TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Woodland No. 12

Bozeman, Montana
January 23, 1979

Re: Windbreak Species Performance Data by Soils
By: Harold E. Hunter, Forester, SCS

CONTENTS

Presented in this Technical Note are selected data from Windbreak Species-Soil Evaluation studies carried out in support of soil survey operations in Montana from 1960 through 1975. To strengthen the data base from which interpretations can be made, data from the same kind of studies made in surrounding states on soils common to Montana are also included. Species growth curves and tables summarizing species performance in terms of height, crown width, and condition are also reported.

ORGANIZATION

Section One. Section One contains a listing of all pertinent data gathered on windbreak species performance. Data are organized by state, nonirrigated or irrigated, species (alphabetical by common name), county, and soil series upon which the data were collected. The number recorded below the county name is the plot number assigned in the field. Usually the number is made up of the county FIPS code and a number representing the order in which the plot was taken.

Most column headings are self-explanatory. However, a detailed explanation of each category and how ratings are determined is contained in Soils Memorandum-64. Under the column heading Row Spacing, the numerical notation AxB represents the average between-row and within-row spacings, respectively. AxB equals the growing space available to the plant. Moisture Source--Other identifies situations where a site, because of position (postn) or some other reason, receives more moisture than what the rainfall estimate for the area represents.

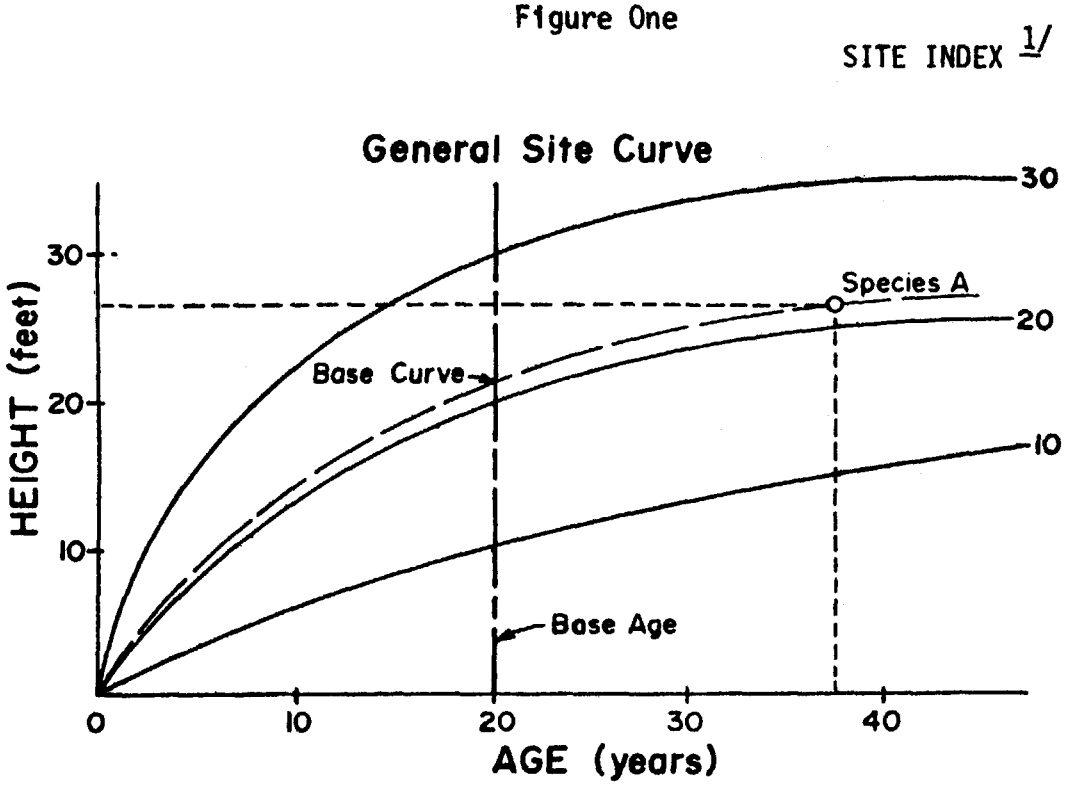
Soil names used in Table One were reviewed and updated in 1974.

Section Two. This section contains tables summarizing species performance by height, crown width, and condition in relation to time. It also contains a summary of expected heights at 20 years in relation to precipitation zones. All data in this section reflect nonirrigated conditions.

Section Three. Growth curves are presented in this section for several species showing the relationship of height growth to time in years. These curves were developed from all (irrigated and nonirrigated) data presented in Section One. The base curve is the average curve for the

population representing a species. The numbered curves are proportional curves drawn to represent the growth of trees which at 20 years of age would be the heights indicated by the curve number. By comparing the height and age of any tree on a study site with the numbered curves, you can determine its expected height at 20 years of age (base age). The curves are helpful in two ways. They enable comparison of species performance among different sites. They enable the projection of height growth forward or backward in time.

EXAMPLE OF HOW TO USE THE CURVES
Figure One



Situation. You have observed species A in a windbreak on soils B to have a height of 27 feet. The windbreak was planted 37 years ago. You want to compare its performance on soil B with soil X for which previous studies have determined an expected height of 22 feet at 20 years of age. By locating the position of species A on the graph (see Figure One) and interpolating between curve no. 20 and curve no. 30, we can ascertain that species A was 21 feet tall at 20 years of age. Indications are that the performance of species A on soil B is very similar to species A on soil X.

USES

Conservationists. Essential to good farmstead, feedlot or field windbreak design is an understanding of species performance (height, crown width, adaptability) on a given site. By comparison of soils at the site

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1/ Expected height at 20 years of age.

on which you are working with other soils for which information is available, by comparing soil series, soil classification or similar soils within or outside the county, you can arrive at a good assessment of its expected performance. By understanding plant performance, you will be able to determine: its adaptation to the site, growing space requirements (within-row and between-row spacing), and proper row position of the species within the windbreak. All these items are key elements in windbreak design.

Twenty years of age is becoming commonly accepted within SCS as a reasonable point in time for determining the size of windbreak species for design purpose. For this reason, SCS policy requires that soil interpretations be developed showing the expected height of windbreak species at 20 years. Consequently, data in this technical note have been summarized, where appropriate, to reflect the design age of 20 years.

Soil Scientists. The data will be helpful in developing soil interpretations for windbreak species performance. As for the convervationist, comparison of the soil with which you are working with the data in Section One will give you a data base from which judgments can be made. Where data are available on the height and age of a species growing on the soil you are studying, you can use the growth curves to determine its 20-year height.

Van K Haderlie
State Conservationist

File: Reference Material - WOODLAND

SECTION ONE

TABLE ONE

MONTANA DATA--NONIRRIGATED

TABLE ONE
MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height (Feet)	Crown Width (Feet)	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Source Precip. / Other	Elevation	Slope % /	Aspect
SPECIES: AMERICAN ELM													
Cascade 7-3	Work clay loam Typic Argiborolls; fine, montmorillonitic	34 34 34 34 34	5 5 2 3 -	3 3 1 2 -	- - - - 	Poor Poor Poor Poor Poor	90 90 90 100 -	Past E Present P	14x7	16-17	No	4170	6	N
Chouteau 071-2	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	18	19	21	18	Fair	100	Past E Present P	16x10	15-19	No	3420	3	NE
Chouteau 071-7	Farland silt loam, till phase Typic Argiborolls; fine-silty, mixed	18	16	18	12	Fair	100	Past E Present E	22x10	16	No	3420	4	SE
Daniels 019-2	Zahill Clay loam Typic Ustorthents; fine-loamy, mixed (calcareous)	14	11	16	9	Poor	100	Past E Present E	16x5.5	10-14	No	2300	3	E
Pondera 37-12	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	18	20	22	10	Good	100	Past E Present E	15x8	15	No	3600	1	X
Richland 648-2	Zahill clay loam Typic Ustorthents; fine-loamy mixed (calcareous), frigid	24	20	17	12	Good	90	P	15x6	12-14	No	2350	3	SE
Richland 648-3	Telstad loam Aridic Argiborolls; fine-loamy, mixed	25 25	28.9 28.9	23 23	16 18	Good Good	70 70	---	14x6	12-14	No	2350	5	W
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13	--	--	8	---	---	P	10x10	12-14	No	2250	1	N
Richland 648-6	Williams loam Typic Argiborolls; fine-loamy, mixed	14	16.8	24	12	Good+	90	E	16x8	12-14	No	2300	1	?
SPECIES: AMERICAN PLUM													
Cascade 7-8	Absarokee Typic Argiborolls; fine, montmorillonitic	21	7		11	Poor	100	Past G Present P	10.5x6	16	No	4200	5	NE

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County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height (Feet)	Crown Width (Feet)	Condition (Vigor)	Percent Alive	Maintenance	Row Spacings	Moisture Precip. /	Source Other	Elevation	Slope %	-2- / Aspect
SPECIES: BOX ELDER														
Cascade 7-2	Cargill silty clay loam Borollic Calciorthids; fine-silty, mixed	35 35	9 10	20 20	13 9	Poor Poor	90 100	Past E Present E	10x6	13	No	3700	1	E
Cascade 7-3	Work clay loam Typic Argiborolls; fine, montmorillonitic	34	8	19	9	Poor	100	Past E Present P	14x6	16-17	No	4170	6	N
Cascade 7-4	Darret loam Typic Argiborolls; fine, mixed	31	12	12	9	Poor	100	Past F Present P	12x6	16-17	No	4160	9	N
Cascade 7-5	Kevin clay loam Aridic Argiborolls; fine-loamy, mixed	35	5	10	10	Poor	90	Past F Present G	10x6	--	No	3250	2	W
Daniels 019-2	Zahill clay loam Typic Ustorthents fine-loamy mixed (calcareous), frigid	14 14	8 7	20	11 10.5	Poor Poor	100 100	Past E Present E	16x4 16x4	10-14	No	2300	3	E
Daniels 019-5	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	13	9	21	8	Poor	90	Past E Present E	16x8	10-14	No	2300	1	E
Pondera 37-11	Telstad silty clay loam Aridic Argiborolls; fine-loamy, mixed	37	--		4	Poor	40	Past E Present E	10x5	12-14	No	3750	1	X
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13	--		--	--	0	P	10 x-	12-14	No	2250	1	N
Roosevelt 085-72-9	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	21	--		30	Excellent	90	Past E Present G	-	13	No	1950	2	S
Roosevelt 085-72-9	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	21	25	25	27	Excellent	96	Past E Present E	15x6	13	No	1950	1	N

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SPECIES: COMMON CHOKECHERRY														
Chouteau 071-5	Kevin loam Aridic Argiborolls; fine-loamy, mixed	8-10	8		7	Fair	100	Past E Present E	27x10	14	No	3140	2	N
Daniels 019-1	Williams loam Typic Argiborolls; fine-loamy, mixed	7	8		8	Good +	100	Past E Present E	--	10-14	No	2300	1	--
Daniels 019-3	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	35	10		13	Excellent	100	Past E Present E	--	10-14	No	2300	--	W
SPECIES: COMMON LILAC														
Daniels 019-5	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	13	6		6	Good	100	Past E Present E	-x4½	10-14	No	2300	1	E
Roosevelt 085-72-1	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	20	8		9.5	Excellent	100	Past E Present E	x-x2	13	No	1950	7	S
Roosevelt 085-72-13	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	12	5		5	Good	100	Past E Present G	16x3	13	No	1950	2	N
SPECIES: COTTONWOOD														
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24 24 24	-- -- --		-- -- --	-- -- --	4 4 12	Past G Present G	9.5x- 5.5x- 14 x-	17	No	4400	6	N
Cascade 7-4	Darret loam Typic Argiborolls; fine, mixed	31	--		--	DEAD	--	Past F Present P	--	16-17	No	4160	9	N
Chouteau 071-8	Floweree silty clay loam till substratum Aridic Haploborolls; fine-silty, mixed	--	--		--	Poor	0	Past E Present E	--	10-14	No	3100	2	SE

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Daniels 019-4	Dooley fine sandy loam Typic Argiborolls; fine-loamy, mixed	14	26	38	26	Excellent	100	Past E Present E	16x12	10-14 No	2300	1 E
Daniels 019-5	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	13	31	51	18	Good	90	Past E Present E	16x8	10-14 No	2300	1 E
Pondera 37-10	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	26 26	N O T 58	M E A S U R E D 50	 26	Excellent Excellent	-- 80	Past E Present P	10x- 10x6	12-14 No	3200	1 S
Roosevelt 085-72-5	Williams sandy loam Typic Argiborolls; fine-loamy, mixed	21	38	38	20	Good	96	Past E Present G	12x15	13 No	1950	3 W
Roosevelt 085-72-10	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	21	51	49	34	Excellent	60	Past E Present G	15x16	13 No	1950	1 N
SPECIES: DOUGLAS-FIR												
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24	15		9	Poor	72	Past G Present G	12.5x8½	17 No	4400	6 N
SPECIES: GOLDEN WILLOW												
Pondera 37-10	Kevin silty clay loam Aridic Argiborolls; fine, loamy, mixed	26	N O T	M E A S U R E D		Excellent	---	Past E Present P	10x-	12-14 No	3200	1 S
SPECIES: GREEN ASH												
Broadwater 066-2	Manhattan sandy loam Typic Calciborolls; coarse-loamy, mixed	--	30		19	--	70	Past E Present G	8 x-	11 No	3960	1 E
Cascade 7-1	Dutton silty clay loam Ustertic Argiborolls; fine, montmorillonitic	23	14	14	11	Good +	100	Past E Present E	30x6	13 No	3700	3 N

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Cascade 7-2	Cargill silty clay loam Borollic Calciorthids; fine-silty, mixed	35 35 35	20 17 20	29 17 20	17 14 8	Excellent Good Good	100 100 100	Past E Present E	15x7 10x7 10x7	13	No	3700	1	E
Cascade 7-3	Work clay loam Typic Argiborolls; fine, montmorillonitic	34 34	15.5 17	16 17	10 10	Good + Good +	100 100	Past E Present P	14x6	16-17	No	4170	6	N
Cascade 7-4	Darret Loam Typic Argiborolls; fine, mixed	31 31	17 17	17 17	9 9	Good + Good +	90 100	Past F Present G	12x6	16-17	No	4160	9	N
Cascade 7-5	Kevin clay loam Aridic Argiborolls fine-loamy, mixed	35 35	11 15	11 15	10 13	Excellent + Excellent +	80 70	Past F Present G	40x6	--	No	3250	2	W
Cascade 7-6	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	34 34	16 14	16 14	11 9	Good + Good +	90 80	Past G Present F	12x6	14	No	3550	1	X
Cascade 7-7	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	45	20	21	14	Excellent +	100	Past E Present E	8x4	14	No	3500	1	X
Cascade 7-8	Absarokee loam Typic Argiborolls; fine, montmorillonitic	21	16	16	10	Fair	92	Past G Present P	10x5	16	No	4200	5	NE
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24 24 24	20 23 24	20 23 24	12 12 14	Fair Fair Fair	100 60 80	Past G Present G	13x7½ 11x7½ 10x6	17	No	4400	6	N
Cascade 7-10	Ipano channery light clay loam Typic calciborolls; fine-loamy, mixed	15 15	15 14	15 14	14 12	Good Good	100 100	Past E Present E	15x6 16x6	14-16	No	4050	1	S
Cascade 7-11	Work light clay loam Typic Argiborolls; fine, montmorillonitic	15 15	16 15	16 15	14 11	Good Good	100 100	Past E Present E	15x6 16x6.5	14-16	Pos.	4050	7	E
Cascade 7-12	Castner channery light clay loam Lithic Haploborolls; loamy - skeletal, mixed	15 15	16 13	16 14	12 13	Good Good	100 --	Past E Present E	15x6 16x6	16	No	4050	1	S

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Cascade 7-13	Kevin clay loam Aridic Argiborolls; fine-loamy, mixed	28	17	17	14	Fair	76	Past E	21x5.5	10-14	No	3400	3	S
		28	16	16	11	Poor	48	Present E	14x5					
		28	14	14	9	Poor	88		14x4.5					
Chouteau 071-1	Telstad loam Aridic Argiborolls; fine-loamy, mixed	16	21.5	23	15	Good	100	Past E	20x14	15x19	No	3340	1	E
		16	18	20	12	Fair	100	Present E	--					
Chouteau 071-2	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	18	17	17	20	Fair	100	Past E Present P	16x10	15-19	No	3420	3	NE
Chouteau 071-3	Brussett silty clay loam Aridic Argiborolls; fine-silty, mixed	18	16.5	17	16	Good	80	Past E	16x7	14	No	2980	1	S
		4-5	6	15	3	Fair	100	Present E	16x12					
		8	14	17	10	Good	100		23x12					
Chouteau 071-4	Telstad loam Aridic Argiborolls; fine-loamy, mixed	43	22	22	16	Good	90	Past F	19x12	15	No	3140	6	E
		43	20	20	10	Fair	60	Present G	16x13					
		43	19	19	14	Fair	80		17x14					
Chouteau 071-5	Kevin loam Aridic Argiborolls; fine-loamy, mixed	43	22	22	11	Fair	80	Past E Present E	-x14	14	No	3140	2	N
Chouteau 071-6	Farnuf loam Typic Argiborolls; fine-loamy, mixed	16	17	17	13	Fair	100	Past E	20x10	15	No	3280	3	NE
		16	16	16	16	Good	100	Present E	20x9					
Chouteau 071-7	Farland silt loam, till phase Typic Argiborolls; fine-silty, mixed	18	20	20	17	Good	100	Past E	19.5x10	16	No	3420	4	SE
		18	21	21	16	Good	100	Present E	19x10					
Chouteau 071-9	Floweree silt loam Aridic Haploborolls; fine-silty, mixed	28	16	16	19	Fair	100	Past E	23x10	10-14	No	3040	1	S
		28	13	13	15	Fair	100	Present G	22x10					
		28	12	12	14	Poor	100		22x10					
		28	13	13	12	Poor	90		22x10					
		28	12	12	12	Poor	70		22x10					
		28	11	11	11	Poor	100		22x10					
Chouteau 071-10	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	17	15	15	8	Fair	100	Past E	16x16	10-14	No	3160	4	S
		17	16	16	10	Fair	100	Present E	16x16					
		17	16	16	10	Fair	100		16x16					
		17	17	17	10	Fair	100		16x16					

