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Kenneth Raleigh Brooks
Utah State University

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PLANT MATERIAL INFORMATION NEEDS OF LANDSCAPE ARCHITECTS AND HORTICULTURISTS IN THE INTERMOUNTAIN REGION

by

Kenneth Raleigh Brooks

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of the requirements for the degree

of

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ABSTRACT

Plant Material Information Needs of Landscape Architects and Horticulturists in the Intermountain Region

by

Kenneth Raleigh Brooks

Master of Landscape Architecture

Utah State University, 1977

Major Professor: Craig W. Johnson
Department: Landscape Architecture and Environmental Planning

The landscape plant materials informational needs of planting designers were evaluated in a historical and contemporary context. It was found that plant designers need to know about the environmental and cultural adaptation, landscape value and use, and commercial availability of the plant materials that they use.

Surveys of regional plant materials experts and nursery inventories were made to determine which plants should be included in a reference text. The climate of the region is also identified and compared to other parts of the country.

Plant materials reference books were reviewed to see if they provided this information for plants grown in the Intermountain region. These reference books were found to be inadequate for professional landscape architectural use in the region.

A proposal for a plant materials reference handbook is made and individual plants to be included are selected.

(204 pages)

CHAPTER I

THE INTRODUCTION

The study of plants has been a traditional part of the discipline of landscape architecture. The effectiveness of a landscape architect's planting plans are dependent upon several factors. These include the selection of plants and their organization and placement in the landscape. In order to make intelligent decisions about plant materials, (plants selected for specific landscape uses) landscape architects, horticulturists, and other professionals with planting design interests must be familiar with the characteristics of the plants from which he or she will make choices. This need for familiarity is amplified by Hubbard and Kimball (1945, p. 153):

> The characteristics of plants, over which, as we have seen, the landscape architect has little or no control, have inevitably a great influence on the effect of any design in which vegetation is used as a material. The forms, colors, and textures offered by plants give to the designer certain opportunities, but also they set for him certain limits. The natural character of each plant, and the associations in which, in most men's minds cling to certain plants, give a plant a complex individuality, and make it by no means an easy thing to use in esthetic composition. The understanding of these characteristics of plant material constitutes no inconsiderable part of the skill of the landscape architect. Indeed, it is special knowledge like this which differentiates the landscape architect from other designers.

It has become expected that landscape architects or horticulturists will know the environmental and cultural adaptation, the

potential landscape value and use, and the botanical characteristics of a wide range of plant materials. The most accurate knowledge and understanding of the characteristics and capabilities of plants comes from continual observation of them under diverse growing conditions and in a variety of uses. The writing and observations of others are helpful when they are available, however, it has been the opinion of this author that adequate reference materials on plant selection and use in the Intermountain region (centered around the Salt Lake City, Utah and Denver, Colorado metropolitan areas) does not exist. The intent of this thesis is to examine the validity of this supposition.

The Problem Statement

The premise that no adequate reference literature exists on plant materials for use by Intermountain landscape architects has been broken into several parts for examination in this thesis. Two basic assumptions have been made. The first is that planting designers need descriptive information on the environmental and cultural adaptation, the potential landscape value and use, the availability, and the botanical morphology of the plant materials that they use. The second assumption is that the available plant materials literature is not adequate for professional use in the Intermountain region. This thesis will evaluate the informational needs of landscape architects in the Intermountain region. It will also review the available plant materials literature to determine if it meets these information needs.

The Research Process

The thesis will be divided into several sections. The first section (Chapter II) will begin with a review of the literature tracing the history of man's developing appreciation and knowledge of the usefulness and limitations of plants. This review will provide a historic perspective for establishing informational needs including descriptions for individual plants concerning (1) environmental and cultural adaptations; (2) potential landscape value and use; (3) availability; and (4) botanical morphology.

The second half of Chapter II will use the information criteria from the historical review to evaluate the available recent literature used by landscape architects as plant materials reference handbooks. These books are used by planting designers for specific information about the expected performance or usefulness of individual plants. This review will be conducted to determine the adequacy of these reference works for professional use in the Intermountain region. The review will examine each work in five informational categories. The first three, suggested by the first half of the chapter, will include the (1) discussion of the environmental and cultural adaptation of individual plants; (2) potential landscape value and use; and (3) botanical descriptions. The review will also examine the: (4) intended audience of the reference work; and (5) geographical orientation of the work.

Plant materials reference handbooks that would be suited for use in the Intermountain region must include the plants adapted to

the region. Chapter III reports the results of three surveys made to identify the Intermountain regional climate and the plants adapted to it. The first of these surveys will define the region, giving it a climatic, environmental and geographic context. For this thesis, the climate of the region is important only as it effects the potential growth or usefulness of plants. Therefore, the description of the climate of the region will be presented in rather general qualitative terms from interpreted reports of other researchers.

The second survey will be conducted to determine which plants should be included in a plant materials reference text for the Intermountain region. Selected landscape architects, horticulturists and other plantsmen of the region will be surveyed to determine which plants they believe to be climatically adaptable, commercially available, and useful in Intermountain landscapes. A third survey will be made of selected Intermountain nursery catalogues and West Coast suppliers to determine which plants are part of regional commercial inventories.

Chapter IV will review the stated hypothesis and evaluate it in terms of the literature review, the review of recent plant materials reference books and the surveys of regional climate, plant materials experts and nursery inventories. From these evaluations, a determination about the validity of the basic assumptions can be made. If it is found that there is insufficient information existing (that the assumptions are true), recommendations for providing adequate information will be made. The last section will review potential further research, identifying apparent gaps in existing information.

CHAPTER II

LITERATURE REVIEW

The literature about plant materials is quite extensive and diverse including books on biology, plant morphology, taxonomy, physiology, pathology, agronomy, horticulture, landscape management, planting design, propagation, and many other academic and popular works. No attempt has been made to make a comprehensive review of this literature. The purpose of this chapter is to investigate two subject areas; the historical association of men and plants from prehistory to the present day, and plant materials reference books currently available for use by landscape design professionals.

The first section is intended to show how man's desire to know about plants has developed. It will trace man's growing appreciation of the potential uses of plants and the development of an understanding of the responses of plants to their environment. It is not intended to be an exhaustive study but rather to create an appreciation of the evolution of information to meet the needs of today's planting designers.

The second section of this chapter will look at current reference books to determine their applicability to the Intermountain region. These reference books will be evaluated in terms of the information needs described in the first part of this chapter.

Historical Associations

Man has been associated with plants from the beginning of time. A concomitant relationship between Man and plants is illustrated by the Judeo-Christian concept of creation--Man placed in the Garden of Eden. Historians (Berrall, 1966; Morris, 1972; Newton, 1971; and Tobey, 1973) have postulated that the earliest peoples were fruit, nut, and animal hunters and gatherers. Later neolithic man developed a primitive sedentary agriculture, domesticating animals and cultivating plants. The "Fertile Crescent" civilizations of 7000-4000 B.C. used plants not only for food but also for fiber and building materials. The Mesopotamian civilizations of 3000-331 B.C. used plants for gardens and parks as well as a source of food and fiber. Figure 2.1 (see page 7) is an artist's conception of the fourth century B.C. Hanging Gardens of Babylon.

In other parts of the world, emerging societies have had similar developments in agriculture. Between 2000 B.C. and 1200 A.D., the Hohokam and Anasazi Indians of southwest North America developed fairly extensive irrigation systems for their agriculture (Farb, 1968).

Plants provided not only food, clothing, buildings materials, and shade for parks and gardens; but they were also used by some cultures for medicines or for religious ceremonies. McHarg (1969) describes several pantheistic cultures where man's use of plants and respect for nature was considered a ritual of reverence and his relationship to his world was sacramental.

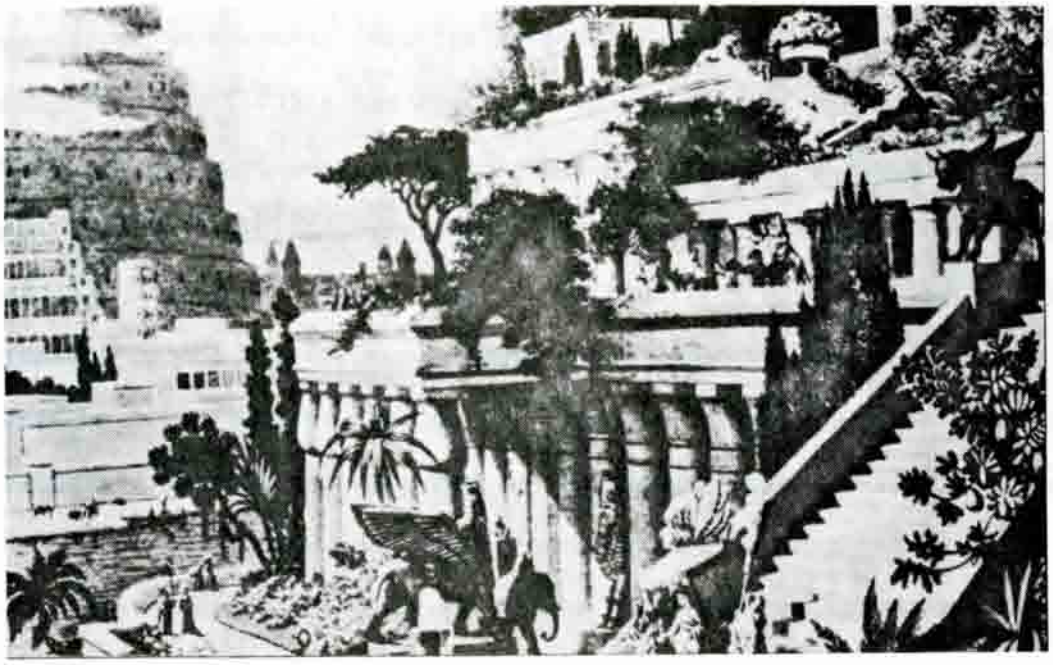

Figure 2.1. Artist's conception of the Hanging Gardens of Babylon. (Source: Berrall, 1966, plate 14)

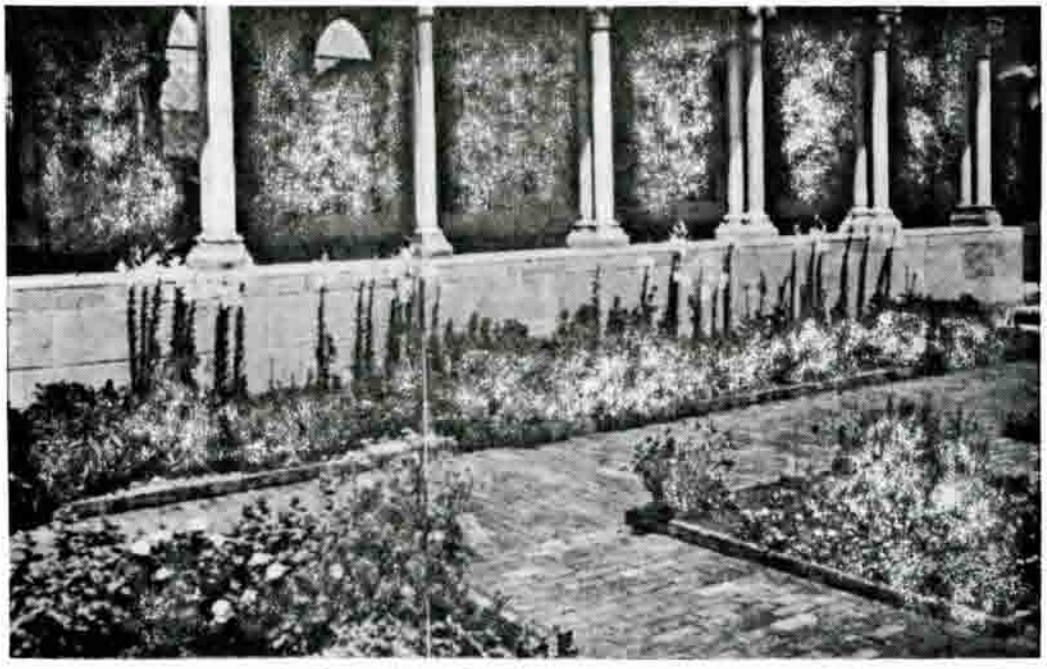

Figure 2.2. Physic and cooking herbs in a monastery cloister garden. (Source: Berrall, 1966, plate 61)

As early as the second century B.C., plant materials were considered an essential decorative part of the country residences of Roman nobility. Pliny the Younger's description of his Laurentine Villa (Plinius Secundus, undated) includes not only a discussion of the climatic orientation of the architecture and its relationship to conditions of the site, but also a horticultural appreciation of the planting around it. Pliny and his father were two of the earliest horticultural writers. Around his Villa, Pliny observed the growing conditions that plants were exposed to and was able to identify which plants grew well near the seashore and which could not tolerate the sea spray. This represents one of the first written documentations that plant materials be selected for specific microclimatic and environmental reasons. Such recommendations have remained an integral part of most plant materials literature.

During the eighth through the fourteenth centuries A.D., classical thought and literature from earlier periods were preserved by monasticism. From the intellectual endeavors of the monasteries came further development of horticultural practices such as the growing of vegetables, fruits, nuts, and physic plants (medicinal herbs). Figure 2.2 (see page 7) shows a monastery cloister garden. Also developed during the Medieval Period were the castle gardens which were planted within the castle walls to provide vegetables, spices, physic herbs, and visual relief from the cold, cramped, confinement of the fortress (see Figure 2.3, page 9). Charlesmagne's Capitulare was a plant list developed to recommend plants for use in the castle garden and it became the main reference turned to by monasteries, kings, and lords of the Middle Ages (DeTurk, 1968).

Figure 2.3. Artist's conception of a medieval castle garden. (Source: Berrall, 1966, plate 67)

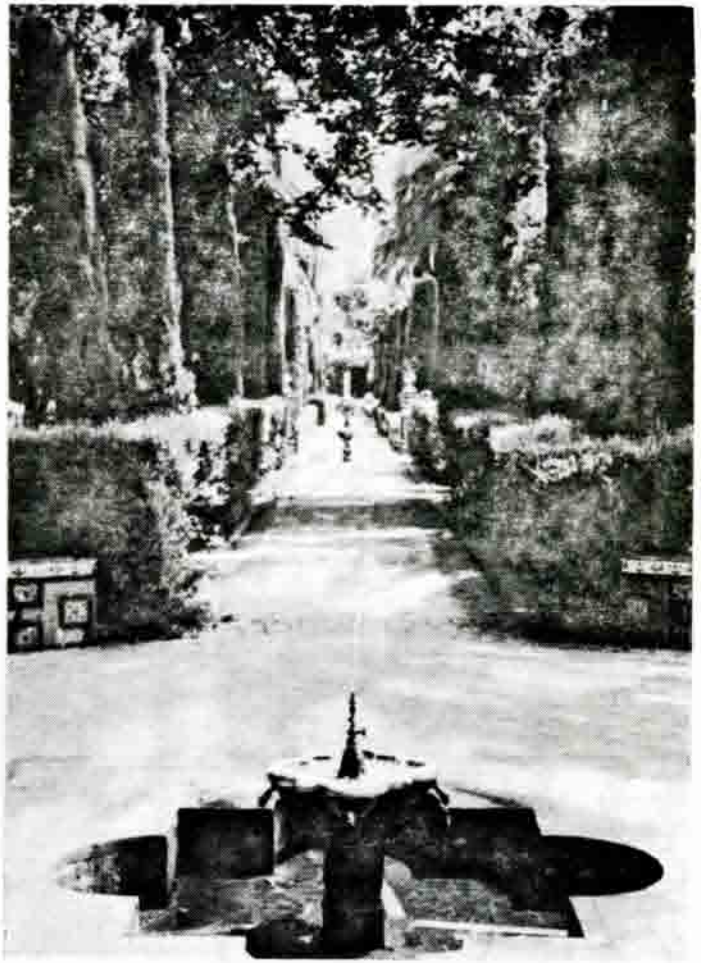

Figure 2.4. Trees and water featured in Moorish gardens of the Alcazar in Seville. (Source: Berrall, 1966, plate 43)

While most of Europe was in the grip of the Dark Ages, the Moors had developed elaborate landscapes in Spain (Newton, 1971). In this harsh climate, plant materials were used to provide shade and visual relief and they were watered with elaborate irrigation channels (see Figure 2.4, page 9).

During the Renaissance in Europe, garden design developed as a disciplined art. The Renaissance began in Italy in the fifteenth century, moved into France in the seventeenth century and then England in the eighteenth century. Although Renaissance gardens had been intended to provide aesthetic benefits, the designs of Claude Mollet and Andre le Nortre elevated the garden to a position of aristocratic ostentation. Trees and shrubs were selected for their visual characteristics and for their adaptability to the specialized horticultural practices of topiary, pollardy, pleaching, and espallier. The trained plants took on rigid geometric and architectonic forms (see Figure 2.5, page 11) as labyrinths, knots, parterre gardens and allees. Plant selection and literature on the subject during this period emphasized the plant's ability to adapt to the rigorous cultural and maintenance techniques of the period.

The "Gardenesque School" of landscape design developed in England through the work and writings of Humphrey Repton, Lanceolot "Capability" Brown, and J. C. Loudon. This movement was a direct contrast to the English Renaissance styles. Planting designers were now interested in developing a natural landscape (see Figure 2.6, page 11). Even the popular newspapers, The Spectator and The Guardian advocated the new style of natural gardens (Newton, 1971).

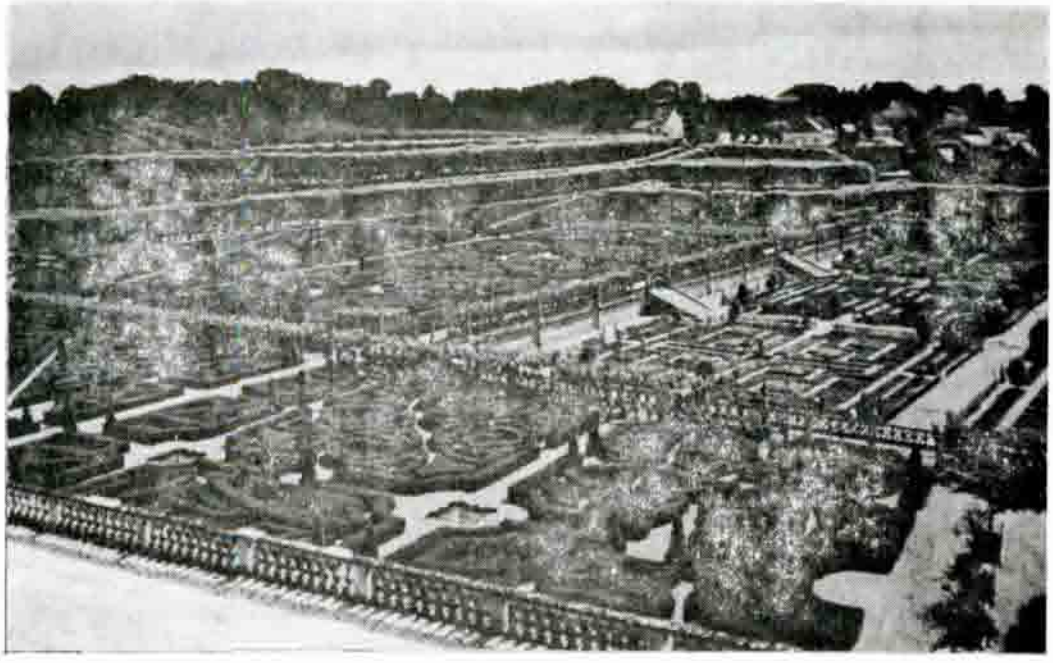

Figure 2.5. Architectonic use of plants in the Renaissance gardens at Villandry, France. (Source: Utah State University Department of Landscape Architecture slide library)

Figure 2.6. English gardenesque style landscape at Stourhead. (Source: Utah State University Department of Landscape Architecture slide library)

The gardenesque style was popularized in the United States through the writings of Andrew Jackson Downing. Downing's writings were partially responsible for the tremendous increase in general public popularity of landscape gardening. As public interest grew, so did the demand for more and different plants as well as "how to do it" references. The result was the collection, importation, and cultivation of exotic plant materials from all over the world. Popular literature such as Waugh's Landscape Gardening (1899) was written to describe the potential visual characteristics of primarily exotic and horticultural hybrid plant material.

The growth of landscape architecture in the midwest at the turn of the present century saw a shift in attitudes away from the ideals of Brown and Downing. The work and writings of Fredrick Law Olmsted, Sr., Wilhelm Miller, H. W. S. Cleveland, and O. C. Simonds began to show a much deeper understanding of the indigenous landscape of a region. In 1913 Miller stated, "The way for every new country to come into its own is to apply universal principles of design to the native materials " (Christy, 1976). These ideas were later echoed by Jens Jensen who "carefully noted plant sizes, forms, textures, colors, growth rates, successional patterns, and plant associations" (Johnson and Becker, 1976, p. 54). Jensen made it clear that landscape designs should not be considered "natural" just because plants were used in the styles common to the English gardenesque idiom. Instead, as Jensen described it, the plants must be used in plant associations to provide a successional landscape that was responsive to ecological principles (see Figure 2.7, page 13).

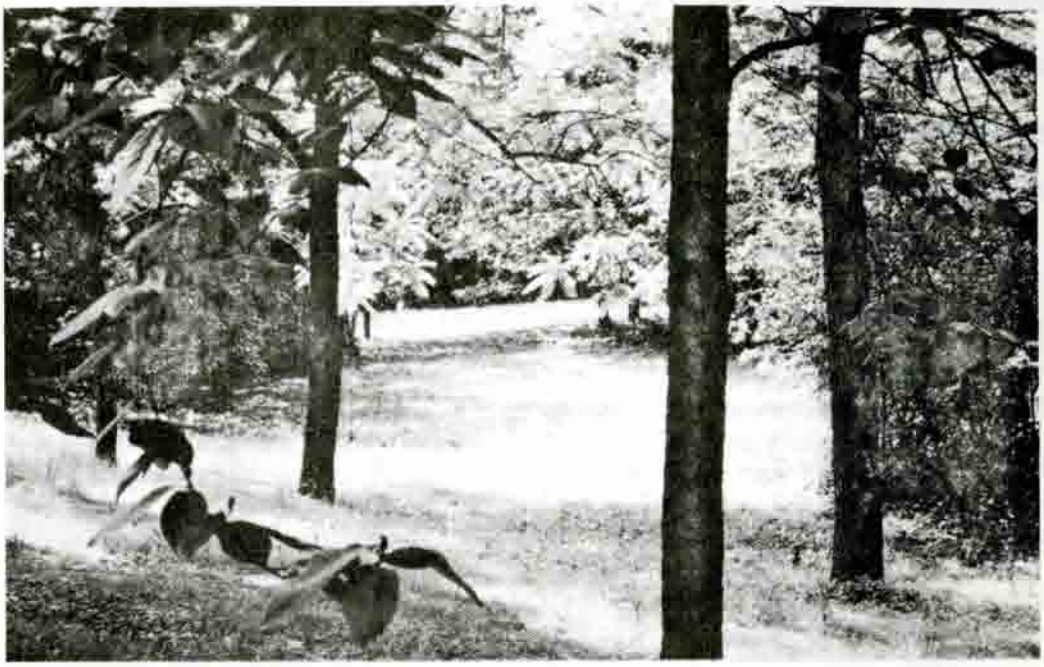

Figure 2.7. Prairie landscape style of Jens Jensen at St. Louis, Missouri. (Source: Gerald Smith)

Figure 2.8. Plants used to reduce undesirable noise, exhaust, and headlights of passing automobiles in front of homes. (Source: the author)

Henry V. Hubbard was another early twentieth century landscape architect who advocated a better understanding of the materials that landscape designers worked with. In his classic design textbook, An Introduction to the Study of Landscape Design, (Hubbard and Kimball, 1917, p. 3), he synthesizes many of the earlier expressed ideas:

> The landscape architect should know the materials of his art: ground forms, vegetation, and structures in their relation to the landscape. He should know on the one hand what results are physically possible of accomplishment with these materials, and on the other hand what kinds of beauty these materials can best produce, and what kinds of beauty were better attained in the materials of some other art. Since, for the most part, the landscape architect cannot produce at will in his design all of the forms which he might desire, but must choose from among the forms offered by nature those which will suit his purpose, he cannot be confident that his design is possible of execution unless he possesses an accurate first-hand knowledge of plant materials and of the ground forms from which he must choose the elements of his composition. Since the beauty of vegetation is that of intricacy, of multiplicity, of growth and change, the landscape architect's experience and power in design will come to be quite different from that of an architect, who deals with definite, rigid forms and balanced masses.

Hubbard further explains that because plants are alive and constantly changing, the planting designer must be familiar with their character from season to season and throughout their life span from juveniility to maturity and senescence. He defines the individuality of plant materials as a function of two factors: inheritance and environment. The inheritance is "its racial tendency to assume certain typical characteristics . . ." and its environment includes " . . . the soil and moisture conditions, the climate and air conditions, the wind, sun, and exposure." The form and character of the plant are the result of its inherent potential and its external surroundings.

Florence Bell Robinson develops these ideas much further in her writing. Her Planting Design (1940) textbook is divided into sections, the first being the "Design Factors" and the second being "Ecological Factors." She describes design factors as being the visual attributes expressed by the plant--its color, texture, and form. The ecological factors section discusses selecting materials according to their probable response to soil, climate and microclimatic influences.

More recent writers (Crowe, 1958; Daubenmire, 1959; Eckbo, 1956; Rubenstein, 1969) also express the need for the plant designer to know the environmental capabilities and limitations of the plants they use. Daubenmire, a plant ecologist, systematizes the environment into factors. These factors " . . . may be grouped into three major categories: (a) climatic (or aerial), such as rainfall and air temperature; (b) edaphic, such as soil moisture and soil temperature; and (c) biotic, such as parasitism and herbivory."

Recently interest has shifted away from the ecological and cultural adaptations of plant materials and is now directed towards determining the potential of plants to provide very specialized functions in the landscape. This was implied but not fully developed by earlier writers. Several writers (Carpenter et al, 1975; Colvin, 1970; Hackett, 1971; Johnson and Becker, 1976; Laurie, 1975; and Robinette, 1972) have summarized the findings of a number of researchers who are determining some of the special uses of plant materials. These special uses can be divided into five groups: (1) architectural uses; (2) engineering uses; (3) climate control;

(4) aesthetic uses; (5) other uses. Figure 2.8 (see page 13) shows some engineering uses of plants.

This review of some of the historical associations between plants and peoples has been conducted to document the development of man's appreciation for the potential uses that plants have. These relationships have been summarized on a time line in Table 2.1 (see page 17). The intent has been to show what people have learned about plants that allows them to use plants to create more beautiful and useful planting designs.

This discussion has shown that it would be useful for landscape designers to have a good reference handbook that classifies plants according to: (1) their potential responses to identifiable environmental conditions; and (2) their potential to serve various utilitarian or aesthetic landscape functions. This kind of plant materials handbook would be useful in determining if a plant can be used for a special landscape effect or whether or not that plant is adapted to a specific microclimatic environment.

Contemporary Reference Literature

A survey was made of contemporary plant materials reference handbooks to determine what type of information was presently available. Based on the assumptions outlined in Chapter I of this thesis, and the findings of the first part of Chapter II, each book was evaluated using five criteria. These include:

1. Discussion of the environmental and cultural adaptation and requirements of individual plant materials;

10,000-7000 B.C.	Neolithic Man Fruits and nuts gathered for food
7000-4000 B.C.	Fertile Crescent Civilizations Beginning of agriculture Plants used for food, fiber, and building materials
3000-331 B.C.	Mesopotamian Civilizations First use of plants for parks and gardens
2000 B.C.-1200 A.D.	Hohokam and Anasazi Indians Irrigation for agriculture in southwest North America
98-117 A.D.	Trajan is Emperor of Rome Plants used for decoration around Roman villas
700-1400 A.D.	Height of monasticism in Europe Cloister gardens, Castle gardens, Charlesmagne's Capitulare
732-1492 A.D.	Moors control parts of Spain Plants used for visual and climatic relief
1400-1700 A.D.	European Renaissance Elaborate garden design and horticulture practices
1800-1900 A.D.	English gardenesque style of design, plant designers advocate "natural" gardens
1900-1950 A.D.	Midwest U.S. landscape architects native plants used to recreate indigenous plant associations
1950- A.D.	Landscape architects use plants for architectural, engineering, climatic control, aesthetic, and other uses.

Table 2.1. Time line of man's association with plants

2. Discussion of the landscape value and use of individual plant materials, including their physiognomic character, other growth characteristics and suggested uses;

3. Providing a botanical description of individual material either as simple morphology or more specific taxonomic morphology;

4. The intended audience of the book, that is, its use by laymen; academic professionals (botanist, taxonimists, etc.) or landscape design professionals (landscape architects, ornamental horticulturists, etc.);

5. The geographical region for which the work was written.

The survey is capsulized in matrix form (see Table 2.2, page 20). Each book is evaluated for its contents and each of the five above criteria are marked to show the contents of the book. If the author has included a discussion on the issues of a specific criterion, that criterion is marked with an "X." If the author only makes a few comments about a given criterion, then that criterion is marked with an "O." Any pertinent remarks about the book are made in a remarks column on the matrix. Several multi-author books are cited by the first author only. Full literature citation for each book can be found in the Literature Cited section at the end of the thesis.

A review of the completed matrix shows that most of the authors that intend for their work to be used by design professionals include information on the environmental and cultural adaptation, and the landscape value and use characteristics of plants. The matrix shows that the idea of a plant material reference source for landscape design professionals based on the specific characteristics of plants

in a given geographic region is not a new one. However, at present such a comprehensive reference for professional use in the Intermountain region is unavailable. A number of authors (Feucht and Macksam, 1968; Harrington, 1954; Holmgren, 1948; Huddleston and Hussey, 1975; Johnson, 1970; Kelly, 1957, 1970, 1975, and 1976; Shaw, 1963; Sunset, 1967; and Sutton, 1974) have made contributions towards developing reference handbooks for landscape design professionals in the Intermountain area; however, their work is not comprehensive. Either their plant lists are too limited, their discussion of plant environmental adaptation is limited, or there is insufficient botanical information to identify specimens in the field.

Further evaluation of the comprehensiveness of some of these books is included in the matrix of suitability of selected plants for use in the Intermountain region included in Appendix A of this thesis. The matrix shows which individual plants are listed by Intermountain plant materials authors.

Table 2.2. Summary of contemporary plant materials reference literature

	Environmental Adaptation	Cultural Requirements	Physiognomic Character	Other Growth Characteristics	Suggested Uses	Simple Morphology	Taxanomic Morphology	Laymen	Academic Professional	Design Professional	North America	East Coast	Midwest	West Coast	Intermountain	Pacific Northwest	Remarks
Bailey (1942)	x	x	x	x			x		x	x	x						
Bailey (1949)	o						x		x	x	x						
Bailey (1976)	o						x		x	x	x						
Berry (1966)			x		o	o			x					x		x	
Brockman (1968)	o		o			o		x			x						Trees only
Collingwood (1974)	o		x	o	o	x		x	o	o	x						Trees only
den Boer (1959)		x	o	o	o		x		x		x						Crabapples only
Feucht (1970)	x	o	x	o	x			x		x					x		Ground covers only
Grimm (1962)	o		o		o		x		x			x					Trees only
Harlow (1969)	o		o		o		x		x		x						Trees only
Harrington (1954)			o				x		x						x		
Holmgren (1948)			o				x		x						x		
Hoyt (1958)	x	x	x	x	x	x				x							Subtropical regions
Huddleston (1975)		x	x	o	x	o		x		o					x		
Johnson (1970)					o	x		x		o					x		Trees only
Keeler (1969)			x	o	x	x	x	o	x	o		x					Shrubs only

Table 2.2. Continued.

	Environmental Adaptation	Cultural Requirements	Physiognomic Character	Other Growth Characteristics	Suggested Uses	Simple Morphology	Taxanomic Morphology	Laymen	Academic Professional	Design Professional	North America	East Coast	Midwest	West Coast	Intermountain	Pacific Northwest	Remarks
Kelly (1957)		o	o	o	x	o		x		o					x		
Kelly (1970)	o		o	o	o	o		x		o					x		Natives only
Kelly (1975)	o		o					x		o					x		
Nelson (1969)			o			x	x	o	x								
Rehder (1940)	o						x		x		x						
Robinson (1960)	x	x	x	x	x	x				x			x				
Roller (1972)					o	x	o		x								Poplar trees
Shaw (1963)	o					x		x	o						x		Trees only
Skinner (1958)		o		x				x			x						
Sunset (1967)	x	o	o	o	o			x		o				x	o	x	
Sutton (1974)	x	x	x	x	x	x	o			x					x		Natives only
Taylor (1961)		o		o	o	o		x		o	x						
Taylor (1965)	o	x	x	o	x	x	o	x		o	x						
Trelease (1931)							x		x			x					
Van Dersal (1938)	o	o			o	o			o	o	o						
Veirtel (1970)	o		o			x		o		x		x	o				

Table 2.2. Continued

	Waugh (1899)	Wyman (1956)	Wyman (1965)	Wyman (1969)	Zion (1968)
Environmental Adaptation		o	o	o	x
Cultural Requirements					x
Physiognomic Character	x	x	x	x	x
Other Growth Characteristics	o	o	o	o	x
Suggested Uses	x	x	x	x	x
Simple Morphology		x	x	x	x
Taxanomic Morphology					o
Laymen	x	o	o	o	
Academic Professional					
Design Professional	o	x	x	x	x
North America		x	x	x	x
East Coast	x				
Midwest					
West Coast					
Intermountain					
Pacific Northwest					
Remarks		Ground Covers	Trees only	Shrubs, vines	Trees only

CHAPTER III

SURVEYS OF INTERMOUNTAIN CLIMATE, PLANT MATERIALS EXPERTS, AND NURSERIES

The purpose of this chapter is to describe the methods and basic results of several surveys that were made as part of this study. The first survey was a review of the physiographic nature of the Intermountain region. It delimits the survey area boundaries and describes the geomorphic, vegetative and cultural framework of the region and then characterizes the climatic and environmental factors of the area. These characterizations will be somewhat generalized because extensive contributions of a number of authors (Callendar, 1966; Cronquist et al, 1972; Dudley et al., 1974; Hunt, 1967; Jeppson et al., 1968; Kelly, 1957, 1975, and 1976; Nelson, 1969; Sunset Editors, 1967; United States Department of Agriculture, 1972; and United States Geological Survey, 1970) towards documenting the nature of the Intermountain climate are readily available.

Within the scope of this thesis there are two reasons for describing the climate. First, to show the general effects of the climate on plant materials, and second, to compare Intermountain climate with the climate of other portions of the country. It is important to determine if plant materials reference handbooks written for other parts of the country would be suitable for professional use in the Intermountain region.

The purpose of the second and third surveys described in this chapter is to determine which specific plant materials are suited for landscape use in the Intermountain region. The survey was broken into two parts--a survey of the opinion of Intermountain plant materials experts, and a survey of Intermountain nursery inventories.

The Intermountain Climate

The theme of George Kelly's writing (1957 , 1975, and 1976) has been that horticulture in the Rocky Mountains is different than horticulture in other parts of the country. Kelly defines the Intermountain region as an area with a diameter of " . . . approximately a thousand miles . . . centering near the southwest corner of Wyoming . . ." covering portions of Montana, Idaho, Oregon, Nevada, Utah, Arizona, New Mexico, Colorado, Kansas, Nebraska, and the Dakotas.

For his discussion of Intermountain flora, Holmgren (Cronquist et al., 1972) delineates a study area that is ". . . essentially the dryland region between the Sierra Nevada on the west and the Rocky Mountains on the east, and between the moist country of the Pacific Northwest on the north and the warmer drylands to the south." This region covers all of Utah, most of Nevada, north of the Colorado River in Arizona, southeastern Oregon and southern Idaho.

