



**MINNESOTA SUPPLEMENT
TO THE
GUIDE FOR PLANT APPRAISAL**

WITH
REGIONAL TREE APPRAISAL FACTORS

TREE SPECIES RATINGS
REPLACEMENT COSTS
BASIC PRICES

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GUIDE FOR PLANT APPRAISAL**

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REGIONAL TREE APPRAISAL
FACTORS**

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The regional tree appraisal factors and factor derivation techniques described in this brochure should be used only by trained tree appraisers. The Tree Valuation Committee and the Minnesota Society of Arboriculture accept no responsibility for any adverse consequences resulting from the improper use of the information contained herein.

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PREFACE

This brochure has been prepared by the Tree Valuation Committee of the Minnesota Society of Arboriculture to serve as a regional supplement and companion document to the ninth edition of the *Guide for Plant Appraisal* authored by the Council of Tree and Landscape Appraisers (CTLA) under contract with the International Society of Arboriculture (ISA). The author and publisher of the *Guide* have determined that certain factors used in the **Trunk Formula Method** of large tree appraisal (e.g. species ratings, replacement costs and basic values) should be determined on a regional basis by a regional committee of tree professionals.

The information contained in this supplement is intended to be used in conjunction with the *Guide* by trained professional tree appraisers. The specific designations contained herein were derived by a consensus of the members of the Tree Valuation Committee. Revisions will be made, as needed, to reflect significant factor changes.

It is the recommendation of the Tree Valuation Committee that the **Trunk Formula Method** only be used to determine the monetary value of those large trees that:

- Ⓐ have a trunk diameter of nine inches (22.5 cm) or greater measured 4.5 feet (1.4 m) above ground,
- Ⓑ are associated with recurring human activity, and
- Ⓒ have a conclusive impact on an owner's measurable enjoyment and use of his / her property (current or intended -- providing shade, energy savings, screening and/or aesthetic appeal).

The tree appraiser should remember that the **Trunk Formula Method** is a subjective process, and one of several options for appraising tree value. *Ultimately, good sense must be applied rather than just the mechanical application of a formula.*

July, 1996

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INTRODUCTION

Generally, the appraisal of property such as jewelry, art objects, antiques, metalware, vehicles and real estate is based on comparable values (prices) determined in the "marketplace" by willing buyers and sellers. Since trees larger than transplantable size normally are not "moved", they do not have a readily ascertainable market value except as an integral part of real estate transactions. Typically, real estate appraisals do not value trees as separate elements (separate and apart from the land), but instead determine their collective monetary contribution to the overall value of a property.

Market evidence (*paired sales* - property with trees versus property without trees), real estate appraisal literature and industry custom support the general findings that:

1. mature "in-place" landscaping (lawn, flowers, shrubs and trees) can contribute up to 10%-20% to the value of an improved residential property, and
2. "good tree cover" or "well-placed" mature trees (trees planted or preserved for aesthetic, shading, energy saving and screening purposes) can increase the value of developed property by 6%-15%, or add 20%-30% to the value of an undeveloped property.

The revised **Trunk Formula Method** adopted by the Council of Tree and Landscape Appraisers provides a suitable means to independently measure or calculate the unit value of large trees. Although tree values derived by the **Trunk Formula Method** are not directly determined by a traditional marketplace strategy, the **Formula** does reflect, and is influenced by established nursery prices for trees of transplantable size.

Trunk Formula:

Appraised Value = Basic Tree Cost x Species Rating (%) x Condition Rating (%) x Location Rating (%)

Basic Tree Cost = Trunk Area of Appraised Tree (TA_A) - Trunk Area of Replacement Tree (TA_R) x Unit Tree Cost + Installed Tree Cost

Historically (since 1957), the **Trunk Formula Method** has served as an accepted basis for determining the "actual monetary value" or **Appraised Value** of large trees that provide shade, screening, energy savings and/or aesthetic appeal. To ensure the credibility and acceptability of tree appraisals based on the **Trunk Formula Method**, it is essential that values derived by the **Formula** should be reasonable and realistic. *It is the intent of the Tree Valuation Committee that the appraised values of large trees should equate to and be reflective of the above mentioned contributory percentages assigned to trees by the real estate market place.* In support of this philosophy, the Tree Valuation Committee has adopted a schedule of **Unit Tree Costs** that will produce such values.

REGIONAL APPRAISAL FACTORS

SECTION 1. TREE SPECIES RATING - objective comparison of listed tree species relative to their respective inherent "survivability" in Minnesota.

Survivability is reflective of a tree species' ability to endure or tolerate the destructive pressures of its growing environment. In order of significance, the rating criteria include **Hardiness, Structural Integrity, Longevity** and **Biotic Tolerance**.

Tree Species Ratings are listed in the tables on pages 21 - 25. The individual ratings are intended for application as designated adjustment factors in the **Trunk Formula Method**. **Species Ratings** range from 25% (low) to 90% (high) indicating that, at the present time, there is no "perfect tree", leaving room for varietal improvements.

Generally, the percentage ratings are absolute since species survivability is a constant under normal conditions, and predictable within identifiable homogenous ecological regions of the state. However, a species population in a specific area might be acutely threatened by a disease epidemic or insect infestation. If such a situation exists, the appraiser can consider reducing the **Species Rating** to a lower percentage. (Such a reduction should be accompanied by a written justification.)

Example. If Dutch elm disease is widespread in a community or neighborhood, is killing an average of one out of every four elm trees, and/or there is no effective control program being implemented, the "established" **Species Rating** for American elm in that particular area might be reduced from 70% to 50%.

Contrary to prior species lists and compilations, this rating evaluation does not consider factors such as maintenance requirements, physical tree characteristics, functional suitability or site adaptability. The influence of such factors are more appropriately considered during the rating of a tree's **Condition** and **Location**. Such dual consideration would constitute "double jeopardy" or unwarranted discounting.