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Chouteau 071-11	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	18 18	15 15	15 15	13 15	Good Good	100 100	Past E Present E	24x7 24x7	10-14	No	3490	1	___
Chouteau 071-12	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	14	15	15	14	Good	100	Past E Present E	19x12	10-14	No	3207	2	S
Daniels 019-6	Williams loam Typic Argiborolls; fine-loamy, mixed	20 20	19 20	19 20	17 17	Good Good	100 100	Past E Present E	17x10 14.5x10	10-14	No	2300	1	S
Dawson 021-2	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	13 13	16 16.5	20 20	10 10	Excellent Excellent	100 100	E	14x8 14x8	10-14	Postn	2800	2-3	SW
Dawson 021-3	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	----------NO MEASUREMENTS----------												
Pondera 37-1	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	43 43 43	23 21 20	23 21 20	10 11 12	Good + Good + Good +	100 100 100	Past E Present G	18x6 22x6 22x6	12-14	No	3640	1	W
Pondera 37-2	Scobey silty clay loam Aridic Argiborolls; fine, Montmorillonitic	44	18	18	14	Excellent	100	Past E Present F	14x12	12-14	No	3640	1	E
Pondera 37-3	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	34 34	13 14	13 14	11 9	Fair+ Fair+	100 80	Past E Present P	12x8 12x8	13	No	3700	1	X
Pondera 37-4	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	31 31	14 14	14 14	7 9	Poor Poor	100 90	Past F Present P	12x7 12x7	12	No	3700	1	---
Pondera 37-5	Richey silty clay loam Aridic Haploborolls; fine, montmorillonitic	22 22	17 16	17 16	11 10	Excellent+ Excellent+	100 100	Past E Present E	12x8 12x8	13	No	3700	1	X
Pondera 37-7	Telstad clay loam Aridic Argiborolls; fine - loamy, mixed	31 31	16 16	16 16	13 15	Excellent+ Excellent+	100 90	Past E Present E	14x8 14x8	12-14	Postn	3490	1	W

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County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip. /	Source Other	Elevation	Slope %	/ Aspect
Pondera 37-8	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	29	22	22	17	Excellent	100	Past E Present E	12x6	12-14	Postn (some)	3500	1	W
Pondera 37-11	Telstad silty clay loam Aridic Argiborolls; fine loamy, mixed	37 37	17 22	17 22	8 11	Fair+ Fair+	50 70	Past E Present E	10x5 10x5	12-14	No	3750	1	X
Richland 648-1	Havre loam Ustic Torrifluvents; fine-loamy, mixed (calcareous), frigid	19	21	21	12	Good+	100	--	14x6	12-14	Postn	2150	1	--
Richland 648-2	Zahill clay loam Typic Ustorthents; fine-loamy, mixed (calcareous),	24 24	16.6 18.6	17 19	10 10	Good - Good -	100 100	P	15x6 15x6	12-14	No	2350	3	SE
Richland 648-3	Telstad loam Typic Argiborolls; fine-loamy, mixed	25 25 25	22.3 18.2 20.5	22 18 20	10 11 12	Good Good Good	60 60 70	--	14x6 14x6 14x6	12-14	Postn	2350	5	W
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13	16.1	20	12	Poor	100	P	10x10	12-14	Postn	2250	1	N
Richland 648-6	Williams loam Typic Argiborolls; fine-loamy, mixed	14	14.3	16	10	Excellent	90	E	16x8	12-14	Postn	2300	1	---
Roosevelt 085-1	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	19	13	13	11	Fair	100	Past E Present E	12x12	10-14	Yes?	2375	2	S
Roosevelt 085-2	Parshall fine sandy loam, till substratum Pachic Haploborolls; coarse-loamy, mixed	22	19	19	17	Good	100	Past E Present E	13x8	10-14	No	2375	2	W
Roosevelt 085-72-11	Dooley sandy loam Typic Argiborolls; fine-loamy, mixed	6	8	18	8	Excellent	100	Past E Present E	5x8	13	No	1950	2	N

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Sheridan 091-1	Williams loam Typic Argiborolls; fine-loamy, mixed	27 27	19 19	19 19	19 17	Fair Fair	100 100	Past E Present G	12x5 19	10-14	No	2375	--	E
Sheridan 091-3	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	10 10	14 14	20 20	10 15	Good Good	70 70	Past E Present E	-x10 -x10	10-14	No	2375	1	W
Sheridan 091-4	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	------- AGE NOT KNOWN ----------						Past G Present E	16x8	10-14	No	2375	4	W
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	14.5	18	8	Fair	100	E	12x12	--	Postn	2850	9	SW
SPECIES: HACKBERRY														
Roosevelt 085-2	Parshall fine sandy loam till substratum- Pachic Haploborolls; coarse-loamy, mixed	22	12		10	Good	100	Past E Present E	13x8	10-14	No	2375	2	W
Sheridan 091-4	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	23	14		11	Good	100	Past G Present E	16x3	10-14	No	2375	4	W
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	9.4		6	Fair	80	E	14x12	--	Postn	2850	9	SW
SPECIES: NANKING CHERRY														
Chouteau 071-4	Telstad loam Aridic Argiborolls; fine-loamy, mixed	8-10	7		9	Excellent	100	Past F Present G	25x8½	15	No	3140	6	E
Daniels 019-3	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	- - - - - NOT MEASURED - - - - - - - - - - - -						Past E Present E	--	10-14	No	2300	--	W

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance	Row Spacings	Moisture Precip.	Source / Other	Elevation	Slope %	Aspect
Roosevelt 085-2	Parshall fine sandy loam till substratum- Pachic Haploborolls; coarse-loamy, mixed	22	8		10	Good	100	Past E Present E	13x4½	10-14	No	2375	2	W

SPECIES: PONDEROSA PINE

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance	Row Spacings	Moisture Precip.	Source / Other	Elevation	Slope %	Aspect
Broadwater 066-2	Manhattan sandy loam Typic Calciorthids; coarse-loamy, mixed	- - - - - - - - - - - - - OUT FIRST YEAR -												
Cascade 7-8 (P. PINE)	Absarokee loam Typic Argiborolls; fine, montmorillonitic	21 21	17 16	16 16	10 13	Fair Fair	92 92	Past G Present P	11x6 --	16	No	4200	5	NE
Chouteau 071-1 (P. PINE)	Telstad loam Aridic Argiborolls; fine-loamy, mixed	16	19	20	17	Excellent	100	Past E Present E	-x5	15-19	No	3340	1	E
Chouteau 071-4 (P. PINE)	Telstad loam Aridic Argiborolls; fine-loamy, mixed	18	15	15	10	Fair	100	Past F Present G	24x8	15	No	3140	6	E
Chouteau 071-5 (P. PINE)	Kevin Loam Aridic Argiborolls; fine-loamy, mixed	18	18	18	14	Good	100	Past E Present E	-x8	14	No	3140	2	N
Chouteau 071-6 (P. PINE)	Farnuf loam Typic Argiborolls; fine-loamy, mixed	16	18	19	15	Excellent	100	Past E Present E	-x9	15	No	3280	3	NE
Chouteau 071-8 (P. PINE)	Floweree silty clay loam, till substratum Aridic Haploborolls; fine-silty, mixed	18	18	18	14	Excellent	100	Past E Present E	-x18	10-14	No	3100	2	SE
Daniels 019-7 (P. PINE)	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	16	22	16	12	Excellent	100	Past E Present E	16x6	10-14	No	2300	1	SW
Pondera 37-2	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	17	13	13	9	Excellent	90	Past E Present F	5x3	12-14	No	3640	1	E

TABLE ONE
MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip. /	Source Other	Elevation	Slope %	/ Aspect
Pondera 37-3 (P. PINE)	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	34 34	14 18	13 18	8 11	Poor Excellent+	60 100	Past E Present P	12x10 12x10	13	No	3700	1	X
Pondera 37-4	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	31 31	13 18	12 18	8 9	Good Excellent+	60 90	F	12x10 12x10	13	No	3700	1	-
Richland 648-5	Kevin loam Aridic Argiborolls; fine-loamy, mixed													
Ponderosa Pine	- - - - - - - - - - - - - -	45	39	40	-	Good	-	-	9x5	-	Pos.	-	3	NW
Scotch Pine	- - - - - - - - - - - - - - - -	32	27.5	30	-	Good	-	-	9x5					
Roosevelt 085-3 (P. PINE)	Williams loam Typic Argiborolls; fine-loamy, mixed	12	12	16	10	Excellent	100	Past E Present E	-x5	10-14	No	2375	1	N
SPECIES: ROCKY MOUNTAIN JUNIPER														
Chouteau 071-7	Farland silt loam till phase Typic Argiborolls; fine-silty, mixed	18	9	10	10	Excellent	100	Past E Present E	22x10	16	No	3420	4	SE
Daniels 019-7	Bearpaw Clay loam Typic Argiborolls; fine, montmorillonitic	16	10	13	10	Excellent	100	Past E Present E	-x7	10-14	No	2300	1	SW
Pondera 37-2	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	17	8	9	8	Excellent	100	Past E Present F	5x2½	12-14	No	3640	1	E
Pondera 37-12	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	19	11	11	12	Excellent	100	Past E Present E	15x8	12-14	No	3600	1	X
Richland 648-6 (J. vir)	Williams loam Typic Argiborolls; fine-loamy, mixed	14	11.5	16	-	Excellent	90	E	16x8	12-14	No	2300	1	-

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
Roosevelt 085-1	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	19	10	11	12	Excellent	100	Past E Present E	-x8	10-14	Yes?	2375	2	S
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	--		6	Good	100	E	14x8	--	Postn	2850	9	SW
SPECIES: RUSSIAN-OLIVE														
Cascade 7-2	Cargill silty clay loam Borollic Calciorthids; fine-silty, mixed	35	18	18	18	Good+	80	Past E Present E	20x6	13	No	3700	1	E
Cascade 7-4	Darret loam Typic Argiborolls; fine, mixed	31	14	13	10	Good+	90	Past F Present P	12x6	16-17	No	4160	9	N
Cascade 7-10	Ipano channery light clay loam Typic Calciborolls; fine-loamy, mixed	15	14	17	11	Good	92	Past E Present E	14x6	7-10	No	4050	1	S
Cascade 7-11	Work light clay loam Typic Argiborolls; fine, montmorillonitic	15	14	17	16	Good	100	Past E Present E	14x6	14-16	Pos.	4050	7	E
Cascade 7-12	Castner channery light clay loam Lithic Haploborolls; loamy-skeletal, mixed	15	12.5	15	12	Fair	64	Past E Present E	14x6	16	No	4050	1	S
Chouteau 071-1	Telstad loam Aridic Argiborolls; fine-loamy, mixed	16	21	26	22	Excellent	100	Past E Present E	20x7	15-19	No	3340	1	E
Chouteau 071-2	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	18	19	20	22	Fair	90	Past E Present P	16x8	15-19	No	3420	3	NE

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Source Precip. / Other	Elevation	Slope %	/ Aspect
Chouteau 071-3	Brussett silty clay loam Aridic Argiborolls; fine-silty, mixed	18 18	13 14	14 14	13 15	Good Good	90 90	Past E Present E	28x7 --	14	No	2980	1	S
Couteau 071-4	Telstad loam Aridic Argiborolls; fine-loamy, mixed	43	16	17	19	Good	100	Past F Present G	-x14	15	No	3140	6	E
Chouteau 071-7	Farland silt loam,till phase Typic Argiborolls; fine-silty, mixed	18	17	18	19	Good	90	Past E Present E	21x6	16	No	3420	4	SE
Chouteau 071-8	Floweree silty clay loam till substratum Aridic Haploborolls; fine-silty, mixed	18	11	12	15	Fair	90	Past E Present E	15x8	10-14	No	3100	2	SE
Chouteau 071-10	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	17	17	18	18	Good	100	Past E Present E	16x8	10-14	No	3160	4	S
Chouteau 071-11	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	18 18 18	13 13 12	14 14 13	16 15 14	Fair Fair Good	100 100 100	Past E Present E	24x7 24x7 24x7	10-14	No	3490	1	--
Chouteau 071-12	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	14 14	14.5 12	17 15	20 16	Good Good	100 100	Past E Present E	19x6 25x6	10-14	No	3207	2	S
Daniels 019-1	Williams loam Typic Argiborolls; fine-loamy, mixed	7	10.5	25	11	Good	100	Past E Present E	20x6	10-14	No	2300	1	--
Daniels 019-2	Zahill clay loam Typic Ustorthents; fine-loamy, mixed (calcareous)	15	10	12	10.5	Fair	100	Past E Present E	21x2.1	10-14	No	2300	3	E
Daniels 019-3	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	35 35	15 13	15 13	9.5 9.5	Fair Fair	90 90	Past E Present E	14x6 15x6	10-14	No	2300	--	W
Daniels 019-4	Dooley fine sandy loam Typic Argiborolls; fine-loamy, mixed	14	NOT MEASURED					Past E Present E	16x-	10-14	No	2300	1	E

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Daniels 019-5	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	13	12	16	10	Poor	100	Past E Present E	16x7½	10-14	No	2300	1	E
Daniels 019-6	Williams loam Typic Argiborolls; fine-loamy, mixed	20	19	19	20	Fair	80	Past E Present E	-x4	10-14	No	2300	1	S
Daniels 019-7	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	16	13	15	12	Fair	90	Past E Present E	16x6	10-14	No	2300	1	SW
Dawson 021-3	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	27 27	22 24.5	22 25	16 12	Fair Fair	90 90	P	10x6 10x6	13-14	Pos.	2800	1	-
Pondera 37-1	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	43	13	15	7	Poor	40	Past E Present G	18x5	12-14	No	3640	1	W
Pondera 37-3	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	34	14	14	10	Excellent	100	Past E Present P	4x6	13	No	3700	1	X
Pondera 37-5	Richey silty clay loam Aridic Haploborolls; fine, montmorillonitic	22	11	11	9	Good+	70	Past E Present E	12x8	13	No	3700	1	X
Pondera 37-11	Telstad silty clay loam Aridic Argiborolls; fine-loamy, mixed	37	24	25	13	Fair	80	Past E Present E	10x5	12-14	No	3750	1	X
Pondera 37-12	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	19	20	20	12	Fair	70	Past E Present E	15x8	12-14	No	3600	1	X
Richland 648-1	Havre Loam Ustic Torrifluvents; fine-loamy, mixed (calcareous), frigid	19	21	21	20	Good	80	--	14x6	12-14	Postn	2150	1	--

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13	5.7	7	8	Poor	80	P	10x10	12-14	Postn	2250	1	N
Richland 648-6	Williams loam Typic Argiborolls; fine-loamy, mixed	RUSSIAN OLIVE WENT OUT BY 1949 -												
Richland 648-7	Telstad loam Aridic Argiborolls; fine-loamy, mixed	30	12	12	9	Fair	90	P	21 x8	-	Postn	--	6	SE
Roosevelt 085-1	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	19	21	21	20	Fair	100	Past E Present E	12x4	10-14	Yes?	2375	2	S
Roosevelt 085-2	Parshall fine sandy loam, till substratum Pachic Haploborolls; coarse-loamy, mixed	22	15	15	15	Fair	100	Past E Present E	14x5	10-14	No	2375	2	W
Roosevelt 085-3	Williams loam Typic Argiborolls; fine-loamy, mixed	12	10	15	14	Good	100	Past E Present E	19x6	10-14	No	2375	1	N
Roosevelt 085-72-5	Williams sandy loam Typic Argiborolls; fine-loamy, mixed	21	11	11	10	Good	70	Past E Present G	12x7	13	No	1950	3	W
Roosevelt 085-72-13	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	-	16	--	10	Good	92	Past E Present G	21x8	13	No	1950	2	N
Roosevelt 085-72-15	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	22	-	--	29	Excellent	92	Past E Present G	15x7	13	No	1950	1	N
Sheridan 091-1	Williams loam Typic Argiborolls; fine-loamy, mixed	27 10	19 10	18 17	25 11	Fair Good	90 80	Past E Present G	26x7 24x7	10-14	No	2375	--	E

TABLE ONE
MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Sheridan 091-2	Williams loam Typic Argiborolls; fine-loamy, mixed	24 24	14 16	15 16	18 18	Excellent Excellent	80 80	Past E Present G	14x4 27x4	10-14	No	2375	0	--
Sheridan 091-3	Bowbells loam Pachic Agriborolls; fine-loamy, mixed	10	15	23	19	Good	70	Past E Present E	20x7	10-14	No	2375	1	W
Sheridan 091-4	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	23 23	19 20	19 20	25 19	Good Fair	80 80	Past G Present E	17x6 48x8	10-14	No	2375	4	W
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	15.2	21	9	Excellent	90	E	14x6	-	Postn	2850	9	SW
SPECIES: SIBERIAN ELM														
Cascade 7-4	Darret Loam Typic Argiborolls; fine, mixed	31	25	25	14	Fair+	80	Past F Present P	12x6	16-17	No	4160	9	N
Cascade 7-8	Absarokee loam Typic Argiborolls: fine, montmorillonitic	21 21	15 20	15 20	15 14	Poor Poor	80 68	Past G Present P	10x7 11x5	16	No	4200	5	NE
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24 24	23 25	23 25	16 15	Fair Fair	80 64	Past G Present G	19x7 10x7	17	No	4400	6	N
Cascade 7-14	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	28	21	20	12	Poor	72	Past E Present E	14x9	10-14	No	3400	2	N
Chouteau 071-1	Telstad loam Aridic Argiborolls fine-loamy, mixed	16 16	18 19	19 20	23 21	Good Fair	90 100	Past E Present E	20x14 20x14	15-19	No	3340	1	E
Chouteau 071-6	Farnuf loam Typic Argiborolls; fine-loamy, mixed	16 16	21 24	23 25	26 28	Good Fair	100 100	Past E Present E	20x10 20x10	15	No	3280	3	NE