For this thesis, the study area is more limited than either Kelly's or Holmgren's. The intent is to center it around the parts of the Intermountain region where the demand for landscape architectural planting design services is greatest, that is, the metropolitan areas around Salt Lake City, Utah and Denver, Colorado

(see Figure 3.1, page 26). Salt Lake City is the largest of a north-south strip of cities along the Wasatch Front stretching from Logan to Provo. Similarly, Denver is the largest of a north-south strip of cities along the Colorado Front Range from Fort Collins to Pueblo. These two metropolitan areas are the primary urbanized regions between the Midwest United States and the West Coast. Although the climate of Salt Lake City and Denver are not exactly alike, the two cities are more similar than dissimilar when compared to the climates of other parts of the country.

Boundaries for the study area should coincide with the natural landscape boundaries of physiographic provinces or climatic divisions. However, the use of exotic plant materials within "unnatural" urban environments often defies such classification schemes. Also the detail for such boundary identification is beyond the scope of this thesis and is left to the aforementioned authors. This study area will concentrate around the Salt Lake City--Denver areas and therefore convenient boundaries will form a trapezoid whose corners are approximated by the location of Logan, Utah; Cheyenne, Wyoming; Colorado Springs, Colorado; and Provo, Utah (see Figure 3.1, page 26). Although the areas adjacent to the study region will be similar in many respects, increasing the size of the study area increases the amount of regional heterogeneity.

There is a large amount of physiographic diversity within the study region. Hunt (1967) details the characteristics of five separate physiographic provinces making up the study region: (1) Basin and Range Province; (2) Middle Rocky Mountains Province; (3) Wyoming

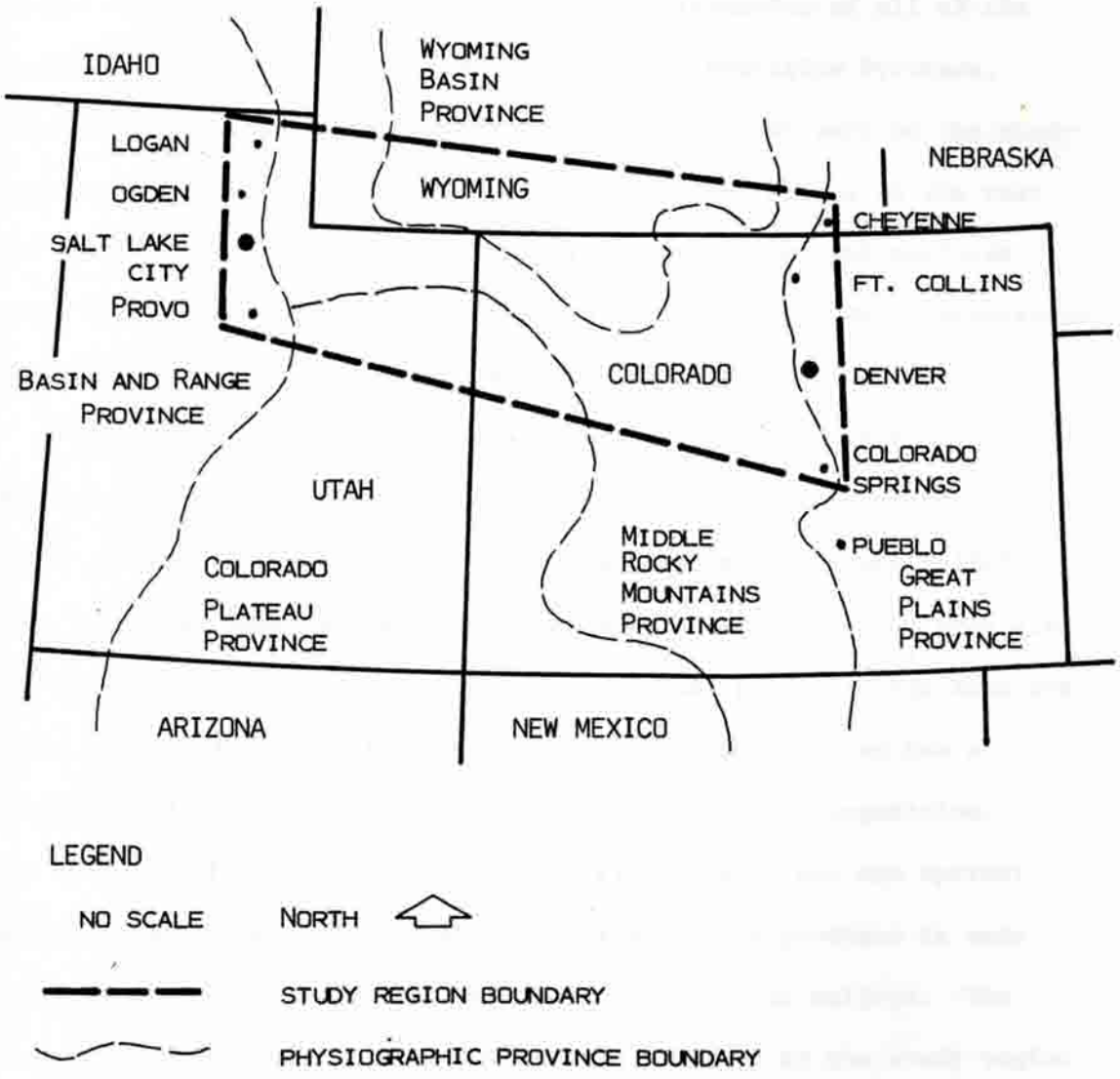

Figure 3.1. Map of the Intermountain study region with physiographic provinces. (Source: Hunt, 1967)

Basin Province; (4) Colorado Plateau Province; and (5) Great Plains Province. Each province (see Figure 3.1, page 26) has a distinct and unique climatic character. The general environmental character of the region becomes the interfacing characteristics of all of the provinces. At the center is the Middle Rocky Mountains Province, which meets the Basin and Range Province on the west part of the study region, the Wyoming Basin to the north, the Great Plains to the east and the Colorado Plateau to the south. The two major metropolitan areas are situated on the outwash plains of the Middle Rocky Mountains-Salt Lake City to the west and Denver to the east.

Hunt finds that many of the landform features of the Middle Rocky Mountains and the Wyoming Basin resemble the adjacent provinces to the north and west. These provinces are characterized by great relief with many high peaks above 14,000 feet above sea level. The area also has shallow soils and a larger amount of annual precipitation than the other provinces in the study region. The Colorado Plateau has a flatter landform and arid climate with sparse natural vegetation. The Basin and Range Province is generally more arid and has sparser natural vegetation than the Colorado Plateau. The province is made up of numerous small parallel ridges and broad, flat valleys. The Great Plains Province becomes the eastern boundary of the study region. The major cities of the Colorado Front Range area are located at the western edge of this province on the outwash plains at the base of the Middle Rocky Mountain Province. At this western edge, the province has gently rolling land with deeper soils and more precipitation than the Colorado Plateau or the Basin and Range Provinces.

A review of the findings of several authors (Callendar, 1966; Jeppson et al., 1968; and Dudley et al., 1974) shows the climatic character of the region. The Intermountain region is characterized generally by extreme fluctuation in temperature, topography, and solar orientation. It generally has high winds, low humidity, low annual precipitation, and alkaline soils. Any of these single factors can limit plant growth. Together, they severely reduce the number of plants that a landscape architect may select from for his designs.

The elevation in the Intermountain region varies from a low of about 4500 feet above sea level to greater than 14,000 feet. Most of the large population centers, though, are at about 5,000 feet. The latitude of the survey area is about 39°N on the south side increasing to about 42°N on the north. However, the largest metropolitan centers of Denver and Salt Lake City are very close at 40°N and 41°N, respectively.

Diurnal temperature variation is quite high within the region. It is not unusual for 30-40°F of temperature change between daily lows and highs. In Salt Lake City and Denver, the January mean temperature is about 20° while in July it is about 70°. Denver has about 120 freeze-free days annually while Salt Lake City has about 140. Cities north of them (Fort Collins, Cheyenne, and Logan) have fewer freeze-free days.

Precipitation is quite limited in the Intermountain region. The population centers get about 16-20 inches of precipitation in an average year. This amount varies with latitude, longitude and elevation. Generally, annual precipitation increased by moving south,

west or to a higher elevation within the region. Most of the precipitation comes during the winter (not during the growing season) and falls in the mountainous portion of the region. Of the 16-20 inches of annual precipitation that falls on Salt Lake City, only about six of it comes during the April-September growing season. This means that winter precipitation must be stored and applied during the summer as irrigation.

Relative humidity is also much lower in this region than in other parts of the country, causing higher evapotranspiration rates. There is not as much variation, though, in the winter, as there is in the summer.

Winds are quite high and variable in the region, further increasing evapotranspiration rates. Architectural wind loads of 90 to 100 miles per hour are not uncommon in the area (Callendar, 1966). Contential winds moving west to east are the major source of wind patterns in the region. Tropical storms from the southwest are the primary source of summer storms, while contential and maritime storm fronts from the north and northwest bring most of the winter precipitation (Dudley et al., 1974). As winds climb in elevation to pass over the mountains, they decrease in temperature and moisture holding capacity which often results in some precipitation. As the winds move over the mountains and down the east face, they increase in velocity, temperature and moisture holding capacity. This causes them to remove moisture from plant tissues which causes dessication within the plant. Because these winds are greatest in early spring while

activity within the plant is still quite low, the potential for severe dessication is high.

Exposure to increased sunlight intensity causes problems for some plant materials not native to this region. Being at an elevation of a mile above sea level, the region does not have as much filtration of sunlight by the atmosphere. This will cause some plants (such as *Taxus*) to burn when used in sunny exposures.

Soil in the Intermountain area is quite different from the soils of other parts of the country (Buckman and Brady, 1969). The soils of the area are quite shallow because of low precipitation, less vigorous natural vegetation, and relatively recent geologic activity. A lack of leaching activity in this arid climate has left them alkaline, many soils having a pH of 8.0 or 9.0 or higher, although most soils in the metropolitan areas have a lower pH. The high pH causes iron to be chemically unavailable to plants which often makes them chlorotic. The lack of moisture and therefore of high levels of biomass production has rendered the soils very low in residual organic matter which reduces fertility and makes the soil structure less desirable.

Biotic influences on plant materials are different in the Intermountain region also. There are generally fewer bacteriological and fungal disease problems because of lower moisture and temperature conditions in the region. There are also fewer insects but they can be devastating to plants already under environmental stress (Metcalf et al., 1962).

A comparison of several climatic factors for five U.S. cities show the degree of variation in plant environments across the country

(see Table 3.1, page 32). In this table, Denver and Salt Lake City of the Intermountain area are compared with Sacramento of the West Coast, Columbus of the Midwest, and Philadelphia of the East Coast. All five cities are of similar latitude. Generally, the Wasatch Front climate is milder than the Front Range climate. It gets slightly more precipitation, has milder temperatures, longer freeze-free season, and fewer drying winds. For this reason there are more plant species that will grow in Salt Lake City than Denver.

Ideal plants for the region then would be those that are tolerant to:

1. low annual precipitation;
2. high diurnal temperature fluctuation;
3. low annual minimum temperature;
4. low relative humidity;
5. drying winds of high velocity;
6. high light intensity;
7. shallow soils of low fertility and organic matter and high pH.

In other parts of the country where soil, moisture, light and wind do not seriously restrict the use of plant materials, temperature is the limiting environmental factor. In those parts of the country plant hardiness is measured in terms of tolerance to annual average minimum temperatures. The United States Department of Agriculture (1972) has developed a map of plant hardiness zones based on annual average minimum temperatures. Many authors label the plants in their books by hardiness zone. Annual average minimum temperature is not

Table 3.1. Selected climatic factors of five U.S. cities (Source: USGS, 1970)

	Sacramento	Salt Lake City	Denver	Columbus	Philadelphia
Latitude	38.6 N	41 N	40 N	40 N	40 N
Elevation	25'	4800'	5000'	800'	75'
January Mean Temperature	45° F	25° F	25° F	35° F	35° F
July Mean Temperature	75° F	75° F	70° F	75° F	75° F
Freeze-Free Period	270 days	140 days	120 days	180 days	180 days
Mean Annual Precipitation	24-32"	16-20"	16-20"	32-40"	40-48"
Mean Annual Snowfall	8"	32-64"	32-64"	16"	16-32"
January Relative Humidity	80%	70%	55%	75%	70%
July Relative Humidity	60%	40%	45%	70%	70%
Soils	Alkaline	Alkaline	Alkaline	Acidic	Acidic

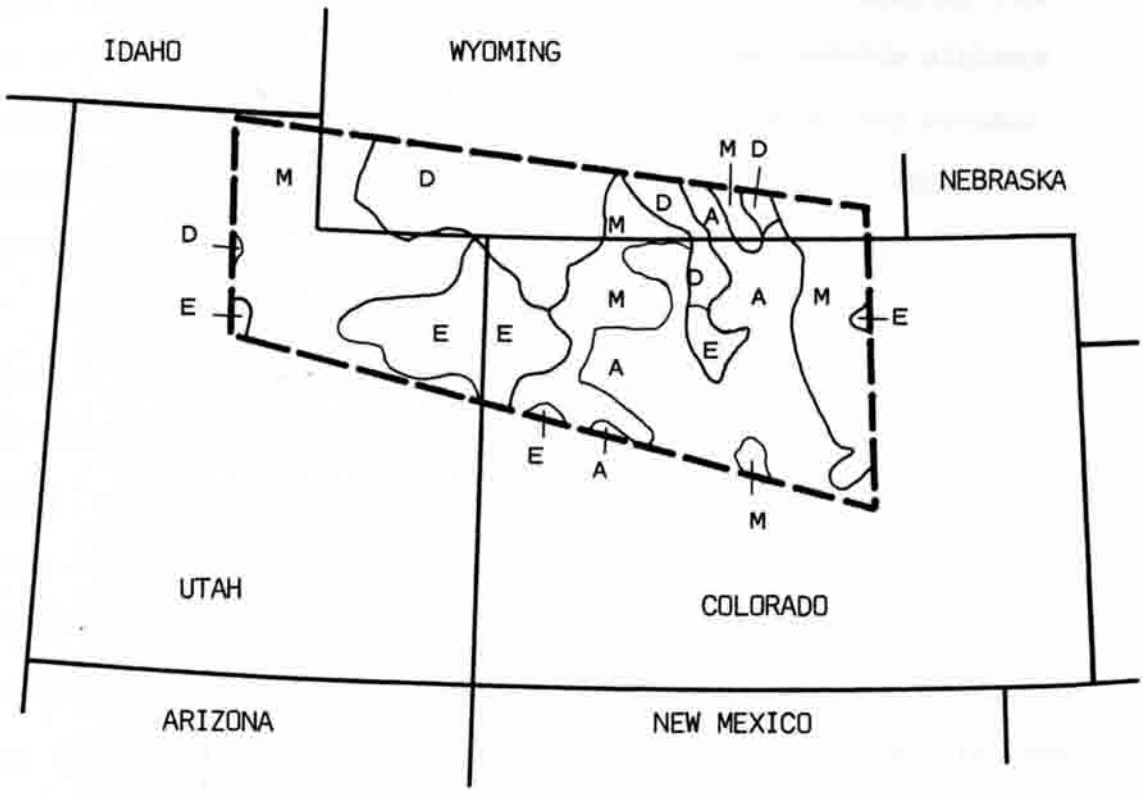

Figure 3.2. Distribution of Soil Orders within the study region. (Source: United States Geologic Survey, 1970)

One of the reasons for reviewing the climate of the region was to answer the question: "Is this climate different enough from other parts of the country to require its own plant materials literature?" Kelly's answer is yes, and a short evaluation of plants growing here and in other places will confirm that answer. The probable ultimate height of several trees is specified differently by various writers preparing reference material for different parts of the country (see Table 3.2, page 36).

These sizes are reported as the expected ultimate height of these trees in the regions shown. The figures for the West Coast are from the editors of Sunset Magazine (1967); the Midwest are from Robinson (1960), the East Coast are from Wyman (1965) and the Intermountain areas are from Wilmore (1977). In almost every case, the expected ultimate size of a tree grown in the intermountain region is substantially smaller than if that same specific tree was grown in another part of the country. For this reason, literature that is written for other parts of the country is not adequate for use in the Intermountain region. Some books have been intended for use for the entire country. Again, it is easy to see that the variation from region to region limits the value of such work.

Survey of Plant Materials Professionals

Two surveys were conducted to determine which plant materials were available and adapted to the Intermountain region. The first of these two was made of a number of Intermountain plant materials experts. A list of broadleaf trees, coniferous trees, broadleaf shrubs, coniferous shrubs, vines, ground covers, ornamental grasses, and

Table 3.2. Probable height (in feet) of trees grown in different parts of the U.S. (Sources: West Coast: the editors of Sunset Magazine, 1967; Intermountain Area: Wilmore Nursery Catalog, 1977; Midwest: Robinson, 1960; and East Coast: Wyman, 1965)

	American Linden	Norway Maple	White Ash	Austrian Pine	Scotch Pine	Colorado Spruce
West Coast	40-60	50-60	80	40	70-100	80-100
Intermountain Area	70	40	40	50	50	60-100
Midwest	to 120	50-100	50-80	60-150	80-90	80-150
East Coast	90	90	120	90	75	100

miscellaneous materials was compiled. The list was composed of species and subspecies of plants that are taught in plant materials courses at Utah State University (Brooks and Morse, 1976), Colorado State University (Macksam, 1974), or are reported by various authors (Brooks, 1973; Kelly, 1956, 1970, 1975, 1976; Sutton, 1974; and Johnson, 1970) to be used in the Intermountain region. On the list of plant materials that were sent to these experts were:

1. 208 different species or subspecies of broadleaf trees;
2. 53 different species or subspecies of coniferous trees;
3. 239 different species or subspecies of broadleaf shrubs;
4. 71 different species or subspecies of coniferous shrubs;
5. 24 different species or subspecies of vines;
6. 22 different species or subspecies of ground covers;
7. 10 different species or subspecies of ornamental grasses;
8. 7 different species of miscellaneous materials.

Nineteen plant materials professionals were selected to participate in this survey. Each was chosen for his extensive experience with plant materials in the Intermountain area. These experts included professional landscape architects, horticulturists, foresters, and nurserymen. Fifteen of the nineteen people responded to the survey, a return rate of almost 80 percent.

A list of the respondents and their professional affiliations are found in Appendix B of this thesis. Each survey participant was requested to review the list of plant materials and to place a checkmark (✓) in front of each plant that in their experience met each of the following criteria:

1. the plant is tolerant of our climatic or microclimatic conditions;

2. the plant is available in our Intermountain region (either commercially imported or propagated or collected);

3. the plant's characteristics can provide aesthetic or utilitarian usefulness in the landscape.

A copy of the cover letter that accompanied the survey list sent to each participant is included in Appendix B. The three selection criteria outlined above were developed from the findings of the literature review previously concluded (see Chapter II). Sutton (1974) conducted a survey to determine what criteria were helpful in evaluating the potential usefulness of plant materials. His nearly 60 informational categories may also be aggregated into three groups of information similar to the three selection criteria outlined above.

The results of this survey are summarized in the plant matrix in Appendix A. Three columns show the collective evaluation of each plant by the respondents. The columns show the percentage of respondents that marked the plants as "fit" (meeting all three of the selection criteria). Some participants elected to comment about the potential of some plants to meet one or two but not all three of the criteria. These plants were recorded as conditionally fit.

Because half of the participants are located in Colorado and the other half in Utah, a comparison is made between the responses of the two groups as well as an aggregate evaluation for the whole group. The survey of climatic conditions of the region (see the first portion of this chapter) showed that the environment is somewhat harsher in

the Front Range area than in the Wasatch Front area. The fitness scores[1] of the Colorado respondents are generally lower than the Utah respondents, reflecting their harsher environment.

Survey of Intermountain Nurseries

A survey was also made of several Intermountain nursery catalogs to determine which plants are commercially available. Most local large wholesale nurseries in the Intermountain area import most of their stock from other parts of the country because of the harshness of the local climate. The smaller nurseries generally purchase their stock from these larger local wholesale nurseries or else from the same propagation nurseries. For this reason a survey of the smaller local nurseries is unnecessary. A review of the inventory of selected larger nurseries will give an accurate accounting of the commercial availability of plant materials for the region. The catalogs of five large intermountain nurseries were surveyed and recorded on a list of the plant materials. Two other plant material listings were also included in this survey. The first was the catalog of a large propagation nursery of California that supplies a large portion of the plants imported into the region. The other was the index of plant materials sources of the AAN (American Association of Nurserymen, 1977).

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[1]The fitness score, which represents just the percentage of respondents who marked the plant, is found by assigning a value of one to the plant if it is marked fit and a value of one-half to the plant if it is marked conditionally fit. The aggregate percentage of fitness for each plant is then calculated as the sum of the score of that plant divided by the number of respondents. For example, if a plant was marked as fit by eleven respondents and as conditionally fit by two others, its percentage of fitness would be: $[(11 \times 1) + (2 \times .5)] \div 15 = 80$ percent.

An availability percentage score[1] is assigned each plant in a manner similar to the fitness score of plant materials experts survey. The results of this survey are summarized as percent availability score recorded on the plant materials matrix in Appendix A. A list of the nursery catalogs reviewed in this survey are included in Appendix C of this thesis.

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[1]Each plant received a score of one for each local nursery that carried it and a score of one-half for each listing in either the catalog of the propagation nursery or the AAN catalog. If a plant material was listed in three local nurseries and one of the others, its availability score would be: [(3 X 1) + (1 X .5)] ÷ 5 which is equal to 70 percent. A plant receives only one-half point for being listed in either the propagation nursery catalog or the AAN catalog because although it is commercially available somewhere in the country, it is not as easily accessible as material available locally.

CHAPTER IV

RESULTS AND CONCLUSIONS

All of the surveys conducted as part of this research have been directed at determining the validity of the basic assumptions outlined in Chapter I. The review of the historical associations of plants and people (see Chapter II) has shown that plant materials writers believe that good information about specific plants is important to successful design use of those plants. They have said that planting designers need to know how a plant will respond to climatic and environmental stimuli. They have also said that the designer must know the design factors of the plants, including its visual characteristics and its potential usefulness in the landscape.

These findings confirm the first assumption of this thesis: that planting designers need to have descriptive information on the environmental and cultural adaptation, the potential landscape value and use, the availability, and the botanical morphology of the plant materials that they use. As the literature survey shows, other authors have concurred with this assumption and have sought to prepare reference texts to provide the necessary information.

The second portion of the literature survey has reviewed these reference texts to evaluate their appropriateness for use in the Intermountain region. The matrix summary of plant materials reference texts (see Table 2.2, page 20) shows that many authors have made substantial contributions to the literature as a whole. However, there

is no single reference text that provides all of the necessary information in a form useful to landscape architects and horticulturists working in the Intermountain region.

Plant Materials Reference Proposed

It has been shown that no plant materials reference text for the Intermountain presently exists. It is proposed that such a reference be prepared. This proposal has also been made by George W. Kelly who feels that "So long as the garden writers and horticultural experts of the east ignore us, we must furnish our own garden literature that fits our climatic conditions."[1] This reference book should be divided into three sections: (1) a description of the Intermountain region; (2) descriptions of individual plants; and (3) other related information to make the work more useful.

Description of the Intermountain region

The first section of this reference book should describe the Intermountain area. It should provide the basic information necessary for the designer to understand the type of regional environment and landscape that he is working in. The review of the Intermountain climate (see Chapter III) has shown the region to have a substantially different plant environment than other parts of the country. The reference work should show how plants generally respond to the low annual precipitation, high diurnal temperature change, low annual

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[1]Personal letter from George W. Kelly to Kenneth Brooks, February 8, 1977.

average minimum temperature, low relative humidity, drying winds of high velocity, high light intensity, and shallow soils of low fertility, low organic matter and high pH. A description of environmental variation due to architectural and topographical microclimates should also be included.

Descriptions of individual plant materials

The surveys conducted as a part of this thesis have shown that the information needed by landscape architects and other planting designers can be organized into three categories. These include: (1) the environmental and cultural adaptation of each plant; (2) its landscape value and use; and (3) a botanical description. A proposed plant materials information recording format is shown in Figure 4.1. An example of a completed sheet for one species is shown in Figure 4.2. This format was developed by the author (Brooks and Morse, 1976a and 1976b) for use in teaching plant materials classes at Utah State University during 1974-1977, and found to be at least as informative and useful as any other format suggested by other authors.

The information on the sheets would generalize the typical responses of the species to various environmental and cultural exposures. Genetic variability and unique microclimatic exposures could be expected to cause plants to express characteristics not described on the sheet. Having descriptive information about a region, no matter how extensive, does not excuse the landscape architect from his responsibility of determining any unique environmental characteristics of a project site. Within this mountainous landscape, there

SCIENTIFIC NAME COMMON NAME

TYPE:
FAMILY:
OTHER NAMES:

ENVIRONMENTAL AND CULTURAL ADAPTATION

ZONE: INTRODUCED:
ORIGIN:
ASSOCIATION:
SOIL & MOISTURE:
EXPOSURE:
TRANSPLANTING &
MAINTENANCE:

LANDSCAPE VALUE AND USE

FORM:
TEXTURE:
ULTIMATE SIZE:
TWENTY YEAR SIZE:
RATE OF GROWTH: LIFE SPAN:
SPACING FOR MASSING:
AVAILABILITY: RELATIVE COST:
VALUE, USE &
RESTRICTIONS:

BOTANICAL DESCRIPTION

FOLIAGE:
INFLORESCENCE:
FRUIT:
BARK & TWIGS:
BUDS:
ROOTS:

VARIETIES, SELECTIONS, OR SIMILAR SPECIES

SCIENTIFIC NAME COMMON NAME

Figure 4.1. Plant materials information recording format

Cercis canadensis EASTERN REDBUD

TYPE:	Deciduous tree
FAMILY:	Leguminosae
OTHER NAMES:	Judas Tree

ENVIRONMENTAL AND CULTURAL ADAPTATION

ZONE:	4 INTRODUCED: 1641
ORIGIN:	Native to northeastern United States
ASSOCIATION:	An understory tree in eastern hardwood forests
SOIL & MOISTURE:	Prefers light, rich, moist soil; needs moderate but constant sun
EXPOSURE:	Sun or partial shade; better if protected from western sun; does not tolerate windy exposures
TRANSPLANTING & MAINTENANCE:	Transplant only in spring while tree is young; tolerant to pruning

LANDSCAPE VALUE AND USE

FORM:	A small deciduous tree with broad rounded or irregular head; branches horizontal, spreading and angular; usually low branched
TEXTURE:	Medium
ULTIMATE SIZE:	Ht. 25 feet (7.6 m) Sp. 20 feet (6.1 m) possibly larger in free standing areas
TWENTY YEAR SIZE:	Ht. 20 feet (6.1 m) Sp. 15 feet (4.6 m)
RATE OF GROWTH:	Slow LIFE SPAN: Short to moderate
SPACING FOR MASSING:	12 to 15 feet on center (3.8-4.6 m)
AVAILABILITY:	Most nurseries, commonest in small sizes
RELATIVE COST:	Moderate
VALUE, USE & RESTRICTIONS:	Beautiful early blossoms; good foliage, open and picturesque; useful as a small specimen or as an understory tree to contrast with larger trees, especially large evergreen trees; best in protected areas, not always winter hardy

Figure 4.2. Sample plant materials information sheet.

BOTANICAL DESCRIPTION

FOLIAGE:	Deciduous; alternate; simple, broadly cordate; 3-5 inches across (7.6-12.7 cm); margin entire; tip acuminate to acute; base cordate; with prominent radiating veins; glabrous to pubescent beneath; petiole about 1/3 as long as blade; bronze-green in spring, blue-green to dull green in summer; purple-bronze to yellow-brown in autumn
INFLORESCENCE:	Very showy; early spring before the leaves; rosy-pink; about 1/2 inch long (1.2 cm); in racemes; perfect; typical pea-shaped flower
FRUIT:	Conspicuous; early fall; legume pod about 2-3 1/2 inches long (95.1-8.9 cm); light brown
BARK & TWIGS:	Bark is dark red-gray; twigs dark or almost black, glabrous, with zig-zag character
BUDS:	Small, glabrous, ovoid, pinkish; upper bud slightly stalked; lower ones sessile, often superposed
ROOTS:	Fibrous, but limited and poor; not forming leguminous root nodules

VARIETIES AND SUBSPECIES

Cercis canadensis alba — WHITE EASTERN REDBUD
Flowers are white

Cercis canadensis 'Oklahoma' — OKLAHOMA EASTERN REDBUD
Flowers are wine-red

Cercis canadensis plena — EASTERN REDBUD
Flowers double, red; not as desirable as the species

Figure 4.2. Continued.

can be great microclimatic variation within very short geographic distances.

The first information on the sheet is basic classification information. It is headed by the recognized genus and species of the plant to be described. A subspecies or varietal name is included here if the sheet is to be devoted to the subspecies. For most cases, however, the sheet would be for describing the typical environmental or heritable character of the species and each of the subspecies would have special notes at the end of the sheet. To be consistent with the rules of plant nomenclature (Bailey, 1963; Dirr, 1975), the botanical name would be either in an italicized typeface or underlined. The generic name would be capitalized and, consistent with contemporary practice, the specific name would be all lower-case letters. Also listed on the heading of the sheet would be the popular common name of the plant.

The next descriptor would be TYPE which places the plant in a basic physiognomic group. The plant would be classified as deciduous, semi-evergreen, or evergreen. It would also be described as a tree, shrub, ground cover or vine. If the plant is not made up of woody tissue (as is a tree or shrub), it will also be described as semi-woody (suffruticose-a perennial with only the lower stems woody and persistant) or herbacious (a non-woody perennial).

Following TYPE would be FAMILY. This is just the taxanomic family that botanists have placed the genus in. OTHER NAMES would be the last of the classification descriptors. Any other common names or botanical synonyms would be listed and explained in this category.

The Environmental and Cultural Adaptation section describes the typical responses of the plant to environmental conditions. It will also suggest cultural and maintenance practices necessary for the successful use of the plant.

The first category would be ZONE. This is based on the Plant Hardiness Zone system of the United States Department of Agriculture. Chapter III has already shown that the Zone system by itself has very limited usefulness in this part of the country and that the U.S.D.A. Map of Plant Hardiness Zones is quite inaccurate in this mountainous landscape. However, the numerical rating given by other authors is helpful in determining the relative annual average minimum temperature tolerance of the plant and is therefore included.

The INTRODUCED category would give the year (as reported by Rehder, 1940) that the plant was introduced to cultivation in North America. This could be importation from another continent or collection from natural occurrence on this continent for cultivation. For hybridized plants, this category would give the date of hybridization.

The ORIGIN descriptor would list (after Rehder, 1940) the part of the world where the plant originated. If the plant is a horticulturally hybridized species, this category would list its parentage.

The ASSOCIATION category is for listing some of the other major genera of plants that are commonly found growing with the plant in question. In some cases it will be convenient to give the name of a specific plant association while in other cases more available

information will allow a listing of the dominate and understory vegetation found growing with this plant.

The SOIL & MOISTURE category would describe the preferred soil and moisture environment for the plant. Consideration of soil texture, soil pH, rockiness, drought, drainage and irrigation tolerances would be important.

The EXPOSURE descriptor would describe the preferred exposure of the plant to light and atmospheric factors. Tolerances to full sun, full shade, reflected heat, cold pockets, storm winds, dessication, and snow loads would be included here.

The TRANSPLANTING & MAINTENANCE category would describe the typical and specialized cultural requirements of the plant. It would specify the tolerance of the plant to various methods (bare-root, balled and burlapped, container established, mechanical spade) of transplanting. If plant age is especially important to successful transplanting, it would also be included. The tolerance of the plant to pruning and shearing (severe pruning such as topiary and formal hedging) would be listed under this section. Any special irrigation or other maintenance needs of the plant would be described in this section along with susceptibility to insect or disease problems.

The Landscape Value and Use section of this sheet would provide information that has been traditionally considered by designers as the "design" factors of the plant, that is, its inherited physiognomic characteristics. The first part of this section would describe physical attributes of the plant and the last portion of the section would recommend potential uses of the plant.

The first category would be FORM. It would describe the overall physical appearance of the plant, first giving its relative size (large, medium, small). Size is compared to other plants of the same type--a small tree is not as large as a medium-sized one, but it will be larger than a large shrub. The plant would also be described as deciduous, semi-evergreen, or evergreen; and a classification as a tree, shrub, ground cover or vine would be included. This is a duplication of the information listed under TYPE but it is included here under FORM as well because it is part of the description of the form of a plant. Also to be included in this category would be any other description of the shape of the plant, or its branching habit necessary to describe its appearance.

The TEXTURE descriptor would describe the plant as either coarse, medium or fine textured (as compared to other plants of similar TYPE). If there is a significant seasonal variation in the textural appearance of the plant, these would be specified in this section.

The size of the plant would be described in a couple of categories. All sizes would be average ranges for healthy plant material growing under average environmental conditions found in the Intermountain area. All measurements would be expressed in English units (feet and inches) followed parenthetically by metric conversions. The ULTIMATE SIZE would list a range for both height and spread of the plant. For trees, a TWENTY YEAR SIZE would list the average ranges of height and spread to be expected of the tree at that age. For shrubs, ground covers and vines, a FIVE YEAR SIZE would list average ranges of height and spread to be expected of the plant material at that age.

A RATE OF GROWTH category would describe a plant growth rate as either slow, moderate or rapid. This would be the typical growth rate potential of this plant under average environmental conditions compared to plants of the same TYPE. Similarly, the LIFE SPAN descriptor would describe the potential life span of the plant as either short, moderate or long. Again, the relative comparison would be made for a typical specimen growing under average cultural and environmental conditions compared to other plants of similar TYPE.

The SPACING FOR MASSING category would suggest a spacing distance for the plant. The distance would be the "on center" measurement that would be recommended so that the planting provides a massing design effect within the design time period. This period is the time necessary for the design effect to mature, if plant stock of typical nursery size is installed. This period would be five years for shrubs, ground covers and vines, and twenty years for trees.

The commercial AVAILABILITY is the next descriptor. The plant would be described as commonly found at few, some, many or most (Intermountain) nurseries. If the plant is commonly collected from local noncommercial sources, such a comment would be included. The RELATIVE COST would also be given here. The cost, described as high, moderate, or low, would be a comparison between this plant and other plants of similar TYPE, size, age, and condition.

The last category of this section would be the VALUE, USE & RESTRICTIONS of the plant. This would include comments about the attractive or distractive characteristics of the plant. Traditional or common architectural, engineering, climate control, aesthetic and

other uses would be suggested here. Any distinctive or showy features would be reviewed. Special uses such as edible food, wildlife habitat or wildlife food would be noted. Common problems of the plant such as disease or insect susceptibility or special maintenance requirements would also be included. Any threats such as poisonous fruit or foliage, or special landscape problems such as invasive root systems, weak and falling branches or undesirable odors would be described in this category. Any other comments about the usefulness of the plant would also be included.

The botanical description section is intended to provide a clear and complete morphological characterization of the plant. In order to express these exact morphological or taxanomical characteristics, basic botanical nomenclature would be used. This would make it necessary for the user of this section to be familiar with standard nomenclature or to use either a glossary in the book or another handbook such as those by Harrington (1957) or Porter (1967).

FOLIAGE would be the first category. The first comment would be about any showy summer or fall foliar characteristics. Next would begin the actual description of the leaves. The foliage would be listed as either evergreen or deciduous. Next would be a basic phyllotaxus (leaf arrangement on the stem) designation of either opposite, alternate or whorled. Following would be a designation as either simple or compound foliage. If the leaves are compound, they would be further described as palmate, pinnate, bipinnate or trifoliate and the number of leaflets commonly found would be given. The description of a single leaf would include the shape, size, and texture of the leaf blade, margin, tip, base, and surface. The

size, form and texture of petiole and stipular structures would be described. The last portion of the FOLIAGE category would be a description of the color of the foliage in each season.