Example. Factors such as branching habit, foliage color, production of fruit litter or intolerance of salt residue do not have "negative implications" until considered relative to *placement* and *contribution*. Generally, the right tree, in the right location, for the right reason will be an asset. Conversely, the wrong tree, in the wrong location, for the wrong reason will become a liability.

Also, it is not intended that the rating list be used to designate such qualities as the most or least "valuable" (monetarily), "beautiful" or "popular".

The tree species contained in the rating list include those *native*, *naturalized*, *varietal* and *exotic* species that will typically attain mature trunk diameters of nine inches (22.5 cm) or greater (measured 4.5 feet above ground). Also included are those horticultural varieties that have been available (post introduction) a sufficient length of time to have reached trunk diameters, to date, of at least nine inches.

Species have not been included in the list if members of the Tree Valuation Committee were not able to confirm their presence in the state or did not have adequate information to evaluate the species. If an appraiser encounters a tree species that is not included in the **Rating List** or has not been assigned a rating for a particular zone, he/she should rate the tree by using the same criteria and scales used by the Tree Valuation Committee.

A Species Rating is derived by the following formula:

$$\text{Species Rating (\%)} = \frac{\text{Sum of Assigned Criteria Points}}{\text{Total Maximum Criteria Points}}$$

$$\text{Criteria Points} = \text{Assigned Score} \times \text{Criteria Importance Factor}$$

Table 1. Species Rating Schedule

Criteria	Score Range* High-Low	Importance Factor	Maximum Criteria Points
Hardiness	10 – 1	10	100
Structural Integrity	11 – 3	7	77
Longevity	10 – 2	7	70
Biotic Tolerance	10 – 1	4	40
*Refer to scoring scales below.			Total 287

Hardiness - ability to withstand zonal average annual minimum temperatures without damage. (Reference - U.S.D.A. Plant Hardiness Zone Map on page 6.)

Longevity - life expectancy under optimum conditions without pathological interference.

Structural Integrity - inherent predisposition to structural failure due to weak crotches (included bark, co-dominant stems), wood decay (cavities) and brittleness of limbwood (modulus of elasticity).

Biotic Tolerance - susceptibility to acute damage by biotic agents (insects and/or diseases).

USDA PLANT HARDINESS ZONES

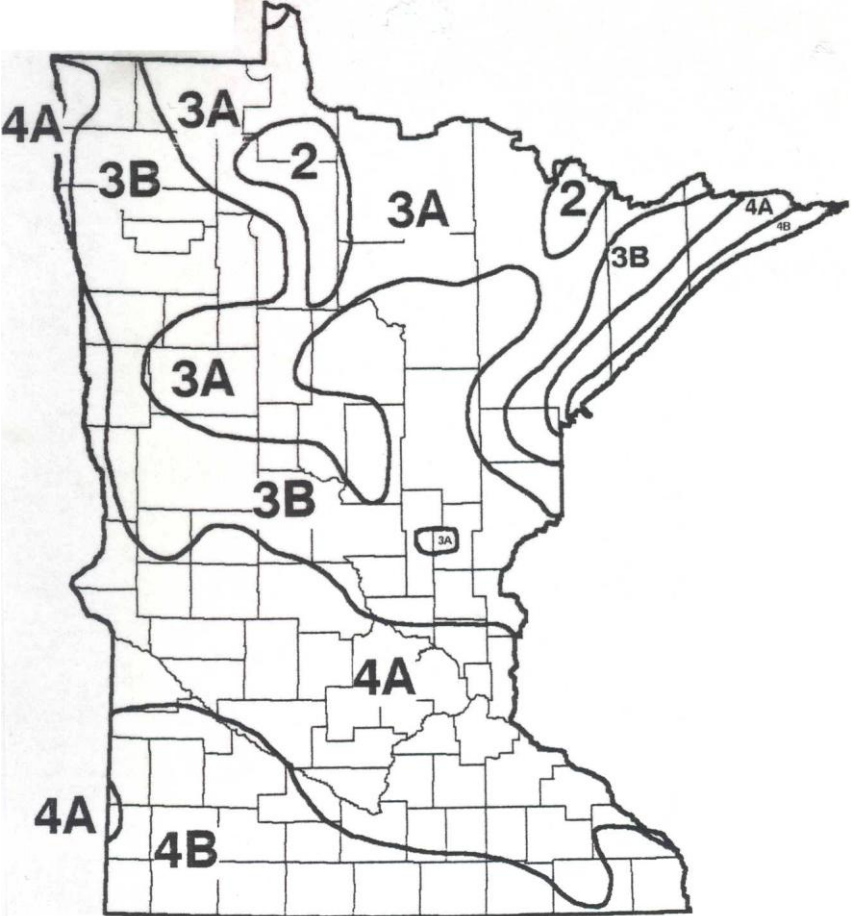


Figure 1. Extracted from USDA Plant Hardiness Zone Map based on average annual minimum temperature.

Criteria Scoring Scales

1. Hardiness

	1	3	5	8	9	10 pts
growing in Zone 3a&b	----- ----- ----- ----- ----- -----					
species zone assignment	5	4b	4a	3a&b	2	

	1	3	5	8	9	10 pts
growing in Zone 4a	----- ----- ----- ----- ----- -----					
species zone assignment	6	5	4b	4a	3a&b	2

	1	3	5	8	9	10 pts
growing in Zone 4b	----- ----- ----- ----- ----- -----					
species zone assignment	7	6	5	4b	4a	3a&b

	1	3	5	8	9	10 pts
growing in Zone 5	----- ----- ----- ----- ----- -----					
species zone assignment	8	7	6	5	4b	4a

Since assignment of a *hardiness zone* reflects a species tolerance to the average minimum cold temperature and not the extreme coldest temperatures or temperature variability in the zone, the rating score allocated to the subject species growing within its designated zone should only be 8 points (moderately high) as the tree may not be completely hardy when subjected to local temperature regimes or abnormally low temperatures.