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Daniels 019-1	Williams loam Typic Argiborolls; fine-loamy, mixed	7 7	16 17	31 32	15 16	Good Good	100 90	Past E Present E	19x6 20x6	10-14	No	2300	1	--
Daniels 019-2	Zahill clay loam Typic Ustorthents; fine-loamy, mixed (calcareous)	14	17	20	15.5	Fair	100	Past E Present E	30x6	10-14	No	2300	3	E
Daniels 019-3	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	35	21	20	17	Good	90	Past E Present E	15x8	10-14	No	2300	--	W
Daniels 019-6	Williams loam Typic Argiborolls; fine-loamy, mixed	20	19	19	23	Good	100	Past E Present E	17x10	10-14	No	2300	1	S
Daniels 019-7	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	16	18	20	19	Good	90	Past E Present E	17x6½	10-14	No	2300	1	SW
Dawson 021-3	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	27 27 27 27	-- -- 35.3 38	-- -- 30 32	-- -- -- --	Fair Fair Fair+ Fair+	80 80 70 80	P	10x6 10x6 10x6 10x6	12-14	Postn	2800	1	--
Pondera 37-3	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	34 34	13 11	12 12	12 6	Poor Poor	100 50	Past E Present P	12x8 12x8	13	No	3700	1	X
Pondera 37-5	Richey silty clay loam Aridic Haploborolls; fine, montmorillonitic	22	17	16	11	Fair	90	Past E Present E	12x8	13	No	3700	1	X
Pondera 37-4	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	31	--	--	--	Poor	--	Past F Present P	-x7	12	No	3700	1	--
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13 13	20.4 18	24 21	12 14	Fair Fair	90 90	P	10x10 10	12-14	Postn	2250	1	N

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Richland 648-7	Telstad loam Aridic Argiborolls; fine-loamy, mixed	30	28.6	29	22	Good+	100	P	21x8	--	Postn	--	6	SE
Roosevelt 085-1	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	19	31	32	26	Good	100	Past E Present E	12x12	10-14	Yes?	2375	2	S
Roosevelt 085-2	Parshall fine sandy loam, till substratum, Pachic Haploborolls; coarse-loamy, mixed	22	28	27	24	Good	100	Past E Present E	13x8	10-14	No	2375	2	W
Roosevelt 085-3	Williams loam Typic Argiborolls; fine-loamy, mixed	12	20	26	22	Good	100	Past E Present E	17x13	10-14	No	2375	1	N
Roosevelt 085-72-6	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	21	31	30	28	Good	80	Past E Present G	-x6	13	No	1950	0	Flat
Roosevelt 085-72-7	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	21	33	32	32	Good	68	Past E Present G	10x6	13	No	1950	--	--
Roosevelt 085-72-8	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	21	28	28	30	Fair to Good	64	Past E Present G	-x5	13	No	1950	1.5	N
Roosevelt 085-72-13	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	--	--	--	15 19 16	Good Good Good	96 100 92	Past E Present G	18x8 21x8 20x8	13	N	1950	2	N
Sheridan 091-2	Williams loam Typic Argiborolls; fine-loamy, mixed	24 24	22 21	22 20	17 19	Excellent Excellent	100 100	Past E Present G	20x7 13x7	10-14	No	2375	0	--
Sheridan 091-3	Bowbells loam Pachic, Argiborolls; fine-loamy, mixed	10 10	16 16	25 25	5 15	Good Good	90 70	Past E Present E	20x10 16x10	10-14	No	2375	1	W

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Sheridan 091-4	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	23	33	32	34	Good	90	Past G	24x5	10-14	No	2375	4	W
		23	32	31	23	Good	80	Present E	24x7					
Sheridan 091-5	Parshall fine sandy loam Pachic Haploborolls; coarse-loamy, mixed	17	28	30	20	Good	100	Past E	13x12	10-14	No	2375	4	N
		17	27	29	14	Good	100	Present E	15x12					
		17	23	25	16	Good	100		15x12					
		17	23	25	16	Good	90		15x12					
		17	23	25	16	Good	90		15x12					
		17	27	29	16	Good	90		13x12					
SPECIES: SIBERIAN PEASHRUB (CARAGANA)														
Broadwater 066-2	Manhattan sandy loam Typic Calciborolls; coarse-loamy, mixed	-	15	--	13.5	---	96	Past E Present G	8x-	11	No	3960	1	E
Cascade 7-1	Dutton silty clay loam Ustertic Argiborolls; fine, montmorillonitic	23	12	12	15	Excellent	80	Past E Present E	30x3	13	No	3700	3	N
Cascade 7-2	Cargill silty clay loam Borollic Calciorthids; fine-silty, mixed	35	13	12	17	Excellent	100	Past E Present E	10x5	13	No	3700	1	E
Cascade 7-3	Work clay loam Typic Argiborolls; fine, montmorillonitic	34	11	11	13	Excellent +	100	Past E Present P	14x3	16-17	No	4170	6	N
Cascade 7-4	Darret loam Typic Argiborolls; fine, mixed	31	11	11	15	Excellent +	90	Past F Present P	12x3	16-17	No	4160	9	N
Cascade 7-5	Kevin clay loam Aridic Argiborolls; fine-loamy, mixed	35	10.5	11	12	Excellent +	90	Past F	10x3	--	No	3250	2	W
		35	10	10	13	Excellent +	100	Present G						
Cascade 7-6	Scobey clay loam Aridic Argiboroll; fine, montmorillonitic	34	9	10	13	Excellent	80	Past G	12x3	14	No	3550	1	X
		34	11	11	16	Excellent	100	Present F						

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	/ Aspect
Cascade 7-7	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	45 45	12 14	12 14	11 16	Good + Excellent	70 100	Past E Present E	8x4	14	No	3500	1	X
Cascade 7-8	Absarokee loam Typic Argiborolls; fine, montmorillonitic	15 21 21 21	4 10 9 7	4 10 9 7	4 12 11 11	Poor Fair Fair Fair	60 100 100 100	Past G Present P	9x3 11x6 10.5x5 10x5	16	No	4200	5	NE
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24 24 24	13 18 20	13 18 20	13 15 20	Good Good Good	100 100 100	Past G Present G	13x3 12.5x4 11.5x3	17	No	4400	6	N
Cascade 7-10	Ipano channery light clay loam Typic Calciborolls; fine-loamy, mixed	15 15	8 8	8 8	9 8	Good Good	100 100	Past E Present E	14.5x 3.5 14.5	14-16	No	4050	1	S
Cascade 7-11	Work light clay loam Typic Argiborolls; fine, montmorillonitic	15 15	9 10	9 10	12 11	Good Good	100 96	Past E Present E	14.5x 3.5 14.5x4	14-16	Postn	4050	7	E
Cascade 7-12	Castner channery light clay loam Lithic Haploborolls; loamy, skeletal, mixed	15 15	8 8	8 8	9 9	Good Good	100 100	Past E Present E	14.5x 3.5 14.5	16	No	4050	1	S
Cascade 7-13	Kevin clay loam Aridic Argiborolls; fine-loamy, mixed	28	13	13	19	Good	96	Past E Present E	28x3	10-14	No	3400	3	S
Cascade 7-14	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	28 28	15 15	15 15	15 21	Good+ Good+	60 88	Past E Present E	14x 2.5 22x2.5	10-14	No	3400	2	N
Chouteau 071-1	Telstad loam Aridic Argiborolls; fine-loamy, mixed	16	12	13	12	Excellent	100	Past E Present E	20x 3.5	15-19	No	3340	1	E
Chouteau 071-2	Scobey clay loam Aridic Argiborolls; fine, montmorillonitic	18 18 18	11 11 10	12 12 11	9 10 16	Fair Fair Fair	90 90 90	Past E Present P	9.5x3 16 x3 16 x3	15-19	No	3420	3	NE

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Source Precip./	Other	Elevation	Slope %	/ Aspect
Chouteau 071-3	Brussett silty clay loam Aridic Argiborolls; fine-silty, mixed	18 18	7 8	7 8	7 11	Fair Good	100 80	Past E Present E	16x5.5 16x2.5	14	No	2980	1	S
Chouteau 071-4	Telstad loam Aridic Argiborolls; fine-loamy, mixed	43	13	13	19	Excellent	100	Past F Present G	27x3.5	15	No	3140	6	E
Chouteau 071-5	Kevin loam Aridic Argiborolls; fine-loamy, mixed	43	11	11	19	Good	90	Past E Present E	29x3.5	14	No	3140	2	N
Chouteau 071-6	Farnuf loam Typic Argiborolls; fine-loamy, mixed	16	10	10	13	Good	100	Past E Present E	20x3	15	No	3280	3	NE
Chouteau 071-7	Farland silt loam, till phase Typic Argiborolls; fine-silty, mixed	18	11	11	14	Good	100	Past E Present E	24x3	16	No	3420	4	SE
Chouteau 071-8	Floweree silty clay loam, till substratum Aridic Haploborolls; fine-silty, mixed	18	10	10	11	Fair	90	Past E Present E	21x5	10-14	No	3100	2	SE
Chouteau 071-9	Floweree silt loam Aridic Haploborolls; fine-silty, mixed	28	13	13	16	Good	100	Past E Present G	22x4	10-14	No	3040	1	S
Chouteau 071-11	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	18 18	12 12	12 12	14 14	Excellent Excellent	100 100	Past E Present E	24x4 24x4	10-14	No	3490	1	---
Chouteau 071-12	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	14	11	12	13	Good	90	Past E Present E	20x4	10-14	No	3207	2	S
Daniels 019-1	Williams loam Typic Argiborolls; fine-loamy, mixed	7	7.5	10	7	Good	90	Past E Present E	20x3	10-14	No	2300	1	---

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./ Other	Source	Elevation	Slope % /	Aspect
Daniels 019-2	Zahill clay loam Typic Ustorthents; fine-loamy, mixed mixed (calcareous)	14	9.5	11	11.5	Good	100	Past E Present E	16x3.5	10-14	No	2300	3	E
Daniels 019-3	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	35 35	9 11	9 11	18 18	Excellent Excellent	90 90	Past E Present E	9x3 13x3	10-14	No	2300	-	W
Daniels 019-4	Dooley fine sandy loam Typic Argiborolls; fine-loamy, mixed	14 14	8.5 8	10 10	12 12	Excellent Good	100 70	Past E Present E	16x4.5 14x6.8	10-14	No	2300	1	E
Daniels 019-5	Parshall fine sandy loam Pachic Haploborolls; coarse - loamy, mixed	13	9	10	11	Excellent	90	Past E Present E	16x3	10-14	No	2300	1	E
Daniels 019-6	Williams loam Typic Argiborolls; fine-loamy, mixed	20	13.5	14	15	Excellent	100	Past E Present E	17x2	10-14	No	2300	1	S
Daniels 019-7	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	16	12	13	14	Excellent	100	Past E Present E	14x3.5	10-14	No	2300	1	SW
Dawson 021-2	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	13 13	8.5 9.5	9 10	9 12	Good Excellent	100 100	E E	14x3 14x3	10-14	No	2800	2-3	SW
Dawson 021-3	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	29	9	8	8	Good	70	P	10x3	12-14	No	2800	1	---
Pondera 37-1	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	43	12	12	15	--	100	Past E Present G	9x2.5	12-14	No	3640	1	W
Pondera 37-2	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	46 46	11 11	11 11	11 11	Excellent Excellent	70 80	Past E Present F	20x3 20x3	12-14	No	3640	1	E
Pondera 37-3	Scobey silty clay loam Aridic Argiborolls, fine, montmorillonitic;	34 34	13.5 13.5	14 14	12 11	Excellent Excellent	100 100	Past E Present P	4x3 4x3	13	No	3700	1	X

TABLE ONE
MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Source Precip./	Other	Elevation	Slope %	/ Aspect
Pondera 37-4	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	31 31	11 11	11 11	7 11	Excellent + Excellent +	100 100	Past F Present P	4x3 4x3	12	No	3700	1	-
Pondera 37-5	Richey silty clay loam Aridic Haploborolls; fine, montmorillonitic	22	10	10	11	Excellent +	100	Past E Present E	12x3	13	No	3700	1	X
Pondera 37-7	Telstad clay loam Aridic Argiborolls; fine-loamy, mixed	31 31	10 10	10 10	13 14	Excellent Excellent	100 90	Past E Present E	14x4	12-14	No	3490	1	W
Pondera 37-8	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	29	11	11	18	Excellent	100	Past E Present E	12x3	12-14	Pos	3500	1	W
Pondera 37-10	Kevin silty clay loam Aridic Argiborolls; fine - loamy, mixed	26	NOT MEASURED			Good	---	Past E Present P	5x-	12-14	No	3700	1	S
Pondera 37-11	Telstad silty clay loam Aridic Argiborolls; fine-loamy, mixed	40 40	15 --	15 --	16 18	-- --	-- 70	Past E Present E	10x3	12-14	No	3750	1	X
Pondera 37-12	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	19	13	13	16	Excellent	100	Past E Present E	15x3	12-14	No	3600	1	X
Richland 648-1	Havre loam Ustic Torrifluvents; fine-loamy, mixed (calcareous), frigid	19	9	9	8	Good	90	----	14x2	12-14	Pos	2150	1	--
Richland 648-2	Zahill clay loam Typic Ustorthents; fine-loamy, mixed (calcareous)	24	10	10	12	Good+	100	P	15x3	12-14	No	2350	3	SE
Richland 648-3	Telstad loam Aridic Argiborolls; fine-loamy, mixed	25	12	12	13	Good	90	---	14x3	12-14	No	2350	5	W

TABLE ONE
MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Source Precip./ Other	Elevation	Slope % /	Aspect
Richland 648-4	Williams loam Typic Argiborolls; fine-loamy, mixed	13	7	7	5	Fair	100	P	10x5	12-14 No	2250	1	N
Richland 648-6	Williams loam Typic Argiborolls; fine-loamy, mixed	14	10	11	10	Excellent	95	E	16x3	12-14 No	2300	1	--
Roosevelt 085-72-2	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	13	11	13	11	Good*	76	Past E Present E	12x3	13 No	1950	2	S
Roosevelt 085-72-4	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	13	10	15	10	Good	88	Past E Present G	12x3	13 No	1950	0	--
Roosevelt 085-72-12	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	6	6	10	7.5	Fair	96	Past E Present E	5x1.5	13 No	1350	1.5	E
Roosevelt 085-72-14	Tally sandy loam Typic Haploborolls; coarse-loamy, mixed	13	9	10	9	Good**	96	Past E Present G	12x3	13 No	1950	--	N
Sheridan 091-1	Williams loam Typic Argiborolls; fine-loamy, mixed	27 27 27 -- 27 27	14 13 12 7 12 10	14 13 12 -- 12 10	17 17 15 11 16 13	Good Good Good Good Good Good	100 100 100 90 100 100	Past E Present G	24x4 16.5x8.5 15.5x8.5 10x- 6x4.5 15.5x4.5	10-14 No	2375	--	E
Sheridan 091-3	Bowbells loam Pachic Argiborolls; fine-loamy, mixed	10	10	13	12	Good	100	Past E Present E	20x4	10-14 No	2375	1	W
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	9.5	11	10	Excellent	100	E	14x3.5	--- No	2850	9	SW

* Grasshoppers eating much foliage 4th row in from west
** Excellent except for current grasshopper damage

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
SPECIES: BLUE SPRUCE														
Broadwater 066-2	Manhatten sandy loam Typic Calciborolls; coarse-loamy, mixed	--	17	--	10	--	92	Past E Present G	--	11	No	3960	1	E
Cascade 7-9	Work loam Typic Argiborolls; fine, montmorillonitic	24	23	20	14	Good	100	Past G Present G	4x7	17	No	4400	6	N
Cascade 7-10	Ipano channery light clay loam Typic Calciborolls; fine-loamy, mixed	15	2.5	--	3	Poor	56	Past E Present E	14x6	14-16	No	4050	1	S
Cascade 7-11	Work light clay loam Typic Argiborolls; fine, montmorillonitic	15	4	6	5	Fair	100	Past E Present E	14x5	14-16	Pos	4050	7	E
Chouteau 071-7	Farland silty loam till phase Typic Argiborolls; fine-silty, mixed	18	13	15	10	Excellent	100	Past E Present E	17x10	16	No	3420	4	SE
Chouteau 071-10	Floweree silty clay loam Aridic Haploborolls; fine-silty, mixed	17	12	15	8	Good	80	Past E Present E	14x8	10-14	No	3160	4	S
Daniels 019-7	Bearpaw clay loam Typic Argiborolls; fine, montmorillonitic	16 16	15 10	19 13	10 7	Good Excellent	90 100	Past E Present E	17x12 16x7.5	10-14	No	2300	1	SW
Dawson 021-2 (White Sprc)	Cherry silt loam Typic Ustochrepts; fine-loamy, mixed, frigid	13	11	16	7.5	Excellent	80	E	14x8	10-14	Pos	2800	2-3	SW
Pondera 37-2	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	17 17	13 8	15 10	6 4	Excellent Excellent+	100 100	Past E Present G	7x2.5 4x2.5	12-14	No	3640	1	E
Pondera 37-3	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	34	15	9	7	Poor	40	Past E Present P	12x10	13	No	3700	1	X