The INFLORESCENCE category would describe the flowers and related structures. The first item would be a description of landscape effect of the flowers. If the floral display is very prominent, the INFLORESCENCE would be described as showy. If the floral display can be seen in the landscape but it is not so prominent that the plant is selected especially for flowers, the INFLORESCENCE would be described as conspicuous. If the flowers provide no flowering effect in the landscape, they would be considered to be inconspicuous. The next information provided would be the season of flowering, flower color, presence of fragrance, and size. Perfect, monoecious, or dioecious flowering condition would be next, followed by a description of the inflorescence morphological type.

The FRUIT descriptor would describe the morphological character and the landscape value of the fruit. The first description would evaluate the fruit as showy, conspicuous, or inconspicuous. Following would be the details of season of fruiting effect, color, size, and type. Comments about edibility or poisonousness or attractiveness to wildlife would be included. If the fruit has any unattractive attributes, these would also be included.

The BARK & TWIGS category would describe the color, texture, and other physical characteristics of bark, branches, twigs or stems. If there are special or unique attributes of internal portions of the stems that could aid in identification of the plant, these would be described.

The presence of prominent morphological structures such as thorns, lenticels, tendrils, pubescence or bloom would be discussed.

The BUDS descriptor would discuss the size, form, texture, and color attributes of vegetative buds. This category would be useful primarily for characterization of winter buds of deciduous plant material.

The final botanical descriptor would be a description of the ROOTS. A characteriziation of root habit, either taproot or fibrous root system would be followed by any comments of suckering, rhizome or stolon tendencies.

If the plant has important subspecies, they would be discussed in a section following the botanical description. For each subspecies, the botanical and common name would be given and a discussion of its unique environmental and cultural adaptation, landscape value and use, or botanical form would be presented.

The plant materials sheets would be even more useful if they also presented sketches of the plant. Good sketches would be preferable to photographs because of their ability to portray typical characteristics without problems of photographic background or lack of good specimens. The cost of reproduction would also be considerably less for sketches. Ideally, each plant would have a sketch of its silhouette form, its foliage, flowers, fruits, and twig with bud.

The plants selected for inclusion are proposed in Tables 4.1 and 4.2 (see pages 60, 66). These proposed lists were developed from the results of the surveys of Intermountain plant materials experts and nursery inventories (see Chapter III and Appendix A). Table 4.1, Primary list of plant materials recommended for the Intermountain

region, is made up of those plants from Appendix A that received at least a 75 percentage rating from the Intermountain authors survey, the experts survey or the nursery survey. These are the plants with the best potential for being adapted to the environment, useful in designed landscapes, and commercially available. Table 4.2, Secondary list of plant materials recommended for the Intermountain region is made up of those plants that received a 50 to 74 percent rating in the Intermountain authors survey, the experts survey, or the nursery survey. The plants on the secondary list have restricted usefulness because of limited environmental hardiness, less landscape design value, or low commercial availability. The work of these Intermountain authors (Colorado State University Extension Service, undated; Feucht and Macksam, 1968; Huddleston and Hussey, 1975; Johnson, 1970; Kelly, 1957, 1970, 1975, and 1976; Reimschussel, 1964; Shaw, 1963; and Sutton, 1974) is reviewed in Table 2.2 (see page 20) while the plants that they list are shown in Appendix A.

Other related information and references

The third section of the plant materials reference book would be made up of special helps. These would include an illustrated glossary of the environmental, design, and botanical terms used in the book. A list of other helpful references or literature should be provided. A glossary that shows pronunciation and origin or translated meaning of botanical names should be given. An index of botanical and common names found in the book would help "quick reference" use of it. Including a number of quick reference lists of plants for special

needs or uses would increase the usefulness of the book. Such lists might include:

1. plants (by type) adapted to specific environmental conditions, such as tolerance to alkaline or heavy soils, non-irrigated or wet conditions, windy exposures, sunny or shaded locations, reflected heat, or restricted root zone;

2. plants (by type) of given aesthetic characteristics as form, relative size, flowering effect (color, fragrance or season), fruiting effect (color, fragrance, or season), special foliage color, texture;

3. plants (by type) of given growth character such as life span or growth rate;

4. plants (by type) with potential for special uses such as street tree plantings, screening masses, shade, bird or wildlife food or habitat, edible fruit, traffic control, erosion control, wind break, or special effects (espalier, pollardy, pleaching, topiary or bonsai).

Recommendations for Further Study

Throughout the course of this research, a number of Intermountain plant materials issues have surfaced that have been deliberately excluded from the discussion. It is not that these issues are not important but rather that they have no direct bearing on the hypothesis that there is inadequate information on landscape plant materials in the Intermountain region.

One of the major problems encountered within this research was inconsistency with plant names. On one hand, some plants are known by several common names, while on the other, a single common name may be used for more than one specific plant. This is the very reason for using scientific names, however, not all of the regional nurseries follow this rule. Although the inventories of most of the more respected nurseries are cataloged by scientific name, there are a number of catalogs full of vague common names. Name confusion may lead to further problems. For example, a RIVER BIRCH purchased within the region may be either a *Betula occidentalis*, a *Betula fontinalis*, or a *Betula papyrifera*, depending upon which nursery it was purchased from. Each of these trees will respond differently in the landscape and therefore this discrepancy can cause a planting design to be less successful.

There is also a problem of multiple scientific names for single plants, such as the CRIMSON KING NORWAY MAPLE which is known both as *Acer platanoides* 'Crimson King' and *Acer platanoides schwedleri nigra*. A similar problem occurs when botanists update a scientific name but the old one or an inaccurate one maintains itself within the horticultural trade. A very prominent example of this is the genera *Mahonia*, which is now considered *Berberis* by most botanists[1] but is still sold in the nurseries as *Mahonia*.

Such problems with names should be resolved within the proposed reference book, however, it would probably be more convenient to

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[1]Personal conversations with Mr. Richard Walters, Herbarium Curator, Department of Botany and Plant Pathology, Colorado State University, Ft. Collins, Colorado, during April and May, 1973.

prepare a list of correct names with their historical or popular synonyms before the handbook is begun.

Another issue to review before the preparation of the handbook is the manner in which information will be gathered for presentation. Should all of the information come from observations of statistically sound plot design? Should it come from the empirical observations of a single expert or group of experts? Should it be developed from the consensus of opinion surveys of a large number of experts? Because the information demand suggested for each plant sheet in the proposed handbook is so large and variable, the research should attempt to take advantage of as much professional experience as possible while maintaining a high degree of scientific objectivity. The actual methods, intensity, and form of research would be highly dependent upon the types of time, facilities, staff and funding resources available.

There are several other issues to be considered as related to this thesis that deserve further exploration and full development outside the scope of this thesis. These issues may include:

1. the effects of using exotic plant materials on the natural Intermountain landscape or its gene pool;

2. the high irrigation requirements of exotic plant materials;

3. the landscape value of indigenous and endemic plant materials;

4. the propagation and marketing of indigenous or endemic plant materials not presently commercially available;

5. the environmental adaptability of exotic plant materials produced in other parts of the country and imported for use in the Intermountain region;

6. the availability of plant materials by size, relative cost, and conditions (such as bare root, B&B, or container);

7. descriptions of Intermountain plant material insect and disease threats and management.

The exploration of each of these issues would contribute greatly to the general usefulness of Intermountain plant materials reference literature.

Summary

This thesis has evaluated Intermountain plant materials literature and shown that it is inadequate for use by professional planting designers. The review of contemporary reference literature has shown the types of information that is needed. Evaluations of surveys of local professionals and nurseries have shown which plant materials are environmentally adapted, commercially available, and useful in landscape design work. A detailed proposal for preparation of a plant materials reference handbook is made as a result of the research.

Table 4.1. Primary list of plant materials for the Intermountain region.

BROADLEAF TREES

Acer ginnala AMUR MAPLE
Acer glabrum ROCKY MOUNTAIN MAPLE
Acer negundo BOXELDER
Acer platanoides NORWAY MAPLE
Acer platanoides columnare COLUMNAR NORWAY MAPLE
Acer platanoides 'Emerald Queen' EMERALD QUEEN NORWAY MAPLE
Acer platanoides schwedleri SCHWEDLER NORWAY MAPLE
Acer saccharinum SOFT MAPLE
Aesculus glabra OHIO BUCKEYE
Aesculus hippocastanum HORSECHESTNUT
Ailanthus altissima TREE OF HEAVEN
Alnus tenuifolia THINLEAF ALDER
Betula fontinalis NATIVE RIVER BIRCH
Betula papyrifera PAPER BIRCH
Betula pendula EUROPEAN WHITE BIRCH
Betula pendula gracilis WEEPING EUROPEAN WHITE BIRCH
Catalpa speciosa WESTERN CATALPA
Celtis occidentalis COMMON HACKBERRY
Cercis canadensis EASTERN REDBUD
Crataegus crus-galli COCKSPUR THORN
Crataegus lavallei CARRIER HAWTHORN
Crataegus oxyacantha ENGLISH HAWTHORN
Crataegus oxyacantha paulii PAUL'S SCARLET HAWTHORN
Crataegus phaenopyrum WASHINGTON THORN
Elaeagnus angustifolia RUSSIAN OLIVE
Fraxinus americana WHITE ASH
Fraxinus pennsylvanica lanceolata GREEN ASH
Fraxinus pennsylvanica lanceolata 'Marshall Seedless' MARSHALL SEEDLESS GREEN ASH
Fraxinus pennsylvanica lanceolata 'Summit' SUMMIT GREEN ASH
Gleditsia triacanthos HONEYLOCUST
Gleditsia triacanthos inermis THORNLESS HONEYLOCUST
Gleditsia triacanthos inermis 'Moraine' MORAINE HONEYLOCUST
Gleditsia triacanthos inermis 'Shademaster' SHADEMASTER HONEYLOCUST
Gleditsia triacanthos inermis 'Skyline' SKYLINE HONEYLOCUST
Gleditsia triacanthos inermis 'Sunburst' SUNBURST HONEYLOCUST
Gymnocladus dioicus KENTUCKY COFFEE TREE
Juglans nigra BLACK WALNUT
Koelreuteria paniculata GOLDENRAIN TREE
Laburnum vossi GOLDEN CHAIN TREE
Liriodendron tulipifera TULIP TREE
Malus 'Almey' ALMEY CRABAPPLE
Malus 'Dolgo' DOLGO CRABAPPLE
Malus 'Dorothea' DOROTHEA CRABAPPLE
Malus 'Hopa' HOPA CRABAPPLE
Malus ioensis plena BECHTEL CRABAPPLE

Table 4.1. Continued.

Malus 'Pink Perfection' PINK PERFECTION CRABAPPLE
Malus purpurea 'Eleyi' ELEY CRABAPPLE
Malus 'Radiant' RADIANT CRABAPPLE
Malus 'Red Jade' RED JADE CRABAPPLE
Malus 'Royalty' ROYALTY CRABAPPLE
Malus sargentii SARGENT CRABAPPLE
Malus 'Snow Cloud' SNOW CLOUD CRABAPPLE
Malus 'Strathmore' STRATHMORE CRABAPPLE
Platanus occidentalis AMERICAN PLANE TREE
Populus alba WHITE POPLAR
Populus alba pyramidalis BOLLEANA POPLAR
Populus angustifolia NARROWLEAF COTTONWOOD
Populus nigra italica LOMBARDY POPLAR
Populus sargentii PLAINS COTTONWOOD
Populus tremuloides QUAKING ASPEN
Prunus cerasifera 'Newport' NEWPORT FLOWERING PLUM
Prunus padus commutata MAY DAY TREE
Prunus virginiana CHOKECHERRY
Prunus virginiana demissa WESTERN CHOKECHERRY
Quercus borealis NORTHERN RED OAK
Quercus gambellii GAMBEL OAK
Quercus macrocarpa BUR OAK
Quercus robur ENGLISH OAK
Sorbus aucuparia EUROPEAN MOUNTAIN ASH
Syringa amurensis japonica JAPANESE TREE LILAC
Tilia americana AMERICAN LINDEN
Tilia cordata LITTLELEAF LINDEN
Tilia cordata 'Greenspire' GREENSPIRE LITTLELEAF LINDEN

CONIFEROUS TREES

Abies concolor WHITE FIR
Juniperus scopulorum ROCKY MOUNTAIN JUNIPER
Juniperus scopulorum 'Blue Haven' BLUE HAVEN JUNIPER
Juniperus scopulorum 'Grey Gleam' GREY GLEAM JUNIPER
Juniperus scopulorum 'Pathfinder' PATHFINDER JUNIPER
Juniperus virginiana EASTERN RED CEDAR
Juniperus virginiana 'Canaertii' CANAERT JUNIPER
Juniperus virginiana cupressifolia HILLSPIRE JUNIPER
Picea abies NORWAY SPRUCE
Picea engelmannii ENGLEMANN SPRUCE
Picea pungens COLORADO SPRUCE
Picea pungens glauca COLORADO BLUE SPRUCE
Pinus aristata BRISTLE CONE PINE
Pinus cembroides edulis PINYON PINE
Pinus densiflora umbraculifera JAPANESE TABLETOP PINE
Pinus edulis PINYON PINE
Pinus flexilis LIMBER PINE
Pinus mugo SWISS MOUNTAIN PINE
Pinus nigra AUSTRIAN PINE

Table 4.1. Continued.

Pinus ponderosa WESTERN YELLOW PINE
Pinus sylvestris SCOTCH PINE
Pseudotsuga menziesii DOUGLAS FIR
Thuja occidentalis AMERICAN ARBORVITAE

BROADLEAF SHRUBS

Artemisia tridentata BIG SAGEBRUSH
Berberis mentorensis MENTOR BARBERRY
Berberis thunbergii JAPANESE BARBERRY
Berberis thunbergii atropurpurea REDLEAF BARBERRY
Berberis thunbergii 'Crimson Pygmy'
CRIMSON PYGMY JAPANESE BARBERRY
Buddleia davidii COMMON BUTTERFLYBUSH
Caragana arborescens SIBERIAN PEA SHRUB
Chaenomeles speciosa FLOWERING JAPANESE QUINCE
Chaenomeles speciosa 'Texas Scarlet'
TEXAS SCARLET FLOWERING QUINCE
Cornus stolonifera RED OSIER DOGWOOD
Cornus stolonifera coloradensis COLORADO RED OSIER DOGWOOD
Cornus stolonifera flaviramea YELLOWTWIG DOGWOOD
Cotoneaster acutifolia PEKING COTONEASTER
Cotoneaster apiculata CRANBERRY COTONEASTER
Cotoneaster divaricata SPREADING COTONEASTER
Euonymus alatus WINGED EUONYMUS
Euonymus alatus compacta DWARF WINGED EUONYMUS
Euonymus atropurpureus BURNING BUSH
Euonymus europaeus EUROPEAN EUNOYMUS
Euonymus fortunei WINTERCREEPER
Euonymus fortunei coloratus PURPLE WINTER CREEPER
Euonymus fortunei radicans WINTERCREEPER
Euonymus fortunei vegetus BIGLEAF WINTERCREEPER
Forsythia 'Arnold Dwarf' ARNOLD DWARF FORSYTHIA
Forsythia intermedia GOLDENBELLS
Forsythia intermedia 'Linwood Gold' LINWOOD GOLD GOLDENBELLS
Forsythia suspensa WEEPING FORSYTHIA
Kolkwitzia amabilis BEAUTY BUSH
Ligustrum vicaryi GOLDEN VICARY
Ligustrum vulgare EUROPEAN PRIVET
Ligustrum vulgare 'Lodense' LODENSE EUROPEAN PRIVET
Lonicera tatarica TATARIAN HONEYSUCKLE
Lonicera tatarica zabeli ZABEL HONEYSUCKLE
Mahonia aquifolium OREGON GRAPE HOLLY
Mahonia aquifolium compacta DWARF OREGON GRAPE HOLLY
Philadelphus lemoinei LEMOINE MOCKORANGE
Philadelphus virginalis VIRGINAL MOCKORANGE

Table 4.1. Continued.

Potentilla fruticosa SHRUBBY CINQUEFOIL
Potentilla fruticosa 'Klondike' KLONDIKE CINQUEFOIL
Prunus cistina PURPLELEAF PLUM
Prunus glanulosa DWARF FLOWERING ALMOND
Prunus laurocerasus ENGLISH LAUREL
Prunus tomentosa NANKING CHERRY
Prunus triloba FLOWERING PLUM
Pyracantha coccinea 'Wyattii' WYATTII FIRETHORN
Pyracantha pauciflora FIRETHORN
Rhamnus catnartica COMMON BUCKTHORN
Rhamnus frangula columnaris TALLHEDGE BUCKTHORN
Rhus glabra SMOOTH SUMAC
Rhus glabra cismontana ROCKY MOUNTAIN SMOOTH SUMAC
Rhus glabra laciniata LACELEAF SMOOTH SUMAC
Rhus trilobata SKUNK BUSH SUMAC
Rhus typhina STAGHORN SUMAC
Rhus typhina laciniata LACELEAF STAGHORN SUMAC
Ribes alpinum ALPINE CURRANT
Rosa hugonis FATHER HUGO'S ROSE
Salix discolor PUSSY WILLOW
Sambucus canadensis AMERICAN ELDERBERRY
Sambucus canadensis aurea GOLDEN ELDER
Shepherdia argentea SILVER BUFFALOBERRY
Spiraea bumalda BUMALDA SPIREA
Spiraea bumalda froebelii FROEBEL PINK SPIREA
Spiraea vanhouttei VANHOUTTE SPIREA
Symphoricarpos albus COMMON SNOWBERRY
Symphoricarpos orbiculatus INDIAN CURRANT
Symphoricarpos orbiculatus chenaulti CHENAULT CORALBERRY
Syringa chinensis CHINESE LILAC
Syringa persica PERSIAN LILAC
Syringa vulgaris COMMON LILAC
Syringa vulgaris 'Charles Jolley' CHARLES JOLLEY COMMON LILAC
Viburnum burkwoodii BURKWOOD VIBURNUM
Viburnum dentatum ARROWWOOD
Viburnum lantana WAYFARING TREE
Viburnum opulus EUROPEAN CRANBERRYBUSH
Viburnum opulus compacta DWARF EUROPEAN CRANBERRYBUSH
Viburnum opulus nanum DWARF EUROPEAN CRANBERRYBUSH
Viburnum opulus sterile COMMON SNOWBALL
Viburnum trilobum AMERICAN HIGHBUSH CRANBERRY

CONIFEROUS SHRUBS

Juniperus chinensis armstrongi ARMSTRONG JUNIPER
Juniperus chinensis 'Blaauwi' BLAAUWI JUNIPER
Juniperus chinensis hetzii HETZ JUNIPER

Table 4.1. Continued.

Juniperus chinensis 'Mint Julep' MINT JULEP JUNIPER
Juniperus chinensis pftizeriana PFTIZER JUNIPER
Juniperus chinensis pftizeriana aurea GOLDEN PFITZER JUNIPER
Juniperus chinensis pftizeriana compacta COMPACT PFITZER JUNIPER
Juniperus chinensis pftizeriana glauca BLUE PFITZER JUNIPER
Juniperus chinensis procumbens 'Green Mound' GREEN MOUND JUNIPER
Juniperus chinensis 'Sea Green' SEA GREEN JUNIPER
Juniperus communis COMMON JUNIPER
Juniperus sabina 'Broadmoor' BROADMOOR JUNIPER
Juniperus sabina 'Buffalo' BUFFALO JUNIPER
Juniperus sabina 'Scandia' SCANDIA JUNIPER
Juniperus sabina tamariscifolia TAM JUNIPER
Picea abies nidiformis NEST SPRUCE
Picea glauca conica ALBERTA SPRUCE
Pinus mugo mughus DWARF MUGO PINE
Taxus cuspidata JAPANESE YEW
Taxus media 'Hicksii' HICKS YEW

VINES

Campsis radicans TRUMPET VINE
Clematis jackmanii JACKMAN CLEMATIS
Hedera helix ENGLISH IVY
Hedera helix baltica BALTIC IVY
Lonicera japonica 'Halliana' HALL'S HONEYSUCKLE
Parthenocissus quinquefolia VIRGINIA CREEPER
Parthenocissus tricuspidata BOSTON IVY
Polygonum aubertii SILVER-LACE VINE
Vinca minor PERIWINKLE

GROUND COVERS

Ajuga reptans CARPET BUGLE
Arctostaphyllos uva-ursi BEARBERRY
Cerastium tomentosum SNOW IN SUMMER
Juniperus horizontalis CREEPING JUNIPER
Juniperus horizontalis 'Bar Harbor' BAR HARBOR JUNIPER
Juniperus horizontalis plumosa ANDORRA JUNIPER
Juniperus horizontalis plumosa compacta COMPACT ANDORRA JUNIPER
Juniperus horizontalis 'Wiltoni' WILTON JUNIPER
Juniperus procumbens nana DWARF JAPGARDEN JUNIPER
Mahonia repens CREEPING MAHONIA
Sedum acre GOLDMOSS SEDUM
Sedum spurium STONECROP

Table 4.1. Continued.

ORNAMENTAL GRASSES

Festuca ovina glauca BLUE FESCUE
Nandina domestica HEAVENLY BAMBOO

MISCELLANEOUS MATERIALS

Yucca filamentosa ADAM'S NEEDLE
Yucca glauca GREAT PLAINS YUCCA

Table 4.2. Secondary list of plant materials for the Intermountain region.

BROADLEAF TREES

Acer grandidentatum BIGTOOTH MAPLE
Acer palmatum JAPANESE MAPLE
Acer platanoides 'Crimson King' CRIMSON KING MAPLE
Acer platanoides globosum GLOBE NORWAY MAPLE
Acer pseudoplatanus PLANETREE MAPLE
Acer saccharum SUGAR MAPLE
Aesculus carnea RED HORSECHESTNUT
Amelanchier alnifolia SASKATOON SERVICEBERRY
Amelanchier canadensis SHADBLOW SERVICEBERRY
Amelanchier utahensis UTAH SERVICEBERRY
Betula occidentalis WESTERN RIVER BIRCH
Betula pendula 'Youngii' YOUNG'S WEEPING BIRCH
Carpinus betulus fastigiata EUROPEAN HORNBEAM
Crataegus ambigua RUSSIAN HAWTHORN
Crataegus mollis DOWNY HAWTHORN
Crataegus rivularis RIVER HAWTHORN
Crataegus succulenta FLESHY HAWTHORN
Crataegus 'Toba' TOBA HAWTHORN
Fagus sylvatica EUROPEAN BEECH
Fagus sylvatica atropunicea PURPLE BEECH
Fagus sylvatica 'Tricolor' TRICOLOR BEECH
Fraxinus americana 'Rosehill' ROSEHILL WHITE ASH
Fraxinus excelsior EUROPEAN ASH
Fraxinus quadrangulata BLUE ASH
Ginkgo biloba GINKGO
Ginkgo biloba 'Autumn Gold' AUTUMN GOLD GINKGO
Gleditsia triacanthos inermis 'Majestic' MAJESTIC HONEYLOCUST
Gleditsia triacanthos inermis 'Rubylace' RUBYLACE HONEYLOCUST
Liquidambar styraciflua AMERICAN SWEETGUM
Magnolia soulangeana SAUCER MAGNOLIA
Malus 'American Beauty' AMERICAN BEAUTY CRABAPPLE
Malus 'Ecktermeyer' ECKTERMEYER CRABAPPLE
Malus 'Eleyi' ELEYI CRABAPPLE
Malus floribunda JAPANESE CRABAPPLE
Malus ioensis 'Klehms Improved' KLEHMS BECHTEL CRABAPPLE
Malus 'Katherine' KATHERINE CRABAPPLE
Malus 'Schiedeckeri' SCHIEDECKER CRABAPPLE
Malus zumi calocarpa REDBUD CRABAPPLE
Morus alba WHITE MULBERRY
Morus alba pendula WEEPING MULBERRY
Platanus acerifolia LONDON PLANE TREE
Populus acuminata LANCELEAF POPLAR
Populus deltoides EASTERN COTTONWOOD
Prunus americana AMERICAN PLUM

Table 4.2. Continued.

Prunus blireiana FLOWERING PLUM
Prunus cerasifera atropurpurea PISSARDI PURPLELEAF PLUM
Prunus cerasifera 'Krauter Vesuvius' KRAUTER VESUVIUS PURPLELEAF PLUM
Prunus cerasifera 'Thoundercloud' THUNDERCLOUD PURPLELEAF PLUM
Prunus cerasus MONTMORENCY CHERRY
Prunus padus EUROPEAN BIRD CHERRY
Prunus serrulata 'Kwanzan' KWANZAN FLOWERING CHERRY
Prunus subhirtella pendula WEEPING JAPANESE CHERRY
Prunus virginiana melanocarpa BLACKFRUITED CHOKECHERRY
Pyrus calleryana 'Bradford' BRADFORD PEAR
Quercus alba WHITE OAK
Quercus palustris PIN OAK
Robinia idahoensis IDAHO FLOWERING LOCUST
Robinia neo-mexicana NEW MEXICAN LOCUST
Robinia pseudoacacia BLACK LOCUST
Salix alba WHITE WILLOW
Salix alba tristis WEEPING WILLOW
Salix amygdaloides PEACH-LEAVED WILLOW
Salix babylonica WEEPING WILLOW
Salix blanda WEEPING WILLOW
Salix matsudana tortuosa CORKSCREW WILLOW
Sophora japonica JAPANESE PAGODA TREE
Sorbus scopulina GREENE'S MOUNTAIN ASH
Tilia euchlora CRIMEAN LINDEN
Tilia euchlora 'Redmond' REDMOND LINDEN
Ulmus americana AMERICAN ELM
Ulmus americana 'Augustine' AUGUSTINE AMERICAN ELM
Ulmus americana 'Molinei' MOLINE AMERICAN ELM
Ulmus carpinifolia 'Christine Buisman' CHRISTINE BUISMAN ELM
Ulmus pumila SIBERIAN ELM

CONIFEROUS TREES

Abies lasiocarpa SUB-ALPINE FIR
Juniperus chinensis columnaria glauca CHINESE BLUE COLUMN JUNIPER
Juniperus monosperma ONE-SEED JUNIPER
Juniperus osteosperma UTAH JUNIPER
Juniperus scopulorum 'Cologreen' COLOGREEN JUNIPER
Juniperus scopulorum 'Emerald Green' EMERALD GREEN JUNIPER
Juniperus scopulorum 'Moffett' MOFFETT JUNIPER
Juniperus scopulorum 'Sutherland' SUTHERLAND JUNIPER
Juniperus scopulorum 'Welchi' WELCH JUNIPER
Juniperus virginiana 'Burkii' BURKII JUNIPER
Juniperus virginiana 'Glauca' RED SILVER CEDAR
Juniperus virginiana 'Sky Rocket' SKY ROCKET JUNIPER
Larix decidua EUROPEAN LARCH
Picea abies pendula WEEPING NORWAY SPRUCE
Picea glauca WHITE SPRUCE

Table 4.2. Continued.

Picea pungens 'Koster' KOSTER BLUE SPRUCE
Pinus contorta LODGEPOLE PINE
Pinus thunbergi JAPANESE BLACK PINE
Thuja occidentalis pyramidalis PYRAMIDAL AMERICAN ARBORVITAE
Thuja orientalis ORIENTAL ARBORVITAE
Thuja orientalis 'Fruitlandi' FRUITLAND ARBORVITAE

BROADLEAF SHRUBS

Althea serica HIBISCUS
Amorpha canescens LEAD PLANT
Amorpha fruticosa FALSE INDIGO
Aralia spinosa DEVIL'S WALKING STICK
Artemisia schmidtiana 'Silver Mound' SILVER MOUND SAGEBRUSH
Berberis gladwynensis 'William Penn' WILLIAM PENN BARBERRY
Berberis julianae JULIANA BARBERRY
Berberis koreana KOREAN BARBERRY
Berberis thunbergii 'Kolbold' KOLBOLD BARBERRY
Berberis thunbergii 'Rosy Glow' ROSY GLOW JAPANESE BARBERRY
Buddleia alternifolia FOUNTAIN BUTTERFLYBUSH
Caryopteris clandonensis BLUEBEARD
Caryopteris incana BLUEMIST SPIREA
Ceanothus velutinus MOUNTAIN BALM
Cercocarpus intricatus LITTLE MOUNTAIN MAHOGANY
Cercocarpus ledifolius CURL-LEAF MOUNTAIN MAHOGANY
Cercocarpus montanus MOUNTAIN MAHOGANY
Chrysothamnus graveolens GREENPLUME RABBITBRUSH
Chrysothamnus nauseosus RUBBER RABBITBRUSH
Colutea arborescens BLADDERPOD
Cornus baileyi BAILEY DOGWOOD
Cornus elegantissima VARIEGATED DOGWOOD
Cornus stolonifera 'Kelseyi' KELSEY DWARF DOGWOOD
Corylus avellana contorta CURLY HAZELNUT
Cotinus coggygria SMOKETREE
Cotinus coggygria purpureus PURPLE SMOKETREE
Cotoneaster adpressa EARLY COTONEASTER
Cotoneaster adpressa praecox EARLY COTONEASTER
Cotoneaster congesta PYRENEES COTONEASTER
Cotoneaster dammeri BEARBERRY COTONEASTER
Cotoneaster dammeri 'Lowfast' LOWFAST BEARBERRY COTONEASTER
Cotoneaster horizontalis ROCKSPRAY COTONEASTER
Cotoneaster microphylla LITTLELEAF COTONEASTER
Cowanis mexicana CLIFF ROSE
Deutzia gracilis SLENDER DEUTZIA
Deutzia lemoine LEMOINE DEUTZIA
Euonymus europaeus aldenhamensis ALDENHAM SPINDLE TREE
Euonymus fortunei 'Emerald Cushion' EMERALD CUSHION WINTERCREEPER
Euonymus fortunei 'Emerald-n-Gold' EMERALD-N-GOLD WINTERCREEPER

Euonymus fortunei 'Golden Prince' GOLDEN PRINCE WINTERCREEPER
Euonymus fortunei 'Manhattan' MANHATTAN WINTERCREEPER
Euonymus fortunei 'Sarcoxie' SARCOXIE WINTERCREEPER
Euonymus japonica microphylla BOX-LEAF EUONYMUS
Forsythia intermedia 'Beatrix Farrand' BEATRIX FARRAND GOLDENBELLS
Forsythia intermedia 'Spring Glory' SPRING GLORY GOLDENBELLS
Hibiscus syriacus SHRUB ALTHEA
Holodoscus discolor BUSH ROCK SPIREA
Hydrangea arborescens grandiflora A. G. HYDRANGEA
Hydrangea paniculata grandiflora PEE GEE HYDRANGEA
Hypericum calycinum AARON'S BEARD
Hypericum kalmianum KALM ST. JOHNSWORT
Kerria japonica JAPANESE KERRIA
Ligustrum amurensis AMUR PRIVET
Lonicera involucrata BEARBERRY HONEYSUCKLE
Lonicera korolkowii BLUELEAF HONEYSUCKLE
Lonicera maakii AMUR HONEYSUCKLE
Lonicera morrowii MARROW HONEYSUCKLE
Lonicera tatarica 'Arnold Red' ARNOLD RED HONEYSUCKLE
Lonicera xylosteum 'Clavey's' CLAVEY'S HONEYSUCKLE
Philadelphus coronarius SWEET MOCKORANGE
Philadelphus virginalis 'Minnesota Snowflake'
MINNESOTA SNOWFLAKE MOCKORANGE
Photinia fraseri PHOTINIA
Physocarpus aureus GOLDEN NINEBARK
Physocarpus monogynus MOUNTAIN NINEBARK
Physocarpus opulifolius COMMON NINEBARK
Physocarpus opulifolius nana DWARF GOLDEN NINEBARK
Potentilla fruticosa 'Farreri' GOLD DROP CINQUEFOIL
Potentilla fruticosa 'Jackmanni' JACKMANN CINQUEFOIL
Potentilla fruticosa 'Katherine Dykes' KATHERINE DYKES CINQUEFOIL
Potentilla fruticosa 'Mount Everest' MOUNT EVEREST CINQUEFOIL
Potentilla fruticosa 'Sutter's Gold' SUTTER'S GOLD CINQUEFOIL
Potentilla fruticosa 'Tangerine' TANGERINE CINQUEFOIL
Prunus besseyi WESTERN SAND CHERRY
Prunus cistina 'Hansen' HANSEN'S PURPLELEAF PLUM
Prunus glandulosa rosea RED FLOWERING ALMOND
Prunus laurocerasus 'Otto Luykens' OTTO LUYKENS LAUREL
Prunus laurocerasus 'Zabeliana' ZABEL CHERRY LAUREL
Pursia tridentata ANTELOPE BITTERBRUSH
Pyracantha angustifolia 'Gnome' GNOME FIRETHORN
Pyracantha coccinea SCARLET FIRETHORN
Pyracantha coccinea 'Lalandei' LALANDEI FIRETHORN
Rhamnus frangula GLOSSY BUCKTHORN
Rhus aromatica FRAGRANT SUMAC
Ribes aureum GOLDEN CURRANT
Ribes inerme WHITESTEM GOOSEBERRY
Rosa blanda MEADOW ROSE
Rosa foetida bicolor AUSTRIAN COPPER ROSE
Rosa rugosa RUGOSE ROSE
Rubus deliciosus BOULDER RASPBERRY

Table 4.2. Continued.

Rubus strigosus AMERICAN RED RASPBERRY
Rubus parviflorus WESTERN THIMBLEBERRY
Salix caprea GOAT WILLOW
Salix exigua COYOTE WILLOW
Salix irrorata BLUESTEM WILLOW
Sorbaria sorbifolia URAL FALSE SPIREA
Spiraea arguta GARLAND SPIREA
Spiraea bumalda 'Anthony Waterer' ANTHONY WATERER SPIREA
Spiraea prunifolia BRIDALWREATH SPIREA
Spiraea trichocarpa KOREAN SPIREA
Symphoricarpos occidentalis WESTERN SNOWBERRY
Syringa chinensis alba WHITE CHINESE LILAC
Syringa rothmagensis PERSIAN LILAC
Syringa villosa LATE LILAC
Syringa vulgaris alba WHITE COMMON LILAC
Syringa vulgaris 'Charles X' CHARLES X COMMON LILAC
Syringa vulgaris 'Congo' CONGO COMMON LILAC
Syringa vulgaris 'Pres. Grevy' PRES. GREVY COMMON LILAC
Tamarix hispida KASHGAR TAMARISK
Viburnum americanum CRANBERRYBUSH
Viburnum carlcephalum FRAGRANT SNOWBALL
Viburnum carlesii KOREAN SPICE VIBURNUM
Viburnum lentago NANNYBERRY
Viburnum paucifolium MOOSEBERRY VIBURNUM
Viburnum rhytidophylloides 'Willowwood' WILLOWWOOD VIBURNUM
Weigela florida ROSE WEIGELA

CONIFEROUS SHRUBS

Juniperus chinensis 'Armstrong Globe' ARMSTRONG GLOBE JUNIPER
Juniperus chinensis aurea 'Gold Coast' GOLD COAST JUNIPER
Juniperus chinensis 'Blue Point' BLUE POINT JUNIPER
Juniperus chinensis 'Blue Vase' BLUE VASE JUNIPER
Juniperus chinensis 'Fruitlandi' FRUITLAND JUNIPER
Juniperus chinensis hetzii columnaris UPRIGHT HETZ JUNIPER
Juniperus chinensis 'Idyllwild' IDYLLWILD JUNIPER
Juniperus chinensis 'Keteleeri' KETELEERI JUNIPER
Juniperus chinensis 'Maneyi' MANEY JUNIPER
Juniperus chinensis 'Old Gold' OLD GOLD JUNIPER
Juniperus chinensis pfitzeriana 'Blue' BLUE PFTIZER JUNIPER
Juniperus chinensis 'Robusta Green' ROBUSTA GREEN JUNIPER
Juniperus chinensis 'San Jose' SAN JOSE JUNIPER
Juniperus chinensis torulosa HOLLYWOOD JUNIPER
Juniperus chinensis 'Wintergreen' WINTERGREEN JUNIPER
Juniperus communis saxitalis COMMON MOUNTAIN JUNIPER
Juniperus sabina SAVIN JUNIPER
Juniperus sabina 'Arcadia' ARCADIA JUNIPER
Juniperus sabina 'Von Ehron' VON EHRON JUNIPER

Table 4.2. Continued.