Example. Norway maple - Reference Hardiness Zone 4a

Tree being appraised growing in:

St. Paul (Zone 4a) - 8 pts. *

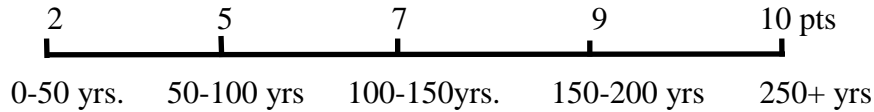
Worthington (Zone 4b) - 9 pts. **

Duluth (Zone 3a) - 5 pts. **

* A higher score of 9 or 10 points is reserved for those tree species assigned to more northerly hardiness zones (Zones 3a, 3b, and 2).

** If a tree is growing in a hardiness zone south of its assigned zone, its rating score will increase to 9 (one zone south) or 10 (two zones south) because its hardiness, in most cases, (except paper birch and balsam fir) increases southward and conversely decreases northward.

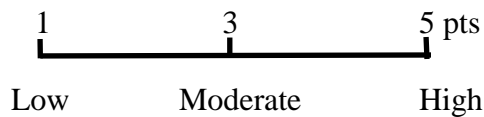
2. Longevity



e.g. Paper Birch Ohio Buckeye Shagbark Hickory Sugar Maple White Oak

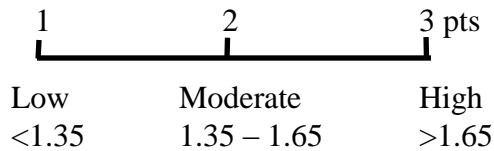
3. Structural Integrity

(a) Decay Resistance



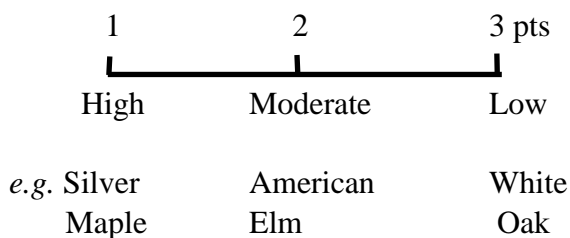
e.g. Paper Birch White Oak Kentucky Coffeetree

(b) Modulus of Elasticity

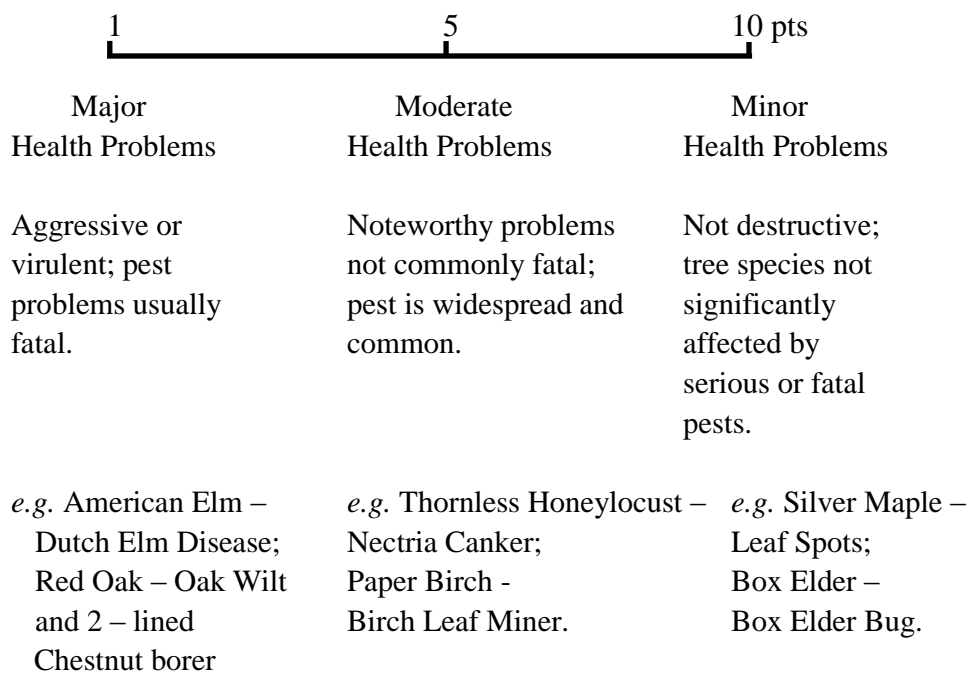


e.g. Hackberry Paper Birch White Oak

(c) Included Bark*



4. Biotic Tolerance



Tree Species Rating Zones

The natural survivability of a particular species may vary between different areas of the state due to corresponding variations in environmental factors such as soil type, growing season precipitation and potential evapotranspiration. The geographic presence or absence, abundance or scarcity, optimum growth or decline of a species is influenced by that species' level of tolerance or adaptability to prevailing environmental patterns. Such patterns are consolidated as "*Ecological Regions*".

For the purpose of rating tree species, Minnesota is subdivided into six (6) Tree Species Rating Zones that correspond to the six designated *Ecological Regions*. (Refer to map on page 12.)

Although regional boundaries are depicted on a map by a narrow line or "hard edge", they are, in reality, transition areas where environmental patterns are intermixed. A region of favorable environmental conditions might encompass micro areas of unfavorable situations typical of adjacent regions, and vice versa.

Regardless of natural origin or general distribution, any species that has been or could be found growing in Minnesota has been listed and subsequently rated relative to its survivability within those **Zones** where its presence has been confirmed.

Generally, the eastern parts of Minnesota have adequate rainfall relative to evapotranspiration and are favorable for tree growth with minimal or moderate irrigation. This area is referred to as the *Forest Biome* and includes four of the six *Ecological Regions (Tree Species Rating Zones)*.

Region/Zone 1 Southeast - diverse hardwood species on rich soils, moderate climate, periodic drought.

Region/Zone 2 Central- predominantly hardwood species with significant pockets of conifers, cool summers and winters.