TABLE ONE

MONTANA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance	Row Spacings	Moisture Precip. / Source Other	Elevation	Slope %	/ Aspect
Pondera 37-4	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	31	17	12	8	Good	80	Past F Present P	12x10	12 / No	3700	1	--
Pondera 37-8 (Blue Sprc)	Scobey silty clay loam Aridic Argiborolls; fine, montmorillonitic	29 29	21 25	14 17	10 17	Excellent Excellent	70 90	Past E Present E	12x6	12-14 / Pos	3500	1	W
Pondera 37-11	Telstad silty clay loam Aridic Argiborolls; fine-loamy, mixed												
Blackhills Spruce - - - - - - - - - - -		-37	29	16	16	Excellent	70	Past E	10x10	12-14 / No	3750	1	X
Blue Spruce - - - - - - - - - - - - - -		-37	32	15	16	Excellent	100	Present E	11x10				
Richland 648-4 (Blue Sprc)	Williams loam Typic Argiborolls; fine-loamy, mixed	13 13 13	-- -- 9.6	-- -- 15	-- -- 9	-- -- Fair	0 0 70	P	10x10 10x10 10x10	12-14 / Pos	2250	1	N
Richland 648-5 (White Sprc)	Kevin loam Aridic Argiborolls; fine-loamy, mixed	32	26.5	17	--	Poor	--	E	9x5	-- / Pos	--	3	NW
Roosevelt 085-2	Parshall fine sandy loam, till substratum Pachic Haploborolls; coarse-loamy, mixed	22	17	15	9	Excellent	100	Past E Present E	13x6.5	10-14 / No	2375	2	W
SPECIES: TATARIAN HONEYSUCKLE													
Chouteau 071-11	Floveree silty clay loam Aridic Haploborolls; fine-silty, mixed	-- --	7 7		-- --	Good Good	100 100	Past E Present E	30x8 16x8	10-14 / No	3490	1	--
Roosevelt 085-2	Parshall fine sandy loam, till substratum Pachic Haploborolls; coarse-loamy, mixed	22	9		13	Good	100	Past E Present E	16x2.5	10-14 / No	2375	2	W
Roosevelt 085-72-13	Parshall sandy loam Pachic Haploborolls; coarse-loamy, mixed	--	9		10	Excellent	96	Past E Present G	16.5x2	13 / No	1950	2	N

TABLE TWO

MONTANA DATA--IRRIGATED

TABLE TWO
MONTANA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
SPECIES: COMMON LILAC														
Pondera 37-9	Marias silty clay Ustertic Torriorthents; fine, montmorillonitic (calcareous), frigid	5	7		6	-	80	Past E Present E	14x3	12-14	Irr	3600	1	X
SPECIES: COTTONWOOD														
Pondera 37-6	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	23	48	44	25	Excellent	?	Past E Present E	10x35	12-14	Irr	----	1	X
Pondera 37-9	Marias silty clay loam Ustertic Torriorthents; fine, montmorillonitic (calcareous), frigid	21 21	54 57	51 54	21 17	Excellent Excellent	90 100	Past E Present E	17x16 17x16	12-14	Irr	3600	1	X
Richland 648-8	Cherry silt loam Typic Ustochrepts; fine-silty, mixed, frigid	--	--	--	--	--	0	F	--	12-14	Irr	2050	2-3	E
SPECIES: GOLDEN WILLOW														
Dawson 021-4	Kremlin loam Aridic Argiborolls; fine-loamy, mixed	7 7	-- --		16 15	Excellent Excellent	90 90	F	12x4 12x4	12-14	Irr	2650	1	--
Pondera 37-6	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	23	32		14	Good+	90	Past E Present E	10x3.5	12-14	Irr	----	1	X
Pondera 37-9	Marias silty clay Usteric Torriorthents; fine, montmorillonitic (calcareous), frigid	21 21	32 28		14 12	Good Good+	100 100	Past E Present E	8x8 8x8	12-14	Irr	3600	1	X

TABLE TWO
MONTANA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
SPECIES: GREEN ASH														
Broadwater 066-1	Lohmiller Variant silty clay Ustic Torrifluvents; fine, montmorillonitic (calcareous), mesic	18	28	25	20	--	100	Past E Present G	8x8	11	Irr	3900	2	NE
Dawson 021-1	Havrelon silt loam, fan Typic Ustochrepts; fine-loamy mixed (calcareous), frigid	8 8 8	14.4 ---- ----	25	6 - -	Excellent ---- ----	100 -- --	G ---- ----	15x10 15x10	10-14	Irr	2650	2	SE
Pondera 37-9	Marias silty clay Ustertic Torriorthents; fine, montmorillonitic (calcareous)	5	8	20	--	----	--	Past E Present E	-x8	12-14	Irr	3600	1	X
Richland 648-8	Cherry silt loam Typic Ustochrepts; fine-silty, mixed, frigid	8 8	11.7 6.4	20 10	6 6	Excellent Excellent	--- ---	F	21x10 13x10	12-14	Irr	2050	2-3	E
SPECIES: ROCKY MOUNTAIN JUNIPER														
Pondera 37-9	Marias silty clay- Ustertic Torriorthents; fine, montmorillonitic (calcareous), frigid	5	7	20	6	--	80	Past E Present E	-x4	12-14	Irr	3600	1	X
SPECIES: RUSSIAN-OLIVE														
Pondera 37-9	Marias silty clay- Ustertic Torriorthents; fine, montmorillonitic (calcareous), frigid	5	13	25	13	--	90	Past E Present E	14x5	12-14	Irr	3600	1	X
Richland 648-8	Cherry silt loam Typic Ustochrepts; fine-silty, mixed, frigid	14 14	9 8.5	11 11	10 10	Good Good	100 80	F	13x8 14x8	12-14	Irr	2050	2-3	E
SPECIES: SIBERIAN ELM														
Dawson 021-4	Kremlin loam- Aridic Argiborolls; fine-loamy, mixed	7	--	--	18	Excellent	100	F	12x6	12-14	Irr	2650	1	--

TABLE TWO

MONTANA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
Pondera 37-7	Telstad clay loam Aridic Argiborolls; fine-loamy, mixed	31 31	9 8	10 9	11 11	Poor Poor	90 90	Past E Present E	14x8 14x8	12-14	Irr	3490	1	W
Pondera 37-10	Kevin silty clay loam Aridic Argiborolls; fine-loamy, mixed	26 26 26	22 28 23	21 27 23	9 9 6	Poor Poor Poor	80 60 50	Past E Present P	10x6 10x6 10x6	12-14	Irr	3700	1	S
Richlan 648-8	Cherry silt loam Typic Ustochrepts; fine-silty, mixed, frigid	14 14	17.6 19.2	20 21	12 16	Good - Good -	80 80	F	14x10 21x10	12-14	Irr	2050	2-3	E
Wibaux 55-1	Chama loam Typic Haploborolls; fine-silty, mixed	12	26	32	19	Good	100	E	14x8	--	Irr	2850	9	SW
SPECIES: SIBERIAN PEASHRUB														
Broadwater 066-1	Lohmiller Variant sic. Ustic Torrifluvents; fine, montmorillonitic (calcareous), mesic	18	14	14	8.5	---	100	Past E Present G	8x2	11	Irr	3900	8	NE
Dawson 021-1	Havrelon silt loam, fan Typic Ustifluvents; fine-loamy, mixed (calcareous), frigid	8 8	8 9	11 12	7 8	Good Good	90 90	G	15x2 15x2	10-14	Irr	2650	2	SE
Dawson 021-4	Kremlin loam Aridic Argiborolls; fine-loamy, mixed	7	5	7	5	Fair	85	F	12x4	12-14	Irr	2650	1	--
Pondera 37-6	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	23	12	12	14	Excellent	100	Past E Present E	10x3	12-14	Irr	---	1	X

TABLE TWO
MONTANA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Mainten-ance	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope % /	Aspect
SPECIES: BLUE SPRUCE														
Broadwater 066-1	Lohmiller Variant silty clay Ustic Torrifluvents; fine, montmorillonitic (calcareous), mesic	18 18	18 21	20 24	9 11	-- --	100 96	Past E Present G	8x8 8x8	11	Irr	3900	8	NE
Pondera 37-6 (Blue Sprc)	Ethridge silty clay loam Aridic Argiborolls; fine, montmorillonitic	23	14	12	6	Excellent+	100	Past E Present E	11x6	12-14	Irr	----	1	X

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: AMERICAN ELM															
Burleigh 015-966	Williams loam Typic Argiborolls fine-loamy, mixed	16	24	27	18	Good	72	G	F	11x4	15.4	No	1900	02	NW
Mercer 057-3610	Williams loam Typic Argiborolls fine-loamy, mixed	3	8	31	-	Good	100	G	G	-x3	13.8	-	2000	-	-
Mercer 057-3612	Williams loam Typic Argiborolls fine-loamy, mixed	3	11	35	-	Good	100	G	G	-x3	13.8	-	2000	-	-
Stark 089-3209	Morton loam Typic Argiborolls fine-silty, mixed	23	33	28	-	--	--	G	G	-x-	15.3	No	2450	02	W
Ward 101-3371	Zahl loam Entic Haploborolls fine-loamy, mixed	15	13	15	11	Good	90	G	G	12x5	15.5	No	2000	10	-
SPECIES: AMERICAN PLUM															
Burleigh 015-102	Parshall fine sandy loam Pachic Haploborolls coarse-loamy, mixed	19	10		12	Good	80	E	F	12x4	15.4	No	1750	00	X
Stark 089-2677	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	16	9		12	Good	96	G	G	14x14	15.3	No	2500	01	S
Ward 101-3395	Zahl loam Entic Haploborolls fine-loamy, mixed	13	5		5	Fair	96	G	G	14x3	15.5	No	1625	10	E

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: BOX ELDER															
McLean 055-3827	Williams loam Typic Argiborolls fine-loamy, mixed	50	27	--	--	--	--	--	--	--	15.3	No	2050	02	X
SPECIES: CHINESE ELM															
McIntosh 051-1915	Bearpaw silt loam Typic Argiborolls fine, montmorillonitic	25	15	15	--	Fair	19	F	P	10x4	16.9	No	2000	03	N
SPECIES: COMMON CHOKECHERRY															
McIntosh 051-1905	Bearpaw silt loam Typic Argiborolls fine, montmorillonitic	27	8	-	-	Good	83	G	F	10x4	16.9	No	2000	02	S
McIntosh 051-1930	Bearpaw silt loam Typic Argiborolls fine, montmorillonitic	28	12	-	-	Fair	67	G	G	10x3	16.9	No	2000	01	X
SPECIES: COMMON LILAC															
McLean 055-1872	Arnegard loam Pachic Haploborolls fine-loamy, mixed	10	8	-	8	Good	92	G	G	13x3	15.3	Pos	1950	-	NW
SPECIES: DAHURIAN BUCKTHORN															
Burleigh 015-58	Lihen loamy fine sand Entic Haploborolls sandy, mixed	6	4		-	Good	80	E	G	-x4	15.4	No	1650	02	X
Burleigh 015-64	Lihen loamy fine sand Entic Haploborolls sandy, mixed	6	4		-	Good	100	E	G	-x4	15.4	No	1650	02	X
Burleigh 015-3184	Lihen loamy fine sand Entic Haploborolls sandy, mixed	6	4		-	-	100	G	G	10x4	15.4	No	1650	02	X
Hettinger 041-1459	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	21	10		13	Fair	52	G	G	11x5	15.3	No	2540	02	SW

TABLE THREE
NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	Aspect
Hettinger 041-1470	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	20	10		13	Good	92	G	F	14x4	15.3	No	2480	03	NE
Hettinger 041-1477	Morton loam Typic Argiborolls fine-silty, mixed	21	10		14	Good	96	G	G	12x3	15.3	No	2480	02	SE
SPECIES: COTTONWOOD															
McLean 055-3828	Williams loam Typic Argiborolls fine-loamy, mixed	50	68	50	-	-	-	-	-	-	15.3	No	2050	02	X
Mercer 057-3615	Williams silt loam Typic Argiborolls fine-loamy, mixed	50	62	50	-	-	-	-	-	-	13.8	-	1960	-	-
Slope 087-3870	Sen silt loam Typic Haploborolls fine-silty, mixed	25	35	30	-	-	-	-	-	-x-	14.9	-	2700	-	-
Stark 089-3191	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	45	42	33	--	Good	100	G	G	-x-	15.3	Pos	2200	02	NE
Stark 089-3219	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	-	67	-	-	-	-	G	G	-x-	15.3	No	2650	02	NW
Stark 089-3871	Grail silt loam Pachic Argiborolls fine, montmorillonitic	50	50	40	--	--	-	-	-	-x-	15.3	--	2500	-	-
Ward 101-3313	Williams loam Typic Argiborolls fine-loamy, mixed	27	65	58	--	Good	-	G	G	-x-	15.5	Pos	1720	03	E
SPECIES: EASTERN REDCEDAR															
Burleigh 015-70	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	21	14		9	Fair	90	E	E	12x8	15.4	Pos	1750	01	E

TABLE THREE
NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip./	Source Other	Elevation	Slope %	Aspect
SPECIES: GREEN ASH															
Burleigh 015-89	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	23	32	28	12	Good	100	E	E	10x6	15.4	Pos	1750	02	W
Burleigh 015-122	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	24	26	23	10	Fair	90	E	E	14x6	15.4	Pos	1750	01	N
Burleigh 015-3179	Lihen loamy fine sand Entic Haploborolls sandy, mixed	60	50	-	24	Good	50	G	G	8x6	15.4	Pos	1750	01	N
McIntosh 051-1922	Bearpaw silt loam Typic Argiborolls fine, montmorillonitic	25	23	21	9	Fair	100	F	P	10x6	16.9	No	2000	03	N
McLean 055-3829	Williams loam Typic Argiborolls fine-loamy, mixed	50	25	25	-	--	-	-	-	--	15.3	No	2050	02	X
Mountrail 061-2038	Zahl loam Entic Haploborolls fine-loamy, mixed	35	-	-	-	--	100	F	P	10x10	13.4	No	2000	-	-
Olluer 065-2047	Morton loam Typic Argiborolls fine-silty, mixed	45	-	-	-	Good	100	G	G	12x10	15.1	No	1966	02	S
Stark 089-3193	Grail silty clay loam Pachic Argiborolls fine, montmorillonitic	53	29	27	-	Good	100	F	F	40x10	15.3	Pos	2250	02	E
Stark 089-3194	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	60	42	-	-	--	-	F	P	-x-	15.3	Pos	2250	01	NE
Stark 089-3201	Grail silt loam Pachic Argiborolls fine, montmorillonitic	40	32	35	-	--	-	G	G	-x-	15.3	Pos	2500	01	NE
Stark 089-3239	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	28	32	32	-	--	-	G	G	12x12	15.3	No	2700	02	E

TABLE THREE
NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Stark 089-3508	Morton silt loam Typic Argiborolls fine-silty, mixed	60	38	-	-	-	-	G	G	10x3	15.3	Pos	2200	07	-
SPECIES: PONDEROSA PINE															
Stark 089-3260	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	25	23	22	-	--	-	G	G	-x-	15.3	No	2460	02	SW
SPECIES: RUSSIAN OLIVE															
Burleigh 015-113	Williams loam Typic Argiborolls fine-loamy, mixed	14	15	18	11	Good	100	G	G	11x3	15.4	No	1750	04	E
Burleigh 015-982	Williams loam Typic Argiborolls fine-loamy, mixed	21	17	16	15	Good	73	G	G	18x8	15.4	No	1800	01	N
Burleigh 015-987	Williams loam Typic Argiborolls fine-loamy, mixed	18	18	17	11	Good	56	G	G	12x12	15.4	No	1800	02	S
Stark 089-3197	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	20	21	21	-	--	-	G	G	12x-	15.3	No	2200	05	NE
Ward 101-3339	Williams loam Typic Argiborolls fine-loamy, mixed	20	20	20	-	Good	100	G	G	12x4	15.5	Pos	1720	04	W
Williams 105-3403	Bowbells loam Pachic Argiborolls fine-loamy, mixed	20	17	17	14	Good	100	G	F	14x3	14.6	No	2000	05	-
SPECIES: SIBERIAN ELM															
Bowman 011-803	Tally fine sandy loam Typic Haploborolls coarse-loamy, mixed	25	33	31	--	Good	--	G	G	13x13	14.7	No	2750	04	NW
Burleigh 015-80	Arnegard loam Pachic Haploborolls fine-loamy, mixed	15	25	26	17	Good	90	E	E	13x7	15.4	Pos	1750	02	SE

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Hettinger 041-1500	Morton silt loam Typic Argiborolls fine-silty, mixed	21	24	22	15	Fair	80	G	G	12x5	15.3	No	2480	04	E
Stark 089-3190	Grail silt loam Pachic Argiborolls fine, montmorillonitic	20	34	34	28	Good	100	G	G	15x15	15.3	Pos	2300	02	SE
Stark 089-3205	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	23	24	24	-	--	-	G	G	-x-	15.3	Pos	2450	01	E
Stark 089-3216	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	15	27	30	-	--	-	G	G	12x10	15.3	No	2600	03	S
Stark 089-3221	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	23	33	32	-	--	-	G	G	15x-	15.3	No	2600	02	W
Stark 089-3233	Morton silt loam Typic Argiborolls fine-silty, mixed	8	22	32	-	--	-	G	G	12x6	15.3	No	2550	05	NE
Stark 089-3245	Regent silty clay Typic Argiborolls fine, montmorillonitic	13	21	25	-	--	-	G	G	-x-	15.3	No	2550	04	S
SPECIES: SIBERIAN PEASHRUB															
Bowman 011-820	Chama silt loam Typic Haploborolls fine-silty, mixed	16	9	9	-	--	-	G	G	12x3	14.7	No	2750	03	N
Bowman 011-825	Farland silt loam Typic Argiborolls fine-silty, mixed	17	10	10	-	Good	80	G	G	10x3	14.7	No	2750	01	S
Bowman 011-841	Grail silt loam Pachic Argiborolls fine, montmorillonitic	26	13	12	-	--	80	G	G	-x3	14.7	Pos	2750	01	S
Burleigh 015-55	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	10	10	12	8	Good	90	E	E	12x3	15.4	Pos	1990	02	X