Juniperus scopulorum 'Lakewood Globe' LAKEWOOD GLOBE JUNIPER
Pinus mugo pumilo DWARF MUGO PINE
Taxus baccata repandens SPREADING ENGLISH YEW
Taxus cuspidata densiformis COMPACT JAPANESE YEW
Taxus cuspidata nana DWARF JAPANESE YEW
Taxus media 'Brownii' BROWN HYBRID YEW
Thuja occidentalis globosa GLOBE ARBORVITAE
Thuja occidentalis 'Little Gem' LITTLE GEM ARBORVITAE
Thuja occidentalis 'Woodwardi' WOODWARD GLOBE ARBORVITAE
Thuja orientalis aurea nana BERKMAN'S DWARF ARBORVITAE
Thuja orientalis 'Blue Cone' BLUE CONE ARBORVITAE

VINES

Celastris scandens AMERICAN BITTERSWEET
Clematis 'Ernest Markham' ERNEST MARKHAM CLEMATIS
Clematis henryi HENRY CLEMATIS
Clematis ligusticifolia WESTERN VIRGIN'S BOWER
Clematis 'Ramona' RAMONA CLEMATIS
Lonicera heckrotti 'Goldflame' GOLDFLAME HONEYSUCKLE
Lonicera sempervirens TRUMPET HONEYSUCKLE
Lycium halimifolium MATRIMONY VINE
Parthenocissus quinquefolia engelmannii ENGELMANN IVY
Polygonum reynoutria FLEECE FLOWER
Vinca major BIGLEAF PERIWINKLE
Vinca minor alba WHITE PERIWINKLE
Vitis labrusca CULTIVATED GRAPE
Wisteria floribunda JAPANESE WISTERIA
Wisteria sinensis CHINESE WISTERIA

GROUND COVERS

Achillea tomentosa WOOLY YARROW
Ajuga reptans atropurpurea CARPET BUGLE
Alyssum saxatile BASKET OF GOLD
Berbenia crassifolia WINTER-BLOOMING BERGENIA
Coronilla varia CROWN VETCH
Juniperus horizontalis 'Douglasii' WAUKEGAN JUNIPER
Juniperus horizontalis 'Hughes' HUGHES JUNIPER
Juniperus horizontalis plumosa compacta 'Youngstown' YOUNGSTOWN ANDORRA JUNIPER
Juniperus horizontalis 'Turquoise Spreader' TURQUOISE SPREADER JUNIPER
Pachysandra terminalis JAPANESE SPURGE
Potentilla verna SPRING CINQUEFOIL
Rosa wichuraiana MEMORIAL ROSE
Trifolium repens WHITE CLOVER

Table 4.2. Continued.

ORNAMENTAL GRASSES

Cortaderia selloana PAMPUS GRASS

Table 4.3. Summary of primary and secondary plant materials lists.

Plant Materials Type	Primary List	Secondary List	Total
Broadleaf Trees	73	74	147
Coniferous Trees	23	21	44
Broadleaf Shrubs	78	115	193
Coniferous Shrubs	20	30	50
Vines	9	15	24
Ground Covers	12	13	25
Ornamental Grasses	2	1	3
Miscellaneous Materials	2	0	2
Total	219	269	488

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APPENDIX A

Plant Materials Matrix

The results of the surveys conducted as part of this thesis are summarized and reported in this plant materials matrix. The first column shows the plant type: BT for broadleaf trees, ET for coniferous trees, BS for broadleaf shrubs, ES for coniferous shrubs, GC for ground covers, V for vines, OG for ornamental grasses, and MS for miscellaneous materials.

The next two columns on the matrix report the plants that are taught in plant materials courses at Colorado State University (Macksam, undated) and Utah State University (Brooks and Morse, 1976a, 1976b). An "X" in the column means that the plant is included in the class. These are the universities with the largest landscape architectural and horticultural programs within the study region.

The next eleven columns report the plant materials that intermountain region plant materials authors selected from Table 2.2 have included in their work. An "X" in the column means that the plant is included. Several of the works contain trees only or ground covers only. For these works the nonapplicable plants have an "N" marked in the column. For example, Johnson's (1970) book contains only trees and so *Ajuga reptens*, a ground cover, would be marked "N."

The eleven authors listed on the matrix are referenced in the Literature Cited section of the thesis and are listed below:

1. Extension (Colorado State University Extension Service, undated)

2. Feucht (and Macksam, 1968)
3. Huddleston (and Hussey, 1975)
4. Johnson (1970)
5. Kelly (1957)
6. Kelly (1970)
7. Kelly (1975)
8. Kelly (1976)
9. Reimschussel (1964)
10. Shaw (1963)
11. Sutton (1974)

In the following column is placed the percentage of inclusion by the authors. (The number of "X"s divided by the number of authors. If there are any "N"s for a particular plant, the number of authors considered is reduced accordingly.)

The next three columns summarize the survey of plant materials experts (see Chapter III and Appendix B). The percentage of response for Colorado experts and Utah experts and the aggregation of all is shown. Some of the plants were added after the experts survey was completed and are therefore marked with an "N."

The next column shows the percentage of nurseries that carry the plant (see Chapter III and Appendix C).

The last column makes a recommendation on the suitability of the plant for use in the Intermountain region based on criteria established in Chapter IV. A designation of "R" (recommended) means that the plant is highly suited for use, a "C" (conditionally recommended) means that the plant has limited suitability for the region, and a

"N" (not recommended) means that the plant is usually unsuited for use in the region.

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey											Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Abelia grandiflora GLOSSY ABELIA	BS				N		N				N		N		.00	N	N	N	.33	N
Abies balsamea BALSAM FIR	ET			X	N						X	N			.22	N	N	N	.08	N
Abies concolor WHITE FIR	ET	X	X	X	N	X	X	X	X		X	N	X	X	.89	.94	1.00	.97	.42	R
Abies lasiocarpa SUB-ALPINE FIR	ET				N		X	X	X		X	N	X	X	.67	.56	.29	.43	.00	C
Abies lasiocarpa arizonica CORK FIR	ET			X	N				X		X	N	X		.44	.06	.14	.10	.00	N
Abies pinsapo SPANISH FIR	ET				N							N			.00	N	N	N	.17	N
Acanthopanax sieboldianus FIVE-LEAVED ARALIA	BS	X		X	N		N				N	X	N		.25	.38	.29	.33	.17	N
Acanthopanax spinosus FIVE-LEAVED ARALIA	BS				N		N	X			N		N		.14	N	N	N	.00	N
Acer campestre HEDGE MAPLE	BT	X		X	N			X			X	N			.33	.44	.29	.37	.25	N
Acer circinatum VINE MAPLE	BS				N						N		N		.00	N	N	N	.17	N
Acer 'Crimson Sentry' CRIMSON SENTRY MAPLE	BT				N							N			.00	N	N	N	.17	N
Acer ginnala AMUR MAPLE	BT	X	X	X	N			X		X	X	N			.44	.88	1.00	.93	.92	R
Acer glabrum ROCKY MOUNTAIN MAPLE	BT	X		X	N	X	X	X	X		X	X		X	.80	.81	1.00	.90	.42	R

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey												Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Acer glabrum neomexicanum NEW MEXICAN MAPLE	BT				N							N			.00	.25	.43	.33	.00	N
Acer glabrum tripartitum ROCKY MOUNTAIN MAPLE	BT				N							N			.00	.31	.43	.37	.00	N
Acer grandidentatum BIGTOOTH MAPLE	BT	X		X	N		X		X		X	N		X	.56	.81	.57	.70	.42	C
Acer griseum : PAPERBARK MAPLE	BT				N							N			.00	N	N	N	.17	N
Acer negundo BOXELDER	BT	X	X	X	N		X	X	X		X	N	X		.67	.81	.79	.80	.17	R
Acer negundo interius BOXELDER	BT				N							N		X	.11	.19	.29	.23	.00	N
Acer negundo variegatum VARIEGATED BOXELDER	BT				N							N			.00	N	N	N	.17	N
Acer negundo violaceum BOXELDER	BT				N							N			.00	.19	.29	.23	.00	N
Acer palmatum JAPANESE MAPLE	BT	X		X	N						X	X			.22	.75	.00	.40	.67	C
Acer palmatum atropurpureum PURPLE JAPANESE MAPLE	BT				N							X			.10	.75	.00	.40	.42	N
Acer palmatum 'Bloodgood' BLOODGOOD JAPANESE MAPLE	BT				N							N			.00	N	N	N	.25	N
Acer palmatum dissectum LACELEAF JAPANESE MAPLE	BT				N							N			.00	.63	.00	.33	.42	N
Acer palmatum ornatum SPIDERLEAF JAPANESE MAPLE	BT				N							N			.00	.31	.00	.17	.00	N

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Acer palmatum 'Ribbonleaf' RIBBONLEAF JAPANESE MAPLE	BT				N							N			.00	N	N	N	.17	N
Acer palmatum sanguineum SCARLET JAPANESE MAPLE	BT				N							X			.11	N	N	N	.00	N
Acer platanoides NORWAY MAPLE	BT	X	X	X	N			X		X	X	N			.44	1.00	.86	.93	.75	R
Acer platanoides columnare COLUMNAR NORWAY MAPLE	BT	X		X	N							N			.11	.75	.86	.80	.92	R
Acer platanoides 'Crimson King' CRIMSON KING NORWAY MAPLE	BT	X	X	X	N						X	N			.22	.88	.36	.63	.42	C
Acer platanoides 'Drummond' DRUMMOND NORWAY MAPLE	BT				N							N			.00	N	N	N	.25	N
Acer platanoides 'Emerald Queen' EMERALD QUEEN NORWAY MAPLE	BT				N						X	N			.11	.88	.86	.87	.42	R
Acer platanoides 'Fassens' FASSENS NORWAY MAPLE	BT	X	X	X	N						X	N			.22	.50	.43	.47	.08	N
Acer platanoides globosum GLOBE NORWAY MAPLE	BT			X	N							N			.11	.69	.29	.50	.42	C
Acer platanoides 'Jade Glen' JADE GLEN NORWAY MAPLE	BT				N						X	N			.11	N	N	N	.25	N
Acer platanoides 'Mountain Beauty' MOUNTAIN BEAUTY NORWAY MAPLE	BT				N							N			.00	N	N	N	.17	N
Acer platanoides 'M-VI' M-VI NORWAY MAPLE	BT				N							N			.00	N	N	N	.17	N

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Acer platanoides 'Royal Red' ROYAL RED NORWAY MAPLE	BT				N						X	N			.11	N	N	N	.25	N
Acer platanoides schwedleri SCHWEDLER NORWAY MAPLE	BT	X	X	X	N			X		X	X	N			.44	.88	.93	.90	.92	R
Acer platanoides schwedleri nigra CRIMSON KING NORWAY MAPLE	BT				N							N			.00	.75	.29	.53	.00	C
Acer platanoides 'Summershade' SUMMERSHADE NORWAY MAPLE	BT				N							N			.00	N	N	N	.25	N
Acer pseudoplatanus PLANETREE MAPLE	BT	X		X	N			X			X	N			.33	.94	.29	.63	.33	C
Acer rubrum RED MAPLE	BT	X		X	N						X	N			.22	.69	.21	.47	.33	N
Acer rubrum columnare COLUMNAR RED MAPLE	BT				N							N			.00	.19	.14	.17	.08	N
Acer rubrum 'Red Sunset' RED SUNSET RED MAPLE	BT				N							N			.00	N	N	N	.42	N
Acer rubrum 'Schlesingeri' SCHLESINGER RED MAPLE	BT				N							N			.00	N	N	N	.25	N
Acer saccharinum SOFT MAPLE	BT	X	X	X	N			X		X	X	N			.44	.88	.79	.83	1.00	R
Acer saccharinum 'Blair' BLAIR SOFT MAPLE	BT			X	N						X	N			.22	N	N	N	.08	N
Acer saccharinum 'Silver Queen' SILVER QUEEN SOFT MAPLE	BT				N						X	N			.11	N	N	N	.25	N
Acer saccharinum 'Skinneri' SKINNER SOFT MAPLE	BT			X	N							N			.11	N	N	N	.17	N

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Acer saccharinum wieri WIER SOFT MAPLE	BT			X	N							N			.11	N	N	N	.00	N
Acer saccharum SUGAR MAPLE	BT	X		X	N			X			X	N			.33	.69	.50	.60	.58	C
Acer saccharum 'Green Mountain' GREEN MOUNTAIN SUGAR MAPLE	BT				N							N			.00	N	N	N	.42	N
Acer tataricum TATARIAN MAPLE	BT			X	N			X				N			.22	.19	.71	.43	.25	N
Achillea tomentosa WOOLY YARROW	GC				X		N				N	N	N		.14	.69	.43	.57	.00	C
Aesculus carnea RED HORSECHESTNUT	BT				N						X	N			.00	N	N	N	.50	C
Aesculus carnea 'O'Neill' O'NEILL RED HORSECHESTNUT	BT				N							N			.11	N	N	N	.25	N
Aesculus glabra OHIO BUCKEYE	BT	X	X	X	N			X		X	X	N			.44	.94	1.00	.97	.25	R
Aesculus hippocastanum HORSECHESTNUT	BT	X	X	X	N			X		X	X	N			.44	1.00	.79	.90	.42	R
Aesculus hippocastanum 'Baumanni' BAUMANN HORSECHESTNUT	BT				N						X	N			.11	.31	.29	.30	.00	N
Aesculus hippocastanum 'Red Carnea' RED CARNEA HORSECHESTNUT	BT				N							N			.00	N	N	N	.17	N
Aesculus octandra YELLOW BUCKEYE	BT	X		X	N			X			X	N			.33	.38	.57	.47	.17	N
Aesculus parviflora BOTTLEBRUSH BUCKEYE	BT			X	N							N			.11	.19	.14	.17	.00	N

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Aesculus pavia RED BUCKEYE	BT			X	N							X			.20	N	N	N	.00	N
Aethionema pulchellum STONECRESS	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ailanthus altissima TREE OF HEAVEN	BT	X	X	X	N			X		X	X	N			.44	.69	1.00	.88	.17	R
Ajuga genevensis CARPET BUGLE	GC				X		N				N	N	N		.14	N	N	N	.17	N
Ajuga metalica crispa CARPET BUGLE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ajuga reptans CARPET BUGLE	GC	X			X		N				N	N	N		.14	.88	.57	.73	.75	R
Ajuga reptans atropurpurea CARPET BUGLE	GC	X					N				N	N	N		.00	.75	.57	.67	.67	C
Ajuga retpans 'Bronzeleaf' BRONZELEAF CARPET BUGLE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ajuga reptans crispa CARPET BUGLE	GC						N				N	N	N		.00	N	N	N	.17	N
Ajuga reptans 'Harlequin' HARLEQUIN CARPET BUGLE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ajuga reptans 'Jungle Bronze' JUNGLE BRONZE CARPET BUGLE	GC						N				N	N	N		.00	N	N	N	.17	N
Ajuga reptans 'Jungle Green' JUNGLE GREEN CARPET BUGLE	GC						N				N	N	N		.00	N	N	N	.17	N

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Ajuga reptans 'Purpleleaf' PURPLELEAF CARPET BUGLE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ajuga reptans 'Silver Beauty' SILVER BEAUTY CARPET BUGLE	GC						N				N	N	N		.00	N	N	N	.17	N
Ajuga reptans variegata VARIEGATED CARPET BUGLE	GC				X		X				X	X	X		.14	N	N	N	.00	N
Albizia julibrissin SILK TREE MIMOSA	BT				N							N			.00	.56	.00	.30	.42	N
Albizia julibrissin rubra RED SILK TREE	BT				N							N			.00	N	N	N	.25	N
Alnus glutinosa BLACK ALDER	BT			X	N			X			X	N			.33	.44	.43	.43	.17	N
Alnus tenuifolia THINLEAF ALDER	BT	X		X	N		X	X	X	X	X	N		X	.78	.56	.71	.63	.08	R
Althea serica HIBISCUS	BS				N					X		N			.63	.71	.67	.00	.00	C
Alyssum montanum MOUNTAIN ALYSSUM	GC				X		N				N	N	N		.14	N	N	N	.00	N
Alyssum saxatile BASKET OF GOLD	GC				X		N	X			N	N	N		.29	.75	.57	.67	.17	C
Amelanchier alnifolia SASKATOON SERVICEBERRY	BT	X		X	N		X		X		X	X		X	.60	.69	.71	.70	.25	C
Amelanchier alnifolia pumila DWARF SASKATOON SERVICEBERRY	BT			X	N						X	N			.22	N	N	N	.00	N
Amelanchier canadensis SHADBLOW SERVICEBERRY	BT				N						X	X			.20	.44	1.00	.70	.08	C

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Amelanchier pumila SERVICEBERRY	BT				N				X			N			.11	N	N	N	.00	N
Amelanchier utahensis UTAH SERVICEBERRY	BT			X	N		X		X		X	X		X	.60	.63	.43	.53	.00	C
Amorpha canescens LEAD PLANT	BS			X	N	X	N	X	X	X	N		N		.71	N	N	N	.25	C
Amorpha fruticosa FALSE INDIGO	BS			X	N	X	N	X	X	X	N	X	N		.86	.06	.57	.30	.00	C
Amorpha nana DWARF WILD INDIGO	BS			X	N		N	X	X		N		N		.43	.06	.29	.17	.00	N
Arabis alpina MOUNTAIN ROCKCRESS	GC				X		N				N	N	N		.14	N	N	N	.00	N
Antennaria spp. PUSSYTOES	GC					X	N				N	N	N		.14	N	N	N	.00	N
Aralia spinosa DEVIL'S WALKING STICK	BS	X	X	X	N		N	X			X		N		.38	.63	.43	.53	.17	C
Arctostaphyllos patula GREENLEAF MANZANITA	BS	X			N		N		X		N		N	X	.29	.56	.00	.30	.00	N
Arctostaphyllos uva-ursi BEARBERRY	GC			X	X	X	N	X	X		N	N	N	X	.86	.69	.57	.63	.42	R
Arenaria verna caespitosa IRISH MOSS	GC				X		N				N	N	N		.14	N	N	N	.17	N
Aristolochia durior DUTCHMAN'S PIPE	V		X	X	N		N				N	X	N		.29	.25	.71	.47	.17	N
Armeria maritima COMMON THRIFT	GC				X		N				N	N	N		.14	N	N	N	.00	N

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Aronia arbutifolia RED CHOKEBERRY	BS			X	N		N				N		N		.14	N	N	N	.17	N
Aronia arbutifolia brilliantissma RED CHOKEBERRY	BS				N		N				N		N		.00	N	N	N	.17	N
Aronia melanocarpa BLACK CHOKEBERRY	BS			X	N		N				N		N		.14	N	N	N	.17	N
Aronia melanocarpa elata BLACK CHOKEBERRY	BS				N						N		N		.00	N	N	N	.17	N
Artemisia abrotanum OLD MAN WORMWOOD	BS				N		N		X		N		N		.14	.25	.57	.40	.17	N
Artemisia cana HOARY SAGEBRUSH	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Artemisia schmidtiana 'Silver Mound' SILVER MOUND SAGEBRUSH	BS				X		N				N		N		.13	.19	.86	.50	.00	C
Artemisia tridentata BIG SAGEBRUSH	BS	X			N	X	N		X		N	X	N	X	.57	.81	.86	.83	.17	R
Artemisia tridentata abruscula DWARF SAGEBRUSH	BS				N		N		X		N		N		.29	N	N	N	.00	N
Artemisia tridentata nova DWARF SAGEBRUSH	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Artemisia tridentata rothrockii INTERMEDIATE SAGEBRUSH	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Arundo donax GIANT REED	OG				N	X	N				N	N	N		.17	.38	.14	.27	.17	N

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Arundo donax versicolor STRIPED GIANT REED	OG				N	X	N				N	N	N		.17	.25	.29	.27	.00	N
Atriplex canescens FOUR-WING SALTBUSH	BS				N		N		X		N		N		.14	N	N	N	.00	N
Avena sterilis ANIMATED OAT GRASS	OG				N	X	N				N	N	N		.17	.00	.43	.20	.17	N
Azalea mollis CHINESE AZALEA	BS				N		N				N		N		.00	N	N	N	.42	N
Azalea occidentalis EXBURY WESTERN AZALEA	BS				N		N				N		N		.00	N	N	N	.25	N
Baccharis halimifolia EASTERN BACCHARIS	BS			X	N		N				N		N		.14	N	N	N	.00	N
Berberis fendleri FENDLER BARBERRY	BS				N		N		X		N		N		.14	N	N	N	.00	N
Berberis gladwynensis 'William Penn' WILLIAM PENN BARBERRY	BS				N		N				N		N		.00	.38	.00	.20	.67	C
Berberis haematocarpa RED HOLLYGRAPE	BS				N		N		X		N		N		.14	N	N	N	.00	N
Berberis julianae JULIANA BARBERRY	BS	X		X	N		N				N		N		.14	.75	.21	.50	.33	C
Berberis koreana KOREAN BARBERRY	BS			X	N		N	X		X	N		N		.43	.63	.71	.67	.08	C
Berberis mentorensis MENTOR BARBERRY	BS	X	X	X	N		N				N	X	N		.29	.88	1.00	.93	1.00	R
Berberis thunbergii JAPANESE BARBERRY	BS	X	X	X	N		N	X	X		N	X	N		.57	.88	1.00	.93	.50	R

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Berberis thunbergii argento-marginata YELLOWEDGED BARBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Berberis thunbergii atropurpurea REDLEAF BARBERRY	BS	X	X	X	N		N	X	X		N	X	N		.57	.88	1.00	.93	1.00	R
Berberis thunbergii atropurpurea erecta REDLEAF BARBERRY	BS				N		N				N		N		.00	.25	.71	.47	.00	N
Berberis thunbergii atropurpurea 'Gold Ring' GOLD RING JAPANESE BARBERRY	BS				N		N				N		N		.00	N	N	N	.33	N
Berberis thunbergii atropurpurea 'Red Bird' RED BIRD JAPANESE BARBERRY	BS			X	N		N				N		N		.14	N	N	N	.00	N
Berberis thunbergii 'Crimson Pygmy' CRIMSON PYGMY JAPANESE BARBERRY	BS			X	N		N				N		N		.14	.75	1.00	.87	1.00	R
Berberis thunbergii erecta TRUEHEDGE COLUMNBERRY	BS			X	N		N				N	X	N		.29	N	N	N	.17	N
Berberis thunbergii 'Kolbold' KOLBOLD JAPANESE BARBERRY	BS				N		N				N		N		.00	N	N	N	.50	C
Berberis thunbergii minor JAPANESE BARBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Berberis thunbergii 'Rosy Glow' ROSY GLOW JAPANESE BARBERRY	BS				N		N				N		N		.00	N	N	N	.67	C
Berberis thunbergii 'Thornless' THORNLESS JAPANESE BARBERRY	BS			X	N		N				N		N		.14	N	N	N	.00	N
Berberis triacanthophora THREE-SPINE BARBERRY	BS				N		N				N	X	N		.14	N	N	N	.42	N

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Berberis verruculosa WARTY BARBERRY	BS			X	N		N				N		N		.14	N	N	N	.25	N
Berberis vulgaris COMMON BARBERRY	BS				N		N				N	X	N		.14	.63	.14	.40	.00	N
Berberis vulgaris atropurpurea REDLEAF COMMON BARBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Berberis wilsonae WILSON BARBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Bergenia crassifolia WINTER-BLOOMING BERGENIA	GC						N				N	N	N		.00	.63	.43	.53	.00	C
Betula alba WHITE BIRCH	BT				N							N			.00	.94	.57	.77	.00	R
Betula fontinalis NATIVE RIVER BIRCH	BT			X	N			X		X	X	N		X	.60	.88	1.00	.93	.42	R
Betula glandulosa BOG BIRCH	BT			X	N				X			N		X	.33	N	N	N	.00	N
Betula lutea YELLOW BIRCH	BT	X		X	N							N			.11	.69	.14	.43	.00	N
Betula nigra EASTERN RIVER BIRCH	BT			X	N					X	X	N			.33	N	N	N	.42	N
Betula occidentalis WESTERN RIVER BIRCH	BT	X			N		X		X			N		X	.33	.69	.43	.57	.33	C
Betula papyrifera PAPER BIRCH	BT	X		X	N			X			X	N			.33	.88	.43	.67	.75	R

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Betula pendula EUROPEAN WHITE BIRCH	BT	X	X	X	N			X		X	X	N			.44	.88	.71	.80	.67	R
Betula pendula gracilis WEEPING EUROPEAN WHITE BIRCH	BT	X		X	N					X	X	N			.33	.75	.86	.80	.83	R
Betula pendula laciniata CUTLEAF WEEPING BIRCH	BT				N						X	N			.11	.44	1.00	.70	.25	C
Betula pendula 'Youngii' YOUNG'S WEEPING BIRCH	BT				N							N			.00	N	N	N	.58	C
Betula populifolia GRAY BIRCH	BT			X	N			X		X	X	N			.44	.06	.21	.13	.08	N
Betula verrucosa EUROPEAN WHITE BIRCH	BT				N							N			.00	.56	.14	.37	.00	N
Bouteloua curtipendula SIDEOATS GRAMMA	OG				N	X	N				N	N	N		.17	.00	.29	.13	.00	N
Bouteloua gracilis BLUE GRAMMA	OG				N	X	N				N	N	N		.17	.13	.43	.27	.00	N
Buchloe dactyloides BUFFALOGRASS	OG				N	X	N				N	N	N		.17	.38	.57	.47	.00	N
Buddleia alternifolia FOUNTAIN BUTTERFLYBUSH	BS			X	N		N	X		X	N	X	N		.57	.69	.71	.70	.08	C
Buddleia davidii COMMON BUTTERFLYBUSH	BS	X	X	X	N		N				N		N		.29	.69	.86	.77	.17	R
Buddleia davidii 'Dubonnet' DUBONNET BUTTERFLYBUSH	BS				N		N				N		N		.00	N	N	N	.25	N
Buddleia davidii 'Empire Blue' EMPIRE BLUE BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.17	N

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Budleia davidii 'Fascinating' FASCINATING BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.00	N
Buddleia davidii 'Flaming Violet' FLAMING VIOLET BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.00	N
Budleia davidii 'Fortune' FORTUNE BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.00	N
Budleia davidii 'Purple Prince' PURPLE PRINCE BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.00	N
Buddleia davidii 'White Bouquet' WHITE BOUQUET BUTTERFLYBUSH	BS				N		N				N		N		.00	N	N	N	.25	N
Buddleia davidii 'White Profession' WHITE PROFESSION BUTTERFLYBUSH	BS				N		N				N	X	N		.14	N	N	N	.00	N
Buddleia 'Royal Red' ROYAL RED BUTTERFLYBUSH	BS				N		N				N		N		.00	N	N	N	.17	N
Buxus microphylla LITTLELEAF BOXWOOD	BS	X			N		N				N		N		.00	.69	.00	.37	.00	N
Buxus microphylla koreana KOREAN BOXWOOD	BS	X		X	N		N				N		N		.14	.56	.36	.47	.08	N
Buxus sempervirens COMMON BOXWOOD	BS	X			N		N				N		N		.00	.81	.00	.43	.25	N
Buxus sempervirens suffruticosa DWARF BOXWOOD	BS				N		N				N		N		.00	.44	.00	.23	.25	N
Callirhoe involucrata POPPY MALLOW	GC				X		N				N	N	N		.14	N	N	N	.00	N
Cullana vulgaris HEATHER	GC				X		N				N	N	N		.14	N	N	N	.00	N

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Calycanthus floridus CAROLINA ALLSPICE	BS			X	N		N				N	X	N		.29	.13	.00	.07	.17	N
Campanula carpatica TUSSOCK BELLFLOWER	GC				X		N				N	N	N		.14	N	N	N	.00	N
Campsis radicans TRUMPET VINE	V	X	X	X	X		N	X		X	N	X	N		.63	.88	.86	.87	.92	R
Caragana arborescens SIBERIAN PEA SHRUB	BS	X	X	X	N		N	X		X	X	X	X		.67	.88	1.00	.93	.75	R
Caragana arborescens lorbergii LORBERG PEA SHRUB	BS				N		N				N	X	N		.14	N	N	N	.00	N
Caragana aurantiaca DWARF PEA SHRUB	BS			X	N		N	X		X	N		N		.43	N	N	N	.00	N
Caragana frutex RUSSIAN PEA SHRUB	BS			X	N		N				N		N		.14	.13	.29	.20	.00	N
Caragana maximowicziana MAXIMOWICZ PEA SHRUB	BS			X	N		N				N		N		.14	N	N	N	.00	N
Caragana microphylla LITTLE-LEAF PEA SHRUB	BS			X	X		N				N		N		.29	N	N	N	.00	N
Caragana microphylla 'Tidy' TIDY LITTLE-LEAF PEA SHRUB	BS			X	N		N				N		N		.14	N	N	N	.00	N
Caragana pekinensis PEKING PEA SHRUB	BS			X	N		N				N		N		.14	N	N	N	.00	N
Caragana pygmaea PYGMY PEA SHRUB	BS		X	X	N		N	X			N		N		.29	.25	.71	.47	.00	N

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Caragana sophoraefolia SOPHORA-LEAF PEA SHRUB	BS			X	N		N				N		N		.14	N	N	N	.00	N
Carpinus betulus EUROPEAN HORNBEAM	BT			X	N						X	N			.22	N	N	N	.08	N
Carpinus betulus fastigiata EUROPEAN HORNBEAM	BT				N							N			.00	N	N	N	.58	C
Carpinus caroliniana AMERICAN HORNBEAM	BT			X	N						X	N			.22	N	N	N	.08	N
Carya ovata SHAGBARK HICKORY	BT			X	N						X	N			.22	.19	.14	.13	.08	N
Caryopteris clandonensis BLUEBEARD	BS	X			N		N				N		N		.00	.44	.57	.50	.00	C
Caryopteris clandonensis azure AZURE BLUEBEARD	BS			X	N		N				N		N		.14	N	N	N	.17	N
Caryopteris clandonensis 'Heavenly Blue' HEAVENLY BLUE BLUEBEARD	BS			X	N		N				N	X	N		.29	N	N	N	.17	N
Caryopteris incana BLUEMIST SPIREA	BS	X	X	X	N		N	X		X	N	X	N		.57	.44	.71	.57	.42	C
Caryopteris mongholica MONGOLIAN BLUEBEARD	BS			X	N		N				N		N		.14	N	N	N	.00	N
Catalpa bignonioides SOUTHERN CATALPA	BT			X	N			X				N			.22	.50	.00	.27	.00	N
Catalpa bungeana DWARF UMBRELLA CATALPA	BT				N						X	N			.11	N	N	N	.00	N
Catalpa bungei UMBRELLA CATALPA	BT			X	N							N			.11	N	N	N	.33	N

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Catalpa ovata CHINESE CATALPA	BT			X	N			X		X	X	N			.44	.13	.57	.33	.25	N
Catalpa speciosa WESTERN CATALPA	BT	X	X	X	N			X		X	X	N			.44	.88	1.00	.93	.92	R
Ceanothus americanus JERSEY TEA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ceanothus fendleri FENDLER CEANOTHUS	BS			X	N		N		X		N		N	X	.43	N	N	N	.00	N
Ceanothus velutinus MOUNTAIN BALM	BS			X	N		N	X	X		N		N	X	.57	N	N	N	.00	C
Celastris scandens AMERICAN BITTERSWEET	V			X	X		N	X			N	X	N		.57	N	N	N	.00	C
Celtis laevigata SUGAR HACKBERRY	BT			X	N						X	N			.22	.06	.43	.23	.08	N
Celtis occidentalis COMMON HACKBERRY	BT	X	X	X	N	X		X	X	X	X	N	X		.78	1.00	1.00	1.00	.92	R
Celtis reticulata NETLEAF HACKBERRY	BT				N		X				X	N		X	.33	.19	.14	.17	.00	N
Cephalanthus occidentalis COMMON BUTTONBUSH	BS			X	N		N				N		N		.14	N	N	N	.00	N
Cerastium tomentosum SNOW IN SUMMER	GC				X		N	X			N	N	N		.29	.88	.71	.80	.17	R
Ceratostigma plumbaginoides DWARF PLUMBAGO	GC						N				N	N	N		.00	.38	.57	.47	.00	N
Cercidiphyllum japonicum KATSURA TREE	BT				N						X	N			.11	.50	.00	.27	.17	N

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Cercis canadensis EASTERN REDBUD	BT	X	X	X	N			X			X	N			.33	.75	.93	.83	.83	R
Cercis canadensis alba WHITE FLOWERING REDBUD	BT				N							N			.00	.50	.14	.33	.09	N
Cercis canadensis 'Oklahoma' OKLAHOMA EASTERN REDBUD	BT				N							N			.00	N	N	N	.42	N
Celtis occidentalis WESTERN REDBUD	BT				N		X		X		X	N			.33	.31	.36	.33	.08	N
Cercocarpus intricatus LITTLE MOUNTAIN MAHOGANY	BS			X	N		X		X		N		N	X	.50	N	N	N	.00	C
Cercocarpus ledifolius CURL-LEAF MOUNTAIN MAHOGANY	BS			X	N	X	X		X		N		N	X	.63	.38	.86	.60	.25	C
Cercocarpus montanus MOUNTAIN MAHOGANY	BS			X	N	X	X		X		N		N	X	.63	.38	1.00	.67	.25	C
Chaenomeles speciosa FLOWERING JAPANESE QUINCE	BS	X	X		N		N	X		X	N	X	N		.43	N	N	N	.83	R
Chaenomeles speciosa 'Apple Blossom' APPLE BLOSSOM FLOWERING QUINCE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Chaenomeles speciosa 'Minerva' MINERVA FLOWERING QUINCE	BS				N		N				N		N		.00	N	N	N	.25	N
Chaenomeles speciosa X californica 'Pink Beauty' PINK BEAUTY FLOWERING QUINCE	BS				N		N				N		N		.00	N	N	N	.25	N
Chaenomeles speciosa 'Pink Lady' PINK LADY FLOWERING QUINCE	BS				N		N				N		N		.00	N	N	N	.17	N

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Chaenomeles speciosa 'Snow' SNOW FLOWERING QUINCE	BS				N		N				N		N		.00	N	N	N	.25	N
Chaenomeles speciosa 'Texas Scarlet' TEXAS SCARLET FLOWERING QUINCE	BS			X	N		N				N		N		.14	N	N	N	.75	R
Chaenomeles superba 'Indian Chief' INDIAN CHIEF FLOWERING QUINCE	BS			X	N		N				N		N		.14	N	N	N	.17	N
Chamaebatiaria millefolium TANSY BUSH	BS			X	N		N		X		N		N		.29	N	N	N	.17	N
Chionanthus virginicus WHITE FRINGE TREE	BS			X	N		N	X			N	X	N		.43	N	N	N	.00	N
Chrysothamnus graveolens GREENPLUME RABBITBRUSH	BS				N		N		X		N		N		.14	.31	.86	.57	.00	C
Chrysothamnus nauseosus RUBBER RABBITBRUSH	BS			X	N		N		X		N	X	N	X	.57	.69	.71	.70	.00	C
Chrysothamnus visidiflorus DOUGLAS RABBITBRUSH	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Cladrastis lutea YELLOWWOOD	BT			X	N			X			X	N			.43	.56	.29	.43	.08	N
Clematis columbiana BLUE CLEMATIS	V				N		N		X		N		N	X	.29	.50	.43	.47	.00	N
Clematis crispa CURLY CLEMATIS	V			X	N		N		X		N		N		.29	N	N	N	.00	N
Clematis davidiana DAVID CLEMATIS	V				N		N	X			N		N		.14	N	N	N	.00	N
Clematis dioscoreifolia SWEET AUTUMN CLEMATIS	V				N		N				N	X	N		.14	N	N	N	.00	N