Region/Zone 3 North and Northeast - mixture of conifers and limited diversity of pioneer hardwoods, cool summers and cold winters.

Region/Zone 4 Midwest - predominantly hardwood species, cool summers and winters, periodic drought.

The western part of Minnesota has evapotranspiration significantly exceeding rainfall during a normal growing season with droughts occurring every few years, requiring that non-drought resistance species be given supplemental water each year. This area is referred to as the *Prairie Biome* and includes two of the six *Ecological Regions (Tree Species Rating Zones.)*

Region/Zone 5 Northwest - similar to Zone 6, but with lower average rainfall and more erratic rainfall patterns. Drought is more common than in Zone 6.

Region/Zone 6 Southwest - early springs and hot summers, adequate moisture offset by high rates of evapotranspiration due to high temperatures, wind and periodic drought.

TREE SPECIES RATING ZONES

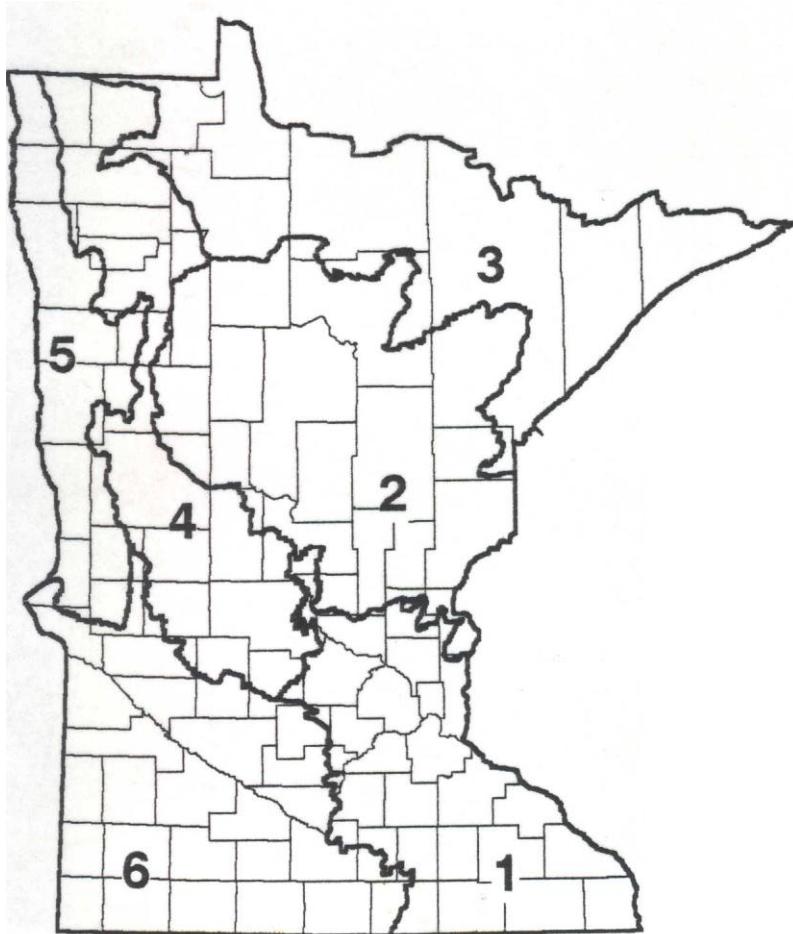


Figure 2. The Tree Species Rating Zones correspond to the six defined Ecological Regions within the state.

Examples - Species Scoring and Rating

Table 2. Bur Oak (*Quercus macrocarpa*) - Located in Hardiness Zone 4a

Criteria	Score	Importance Factor	Points
Hardiness	10	10	100
Longevity	10	7	70
Structural Integrity	8	7	56
Biotic Tolerance	5	4	20

Total 246 pts

246 pts)289 max pts = 86% (rounded to nearest 5% increment = 85%)

Table 3. Common Horeschestnut (*Aesculus hippocastanum*) – Located in Hardiness Zone 4a

Criteria	Score	Importance Factor	Points
Hardiness	5	10	50
Longevity	2	7	14
Structural Integrity	7	7	49
Biotic Tolerance	10	4	40

Total 153 pts

153 pts)287 max pts = 53% (rounded to nearest 5% increment = 55%)

Table 4. Colorado Spruce (*Picea pungens*) – Located in Hardiness Zone 4a

Criteria	Score	Importance Factor	Points
Hardiness	10	10	100
Longevity	5	7	35
Structural Integrity	6	7	42
Biotic Tolerance	5	4	20
Total			197 pts

197 pts / 287 max pts = 69% (rounded to nearest 5% increment = 70%)

The **Basic Tree Cost** or monetary component of the **Formula** includes two fundamental marketplace (cost/price) oriented factors:

SECTION 2. INSTALLED TREE COST - cost to buy and install the largest commonly-available transplantable tree in the region (same or comparable species).

The **Largest Commonly-Available Transplantable Tree** is defined as:

- ☞ the largest size class that is available for over 50% of the marketed species,
- ☞ the largest size class that is available from over 50% of the state's dominant suppliers of wholesale and retail nursery stock, and
- ☞ the largest size class that constitutes at least 10% of actually available stock for a majority of the marketed species.

Based on common nursery industry production and marketing practices, "balled and burlapped" (B & B) trees are currently the most common form of transplanted nursery stock. Typically, trees ranging in size (caliper) from 1 1/2 to 4 1/2 inches (3.75 - 11.25 cm) are balled and burlapped. Although larger trees ranging from 4 to 8 inches (10 - 20 cm) and occasionally 10 to 12 inches (25 - 30 cm) are being transplanted using mechanical tree movers, only a limited number of nurseries and landscape contractors grow such trees and/or have the required specialized equipment. Consequently, species selection and available quantities are limited, and such trees are planted as a "specialty" in response to requests for "instant shade" supported by ample budgets.

