

Plant Hardiness Zone Map

O F M A I N E

Bulletin #2242



Why a Plant Hardiness Zone Map?

Low temperature is one of the most critical environmental limitations for plants. Some plants, like annual flowers and vegetables, simply avoid the cold of winter by dying at the end of summer. Perennial plants (including trees, shrubs and herbaceous perennials) must be able to survive the lowest temperature each winter in order to live into the next growing season. Such plants have a threshold temperature below which they will die. These threshold temperatures determine how far north plants will survive.

The Plant Hardiness Zone Map of the United States Department of Agriculture (USDA) represents low winter temperatures in North America. It is a guide to help you to assess plant hardiness.

What the Map Shows

The map on page 2 shows the plant hardiness zones of Maine based on average yearly minimum temperatures, from data for each year from 1974 to 1986. (This time period was the most recent prior to the map's release for which reliable data were available, with most sites reporting at least 10 years of data.) Compared to the earlier map, this map shows that many sites in Maine have become colder. This recent period of cold extremes is verified by reports of freeze damage to plants. Remember that the map is based on average annual minimum temperatures. Although there is a global warming trend, we continue to have very cold temperatures each winter in Maine.

Environmental Factors that Affect Plant Growth

Low winter temperature is just one factor that affects plant growth. A plant may be adapted to the temperature of a location, but may die because of a problem related to

another environmental factor. Or a plant may be stressed due to other problems, and may then die from the extra stress caused by a very cold winter. The success of perennial plants depends on many factors, including the following:

- **Temperature.** Plants *survive* within a more or less broad range of temperatures. They *thrive* within a more narrow range of temperatures. In Maine and other cold climates, minimum temperatures generally determine whether plants will survive. Plants survive very low temperatures only when they are fully hardened off. If a very low temperature occurs in late fall, before a plant has fully hardened off, it may not be able to withstand the stress. High temperatures during the summer and temperature fluctuations throughout the year also impact a plant's success.
- **Light levels.** Plants are categorized as sun, partial shade or shade plants, depending on the amount of light they thrive in. Cloudy days and shade from nearby plants and structures can greatly reduce the amount of light that reaches plants. Plants may survive in less light, but they will thrive only in locations where they get the amount of light they are best adapted to.
- **Light duration.** Daylength (the number of hours of light per 24-hour daily cycle) regulates many plant functions, including vegetative growth, flower bud development and growth, and the start of dormancy in the fall. Daylengths naturally vary from one season to another. In urban areas and in many landscapes, night lighting can interfere with plants' perception of daylength. Such artificial alteration of daylength can prevent a plant from fully hardening off. This may mean it won't survive the winter, especially if it's in a location where it may be marginally hardy.
- **Soil, water, oxygen and nutrients.** The soil supplies the plant with water, oxygen and nutrients. The soil must be able to absorb and hold a reserve of water, from rain or irrigation. This holding ability is better if the soil has ample organic matter.

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Plant Hardiness Zones in Maine