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Clematis douglasi BUSH CLEMATIS	V				N		N	X			N		N		.14	N	N	N	.00	N
Clematis 'Douchess of Edinbrough' DOUCHESS OF EDINBROUGH CLEMATIS	V				N		N				N		N		.00	N	N	N	.33	N
Clematis 'Ernest Markham' ERNEST MARKHAM CLEMATIS	V				N		N				N		N		.00	N	N	N	.50	C
Clematis 'Gypsy Queen' GYPSY QUEEN CLEMATIS	V				N		N				N		N		.00	N	N	N	.17	N
Clematis 'Hagley Hybrid' HAGLEY HYBRID CLEMATIS	V				N		N				N		N		.00	N	N	N	.17	N
Clematis henryi HENRY CLEMATIS	V				N		N	X			N		N		.14	.50	.71	.60	.67	C
Clematis jackmanii JACKMAN CLEMATIS	V	X	X	X	N		N	X			N	X	N		.43	.88	1.00	.93	.92	R
Clematis jackmanii rubra JACKMAN CLEMATIS	V				N		N				N		N		.00	N	N	N	.17	N
Clematis jackmanii 'Comtesse de Bouchard' COMTESSE DE BOUCHARD CLEMATIS	V				N		N				N		N		.00	.38	.43	.40	.25	N
Clematis jackmanii 'Mme. Andre' MME. ANDRE CLEMATIS	V				N		N				N		N		.00	.38	.43	.40	.33	N
Clematis ligusticifolia WESTERN VIRGIN'S BOWER	V			X	N		N	X	X	X	N		N	X	.71	.13	.43	.27	.08	C
Clematis montana ANEMONE CLEMATIS	V			X	N		N				N		N		.14	N	N	N	.00	N

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Clematis montana 'Rubens' RUBENS ANEMONE CLEMATIS	V				N		N				N		N		.00	N	N	N	.25	N
Clematis 'Nellie Mosier' NELLIE MOSIER CLEMATIS	V				N		N				N		N		.00	N	N	N	.25	N
Clematis orientalis ORIENTAL CLEMATIS	V			X	N		N	X	X		N		N		.43	.19	.43	.30	.08	N
Clematis paniculata SWEET AUTUMN CLEMATIS	V			X	N		N	X			N		N		.29	N	N	N	.17	N
Clematis pseudoalpina ROCKY MOUNTAIN CLEMATIS	V			X	N		N	X	X		N		N		.43	N	N	N	.00	N
Clematis 'Ramona' RAMONA CLEMATIS	V			X	N		N				N		N		.14	N	N	N	.67	C
Clematis recta CLEMATIS	V				N		N	X			N		N		.14	N	N	N	.00	N
Clematis 'The President' THE PRESIDENT CLEMATIS	V				N		N				N		N		.00	N	N	N	.33	N
Clematis tanguta GOLDEN CLEMATIS	V			X	N		N	X			N	X	N		.43	N	N	N	.00	N
Clematis texensis SCARLET CLEMATIS	V			X	N		N	X			N		N		.29	N	N	N	.00	N
Clematis virginiana VIRGIN'S BOWER	V				N		N				N	X	N		.14	.38	.43	.40	.08	N
Colutea arborescens BLADDERPOD	BS			X	N		N	X		X	N	X	N		.57	.06	.57	.30	.00	C
Colutea istria BLADDER SENNA	BS			X	N		N				N		N		.14	N	N	N	.00	N

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Colutea media HYBRID BLADDER SENNA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Convallaria majalis LILLY OF THE VALLEY	GC				X		N	X			N	N	N		.29	N	N	N	.25	N
Cornus alba TATARIAN DOGWOOD	BS				N		N	X			N	X	N		.29	N	N	N	.00	N
Cornus alba argenteo-marginata CREAMEDGE TATARIAN DOGWOOD	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Cornus alba siberica SIBERIAN DOGWOOD	BS			X	N		N	X			N		N		.29	N	N	N	.25	N
Cornus alba siberica 'Coral Beauty' CORAL BEAUTY SIBERIAN DOGWOOD	BS				N		N				N	X	N		.14	N	N	N	.00	N
Cornus alternifolia PAGODA DOGWOOD	BS			X	N		N				N	X	N		.29	N	N	N	.25	N
Cornus amomum SILKY DOGWOOD	BS				N		N				N	X	N		.14	.06	.14	.10	.00	N
Cornus baileyi BAILEY DOGWOOD	BS			X	N		N		X		N		N		.29	.56	.86	.70	.50	C
Cornus canadensis DWARF CORNEL	BS				N		N	X			N		N		.14	N	N	N	.00	N
Cornus elegantissima VARIEGATED DOGWOOD	BS				N		N				N		N		.00	N	N	N	.67	C
Cornus florida FLOWERING DOGWOOD	BS				N		N				N		N		.00	.63	.00	.33	.08	N
Cornus florida 'Cherokee Chief' CHEROKEE CHIEF FLOWERING DOGWOOD	BS				N		N				N		N		.00	N	N	N	.42	N

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Cornus mas CORNELIAN CHERRY	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Cornus racemosa GRAY DOGWOOD	BS			X	N		N	X		X	N		N		.43	.25	.43	.33	.08	N
Cornus sanguinea BLOODTWIG DOGWOOD	BS			X	N		N				N	X	N		.29	N	N	N	.17	N
Cornus sanguinea viridissima ROUGHLEAF DOGWOOD	BS				N		N				N	X	N		.14	N	N	N	.00	N
Cornus serica RED OSIER DOGWOOD	BS				N		N				N		N		.00	N	N	N	.17	N
Cornus siberica REDTWIG DOGWOOD	BS				N		N				N		N		.00	N	N	N	.17	N
Cornus stolonifera RED OSIER DOGWOOD	BS	X			X		X	X			N	X	N	X	.56	1.00	1.00	1.00	.42	R
Cornus stolonifera coloradensis COLORADO RED OSIER DOGWOOD	BS	X	X	X	X	X	N	X	X	X	N	X	N		.88	.50	1.00	.73	.17	R
Cornus stolonifera flaviramea YELLOWTWIG DOGWOOD	BS	X	X	X	X	X	N	X			N	X	N		.63	.63	1.00	.80	.75	R
Cornus stolonifera 'Kelseyi' KELSEY DWARF DOGWOOD	BS			X	N		N				N		N		.14	.38	.86	.60	.17	C
Coronilla varia CROWN VETCH	GC				X		N				N	N	N		.14	.63	.43	.57	.00	C
Cortaderia selloana PAMPUS GRASS	OG				N	X	N				N	N	N		.17	.63	.57	.60	.33	C
Corylus americana AMERICAN FILBERT	BS			X	N		N				N	X	N		.29	N	N	N	.00	N

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Corylus avellana EUROPEAN FILBERT	BS				N		N				N	X	N		.14	N	N	N	.00	N
Corylus avellana contorta CURLY HAZELNUT	BS				N		N				N	X	N		.14	.50	.36	.43	.58	C
Corylus cornuta BEAKED FILBERT	BS			X	N		N		X		N	X	N		.43	N	N	N	.00	N
Corylus maxima GIANT FILBERT	BS	X			N		N				N	X	N		.14	.63	.00	.33	.00	N
Corylus maxima purpurea PURPLE GIANT FILBERT	BS	X			N		N				N	X	N		.14	.38	.00	.20	.00	N
Cotinus americanus AMERICAN SMOKETREE	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Cotinus coggygria SMOKETREE	BS	X		X	N		N	X			N		N		.29	.88	.43	.67	.33	C
Cotinus coggygria 'Notcut' NOTCUT SMOKETREE	BS				N		N				N	X	N		.14	N	N	N	.00	N
Cotinus coggygria purpureus PURPLE SMOKETREE	BS			X	N		N				N		N		.14	.56	.43	.50	.25	C
Cotinus coggygria 'Royal Purple' ROYAL PURPLE SMOKETREE	BS				N		N				N		N		.00	N	N	N	.25	N
Cotoneaster acutifolia PEKING COTONEASTER	BS	X		X	N		N	X		X	N	X	X		.63	1.00	1.00	1.00	.83	R
Cotoneaster adpressa EARLY COTONEASTER	BS			X	N		N				N		N		.14	.75	.57	.67	.33	C

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Cotoneaster adpressa praecox EARLY COTONEASTER	BS				N		N				N		N		.00	.63	.43	.53	.33	C
Cotoneaster apiculata CRANBERRY COTONEASTER	BS	X		X	N		N				N	X	N		.29	.88	1.00	.93	1.00	R
Cotoneaster congesta PYRENEES COTONEASTER	BS				N		N				N		N		.00	.75	.43	.60	.67	C
Cotoneaster dammeri BEARBERRY COTONEASTER	BS				N		N				N		N		.00	.88	.29	.60	.08	C
Cotoneaster dammeri 'Lowfast' LOWFAST BEARBERRY COTONEASTER	BS				N		N				N		N		.00	N	N	N	.67	C
Cotoneaster dielsiana DIELS COTONEASTER	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Cotoneaster divaricata SPREADING COTONEASTER	BS	X	X	X	N		N				N	X	N		.29	.88	1.00	.60	1.00	R
Cotoneaster glaucophylla BRIGHT BEAD COTONEASTER	BS			X	N		N				N		N		.14	N	N	N	.33	N
Cotoneaster horizontalis ROCKSPRAY COTONEASTER	BS	X		X	X		N				N	X	N		.38	.75	.71	.73	.67	C
Cotoneaster horizontalis robusta ROUND ROCK COTONEASTER	BS				N		N				N		N		.00	N	N	N	.25	N
Cotoneaster integerrima EUROPEAN COTONEASTER	BS			X	N		N	X		X	N		N		.43	.06	.86	.43	.25	N
Cotoneaster melanocarpa BLACKFRUITED COTONEASTER	BS		X	X	N		N				N		N		.14	.06	.57	.30	.00	N
Cotoneaster microphylla LITTLELEAF COTONEASTER	BS			X	N		N				N		N		.14	.63	.57	.60	.00	C

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Cotoneaster microphylla cochleata BLACKFRUITED COTONEASTER	BS				N		N				N		N		.00	N	N	N	.17	N
Cotoneaster multiflora LARGE FLOWERING COTONEASTER	BS			X	N		N				N	X	N		.29	N	N	N	.17	N
Cotoneaster pannosa SILVER COTONEASTER	BS				N		N				N	X	N		.14	N	N	N	.00	N
Cotoneaster racemiflora : READ BEAD COTONEASTER	BS			X	N		N				N		N		.14	N	N	N	.00	N
Cotoneaster salicifolia repandens CREEPING WILLOWLEAF COTONEASTER	BS				N		N				N		N		.00	N	N	N	.42	N
Cowania mexicana CLIFF ROSE	BS				N		X		X		N		N		.14	N	N	N	.17	N
Cowania stansburiana CLIFF ROSE	BS			X	N		N		X		X		N	X	.50	.25	.43	.33	.00	C
Crataegus ambigua RUSSIAN HAWTHORN	BT			X	N						X	N			.22	.31	.71	.50	.17	C
Crataegus arnoldiana ARNOLD HAWTHORN	BT			X	N						X	N			.22	N	N	N	.00	N
Crataegus chrysocarpa FIREBERRY HAWTHORN	BT			X	N				X		X	N			.33	.19	.14	.17	.00	N
Crataegus coccinea SCARLET HAWTHORN	BT				N						X	N			.11	N	N	N	.00	N
Crataegus coccinioides KANSAS HAWTHORN	BT			X	N							N			.11	N	N	N	.00	N
Crataegus coloradensis COLORADO HAWTHORN	BT			X	N			X	X		X	N			.44	N	N	N	.00	N

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Crataegus columbiana IDAHO HAWTHORN	BT				N						X	N			.11	N	N	N	.00	N
Crataegus cordata WASHINGTON THORN	BT				N						X	N			.11	N	N	N	.00	N
Crataegus crus-galli COCKSPUR THORN	BT			X	N			X		X	X	N			.44	.56	1.00	.77	.42	R
Crataegus douglasii DOUGLAS HAWTHORN	BT				N		X				X	N		X	.33	.31	.29	.30	.00	N
Crataegus erythopoda SHINY-LEAVED HAWTHORN	BT				N				X			N			.11	.06	.14	.10	.00	N
Crataegus intricata THICKET HAWTHORN	BT			X	N			X				N			.22	.06	.29	.17	.00	N
Crataegus lavallei CARRIER HAWTHORN	BT	X			N						X	N			.11	.75	.29	.53	.75	R
Crataegus mollis DOWNY HAWTHORN	BT			X	N			X		X	X	N			.44	.25	.86	.53	.25	C
Crataegus monogyna SINGLESEED HAWTHORN	BT				N			X			X	N			.22	.38	.29	.33	.08	N
Crataegus oxyacantha ENGLISH HAWTHORN	BT	X		X	N		X	X			X	N			.44	.94	.57	.77	.00	R
Crataegus oxyacantha paulii PAUL'S SCARLET HAWTHORN	BT	X		X	N			X			X	N			.33	.88	.71	.80	.75	R
Crataegus oxyacantha superba CRIMSON CLOUD HAWTHORN	BT				N							N			.00	N	N	N	.25	N

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Crataegus phaenopyrum WASHINGTON THORN	BT	X		X	N			X		X	X	N			.44	.63	1.00	.80	.92	R
Crataegus pinnatifida CHINESE HAWTHORN	BT				N							N			.00	N	N	N	.25	N
Crataegus punctata DOTTED HAWTHORN	BT			X	N			X			X	N			.33	.00	.14	.07	.08	N
Crataegus rivularis RIVER HAWTHORN	BT	X		X	N		X		X			X		X	.56	.44	.14	.30	.00	C
Crataegus saligna WILLOW HAWTHORN	BT			X	N			X	X		X	N			.44	N	N	N	.00	N
Crataegus succulenta FLESHY HAWTHORN	BT			X	N	X		X	X		X	N			.56	.00	.14	.07	.00	C
Crataegus 'Toba' TOBA HAWTHORN	BT	X			N					X	X	N			.22	.50	.86	.67	.50	C
Crataegus viridis GREEN HAWTHORN	BT				N							N			.00	N	N	N	.17	N
Crataegus viridis 'Wintering' WINTERING GREEN HAWTHORN	BT				N						X	N			.11	N	N	N	.00	N
Cytissus hirsutus BROOM	BS			X	N		N				N		N		.14	N	N	N	.00	N
Cytissus multiflorus WHITE SPANISH BROOM	BS				N		N				N	X	N		.14	N	N	N	.00	N
Cytissus praecox WARMINSTER BROOM	BS				N		N				N		N		.00	.43	.38	.40	.42	N
Cytisus scoparius SCOTCH BROOM	BS				N		N			N		X	N		.14	N	N	N	.17	N

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Cytisus scoparius 'Burkwoodi' BURKWOOD SCOTCH BROOM	BS				N		N			N			N		.00	N	N	N	.25	N
Cytisus scoparius 'Killeney Red' KILLENEY RED SCOTCH BROOM	BS				N		N			N			N		.00	N	N	N	.17	N
Cytisus scoparius 'Red Wings' RED WINGS SCOTCH BROOM	BS				N		N			N			N		.00	N	N	N	.17	N
Cytisus scoparius 'Zeelandia' ZEELANDIA SCOTCH BROOM	BS				N		N			N			N		.00	N	N	N	.17	N
Daphne burkwoodii 'Somerset' BURKWOOD DAPHNE	BS				N		N			N			N		.00	.75	.00	.40	.33	N
Daphne cneorum GARLAND DAPHNE	BS			X	N		N			N			N		.14	.88	.00	.47	.17	N
Daphne cneorum 'Ruby Glow' RUBY GLOW DAPHNE	BS				N		N			N			N		.00	N	N	N	.33	N
Daphne mezereum FEBRUARY DAPHNE	BS	X			N		N			N			N		.00	.63	.00	.33	.00	N
Deutzia gracilis SLENDER DEUTZIA	BS			X	N		N			N		X	N		.29	.75	.57	.67	.25	C
Deutzia lemoine LEMOINE DEUTZIA	BS				N		N			N			N		.00	.75	.43	.60	.00	C
Deutzia scabra FUZZY DEUTZIA	BS				N		N			N		X	N		.14	N	N	N	.00	N
Deutzia scabra plena 'Pride of Rochester' PRIDE OF ROCHESTER DEUTZIA	BS				N		N			N		X	N		.14	N	N	N	.00	N

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Dianthus deltoides MAIDEN PINK	GC				X		N			N		N	N		.14	N	N	N	.00	N
Dianthus plumarius COTTAGE PINK	GC				X		N			N		N	N		.14	N	N	N	.00	N
Echinocactus spp. BARREL CACTUS	GC					X	N			N		N	N		.14	.13	.29	.20	.00	N
Elaeagnus angustifolia RUSSIAN OLIVE	BT	X	X	X	N	X		X	X	X	X	N	X		.78	1.00	1.00	1.00	.92	R
Elaeagnus angustifolia orientalis RED-FRUITED RUSSIAN OLIVE	BT				N					X		N			.11	N	N	N	.00	N
Elaeagnus commutata SILVER BERRY ELAEAGNUS	BT			X	N				X			N			.22	.19	.79	.47	.08	N
Elaeagnus multiflora CHERRY ELAEAGNUS	BS				N		N			N		X	N		.14	N	N	N	.00	N
Elaeagnus umbellata AUTUMN ELAEAGNUS	BT			X	N							N			.11	.13	.57	.33	.08	N
Ephedra viridis EPHEDRA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Epimedium alpinum ALPINE EPIMEDIUM	GC				X		N				N	N	N		.14	N	N	N	.00	N
Erica carnea SCOTCH HEATHER	GC						N				N	N	N		.00	.56	.00	.30	.00	N
Erica carnea 'Mediterranean Pink' MEDITERRANEAN PINK HEATHER	GC						N				N	N	N		.00	N	N	N	.17	N
Erica carnea vivelli SCOTCH HEATHER	GC						N				N	N	N		.00	N	N	N	.17	N

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Eriogonum caespitosum MAT BUCKWHEAT	GC						N				N	N	N	X	.14	.13	.14	.13	.00	N
Eriogonum heracleoides WYETH BUCKWHEAT	GC						N				N	N	N	X	.14	.00	.14	.07	.00	N
Eriogonum umbellatum SULPHER-FLOWERED BUCKWHEAT	GC						N				N	N	N	X	.14	.25	.29	.27	.00	N
Euphorbia spp. SPURGE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Euonymus alatus WINGED EUONYMUS	BS	X	X	X	N		N	X		X	N	X	N		.57	.88	1.00	.93	.75	R
Euonymus alatus compacta DWARF WINGED EUONYMUS	BS	X		X	N		N			X	N	X	N		.43	.75	1.00	.87	.92	R
Euonymus americana STRAWBERRY BUSH	BS			X	N		N				N		N		.14	N	N	N	.00	N
Euonymus atropurpureus BURNING BUSH	BS		X	X	N		N	X		X	X		N		.57	.69	1.00	.83	.00	R
Euonymus bungeanus WINTERBERRY EUONYMUS	BS				N		N				N	X	N		.14	N	N	N	.00	N
Euonymus europaeus EUROPEAN EUONYMUS	BS	X		X	N		N	X		X	X	X	N		.63	.75	.86	.80	.25	R
Euonymus europaeus aldenhamensis ALDENHAM SPINDLE TREE	BS			X	N		N			X	N	X	N		.43	.38	1.00	.67	.17	C
Euonymus europaeus angustifolia EUROPEAN EUONYMUS	BS				N		N				N	X	N		.14	N	N	N	.00	N
Euonymus fortunei WINTERCREEPER	BS	X	X	X	X		N	X			N		N		.38	.88	1.00	.93	.08	R

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Euonymus fortunei 'Acutus' WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.33	N
Euonymus fortunei argenteo variegata SILVER-LEAF WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.33	N
Euonymus fortunei 'Azusa': AZUSA WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.25	N
Euonymus fortunei 'Carrierei' CARRIERE WINTERCREEPER	BS				X		N			N			N		.13	N	N	N	.00	N
Euonymus fortunei coloratus PURPLE WINTERCREEPER	BS				N		N			N			N		.00	.75	1.00	.87	1.00	R
Euonymus fortunei 'Emerald Cushion' EMERALD CUSHION WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.50	C
Euonymus fortunei 'Emerald-n-Gold' EMERALD-N-GOLD WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.50	C
Euonymus fortunei 'Emerald Gaiety' EMERALD GAIETY WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.33	N
Euonymus fortunei 'Golden Prince' GOLDEN PRINCE WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.67	C
Euonymus fortunei gracilis SILVER EDGE WINTERCREEPER	BS			X	N		N			N			N		.14	N	N	N	.25	N
Euonymus fortunei 'Kewensis' KEWENSIS WINTERCREEPER	BS				X		N	X		N			N		.25	N	N	N	.08	N
Euonymus fortunei 'Manhattan' MANHATTAN WINTERCREEPER	BS				N		N			N			N		.00	.50	.86	.67	.50	C
Euonymus fortunei minimus LITTLELEAF WINTERCREEPER	BS			X	X		N	X		N			N		.38	.25	.14	.20	.17	N

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Euonymus fortunei radicans WINTERCREEPER	BS			X	X		N	X		N			N		.38	.88	.71	.80	.08	R
Euonymus fortunei 'Sarcoxie' SARCOXIE WINTERCREEPER	BS			X	N		N			N			N		.14	.38	1.00	.67	.42	C
Euonymus fortunei 'Silver Queen' SILVER QUEEN WINTERCREEPER	BS				N		N			N			N		.00	N	N	N	.25	N
Euonymus fortunei vegetus BIGLEAF WINTERCREEPER	BS			X	N		N	X		N			N		.29	.75	.86	.80	.25	R
Euonymus japonica EVERGREEN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.42	N
Euonymus japonica 'Gold Spot' GOLD SPOT EVERGREEN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.42	N
Euonymus japonica grandifolia EVERGREEN EUONYMUS	BS				N		N			N			N		.00	.56	.00	.30	.42	N
Euonymus japonica microphylla BOX-LEAF EUONYMUS	BS				N		N			N			N		.00	.50	.00	.27	.50	C
Euonymus japonica pulchellus variegata VARIEGATED EVERGREEN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.17	N
Euonymus japonica 'Silver King' SILVER KING EVERGREEN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.33	N
Euonymus japonica 'Silver Queen' SILVER QUEEN EVERYGREEN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.17	N
Euonymus 'Longwood' LONGWOOD EUONYMUS	BS				N		N			N			N		.00	N	N	N	.17	N

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Euonymus kiautschovica SPREADING EUONYMUS	BS			X	N		N			N		X	N		.29	N	N	N	.08	N
Euonymus kiautschovica 'Pauli' PAULI SPREADING EUONYMUS	BS				N		N			N			N		.00	N	N	N	.25	N
Euonymus nanus DWARF EUONYMUS	BS				N		N			N		X	N		.14	N	N	N	.00	N
Euonymus patens 'Manhattan' MANHATTAN EUONYMUS	BS				N		N			N			N		.00	N	N	N	.33	N
Exochorda racemosa COMMON PEARL BUSH	BS	X		X	N		N	X		N		X	N		.43	.31	.14	.23	.08	N
Fagus grandifolia AMERICAN BEECH	BT				N						X	N			.11	N	N	N	.08	N
Fagus sylvatica EUROPEAN BEECH	BT	X			N			X			X	N			.22	.94	.07	.53	.58	C
Fagus sylvatica atropunicea PURPLE BEECH	BT	X		X	N							N			.11	.56	.21	.40	.50	C
Fagus sylvatica laciniata CUTLEAF EUROPEAN BEECH	BT				N							N			.00	.31	.00	.17	.25	N
Fagus sylvatica pendula WEEPING EUROPEAN BEECH	BT				N							N			.00	.56	.00	.30	.17	N
Fagus sylvatica purpurea PURPLE BEECH	BT				N						X	N			.11	.56	.07	.33	.00	N
Fagus sylvatica purpureo-pendula WEEPING PURPLE BEECH	BT				N							N			.00	N	N	N	.17	N
Fagus sylvatica 'Riversii' RIVERS PURPLE BEECH	BT				N							N			.00	N	N	N	.25	N

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Fagus sylvatica 'Rohanni' ROHAN BEECH	BT				N							N			.00	N	N	N	.42	N
Fagus sylvatica 'Spaethiana' SPAETHIAN BEECH	BT				N							N			.00	N	N	N	.17	N
Fagus sylvatica 'Tricolqr' TRICOLOR BEECH	BT				N							N			.00	N	N	N	.50	C
Fallugia paradoxa APACHEPLUME	BS		X	X	N		N	X	X		N		N		.43	N	N	N	.25	N
Fendlera rupicola CLIFF FENDLER BUSH	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Festuca ovina glauca BLUE FESCUE	OG				N	X	N				N	N	N		.17	N	N	N	.75	R
Fontanesia fortunei DESERT BAMBOO	OG				N		N			X	N	X	N		.33	.06	.21	.13	.00	N
Forestiera neo-mexicana NEW MEXICAN MOUNTAIN PRIVET	BS			X	N		N	X	X		N		N		.43	N	N	N	.25	N
Forsythia 'Arnold Dwarf' ARNOLD DWARF FORSYTHIA	BS				N		N				N		N		.00	.69	.86	.77	.33	R
Forsythia intermedia GOLDENBELLS	BS	X	X	X	N		N			X	N	X	N		.43	.88	.86	.87	.08	R
Forsythia intermedia 'Beatrix Farrand' BEATRIX FARRAND GOLDENBELLS	BS			X	N		N				N	X	N		.29	N	N	N	.58	C
Forsythia intermedia compacta nana DWARF BORDER FORSYTHIA	BS			X	N		N				N		N		.14	N	N	N	.17	N
Forsythia intermedia 'Linwood Gold' LINWOOD GOLD GOLDENBELLS	BS			X	N		N				N	X	N		.29	.75	.86	.80	.92	R

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Forsythia intermedia 'Spectabilis' SPECTABILIS GOLDENBELLS	BS			X	N		N	X			N	X	N		.43	N	N	N	.08	N
Forsythia intermedia 'Spring Glory' SPRING GLORY GOLDENBELLS	BS			X	N		N				N	X	N		.29	N	N	N	.67	C
Forsythia ovata EARLY FORSYTHIA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Forsythia suspensa WEEPING FORSYTHIA	BS	X		X	X		N	X			N		N		.38	.81	.86	.83	.00	R
Forsythia suspensa 'Fortunei' FORTUNEI WEEPING FORSYTHIA	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Forsythia suspensa 'Sieboldi' SIEBOLD WEEPING FORSYTHIA	BS				X		N				N		N		.13	N	N	N	.00	N
Forsythia viridissima GREENSTEM FORSYTHIA	BS				N		N				N	X	N		.14	.06	.43	.23	.00	N
Fragaria bracteata WILD STRAWBERRY	GC					X	N				N	N	N		.14	N	N	N	.00	N
Fraxinus americana WHITE ASH	BT	X		X	N			X		X	X	N			.44	.94	1.00	.97	.25	R
Fraxinus americana 'Autumn Purple' AUTUMN PURPLE WHITE ASH	BT				N						X	N			.11	N	N	N	.42	N
Fraxinus americana 'Rosehill' ROSEHILL WHITE ASH	BT				N						X	N			.11	N	N	N	.67	C
Fraxinus anomala SINGLE-LEAF ASH	BT			X	N		X		X		X	N			.44	.25	.29	.27	.00	N

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Fraxinus excelsior EUROPEAN ASH	BT	X			N			X				N			.11	.94	.21	.60	.33	C
Fraxinus excelsior 'Kimberly' KIMBERLY EUROPEAN ASH	BT				N							N			.00	N	N	N	.17	N
Fraxinus excelsior 'Mountain Pride' MOUNTAIN PRIDE ASH	BT				N							N			.00	N	N	N	.17	N
Fraxinus holotricha 'Moraine' MORAINE ASH	BT				N							N			.00	N	N	N	.25	N
Fraxinus nigra BLACK ASH	BT			X	N							N			.11	N	N	N	.00	N
Fraxinus ornus FLOWERING ASH	BT			X	N							N			.11	N	N	N	.25	N
Fraxinus oxycarpa 'Raywoodi' RAYWOOD ASH	BT				N							N			.00	N	N	N	.25	N
Fraxinus pennsylvanica RED ASH	BT				N							N			.00	N	N	N	.00	N
Fraxinus pennsylvanica lanceolata GREEN ASH	BT	X	X	X	N			X		X	X	N	X		.56	.94	1.00	.97	.83	R
Fraxinus pennsylvanica lanceolata 'Marshall Seedless' MARSHALL SEEDLESS GREEN ASH	BT	X		X	N						X	N			.22	.81	1.00	.90	.83	R
Fraxinus pennsylvanica lanceolata 'Moraine' MORAINE GREEN ASH	BT				N							N			.00	N	N	N	.33	N
Fraxinus pennsylvanica lanceolata 'Mountain Green' MOUNTAIN GREEN ASH	BT				N							N			.00	N	N	N	.17	N

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Fraxinus pennsylvanica lanceolata 'Summit' SUMMIT GREEN ASH	BT	X			N							N			.00	.56	1.00	.77	.75	R
Fraxinus quadrangulata BLUE ASH	BT	X		X	N			X			X	N			.33	.81	.50	.67	.08	C
Fraxinus velutina 'Modesto' MODESTO VELVET ASH	BT				N							N			.00	N	N	N	.33	N
Fuchsia magellanica MAGELLAN FUCHIA	BS				N		N				N	X	N		.14	N	N	N	.00	N
Genista tinctoria COMMON WOADWAXEN	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ginko biloba GINKGO	BT	X		X	N			X			X	N			.33	1.00	.07	.57	.50	C
Ginkgo biloba 'Autumn Gold' AUTUMN GOLD GINKGO	BT				N							N			.00	N	N	N	.50	C
Glacoma hederacea CREEPING CHARLIE	GC						N				N		N		.00	.38	.57	.47	.00	N
Gleditsia triacanthos HONEYLOCUST	BT	X	X	X	N			X			X	N	X		.44	.75	.86	.80	.08	R
Gleditsia triacanthos 'Elegantissima' BUSHY HONEYLOCUST	BT				N						X	N			.11	N	N	N	.00	N
Gleditsia triacahthos 'Imperial' IMPERIAL HONEYLOCUST	BT	X		X	N						X	N			.22	N	N	N	.25	N
Gleditsia triacahthos inermis THORNLESS HONEYLOCUST	BT	X	X	X	N					X	X	N			.33	1.00	1.00	1.00	.58	R

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Gleditsia triacanthos inermis 'Majestic' MAJESTIC HONEYLOCUST	BT	X		X	N							N			.11	.50	.71	.60	.25	C
Gleditsia triacanthos inermis 'Moraine' MORAINE HONEYLOCUST	BT	X	X	X	N						X	N			.22	.88	1.00	.93	1.00	R
Gleditsia triacanthos inermis 'Mountain Gem' MOUNTAIN GEM HONEYLOCUST	BT				N							N			.00	N	N	N	.17	N
Gleditsia triacanthos inermis 'Rubylace' RUBYLACE HONEYLOCUST	BT	X	X	X	N						X	N			.22	.75	.29	.53	.45	C
Gleditsia triacanthos inermis 'Shademaster' SHADEMASTER HONEYLOCUST	BT	X	X		N							N			.00	.88	1.00	.93	.92	R
Gleditsia triacanthos inermis 'Skyline' SKYLINE HONEYLOCUST	BT	X	X	X	N						X	N			.22	.88	1.00	.93	.58	R
Gleditsia triacanthos inermis 'Sunburst' SUNBURST HONEYLOCUST	BT	X	X	X	N						X	N			.22	.75	.79	.77	.75	R
Gymnocladus dioicus KENTUCKY COFFEE TREE	BT	X	X	X	N						X	N			.22	.94	.93	.93	.58	R
Gypsophila repens CREEPING BABYSBREATH	GC				X		N				N	N	N		.14	N	N	N	.00	N

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Hamamelis mollis CHINESE WITCHHAZEL	BT				N							N			.00	.38	.00	.20	.00	N
Hamamelis virginiana COMMON WITCH HAZEL	BT			X	N							N			.11	N	N	N	.17	N
Hedera helix ENGLISH IVY	V	X	X	X	X		N	X			N		N		.38	.88	.86	.87	.83	R
Hedera helix baltica BALTIC IVY	V	X		X	N		N				N		N		.14	.88	.71	.80	.42	R
Hedera helix 'Hahni' HAHN'S ENGLISH IVY	V				N		N				N		N		.00	N	N	N	.42	N
Hedera helix 'Thorndale' ENGLISH IVY	V				N		N				N		N		.00	N	N	N	.33	N
Hemerocallis fulva 'Kwanso' KWANSO TAWNY DAYLILY	GC						N				N	N	N		.00	N	N	N	.17	N
Herniaria glabra GREEN CARPET	GC						N				N	N	N		.00	N	N	N	.17	N
Heuchera sanguinea CORALBELL	GC				X		N				N	N	N		.14	N	N	N	.00	N
Hibuscus syriacus SHRUB ALTHEA	BS	X	X	X	N		N	X			X		N		.38	.69	.43	.57	.42	C
Hibiscus syriacus 'Anemonaeflorus' ANEMONAEFLORUS SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.17	N
Hibiscus syriacus 'Ardens' ARDENS SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.33	N
Hibiscus syriacus 'Bluebird' BLUEBIRD SHRUB ALTHEA	BS			X	N		N				N		N		.14	N	N	N	.08	N

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Hibicus syriacus 'Boule De Feu' BOULE DE FEU SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.33	N
Hibiscus syriacus 'Hamabo' HAMABO SHRUB ALTHEA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Hibiscus syriacus 'Jeanne D Aec' JEANNE D AEC SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.33	N
Hibiscus syriacus 'Red Heart' RED HEART SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.25	N
Hibiscus syriacus 'Woodbridge' WOODBRIDGE SHRUB ALTHEA	BS				N		N				N		N		.00	N	N	N	.25	N
Hippophaea rhamnoides SEA-BUCKTHORN	BS			X	N		N	X			X		N		.38	.00	.57	.27	.25	N
Holodiscus discolor BUSH ROCK SPIREA	BS			X	N		N	X	X		N		N	X	.57	N	N	N	.00	C
Hydrangea arborescens grandiflora A. G. HYDRANGEA	BS			X	N		N	X			N		N		.29	.63	.64	.63	.42	C
Hydrangea macrophylla BIGLEAF HYDRANGEA	BS				N		N				N		N		.00	.31	.00	.17	.08	N
Hydrangea macrophylla 'Annabelle' ANNABELLE BIGLEAF HYDRANGEA	BS				N		N				N		N		.00	N	N	N	.42	N
Hydrangea microphylla 'Nikko Blue' NIKKO BLUE BIGLEAF HYDRANGEA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Hydrangea paniculata grandiflora PEE GEE HYDRANGEA	BS	X	X	X	N		N	X			N	X	N		.43	.50	.71	.60	.42	C
Hydrangea petiolaris CLIMBING HYDRANGEA	V			X	N		N				N		N		.14	N	N	N	.00	N