TABLE THREE
NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Burleigh 015-84	Arnegard loam Pachic Haploborolls fine-loamy, mixed	15	10	11	10	Good	90	E	E	12x4	15.4	Pos	1750	02	SE
Burleigh 015-957	Williams loam Typic Argiborolls fine-loamy, mixed	19	10	10	8	Good	55	G	G	12x3	15.4	No	1800	02	N
Burleigh 015-972	Williams silt loam Typic Argiborolls fine-loamy, mixed	19	10	10	8	Good	84	G	G	10x2	15.4	No	1800	04	E
Burleigh 015-996	Williams loam Typic Argiborolls fine-loamy, mixed	16	11	12	10	Good	88	G	G	12x3	15.4	No	1920	02	--
Burleigh 015-1004	Williams loam Typic Argiborolls fine-loamy, mixed	23	13	13	11	Good	92	G	P	11x3	15.4	No	1800	04	E
Divide 023-1278	Williams loam Typic Argiborolls fine-loamy, mixed	18	12	13	11	Good	100	G	G	16x2	14.1	No	2100	04	NW
Divide 023-1286	Williams loam Typic Argiborolls fine-loamy, mixed	17	12	13	13	Good	88	G	G	12x3	14.1	No	1900	00	X
Divide 023-1291	Williams loam Typic Argiborolls fine-loamy, mixed	18	12	13	11	Fair	100	F	P	12x3	14.1	No	2000	01	S
Divide 023-1297	Williams loam Typic Argiborolls fine-loamy, mixed	16	9	10	9	Good	80	G	G	10x2	14.1	No	2000	03	NE
Divide 023-1305	Williams loam Typic Argiborolls fine-loamy, mixed	35	14	13	10	Good	100	G	G	12x3	14.1	No	2100	02	W
Golden Valley 033-586	Sen silt loam Typic Haploborolls fine-silty, mixed	35	13	12	12	Good	92	G	P	15x3	13.8	Pos	2550	01	NW

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Golden Valley 033-592	Sen silt loam Typic Haploborolls fine-silty, mixed	36	10	9	11	Good	40	F	P	13x6	13.8	Pos	2550	01	NW
Golden Valley 033-597	Sen silt loam Typic Haploborolls fine-silty, mixed	30	13	12	11	Good	92	G	P	15x3	13.8	No	2550	04	NE
Golden Valley 033-605	Sen silt loam Typic Haploborolls fine-silty, mixed	38	13	12	9	Good	100	E	F	12x3	13.8	No	2550	02	NW
Golden Valley 033-614	Sen silt loam Typic Haploborolls fine-silty, mixed	30	13	12	15	Good	84	E	P	14x3	13.8	No	2550	04	SW
Hettinger 041-1455	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	20	12	12	14	Good	84	G	F	13x4	15.3	Pos	2480	01	S
Hettinger 041-1483	Morton silt loam Typic Argiborolls fine-silty, mixed	31	12	11	15	Fair	84	G	P	10x3	15.3	No	2500	03	S
Hettinger 041-1490	Morton silt loam Typic Argiborolls fine-silty, mixed	19	14	14	14	Good	100	G	G	12x5	15.3	No	2550	04	W
Hettinger 041-1495	Morton silt loam Typic Argiborolls fine-silty, mixed	24	11	10	10	Good	68	G	F	15x4	15.3	No	2550	04	W
McLean 055-1850	Parshall silt loam Pachic Haploborolls coarse-loamy, mixed	12	9	10	9	Fair	100	G	G	14x3	15.3	No	1850	04	W
Mercer 057-3614	Williams loam Typic Argiborolls fine-loamy, mixed	3	6	12	-	Good	90	G	G	-x2	13.8	-	2000	-	-
Mercer 057-3759	Williams loam Typic Argiborolls fine-loamy, mixed	15	12	13	12	Good	100	G	P	12x3	13.8	No	1850	04	W

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Morton 059-3155	Tally fine sandy loam Typic Haploborolls coarse-loamy, mixed	16	8	8	-	--	90	G	G	10x3	15.2	No	1650	02	E
Morton 059-3163	Tally fine sandy loam Typic Haploborolls coarse-loamy, mixed	16	6	6	--	--	70	G	G	10x3	15.2	No	1900	02	E
Mountrail 061-2005	Zahl loam Entic Haploborolls fine-loamy, mixed	24	12	12	8	Good	100	G	G	14x3	13.4	No	2000	-	-
Mountrail 061-2017	Zahl loam Entic Haploborolls fine-loamy, mixed	30	-	-	-	Poor	88	F	P	14x-	13.4	No	2000	-	NW
Mountrail 061-2019	Zahl loam Entic Haploborolls fine-loamy, mixed	19	2	-	-	Poor	34	F	P	14x3	13.4	No	2000	-	SW
Mountrail 061-2032	Zahl loam Entic Haploborolls fine-loamy, mixed	35	7	7	4	Good	100	F	P	10x2	13.4	No	2000	-	-
Olluer 065-2058	Williams loam Typic Argiborolls fine-loamy, mixed	29	2	-	2	Poor	50	P	P	12x3	15.1	No	1966	04	S
Stark 089-2680	Savage silty clay loam Typic Argiborolls fine-montmorillonitic	15	10	11	14	Good	100	G	F	14x3	15.3	Pos	2500	01	SE
Stark 089-2687	Morton silt loam Typic Argiborolls fine-silty, mixed	18	11	11	14	Good	96	G	G	13x4	15.3	No	2500	03	E
Stark 089-3202	Grail silt loam Pachic Argiborolls fine, montmorillonitic	4	5	10		Good		G	G	6x6	15.3	Pos	2450	03	W
Stark 089-3248	Arnegard loam Pachic Haploborolls fine-loamy, mixed	31	12	12	-	--	--	G	G	-x-	15.3	Pos	2460	02	S

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Ward 101-154	Arnegard loam Pachic Haploborolls fine-loamy, mixed	24	14	14	12	Good	100	E	G	14x2	15.5	Pos	1720	02	NW
Ward	Arnegard loam Pachic Haploborolls fine-loamy, mixed	24	-	-	13	Good	100	G	G	14x3	15.5	Pos	1720	00	X
Ward 101-3327	Bowbells loam Pachic Argiborolls fine-loamy, mixed	20	12	12	16	Good	100	G	G	12x3	15.5	Pos	1830	01	X
Ward 101-3352	Zahl loam Entic Haploborolls fine-loamy, mixed	20	7	7	--	--	-	G	F	10x3	15.5	No	2000	10	-
Ward 101-3365	Zahl loam Entic Haploborolls fine-loamy, mixed	15	8	8	6	Good	100	G	G	12x2	15.5	No	2000	10	-
Ward 101-3379	Zahl loam Entic Haploborolls fine-loamy, mixed	15	9	9	8	Good	96	G	G	24x3	15.5	No	1500	12	W
Ward 101-3384	Zahl loam Entic Haploborolls fine-loamy, mixed	10	6	7	4	Good	96	G	G	12x3	15.5	No	1500	07	N
Ward 101-3390	Zahl loam Entic Haploborolls fine-loamy, mixed	13	7	8	6	Fair	72	F	P	15x4	15.5	No	1650	10	-
Williams 105-3410	Bowbells loam Pachic Argiborolls fine-loamy, mixed	17	8	8	7	Good	76	G	F	14x3	14.6	-	2280	05	-
SPECIES: SILVER BUFFALO BERRY															
Burleigh 015-871	Lihen fine sandy loam Entic Haploborolls sandy, mixed	8	8		6	--	90	G	G	12x4	15.4	Pos	1700	07	-

TABLE THREE

NORTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Burleigh 015-877	Savage silt loam Typic Argiborolls fine, montmorillonitic	8	8		6	Good	80	G	G	12x4	15.4	Pos	1700	01	-
Burleigh 015-883	Savage silt loam Typic Argiborolls fine, montmorillonitic	8	10		8	Good	100	G	G	12x4	15.4	No	1700	01	-

TABLE FOUR

NORTH DAKOTA DATA--IRRIGATED

TABLE FOUR

NORTH DAKOTA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: AMERICAN ELM															
Stark 089-3520	Savage silty clay loam Typic Argiborolls fine, montmorillonitic	60	28	-	-	-	-	G	G	-x-	15.3	WRT	2500	01	X
Stark 089-3523	Havrelon clay loam Typic Ustifluvents fine-loamy, mixed (calcareous), frigid	60	37	-	-	-	-	G	G	-x-	15.3	WRT	2550	01	X
SPECIES: COTTONWOOD															
Olluer 065-3263	Havrelon silt loam Typic Ustifluvents fine-loamy, mixed (calcareous), frigid	90	-	-	-	-	-	G	G	-x-	15.1	WRT	1700	01	X
Stark 089-3192	Havrelon silt clay loam Typic Ustifluvents fine-loamy, mixed (calcareous), frigid	23	42	-	-	-	-	G	G	-x-	15.3	WRT	2250	01	X
Stark 089-3200	Arnegard loam Pachic Haploborolls fine-loamy, mixed	40	71	-	-	-	-	G	G	6x6	15.3	WRT	2350	02	X
SPECIES: GREEN ASH															
Burleigh 015-109	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	40	34	-	8	Fair	-	G	G	10x6	15.4	WRT	1750	-	-
SPECIES: SIBERIAN PEASHRUB															
Bowman 011-818	Arnegard loam Pachic Haploborolls fine-loamy, mixed	42	15	-	-	--	-	G	G	15x2	14.7	WRT	2750	02	W

TABLE FOUR
NORTH DAKOTA DATA--IRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Bowman 011-832	Arnegard silt loam Pachic Haploborolls fine-loamy, mixed	26	9	-	-	-	80	G	G	15x2	14.7	WRT	2750	01	E
Williams 105-3416	Bowbells silt loam Pachic Argiborolls fine-loamy, mixed	20	12	-	14	Good	100	G	P	12x4	14.6	IRR	2200	02	S

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: AMERICAN ELM															
Butte 019-144	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	26	18	14	5	Fair	50	G	P	10x8	15-16	No	2915	2	NW
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	20	13	-	Fair	-	G	F	10x5	17	No	2100	2	SE
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	22	25	12	Good	100	E	E	14x6	16	Pos	1880	1	-
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	23	26	-	-	90	E	E	14x-	16	Pos	1880	1	-
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	13	15	6	-	40	G	G	14x6	16	No	1880	4	E
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	16	19	9	Fair	50	G	G	14x6	16	No	1880	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	20	28	9	-	70	G	G	16x8	16	No	1860	4	E
SPECIES: AMERICAN PLUM															
Sully 119-6	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	-		5	-	-	G	F	14x4	16	No	1920	4	E
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	-		8	Good	48	G	F	14x4	16	Pos	1920	1	-
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	10		6	Good	100	E	E	14x3	16	Pos	1880	1	-

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	8		10	Fair	50	G	G	14x4	16	No	1880	4	E
SPECIES: BOX ELDER															
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	15	30	14	Poor	84	G	F	30x-	12-13	No	3200	3	SW
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	15	30	14	Poor	84	G	F	10x-	12-13	No	3200	3	SW
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	33	50	13	Good	-	G	F	10x6	12-13	Pos	2900	2	-
Butte 019-143	Morton silt loam Typic Argiborolls fine-silty, mixed	36	8	18	6	Poor	39	G	F	10x6	12-13	No	2900	3	SW
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	10	27	7	Fair	68	G	E	14x8	16	Pos	1920	1	-
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	-	-	14	Fair	80	E	E	14x6	16	Pos	1880	1	-
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	-	-	14	Fair	80	F	F	14x6	16	Pos	1880	1	-
SPECIES: DAHURIAN BUCKTHORN															
Sully 119-8	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	-	-	10	Good	-	E	E	16x4	16	No	1920	1	-

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: GREEN ASH															
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	15	15	9	Poor	88	G	F	11x6	12-13	No	3200	3	SW
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	13	13	7	Poor	68	G	F	11x6	12-13	No	3200	3	SW
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	-	-	-	-	-	G	F	10x6	12-13	Pos	2900	2	-
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	-	-	-	-	-	G	F	10x6	12-13	Pos	2900	2	-
Butte 019-143	Morton silt loam Typic Argiborolls fine-silty, mixed	36	11	12	10	Fair	76	G	F	10x6	12-13	No	2900	3	SW
Butte 019-143	Morton silt loam Typic Argiborolls fine-silty, mixed	36	13	13	10	Fair	84	G	F	10x6	12-13	No	2900	3	SW
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	10	10	8	Poor	92	G	F	15x6	12-13	Pos	3300	4	E
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	13	13	10	Poor	92	G	F	15x6	12-13	Pos	3300	4	E
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	20	20	-	Good	-	G	F	10x5	17	No	2100	2	SE
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	15	16	9	Good	100	G	G	12x6	17	No	1780	4	E

TABLE FIVE
SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	21	22	14	Fair	100	E	E	14x6	16	Pos	1880	1	-
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	13	14	6	Fair	50	G	G	14x6	16	No	1880	4	E
SPECIES: HACKBERRY															
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	12	-	-	Fair	-	G	F	10x5	17	No	2100	2	SE
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	-	-	14	Fair	100	E	E	14x6	16	Pos	1880	1	
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	16	-	9	Fair	70	G	G	14x6	16	No	1880	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	12	-	4	Poor	60	G	G	16x8	16	No	1860	4	E
SPECIES: HONEYLOCUST															
Butte 019-144	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	26	9	-	8	Poor	100	G	P	10x8	15-16	No	2915	2	NW
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	15	-	10	Fair	70	G	G	12x6	17	No	1780	4	E
SPECIES: NANKING CHERRY															
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	5	-	3	Fair	64	G	F	14x-	16	Pos	1920	1	-

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
SPECIES: ROCKY MOUNTAIN JUNIPER AND EASTERN REDCEDAR															
Sully 119-1	Grail silty clay loam Pachic Argiborolls fine, montmorillonitic	15	14	-	13	Good	-	E	E	15x6	16	Pos	1830	1	-
Sully 119-10	Grail silty clay loam Pachic Argiborolls fine, montmorillonitic	17	10	-	10	Good	90	E	E	14x6	16	Pos	1880	1	-
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	6	-	4	Fair	40	G	G	14x6	16	No	1880	4	E
SPECIES: RUSSIAN OLIVE															
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	11	12	11	Fair	76	G	F	11x6	12-13	No	3200	3	SW
Butte 019-140	Vebar fine sandy loam Typic Haploborolls coarse - loamy, mixed	36	14	15	15	Good	70	E	E	-x6	12-13	No	2800	2	S
Butte 019-141	Morton fine sandy loam Typic Argiborolls fine-silty, mixed	35	25	30	20	Good	90	G	G	12x6	12-13	Pos	2800	11	N
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	29	-	20	Good	100	G	F	10x6	12-13	Pos	2900	2	-
Butte 019-143	Morton silt loam Typic Argiborolls fine-silty, mixed	36	10	10	11	Fair	64	G	F	10x6	12-13	No	2900	3	SW
Butte 019-144	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	26	7	7	6	Poor	80	G	P	10x6	15-16	No	2915	2	NW

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	15	14	-	Fair	24	G	F	15x6	12-13	Pos	3300	4	E
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	11	10	10	Fair	20	G	F	15x6	12-13	Pos	3300	4	E
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	14	13	-	Fair	--	G	F	10x5	17	No	2100	2	SE
Sully 119-2	Grail silt loam Pachic Argiborolls fine, montmorillonitic	14	13	16	12	Good	--	G	F	15x7	16	Pos	1800	1	--
Sully 119-8	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	-	-	14	Good	--	E	E	16x7	16	No	1920	1	--
Sully 119-8	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	15	30	15	Fair	--	E	E	--	16	No	1920	1	--
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	10	12	10	Fair	90	G	G	12x4	17	No	1780	4	E
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	11	11	12	Fair	90	G	G	12x4	17	No	1780	4	E
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	10	10	10	Fair	80	G	G	12x4	17	No	1780	4	E
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	21	25	17	Good	--	E	E	14x6	16	Pos	1880	1	--
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	14	16	10	Fair	100	G	G	16x4	16	No	1860	4	E

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	13	16	13	Good	70	G	G	16x6	16	No	1860	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	17	21	10	Fair	80	G	G	16x4	16	No	1860	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	16	20	15	Good	60	G	G	16x6	16	No	1860	4	E
SPECIES: SIBERIAN CRABAPPLE															
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	9	-	6	Fair	50	G	G	16x6	16	No	1860	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	9	-	6	Good	60	G	G	16x6	16	No	1860	4	E
SPECIES: SIBERIAN ELM															
Butte 019-140	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	36	37	34	22	Good	64	E	E	-x6	12-13	No	2800	2	S
Butte 019-141	Morton fine sandy loam Typic Argiborolls fine-silty, mixed	35	26	25	17	Good	24	G	G	-	12-13	Pos	2800	11	N
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	41	-	19	Good	77	G	F	10x6	12-13	Pos	2900	2	-
Butte 019-143	Morton sandy loam Typic Argiborolls fine-silty, mixed	36	28	26	18	Good	92	G	F	10x6	12-13	No	2900	3	SW