A survey of retail nurseries in each of the six **Tree Species Rating Zones** has determined that:

- ⌘ 3-inch (7.5 cm) caliper balled and burlapped shade and ornamental trees, and 7-foot (12-13 m) tall balled and burlapped evergreens are the respective sizes that best qualify as the **Largest Commonly–AvailableTransplantable Trees** in Minnesota. (Field measurements have determined that 7-foot evergreen trees have an average caliper of 3-inches).
- ⌘ Trees marketed and transplanted by retail nurseries can be grouped into one of five price categories (2 - evergreen, 3 - deciduous). If a tree species is not grown or marketed by area nurseries, an **Installed Tree Cost** can be assigned based on the similarity of the subject species to other species that have established replacement costs (e.g. rate of growth, genus, aesthetic characteristics).

Generic **Installed Tree Costs** (2009 dollars) have been derived for each of the tree species in the Tree Species Rating List, and are listed by Rating Zone in the tables on pages 20-24. The **Installed Tree Cost** is the sum of the retail B & B replacement tree cost, installation cost and sales tax. There can be up to a \$100 ± cost range variation between providers within the same rating zone.

SECTION 3. UNIT TREE COST- wholesale-in-the-ground cost per unit of trunk area (in² or cm²) of a replacement tree measured at height prescribed by *The American Standard for Nursery Stock (ANSI 1990)*.

The **Wholesale In-The-Ground Price** for an "undug" tree in a nursery field has been selected as the basis for determining the **Unit Tree Cost** for tree appraisal purposes. Since the **Wholesale In-The-Ground Price** reflects only those costs associated directly with the tree, and does not include the costs of digging, handling, storage, transporting, transplanting and warranties, it is the appropriate index to establish the value of that portion of an appraised tree that cannot be feasibly transplanted [**TA_A** - **TA_R**]. Although wholesale prices include profit, propagation and early maintenance costs, the inclusion of such factors is an appropriate allowance as it serves as compensation for assumed tree care and maintenance measures exercised, over time, by the property owner.

Based on a comparative survey of wholesale nursery prices in Minnesota, western Wisconsin and eastern North Dakota, **Generic Unit Tree Costs** have been derived for each tree species contained in the **Tree Species Rating List**. Since retail nurseries and landscape contractors purchase their stock from the same group of wholesale nurseries, generally paying the same unit prices except for volume discounts and freight charges, the same **Unit Tree Costs** are applicable in each of the six **Tree Species Rating Zones**.

Generic **Unit Tree Costs** (2009 dollars) for each species in the **Tree Species Rating List** are included in the tables on pages 20-24.

Table 5. Generic Unit Tree Cost Schedule

Tree Type	Price Group	\$/sq in*	\$/sq cm
Evergreen	1	\$ 13.00	\$2.00
Evergreen	2	\$ 15.00	\$2.50
Deciduous	1	\$18.00	\$3.00
Deciduous	2	\$21.00	\$3.50
Deciduous	3	\$24.00	\$4.00

*The Unit Tree Costs have been "rounded" to the nearest whole dollar.

Example. The state-wide average **Wholesale In-The-Ground Price** for a 3" caliper Greenspire Linden (Deciduous Price Group 2) is \$150.00. Resultantly, the **Unit Tree Cost** for a 3" caliper replacement tree is \$21 (\$150 divided by 7.06 sq. in. rounded to nearest dollar). The **Wholesale-In-The- Ground Price** is approximately 55% of the wholesale B&B price.

It is likely that **Appraised Values** derived for the same tree by the **Replacement Cost Method** (extended or projected for trees with diameters greater than 9 inches) and the **Trunk Formula Method** will be notably inequitable. Typically, values derived by the **Trunk Formula Method** will be 10% - 30% less for deciduous trees having trunk diameters less than 15 inches, and 15% - 40% less for evergreen trees having trunk diameters less than 20 inches. The resulting contrast in values is related to:

- Use of the **Wholesale-In-The-Ground-Price as the basis for determining Unit Tree Cost**. Although other wholesale or retail price options would produce values equal to or greater than extended replacement costs, values so derived for larger trees would exceed the contribution of the tree to overall property value. Also, application of a wholesale price to the greatest portion of the trunk area [**TA_A** - **TA_R**] contributes to the lessening of values.

- **Adjustment of value by the respective Species Rating.** A **Species Rating** percentage may disproportionately discount the basic value of a tree in comparison to its landscape market status as reflected by the nursery price of the species. For example, a sugar maple is in the highest nursery price group (Deciduous Price Group 3), but has a **Species Rating** of only 70%.

Tree values derived by the **Trunk Formula Method** can be "checked for reasonableness" by multiplying the property value (estimated market value from county tax records or value from recent real estate appraisal) by the subject tree's proportional tree cover assignment (percentage of 6% - 15% contribution to property value). **Trunk Formula** values should approximate the tree's contribution to the real estate value. The **Unit Tree Costs** assigned by the Tree Valuation Committee were tested in sample tree appraisals to verify consistent conformance with the "contributory" principle.

Table 8. Tree Species Rating List (Conifer)