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Hydrangea quercifolia OAKLEAF HYDRANGEA	BS			X	N		N				N		N		.14	.38	.00	.20	.25	N
Hydrangea serrata acuminata HYDRANGEA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Hypericum calycinum AARON'S BEARD	BS				N		N				N		N		.00	.43	.69	.57	.42	C
Hypericum kalmianum KALM ST. JOHNSWORT	BS			X	N		N				N		N		.14	.50	.57	.53	.42	C
Hypericum moserianum GOLD FLOWER ST. JOHNSWORT	GC						N				N	N	N		.00	N	N	N	.17	N
Hypericum patulum 'Hidcote' HIDCOTE ST. JOHNSWORT	GC			X			N				N	N	N		.14	N	N	N	.00	N
Hypericum patulum 'Sungold' SUNGOLD ST. JOHNSWORT	BS				N		N				N	X	N		.14	N	N	N	.00	N
Iberis sempervirens EVERGREEN CANDYTUFF	GC				X		N				N	N	N		.14	N	N	N	.00	N
Ilex aquifolium 'Boulder Creek' BOULDER CREEK HOLLY	BS				N		N				N		N		.00	.50	.00	.27	.33	N
Jamesia americana CLIFFBUSH	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Juglans cinerea BUTTERNUT	BT			X	N			X			X	N			.33	.13	.29	.20	.00	N
Juglans nigra BLACK WALNUT	BT	X	X	X	N			X		X	X	N			.44	.81	1.00	.90	.25	R

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Juglans nigra 'Thomas' THOMAS BLACK WALNUT	BT				N						X	N			.11	N	N	N	.00	N
Juglans regina ENGLISH WALNUT	BT			X	N						X	N			.22	.81	.07	.47	.08	N
Juglans rupestris TEXAS BLACK WALNUT	BT			X	N			X				N			.22	N	N	N	.00	N
Juniperus chinensis CHINESE JUNIPER	ET	X		X	N						X	N			.22	N	N	N	.08	N
Juniperus chinensis 'Ames' AMES JUNIPER	ET				N							N			.00	.31	.43	.37	.25	N
Juniperus chinensis armstrongi ARMSTRONG JUNIPER	ES			X	N		N			X	N	N	N		.33	.75	1.00	.87	.67	R
Juniperus chinensis 'Armstrong Globe' ARMSTRONG GLOBE JUNIPER	ES				N		N				N	N	N		.00	.38	.86	.60	.17	C
Juniperus chinensis aurea 'Gold Coast' GOLD COAST JUNIPER	ES				N		N				N	N	N		.00	.50	.71	.60	.58	C
Juniperus chinensis 'Blaauwi' BLAAUWI JUNIPER	ES				N		N				N	N	N		.00	.31	.71	.50	.92	R
Juniperus chinensis 'Blue Point' BLUE POINT JUNIPER	ES				N		N				X	N	N		.14	.50	.57	.53	.67	C
Juniperus chinensis 'Blue Vase' BLUE VASE JUNIPER	ES				N		N				N	N	N		.00	.50	.57	.53	.00	C
Juniperus chinensis columnaria glauca CHINESE BLUE COLUMN JUNIPER	ET				N							N			.00	.50	.71	.60	.67	C
Juniperus chinensis densaerecta 'Spartan' SPARTAN JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.25	N

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Juniperus chinensis 'Fruitlandi' FRUITLAND JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.50	C
Juniperus chinensis hetzii HETZ JUNIPER	ES	X	X	X	N		N	X		X	N	N	N		.50	.75	1.00	.87	.58	R
Juniperus chinensis hetzii columnaris UPRIGHT HETZ JUNIPER	ES				N		N				N	N	N		.00	.63	.86	.73	.58	C
Juniperus chinensis hetzii glauca BLUE HETZ JUNIPER	ES				N		N	X			N	N	N		.17	N	N	N	.25	N
Juniperus chinensis 'Idyllwild' IDYLLWILD JUNIPER	ES				N		N				X	N	N		.14	.38	.29	.33	.50	C
Juniperus chinensis 'Iowa' IOWA JUNIPER	ET				N							N			.00	.06	.50	.27	.08	N
Juniperus chinensis japonica JAPANESE JUNIPER	ES			X	N		N				N	N	N		.17	N	N	N	.00	N
Juniperus chinensis 'J. C. Weaver' J. C. WEAVER JUNIPER	ES			X	N		N				N	N	N		.17	N	N	N	.00	N
Juniperus chinensis 'Keteleeri' KETELEER JUNIPER	ES				N		N				N	N	N		.00	.63	.71	.67	.67	C
Juniperus chinensis 'Maneyi' MANEY JUNIPER	ES			X	N		N				N	N	N		.17	.50	.71	.60	.33	C
Juniperus chinensis 'Mint Julep' MINT JULEP JUNIPER	ES				N		N				N	N	N		.00	.88	.86	.87	.67	R
Juniperus chinensis 'Old Gold' OLD GOLD JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.67	C
Juniperus chinensis perfecta PERFECTA JUNIPER	ES				N		N				X	N	N		.14	N	N	N	.00	N

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Juniperus chinensis pftizeriana PFITZER JUNIPER	ES	X	X	X	N		N	X		X	N	N	N		.50	.88	1.00	.93	1.00	R
Juniperus chinensis pftizeriana 'Arctic' ARCTIC PFITZER JUNIPER	ES				N		N				N	N	N		.00	.38	.29	.33	.17	N
Juniperus chinensis pftizeriana aurea GOLDEN PFITZER JUNIPER	ES			X	N		N				N	N	N		.17	.75	.86	.80	.50	R
Juniperus chinensis pftizeriana 'Aureo-spicata' GOLD-TIPPED PFITZER JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.17	N
Juniperus chinensis pfitzeriana 'Blue' BLUE PFITZER JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.67	C
Juniperus chinensis pfitzeriana compacta COMPACT PFITZER JUNIPER	ES			X	N		N				N	N	N		.17	.75	1.00	.87	.58	R
Juniperus chinensis pfitzeriana glauca BLUE PFITZER JUNIPER	ES				N		N				N	N	N		.00	.63	1.00	.80	.33	R
Juniperus chinensis pfitzeriana 'Plume' PLUME COMPACT PFITZER JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.33	N

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'Green Mound' GREEN MOUND JUNIPER	ES				N		N			X	N	N	N		.17	.75	.86	.80	.00	R
Juniperus chinensis prostrata PROSTRATA JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.25	N
Juniperus chinensis pyramidalis PYRAMIDAL CHINESE JUNIPER	ET				N							N			.00	N	N	N	.17	N
Juniperus chinensis 'Robusta Green' ROBUSTA GREEN JUNIPER	ES				N		N				N	N	N		.00	.63	.43	.53	.67	C
Juniperus chinensis 'San Jose' SAN JOSE JUNIPER	ES				N		N				N	N	N		.00	.44	.50	.47	.67	C
Juniperus chinensis sargentii SARGENT CHINESE JUNIPER	ES			X	X		N				N	N	N		.29	N	N	N	.25	N
Juniperus chinensis sargenti glauca BLUE SARGENT CHINESE JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.33	N
Juniperus chinensis 'Sea Green' SEA GREEN JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.83	R
Juniperus chinensis 'Sea Spray' SEA SPRAY JUNIPER	ES				N		N				N	N	N		.00	.44	.21	.33	.33	N
Juniperus chinensis 'Spartan' SPARTAN JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.33	N
Juniperus chinensis torulosa HOLLYWOOD JUNIPER	ES				N		N				N	N	N		.00	.81	.07	.47	.67	C
Juniperus chinensis 'Wilsonii' WILSON JUNIPER	ES				N		N				N	N	N		.00	.63	.29	.47	.00	N
Juniperus chinensis 'Wintergreen' WINTERGREEN JUNIPER	ES				N		N				N	N	N		.00	.63	.57	.60	.42	C

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Juniperus communis COMMON JUNIPER	ES				X		X		X		N	N	X		.44	.88	.71	.80	.00	R
Juniperus communis depressa COMMON JUNIPER	ES				N		N				N	N	N		.00	.25	.57	.40	.17	N
Juniperus communis saxitalis COMMON MOUNTAIN JUNIPER	ES		X	X		X	N	X	X		N	N	N	X	.71	N	N	N	.00	C
Juniperus excelsa GREEK JUNIPER	ES			X	N		N				N	N	N		.17	N	N	N	.00	N
Juniperus excelsa stricta SPINY GREEK JUNIPER	ET				N							N			.00	N	N	N	.25	N
Juniperus horizontalis CREEPING JUNIPER	GC	X	X	X	X		N	X	X		N	N	N		.57	.88	.86	.87	.25	R
Juniperus horizontalis 'Bar Harbor' BAR HARBOR JUNIPER	GC	X		X	X		N				N	N	N		.29	.75	.93	.83	.83	R
Juniperus horizontalis 'Black Hills' BLACK HILLS JUNIPER	GC			X			N				N	N	N		.14	N	N	N	.00	N
Juniperus horizontalis 'Blue Chip' BLUE CHIP JUNIPER	GC						N				N	N	N		.00	N	N	N	.17	N
Juniperus horizontalis 'Douglasii' WAUKEGAN JUNIPER	GC						N				N	N	N		.00	.88	.43	.67	.08	C
Juniperus horizontalis 'Emerald Spreader' EMERALD SPREADER JUNIPER	GC						N				N	N	N		.00	N	N	N	.33	N
Juniperus horizontalis 'Emerson' EMERSON JUNIPER	GC						N				N	N	N		.00	.25	.29	.27	.08	N

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Juniperus horizontalis 'Hughes' HUGHES JUNIPER	GC						N				N	N	N		.00	.38	.57	.47	.58	C
Juniperus horizontalis lividus CREEPING JUNIPER	GC			X			N				N	N	N		.14	N	N	N	.00	N
Juniperus horizontalis 'Low Green' LOW GREEN JUNIPER	GC						N				N	N	N		.00	.63	.29	.47	.00	N
Juniperus horizontalis 'Marshall Creeper' MARSHALL CREEPER JUNIPER	GC						N			X	N	N	N		.14	N	N	N	.25	N
Juniperus horizontalis 'Petraeus' PETRAEUS JUNIPER	GC			X			N				N	N	N		.14	N	N	N	.00	N
Juniperus horizontalis planifolius CREEPING JUNIPER	GC			X			N				N	N	N		.14	N	N	N	.00	N
Juniperus horizontalis plumosa ANDORRA JUNIPER	GC	X		X	X		N	X			N	N	N		.43	.81	.86	.83	.75	R
Juniperus horizontalis plumosa compacta COMPACT ANDORRA JUNIPER	GC						N				N	N	N		.00	.81	.86	.83	.25	R
Juniperus horizontalis plumosa compacta 'Youngstown' YOUNGSTOWN ANDORRA JUNIPER	GC						N				N	N	N		.00	.75	.43	.60	.25	C
Juniperus horizontalis 'Turquoise Spreader' TURQUOISE SPREADER JUNIPER	GC						N				N	N	N		.00	.50	.43	.47	.50	C

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Juniperus horizontalis variegata VARIEGATED CREEPING JUNIPER	GC						N				N	N	N		.00	.25	.00	.13	.00	N
Juniperus horizontalis 'Ventusa' VENTUSA JUNIPER	GC						N				N	N	N		.00	.25	.14	.20	.00	N
Juniperus horizontalis 'Webberi' WEBBER JUNIPER	GC						N				N	N	N		.00	.50	.29	.40	.25	N
Juniperus horizontalis 'Wiltoni' WILTON JUNIPER	GC	X		X	X		N			X	N	N	N		.43	.88	1.00	.93	1.00	R
Juniperus horizontalis 'Yukon Bell' YUKON BELL JUNIPER	GC						N				N	N	N		.00	N	N	N	.25	N
Juniperus monosperma ONE-SEED JUNIPER	ET		X	X	N	X		X	X	X	X	N			.67	.19	.86	.50	.25	C
Juniperus osteosperma UTAH JUNIPER	ET	X			N		X			X	X	N		X	.44	1.00	.36	.70	.00	C
Juniperus pachyphloea ALLIGATOR JUNIPER	ET			X	N						X	N			.22	N	N	N	.00	N
Juniperus procumbens CREEPING JUNIPER	ES			X	N			X			N	N	N		.22	N	N	N	.08	N
Juniperus procumbens nana DWARF JAPGARDEN JUNIPER	GC						N	X			N	N	N		.11	.56	.29	.43	.83	R
Juniperus sabina SAVIN JUNIPER	ES		X	X	N		N	X	X		N	N	N		.50	.75	.71	.73	.33	C
Juniperus sabina 'Arcadia' ARCADIA JUNIPER	ES				N		N				N	N	N		.00	.38	.86	.60	.33	C
Juniperus sabina 'Blue Danube' BLUE DANUBE JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.33	N

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Juniperus sabina 'Broadmoor' BROADMOOR JUNIPER	ES				N		N				N	N	N		.00	.81	.86	.83	1.00	R
Juniperus sabina 'Buffalo' BUFFALO JUNIPER	ES				N		N				N	N	N		.00	.81	1.00	.90	1.00	R
Juniperus sabina 'Russian #3' RUSSIAN #3 JUNIPER	ES			X	N		N				N	N	N		.17	N	N	N	.00	N
Juniperus sabina 'Russian #4' RUSSIAN #4 JUNIPER	ES			X	N		N				N	N	N		.17	N	N	N	.00	N
Juniperus sabina 'Scandia' SCANDIA JUNIPER	ES				N		N				N	N	N		.00	.75	.86	.80	.67	R
Juniperus sabina tamariscifolia TAM JUNIPER	ES	X	X	X	X		N	X		X	N	N	N		.57	.88	1.00	.93	.92	R
Juniperus sabina 'Variegated' HOARFROST SAVINS JUNIPER	ES				N		N				N	N	N		.00	.19	.14	.17	.00	N
Juniperus sabina 'Von Ehron' VON EHRON JUNIPER	ES			X	N		N	X		X	N	N	N		.50	.44	.43	.43	.08	C
Juniperus scopulorum ROCKY MOUNTAIN JUNIPER	ET	X	X	X	N	X	X	X	X	X	X	N	X	X	1.00	1.00	.86	.93	.25	R
Juniperus scopulorum 'Blue Haven' BLUE HAVEN JUNIPER	ET			X	N							N			.11	.75	.86	.80	.83	R
Juniperus scopulorum 'Cologreen' COLOGREEN JUNIPER	ET			X	N							N			.11	.38	.86	.60	.58	C
Juniperus scopulorum 'Emerald Green' EMERALD GREEN JUNIPER	ET				N							N			.00	.63	.71	.67	.17	C
Juniperus scopulorum 'Erecta Glauca' ERECTA GLAUCA JUNIPER	ET				N							N			.00	N	N	N	.33	N

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Juniperus scopulorum 'Grey Gleam' GREY GLEAM JUNIPER	ET			X	N							N			.11	.50	.86	.67	.75	R
Juniperus scopulorum 'Hill's Silver' HILL'S SILVER JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus scopulorum 'Lakewood Globe' LAKEWOOD GLOBE JUNIPER	ES				N		N				N	N	N		.00	.63	.57	.60	.42	C
Juniperus scopulorum 'Marshall' MARSHALL JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus scopulorum 'Moffett' MOFFETT JUNIPER	ET			X	N							N			.11	.38	.86	.60	.25	C
Juniperus scopulorum 'Pathfinder' PATHFINDER JUNIPER	ET			X	N							N			.11	.75	.86	.80	.83	R
Juniperus scopulorum 'Silver King' SILVER KING JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus scopulorum 'Sutherland' SUTHERLAND JUNIPER	ET			X	N							N			.11	.38	.86	.60	.25	C
Juniperus scopulorum 'Table Top Blue' TABLE TOP BLUE JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.42	N
Juniperus scopulorum 'Welchi' WELCH JUNIPER	ET				N							N			.00	.25	.86	.53	.33	C
Juniperus squamata meyeri MEYER JUNIPER	ES	X		X	N		N				N	N	N		.17	N	N	N	.25	N
Juniperus squamata prostrata PROSTRATE SINGLE-SEED JUNIPER	GC				X		N				N	N	N		.14	N	N	N	.00	N

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Juniperus utahensis UTAH JUNIPER	ET				N			X				N	X		.22	.88	.50	.70	.08	C
Juniperus virginiana EASTERN RED CEDAR	ET	X		X	N			X			X	N			.33	.88	.71	.80	.00	R
Juniperus virginiana 'Burkii' BURKII JUNIPER	ET			X	N							N			.11	N	N	N	.58	C
Juniperus virginiana 'Canaertii' CANAERT JUNIPER	ET			X	N							N			.11	.75	1.00	.87	.25	R
Juniperus virginiana cupressifolia HILLSPIRE JUNIPER	ET				N							N			.00	.63	.50	.57	.83	R
Juniperus virginiana 'Dundee' DUNDEE JUNIPER	ET			X	N							N			.11	.44	.43	.43	.00	N
Juniperus virginiana 'Erecta Glauca' ERECTA GLAUCA JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus virginiana 'Glauca' RED SILVER CEDAR	ET				N							N			.00	.56	.43	.50	.08	C
Juniperus virginiana 'Hillbush' HILLBUSH JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus virginiana 'Hillspire' HILLSPIRE JUNIPER	ET			X	N							N			.11	N	N	N	.00	N
Juniperus virginiana 'Manhattan Blue' MANHATTAN BLUE JUNIPER	ET				N							N			.00	N	N	N	.42	N
Juniperus virginiana 'Silver Spreader' SILVER SPREADER JUNIPER	ES				N		N				N	N	N		.00	N	N	N	.25	N
Juniperus virginiana 'Sky Rocket' SKY ROCKET JUNIPER	ET				N							N			.00	N	N	N	.67	C

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Juniperus virginiana 'Ventusa' VENTUSA RED CEDAR	ET			X	N							N			.11	N	N	N	.00	N
Kalmia polifolia BOG KALMIA	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Kerria japonica JAPANESE KERRIA	BS			X	N		N				N	X	N		.29	.75	.29	.53	.33	C
Kerria japonica pleniflora GLOBE FLOWERING KERRIA	BS				N		N				N	X	N		.14	.50	.14	.33	.00	N
Koelreuteria paniculata GOLDENRAIN TREE	BT	X		X	N			X		X	X	N			.44	1.00	1.00	1.00	1.00	R
Kolkwitzia amabilis BEAUTY BUSH	BS	X	X	X	N		N	X		X	N		N		.43	.75	1.00	.87	.83	R
Laburnum anagyroides GOLDEN CHAIN TREE	BT			X	N						X	N			.22	.56	.36	.47	.00	N
Laburnum vossi GOLDEN CHAIN TREE	BT				N			X				N			.11	.56	.14	.37	.75	R
Laburnum watereri WATERER LABURNUM	BT			X	N						X	N			.22	.31	.07	.20	.00	N
Larix decidua EUROPEAN LARCH	ET	X	X	X	N						X	N			.22	.75	.50	.63	.08	C
Larix laricina EASTERN LARCH	ET			X	N							N			.11	N	N	N	.00	N
Larix occidentalis WESTERN LARCH	ET				N						X	N			.11	N	N	N	.00	N
Larix sibirica SIBERIAN LARCH	ET			X	N							N			.11	N	N	N	.00	N

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Ligustrum amurensis AMUR PRIVET	BS		X		N		N				N		N		.00	.75	.57	.67	.17	C
Ligustrum amurense 'North' NORTH AMUR PRIVET	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ligustrum ibolium IBOLIUM PRIVET	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ligustrum ibota IBOTA PRIVET	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ligustrum obtusifolium BORDER PRIVET	BS	X			N		N				N	X	N		.14	.50	.43	.47	.08	N
Ligustrum obtusifolium regelianum REGAL PRIVET	BS			X	N		N	X			N	X	N		.43	.63	.43	.53	.42	N
Ligustrum ovalifolium CALIFORNIA PRIVET	BS			X	N		N				N		N		.14	N	N	N	.00	N
Ligustrum vicaryi GOLDEN VICARY	BS				N		N				N	X	N		.14	.25	.86	.53	.83	R
Ligustrum vulgare EUROPEAN PRIVET	BS	X		X	N		N	X		X	N	X	N		.57	.88	1.00	.93	.25	R
Ligustrum vulgare aureo-variegatum YELLOW APPLE EUROPEAN PRIVET	BS				N		N				N	X	N		.14	N	N	N	.00	N
Ligustrum vulgare 'Cheyenne' CHEYENNE PRIVET	BS				N		N				N		N		.00	N	N	N	.42	N
Ligustrum vulgare chlorocarpum GREENFRUIT EUROPEAN PRIVET	BS				N		N				N	X	N		.14	N	N	N	.00	N

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Ligustrum vulgare 'Lodense' LODENSE EUROPEAN PRIVET	BS	X		X	N		N			X	N		N		.29	.88	1.00	.93	.92	R
Ligustrum vulgare nanum DWARF EUROPEAN PRIVET	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Ligustrum vulgare 'Polish' POLISH EUROPEAN PRIVET	BS			X	N		N				N		N		.14	N	N	N	.00	N
Liquidambar styraciflua AMERICAN SWEETGUM	BT				N							N			.00	.88	.14	.53	.67	C
Liriodendron tulipifera TULIP TREE	BT	X		X	N			X			X	N			.33	1.00	.50	.77	.67	R
Lonicera bella BELLE HONEYSUCKLE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Lonicera fragrantissima WINTER HONEYSUCKLE	BS			X	N		N				N	X	N		.29	N	N	N	.25	N
Lonicera heckrotti EVERBLOOMING HONEYSUCKLE	V			X	N		N	X			N		N		.29	N	N	N	.25	N
Lonicera heckrotti 'Goldflame' GOLDFLAME HONEYSUCKLE	V			X	N		N				N	X	N		.29	N	N	N	.50	C
Lonicera involucrata BEARBERRY HONEYSUCKLE	BS			X	N		N	X	X		N	X	N	X	.71	N	N	N	.17	C
Lonicera japonica aureo-reticulata YELLOWNET JAPANESE HONEYSUCKLE	V				N		N				N	X	N		.14	N	N	N	.00	N
Lonicera japonica 'Halliana' HALL'S HONEYSUCKLE	V	X		X	X		N	X		X	N	X	N		.63	.88	1.00	.93	.92	R
Lonicera japonica purpurea PURPLE JAPANESE HONEYSUCKLE	V				N		N				N		N		.00	N	N	N	.25	N

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Lonicera korolkowii BLUELEAF HONEYSUCKLE	BS			X	N		N	X		X	N	X	N		.57	.44	1.00	.70	.42	C
Lonicera korolkowii zabeli ZABEL BLUELEAF HONEYSUCKLE	BS			X	N		N				N		N		.14	N	N	N	.17	N
Lonicera maakii AMUR HONEYSUCKLE	BS			X	N		N	X			N	X	N		.43	.75	.57	.67	.00	C
Lonicera maximowiczii sachalinensis SAKHALIN HONEYSUCKLE	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Lonicera marrowii MARROW HONEYSUCKLE	BS			X	N		N	X			N	X	N		.43	.44	.57	.50	.00	C
Lonicera periclymenum WOODBINE HONEYSUCKLE	V			X	N		N				N		N		.14	N	N	N	.00	N
Lonicera pileata PRIVET HONEYSUCKLE	BS				N		N				N		N		.00	N	N	N	.17	N
Lonicera sempervirens TRUMPET HONEYSUCKLE	V		X	X	N		N	X			N	X	N		.43	.63	.71	.67	.00	C
Lonicera spinosa alberti ALBERT THORN HONEYSUCKLE	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Lonicera syringantha LILAC HONEYSUCKLE	BS			X	N		N	X			N	X	N		.43	N	N	N	.00	N
Lonicera tatarica TATARIAN HONEYSUCKLE	BS	X	X	X	N		N	X		X	N	X	N		.57	.88	.86	.87	.08	R
Lonicera tatarica alba WHITE TATARIAN HONEYSUCKLE	BS				N		N				N		N		.00	.38	.57	.47	.08	N
Lonicera tatarica 'Arnold Red' ARNOLD RED HONEYSUCKLE	BS			X	N		N				N		N		.14	.50	.86	.67	.17	C

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Lonicera tatarica zabeli ZABEL HONEYSUCKLE	BS	X			N		N	X		X	N	X	N		.43	.38	1.00	.67	.75	R
Lonicera xylosteum 'Clavey's' CLAVEY'S HONEYSUCKLE	BS			X	N		N				N		N		.14	.50	.57	.53	.25	C
Lycium halimifolium MATRIMONY VINE	V	X	X	X	X		N	X	X		N	X	N		.63	.25	.43	.33	.00	C
Lysimachia nummularia CREEPING JENNIE	GC						N				N	N	N		.00	N	N	N	.33	N
Magnolia acuminata CUCUMBER TREE	BT			X	N						X	N			.22	N	N	N	.08	N
Magnolia grandiflora SOUTHERN MAGNOLIA	BT				N							N			.00	N	N	N	.33	N
Magnolia soulangeana SAUCER MAGNOLIA	BT	X		X	N						X	X			.30	.75	.21	.50	.58	C
Magnolia soulangeana 'Lennei' LENNE MAGNOLIA	BT				N							X			.10	N	N	N	.00	N
Magnolia stellata STAR MAGNOLIA	BT			X	N						X	X			.30	N	N	N	.33	N
Mahonia aquifolium OREGON GRAPE HOLLY	BS	X	X	X	N	X	N	X	X		N		N		.57	.75	.71	.73	1.00	R
Mahonia aquifolium compacta DWARF OREGON GRAPE HOLLY	BS	X		X	N	X	N				N		N		.29	.75	.71	.73	1.00	R
Mahonia aquifolium 'Mayhan Strain' MAYHAN STRAIN GRAPE HOLLY	BS				N		N				N		N		.00	N	N	N	.17	N

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Mahonia aquifolium 'Orange Flame' ORANGE FLAME GRAPE HOLLY	BS				N		N				N		N		.00	N	N	N	.42	N
Mahonia bealei LEATHERLEAF MAHONIA	BS				N		N				N		N		.00	.44	.00	.23	.08	N
Mahonia nervosa CASCADES MAHONIA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Mahonia repens CREEPING MAHONIA	GC	X	X	X	X	X	N	X	X		N	N	N	X	.86	.75	.71	.73	.75	R
Malus 'Almey' ALMEY CRABAPPLE	BT		X	X	N					X	X	N			.33	.75	1.00	.87	.83	R
Malus 'Aldenheim' ALDENHEIM CRABAPPLE	BT				N						X	N			.11	N	N	N	.00	N
Malus 'American Beauty' AMERICAN BEAUTY CRABAPPLE	BT				N							N			.00	.63	.86	.73	.58	C
Malus arnoldiana ARNOLD CRABAPPLE	BT			X	N			X			X	N			.33	.50	.43	.47	.08	N
Malus baccata SIBERIAN CRABAPPLE	BT			X	N			X			X	N			.33	N	N	N	.08	N
Malus baccata columnaris COLUMNAR SIBERIAN CRABAPPLE	BT				N							N			.00	N	N	N	.25	N
Malus 'Beverly' BEVERLY CRABAPPLE	BT				N						X	N			.11	N	N	N	.17	N
Malus 'Carmine' CARMINE CRABAPPLE	BT				N						X	N			.11	N	N	N	.00	N
Malus 'Dolgo' DOLGO CRABAPPLE	BT		X	X	N			X		X	X	N			.44	.75	1.00	.87	.75	R

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Malus 'Dorothea' DOROTHEA CRABAPPLE	BT			X	N							N			.11	.75	.86	.80	.58	R
Malus 'Eckstermeyer' ECKTERMEYER CRABAPPLE	BT				N						X	N			.11	.44	.71	.57	.58	C
Malus 'Eleyi' ELEYI CRABAPPLE	BT		X		N			X			X	N			.22	N	N	N	.50	C
Malus 'Flame' FLAME CRABAPPLE	BT			X	N							N			.11	N	N	N	.17	N
Malus floribunda JAPANESE FLOWERING CRABAPPLE	BT	X		X	N			X			X	N			.33	.63	.64	.63	.67	C
Malus 'Hopa' HOPA CRABAPPLE	BT	X	X	X	N			X		X	X	N			.44	.88	1.00	.93	1.00	R
Malus ioensis PRAIRIE CRABAPPLE	BT		X	X	N			X			X	N			.33	N	N	N	.00	N
Malus ioensis 'Klehms Improved' KELHMS BECHTEL CRABAPPLE	BT			X	N						X	N			.22	N	N	N	.58	C
Malus ioensis plena BECHTEL CRABAPPLE	BT			X	N						X	N			.22	.75	1.00	.87	.33	R
Malus 'Inglis' INGILIS CRABAPPLE	BT				N							N			.00	N	N	N	.17	N
Malus 'Jay Darling' JAY DARLING CRABAPPLE	BT			X	N						X	N			.22	N	N	N	.00	N
Malus 'Katherine' KATHERINE CRABAPPLE	BT			X	N						X	N			.22	.50	.71	.60	.58	C
Malus 'Kelsey' KELSEY CRABAPPLE	BT				N							N			.00	N	N	N	.17	N

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Malus oekonomierat echtermeyer ECHTERMEYER WEEPING CRABAPPLE	BT				N						X	N			.11	N	N	N	.25	N
Malus 'Pink Perfection' PINK PERFECTION CRABAPPLE	BT				N							N			.00	.38	.86	.60	.75	R
Malus 'Pink Spire' PINK SPIRE CRABAPPLE	BT				N							N			.00	N	N	N	.25	N
Malus pumila COMMON APPLE	BT				N			X			X	N			.22	N	N	N	.00	N
Malus pumila niedzwetzkyana REDVEIN CRABAPPLE	BT			X	N			X		X		N			.33	.38	.57	.47	.17	N
Malus purpurea 'Eleyi' ELEY CRABAPPLE	BT			X	N			X			X	N			.33	.88	1.00	.93	.25	R
Malus 'Radiant' RADIANT CRABAPPLE	BT			X	N			X		X		N			.33	.75	1.00	.87	.75	R
Malus 'Red Jade' RED JADE CRABAPPLE	BT			X	N						X	N			.22	.75	.86	.80	.42	R
Malus 'Red Jewel' RED JEWEL CRABAPPLE	BT				N						X	N			.11	N	N	N	.08	N
Malus 'Red Silver' RED SILVER CRABAPPLE	BT			X	N						X	N			.11	N	N	N	.42	N
Malus 'Red Splendor' RED SPLENDOR CRABAPPLE	BT			X	N						X	N			.11	N	N	N	.17	N
Malus 'Royal Purple' ROYAL PURPLE CRABAPPLE	BT				N							N			.00	N	N	N	.17	N

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Malus 'Royalty' ROYALTY CRABAPPLE	BT				N					X	X	N			.22	.50	1.00	.73	.75	R
Malus sargentii SARGENT CRABAPPLE	BT			X	N						X	N			.22	.88	.86	.87	.42	R
Malus 'Schiedeckeri' SCHIEDECKER CRABAPPLE	BT			X	N			X			X	N			.33	.75	.43	.60	.42	C
Malus 'Selkirk' SELKIRK CRABAPPLE	BT				N							N			.00	N	N	N	.25	N
Malus 'Snow Cloud' SNOW CLOUD CRABAPPLE	BT				N							N			.00	.50	.71	.60	.75	R
Malus 'Snow Drift' SNOW DRIFT CRABAPPLE	BT				N						X	N			.11	N	N	N	.25	N
Malus 'Sparkler' SPARKLER CRABAPPLE	BT				N						X	N			.11	N	N	N	.25	N
Malus 'Spring Snow' SPRING SNOW CRABAPPLE	BT				N							N			.00	N	N	N	.25	N
Malus 'Strathmore' STRATHMORE CRABAPPLE	BT		X	X	N						X	N			.22	.63	.93	.77	.75	R
Malus 'Sundog' SUNDOG CRABAPPLE	BT		X		N							N			.00	N	N	N	.00	N
Malus sylvestris YELLOW TRANSPARENT APPLE	BT				N	X						N			.11	.25	.57	.40	.00	N
Malus thiefera TEA CRABAPPLE	BT			X	N			X			X	N			.33	N	N	N	.00	N
Malus 'Van Eseltine' VAN ESELTINE CRABAPPLE	BT			X	N							N			.11	N	N	N	.25	N

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Malus 'Vanguard' VANGUARD CRABAPPLE	BT				N						X	N			.11	N	N	N	.42	N
Malus 'Wabiskaw' WABISKAW CRABAPPLE	BT			X	N							N			.11	N	N	N	.00	N
Malus 'White Angel' WHITE ANGEL CRABAPPLE	BT				N							N			.00	N	N	N	.25	N
Malus zuni calocarpa REDBUD CRABAPPLE	BT				N						X	N			.11	.38	.71	.53	.17	C
Mamillaria spp. PINCUSHION CACTUS	MS				N	X	N		X		N	N	N		.33	.13	.29	.20	.00	N
Morus alba WHITE MULBERRY	BT	X		X	N			X			X	N			.33	.88	.43	.67	.67	C
Morus alba 'Kingan' KINGAN MULBERRY	BT				N							N			.00	.75	.14	.47	.08	N
Morus alba pendula WEEPING MULBERRY	BT			X	N							N			.11	.63	.43	.53	.17	C
Morus alba tatarica RUSSIAN MULBERRY	BT			X	N			X			X	N			.33	N	N	N	.25	N
Morus rubra RED MULBERRY	BT				N			X			X	N			.22	N	N	N	.00	N
Nandina domestica HEAVENLY BAMBOO	OG			X	N		N				N	N	N		.17	N	N	N	.83	R
Opuntia polyacantha PRICKLY PEAR CACTUS	MS				N	X	N				N	N	N		.17	.44	.29	.37	.00	N

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Ostrya knowletoni WESTERN HOPHORNBEAM	BT				N						X	N			.11	N	N	N	.00	N
Ostrya virginiana AMERICAN HOPHORNBEAM	BT			X	N							N			.11	N	N	N	.00	N
Pachistima myrsinites MYRTLE PACHISTIMA	BS			X	N		N	X			N		N	X	.43	N	N	N	.00	N
Pachysandra terminalis JAPANESE SPURGE	BC						N				N	N	N		.00	.63	.36	.50	.33	C
Paeonia suffruticosa TREE PAEONY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Parrotia persica PERSIAN PARROTIA	BT				N							X			.10	N	N	N	.00	N
Parthenocissus quinquefolia VIRGINIA CREEPER	V	X	X	X	N		N		X		N	X	N		.43	.88	.86	.87	.33	R
Parthenocissus quinquefolia engelmannii ENGELMANN IVY	V			X	X		N	X		X	N	X	N		.63	.31	1.00	.63	.50	C
Parthenocissus quinquefolia saint-paulii SAINT PAUL VIRGINIA CREEPER	V			X	N		N	X			N		N		.29	.06	.43	.23	.00	N
Parthenocissus tricuspidata BOSTON IVY	V	X	X	X	X		N	X			N	X	N		.50	.75	1.00	.87	.83	R
Parthenocissus tricuspidata 'Beverly Brooks' BEVERLY BROOKS BOSTON IVY	V				N		N				N		N		.00	N	N	N	.33	N
Parthenocissus tricuspidata 'Lowii' LOWII BOSTON IVY	V				N		N				N	X	N		.14	N	N	N	.42	N

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Parthenocissus tricuspidata 'Vetchii' VETCHII BOSTON IVY	V				N		N				N	X	N		.14	N	N	N	.33	N
Peraphyllum ramosissimum SQUAW APPLE	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Phellodendron amurense AMUR CORK TREE	BT				N						X	N			.11	N	N	N	.25	N
Philadelphus coronarius SWEET MOCKORANGE	BS	X	X	X	N		N	X		X	N	X	N		.57	.63	.86	.73	.00	C
Philadelphus coronarius aureus GOLDEN SWEET MOCKORANGE	BS				N		N				N	X	N		.14	N	N	N	.08	N
Philadelphus cymosus 'Atlas' ATLAS MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus grandiflorus BIG SCENTLESS MOCKORANGE	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Philadelphus lemoinei LEMOINE MOCKORANGE	BS			X	N		N	X		X	N	X	N		.57	.88	.86	.87	.00	R
Philadelphus lemoinei 'Belle Etoile' BELLE ETOILE LEMOINE MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus lemoinei 'Enchantment' ENCHANTMENT LEMOINE MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus lemoinei 'Innocence' INNOCENCE LEMOINE MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus lemoinei 'Sylviane' SYLVIANE LEMOINE MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus lewisii LEWIS MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N