TABLE FIVE
SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Precip.	Source Other	Elevation	Slope %	Aspect
Butte 019-144	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	26	27	26	17	Fair	90	G	P	10x8	15-16	No	2915	2	NW
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	30	29	20	Fair	100	G	F	15x6	12-13	Pos	3300	4	E
Dewey 041-1	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	20	20	11	Fair	-	G	F	10x5	11	No	2100	2	SW
Dewey 041-1	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	21	20	10	Fair	-	G	F	10x5	17	No	2100	2	SW
Dewey 041-1	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	20	20	6	Fair	-	G	F	10x5	17	No	2100	2	SW
Dewey 041-1	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	21	20	10	Fair	-	G	F	10x5	17	No	2100	2	SW
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	28	27	-	Good	-	G	F	10x5	17	No	2100	2	SE
Dewey 041-1	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	21	20	10	Fair	-	G	F	10x5	17	No	2100	2	SW
Sully 119-1	Grail silt loam Pachic Argiborolls fine, montmorillonitic	15	31	36	18	Good	-	E	E	15x4	16	Pos	1830	1	-
Sully 119-1	Grail silt loam Pachic Argiborolls fine, montmorillonitic	15	29	31	19	Good	-	E	E	15x4	16	Pos	1830	1	-

TABLE FIVE
SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Sully 119-2	Grail silt loam Pachic Argiborolls fine, montmorillonitic	14	19	22	15	Fair	-	G	F	15x7	16	Pos	1800	1	--
Sully 119-2	Grail silt loam Pachic Argiborolls fine, montmorillonitic	14	21	25	13	Good	-	G	F	15x8	16	Pos	1800	1	--
Sully 119-2	Grail silt loam Pachic Argiborolls fine, montmorillonitic	14	20	22	12	Fair	-	G	F	15x7	16	Pos	1800	1	--
Sully 119-2	Grail silt loam Pachic Argiborolls fine, montmorillonitic	14	-	-	12	Good	-	G	F	15x8	16	Pos	1800	1	--
Sully 119-4	Grail silt loam Pachic Argiborolls fine, montmorillonitic	34	43	-	35	Good	44	G	G	12x8	16	Pos	1800	1	--
Sully 119-4	Grail silt loam Pachic Argiborolls fine, montmorillonitic	34	46	-	31	Good	80	G	G	12x8	16	Pos	1800	1	--
Sully 119-6	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	20	30	17	Good	--	G	F	14x8	16	No	1920	4	E
Sully 119-6	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	20	30	15	-	-	G	F	14x8	16	No	1920	4	E
Sully 119-6	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	20	30	18	Good	-	G	F	14x8	16	No	1920	4	E
Sully 119-6	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	20	30	18	Good	-	G	F	14x8	16	No	1920	4	E
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	-	-	17	Good	92	G	F	14x8	16	Pos	1920	1	-

TABLE FIVE

SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	31	40	20	Good	100	G	F	14x8	16	Pos	1920	1	-
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	26	35	20	Good	100	G	F	14x8	16	Pos	1920	1	
Sully 119-7	Grail silt loam Pachic Argiborolls fine, montmorillonitic	10	31	40	15	Good	92	G	F	14x8	16	Pos	1920	1	-
Sully 119-8	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	21	30	18	Good	-	E	E	16x8	16	No	1920	1	-
Sully 119-8	Williams silt loam Typic Argiborolls fine-loamy, mixed	10	21	30	20	Good	-	E	E	16x8	16	No	1920	1	-
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	22	25	13	Good	80	G	G	12x6	17	No	1780	4	E
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	21	25	13	Good	70	G	G	12x6	17	No	1780	4	E
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	22	25	13	Good	80	G	G	12x6	17	No	1780	4	E
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	20	22	12	Good	90	G	G	12x6	17	No	1780	4	E
SPECIES: SIBERIAN PEASHRUB															
Butte 019-137	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	43	9	9	9	Fair	92	G	F	10x-	12-13	No	3200	3	SW
Butte 019-140	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	36	16	16	15	Good	96	E	E	-x4	12-13	No	2800	2	S

TABLE FIVE
SOUTH DAKOTA DATA--NONIRRIGATED

County and Sample No.	Soil Series Name & Classification	Age	Height (Feet)	Expected 20-year Height Feet	Crown Width Feet	Condition (Vigor)	Percent Alive	Maintenance Past	Maintenance Now	Row Spacings	Moisture Source Precip.	Moisture Source Other	Elevation	Slope %	Aspect
Butte 019-141	Morton fine sandy loam Typic Argiborolls fine-silty, mixed	35	9	9	13	Good	68	G	G	12x4	12-13	Pos	2800	11	N
Butte 019-142	Arnegard loam Pachic Haploborolls fine-loamy, mixed	36	-	-	7	Good	88	G	F	10x3	12-13	Pos	2900	2	-
Butte 019-143	Morton sandy loam Typic Argiborolls fine-silty, mixed	36	12	12	9	Fair	100	G	F	10x3	12-13	No	2900	3	SW
Butte 019-144	Kyle clay loam Ustertic Camborthids very fine, montmorillonitic, mesic	26	8	7	6	Good	80	G	P	10x3	15-16	No	2915	2	NW
Butte 019-146	Morton loam Typic Argiborolls fine-silty, mixed	33	11	10	10	Good	100	G	F	15x3	12-13	Pos	3300	4	E
Dewey 041-2	Vebar fine sandy loam Typic Haploborolls coarse-loamy, mixed	30	8	7	-	Good	-	G	F	10x5	17	No	2100	2	SE
Sully 119-9	Williams silt loam Typic Argiborolls fine-loamy, mixed	15	9	10	6	Good	80	G	G	12x3	17	No	1780	4	E
Sully 119-10	Grail silt loam Pachic Argiborolls fine, montmorillonitic	17	-	-	6	Good	60	E	E	14x3	16	Pos	1880	1	-
Sully 119-11	Williams silt loam Typic Argiborolls fine-loamy, mixed	17	-	-	6	Fair	--	G	G	14x4	16	No	1880	4	E
Sully 119-12	Williams silt loam Typic Argiborolls fine-loamy, mixed	14	8	8	6	Fair	50	G	G	16x3	16	No	1860	4	E

SECTION TWO

TABLE ONE
CROWN WIDTH BY AGE CLASS
NONIRRIGATED SITES

SPECIES	Precip. Zone	0 - 10			11 - 20			21 - 30			31 - 40			40 +		
		Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements
American elm	10-14 15-19				9.66 11.66	8-12 6-18	3 9	15-33 5	12-18 5-5	3 1						
American plum	15-19	6.5	5-8	2	9.0	5-12	5	10	10-10	1						
Box elder	10-14 15-19	7	7-7	1	9.82 14.0	8-11 14-14	3 2	28.5	27-30	2	9.0 9.0	4-13 9-9	5 2	14	14-14	2
Common choke-cherry	10-14	7.50	7-8	2							13.0	13-13	1			
Common lilac	10-14 15-19	6 8	6-6 8-8	1 1	6.83	5-9.5	3									
Cotton-wood	10-14 15-19				22	18-26	2	26.67 9.00	20-34 9-9	3 1						
Dahurian buckthorn	10-14 15-19	10	10-10	1	13	13-13	1	13.5	13-14	2						
Douglas-fir	15-19							9.0	9.0-9.0	1						
Green ash	10-14 15-19	9.20	3.0-15.0	5	12.00 13.38	8-17 6-20	19 16	12.95 11.28	9-19 9-14	21 7	10.59 9.5	7-17 9-10	17 4	11.0 16.0	7-14 10-24	8 4
Hackberry	10-14 15-19				9.0	4-14	3	10.50	10-11	2						

CROWN WIDTH BY AGE CLASS

SPECIES	Precip Zone	0 - 10 Avg.	0 - 10 Range	0 - 10 #Elements	11 - 20 Avg.	11 - 20 Range	11 - 20 #Elements	21 - 30 Avg.	21 - 30 Range	21 - 30 #Elements	31 - 40 Avg.	31 - 40 Range	31 - 40 #Elements	40 + Avg.	40 + Range	40 + #Elements
Nanking cherry	10-14 15-19	6.0	3-9	2				10	10-10	1						
Ponderosa pine	10-14 15-19				11.8 14.00	9-14 10-17	5 3	11.50	10-13	2	9.0	8-11	4			
Rocky Mountain juniper & Eastern red cedar	10-14 15-19	6	6-6	1	12.0 9.25	8-16 4-13	4 4	9.0	9-9	1						
Russian-olive	10-14 15-19	13.5 14.5	11-19 14-15	4 2	14.33 13.88	8-20 10-22	23 17	17.8 10.50	6-29 6-15	11 2	13.6 10	9.5-20 10-10	10 1	11.0 19.0	11-11 19-19	1 1
Siberian elm	10-14 15-19	12.6 17.8	3-18 15-20	5 10	17.75 20.56	12-26 12-28	14 16	20.77 13.4	11-34 6-20	13 10	16.29 26.57	6-22 14-35	7 7 3 3			
Siberian peashrub	10-14 15-19	9.08 6.00	5.0-12 4-8	6 2	11.40 9.89	5.0-16 4-16	21 37	14.42 11.33	8-21 2-20	19 12	11.91 11.00	4-18 2-15	23 5	14.17 19	9-19 19-19	9 1
Spruce	10-14 15-19				7.25 6.5	4-10 3-10	6 4	12.0 14	9-17 14-14	3 1	11.75	7-16	4			
Tatarian honey-suckle	10-14 15-19				10.0	10-10	1	13.0 8.0	13-13 8-8	1 1						

TABLE TWO
HEIGHT BY AGE CLASS
NONIRRIGATED SITES

SPECIES	0 - 10			11 - 20			21 - 30			31 - 40			41 +		
	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements
American elm	10.5	8-11	2	17.82	11-24	12	24.80	17-33	6	3.75	2-5	4			
American plum				8.40	5-10	5	7	7-7	1						
Box Elder	10	10-10	1	8.5	7-10	4	25	25-25	1	12.14	5-33	7	19	15-27	3
Common chokecherry	8	8-8	2				10	8-12	2	10	10-10	1			
Common lilac	8	8-8	1	6.33	5-8	3									
Cottonwood				28.5	26-31	2	49.00	35-65	5				55.5	42-68	4
Dahurian Buckthorn	4	4-4	3	10	10-10	1	10	10-10	2						
Douglas-fir							15	15-15	1						
Green ash	11.20	6-14	5	17.50	13-26	33	19.08	12-32	29	16.06	10-32	24	25.85	13-50	17
Hackberry				12.47	9-16	3	12.67	12-14	3						
Nanking cherry	6	5-7	2				8	8-8	1						
Ponderosa pine				16.88	12-22	8	18.67	16-23	3	18.1	13-27.5	5	39	39-39	1
Rocky Mountain Juniper & Eastern Redcedar				9.94	6-14	9	14	14-14	1						

HEIGHT BY AGE CLASS

SPECIES	0 - 10			11 - 20			21 - 30			31 - 40			41 +		
	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements	Avg.	Range	#Elements
Russian-olive	14.38	10-17	4	14.87	5.7-21	39	15.82	7-24.5	14	18.3	10-29	12	13.3	11-16	3
Siberian elm	21.69	16-31	13	22.93	17-34	30	24.90	15-38	30	29.18	11-46	11			
Siberian peashrub	7.29	5-10	7	9.55	2-14	63	11.77	2-20	31	11.43	7-16	27	11.57	9-14	7
Spruce				9.81	2.5-15	10	23.0	17-29	5	23.9	15-32	5			

TABLE THREE

Information from Soil Conservation Service soil-windbreak species evaluations from within Montana was used to provide data for Table Three. One hundred eighty-eight evaluations of windbreaks occurring on soils representative of defined soil series known to occur in Montana and having received good management were used. Twenty-five trees of a species were measured in each row of a representative section of the windbreak. Each row sample was considered a plot for the purposes of this analysis. No values were reported in the table where the number of plots was less than five.

Condition refers to the overall health of the trees or shrubs in the windbreak. Factors such as leaf or needle color and growth, amounts of dead wood within live crown, evidence of disease, insect and climatic damage, suppression or stagnation, are considered when making ratings. In the analysis the ratings were placed in three groups: good to excellent, fair, poor to very poor. Survival, expressed as a percentage, is a ratio based upon the number of trees still living and the number of planted spaces as determined by the within row spacing.

TABLE THREE
PERFORMANCE OF COMMONLY USED WINDBREAK & SHELTERBELT SPECIES (NONIRRIGATED)

SPECIES	AGE CLASS (years)	CONDITION (% of Class) G-E	F	P-VP	HEIGHT (feet)	SURVIVAL BY CLASS (%)	NO. SAMPLE PLOTS EVALUATED
SIBERIAN PEASHRUB	0 - 10	89	11	0	8	93	8
	10 - 20	79	18	3	10	91	59
	20 - 30	90	10	0	12	92	30
	30 - 40	93	7	0	12	91	21
	40 +	86	14	0	11.5	86	7
BLUE SPRUCE	10 - 20	66	17	17	10	90	6
	20 - 30	100	0	0	18	87	6
GREEN ASH	10 - 20	65	35	0	16.5	98	32
	20 - 30	35	42	23	19	88	25
	30 - 40	58	21	21	16	85	20
	40 +	55	27	18	26	83	11
PONDEROSA PINE	10 - 20	86	14	0	17.5	100	7
ROCKY MOUNTAIN JUNIPER AND EASTERN REDCEDAR	10 - 20	88	12	0	10	87	8
RUSSIAN OLIVE	10 - 20	58	39	3	14.5	84	39
	20 - 30	47	47	6	16	84	15
	30 - 40	45	55	0	16	74	11
SIBERIAN ELM	0 - 10	100	0	0	23	97	10
	10 - 20	81	16	3	23	90	33
	20 - 30	45	45	10	25	84	23
	30 - 40	67	16	17	30	72	12

TABLE FOUR

EXPECTED SPECIES HEIGHT AT 20 YEARS IN RELATION TO PRECIPITATION ZONES

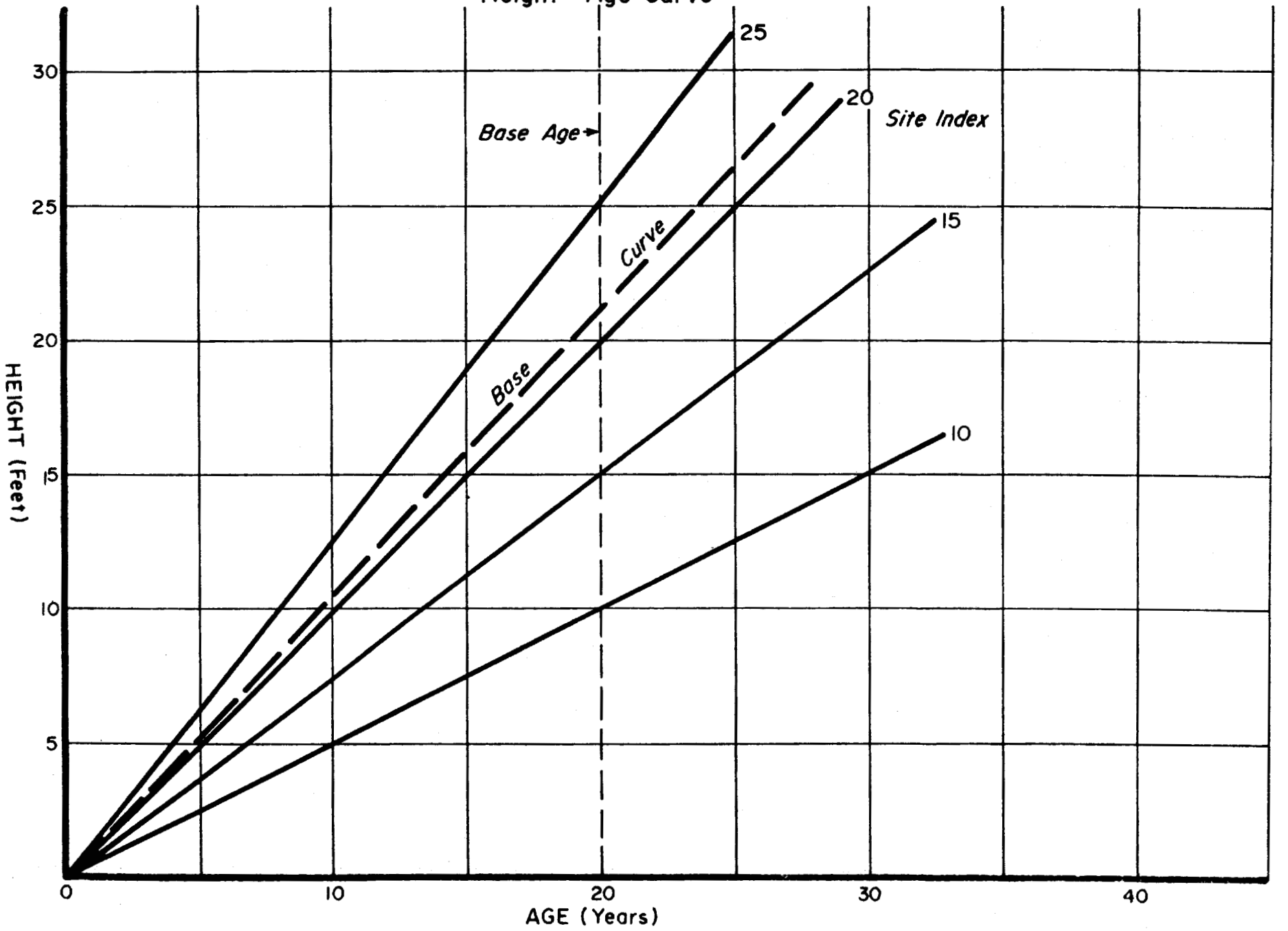
NONIRRIGATED

SPECIES	EXPECTED HEIGHT AT 20 YEARS Precipitation Zone	
	10-15	15-19
AMERICAN ELM	21.5	18.2
BOXELDER	21.5	30.2
COTTONWOOD	45.2	43.5
GREEN ASH	16.4	20.8
PONDEROSA PINE	15.8	17.2
ROCKY MOUNTAIN JUNIPER	11.7	--
RUSSIAN OLIVE	15.9	17.6
SIBERIAN ELM	25.0	26.7
SIBERIAN PEASHRUB	11.22	10.6
BLUE SPRUCE	14.0	15.0