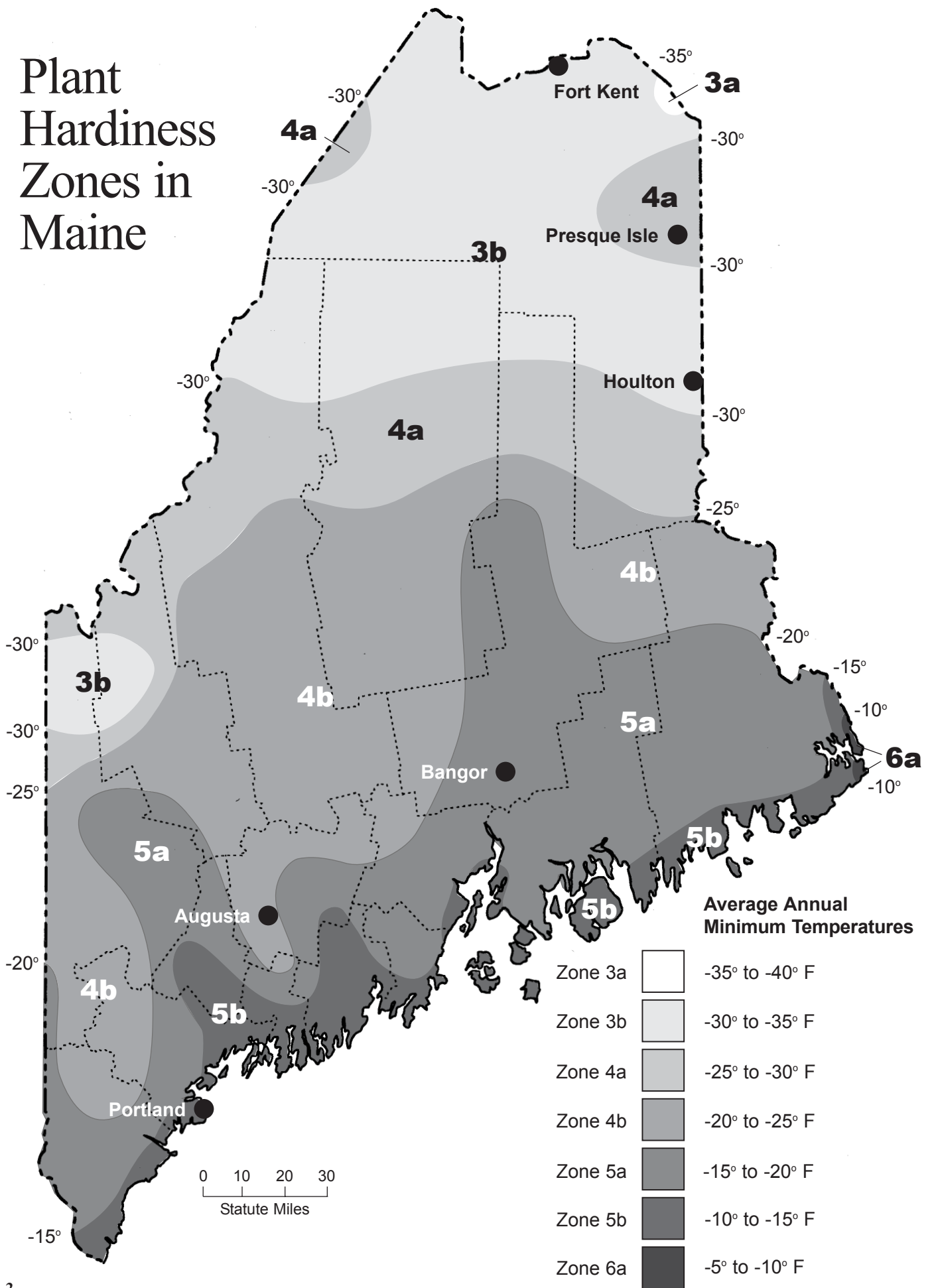


Table 1

Station Name	Lat		Long		Elev	Annual Minimum Temperatures in Degrees Fahrenheit Extreme Minimums												Avg		
	Deg	Min	Deg	Min	Ft Msl	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	74-86	
Acadia National Park	44	21	068	16	470	---	---	---	---	---	---	---	---	---	-11	-13	-11	-13	MSG	
Augusta FAA AP	44	19	069	48	350	-15	-14	-19	-8	-5	-13	-10	-12	-11	-12	-5	-7	-10	-10.8	
Bangor Airport	44	48	068	49	190	-22	-21	-23	-13	-8	-11	-23	-23	-17	-8	-5	-10	-13	-15.1	
Bar Harbor 3 NW	44	25	068	15	110	-12	-9	-12	-7	-6	-11	-16	-17	---	---	---	---	---	MSG	
Belfast	44	24	069	00	20	-19	-20	-15	-23	-15	-12	-27	-27	-27	-9	-26	-12	-9	-18.5	
Brassua Dam	45	40	069	49	1060	-25	-26	-33	-23	-23	-26	-24	-26	-28	-20	-32	-19	-18	-24.8	
Bridgewater	46	25	067	51	420	-31	-33	---	---	---	-36	-36	-32	-37	-17	-35	-28	-27	-31.2	
Brunswick	43	54	069	56	70	-21	---	---	---	---	-10	-10	-21	---	---	-10	-23	-9	-7	MSG
Caribou WSO AP	46	52	068	01	620	-32	-29	-32	-25	-16	-27	-23	-27	-28	-16	-27	-24	-25	-25.4	
Clayton Lake 2	46	37	069	32	1000	-42	-38	-38	-30	-27	-35	-29	-31	-35	-26	---	---	---	-33.1	
Corinna	44	55	069	16	220	-27	-25	-34	-25	-20	-19	-25	-38	-31	-17	-30	-25	-24	-26.1	
Dover-Foxcroft87083	45	11	069	15	460	---	---	---	-15	-12	-23	-28	-25	-29	-15	-29	-18	-18	-21.2	
East Hiram	43	53	070	45	530	-26	-26	-33	-25	-25	-33	---	---	-24	-19	-28	-15	-20	-24.9	
Eastport	44	55	067	00	90	-12	-10	-11	-6	-3	-7	-13	---	-16	---	-10	-9	-10	-9.7	
Ellsworth	44	32	068	26	20	-12	-13	-16	-18	-10	-7	-21	-33	-18	---	---	-15	-11	-15.8	
Farmington	44	41	070	09	420	-26	-26	-32	-22	-22	-23	-26	-34	-26	-15	-30	-22	-13	-24.3	
Fort Kent	47	15	068	35	520	-30	-36	-37	-35	-27	-38	-33	-29	-33	-18	-38	-36	-23	-31.7	
Gardiner	44	13	069	47	140	-25	-20	-28	-22	-17	-19	-24	-34	-27	---	-27	-18	-11	-22.6	
Grand Lake Stream	45	11	067	47	290	-15	-20	-23	-15	-9	-21	-21	-25	-28	-9	-24	-15	-15	-18.4	
Houlton Airport	46	07	067	47	490	-27	-32	-36	-29	-24	-29	-30	-41	-32	-16	-21	---	---	-28.8	
Jackman	45	38	070	16	1180	-31	-31	-26	-21	-20	-27	-26	-30	-32	-18	-34	-20	-22	-26.0	