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Philadelphus microphyllus LITTLELEAF MOCKORANGE	BS			X	N		N		X		N		N	X	.43	N	N	N	.00	N
Philadelphus virginalis VIRGINAL MOCKORANGE	BS			X	N		N	X			N	X	N		.43	.75	1.00	.87	.50	R
Philadelphus virginalis 'Bouquet Blanc' BOUQUET BLANC VIRGINAL MOCKORANGE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Philadelphus virginalis 'Glacier' GLACIER MOCKORANGE	BS				N		N				N		N		.00	N	N	N	.17	N
Philadelphus virginalis 'Minnesota Snowflake' MINNESOTA SNOWFLAKE MOCKORANGE	BS			X	N		N				N		N		.14	.38	1.00	.67	.58	C
Philadelphus virginalis 'Virginal' VIRGINAL MOCKORANGE	BS				N		N				N		N		.00	N	N	N	.17	N
Phlox sublata CREEPING PHLOX	GC				X		N				N	N	N		.14	N	N	N	.00	N
Photinia fraseri PHOTINIA	BS				N		N				N		N		.00	.63	.00	.33	.50	C
Physocarpus aureus GOLDEN NINEBARK	BS				N		N				N		N		.00	.50	.71	.60	.17	C
Physocarpus bracteatus TWIN POD NINEBARK	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Physocarpus intermedius ILLINOIS NINEBARK	BS		X	X	N		N				N		N		.14	.13	.29	.20	.00	N
Physocarpus monogynus MOUNTAIN NINEBARK	BS			X	N	X	N	X	X		N		N	X	.71	.50	.86	.67	.17	C

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Physocarpus opulifolius COMMON NINEBARK	BS		X	X	N		N	X		X	N	X	N		.57	.38	1.00	.67	.00	C
Physocarpus opulifolius aurea GOLDEN NINEBARK	BS				N		N				N		N		.00	N	N	N	.17	N
Physocarpus opulifolius luteus GOLDLEAF NINEBARK	BS				N		N				N	X	N		.14	N	N	N	.00	N
Physocarpus opulifolius nana DWARF GOLDEN NINEBARK	BS			X	N		N	X		X	N	X	N		.57	.19	1.00	.57	.17	C
Physocarpus ramaleyi RAMALEY NINEBARK	BS				N		N	X	X		N		N		.29	N	N	N	.00	N
Picea abies NORWAY SPRUCE	ET	X		X	N						X	N			.22	1.00	.50	.77	.42	R
Picea abies 'Maxwelli' MAXWELL NORWAY SPRUCE	ES			X	N		N				N	N	N		.17	N	N	N	.17	N
Picea abies mucronata SHARPLEAF NORWAY SPRUCE	ES				N		N				N	N	N		.00	N	N	N	.33	N
Picea abies nidiformis NEST SPRUCE	ES	X		X	N		N				N	N	N		.17	.63	.71	.67	.75	R
Picea abies nigra BLACK NORWAY SPRUCE	ET				N							N			.00	.69	.14	.43	.00	N
Picea abies pendula WEEPING NORWAY SPRUCE	ET				N							N			.00	N	N	N	.67	C
Picea abies remontii REMONT NORWAY SPRUCE	ET			X	N							N			.11	N	N	N	.00	N
Picea densata BLACK HILLS WHITE SPRUCE	ET				N			X		X	X	N			.33	N	N	N	.00	N

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Picea engelmannii ENGELMANN SPRUCE	ET	X	X	X	N		X	X	X		X	N	X	X	.78	.88	.86	.87	.08	R
Picea excelsa NORWAY SPRUCE	ET				N					X		N			.11	N	N	N	.00	N
Picea excelsa mucronata SHARPLEAF NORWAY SPRUCE	ES				N		N				N	N	N		.00	.19	.14	.17	.17	N
Picea glauca WHITE SPRUCE	ET	X	X	X	N								N		.11	.75	.71	.73	.08	C
Picea glauca albertina DWARF ALBERTA SPRUCE	ES				N		N	X			X	N	N		.29	N	N	N	.17	N
Picea glauca conica ALBERTA SPRUCE	ES	X		X	N		N				N	N	N		.17	N	N	N	.75	R
Picea glauca densata BLACK HILLS SPRUCE	ET			X	N						X	N			.22	.19	.71	.43	.25	N
Picea galuca 'Multnomah' MULTNOMAH SPRUCE	ET			X	N							N			.11	N	N	N	.00	N
Picea pungens COLORADO SPRUCE	ET	X	X	X	N	X	X	X	X	X	X	N	X	X	1.00	1.00	1.00	1.00	.92	R
Picea pungens glauca COLORADO BLUE SPRUCE	ET				N							N			.00	.75	1.00	.87	.50	R
Picea pungens 'Hoopsi' HOOPSI COLORADO SPRUCE	ET				N							N			.00	N	N	N	.42	N
Picea pungens 'Koster' KOSTER BLUE SPRUCE	ET				N						X	N			.11	.63	.71	.67	.58	C
Picea pungens 'Moerheimmi' MOERHEIM SPRUCE	ET				N						X	N			.11	N	N	N	.25	N

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Picea pungens 'Sherwood Spreading' SHERWOOD SPREADING COLORADO SPRUCE	ET				N							N			.00	N	N	N	.17	N
Pieris japonica LILY OF THE VALLEY SHRUB	BS				N		N				N		N		.00	.69	.00	.37	.33	N
Pinus albicaulis WHITE BARK PINE	ET				N		X					N			.11	N	N	N	.00	N
Pinus aristata BRISTLE CONE PINE	ET	X	X	X	N	X	X	X	X	X	X	N			.78	.88	1.00	.93	.83	R
Pinus cembra SWISS STONE PINE	ET			X	N						X	N			.22	N	N	N	.08	N
Pinus cembroides edulis PINYON PINE	ET		X	X	N	X		X		X	X	N			.56	.75	1.00	.87	.33	R
Pinus contorta LODGEPOLE PINE	ET			X	N		X					N			.22	.88	.50	.70	.42	C
Pinus contorta latifolia ROCKY MOUNTAIN LODGEPOLE PINE	ET			X	N		X	X		X		N		X	.56	.38	.43	.40	.00	N
Pinus densiflora umbraculifera JAPANESE TABLETOP PINE	ET			X	N					X		N			.22	.44	.14	.30	.75	R
Pinus edulis PINYON PINE	ET	X			N		X		X			N		X	.33	1.00	.86	.93	.42	R
Pinus flexilis LIMBER PINE	ET	X	X	X	N		X	X	X	X	X	N		X	.78	.63	.93	.77	.25	R
Pinus leucodermos BALKAN PINE	ET				N							N			.00	N	N	N	.33	N

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Pinus longaeva INTERMOUNTAIN BRISTLECONE PINE	ET				N							N		X	.11	N	N	N	.00	N
Pinus monophylla SINGLELEAF PINYON PINE	ET	X			N		X					N		X	.22	.50	.29	.40	.25	N
Pinus monticola WESTERN WHITE PINE	ET	X			N							N			.00	.44	.14	.30	.08	N
Pinus mugo SWISS MOUNTAIN PINE	ET	X	X		N						X	N			.11	1.00	1.00	1.00	.58	R
Pinus mugo mughus DWARF MUGO PINE	ES	X		X	N	X	N	X		X	N	N	N		.67	.88	1.00	.93	.75	R
Pinus mugo pumilo DWARF MUGO PINE	ES	X			N		N				N	N	N		.00	.56	.71	.63	.25	C
Pinus nigra AUSTRIAN PINE	ET	X	X	X	N			X		X	X	N			.44	1.00	1.00	1.00	.92	R
Pinus ponderosa WESTERN YELLOW PINE	ET	X	X	X	N	X	X		X	X		N		X	.67	1.00	1.00	1.00	.75	R
Pinus ponderosa scopulorum ROCKY MOUNTAIN PONDEROSA PINE	ET				N			X			X	N			.22	N	N	N	.00	N
Pinus resinosa RED PINE	ET				N							N			.00	.38	.21	.23	.08	N
Pinus strobus EASTERN WHITE PINE	ET			X	N			X			X	N			.33	N	N	N	.25	N
Pinus sylvestris SCOTCH PINE	ET	X	X	X	N			X		X	X	N			.44	1.00	1.00	1.00	.92	R
Pinus sylvestris fastigiata PYRAMIDAL SCOTCH PINE	ET				N							N			.00	N	N	N	.33	N

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Pinus sylvestris nana DWARF SCOTCH PINE	ET				N							N			.00	N	N	N	.33	N
Pinus thunbergi JAPANESE BLACK PINE	ET				N						X	N			.11	.69	.14	.43	.67	C
Pinus wallichiana HIMALAYAN WHITE PINE	ET				N							N			.00	N	N	N	.17	N
Platanus acerifolia LONDON PLANE TREE	BT	X		X	N						X	N			.22	1.00	.29	.67	.42	C
Platanus occidentalis AMERICAN PLANE TREE	BT	X		X	N			X		X	X	N			.44	.88	.79	.83	.08	R
Platanus orientalis ORIENTAL SYCAMORE	BT			X	N						X	N			.11	N	N	N	.00	N
Plumbago larpentae PLUMBAGO	GC						N				N	N	N		.00	N	N	N	.17	N
Polygonum aubertii SILVER-LACE VINE	V			X	X		N	X		X	N	X	N		.63	.69	.86	.77	1.00	R
Polygonum reynoutria FLEECE FLOWER	V				N		N				N		N		.00	N	N	N	.50	C
Populus acuminata LANCELEAF POPLAR	BT			X	N	X		X	X	X	X	N			.67	.25	.86	.53	.58	C
Populus alba WHITE POPLAR	BT	X	X	X	N						X	N			.22	.88	.79	.83	.42	R
Populus alba pyramidalis BOLLEANA POPLAR	BT	X	X	X	N			X			X	N			.33	.75	1.00	.87	.75	R
Populus angustifolia NARROWLEAF COTTONWOOD	BT			X	N	X	X	X	X	X	X	N	X	X	1.00	.56	1.00	.77	.25	R

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Populus balsamifera BALSAM POPLAR	BT				N	X			X		X	N			.33	.06	.64	.33	.00	N
Populus canadensis erecta PYRAMIDAL CAROLINA POPLAR	BT			X	N							N			.11	N	N	N	.00	N
Populus canadensis eugenei CAROLINA POPLAR	BT				N			X			X	N			.22	.69	.14	.43	.25	N
Populus candicans BALM OF GILEAD	BT				N							N			.00	.06	.43	.23	.08	N
Populus canescens GRAY POPLAR	BT			X	N							N			.11	N	N	N	.00	N
Populus deltoides EASTERN COTTONWOOD	BT	X			N			X				N			.11	.75	.43	.60	.00	C
Populus deltoides 'Siouxland' SIOUXLAND COTTONWOOD	BT				N							N			.00	.13	.86	.47	.17	N
Populus fremontii FREMONT POPLAR	BT				N		X				X	N			.22	N	N	N	.00	N
Populus nigra BLACK COTTONWOOD	BT			X	N			X				N			.22	.63	.14	.33	.00	N
Poupulus nigra italica LOMBARDY POPLAR	BT	X	X	X	N			X			X	N			.33	1.00	.71	.87	.58	R
Populus nigra 'Theves' THEVES POPLAR	BT				N							N			.00	N	N	N	.42	N
Populus salicina WILLOWLEAF POPLAR	BT				N							N			.00	N	N	N	.17	N
Populus sargentii PLAINS COTTONWOOD	BT		X	X	N	X		X	X	X	X	N	X		.78	.06	.86	.43	.33	R

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Populus simonii SIMON POPLAR	BT			X	N			X			X	N			.33	.00	.43	.20	.00	N
Populus suaveolens MONGOLIAN POPLAR	BT			X	N							N			.11	N	N	N	.00	N
Populus trichocarpa NORTHWEST POPLAR	BT				N						X	N			.11	N	N	N	.00	N
Populus tremuloides QUAKING ASPEN	BT	X	X	X	N	X	X	X	X	X	X	N	X	X	1.00	1.00	1.00	1.00	.92	R
Populus tristis BROWN TWIG POPLAR	BT			X	N							N			.11	N	N	N	.00	N
Potentilla abruscula CINQUEFOIL	BS				N		N				N		N		.00	N	N	N	.17	N
Potentilla aurea GOLDEN CINQUEFOIL	GC				X		N				N	N	N		.14	N	N	N	.00	N
Potentilla fruticosa SHRUBBY CINQUEFOIL	BS	X	X	X	N	X	N	X	X	X	N	X	N	X	1.00	1.00	.93	.97	.33	R
Potentilla fruticosa dahurica DAHURIAN BUSH CINQUEFOIL	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Potentilla fruticosa 'Farreri' GOLD DROP CINQUEFOIL	BS			X	X		N				N	X	N		.38	.25	.79	.50	.33	C
Potentilla fruticosa 'Friedrichsenii' FRIEDRICHSEN CINQUEFOIL	BS			X	N		N				N		N		.14	N	N	N	.00	N
Potentilla fruticosa 'Gold Drop' GOLD DROP CINQUEFOIL	BS			X	N		N				N		N		.14	N	N	N	.00	N

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Potentilla fruticosa 'Jackmanni' JACKMANN CINQUEFOIL	BS				N		N				N		N		.00	N	N	N	.50	C
Potentilla fruticosa 'Katherine Dykes' KATHERN DYKES CINQUEFOIL	BS			X	N		N				N		N		.14	.25	.93	.57	.58	C
Potentilla fruticosa 'Klondike' KLONDIKE CINQUEFOIL	BS			X	N		N				N		N		.14	.63	.93	.77	.50	R
Potentilla fruticosa 'Lemon Drop' LEMON DROP CINQUEFOIL	BS			X	N		N				N		N		.14	N	N	N	.17	N
Potentilla fruticosa 'Moonlight' MOONLIGHT CINQUEFOIL	BS				N		N				N		N		.00	N	N	N	.42	N
Potentilla fruticosa 'Mount Everest' MOUNT EVEREST CINQUEFOIL	BS			X	N		N				N		N		.14	.25	.64	.50	.33	C
Potentilla fruticosa 'Primrose Beauty' PRIMROSE BEAUTY CINQUEFOIL	BS			X	N		N				N		N		.14	N	N	N	.00	N
Potentilla fruticosa 'Snowflake' SNOWFLAKE CINQUEFOIL	BS				N		N				N		N		.00	.25	.64	.43	.00	N
Potentilla fruticosa 'Sutter's Gold' SUTTER'S GOLD CINQUEFOIL	BS				N	X	N				N		N		.14	.50	.79	.63	.08	C
Potentilla fruticosa 'Tangerine' TANGERINE CINQUEFOIL	BS				N		N				N		N		.00	.38	.50	.43	.50	C
Potentilla fruticosa 'Veitchii' VEITCHII CINQUEFOIL	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Potentilla fruticosa 'Vilmoriniana' VILMORINIANA CINQUEFOIL	BS				N		N				N		N		.00	.13	.64	.37	.00	N
Potentilla verna SPRING CINQUEFOIL	GC						N				N	N	N		.00	.75	.57	.67	.58	C

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				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Primula spp. PRIMROSE	GC				X		N				N	N	N		.14	N	N	N	.00	N
Prunus americana AMERICAN PLUM	BT			X	N	X	X	X	X		X	N	X	X	.89	.50	1.00	.73	.17	C
Prunus besseyi WESTERN SAND CHERRY	BS				N	X	N	X		X	N	X	X		.63	.25	1.00	.63	.17	C
Prunus blireiana FLOWERING PLUM	BT				N						X	N			.11	N	N	N	.58	C
Prunus cerasifera atropurpurea PISSARDI PURPLE LEAF PLUM	BT				N						X	N			.11	.63	.71	.67	.42	C
Prunus cerasifera 'Krauter Vesuvius' KRAUTER VESUVIUS PURPLELEAF PLUM	BT				N							N			.00	N	N	N	.58	C
Prunus cerasifera 'Newport' NEWPORT FLOWERING PLUM	BT	X	X	X	N			X		X	X	N			.44	.63	1.00	.80	.92	R
Prunus cerasifera 'Thundercloud' THUNDERCLOUD FLOWERING PLUM	BT			X	N							N			.11	.63	.86	.73	.58	C
Prunus cerasus MONTMORENCY CHERRY	BT				N	X		X			X	N			.33	.50	.86	.67	.25	C
Prunus cistina PURPLELEAF PLUM	BS		X	X	N		N	X			N		N		.29	.63	.86	.73	.75	R
Prunus cistina 'Hansen' HANSEN'S PURPLELEAF PLUM	BS			X	N		N				N		N		.14	.31	.71	.50	.17	C
Prunus domestica COMMON GARDEN PLUM	BT				N						X	N			.11	.38	.57	.47	.00	N
Prunus fruticosa GROUND CHERRY	BS				N		N				N		N		.00	N	N	N	.17	N

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Prunus glandulosa DWARF FLOWERING ALMOND	BS	X			N		N	X		X	N	X	N		.43	.75	.79	.77	.25	R
Prunus glandulosa albiplena WHITE FLOWERING ALMOND	BS	X			N		N				N		N		.00	.44	.43	.43	.00	N
Prunus glandulosa rosea RED FLOWERING ALMOND	BS				N		N				N		N		.00	.63	.57	.60	.17	C
Prunus glandulosa sinensis DOUBLE PINK FLOWERING ALMOND	BS				N		N				N		N		.00	N	N	N	.42	N
Prunus laurocerasus ENGLISH LAUREL	BS				N		N				N		N		.00	.63	.29	.47	.75	R
Prunus laurocerasus nana DWARF ENGLISH LAUREL	BS				N		N				N		N		.00	N	N	N	.33	N
Prunus laurocerasus 'Otto Luykens' OTTO LUYKENS LAUREL	BS				N		N				N		N		.00	N	N	N	.67	C
Prunus laurocerasus 'Schipkaensis' SCHIPKA LAUREL	BS				N		N				N		N		.00	N	N	N	.42	N
Prunus laurocerasus 'Zabeliana' ZABEL CHERRY LAUREL	BS				N		N				N		N		.00	N	N	N	.50	C
Prunus mandshurica MANCHURIAN APRICOT	BT			X	N							N			.11	N	N	N	.00	N
Prunus mume 'Peggy Clark' PEGGY CLARK JAPANESE FLOWERING PLUM	BT				N							N			.00	N	N	N	.17	N
Prunus opata PLUM CHERRY	BS				N	X	N				N		N		.14	N	N	N	.00	N

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Prunus padus EUROPEAN BIRD CHERRY	BT			X	N			X			X	N			.33	.75	.64	.70	.33	C
Prunus padus commutata MAY DAY TREE	BT				N							N			.00	.88	1.00	.93	.17	R
Prunus pedinculata FLOWERING ALMOND	BT			X	N							N			.11	N	N	N	.00	N
Prunus pennsylvanica PIN CHERRY	BT			X	N			X	X		X	N			.44	N	N	N	.00	N
Prunus persica FLOWERING PEACH	BT			X	N							N			.11	N	N	N	.08	N
Prunus persica atropurpurea PURPLE FLOWERING PEACH	BT			X	N							N			.11	N	N	N	.00	N
Prunus persica 'Early Double Red' EARLY DOUBLE RED FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N
Prunus persica 'Helen Borchers' HELEN BORCHERS FLOWERING PEACH	BT				N							N			.00	N	N	N	.33	N
Prunus persica 'Late Double Red' LATE DOUGLE RED FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N
Prunus persica 'Pink' PINK FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N
Prunus persica 'Red' RED FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N
Prunus persica 'Saturn' SATURN FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N
Prunus persica 'Weeping Double Red' WEEPING DOUBLE RED FLOWERING PEACH	BT				N							N			.00	N	N	N	.17	N

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Prunus pumila SAND CHERRY	BS			X	N		N				N		N		.14	N	N	N	.00	N
Prunus salicina JAPANESE PLUM	BT			X	N							N			.11	N	N	N	.00	N
Prunus sargentii SARGENT CHERRY	BT				N							N			.00	N	N	N	.25	N
Prunus serotina BLACK CHERRY	BT			X	N			X		X	X	N			.44	.38	.43	.37	.08	N
Prunus serrulata 'Amanogawa' AMANOGAWA FLOWERING CHERRY	BT				N							N			.00	N	N	N	.25	N
Prunus serrulata 'Kwanzan' KWANZAN FLOWERING CHERRY	BT				N							N			.00	.50	.14	.33	.58	C
Prunus serrulata 'Mt. Fugi' MT. FUGI FLOWERING CHERRY	BT				N							N			.00	N	N	N	.42	N
Prunus sibirica SIBERIAN APRICOT	BT				N			X				N			.11	N	N	N	.00	N
Prunus subhirtella pendula WEEPING JAPANESE CHERRY	BT	X			N							N			.00	.75	.14	.47	.58	C
Prunus subhirtella 'Yae-shidare-higan' DOUBLE WEEPING CHERRY	BT				N							N			.00	N	N	N	.17	N
Prunus tenella RUSSIAN ALMOND	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Prunus tomentosa NANKING CHERRY	BS		X		N		N	X		X	N	X	N		.43	.75	1.00	.87	.42	R
Prunus triloba FLOWERING PLUM	BS		X	X	N		N	X		X	N		N		.43	.88	1.00	.93	.75	R

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Prunus triloba multiplex FLOWERING ALMOND	BS				N		N				N	X	N		.14	N	N	N	.00	N
Prunus virginiana CHOKECHERRY	BT				N		X					N			.11	.63	1.00	.80	.33	R
Prunus virginiana demissa WESTERN CHOKECHERRY	BT			X	N	X	X	X	X	X	X	X			.80	N	N	N	.08	R
Prunus virginiana melanocarpa BLACKFRUITED CHOKECHERRY	BT				N		X		X			N		X	.33	.25	.86	.53	.00	C
Prunus virginiana melanocarpa 'Shubert' SHUBERT CHOKECHERRY	BT				N						X	N			.11	N	N	N	.42	N
Prunus yedoensis YOSHINO FLOWERING CHERRY	BT				N							N			.00	N	N	N	.25	N
Pseudotsuga menziesii DOUGLAS FIR	ET	X	X	X	N	X		X	X		X	N	X		.67	.94	.71	.83	.25	R
Pseudotsuga menziesii glauca ROCKY MOUNTAIN DOUGLAS FIR	ET				N		X					N		X	.22	.50	.43	.47	.00	N
Ptelea trifoliata COMMON HOPTREE	BT			X	N			X			X	N			.33	N	N	N	.00	N
Pursia tridentata ANTELOPE BITTERBRUSH	BS			X	N		N	X	X	X	N		N	X	.71	.25	.71	.47	.17	C
Pyracantha angustifolia 'Gnome' GNOME FIRETHORN	BS				N		N				N		N		.00	N	N	N	.67	C

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Pyracantha coccinea SCARLET FIRETHORN	BS	X	X	X	N		N				N		N		.14	1.00	.29	.67	.42	C
Pyracantha coccinea 'Colorado Red' COLORADO RED FIRETHORN	BS				N		N				N		N		.00	N	N	N	.17	N
Pyracantha coccinea 'Lalandei' LALANDEI FIRETHORN	BS			X	N		N				N		N		.14	.63	.86	.73	.58	C
Pyracantha coccinea 'Lowboy' LOWBOY FIRETHORN	BS				N		N				N		N		.00	N	N	N	.33	N
Pyracantha coccinea "Wyattii' WYATTII FIRETHORN	BS			X	N		N			X	N		N		.29	.50	1.00	.73	.92	R
Pyracantha pauciflora FIRETHORN	BS				N		N			X	N		N		.14	.75	.71	.73	.92	R
Pyracantha 'Walker's Dwarf' WALKER'S DWARF FIRETHORN	BS				N		N				N		N		.00	N	N	N	.17	N
Pyrus calleryana 'Aristocrat' ARISTOCRAT PEAR	BT				N							N			.00	N	N	N	.33	N
Pyrus calleryana 'Bradford' BRADFORD PEAR	BT				N						X	N			.11	.38	.71	.53	.67	C
Pyrus communis COMMON PEAR	BT			X	N							N			.11	N	N	N	.00	N
Pyrus ussuriensis USSURIAN PEAR	BT				N						X	N			.11	N	N	N	.17	N
Quercus alba WHITE OAK	BT	X		X	N			X		X	X	N			.44	.38	.79	.57	.08	C
Quercus bicolor SWAMP WHITE OAK	BT				N					X	X	N			.22	N	N	N	.08	N

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Quercus borealis NORTHERN RED OAK	BT			X	N					X	X	N			.33	.56	.93	.73	.83	R
Quercus coccinea SCARLET OAK	BT			X	N			X			X	N			.33	N	N	N	.08	N
Quercus falcata SOUTHERN RED OAK	BT			X	N			X		X	X	N			.44	.13	.00	.07	.00	N
Quercus gambellii GAMBEL OAK	BT			X	N	X	X		X	X	X	X		X	.80	.75	1.00	.87	.50	R
Quercus gambellii utahensis UTAH GAMBEL OAK	BT				N						X	N			.11	N	N	N	.00	N
Quercus imbricata SHINGLE OAK	BT				N						X	N			.11	N	N	N	.08	N
Quercus macrocarpa BUR OAK	BT	X	X	X	N			X		X	X	N			.44	.81	1.00	.90	.67	R
Quercus palustris PIN OAK	BT			X	N			X			X	N			.33	N	N	N	.67	C
Quercus phellos WILLOW OAK	BT				N						X	N			.11	N	N	N	.08	N
Quercus montana CHESTNUT OAK	BT				N						X	N			.11	N	N	N	.00	N
Quercus robur ENGLISH OAK	BT	X		X	N			X		X	X	N			.44	.63	1.00	.80	.42	R
Quercus velutina NORTHERN BLACK OAK	BT				N						X	N			.11	N	N	N	.00	N
Rhamnus cathartica COMMON BUCKTHORN	BS	X	X	X	N		N	X		X	X		N		.50	.75	1.00	.87	.17	R

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Rhamnus frangula GLOSSY BUCKTHORN	BS			X	N		N	X			N	X	N		.57	.38	.86	.60	.25	C
Rhamnus frangula columnaris TALLHEDGE BUCKTHORN	BS			X	N		N			X	N		N		.29	.31	1.00	.63	.75	R
Rhodotypos scandens BLACK JETBEAD	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Rhodotypos tetrapetala JETBEAD	BS				N		N				N	X	N		.14	N	N	N	.00	N
Rhus aromatica FRAGRANT SUMAC	BS			X	N		N				N	X	N		.29	.75	.64	.70	.42	C
Rhus copallina SHINING SUMAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Rhus glabra SMOOTH SUMAC	BS	X	X	X	N		X	X	X		N	X	N	X	.75	1.00	1.00	1.00	.58	R
Rhus glabra cismontana ROCKY MOUNTAIN SMOOTH SUMAC	BS			X	N	X	N	X	X		N		N		.57	.69	1.00	.83	.17	R
Rhus glabra laciniata LACELEAF SMOOTH SUMAC	BS			X	N		N	X			N		N		.29	.75	1.00	.87	.17	R
Rhus trilobata SKUNK BUSH SUMAC	BS	X	X	X	N	X	X	X	X	X	N	X	N	X	1.00	.88	1.00	.93	.17	R
Rhus typhina STAGHORN SUMAC	BS	X	X	X	N		N	X		X	X	X	N		.63	1.00	1.00	1.00	.83	R
Rhus typhina laciniata CUTLEAF STAGHORN SUMAC	BS				N		N	X			N	X	N		.29	.75	1.00	.87	.50	R

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Ribes alpinum ALPINE CURRANT	BS		X	X	N		N	X		X	N	X	N		.57	.88	1.00	.93	.58	R
Ribes americanum AMERICAN BLACK CURRANT	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Ribes aureum GOLDEN CURRANT	BS			X	N	X	N	X	X	X	N	X	N	X	1.00	.38	.86	.60	.17	C
Ribes cereum WAX CURRANT	BS				N		N	X	X		N		N	X	.43	N	N	N	.08	N
Ribes coloradense COLORADO CURRANT	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Ribes diacanthum SIBERIAN RED CURRANT	BS			X	N		N				N		N		.14	N	N	N	.17	N
Ribes grossularia hirtellum GOOSEBERRY	BS				N	X	N				N		N		.14	N	N	N	.00	N
Ribes grossularia hirtellum 'Colossal' COLOSSAL GOOSEBERRY	BS				N	X	N				N		N		.14	N	N	N	.00	N
Ribes grossularia hirtellum 'Pixwell' PIXWELL GOOSEBERRY	BS				N	X	N				N		N		.14	N	N	N	.00	N
Ribes inerme WHITESTEM GOOSEBERRY	BS			X	N	X	N	X	X		N		N		.57	.19	.57	.37	.00	C
Ribes odoratum BUFFALO CURRANT	BS				N		N				N		N		.00	.25	.57	.40	.00	N
Robinia hispida ROSE ACACIA	BS			X	N		N	X			N	X	N		.43	.63	.14	.40	.17	N
Robinia idahoensis IDAHO FLOWERING LOCUST	BT	X			N							N			.00	.75	.71	.73	.58	C

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Robinia neo-mexicana NEW MEXICAN LOCUST	BT			X	N		X	X				N			.33	.19	.86	.50	.17	C
Robinia pseudoacacia BLACK LOCUST	BT	X	X	X	N						X	N			.22	.88	.57	.73	.08	C
Robinia pseudoacacia umbraculifera GLOBE LOCUST	BT				N							N			.00	N	N	N	.33	N
Rosa arkansana PRAIRIE WILD ROSE	BS				N		N		X		N		N		.14	.13	.57	.33	.00	N
Rosa blanda MEADOW ROSE	BS			X	N		N	X			N		N		.29	.38	.71	.53	.17	C
Rosa 'Blaze' BLAZE SHRUB ROSE	BS				N		N				N		N		.00	N	N	N	.17	N
Rosa foetida bicolor AUSTRIAN COPPER ROSE	BS	X	X	X	N		N	X		X	N	X	N		.57	.63	.86	.73	.50	C
Rosa foetida persiana PERSIAN YELLOW ROSE	BS				N		N	X			N	X	N		.29	.13	.71	.40	.17	N
Rosa 'Hansa' HANSA SHRUB ROSE	BS				N		N				N		N		.00	N	N	N	.17	N
Rosa Harisoni HARRISON'S YELLOW ROSE	BS	X		X	N		N	X			N		N		.29	.13	.86	.47	.17	N
Rose Hugonis FATHER HUGO'S ROSE	BS	X		X	N		N	X			N	X	N		.43	.88	.71	.80	.00	R
Rosa lucida SHINING ROSE	BS				N		N				N		N		.00	N	N	N	.17	N
Rosa magnifica ROSE	BS				N		N				N		N		.00	N	N	N	.17	N

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Rosa multiflora JAPANESE ROSE	BS	X		X	N		N	X			N	X	N		.43	N	N	N	.00	N
Rosa pomifera APPLE ROSE	BS				N		N				N		N		.00	N	N	N	.17	N
Rosa rubifolia REDLEAF ROSE	BS	X		X	N		N	X			N		N		.29	.00	.86	.40	.00	N
Rosa rubignosa SWEETBRIAR ROSE	BS				N		N	X			N		N		.14	N	N	N	.00	N
Rosa rugosa RUGOSE ROSE	BS	X		X	N		N				N	X	N		.29	.50	.57	.53	.00	C
Rosa rugosa alba WHITE RUGOSE ROSE	BS	X			N		N				N		N		.00	.38	.57	.47	.00	N
Rosa rugosa 'Grootendorst' GROOTENDORST ROSE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Rosa sayi NATIVE REDSTEM ROSE	BS				N		N	X			N		N		.14	N	N	N	.00	N
Rosa setigera PRAIRIE ROSE	BS			X	N		N	X		X	N		N		.43	N	N	N	.00	N
Rosa wichuraiana MEMORIAL ROSE	GC	X					N				N	X	N		.13	.75	.29	.53	.25	C
Rosa wichuraiana 'Dorothy Perkins' DOROTHY PERKINS ROSE	V				N		N	X			N		N		.14	.50	.36	.43	.00	N
Rubus deliciosus BOULDER RASPBERRY	BS			X	N	X	N	X	X	X	N		N		.71	.25	1.00	.60	.25	C

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Rubus odoratus THIMBLEBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Rubus strigosus AMERICAN RED RASPBERRY	BS				N	X	N	X	X		N		N	X	.57	.38	.57	.47	.00	C
Rubus parviflorus WESTERN THIMBELBERRY	BS			X	N		N	X	X		N		N	X	.57	N	N	N	.00	C
Sagina sublata SCOTCH MOSS	GC						N				N		N		.00	N	N	N	.33	N
Salix alba WHITE WILLOW	BT		X	X	N						X	N			.22	.56	.57	.57	.00	C
Salix alba tristis WEEPING WILLOW	BT	X	X		N							N			.00	.63	.86	.73	.17	C
Salix amygdaloides PEACH-LEAVED WILLOW	BT			X	N	X	X		X		X	N			.56	.13	.57	.33	.00	C
Salix babylonica WEEPING WILLOW	BT	X		X	N						X	N			.22	.75	.57	.67	.42	C
Salix babylonica 'Golden' GOLDEN WEEPING WILLOW	BT				N	X				X		N			.22	N	N	N	.00	N
Salix bebbiana BEBB WILLOW	BS	X			N		X		X		X		N		.33	.00	.29	.13	.00	N
Salix bebbiana perrostrata BEBB WILLOW	BS				N		N				N		N	X	.14	N	N	N	.00	N
Salix blanda WISCONSIN WEEPING WILLOW	BT	X		X	N					X	X	N			.33	.19	.43	.30	.67	C
Salix blanda 'Fan' FAN GIANT BLUE WILLOW	BT				N							N			.00	N	N	N	.42	N

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Salix caprea GOAT WILLOW	BS	X	X		N		N				N	X	N		.14	.50	.57	.53	.17	C
Salix discolor PUSSY WILLOW	BS	X		X	N		N	X			X		N		.43	.88	.86	.87	.42	R
Salix drummondiana DRUMMOND WILLOW	BS				N		N		X		N		N	X	.29	N	N	N	.00	N
Salix elegantissima WEEPING WILLOW	BS	X			N		N				N		N		.00	.13	.43	.27	.08	N
Salix exigua COYOTE WILLOW	BS	X		X	N		X		X		N		N	X	.57	.31	.29	.30	.00	C
Salix fragilis CRACK WILLOW	BT	X			N							N			.00	.19	.29	.23	.00	N
Salix geyeriana GEYER WILLOW	BS	X			N		N		X		N		N	X	.29	N	N	N	.00	N
Salix interior SANDBAR WILLOW	BS	X			N		N		X		N		N		.14	N	N	N	.00	N
Salix irrorata BLUESTEM WILLOW	BS	X	X	X	N		N	X	X		N		N		.43	.25	.86	.53	.17	C
Salix lasiandra PACIFIC WILLOW	BT				N							N		X	.11	.06	.14	.10	.00	N
Salix lutea YELLOW WILLOW	BS				N		X				N		N		.13	N	N	N	.00	N
Salix matsudana tortuosa CORKSCREW WILLOW	BT	X			N						X	N			.11	.88	.43	.67	.42	C
Salix nigra BLACK WILLOW	BT			X	N		X				X	N			.33	N	N	N	.00	N