SECTION THREE

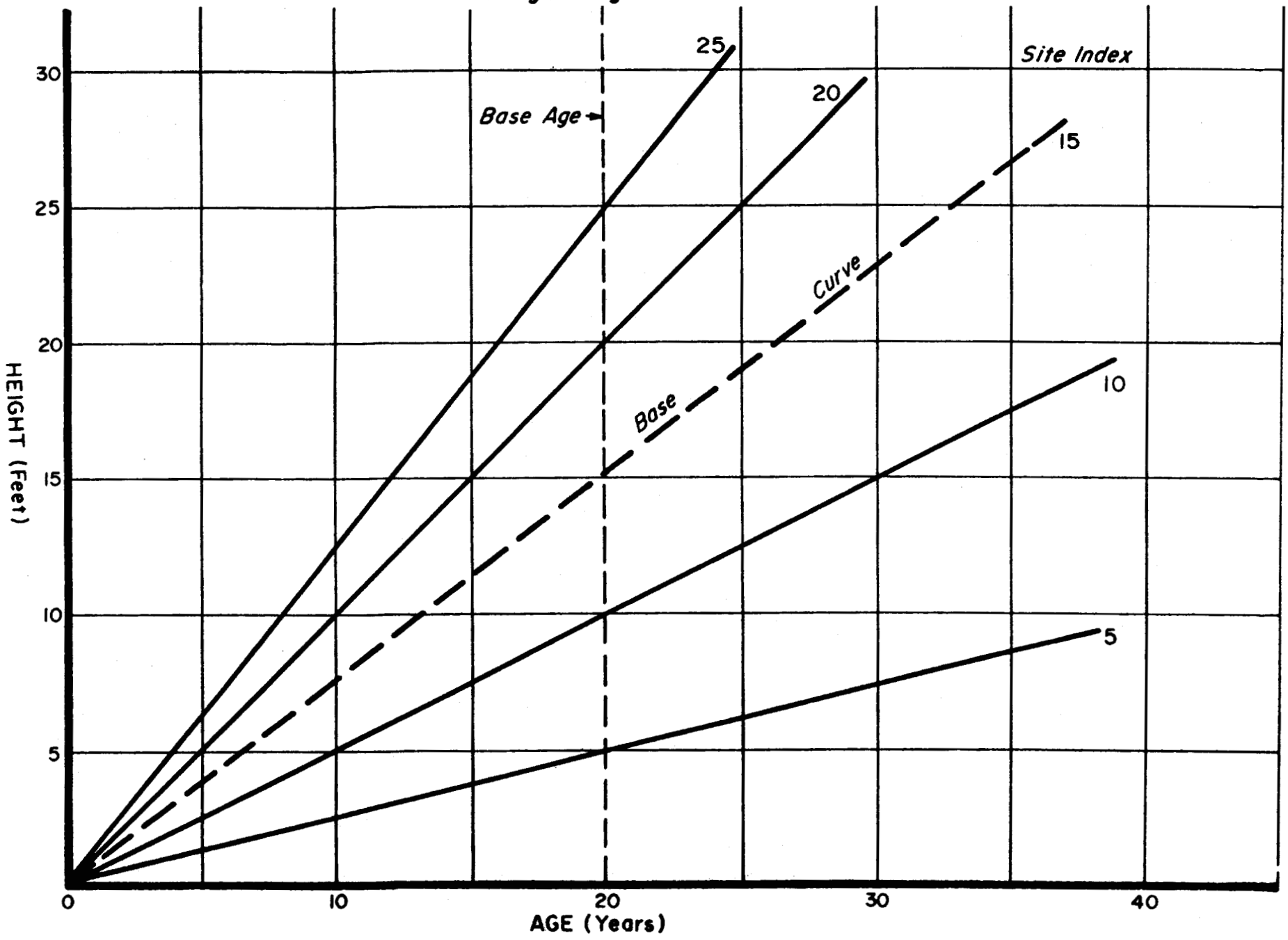
AMERICAN ELM

Height — Age Curve



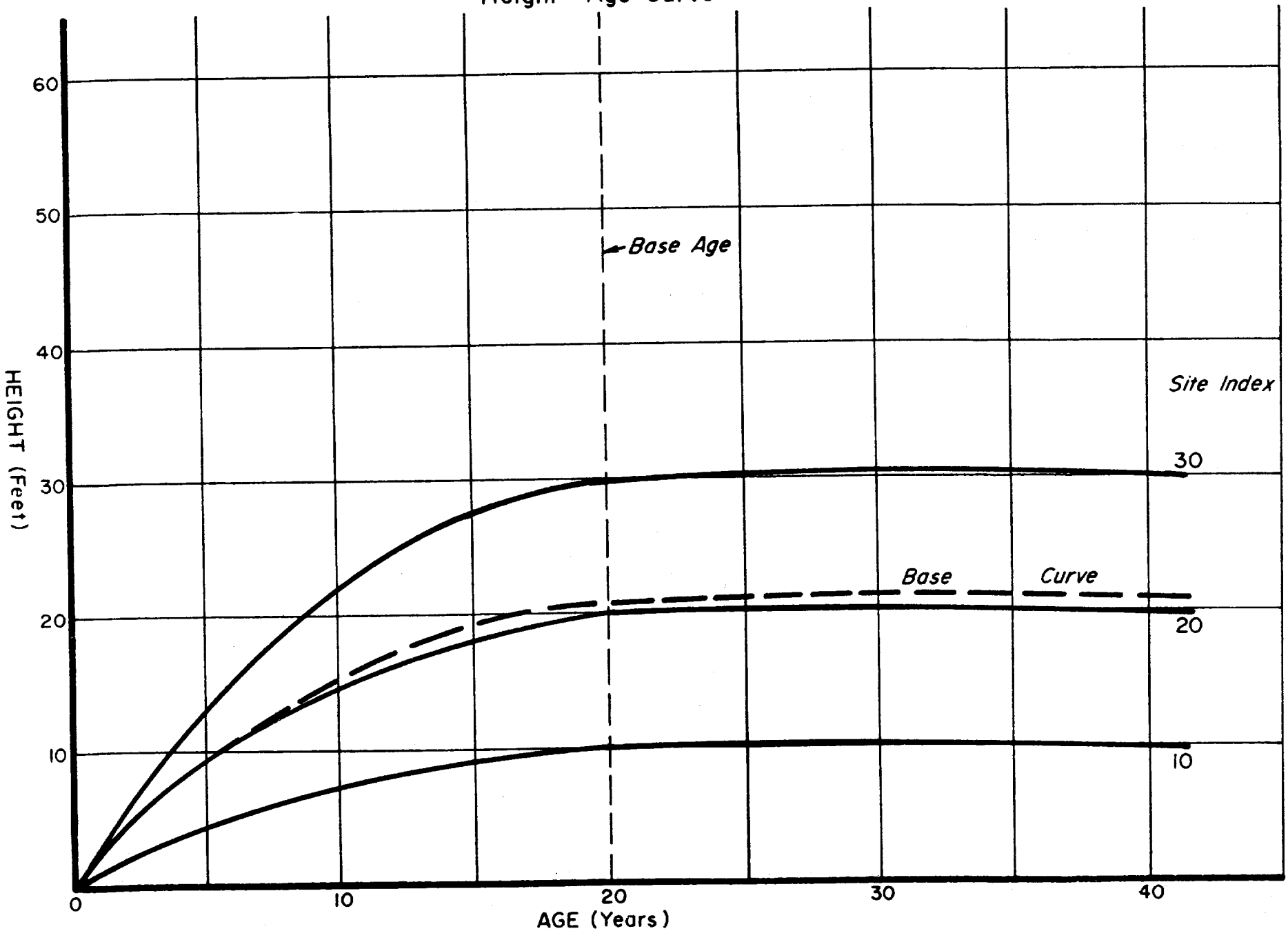
BLUE SPRUCE

Height—Age Curve



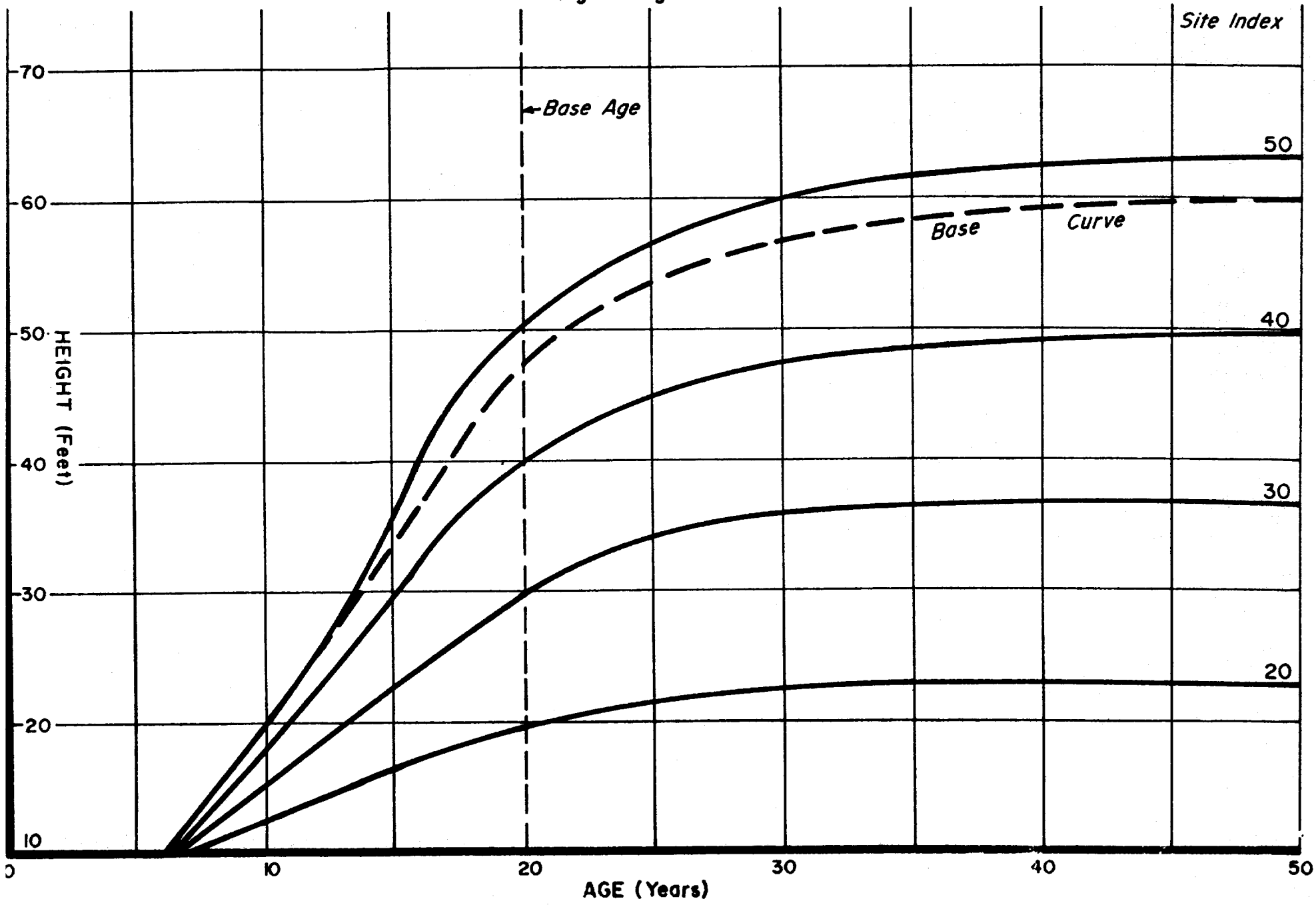
BOX ELDER

Height – Age Curve



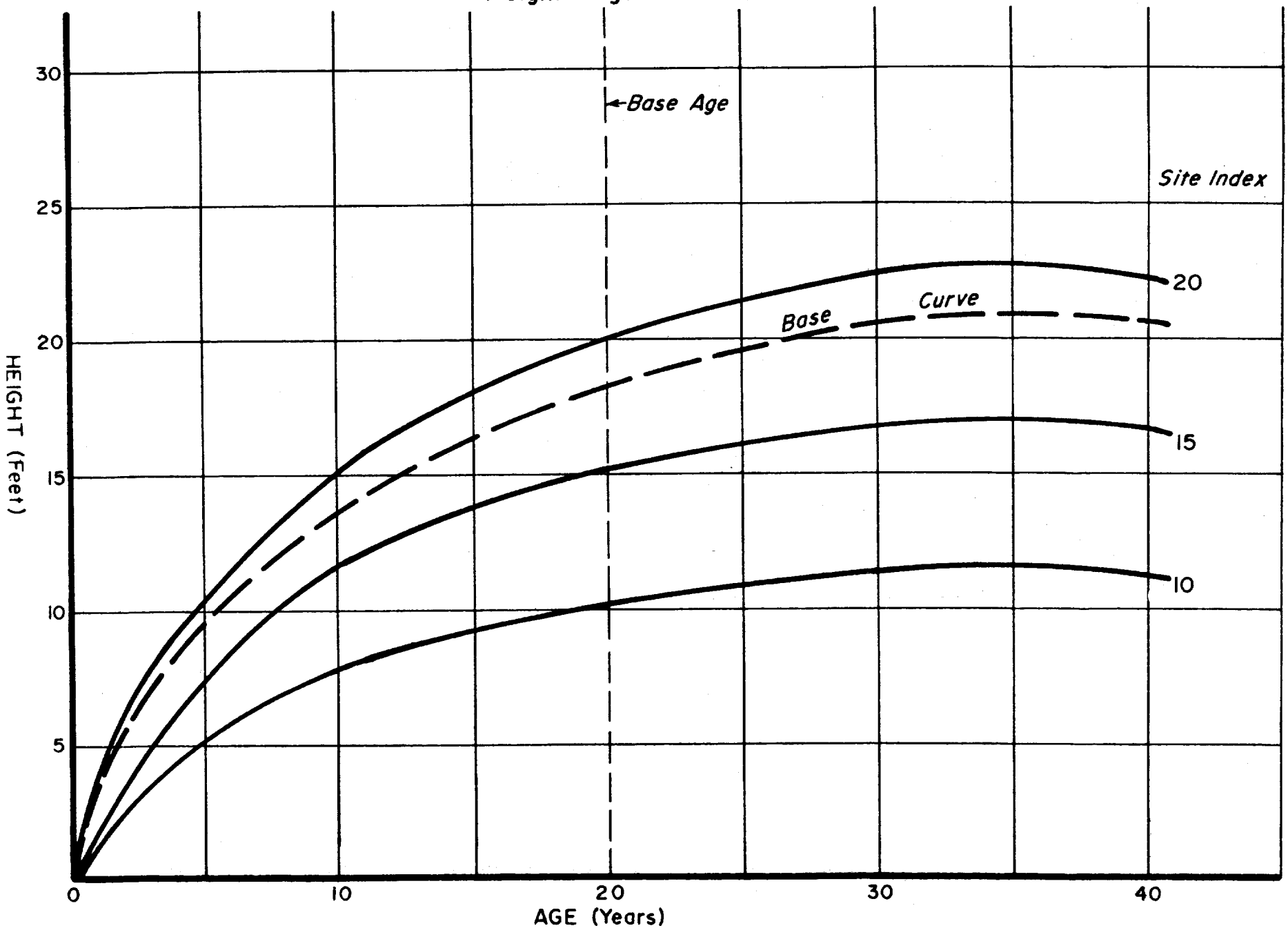
COTTONWOOD

Height—Age Curve



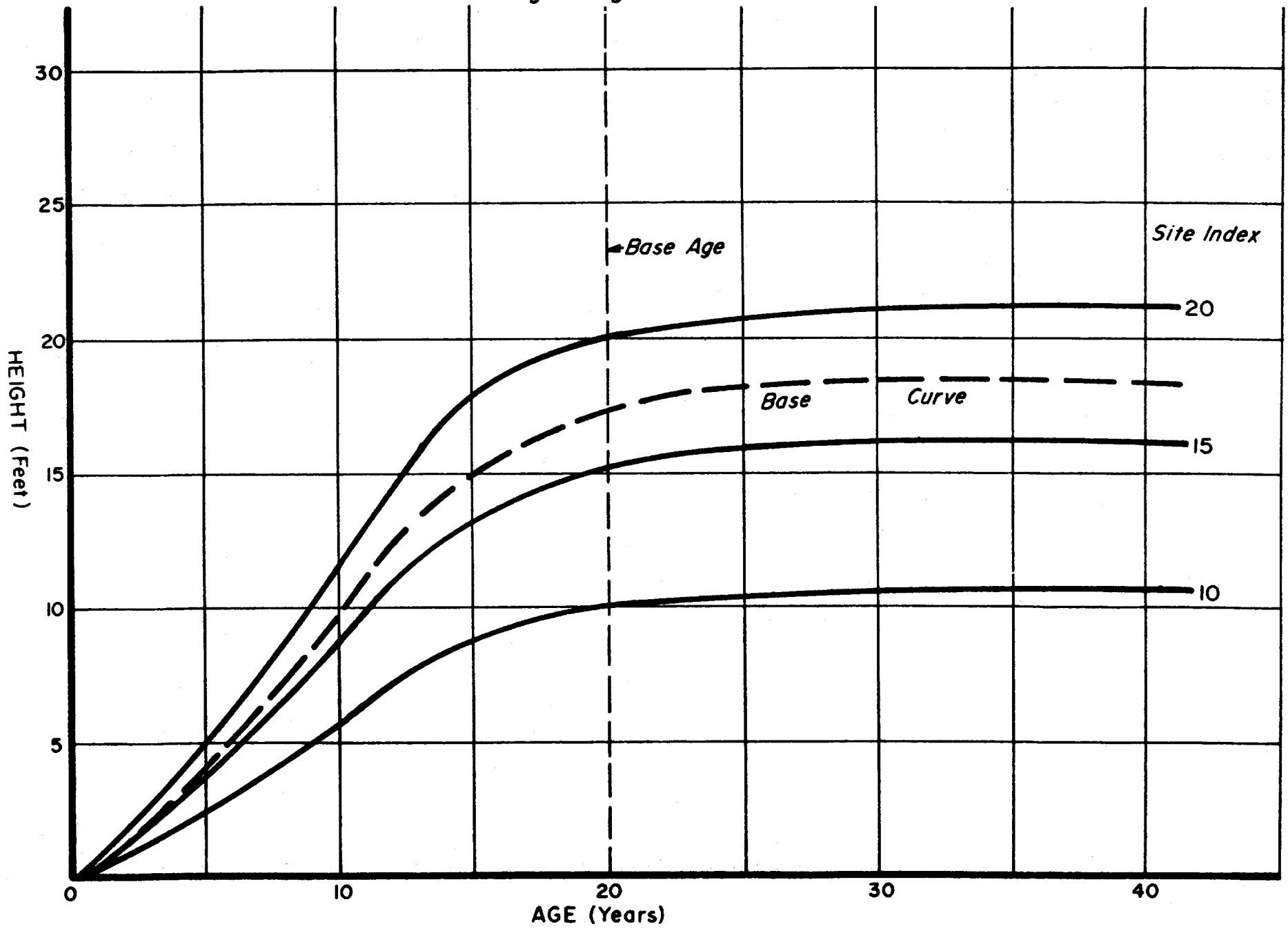
GREEN ASH