Scientific Name	Common Name	Species Rating Ecological Regions						Installed Tree Costs Ecological Regions						Unit Tree Cost \$/sq. in.
		1	2	3	4	5	6	1	2	3	4	5	6	
<i>Abies balsamea</i>	Balsam Fir	55%	65%	75%	50%	50%	45%	\$440	\$440	\$440	\$440	\$440	\$440	\$15
<i>Abies concolor</i>	White Fir	65	55	50	65	–	65	440	440	440	440	–	440	15
<i>Abies fraseri</i>	Fraser Fir	50	–	–	–	–	–	440	–	–	–	–	–	15
<i>Juniperus virginiana</i>	Eastern Red Cedar	85	80	80	85	80	85	400	400	400	400	400	400	13
<i>Juniperus var.</i>	Red Cedar Varieties	75	70	70	–	–	75	400	400	400	–	–	400	13
<i>Larix decidua</i>	European Larch	80	80	80	80	80	80	400	400	400	400	400	400	13
<i>Larix kaempferi</i>	Japanese Larch	80	–	–	80	80	75	400	–	–	400	–	400	13
<i>Larix laricina</i>	Eastern Larch	85	85	85	80	–	80	400	400	400	400	–	400	13
<i>Larix sibirica</i>	Siberian Larch	85	80	80	80	–	80	400	400	400	400	400	400	13
<i>Picea abies</i>	Norway Spruce	75	65	70	75	75	75	440	440	440	440	440	440	15
<i>Picea glauca</i>	White Spruce	80	80	80	75	75	80	420	420	420	420	420	420	15
<i>Picea glauca densata</i>	Black Hills Spruce	80	75	75	80	80	80	420	420	420	420	420	420	15
<i>Picea mariana</i>	Black Spruce	80	75	75	55	65	75	420	420	420	420	420	420	15
<i>Picea pungens</i>	Colorado Spruce	70	65	65	60	65	70	420	420	420	420	420	420	15
<i>Picea pungens var.</i>	Colorado Spruce Varieties	70	60	–	–	–	70	440	–	–	–	–	440	15
<i>Pinus banksiana</i>	Jack Pine	55	70	70	–	55	55	420	420	420	–	420	420	15
<i>Pinus cembra</i>	Swiss Stone Pine	80	–	–	65	–	80	440	–	–	440	–	440	15
<i>Pinus flexilis</i>	Limber Pine	75	70	–	–	–	–	440	440	–	–	–	–	15
<i>Pinus nigra</i>	Austrian Pine	70	60	70	70	60	70	420	420	420	420	420	420	15
<i>Pinus ponderosa</i>	Ponderosa Pine	75	75	75	75	75	75	420	420	420	420	420	420	15
<i>Pinus resinosa</i>	Red Pine	80	80	80	55	65	70	420	420	420	420	420	420	15
<i>Pinus strobus</i>	Eastern White Pine	80	75	80	65	65	70	420	420	420	420	420	420	15
<i>Pinus sylvestris</i>	Scotch Pine	70	70	60	70	60	60	420	420	420	420	420	420	15
<i>Pseudotsuga menziesii</i>	Douglas-fir	75	–	65	70	–	70	440	–	440	440	–	440	15
<i>Thuja occidentalis</i>	Northern White Cedar	90	85	85	80	80	85	400	400	400	400	400	400	13
<i>Thuja occidentalis var.</i>	White Cedar Varieties	85	80	80	–	–	80	400	400	400	–	–	400	13
<i>Tsuga canadensis</i>	Eastern Hemlock	60	–	70	–	–	–	440	–	440	–	–	–	15

Table 9. Tree Species Rating List (Deciduous)

Scientific Name	Common Name	Species Rating Ecological Regions						Replacement Costs Ecological Regions						Unit Tree Cost \$/sq. in.
		1	2	3	4	5	6	1	2	3	4	5	6	
<i>Acer ginnala</i>	Amur Maple	70%	65%	65%	70%	65%	70%	\$585	\$585	\$585	\$585	\$585	\$585	\$21
<i>Acer negundo</i>	Boxelder	70	70	65	70	65	70	530	530	530	530	530	530	18
<i>Acer nigrm</i>	Black Maple	70	–	–	60	–	–	640	–	–	640	–	–	24
<i>Acer platanoides</i>	Norway Maple	60	50	40	45	40	50	585	585	585	585	585	585	21
<i>Acer platanoides var.</i>	Norway Maple Varieties	60	50	40	–	–	–	585	585	585	–	–	–	21
<i>Acer rnbrrm</i>	Red Maple	70	65	65	50	–	65	585	585	585	585	–	585	21
<i>Acer rnbrrm var.</i>	Red Maple Varieties	60	–	–	–	–	–	640	–	–	–	–	–	24
<i>Acer saccharinum</i>	Silver Maple	70	65	65	70	65	70	530	530	530	530	530	530	18
<i>Acer saccharinum var.</i>	Silver Maple Varieties	60	65	65	–	–	60	530	–	530	–	–	530	18
<i>Acer saccharum</i>	Sugar Maple	70	70	70	60	50	70	640	640	640	640	640	640	24
<i>Acer saccharum var.</i>	Sugar Maple Varieties	70	70	70	–	–	70	640	–	640	–	–	640	24
<i>Acer tataricum</i>	Tatarian Maple	60	60	60	60	60	–	585	585	–	585	585	–	21
<i>Acer x freemanii</i>	Maple Hybrids	65	–	–	–	–	–	640	–	–	–	–	–	24
<i>Aesculus glabra</i>	Ohio Buckeye	75	70	70	70	60	70	640	640	640	640	640	640	24
<i>Aesculus hippocastanum</i>	Common Horsechestnut	55	–	45	45	–	–	530	–	530	530	–	–	18
<i>Betula alleghaniensis</i>	Yellow Birch	80	75	75	65	55	80	530	530	530	530	530	530	18
<i>Betula lenta</i>	Sweet Birch	80	–	–	–	–	–	530	–	–	–	–	–	18
<i>Betula nigra</i>	River Birch	70	65	65	65	65	70	530	530	530	530	530	530	18
<i>Betula papyrifera</i>	Paper Birch	40	55	55	35	35	40	530	530	530	530	530	530	18
<i>Betula pendula</i>	European White Birch	55	50	50	–	50	–	530	530	530	–	530	–	18
<i>Betula pendula var.</i>	European White Birch Varieties	55	50	50	–	50	–	530	530	530	–	530	–	18
<i>Betula platyphylla japonica</i>	Japanese White Birch	55	–	–	–	–	–	530	–	–	–	–	–	18
<i>Betula populifolia</i>	Gray Birch	60	–	–	–	–	–	530	–	–	–	–	–	18
<i>Carpinus caroliniana</i>	American Hornbeam	70	70	70	60	50	70	640	640	640	640	640	640	24
<i>Carya cordiformis</i>	Bitternut Hickory	80	–	65	75	55	80	640	–	640	640	640	640	24
<i>Carya laciniosa</i>	Shellbark Hickory	65	–	–	55	–	–	640	–	–	640	–	–	24
<i>Carva ovata</i>	Shagbark Hickory	75	–	–	65	–	75	640	–	–	640	–	640	24
<i>Castanea dentata</i>	American Chestnut	45	–	–	–	–	–	640	–	–	–	–	–	24