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Salix pentandra LAUREL-LEAVED WILLOW	BT			X	N			X			X	N			.33		.00	.29	.13	.25	N
Salix purpurea ARCTIC WILLOW	BS	X			N		N	X			N	X	N		.29		.19	.57	.37	.17	N
Salix purpurea gracilis SLENDER PURPLEOSIER WILLOW	BS			X	N		N				N		N		.14		N	N	N	.00	N
Salix purpurea nana DWARF PURPLEOSIER WILLOW	BS	X		X	N		N				N	X	N		.29		N	N	N	.00	N
Salix sp. RUSSIAN WEEPING WILLOW	BT				N					X	X	N			.22		N	N	N	.17	N
Salix scouleriana SCOULER WILLOW	BS	X			N		X		X		N		N	X	.43		N	N	N	.00	N
Salix vitellina GOLDEN WILLOW	BT				N							N			.00		N	N	N	.17	N
Salix wolfii WOLF'S WILLOW	BS	X			N		X		X		N		N	X	.38		N	N	N	.00	N
Sambucus canadensis AMERICAN ELDERBERRY	BS	X		X	N		N	X	X	X	N	X	N		.71		.75	.86	.80	.33	R
Sambucus canadensis acutiloba CUTLEAF ELDER	BS			X	N		N				N		N		.14		N	N	N	.33	N
Sambucus canadensis aurea GOLDEN ELDER	BS			X	N		N				N		N		.14		N	N	N	.75	R
Sambucus coerulea BLUEBERRY ELDER	BS			X	N		N				N		N		.14		N	N	N	.00	N

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Sambucus coerulea neo-mexicana NEW MEXICAN BLUEBERRY ELDER	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Sambucus glauca BLUEBERRY ELDER	BS				N		X				N		N		.13	.63	.29	.47	.08	N
Sambucus microbotrys BUNCHBERRY ELDER	BS			X	N		N	X	X		N		N		.43	N	N	N	.00	N
Sambucus nigra aurea GOLDEN EUROPEAN ELDER	BS				N		N				N	X	N		.14	N	N	N	.00	N
Sambucus pubens RED BERRIED ELDER	BS				N		N		X		N		N		.14	N	N	N	.17	N
Sambucus racemosa EUROPEAN RED ELDERBERRY	BS				N		N				N	X	N	X	.29	N	N	N	.17	N
Sapindus drummondii WESTERN SOAPBERRY	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Saponaria ocymoides ROCK SOAPWORT	GC				X		N				N	N	N		.14	N	N	N	.00	N
Saxifraga rubicunda HEARTLEAF BERGENIA	GC						N				N	N	N		.00	N	N	N	.33	N
Sedum acre GOLDMOSS SEDUM	GC				X		N				N	N	N		.14	.75	.86	.80	.17	R
Sedum brevifolium GREEN STONECROP	GC						N				N	N	N		.00	N	N	N	.33	N
Sedum 'Perry's Green' PERRY'S GREEN STONECROP	GC						N				N	N	N		.00	N	N	N	.17	N
Sedum 'Sarmentosum' SARMENTOSUM STONECROP	GC						N				N	N	N		.00	N	N	N	.17	N

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Sedum spathulifolium SEDUM	GC						N				N	N	N		.00	.50	.29	.40	.00	N
Sedum spurium STONECROP	GC						N	X			N	N	N		.14	.81	.71	.77	.25	R
Sedum spurium 'Dragons Blood' DRAGONS BLOOD STONECROP	GC						N				N	N	N		.00	N	N	N	.33	N
Sedum utah UTAH STONECROP	GC						N				N	N	N		.00	N	N	N	.33	N
Sempervivum spp. HOUSELEEK	GC				X		N				N	N	N		.14	N	N	N	.00	N
Shepherdia argentia SILVER BUFFALOBERRY	BS	X	X	X	N		N		X	X	N	X	N	X	.71	.75	1.00	.87	.42	R
Shepherdia canadensis RUSSETT BUFFALOBERRY	BS			X	N		N		X		N		N		.29	N	N	N	.00	N
Sophora japonica JAPANESE PAGODA TREE	BT	X		X	N			X		X	X	N			.44	1.00	.43	.73	.58	C
Sorbaria aitchisoni KASHMIR FLASESPIREA	BS			X	N		N				N	X	N		.29	N	N	N	.00	N
Sorbaria arborea TREE FLASESPIREA	BS				N		N				N	X	N		.14	N	N	N	.00	N
Sorbaria arborea glabrata SMOOTH TREE FALSESPIREA	BS			X	N		N	X			N		N		.22	N	N	N	.00	N
Sorbaria sorbifolia URAL FALSESPIREA	BS	X	X	X	N		N	X			N	X	N		.43	.50	.71	.60	.17	C

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Sorbus alnifolia KOREAN MOUNTAIN ASH	BT				N						X	N			.11	N	N	N	.08	N
Sorbus americana AMERICAN MOUNTAIN ASH	BT			X	N			X			X	N			.33	N	N	N	.08	N
Sorbus aucuparia EUROPEAN MOUNTAIN ASH	BT	X	X	X	N			X		X	X	N			.44	1.00	1.00	1.00	.75	R
Sorbus decora SHOWY MOUNTAIN ASH	BT			X	N							N			.11	N	N	N	.00	N
Sorbus hybrida OAKLEAF MOUNTAIN ASH	BT				N			X			X	N			.22	.06	.36	.20	.17	N
Sorbus scopulina GREENE'S MOUNTAIN ASH	BT			X	N		X	X	X		X	N		X	.67	.38	.29	.33	.00	C
Sorbus tianshanica TURKISH MOUNTAIN ASH	BT			X	N							N			.11	N	N	N	.17	N
Spiraea albiflora JAPANESE WHITE SPIREA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Spiraea arguta GARLAND SPIREA	BS			X	N		N	X		X	N	X	N		.57	.38	.57	.47	.00	C
Spiraea billardii BILLARD SPIREA	BS			X	N		N				N	X	N		.29	N	N	N	.17	N
Spiraea bumalda BUMALDA SPIREA	BS			X	N		N	X			N		N		.29	.75	1.00	.87	.00	R
Spiraea bumalda 'Anthony Waterer' ANTHONY WATERER SPIREA	BS		X	X	N		N				N	X	N		.29	N	N	N	.58	C
Spiraea bumalda froebelii FROEBEL PINK SPIREA	BS			X	N		N			X	N	X	N		.43	.63	1.00	.80	.58	R

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Spiraea bumalda 'Gold Flame' GOLD FLAME SPIREA	BS				N		N				N		N		.00	N	N	N	.42	N
Spiraea canescens HOARY SPIREA	BS				N		N				N	X	N		.14	N	N	N	.00	N
Spiraea japonica coccinea JAPANESE SPIREA	BS				N		N				N		N		.00	.44	.29	.37	.17	N
Spiraea latifolia MEADOWSWEET SPIREA	BS				N		N				N		N		.00	.13	.07	.10	.00	N
Spiraea macrothyrsa SPIREA	BS				N		N				N		N		.00	N	N	N	.17	N
Spiraea nipponica SNOWMOUND SPIREA	BS			X	N		N				N		N		.14	N	N	N	.42	N
Spiraea prunifolia BRIDALWREATH SPIREA	BS				N		N	X			N		N		.14	.63	.86	.73	.42	C
Spiraea prunifolia plena DOUBLE BRIDALWREATH SPIREA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Spiraea thunbergi THUNBERG SPIREA	BS				N		N	X			N	X	N		.29	N	N	N	.00	N
Spiraea trichocarpa KOREAN SPIREA	BS			X	N		N	X		X	N	X	N		.57	.25	.29	.27	.00	C
Spiraea trilobata THREELOBE SPIREA	BS			X	N		N				N		N		.14	N	N	N	.17	N
Spiraea vanhouttei VANHOUTTE SPIREA	BS	X	X	X	N		N	X		X	N	X	N		.57	.88	1.00	.93	1.00	R
Stachys olympica LAMB'S EARS	GC						N	X			N	N	N		.14	N	N	N	.00	N

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Staphylea bumalda BUMALDA BLADDERNUT	BS			X	N		N				N		N		.14	N	N	N	.00	N
Symphoricarpos albus COMMON SNOWBERRY	BS	X	X	X	N		N	X	X	X	N		N		.57	.88	1.00	.93	.83	R
Symphoricarpos albus laevigatus SNOWBERRY	BS				N		N				N	X	N		.14	N	N	N	.00	N
Symphoricarpos 'Hancock' HANCOCK CORALBERRY	BS			X	N		N				N		N		.14	N	N	N	.25	N
Symphoricarpos mollis SPREADING SNOWBERRY	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Symphoricarpos occidentalis WESTERN SNOWBERRY	BS			X	N		N	X	X		N		N		.43	.38	.86	.60	.00	C
Symphoricarpos orbiculatus INDIAN CURRANT	BS		X	X	X		N	X	X		N	X	N		.71	.63	1.00	.80	.33	R
Symphoricarpos orbiculatus chenaulti CHENAULT CORALBERRY	BS			X	N		N	X			N	X	N		.43	.56	1.00	.77	.33	R
Symphoricarpos oreophilus MOUNTAIN SNOWBERRY	BS			X	N		N	X	X	X	N		N	X	.71	N	N	N	.00	N
Symphoricarpos vacciniodes WHORTLELEAF SNOWBERRY	BS				N		N		X		N	X	N	X	.43	N	N	N	.00	N
Syringa amurensis japonica JAPANESE TREE LILAC	BT	X		X	N			X		X	X	N			.44	.69	1.00	.83	.42	R
Syringa chinensis CHINESE LILAC	BS	X		X	N		N				N	X	N		.29	.88	.86	.87	.75	R
Syringa chinensis alba WHITE CHINESE LILAC	BS	X			N		N				N		N		.00	.75	.29	.53	.00	C

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Syringa chinensis rothmagensis CHINESE LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa josikaea HUNGARIAN LILAC	BS			X	N		N				X	X	N		.43	.00	.36	.17	.00	N
Syringa laciniata CUTLEAF PERSIAN LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa meyeri DWARF KOREAN LILAC	BS				N		N				N		N		.00	N	N	N	.42	N
Syringa 'Miss Kim' MISS KIM LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa pekinensis CHINESE TREE LILAC	BS			X	N		N	X			N		N		.29	N	N	N	.00	N
Syringa persica PERSIAN LILAC	BS				N		N	X			N		N		.14	.75	.86	.80	.08	R
Syringa prestonae PRESTON LILAC	BS			X	N		N				N		N		.14	N	N	N	.00	N
Syringa reflexa MACFARLANE PINK LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa rothmagensis PERSIAN LILAC	BS				N		N			X	N		N		.14	.25	1.00	.60	.00	C
Syringa sweginzowi CHENGTU LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa villosa LATE LILAC	BS			X	N		N	X			X		N		.43	.31	.86	.57	.00	C

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Syringa villosa 'Aladdin' ALADDIN LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa villosa 'Evangeline' EVANGELINE LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa villosa 'Isabella' ISABELLA LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa villosa 'Miranda' MIRANDA LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa villosa 'Nocturne' NOCTURNE LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.17	N
Syringa villosa 'Pocahontas' POCAHONTAS LATE LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa villosa 'Royalty' ROYALTY LATE LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris COMMON LILAC	BS	X	X	X	N		N	X		X	N	X	X		.71	1.00	1.00	1.00	.92	R
Syringa vulgaris 'Abel Chutenay' ABEL CHUTENAY COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris alba WHITE COMMON LILAC	BS	X			N		N				N	X	N		.14	N	N	N	.58	C
Syringa vulgaris 'Ami Schott' AMI SCHOTT COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Ambassadeur' AMBASSADEUR COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Belle De Nancy' BELLE DE NANCY COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.33	N

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Syringa vulgaris 'Blue Hyacinth' BLUE HYACINTH COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Charles Jolley' CHARLES JOLLEY COMMON LILAC	BS				N		N	X			N	X	N		.29	N	N	N	.83	R
Syringa vulgaris 'Charles X' CHARLES X COMMON LILAC	BS				N		N	X			N	X	N		.29	N	N	N	.50	C
Syringa vulgaris 'Congo' CONGO COMMON LILAC	BS				N		N	X			N		N		.14	.63	.71	.67	.67	C
Syringa vulgaris 'Clark's Giant' CLARK'S GIANT COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Decaisne' DECAISNE COMMON LILAC	BS				N		N	X			N	X	N		.29	N	N	N	.00	N
Syringa vulgaris 'Ed Harding' ED HARDING COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.17	N
Syringa vulgaris 'Edith Cavelle' EDITH CAVELLE COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Edouard Andre' EDOUARD ANDRE COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.33	N
Syringa vulgaris 'Ellen Willmott' ELLEN WILLMOTT COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.33	N
Syringa vulgaris 'Ester Staley' ESTER STALEY COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Katheryn Havermeyer' KATHERYN HAVERMEYER COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.25	N
Syringa vulgaris 'La Vestivale' LA VESTIVALE COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N

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Syringa vulgaris 'Leon Gambetti' LEON GAMBETTI COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Lucie Baltet' LUCIE BALTET COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Ludwig Spaeth' LUDWIG SPAETH COMMON LILAC	BS				N		N	X			N	X	N		.29	N	N	N	.33	N
Syringa vulgaris 'Massena' MASSENA COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Marceau' MARCEAU COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Marechal Foch' MARECHAL FOCH COMMON LILAC	BS				N		N				N	X	N		.14	N	N	N	.00	N
Syringa vulgaris 'Michael Buchner' MICHAEL BUCHNER COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris 'Mme. Antoine Buchner' MME. ANTOINE BUCHNER COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Mme. Casimir Perier' MME. CASIMIR PERIER COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris 'Mme. Chas Souchet' MME. CHAS SOUCHET COMMON LILAC	BS				N		N	X			N	X	N		.29	N	N	N	.00	N
Syringa vulgaris 'Mme. Florent Stepman' MME. FLORENT STEPMAN COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.33	N

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Syringa vulgaris 'Mme. F. Morel' MME. F. MOREL COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Mme. Lamoine' MME. LAMOINE COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.42	N
Syringa vulgaris 'Pres. Carnot' PRES. CARNOT COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris 'Pres. Grevy' PRES. GREVY COMMON LILAC	BS				N		N	X			N	X	N		.29	.50	1.00	.73	.33	C
Syringa vulgaris 'President Lincoln' PRESIDENT LINCOLN COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.17	N
Syringa vulgaris 'Purple Glory' PURPLE GLORY COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Rhum Von Hodstedstein' RHUM VON HODSTEDSTEIN COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris 'Thunberg' THUNBERG COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Syringa vulgaris 'Vivand Morel' VIVAND MOREL COMMON LILAC	BS				N		N				N		N		.00	N	N	N	.17	N
Syringa vulgaris 'Volcan' VOLCAN COMMON LILAC	BS				N		N	X			N		N		.14	N	N	N	.00	N
Tamarix africana AFRICAN TAMARISK	BS	X		X	N		N				X		N		.25	.25	.00	.13	.17	N
Tamarix gallica FRENCH TAMARISK	BS	X			N		N		X		X	X	N		.38	.63	.14	.40	.00	N

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Tamarix hispida KASHGAR TAMARISK	BS	X	X	X	N		N	X	X	X	X		N		.63	.38	.86	.60	.00	C
Tamarix parviflora SMALL-FLOWERED TAMARISK	BS				N		N				N	X	N		.14	N	N	N	.00	N
Tamarix pentandra AMUR TAMARISK	BS	X		X	N		N				X	X	N		.38	.50	.29	.40	.00	N
Tamarix pentandra 'Summer Glow' SUMMER GLOW TAMARISK	BS				N		N				N		N		.00	N	N	N	.42	N
Taxus baccata ENGLISH YEW	ES				N		N				N	N	N		.00	.75	.00	.40	.00	N
Taxus baccata fastigiata IRISH YEW	ES				N		N				N	N	N		.00	.38	.00	.20	.17	N
Taxus baccata repandens SPREADING ENGLISH YEW	ES	X			N		N				N	N	N		.00	.75	.00	.40	.58	C
Taxus brevifolia PACIFIC YEW	ES				N		N				N	N	N		.00	N	N	N	.25	N
Taxus cuspidata JAPANESE YEW	ES	X	X		N		N				N	N	N		.00	.88	.71	.80	.42	R
Taxus cuspidata 'Cushion' CUSHION JAPANESE YEW	ES				N		N				N	N	N		.00	N	N	N	.17	N
Taxus cuspidata densiformis COMPACT JAPANESE YEW	ES				N		N				N	N	N		.00	N	N	N	.67	C
Taxus cuspidata nana DWARF JAPANESE YEW	ES	X		X	N		N				N	N	N		.17	.88	.43	.67	.42	C
Taxus media ANGLOJAP YEW	ES				N		N				N	N	N		.00	.50	.00	.27	.08	N

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Taxus media 'Brownii' BROWN HYBRID YEW	ES	X		X	N		N				X	N	N		.29	.75	.14	.47	.58	C
Taxus media 'Hatfieldii' HATFIELD HYBRID YEW	ES			X	N		N				N	N	N		.17	N	N	N	.25	N
Taxus media 'Hicksii' HICKS YEW	ES	X		X	N		N				X	N	N		.29	.75	.57	.67	.92	R
Taxus media pyramidalis hilli HILL HYBRID YEW	ES				N		N				N	N	N		.00	N	N	N	.33	N
Taxus media 'Taunton' TAUNTON HYBRID YEW	ES				N		N				N	N	N		.00	N	N	N	.25	N
Teucrium canadensis AMERICAN GERMENDER	GC				X		N				N	N	N		.14	N	N	N	.00	N
Teucrium chamaedrys GEMMANDER	GC						N				N	N	N		.00	N	N	N	.33	N
Teucrium chamaedrys prostratum CREEPING GERMANDER	GC						N				N	N	N		.00	N	N	N	.33	N
Thuja occidentalis AMERICAN ARBORVITAE	ET	X	X	X	N						X	N			.22	1.00	.50	.77	.17	R
Thuja occidentalis 'Booth Globe' BOOTH GLOBE ARBORVITAE	ES				N		N				N	N	N		.00	.50	.07	.30	.08	N
Thuja occidentalis 'Brewer' BREWER ARBORVITAE	ET				N							N			.00	N	N	N	.17	N
Thuja occidentalis compacta AMERICAN ARBORVITAE	ES				N		N				N	N	N		.00	.63	.21	.43	.00	N

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Thuja occidentalis globosa GLOBE ARBORVITAE	ES	X			N		N				N	N	N		.00	.75	.36	.57	.00	C
Thuja occidentalis 'Holmstrip' HOMSTRIP ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.17	N
Thuja occidentalis 'Little Gem' LITTLE GEM ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.58	C
Thuja occidentalis pyramidalis PYRAMIDAL AMERICAN ARBORVITAE	ET				N							N			.00	N	N	N	.58	C
Thuja occidentalis 'Techney' TECHNEY ARBORVITAE	ES				N		N				X	N	N		.14	.13	.14	.13	.25	N
Thuja occidentalis 'Wareana' WAREANA ARBORVITAE	ES				N		N				X	N	N		.14	N	N	N	.08	N
Thuja occidentalis 'Woodwardi' WOODWARD GLOBE ARBORVITAE	ES				N		N				N	N	N		.00	.63	.21	.43	.58	C
Thuja orientalis ORIENTAL ARBORVITAE	ET	X		X	N							N			.11	.88	.14	.53	.08	C
Thuja orientalis aurea nana BERKMAN'S DWARF ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.58	C
Thuja orientalis 'Beverleyensis' BEVERLEY HILLS ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.17	N
Thuja orientalis 'Blue Cone' BLUE CONE ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.50	C
Thuja orientalis 'Bonita' BONITA ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.25	N
Thuja orientalis 'Fruitlandi' FRUITLAND ARBORVITAE	ET				N							N			.00	N	N	N	.67	C

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Thuja orientalis 'Raffles' RAFFLES ARBORVITAE	ES				N		N				N	N	N		.00	N	N	N	.33	N
Thuja orientalis 'Westmont' WESTMONT ARBORVITAE	ET				N							N			.00	N	N	N	.33	N
Thuja plicata WESTERN RED CEDAR	ET				N							N			.00	.50	.07	.30	.08	N
Thymus serpyllum MOTHER-OF-THYME	GC				X		N				N	N	N		.14	N	N	N	.17	N
Tilia americana AMERICAN LINDEN	BT	X	X	X	N			X		X	X	N			.44	1.00	1.00	1.00	.58	R
Tilia cordata LITTLELEAF LINDEN	BT	X		X	N			X		X	X	N			.44	1.00	1.00	1.00	.75	R
Tilia cordata 'Greenspire' GREENSPIRE LITTLELEAF LINDEN	BT	X			N						X	N			.11	.88	1.00	.93	.75	R
Tilia cordata 'Olympic' OLYMPIC LITTLELEAF LINDEN	BT				N							N			.00	N	N	N	.25	N
Tilia euchlora CRIMEAN LINDEN	BT	X			N							N			.00	.69	.43	.57	.25	C
Tilia euchlora 'Redmond' REDMOND LINDEN	BT			X	N						X	N			.22	.31	1.00	.63	.58	C
Tilia europaea EUROPEAN LINDEN	BT			X	N			X		X	X	N			.44	N	N	N	.00	N
Tilia 'Fairview' FAIRVIEW LINDEN	BT				N							N			.00	N	N	N	.17	N
Tilia platyphyllos BIGLEAF LINDEN	BT			X	N						X	N			.22	N	N	N	.00	N

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Tilia tomentosa SILVER LINDEN	BT				N							N			.00	.56	.00	.30	.08	N
Trifolium repens WHITE CLOVER	GC						N				N	N	N		.00	.75	.29	.53	.00	C
Ulmus americana AMERICAN ELM	BT	X	X	X	N			X			X	N	X		.44	.88	.57	.73	.25	C
Ulmus americana ascendens ASCENDING AMERICAN ELM	BT			X	N							N			.11	.31	.36	.33	.00	N
Ulmus americana 'Augustine' AUGUSTINE AMERICAN ELM	BT				N			X			X	N			.22	.56	.50	.53	.08	C
Ulmus americana 'Molinei' MOLINE AMERICAN ELM	BT				N							N			.00	.56	.43	.50	.25	C
Ulmus carpinifolia 'Christine Buisman' CHRISTINE BUISMAN ELM	BT			X	N							N			.11	.44	.71	.57	.42	C
Ulmus glabra camperdowni CAMPERDOWN ELM	BT				N						X	N			.11	.31	.64	.47	.25	N
Ulmus parvifolia CHINESE ELM	BT				N						X	N			.11	.50	.43	.47	.08	N
Ulmus procera ENGLISH ELM	BT			X	N			X			X	N			.33	N	N	N	.00	N
Ulmus pumila SIBERIAN ELM	BT	X	X	X	N			X			X	N	X		.44	.75	.57	.67	.25	C
Ulmus thomasii ROCK ELM	BT			X	N						X	N			.22	.19	.50	.33	.00	N

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Viburnum acerifolium MAPLELEAF VIBURNUM	BS			X	N		N				N		N		.14		N	N	N	.00	N
Viburnum americanum CRANBERRYBUSH	BS				N		N			X	N		N		.14		.63	.86	.73	.00	C
Viburnum bodnantense PINK DAWN VIBURNUM	BS				N		N				N		N		.00		.31	.29	.30	.17	N
Viburnum burkwoodii BURKWOOD VIBURNUM	BS	X		X	N		N	X			N	X	N		.43		.88	.64	.77	1.00	R
Viburnum carlcephalum FRAGRANT SNOWBALL	BS				N		N				N		N		.00		.63	.71	.67	.50	C
Viburnum carlesii KOREAN SPICE VIBURNUM	BS			X	N		N	X			N	X	N		.43		.81	.50	.67	.42	C
Viburnum cassinoides WITHEROD VIBURNUM	BS			X	N		N				N		N		.14		N	N	N	.00	N
Viburnum davidi DAVID VIBURNUM	BS				N		N				N		N		.00		N	N	N	.33	N
Viburnum dentatum ARROWWOOD	BS			X	N		N	X		X	N	X	N		.57		.69	1.00	.83	.42	R
Viburnum dilatatum LINDEN VIBURNUM	BS			X	N		N				N		N		.14		N	N	N	.00	N
Viburnum lantana WAYFARING TREE	BS	X	X	X	N		N	X		X	N	X	N		.57		.88	1.00	.93	.92	R
Viburnum lentago NANNYBERRY	BS		X	X	N		N	X	X	X	N		N		.57		.38	1.00	.67	.42	C
Viburnum mollis KENTUCKY VIBURNUM	BS			X	N		N				N		N		.14		N	N	N	.00	N

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey												Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Viburnum opulus EUROPEAN CRANBERRYBUSH	BS	X			N		N	X		X	N		N		.29	.88	.86	.87	.42	R
Viburnum opulus compacta DWARF EUROPEAN CRANBERRYBUSH	BS	X			N		N				N		N		.00	.75	.86	.80	.42	R
Viburnum opulus nanum DWARF EUROPEAN CRANBERRYBUSH	BS	X		X	N		N				N	X	N		.29	.75	1.00	.87	.25	R
Viburnum opulus roseum EUROPEAN SNOWBALL	BS	X		X	N		N				N	X	N		.29	.25	.43	.33	.00	N
Viburnum opulus sargentii SARGENT SNOWBALL	BS				N		N				N		N		.00	N	N	N	.17	N
Viburnum opulus sterile COMMON SNOWBALL	BS	X			N		N			X	N		N		.14	.75	1.00	.87	.92	R
Viburnum paucifolium MOOSEBERRY VIBURNUM	BS			X	N		N	X	X		N		N	X	.57	N	N	N	.00	C
Viburnum prunifolium BLACK HAW	BS		X	X	N		N				N	X	N		.29	.50	.36	.43	.25	N
Viburnum rhytidophylloides 'Willowwood' WILLOWWOOD VIBURNUM	BS				N		N				N		N		.00	.19	.07	.13	.67	C
Viburnum rhytidophyllum LEATHERLEAF VIBURNUM	BS	X		X	N		N				N		N		.14	.75	.07	.43	.08	N
Viburnum sieboldii SIEBOLD VIBURNUM	BS	X			N		N				N		N		.00	.50	.29	.40	.08	N
Viburnum tomentosum DOUBLE VIBRUNUM	BS			X	N		N				N	X	N		.29	N	N	N	.00	N

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey												Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Viburnum trilobum AMERICAN HIGHBUSH CRANBERRY	BS	x	x	x	N		N	x			N	x	N		.43	.75	1.00	.87	.42	R
Viburnum trilobum compactum DWARF AMERICAN HIGHBUSH CRANBERRY	BS				N		N				N		N		.00	N	N	N	.25	N
Viburnum wrightii WRIGHT VIBURNUM	BS			x	N		N				N		N		.14	N	N	N	.00	N
Vinca major BIGLEAF PERIWINKLE	V	x			N		N				N		N		.00	.88	.50	.70	.33	C
Vinca minor PERIWINKLE	V	x	x	x	x		N	x			N		N		.38	.88	.57	.73	.75	R
Vinca minor alba WHITE PERIWINKLE	V				N		N				N		N		.00	.56	.43	.50	.00	C
Vinca minor atropurpurea PURPLELEAF PERIWINKLE	V				N		N				N		N		.00	.50	.43	.47	.00	N
Vinca minor 'Bowles Variety' BOWLES VARIETY PERIWINKLE	V				N		N				N		N		.00	N	N	N	.25	N
Vinca minor variegata VARIEGATED PERIWINKLE	V				N		N				N		N		.00	.44	.36	.40	.00	N
Viola cornuta TUFTED PANSY	GC				x		N				N		N		.13	N	N	N	.00	N
Vitex agnus-castus CHASTE TREE	BS				N		N				N	x	N		.14	.13	.14	.13	.08	N
Vitex agnus-castus latifolia HARDY LILAC CHASTE TREE	BS			x	N		N				N		N		.14	N	N	N	.00	N

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey												Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Vitex macrophylla CHASTE TREE	BS				N		N	X			N		N		.14	N	N	N	.00	N
Vitex negundo incisa CUTLEAF CHASTE TREE	BS			X	N		N				N		N		.14	N	N	N	.00	N
Vitis labrusca CULTIVATED GRAPE	V				N		N				N	X	N		.14	.63	.71	.67	.00	C
Vitis sp. BETA HYBRID GRAPE	V			X	N		N			X	N		N		.29	N	N	N	.00	N
Vitis 'Concord' CONCORD GRAPE	V			X	N		N				N		N		.14	N	N	N	.00	N
Vitis 'Niagara' NIAGARA GRAPE	V			X	N		N				N		N		.14	N	N	N	.00	N
Weigela 'Bristol Ruby' BRISTOL RUBY WEIGELA	BS			X	N		N				N	X	N		.29	N	N	N	.33	N
Weigela florida ROSE WEIGELA	BS	X			N		N				N		N		.00	.75	.50	.63	.17	C
Weigela florida 'Variegata Nana' VARIEGATED DWARF ROSE WEIGELA	BS				N		N				N		N		.00	N	N	N	.17	N
Weigela 'Vaniceki' VANICEKI WEIGELA	BS			X	N		N				N		N		.14	N	N	N	.00	N
Weigela rosea WEIGELA	BS				N		N				N		N		.00	N	N	N	.33	N
Weigela wagneri 'Eva Rathke' EVA RATHKE WEIGELA	BS				N		N				N	X	N		.14	N	N	N	.00	N
Wisteria floribunda JAPANESE WISTERIA	V				N		N				N		N		.00	.63	.43	.53	.33	C

Scientific and Common Name	Type	Utah State	Colorado State	Author Survey												Experts Survey			Nursery Percentage	Recommendation
				Extension	Feucht	Huddleston	Johnson	Kelly 1957	Kelly 1970	Kelly 1975	Kelly 1976	Reimschussel	Shaw	Sutton	Percentage	Utah Percentage	Colorado Percentage	Combined Percentage		
Wisteria floribunda 'Royal Purple' ROYAL PURPLE WISTERIA	V				N		N				N		N		.00	N	N	N	.42	N
Wisteria frutescens AMERICAN WISTERIA	V			X	N		N				N		N		.14	N	N	N	.00	N
Wisteria sinensis CHINESE WISTERIA	V				N		N				N		N		.00	.88	.29	.69	.08	C
Xanthocerus sorbifolium YELLOWHORN	BT			X	N			X		X	X				.40	.13	.21	.17	.00	N
Xanthorhiza simplissima YELLOWROOT	BS				N		N				N	X	N		.14	N	N	N	.00	N
Yucca baccata INDIAN BANANA	MS				N	X	N		X		N	N	N		.33	N	N	N	.17	N
Yucca filamentosa ADAM'S NEEDLE	MS	X			N		N				N	N	N		.00	.81	.86	.83	1.00	R
Yucca glauca GREAT PLAINS YUCCA	MS	X			N	X	N		X		N	N	N		.33	.69	.86	.77	.58	R
Zelcova serrata JAPANESE ZELCOVA	BT				N						X	N			.11	.75	.07	.43	.42	N

APPENDIX B

Survey of Plant Materials Experts

Several plant materials experts were surveyed to determine which plants they collectively believed to be adapted to the intermountain environment useful in the landscape and commercially available. These nineteen experts were selected for their experience with intermountain plants. Nine people from Colorado and ten from Utah were contacted by mail and asked to participate in the survey. (A copy of a typical cover letter follows on the next page.) Seven of the Coloradoans and eight of the Utahns responded for about an 80 percent response rate. A list of the participants are given following the cover letter. A summary of the results of this survey are recorded in Appendix A of this thesis.

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322
COLLEGE OF HUMANITIES, ARTS AND SOCIAL SCIENCE
DEPARTMENT OF LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL PLANNING, UMC 12

February 1, 1977

Mr. Arden Larsen
Campus Planning Department
Annex 105 Room 2202
University of Utah 84112

Dear Mr. Larsen:

I am a graduate student in landscape architecture here at Utah State University. I am now writing a thesis on landscape plant materials and I would like to ask you for some help if you have a little bit of time and are interested. The purpose of the work is to describe the cultural and environmental adaptation, the characteristic attributes and the landscape value and use of selected plant materials. The work is intended to be used as a reference source for landscape architects, horticulturists, arborists, nurserymen, county extension agents, and students.

I would be very grateful for your assistance if you can help me. I have compiled a base list of plant materials that have been reported as being used horticulturally in inter-mountain landscapes. I am surveying a number of plant materials experts, such as yourself, to determine which plants on this list are the most useful in our region. There are three criteria for evaluating the materials:

1) the plant is tolerant of our climatic or micro-climatic conditions
2) the plant is available in our inter-mountain region (either commercially imported or propogated or collected)
3) the plant's characteristics can provide aesthetic or utilitarian usefulness in the landscape

Please place a checkmark (✓) in front of each plant that you have found in your experience to meet each of the above three criteria. If there are other plants that you believe should be added, please list them after each section. Any comments that you care to make are welcome.

After checking the list, please return it to me in the enclosed envelope. You may make yourself a copy of the list if you desire. I will also send you a report of the results of the survey if you request it when you return the checked list. I would also like to know if you would be interested in reviewing and commenting on portion of the manuscript as they are prepared.

Thankyou for your time and your help.

Sincerely,

Kenneth R Brooks

Kenneth R. Brooks

Enclosure: List of Inter-mountain Region Landscape Plant Materials

KB/jb

Survey Participants from Colorado

(* indicates respondants)

*Mike Corbin
Retired Horticulturist and Nurseryman
Haxton, Colorado

*Dr. James Feucht
C.S.U. Extension Horticulturist
Denver, Colorado

Donald Godi
Landscape Architect
Littleton, Colorado

*Prof. Carl Jorgensen
C.S.U. Horticulture Department
Ft. Collins, Colorado

*George Kelly
Retired Horticulturist and Nurseryman
Cortez, Colorado

Prof. William Macksam
C.S.U. Horticulture Department
Ft. Collins, Colorado

*Chris Moritz
Landscape Architect
Denver, Colorado

*Dr. Bert Swanson
C.S.U. Horticulture Department
Ft. Collins, Colorado

*Larry Watson
Horticulturist and Nurseryman
Golden, Colorado

Survey Participants from Utah

*John Maas
Landscape Architect
Ogden, Utah

*Karsten Hansen
Landscape Architect
Salt Lake City, Utah

*Ray Jepson
Landscape Architect
Salt Lake City, Utah

*Prof. Carl Johnson
U.S.U. Forestry and Outdoor
Recreation Department
Logan, Utah

*Prof. Craig Johnson
U.S.U. Landscape Architecture and
Environmental Planning Department
Logan, Utah

*Arden Larsen
Landscape Architect
Salt Lake City, Utah

*Prof. Wendell Morse
U.S.U. Landscape Architecture and
Environmental Planning Department
Logan, Utah

Robert Pedersen
Nurseryman
Logan, Utah

Dr. Ernest Reimschussel
B.Y.U. Agronomy Department
Provo, Utah

*Prof. Gerald Smith
U.S.U. Landscape Architecture and
Environmental Planning Department
Logan, Utah

APPENDIX C

Survey of Nursery Inventories

The catalogs of five intermountain nurseries were reviewed to determine which plants were commercially available in the region. The nurseries selected are all fairly large operations with both retail and wholesale services. Most smaller intermountain nurseries usually purchase their stock from these bigger nurseries or else import the same materials from other areas.

One propagation nursery from southern California was also reviewed since most local nurseries that do import shrubs from outside the region buy from this California nursery. The index of Sources of Plants and Related Supplies (American Association of Nurserymen, 1976-1977) was also reviewed to see which plants were listed as commercially available by the American Association of Nurserymen.

The results of this survey are included in Appendix A. The nurseries included in the survey are listed below:

Forest Hills Nursery
Salt Lake City, Utah

Porter-Walton Nursery
Centerville, Utah

Valley Nursery
Uintah, Utah

Western Evergreen Nursery
Golden, Colorado

Wilmore Nurseries
Wheat Ridge, Colorado

Monrovia Nurseries
Monrovia, California