A STUDY OF CTLA FORMULA VALUES

by Gary Watson

Abstract. Appraisal records dating from 1980 to 1995 were acquired from 51 casualty loss appraisers (usually for privately owned trees) and 24 municipal inventories (primarily for street trees). The final database consisted of 3,966 casualty loss appraisals and 129,880 inventory appraisals. The data from this study were used to develop a reference table of tree appraisal values grouped by size and species classes. The table does not eliminate the need to use the formula, but it does provide an individual an opportunity to compare his or her appraised values to values of similar trees. Appraised values of inventory trees were significantly higher ($P < 0.001$) than values of casualty loss trees. The difference is partially explained by larger size and higher location rating of inventory trees. The average condition of all the trees appraised was rated as fair.

Key Words. Tree appraisal; formula method; CTLA.

The most common and widely used method of establishing the value of large trees worldwide is through the use of formulas. In North America, formula methods for establishing the value of trees that are larger than can be replaced with a similar tree date back to the early 1900s (Spicer 1969). The Felt formula (Felt 1942) assigned a value of $1 per square inch of trunk cross section and then modified the figure according to species, location, condition, and land value. This method was well accepted (Armstrong 1947) and was later modified and adopted by ISA in 1951 and first published in 1957 (National Shade Tree Conference 1957). The land value adjustment was dropped. The chair of the Shade Tree Evaluation Committee of the National Shade Tree Conference had previously stated that the land value calculation in the Felt formula affected tree value excessively (Armstrong 1947). The cross-sectional square inch value was increased to a "conservative value" of $5, based on "many discussions of opinions expressed by leaders in the arboricultural profession" (Chadwick 1975). The publication is now known as *Guide for Plant Appraisal;* the 9th edition of the Guide was released in 2000 (CTLA 2000).

The formula method has not been without its critics. Chadwick (1975) felt that the values of very large trees could be unrealistic (too high). The cross-sectional area of the trunk is used as the size measurement. It is an exponential calculation that increases very rapidly for larger trees. The 8th edition of the Guide (CTLA 1992) introduced an adjustment for large trees.

Perhaps the most often-heard criticism is the high variation sometimes encountered between appraisers, often 100% to 200% or higher (Kielbaso 1979; Rey-Lescure 1985; Abbot and Miller 1991). This variation is most often due to differences in the factors of condition and location. Several authors have argued that condition and location are too subjective (Davis 1983; Tate 1989; Abbot and Miller 1991).

Species ratings and price per square inch of trunk area are more objective. National values for these factors were included in the earlier editions of the Guide. Starting with the 8th edition, they were determined and published by regional committees.

The Guide does state that the "appraised tree value should be reasonable." Abbott and Miller (1991) state that "appraisers have not learned, or failed to recognize, that reasonable value principle." The only test of reasonableness mentioned in the Guide is the value of the tree in relation to the value of the property. Henry (1994,

1999) reported that homes with excellent landscaping sold for 14% to 17% more than similar homes with poor landscaping. If this criterion is used as a basis for reasonableness, when an excellent landscape consists of multiple trees, shrubs, and other plants, a single large tree may contribute only 1% or less to the value of the property. But is it fair to conclude that the value of a tree is simply a proportion of the total property value? Abbott and Miller (1991) draw a comparison to replacement parts for mechanical equipment, such as automobiles and appliances, that are always more expensive when purchased separately. Using property values for a test of reasonableness may also be problematic in that arborists may have difficulty determining property values without enlisting the assistance of a real estate appraiser or consulting government tax records.

Given the potential difficulty of testing reasonableness against property value, the appraiser often has to rely only on personal experience. This situation can be difficult for all but the most experienced appraisers. Even experienced appraisers may encounter situations beyond their normal experience in which their normal sense of reasonableness does not serve them well. Is there another way to test reasonableness and help to limit variation between appraisers? The primary objective of this study was to build a database of actual appraised tree values and to use these data to develop a table of comparable values for trees of different sizes, species, and locations. The data can be used to answer other questions as well.

METHODS

Data Collection

Formula method tree appraisal data were actively solicited from appraisers throughout the United States. Complete detailed information used in calculating the appraised values was required for each appraisal record (Table 1). Only trees 4 in. (10 cm) dbh and greater were used, based on a review of what is commonly used as the "largest commonly available transplantable tree" across the United

Table 1. Appraisal data collected and calculations performed.