Table 10. Tree Species Rating List (Deciduous)

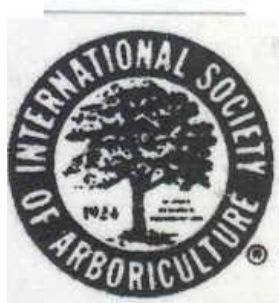
Scientific Name	Common Name	Species Rating Ecological Regions						Replacement Costs Ecological Regions						Unit Tree Cost Price \$/sq. in.	
		1	2	3	4	5	6	1	2	3	4	5	6		
<i>Catalpa bignonioides</i>	Southern Catalpa	60%	—	—	—	—	—	\$640	—	—	—	—	—	—	\$24
<i>Catalpa speciosa</i>	Northern Catalpa	70	60	50	70	50	70	530	530	530	530	530	530	530	18
<i>Celtis occidentalis</i>	Common Hackberry	70	65	65	70	70	70	585	585	585	585	585	585	585	21
<i>Cercis canadensis</i>	Eastern Redbud	45	—	—	45	—	—	640	—	—	640	—	—	—	24
<i>Crataegus spp.</i>	Hawthorn Hybrids/Var.	70	55	—	—	60	70	585	585	—	—	585	585	21	
<i>Elaeagnus angustifolia</i>	Russian Olive	55	50	50	55	55	55	530	530	530	530	530	530	18	
<i>Fagus grandifolia</i>	American Beech	65	—	—	—	—	—	530	—	—	—	—	—	18	
<i>Fraxinus americana</i>	White Ash	60	60	60	60	60	60	585	585	585	585	585	585	21	
<i>Fraxinus americana var.</i>	White Ash Varieties	60	—	—	—	—	60	585	—	—	—	—	585	21	
<i>Fraxinus mandshurica</i>	Manchurian Ash	65	—	—	—	60	65	640	—	—	—	640	640	24	
<i>Fraxinus nigra</i>	Black Ash	65	60	60	60	60	65	585	585	585	585	585	585	21	
<i>Fraxinus nigra var.</i>	Black Ash Varieties	65	60	60	—	—	65	585	—	585	—	—	585	21	
<i>Fraxinus pennsylvanica</i>	Green Ash	65	60	60	65	65	65	530	530	530	530	530	530	18	
<i>Fraxinus pennsylvanica var.</i>	Green Ash Varieties	60	60	60	—	—	60	530	530	530	—	—	530	18	
<i>Fraxinus quadrangulata</i>	Blue Ash	60	—	—	—	—	60	530	—	—	—	—	530	18	
<i>Ginkgo biloba</i>	Ginkgo	85	—	90	—	—	85	640	—	640	640	—	640	24	
<i>Gleditsia triacanthos</i>	Common Honeylocust	65	55	55	65	55	65	530	530	530	530	530	530	18	
<i>Gleditsia triacanthos inermis</i>	Thornless Common Honeylocust	55	45	45	55	45	55	530	530	530	530	530	530	18	
<i>Gleditsia triacanthos mermis var.</i>	Thornless Common Honeylocust Varieties	45	45	45	—	35	45	585	585	585	—	585	585	21	
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	85	—	—	85	75	85	640	—	—	640	640	640	24	
<i>Juglans cinerea</i>	Butternut	45	45	—	40	—	45	530	530	—	530	—	530	18	
<i>Juglans nigra</i>	Black Walnut	70	40	—	70	60	60	585	585	—	585	585	585	21	
<i>Magnolia acuminata</i>	Cucumber tree	60	—	—	60	—	—	585	—	—	585	—	—	21	
<i>Malus spp.</i>	Flowering Crabapple Varieties	35-50	35-50	35-50	35-50	35-50	35-50	530	530	530	530	530	530	18	
<i>Morus alba tatarica</i>	Russian Mulberry	65	—	—	65	—	—	530	—	—	530	—	—	18	
<i>Morus rubra</i>	Red Mulberry	45	—	—	45	—	45	530	—	—	530	—	530	18	
<i>Ostrya virginiana</i>	American Hop Hornbeam	70	70	70	60	70	70	640	640	640	640	640	640	24	

Table 11. Tree Species Rating List (Deciduous-cont'd.)