Jonesboro	44	39	067	39	190	-15	-15	-16	-14	-9	-11	-21	-21	-22	-12	-17	-10	-13	-15.0	
Lewiston	44	06	070	13	180	-15	-12	-22	-12	-9	-12	-17	-23	-18	-7	-17	-10	-8	-14.0	
Long Falls Dam	45	13	070	12	1160	-26	-24	-28	-18	-19	-25	---	-28	-22	-16	-29	-14	-16	-22.0	
Madison	44	48	069	53	260	-16	-22	-28	-20	-20	-20	-30	-30	-25	-15	-28	-22	-25	-23.1	
Middle Dam	44	47	070	55	1460	---	-26	-34	-20	-26	-29	-28	-30	---	-18	---	-25	-22	-25.8	
Millinocket	45	39	068	42	360	-22	-22	-27	-16	-11	-21	-19	-23	-23	-11	-22	-20	-15	-19.3	
Newcastle	44	03	069	32	190	-13	-11	-14	-9	-7	-11	-20	-20	-15	-9	-14	-8	-8	-12.2	
Orono	44	54	068	40	120	-19	-15	-20	-14	-9	-13	-14	-20	-20	-6	-19	-14	-13	-15.0	
Patten 4 WSW	45	58	068	32	770	---	-24	-22	-19	-16	-21	---	---	---	---	---	---	---	MSG	
Portland WSMO AP	43	39	070	19	60	-16	-20	-20	-15	-14	-13	-20	-18	-16	-9	-19	-9	-8	-15.1	
Presque Isle	46	39	068	00	600	-24	-32	-35	-31	-19	-31	-22	-28	---	-17	-27	-21	-25	-26.0	
Rangeley	44	58	070	39	1530	-34	-30	-40	-29	-32	-38	-27	-35	-36	-27	-36	-27	-23	-31.8	
Ripogenus Dam	45	53	069	11	970	-26	-26	-32	-25	-24	-28	-26	-30	-28	-25	-29	-18	-25	-26.3	
Rockland	44	06	069	07	40	-13	-10	---	---	---	---	---	---	---	---	---	---	---	MSG	
Rumford 1 SSE	44	32	070	32	630	-18	-21	-22	-13	-15	-17	-17	-21	-23	-10	-28	-20	-10	-18.0	
Sanford 2 NNW	43	28	070	47	280	-15	-17	-22	-12	-13	-20	-18	-18	-20	-13	-23	-13	-6	-16.1	
Springfield	45	24	068	10	440	-20	-23	-27	-20	-16	-20	-25	-31	-23	-11	-24	-17	-17	-21.0	
Squa Pan Dam	46	33	068	20	610	-36	-37	-38	-33	-28	-34	-31	-30	-33	-21	-35	-25	-32	-31.7	
Van Buren 2	47	10	067	56	460	-36	-44	-41	-37	-27	-40	-34	-39	-34	-25	-47	-33	-26	-35.6	
Vanceboro 2	45	34	067	26	390	-24	-24	-26	---	-14	-20	-28	-29	-25	-14	-26	-20	-21	-22.5	
Waterville Pump Stn	44	33	069	39	90	-17	-18	-26	-22	-12	-15	-27	-32	-28	-13	-17	-24	-20	-20.8	
West Buxton 2 NNW	43	42	070	37	150	-18	-22	-30	-27	-21	-28	-31	-33	-26	-21	-33	-20	-16	-25.0	
West Rockport 1 NNW	44	12	069	09	380	---	---	---	-10	-15	-10	-25	-20	-18	-10	-22	-12	-12	-15.4	
Woodland	45	09	067	24	140	-23	-25	-19	-30	-14	-14	---	---	-22	-12	-27	-17	-16	-19.9	