Required Data
State/ZIP code
Year appraised
Dbh
Species name (uniform species code assigned)
Species rating
Condition rating
Location rating (site, contribution, and placement for the 8th edition of the Guide)
Site class (street, residential property, commercial, parking lot, etc.)
Basic price (value per trunk cross-sectional square inch in U.S. dollars)
Largest commonly available transplanted tree value and size (8th edition only)
Cleanup and repair costs
Settled value
Casualty loss or inventory
Client responsible for or experiencing loss (casualty loss only)
Serial number (assigned)
Guide edition used
Calculations
Location (8th edition)
Trunk cross-sectional area (adjusted for large trees as required by 8th edition)
Formula value without condition rating (varies with edition used)
Appraised value (converted to 1998 dollars, the year for which the most recent Consumer Price Index information was available at the time the database was finalized)

States. Species names were converted to uniform species codes. Data were entered into Dbase for Windows™ and appraised values were calculated according to the appropriate edition of the Guide, with one exception. To reduce the number of variables, condition was not factored into individual appraised value calculations (i.e., rated at 100%). Condition data were recorded for use in other and data analysis.

Data Summary

Using programming features of Dbase 5.0, appraisal records were grouped by published species rating, size class, and landscape site type (residential, park, etc.). Records were sorted by published species rating rather than the rating used in the appraisal in order to allow decisions by individual appraisers to use a different value to be reflected in appraised value variation. When the published rating for any species differed from region to region, the midpoint value was used. Whenever possible, size classes represented consistent trunk cross-sectional area increases between classes. The mean, standard deviation, and the number of appraisal records for each group were calculated.

For greater consistency, the average appraised values used in the tables were drawn from linear regression curves ($f = y_0+ax+bx^2$, SigmaPlot 5.0) for each species class within each size class. Regression coefficients were always greater than 0.86 and usually greater than 0.90. This mean ± one standard deviation was used to determine the comparable value range.

A t-test ($P \leq 0.05$) was used to compare current values, condition, location, and dbh between casualty loss and inventory appraisals, and also between casualty loss appraisals performed for parties responsible for the loss of the trees and those who owned the trees.

RESULTS AND DISCUSSION

Appraisal records were received from 51 casualty loss appraisers (generally for privately owned trees) and 24 municipal inventories (primarily for street trees). The appraisals were performed between 1980 and 1995. The final database consisted of 3,966 casualty loss appraisals and 129,880 street and park tree inventory appraisals.

Table of Comparable Values

Recent editions of the Guide emphasize that appraisals should be reasonable. Suggestions are provided for comparing tree values to overall property values, but there is no mention of comparing formula values to values of similar trees, as is often standard in other appraisal disciplines, such as real estate. Many appraisers would not have enough personal experience to perform a comparison to similar situations over a wide variety of circumstances. The data from this study were used to develop a reference table of comparable tree appraisal values by size and species class (Table 2). The adjusted mean ± one standard deviation was used to define this "range of comparable values." This range includes 67% of all the values, while excluding the one-third of the values that are very high or very low. *The table is not intended to replace the formula but simply provides an appraiser with the opportunity to compare how his or her appraised value compares to values produced by other appraisers.* The table data represent trees with a 54% condition rating, the average condition rating of all appraisals (See "Condition" on page 295). Condition of individual appraised trees being compared to the table could be higher or lower, and any comparison to table values would have to take this into consideration. Appraised values higher or lower than the comparable ranges in the table can be valid but would probably involve special circumstances.

The comparable ranges are fairly large in many cases, due to high standard deviations. In some cases, these deviations have produced range limits that do not closely follow the increases in size and species rating. Variation among appraisers (often due to the subjective factors) is a major

Table 2. Comparable appraised values for trees by species class and size class derived from actual formula method appraisals. High and low values represent the mean ± one standard deviation. Values are expressed in U.S. dollars.

