated USDA hardiness map now allows plants to be assigned four zone codes—two hardiness codes and two heat codes. “The four-number code can be applied to all plants,” says Dr. Cathey, “thus setting up a national system that can be used to code many plants that have never been coded before, such as vegetables, annuals, aquatic plants, and even turf grasses.”

The zone ratings have always been intended to indicate excellent adaptability of the plants. Many plants may survive in warmer or colder zones, but survival is not necessarily satisfactory garden performance. “The zone rating should indicate where plants will thrive,” says Dr. Cathey, “not just survive.” The zones also assume that plants will be provided with the other essential needs for growth—compatible soil type and pH, adequate water, proper exposure to sun or shade, etc.

The first two numbers in the series indicate hardiness: the initial number is the

coldest zone to which the plant is rated, and the second number is the “least” cold zone in which a plant will thrive—this often reflects how intense a period of “chilling” or dormancy a plant needs in order to grow successfully.

The second set of numbers denotes heat tolerance: the initial number in the series indicates the hottest zone in which a plant will thrive; the second number reflects the “least heat” zone in which the

plant will grow—this is often an indication of the minimum number of warm days a plant needs to fruit or flower successfully.

Plants considered “true” annuals—those that complete their life cycle in a year or less and die—are indicated by a hardiness rating of 0-0 followed by two heat code numbers. For instance, a marigold (*Tagetes* spp.) is coded 0-0, 12-1.

HOW TO USE THE CODES

Start by determining your own zone numbers for hardiness and heat by looking at the maps. If it’s difficult to determine your zones from the printed map, databases of both hardiness and heat codes, searchable by zip code, are available on the AHS Web site (www.ahs.org).

Then look for publications that contain the four-zone coding system, such as AHS books published by DK publishing, and magazines such as *The American Gardener* and *Garden Gate*. Many nursery catalogs are now also using the four-number zone system, and some plants at nurseries are labeled with the four-number code.

AHS’s River Farm headquarters in Alexandria, Virginia, for instance, is in USDA hardiness zone 7 and AHS heat zone 7. So, plants that include 7 in both number series—such as (7-9, 9-1), (3-7, 7-1), (4-15, 12-1)—will thrive here as long as their other cultural needs are met.

MORE TO COME

In upcoming issues, we’ll focus in on a variety of topics relating to the USDA hardiness and AHS heat maps and the standardized coding system that will help guide your plant selection.

David J. Ellis is editor of The American Gardener.