Scientific Name	Common Name	Species Rating Ecological Regions						Replacement Costs Ecological Regions						Unit Tree Cost \$/sq. in.
		1	2	3	4	5	6	1	2	3	4	5	6	
<i>Phellodendron amurense</i>	Amur Corktree	75%	-	65%	-	-	70%	\$640	--	\$640	-	-	\$640	\$24
<i>Phellodendron sachalinense</i>	Sakhalin Corktree	60	-	-	-	-	-	640	-	-	-	-	-	24
<i>Platanus occidentalis</i>	American Sycamore	60	-	-	-	-	50	530	-	-	-	-	530	18
<i>Populus spp.</i>	Poplar Hybrids	50-60	-	45	-	-	50-60	530	-	530	-	-	530	18
<i>Populus alba</i>	White Poplar	65	60	60	65	65	55	530	530	530	530	530	530	18
<i>Populus alba var.</i>	White Poplar Varieties	55	-	-	-	-	45	530	-	-	-	--	530	18
<i>Populus balsamifera</i>	Balsam Poplar	55	60	60	60	65	-	530	530	530	530	530	--	18
<i>Populus deltoides</i>	Eastern Cottonwood	70	65	65	75	70	70	530	530	530	530	530	530	18
<i>Populus deltoides var.</i>	Eastern Cottonwood Varieties	70	65	65	-	-	70	530	530	530	-	-	530	18
<i>Populus grandidentata</i>	Bigtooth Aspen	70	65	65	70	70	70	530	530	530	530	530	530	18
<i>Populus nigra</i>	Black Poplar	55	-	-	-	-	-	530	-	-	-	-	-	18
<i>Populus nigra var.</i>	Black Poplar Varieties	45	-	-	-	-	-	530	-	-	-	-	-	18
<i>Populus tremuloides</i>	Quaking Aspen	60	65	65	60	65	50	530	530	530	530	530	530	18
<i>Prunus spp.</i>	Apricot, Cherry and Plum Hybrids	30-45	30-45	30-45	-	-	30-45	530	-	530	-	-	530	18
<i>Prunus americana</i>	American Plum	50	45	45	50	50	50	530	530	530	530	530	530	18
<i>Prunus maackii</i>	Amur Chokecherry	50	45	45	50	50	50	530	530	530	530	530	530	18
<i>Prunus padus</i>	European Birdcherry	50	-	-	50	50	-	530	-	-	530	530	-	18
<i>Prunus pensylvanica</i>	Pin Cherry	65	60	60	50	60	55	530	530	530	530	530	530	18
<i>Prunus serotina</i>	Black Cherry	60	55	55	55	45	50	530	530	530	530	530	530	18
<i>Prunus virginiana</i>	Common Chokecherry	55	50	50	55	55	55	530	530	530	530	530	530	18
<i>Pyrus ussuriensis</i>	Ussurian Pear	70	-	-	70	-	70	585	-	-	585	-	585	21
<i>Quercus alba</i>	White Oak	80	-	70	80	70	80	640	-	640	640	640	640	24
<i>Quercus bicolor</i>	Swamp White Oak	90	75	75	85	75	80	640	640	640	640	640	640	24
<i>Quercus ellipsoidalis</i>	Northern Pin Oak	70	-	70	70	-	70	640	-	640	640	-	640	24
<i>Quercus macrocarpa</i>	Bur Oak	85	80	80	85	85	85	640	640	640	640	640	640	24
<i>Quercus rubra</i>	Northern Red Oak	70	70	70	70	70	70	640	640	640	640	640	640	24
<i>Quercus velutina</i>	Black Oak	65	-	-	-	-	65	640	-	-	-	-	640	24
<i>Quercus palustris</i>	Pin Oak	65	-	-	55	-	65	640	-	-	640	-	640	24

Table 12. Tree Species Rating List (Deciduous-cont'd.)

Scientific Name	Common Name	Species Rating Ecological Regions						Replacement Costs Ecological Regions						Unit Tree Cost \$/sq. in.
		1	2	3	4	5	6	1	2	3	4	5	6	
<i>Robinia pseudoacacia</i>	Black Locust	60%	60%	45%	55%	60%	60%	\$530	\$530	\$530	\$530	\$530	\$530	\$18
<i>Salix</i> spp.	Willow Hybrids	45	–	–	–	–	45	530	–	–	–	–	530	18
<i>Salix alba</i>	White Willow	50	45	45	50	45	50	530	530	530	530	530	530	18
<i>Salix alba</i> var.	White Willow Varieties	45	–	–	–	–	45	530	–	–	–	–	530	18
<i>Salix amygdaloides</i>	Peach-leaved Willow	50	–	–	–	–	50	530	–	–	–	–	530	18
<i>Salix matsudana tortuosa</i>	Corkscrew Willow	25	–	–	–	–	25	530	–	–	–	–	530	18
<i>Salix nigra</i>	Black Willow	50	50	50	–	–	50	530	530	530	–	–	530	18
<i>Salix pentandra</i>	Laurel Willow	50	–	45	45	45	50	530	–	530	530	530	530	18
<i>Sorbus alnifolia</i>	Korean Mountain Ash	60	45	40	60	40	60	585	585	585	585	585	585	21
<i>Sorbus americana</i>	American Mountain Ash	60	55	55	45	40	45	530	530	530	530	530	530	18
<i>Sorbus aucuparia</i>	European Mountain Ash	50	45	45	45	45	40	530	530	530	530	530	530	18
<i>Sorbus aucuparia</i> var.	European Mountain Ash Varieties	50	–	–	–	–	40	585	–	–	–	–	585	21
<i>Sorbus decora</i>	Showy Mountain Ash	65	60	60	60	60	60	585	585	585	585	585	585	21
<i>Syringa reticulata</i>	Japanese Tree Lilac	75	65	65	75	65	75	640	640	640	640	640	640	24
<i>Syringa reticulata</i> var.	Japanese Tree Lilac Var.	75	–	–	–	–	75	640	–	–	–	–	640	24
<i>Tilia</i> spp.	Linden Hybrids	60	–	–	–	–	60	585	585	–	–	–	585	21
<i>Tilia americana</i>	American Linden	70	70	65	70	65	65	585	585	585	585	585	585	21
<i>Tilia americana</i> var.	American Linden Var.	65	60	60	–	–	60	585	585	585	–	–	585	21
<i>Tilia cordata</i>	Littleleaf Linden	70	70	70	65	70	65	585	585	585	585	585	585	21
<i>Tilia cordata</i> var.	Littleleaf Linden Var.	65	70	70	–	–	60	585	585	585	–	–	585	21
<i>Ulmus americana</i>	American Elm	70	70	70	70	70	70	530	530	530	530	530	530	18
<i>Ulmus pumila</i>	Siberian Elm	65	65	65	65	50	65	530	530	530	530	530	530	18
<i>Ulmus rubra</i>	Slippery Elm	75	70	70	75	75	75	530	530	530	530	530	530	18
<i>Ulmus thomasii</i>	Rock Elm	75	70	–	75	75	75	530	530	–	530	530	530	18



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