Species class (%)	Low value	High value	No. of records	Low value	High value	No. of records	Low value	High value	No. of records
	4-in. dbh			5-in. dbh			6-in. dbh		
10	0	94	51	1	103	14	0	142	10
20	35	94	445	58	155	157	82	186	68
30	3	171	554	61	244	310	74	308	147
40	15	198	1,405	85	297	626	88	393	276
50	59	186	1,803	124	320	1,031	135	429	319
60	57	214	1,591	166	324	1,089	176	455	281
70	70	219	3,515	185	335	2,543	210	472	940
80	82	219	2,905	177	358	2,007	217	500	844
90	67	240	1,620	177	357	824	246	490	510
100	101	205	628	204	313	445	296	444	56
	7-in. dbh			8-in. dbh			9-in. dbh		
10	*	*	*	*	*	*	34	145	29
20	73	248	142	87	329	50	173	301	157
30	97	405	225	119	482	113	190	538	276
40	173	478	524	181	580	233	247	696	518
50	255	514	779	233	665	298	337	782	920
60	325	533	1,152	327	683	300	434	821	1,087
70	356	560	2,578	402	696	1,009	530	821	3,349
80	348	596	1,896	392	770	1,063	531	878	2,328
90	333	608	751	427	776	499	535	891	950
100	359	549	343	497	722	92	571	832	362
	10-in. dbh			11-in. dbh			12- to 14-in. dbh		
10	0	516	11	0	695	11	*	*	*
20	304	384	39	346	528	241	253	446	258
30	277	653	122	310	837	349	403	834	579
40	314	831	262	404	980	515	476	1,215	708
50	431	902	271	487	1,102	875	645	1,416	735
60	423	1,070	323	589	1,168	1,006	726	1,621	1,122
70	591	1,036	1,316	758	1,133	3,289	972	1,577	3,769
80	650	1,082	1,379	754	1,237	1,922	984	1,682	2,394
90	667	1,143	503	800	1,255	776	1,027	1,672	991
100	770	1,091	76	857	1,228	354	1,041	1,607	509
	15- to 16-in. dbh			17- to 18-in. dbh			19- to 20-in. dbh		
10	0	516	11	0	695	11	*	*	*
20	229	689	213	363	895	154	358	1,079	197
30	557	1,006	749	649	1,296	983	837	1,436	981
40	612	1,504	722	657	1,900	842	764	2,261	923
50	829	1,749	557	839	2,253	354	972	2,719	251
60	919	2,029	856	1,094	2,457	681	1,331	2,941	609
70	1,205	2,020	3,121	1,434	2,501	2,656	1,813	2,956	2,591
80	1,235	2,176	1,962	1,445	2,797	1,648	1,794	3,388	1,422
90	1,332	2,173	701	1,655	2,817	577	2,091	3,419	485
100	1,336	2,170	458	1,756	2,872	449	2,159	3,594	407

Table 2 (continued). Comparable appraised values for trees by species class and size class derived from actual formula method appraisals. High and low values represent the mean ± one standard deviation. Values are expressed in U.S. dollars.

Species class (%)	Low value	High value	No. of records	Low value	High value	No. of records	Low value	High value	No. of records
	21- to 22-in. dbh			23- to 25-in. dbh			26- to 28-in. dbh		
10	*	*	*	*	*	*	*	*	*
20	412	1,411	103	628	1,586	113	743	1,901	65
30	994	1,706	958	993	2,209	971	1,263	2,620	846
40	865	2,651	983	1,039	3,102	1,566	1,336	3,733	1,435
50	968	3,302	164	867	4,165	148	1,126	5,077	95
60	1,458	3,504	363	1,659	4,217	382	2,327	4,956	292
70	2,062	3,530	2,046	2,357	4,314	2,349	3,162	5,149	2,503
80	2,087	4,071	1,097	2,399	5,018	1,259	3,170	6,116	1,189
90	2,551	4,112	333	3,055	5,062	437	3,835	6,373	408
100	2,804	4,301	406	3,373	5,395	458	4,350	6,727	536
	29- to 31-in. dbh			32- to 35-in. dbh			36- to 39-in. dbh		
10	*	*	*	*	*	*	*	*	*
20	1,254	1,861	41	1,454	2,612	11	893	6,014	10
30	1,406	3,594	373	1,700	4,326	242	2,510	6,318	73
40	1,905	4,832	1,076	2,193	5,710	891	3,236	7,506	404
50	2,193	6,132	74	1,655	8,044	42	4,281	8,368	21
60	3,317	6,451	112	3,375	8,040	105	5,240	9,308	43
70	4,051	7,011	1,249	4,854	8,196	1,328	6,176	10,263	813
80	4,263	7,946	792	5,214	9,389	826	6,621	11,700	552
90	5,156	8,053	298	6,349	9,727	243	8,173	12,024	161
100	5,696	8,365	245	6,951	10,516	260	9,087	12,978	164
	40- to 44-in. dbh			45- to 50-in. dbh					
10	*	*	*	*	*	*			
20	*	*	*	*	*	*			
30	3,198	7,525	32	3,915	7,651	8			
40	3,223	9,225	191	3,688	10,895	69			
50	4,428	10,059	9	3,181	14,693	6			
60	5,939	10,898	50	7,268	14,168	14			
70	6,988	12,512	434	7,940	17,333	134			
80	7,889	14,584	371	10,241	19,141	134			
90	10,455	15,305	111	12,900	20,865	23			
100	11,913	17,445	92	15,494	22,926	44			