Table 2 Plant Hardiness Zones Based on Average and Lowest Annual Minimum Temperatures

Station Name	Lat	Long	Ft Msl	Avg Zone	Low Zone	Station Name	Lat	Long	Ft Msl	Avg Zone	Low Zone
Acadia National Park	4421	06816	470	**	**	Lewiston	4406	07013	180	5b	4b
Augusta FAA AP	4419	06948	350	5b	5a	Long Falls Dam	4513	07012	1160	4b	4a
Bangor Airport	4448	06849	190	5a	4b	Madison	4448	06953	260	4b	4a
Bar Harbor 3 NW	4425	06815	110	**	**	Middle Dam	4447	07055	1460	4a	3b
Belfast	4424	06900	20	5a	4a	Millinocket	4539	06842	360	5a	4a
Brassua Dam	4540	06949	1000	4b	3b	Newcastle	4403	06932	190	5b	5a
Bridgewater	4625	06751	420	3b	3a	Orono	4454	06840	120	5b	5a
Bridgton 3 NW	4404	07045	520	4b	4b	Patten 4 WSW	4558	06832	770	**	**
Brunswick	4354	06956	70	**	**	Portland WSMO AP	4339	07019	60	5a	5a
Caribou WSO AP	4652	06801	620	4a	3b	Presque Isle	4639	06800	600	4a	3b
Clayton Lake 2	4637	06932	1000	3b	2b	Rangeley	4458	07039	1530	3b	3a
Corinna	4455	06916	220	4a	3a	Ripogenus Dam	4553	06911	970	4a	3b
Dover-Foxcroft 87083	4511	06915	460	4b	4a	Rockland	4406	06907	40	**	**
East Hiram	4353	07045	530	4b	3b	Rumford 1 SSE	4432	07032	630	5a	4a
Eastport	4455	06700	90	6a	5a	Sanford 2 NNW	4328	07047	280	5a	4b
Ellsworth	4432	06826	20	5a	3b	Springfield	4524	06810	440	4b	3b
Farmington	4441	07009	420	4b	3b	Squa Pan Dam	4633	06820	610	3b	3a
Fort Kent	4715	06835	520	3b	3a	Van Buren 2	4710	06756	460	3a	2a
Gardiner	4413	06947	140	4b	3b	Vanceboro 2	4534	06726	390	4b	4a
Grand Lake Stream	4511	06747	290	5a	4a	Waterville Pump Stn	4433	06939	90	4b	3b
Houlton Airport	4607	06747	490	4a	2b	West Buxton 2 NNW	4342	07037	150	4b	3b
Jackman	4538	07016	1180	4a	3b	West Rockport 1 NNW	4412	06909	380	5a	4b
Jonesboro	4439	06739	190	5b	4b	Woodland	4509	06724	140	5a	4a

continued from page 1

Soils must also be well aerated to supply enough oxygen to plant roots. Heavy clay and compacted soils hold too little oxygen for many plants.