Height—Age Curve



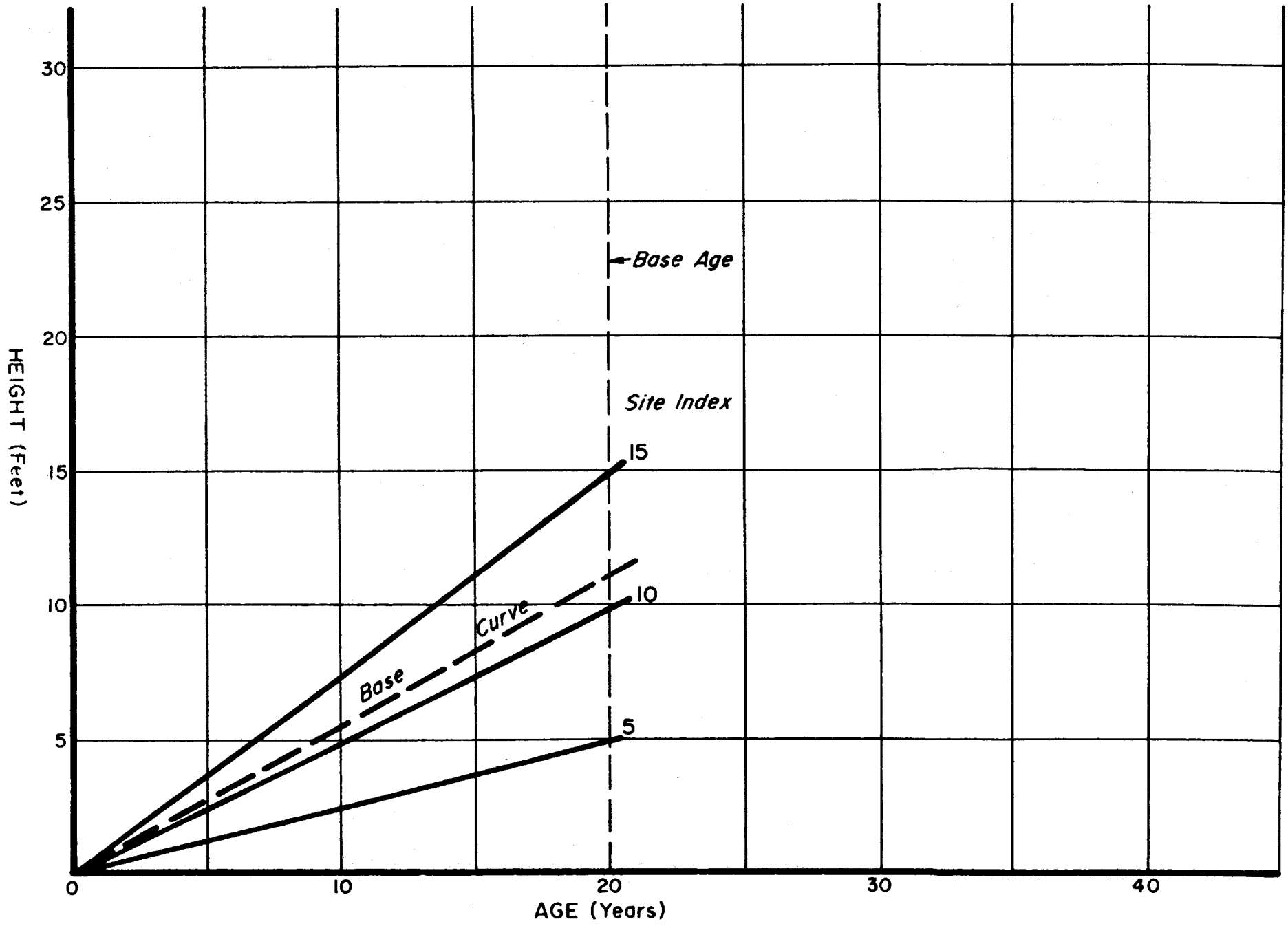
PONDEROSA PINE

Height—Age Curve



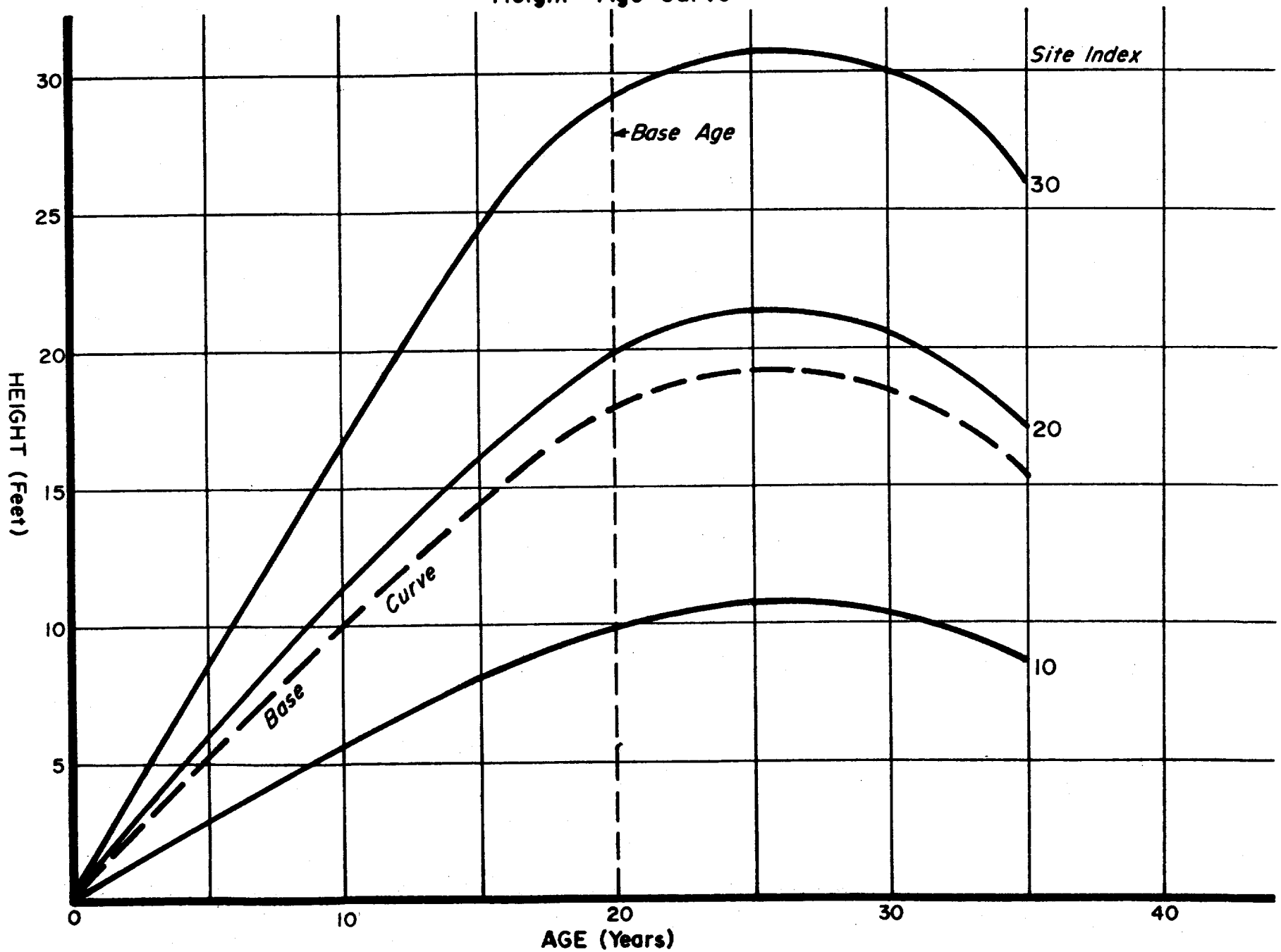
ROCKY MTN. JUNIPER

Height – Age Curve



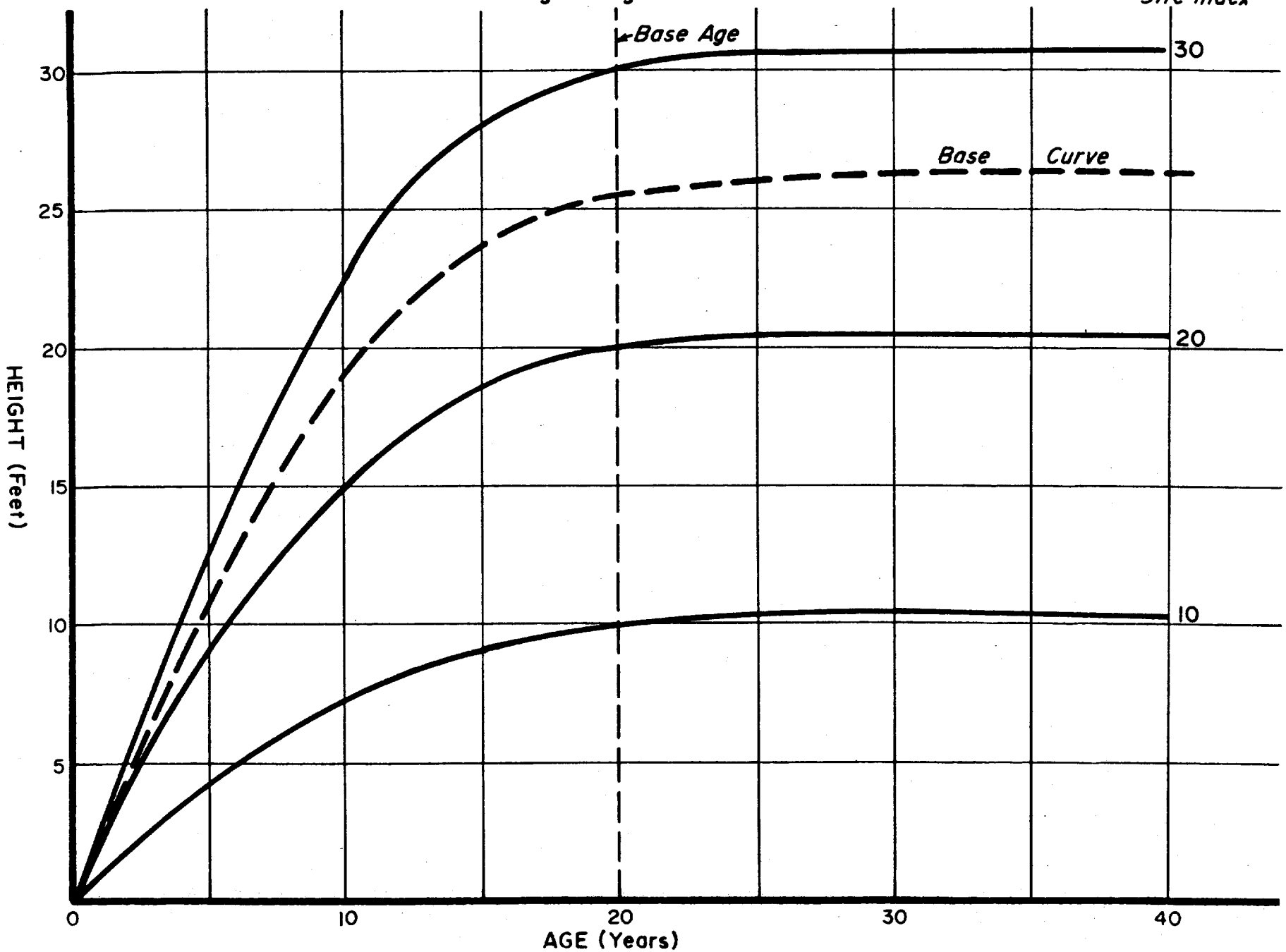
RUSSIAN OLIVE

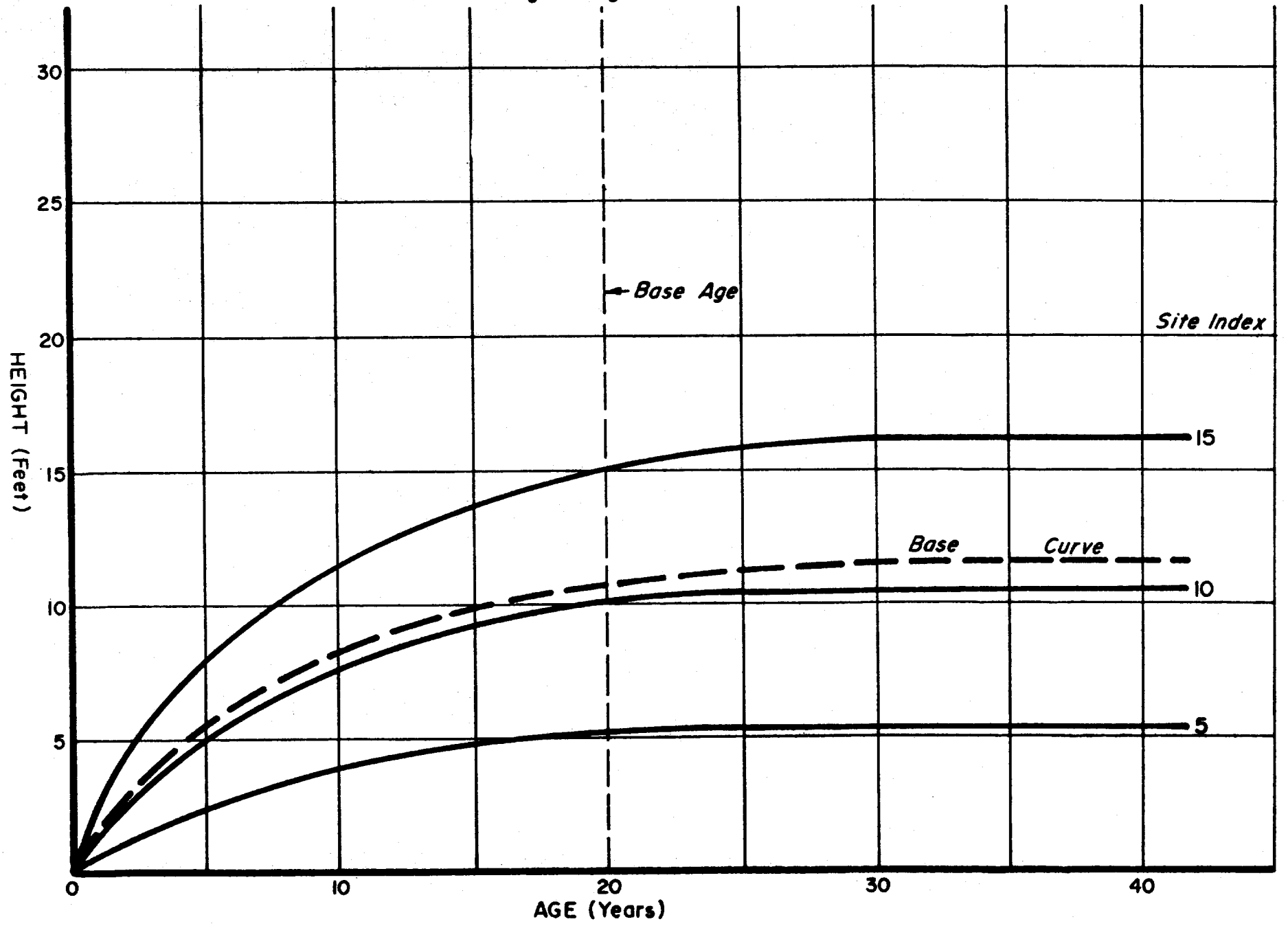
Height—Age Curve



SIBERIAN ELM

Height—Age Curve



SIBERIAN PEASHRUB

Height – Age Curve