*Insufficient data.

contributor. Differences between species rating actually used by the appraiser in the formula, and species rating used to sort records (the median published value from across the country) also contribute. The original intent was to divide appraisal records by geographic region. When divided, there was then insufficient data in many of the species class/size rating categories. The subsequent need to sort records by only one species rating increased variation.

The way size classes are determined also contributes to the variation. Because size is measured as trunk cross-sectional area, size classes were increased by increments that represented consistent increases in cross-sectional area instead of increases in dbh [a 2-in. (5-cm) dbh increase from 4 to 6 in. (10 to 15 cm) results in a cross sectional area increase of 124%, while a similar increase from 40 to 42 in. (100 to 105 cm) dbh increases the area only 10%). A 25% increase in cross-sectional area was desired, but size classes had to be divided by whole-inch increments because many appraisers round to the nearest inch. As a result, the percentage increase from one class to the next varied somewhat. Most fell between 20% and 30%, but increases between some of the smallest size classes were much larger. This variation no doubt increased the standard deviation and, therefore, the range.

Formula Components

Appraised values of inventory trees were significantly higher ($P < 0.001$) than values of casualty loss trees. Average location rating and size were both significantly ($P < 0.001$) higher for inventory trees, while species rating was higher ($P < 0.001$) for casualty loss trees (Table 3). Condition was not factored in.

These differences in the variables used in the formula do not seem to adequately explain the higher appraised values of inventory trees. The higher average location rating (27%) of inventory trees alone more than accounts for the 25% higher appraised value of inventory trees. Inventory trees were also 33% larger (based on cross-sectional area) and offset by only a 16% lower species rating. The remaining difference (18%) must somehow be explained by the only remaining factor, price per square inch.

Table 3. Mean dbh measurement, condition, and location for casualty loss and inventory appraisals.

	Casualty loss	Inventory
Current value ($)	2,507	3,124*
Dbh (in.)	13.4	15.5*
Species (%)	71	61*
Location (%)	54	69*
Condition (%)	62	53*

*Significantly different from casualty loss at $P < 0.001$.

Most inventory appraisals used the 6th and 7th editions of the Guide. The $22 and $27 per square inch value published respectively in 1983 and 1988 would both be equivalent to $37 in 1998 dollars (http://stats.bls.gov/cpihome.htm). Many of the casualty loss appraisals were more recent and used the 8th edition. The regionally determined dollar per square inch values for the 8th edition were $18 to $36, averaging $28. Most of these published values were determined soon after the 8th edition was published in 1992. Inflation between 1993 and 1998 would increase this average value to $31, 16% lower than the equivalent fixed published values in previous editions. It would appear that once tree values were made dependent on nursery stock values, appraised values of trees were lower relative to the era of fixed published cost per square inch.

Species. Species ratings have always been published regionally and not often modified by individual appraisers. The higher average species rating of casualty loss trees may simply be due to a different mix of species encountered in the two situations. Inventories typically consist of street and park trees, where larger numbers of fast-growing, lower-quality species have often been planted. Casualty loss appraisers may be more likely to encounter a wider variety and higher quality species on private properties.

Location. The higher average location rating of inventory trees does not appear to result from the difference in their position in the landscape. Guidelines for determining location ratings were provided by the 7th edition of the Guide (CTLA 1988). These guidelines were abandoned in the 8th edition, but it would be hard for appraisers not to continue to be influenced by them to some degree. These recommendations indicate that the street and park trees dominating the inventories should be rated 40% to 80%. Casualty loss trees include a wider variety of residential, commercial, and some public sites. The guidelines suggest similar location ratings of 50% to 90% for these sites. With so much overlap, average location ratings for all trees should be quite similar. If there is a difference, street tree inventory appraisals might be expected to be a little lower than casualty loss appraisals. The inventory mean of 69% is higher than the casualty loss mean of 54%, and not what would be predicted.