Essential nutrients must be available in the soil in the right amount and balance. These nutrients are more available to plants if the soil pH (acidity or alkalinity) is at an optimum level. Each plant performs best within a range of pH and nutrient levels.

About Microclimates

The plant hardiness zone map is based on a limited amount of data, and the zones represent five degree increments of low temperatures. This averaging and smoothing of data give only a general picture of temperatures. It does not include local variations called microclimates. A low, wet location, for example, may be a lot colder than a higher, dry location. Cities tend to be warmer than nearby countryside. Large bodies of water make temperatures less extreme. High mountain areas tend to be colder than lower elevations. (The Maine data station with the highest elevation is Rangeley, 1,530 feet above mean sea level, so the mountainous areas of Maine may be colder than shown on the map.) One guideline states that a 1,000-foot rise in elevation means a 5 degree F drop in temperature.

There are two areas of Maine for which there are differences between site data and the map. The first is Houlton. Houlton data suggest that it should be in zone 4a. The map shows it in zone 3b. This rating reflects both the “smoothing” of data and the fact that data stations east of Houlton, in Canada, report much colder data than the Houlton station.

The second discrepancy is Augusta. The Augusta airport station’s data suggest that Augusta be rated zone 5b, but the map shows it in zone 4b, a full zone colder. Surrounding data stations in all directions produced colder temperature readings than Augusta. It’s unclear whether the entire Augusta area should be considered a warmer microclimate, or whether the Augusta weather station, located at the airport, is artificially influenced by river and urban factors.

How to Use the Map

Maine is divided into four zones, 3 through 6. Each represents a 10 degree F difference in average annual minimum temperatures. Each zone is further subdivided into sections a and b, with 5 degree F differences between them. For example, Bangor is located in zone 5a (-15 to -20 degrees F average annual minimum temperature), and Portland is located in zone 5b (-10 to -15 degrees F average annual minimum temperature).

Many catalogs and plant references refer to the plant hardiness zone map to indicate whether a plant is likely to survive in a location. For example, eastern white pine is rated hardy to zone 3, and would be expected to do well in any part of Maine. A Japanese maple, on the other hand, is rated hardy to zone 5 or 6 (depending on the type). It would show great adaptability only in coastal areas of Maine. You can use the zone information to choose landscape plants. However, don’t forget that there is a difference between surviving and thriving. A plant exposed to the lowest temperatures it can stand may survive the winter but lose so much vigor that it does not grow well.

This map is intended as a starting point only. Experiment with a wide variety of plant materials and collect long-term weather data for your site. This will help you fine-tune your ability to select plants that will survive and thrive in your location.

The map is based primarily on *average* minimum winter temperatures, which means that some winters may be a lot colder than what’s on the map. Plants that are marginally hardy to a location may succumb in an extremely cold winter. Table 1 (see page 3) shows the annual minimum temperatures recorded from 1974 to 1986 at locations in Maine on which the map is based. The average of these temperatures largely sets the zone rating. Table 2 (see page 3) lists zones calculated from the average minimum temperatures (as on the map) and also from the lowest annual minimum temperature recorded from 1974 to 1986.

Of course, to be hardy long-term, a plant must be able to withstand low temperatures as they occur. A plant might do well for several mild winters, only to succumb in a very harsh winter. You might want to choose plants based on a colder zone, especially if you think your location is colder than nearby areas. Or, when selecting plants that you want to live for many years, you may want to use your site’s “Low Zone” in Table 2 on page 3, rather than its “Average Zone.” That way, you’ll be selecting plants that will survive the very coldest temperatures they might encounter, even in an extreme year.

Developed by Lois Berg Stack, Extension ornamental horticulture specialist

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