The inventory appraisal data included in this study often used a "default" location value (i.e., 70% for all street trees) unless circumstances warranted it be changed for individual trees. The result is that thousands of inventory location ratings may represent just a single decision from the inventory software developer. Are these inventory location ratings too high? Street trees are generally highly regarded by professionals and the public for their aesthetic and functional properties. The 69% average is above midpoint of the recommended range and may be slightly, but not unreasonably, high. Are location ratings of casualty loss trees too low? A 54% rating implies that appraisers must believe that the trees are providing only a small fraction of the aesthetic and functional benefits possible on these sites (80% to 90% maximum). The data cannot tell us why casualty loss appraisers used such low location ratings, but further study by the appraisal community may be useful.

Data were collected in such a way as to allow analysis of location rating by landscape site type (street, residential property, commercial, parking lots, etc.). There was no significant difference in location rating between landscape site types (data not shown). This again may be traced back to the small difference in location rating guidelines in the 7th edition of the Guide, as described above.

Condition. Though condition was not used in individual appraised value calculations, analysis shows that it was higher ($P < 0.001$) for casualty loss trees (Table 3). Why? Do privately owned trees receive better care or are the trees growing under better conditions? Are they less subject to vandalism and damage than street trees? Perhaps they were just more carefully examined, revealing their true condition (which may be more likely to decrease the condition rating).

The average condition rating (54%) of appraised trees would be considered "fair" as defined in the guide (50% to 69%). Is this an accurate representation of the condition of the average tree in the landscape? Street tree surveys done in the late 1980s showed that 34% of the trees were considered to be in good condition and 28% in fair condition, though there was no clear definition of the condition categories (Kielbaso 2000). Further examination of the appraisal records from this study showed that 24% were rated good and 37% (the highest of any class) of the trees were rated fair as defined in the Guide. This finding is very similar to those in the previous study. Any differences could easily lie in the interpretation of "fair" and "good" by evaluators involved in each case. Fair-to-good is probably an accurate description of landscape tree condition.

Fault. Appraisers for casualty losses can be working for only one side of the dispute; the party whose tree was damaged, or the party who was in some way responsible for the damage. Values determined by appraisers working for those responsible for casualty losses were

higher ($P < 0.001$). Higher location and condition ratings explain most of this difference (Table 4). Appraisers may have contact only with their own client and may be working with slightly different information, which could indirectly influence their perspective without their knowledge. If this were the case, then the reverse difference might be expected. This is another aspect that deserves more investigation.

Table 4. Comparison of appraised value by client type.

	Owner of damaged tree	Person causing damage
Current value ($)	2,226	2,948*
Dbh (in.)	13.5	13.3
Location (%)	51	58*
Condition (%)	58	67*

*Significantly different from owner of damaged trees at $P < 0.001$.

SUMMARY

The most common and widely used method of establishing the value of large trees worldwide is through the use of formulas. The *Guide for Plant Appraisal* states that appraisals must be reasonable but offers no method to accomplish this other than a suggestion to compare to property values. Comparison of values produced by the formula to the table of values derived from more than 130,000 formula appraisals provides the appraiser with another means to test reasonableness.

LITERATURE CITED

Abbot, R.E., and C. Miller. 1991. Utility tree claims. J. Arboric. 17:113–116.

Armstrong, N. 1947. Shade Tree Evaluation Formulas and Their Use. National Shade Tree Conference Proceedings, pp. 38–48.

Chadwick, L.C. 1975. ASCA recommendations for modification of the ISTC shade tree evaluation formula. J. Arboric. 1:35–38.

Davis, S.H. 1983. Tree valuation pitfalls. J. Arboric. 9:164–166.

Council of Tree & Landscape Appraisers (CTLA). 1998. Valuation of Landscape Trees, Shrubs, and Other Plants: A Guide to the Methods and Procedures for Appraising Amenity Plants (7th ed.). International Society of Arboriculture, Champaign, IL.

Council of Tree & Landscape Appraisers (CTLA). 1992. Guide for Plant Appraisal (8th ed.). International Society of Arboriculture, Champaign, IL.

Council of Tree & Landscape Appraisers (CTLA). 2000. Guide for Plant Appraisal (9th ed.). International Society of Arboriculture, Champaign, IL.

Felt, E.P. 1942. Our Shade Trees. Orange Judd Publishing, New York, NY

Kielbaso, J.J. 1979. Evaluating trees in urban areas. J. Arboric. 5:70–72.

Kielbaso, J.J. 2000. Michigan State University, East Lansing, MI. Personal communication.

National Shade Tree Conference. 1957. Shade Tree Evaluation. National Arborist Association, Wooster, Ohio. 14 pp.

Henry, M.S. 1994. The contribution of landscaping to the price of single family houses: A study of home sales in Greenville, South Carolina. J. Environ. Hortic. 12:65–70.

Henry, M.S. 1999. Landscape quality and the price of single family houses: Further evidence from home sales in Greenville, South Carolina. J. Environ. Hortic. 17:25–30.

Rey-Lescure, E. 1985. The location factor in evaluating shade trees and the replacement value in appraising hedges: Two proposals. J. Arboric. 11:113–136.

Spicer, O.W. 1969. Appraising Shade and Ornamental Trees. Bartlett Tree Experts, Stamford CT. 12 pp.

Tate, R. 1989. ISA tree valuation guide: A critical examination. J. Arboric. 15:145–149.

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Résumé. Des données d'évaluation monétaire remontant de 1980 à 1995 ont été acquises auprès de 51 évaluateurs (généralement des cas de dommages sur des arbres privés) et de 24 inventaires d'arbres municipaux (des arbres de rues pour la plupart). La banque de données finale comportait donc 3966 évaluations monétaires de dommages et 129880 évaluations monétaires d'arbres inventoriés. Les données de cette étude ont été utilisées pour développer une table de référence d'évaluations de valeurs d'arbres en les groupant par classes de dimensions et d'espèces. La table n'élimine pas le besoin d'utiliser la formule, mais donne à une personne l'opportunité de comparer ses valeurs calculées avec celles d'arbres similaires. Les valeurs monétaires des arbres inventoriés étaient significativement plus élevées ($P < 0{,}001$) que les valeurs des arbres endommagés. La différence s'explique en partie par la dimension plus grande et le facteur de localisation plus élevé des arbres inventoriés. La condition moyenne de tous les arbres évalués a été jugée comme honnête.

Zusammenfassung. Es wurden die Aufzeichnungen der Bewertungen von 1980 bis 1995 von 51 Schätzern, die gewöhnlich private Bäume taxieren und 24 Inventuren von Gemeinden (überwiegend Straßenbäume) angefordert. Die finale Datenbank enthielt 3.966 Bewertungen von zufälligen Baumausfällen und 129.880 Inventurberichten. Die Daten aus dieser Studie wurden verwendet, um eine Referenz der Bewertungsschemata, unterteilt in Gruppen nach Arten und Größe zu erhalten. Die Referenztafel verhindert nicht die Entwicklung von Formularen, aber es liefert dem Individuum eine Gelegenheit, seine Bewertungen mit denen anderer zu vergleichen. Die Bewertungen der Schätzungen der Bäume aus den Inventuren waren signifikant höher ($P < 0.001$) als die Werte der anderen Bäumen. Die Differenz erklärt sich teilweise aus der Größe und Anzahl der Bäume aus der Inventur. Die durchschnittlichen Bedingungen von allen bewerteten Bäumen wurde als fair eingestuft.

Resumen. Se adquirieron registros de valoración entre 1980 a 1995 provenientes de 51 valoraciones de pérdidas (usualmente árboles de propietarios privados) y 24 inventarios municipales (principalmente árboles de la calle). La base de datos final consistió de 3,966 valoraciones de pérdidas casuales y 129,880 de inventario. Los datos de este estudio fueron usados para desarrollar la valoración de árboles agrupados por clases de tamaño y especie. La tabla no elimina la necesidad de usar la fórmula, pero proporciona una oportunidad de comparar los valores con árboles similares. Los valores obtenidos del inventario fueron significativamente más altos ($P < 0.001$) que los valores de las pérdidas casuales. Esta diferencia es explicada parcialmente por el mayor tamaño y la tasa de localización más alta de los árboles del inventario. La condición promedio de todos los árboles valorados fue evaluada como regular.